LONG TERM TRENDS IN INEQUALITY OF EDUCATIONAL OPPORTUNITY IN ITALY

An analysis using conditional association models with linearly constrained parameters

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Abstract:

This paper is a contribution to the debate on inequality of educational opportunity (IEO) in Italy during the 20th century. In reviewing the existing literature on this topic, we find that the contrasting evidence arrived at by previous research can be partly connected to four methodological factors (type of data, technique of analysis, type of measurement, and the role of gender). We intend to overcome the limitations of previous studies using a large database consisting of studies collected between 1963 and 2008, which covers cohorts of women and men born between 1900 and 1980, with post-harmonized measures of social origin and education. As for the technique of analysis, we propose and apply a new variant of conditional association models with linearly constrained row and column parameters, which we contrast to their standard counterpart (UniDiff and Constant Social Fluidity models). Our results show that the model we propose allows a better insight into the process of reproduction of social inequality along the 20th century in Italy. We find a decrease of IEO over time in both women's and men's case, though more pronounced for women. This general trend couples with two key factors: 1) an upward shift over time in the location of major inequality in the educational system, from the primary-to-lower secondary school transition, to the lower-to-higher secondary school transition; 2) the persistency of the relative inequalities between class origins, despite the decrease of the disadvantage experienced by the agricultural classes. We also show that in women's case these findings are not conditional upon the data set used, while in men's case the downward IEO trend shows up in a clear fashion only in (most of) the more recent surveys among those we analysed

1. Introduction

Differences in access to education by social origin, often referred to as inequality of educational opportunity (IEO in short), has been widely discussed over the last decades. The importance of access to education lies in the fact that it is considered as the major force either behind social mobility, or for ensuring the intergenerational reproduction of social inequalities. Education's variance can be in fact decomposed into two parts, the first being the expression of social origin, the second representing all factors independent from origin. Whether education fosters social reproduction or mobility depends on which of the two components dominates: if the influence of factors relating to social origin is stronger, then social reproduction prevails; if the influence of variables other than social origin overshadows the latter, we observe social mobility.

At the international level, two large-scale research projects have been conducted to examine IEO in a comparative perspective. The first project was carried out by Shavit & Blossfeld (1993), while the second was conducted by Breen (Breen, 2004; Breen et al., 2009). The major finding of the former – which implemented for the first time in a systematic way the sequential logit model proposed by Mare (1980, 1981) concerning educational transitions on comparative data – is that IEO remained stable over the last decades of the 20th century in almost all countries, with the exception of Sweden and the Netherlands. Ten years later, Breen and his contributors showed that IEO has shown signs of a lessened strenght in six out of the eight countries examined, with the exception of Ireland and Italy, where IEO remained stable or showed no clear trend.

In comparative mobility research, the Italian case has been classified long ago as an exception to generally observed patterns as for the strong effect of social origin on both educational and occupational achievement (Lipset & Bendix, 1959). Empirical research shows that Italy is one of the least open countries in Europe (Breen & Luijkx, 2004), and that this feature has not changed during the last 20 years of the 20th century (Pisati & Schizzerotto, 2004). Over this period the Italian educational system seemed to foster social reproduction more than social mobility, as indicated by the decomposition of the association between parental and offspring's occupations. Breen et al. (2009) not only support this conclusion, but also attribute the relatively high level – when compared to those found in the European countries they consider – of intergenerational occupational reproduction to the fact that in Italy education reform policies have not helped in leveling out class disparities. These claims have been confirmed by a number of Italian studies (Schizzerotto, 1988; Cobalti 1990; Cobalti & Schizzerotto, 1993, 1994; Pisati 2002; Barone, 2009; and, to some extent, Checchi et al., 2008), which all support the conclusion of no change of IEO (or of a very limited change) across time.

These conclusions have been questioned by recent empirical research, which found evidence supporting the hypothesis of a weakening of the association between social origin and educational achievement (Ballarino & Schadee, 2006, 2008; Ballarino et al., 2009; Barone et al., 2010; Breen et al. 2010; among the older studies, see Shavit & Westerbeek, 1998).

Interestingly, different studies conducted on the very same data set arrived at different, or even opposite, conclusions. For instance, using the 1985 National Survey on Social Mobility [Barbagli et al., 1985], Pisati (2002) find stability or possibily a slight increase of class differentials over time; by contrast, Shavit & Westerbeek (1998) find a declining influence of class origin on educational achievement in these data. An even more striking example comes from the work of Breen and colleagues (2009, 2010), who use in both instances the data originally prepared for the comparative analyses accounted for in Breen (2004) and conducted by Pisati & Schizzerotto (2004). While Breen et al. (2009) find an unclear pattern over time, Breen et al. (2010) – relying on a smaller subset of cases, see Table 1 – find a clear decrease of IEO for both genders.

On this ground we claim that the contrasting results concerning IEO in Italy may depend not only on the actual change over time of the association between social origin and educational attainment, but also on some methodological factors. We identify four of them, namely: 1) the nature and amount of data used for the analysis; 2) how the crucial variables (origin, education, time) have been measured; 3) what kind of models have been applied; 4) whether the analysis is conducted on men and women separately, or by pooling them together.

As for the first three sources of influence, we will show that some regularities can be found in the results so far attained according to these crucial aspects. As for the fourth methodological concern, we note that men and women have experienced quite different trends in educational expansion over the 20th century in all Western countries, including Italy (see for example Schizzerotto & Barone, 2006); actually women experienced a much greater reduction in IEO than men (Cobalti, 1990; Cobalti & Schizzerotto, 1993; Ganzeboom & Treiman, 1996a; Shavit & Westerbeek, 1998; Barone, 2009). Therefore, as we will claim later, averaging the trends of men and women may have a confounding effect on the overall trend in IEO.

In the following section we will discuss these claims in further detail, while section 3 will present our contribution to the debate. In section 4 we will extensively describe our data basis, while section 5 will present the measurement of the three crucial variables in our analyses (social origin, education and time). In section 6 we will present some descriptive analyses, with the aim of introducing the reader to the features of our extended data basis. In section 7 we present the conditional association model with linearly constrained scores, while section 8 and 9 illustrate the analyses we conducted; finally, in section 10 we summarize our conclusions.

2. IEO studies in Italy thus far

Some regularities can be found in connection with the four methodological issues we raised in the previous section. In order to illustrate our point, we review a total of 17 studies on IEO in Italy conducted by various authors between 1988 and 2010, which we list in Table 1.

[TABLE 1 ABOUT HERE]

2.1. The data used

A large part of the empirical evidence on IEO in Italy comes from the analysis of only one or two data sets of moderate size, that were collected in a relatively short time-span (1985-1997). This could be a too narrow empirical basis for ascertaining the long-term trends in IEO; as Breen and colleagues say, "the rather unclear picture of the trend in inequality in Italy and Ireland may be due to the small sample size in these two cases" (2009:1513). This observation should be evaluated having in mind that in fact many more numerous and pertinent data sets were available, as we will further introduce below.

Roughly speaking, studies on IEO in Italy form two groups depending on whether they use data collected (or made available) before or after the year 2000[1]. The first cluster of studies relies primarily on comparing cohorts in the 1985 National Survey on Social Mobility [Barbagli et al., 1985], the first and – for many years – the only available high quality data source of this kind. Many authors based their analyses on this data set alone (Schizzerotto, 1988; Cobalti, 1990; Cobalti & Schizzerotto, 1993, 1994; Shavit & Westerbeek, 1998). With the exception of the Shavit & Westerbeek's study, the conclusion of these analyses is that there has been no change of IEO in Italy along the 20th century. However, for this first group of studies, the claim of Breen et al. (2009) about the scarcity of Italian data seems to be fully confirmed: not only the analyses rely on just one data set, but also the sample counts no more than 4500 cases.

The second group of studies adds a new data set, namely the first wave of the Italian Longitudinal Household Survey [Schizzerotto, 1997], which was fielded in 1997 but was made available only later (Schizzerotto, 2002); however the data set still counts no more than 12000 cases. The results of the studies which use both data sources become more mixed. On one hand, Pisati (2000) and Breen et al. (2009) claim that the pattern of change is rather unclear, but – if one has to pass final judgement – the most plausible is that Italy experienced no significant decrease of

[1] All reference to data sets, their producers and distributors is given in the References section. In the text, reference to data sources is given in square brackets.

IEO. By contrast, Ballarino & Schadee (2006, 2008, 2010), Ballarino et al. (2009) and Breen et al. (2010) conclude that some decrease in the strength of the association between class origin and the achieved educational level actually has taken place, though this is primarily true – as other authors found (Cobalti & Schizzerotto, 1994; Barone, 2009) – for agricultural classes, as well as for manual workers.

There are some exceptions to this general pattern. Among the first group of studies, the article by Ganzeboom & Treiman (1996a) takes into account the 1985 survey together with five earlier surveys that where available at that time through the Inter-university Consortium for Political and Social Research of the University of Michigan (ICPSR). Although using all available data at that time, these authors work on a pooled data set of about 9000 cases; they find no change in IEO for men, and even an increase in the case of women.

Among the more recent studies, an exception is the paper by Barone (2009), which relies on the Istat Omnibus (*Multiscopo*) survey, collected in 1998 by the Italian National Institute of Statistics (Istat); Barone et al. (2010) add to this the 2003 release of the same survey. The conclusion of the former study parallels those of the first group of studies in finding that IEO remained constant over time, with the exception of the agricultural classes. However Barone et al. (2010) find a decrease of IEO for all classes alike, except for the middle classes, which nonetheless have been always very similar in terms of IEO to the burgeoisie.

Finally we mention the analyses conducted by economists on a different and ample data set, namely the Survey on Household Income and Wealth (SHIW) [Bank of Italy 1993-2004], collected every two years since 1993 by the Bank of Italy, which combines a cross-section and a panel design. Checchi et al. (2008) use the data set resulting from pooling the surveys from 1993 to 2004; their findings are conditional upon the technique they use (see Table 1).

2.2. Measurement and models used

Studies on IEO in Italy are highly variable in both measurement and type of models used[2]. Again, some regularity can be singled out (Table 1). As for the technique of analysis, studies that use log-linear or logit modelling generally come to the conclusion of no change, or find an unclear pattern at best (Schizzerotto, 1988; Cobalti 1990; Cobalti & Schizzerotto, 1993, 1994; Pisati, 2000; Breen et al., 2009). However Barone (2009), using UniDiff models, finds a decrease of IEO over time, as do Barone et al. (2010) using logistic regression.

Studies which use variants of the standard loglinear model (cumulative logit models, ordered probit models and the like) find evidence of some decrease of IEO over time at all levels of

[2] Sampling design would also be a pertinent issue here; however we are not addressing directly this topic in this paper.

education, and particularly for the agricultural classes (Shavit & Westerbeek, 1998; Ballarino & Schadee, 2006, 2008, 2010; Checchi et al., 2008; Ballarino et al., 2009; Breen et al. 2010). On the other side, studies that use OLS regression models and a continuous representation of variables find some (albeit) limited increase of the influence of social origin over educational achievement (Cobalti & Schizzerotto, 1993; Ganzeboom & Treiman, 1996a;). The study by Checchi et al. (2008) does not conform to this pattern, since they find a reduction of IEO, especially when mother's education is used as an indicator of social origin.

Turning to measurement issues, we consider the three core variables involved in studying IEO changes over time, namely education, social origin and time.

Respondent's education. Education has been coded both in a categorical and continuous fashion. Some studies among those we reviewed express education as years-equivalent (Cobalti & Schizzerotto, 1993; Ganzeboom & Treiman, 1996a; Checchi et al., 2008; Barone 2009), thus recoding the highest degree attained into the (average) number of years that it takes to achieve each degree (typically, 5 years for primary school, 8 years for lower secondary school, 13 years for higher secondary school and 18 years for tertiary education)[3]. Many other studies use a categorical version consisting of four levels, corresponding to the four main degrees issued by the Italian educational system: primary school (*scuola elementare*), lower secondary school (*scuola media inferiore*), higher secondary school (*scuola media superiore*), tertiary education (*laurea* and *post-laurea*).

Contrary to our hypothesis, according to which differences in measurement may lead to contrasting results, findings concerning IEO do not follow a clear pattern as to how they express respondent's education; however, it must be noted that two studies conducted in the same period, both measuring education on a continuous scale, found a slight increase of the IEO (Cobalti & Schizzerotto, 1993; Ganzeboom & Treiman, 1996a).

Social origin. A first difference as for the measurement of social origin concerns the use of categorical versus continuous variables; as in the case of education, this has obvious consequences for the technique of analysis that can be used. Studies which apply regression models use two different measures. One is the ISEI (Ganzeboom & Treiman, 1996b), as in the study by Ganzeboom & Treiman (1996a), while the second is the Italian social desirability scale (de Lillo & Schizzerotto, 1985), as in the study of Cobalti & Schizzerotto (1993) and Shavit & Westerbeek (1998). On the other side, when conducted with categorical variables, most studies use either the EGP class scheme

[3] See Cobalti and Schizzerotto (1993) for an overview of the Italian educational system.

(Erikson, Goldthorpe, & Portocarero 1978; Goldthorpe, 2007) or its Italian version (Cobalti & Schizzerotto, 1994).

A further methodological concern when measuring social origin is whether to use only father's or also mother's occupation, the first being the most frequent choice. The usual claim for relying only on father's occupation is that mothers often do not have a paid job; this is particularly true in Italy, where women's employment rate is still below 50%. Using also mother's occupation as an indicator of social origin would then mean discarding a substantial part of the available data. However mother's occupation has proven to be relevant in the transmission of social position in Italy (Meraviglia & Ganzeboom, 2008; Meraviglia, 2013). On empirical grounds, Italian researchers mostly used a dominance approach (see again Table 1), while Ganzeboom & Treiman (1996a) use mother's ISEI only in case father's score was not available.

Another option that has been chosen by researchers is to use both parental education and occupation as indicators of social origin, as Shavit & Westerbeek (1998) do. Some studies follow these authors (Cobalti & Schizzerotto, 1993; Ballarino & Schadee, 2008; Barone, 2009; Barone et al., 2010), while Checchi et al. (2008) use father's and mother's education. Barone (2009) and Barone et al. (2010) conclude that the results in terms of IEO are the same whether social origin is measured by parents' occupation or education, while previous research found a significant downward trend in the association between father's and offspring's education, but not so between the latter and father's occupation (Shavit & Westerbeek, 1998). Similarly, Ballarino & Schadee (2008) showed that, when both parental education and occupation are considered, the former maintains its influence on the educational attainment of offspring, while class origin loses part of its importance.

As in the case of parents' occupation, the variable referring to their education has been built either according to a dominance principle (Ballarino & Schadee, 2008; Barone, 2009), or using only father's education (Shavit & Westerbeek, 1998), or considering father's and mother's education both separately and jointly (Shavit & Westerbeek, 1998; Checchi et al., 2008). Checchi et al. (2008) finds that the educational achievement of the offspring is not substantially influenced by how the parental education is measured, while Checchi (2003) shows that mother's education is crucial in determining whether respondents enrol in both secondary and tertiary education (however in this study IEO is not considered over time).

Time. The last key variable we consider in this literature review is time, which has also been expressed in a highly variable way by different researchers. As it can be seen in Table 1, birth cohorts have been often used, while a few studies used continuous birth years (Ganzeboom &

Treiman, 1996a; Shavit & Westerbeek, 1998), while Ballarino & Schadee (2006, 2008) used birth cohorts together with a multiplicative time specification.

Birth cohorts show different width in different studies. Schizzerotto & Schadee (1987) use only two age groups covering the time span from 1920 to 1967, each of them comprising about 20 years. In other studies, birth cohorts have an even spacing of 13 years (Cobalti, 1990; Cobalti & Schizzerotto, 1993, 1994), while Shavit & Westerbeek (1998) use paired years of birth from 1930 to 1959. The most recent studies which include the 1997 survey adopt 10-years wide birth cohorts, albeit with different starting years. Breen et al. (2009, 2010) have 10 years wide cohorts (with the exception in the former study of the first one, which is 20 years wide), while Checchi et al. (2008) use 5-years wide cohorts.

Apart from this variety, and notwithstanding the fact that the great majority of the analyses have been conducted on the very same two data sets, many studies use different sub-samples drawn from the original data, which results in different time windows. Then the starting year ranges from 1900 (Pisati, 2000) to 1930 (Shavit & Westerbeek, 1998), while the ending point goes from 1959 (Shavit & Westerbeek, 1998) to 1981 (Barone et al., 2010).

In concluding this review, we note that a comparison between results of different studies which use different (and sometimes very different) specifications for the three crucial variables (education, social origin and time) may not be straightforward. Actually, each study represents a sort of unique combination of data, technique of analysis and specification of the core variables, that casts some doubts on the possibility of a plain and meaningful comparison of the results achieved.

2.3. Pooling vs separating women and men

We now wish to introduce the last methodological issue possibly influencing the results produced by empirical research on IEO in Italy, i.e. whether and how gender is included in the analysis. This variable has not often been considered; actually, in the very first available data set on Italy [Lopreato, 1963], women were not even included in the sample. Most of the studies we reviewed use a sample resulting from pooling women and men together, without conducting separate analyses for the two genders. In some other cases, gender has the role of a control variable (Shavit & Westerbeek, 1998; Checchi et al., 2008; Barone et al., 2010), while a few studies run separate analyses for women and men (Cobalti, 1990; Cobalti & Schizzerotto, 1993; Ganzeboom & Treiman, 1996a; Barone, 2009; Breen et al. 2010). As for results, some studies (Ganzeboom & Treiman, 1996a; Breen et al. 2010) find a different trend for men and women, while others (eg.

Cobalti, 1990) find a systematic distance between men and women as for the odds of making each of the three transitions considered (primary-lower secondary, lower-higher secondary, lower secondary-tertiary), but no variation according to gender in the overall IEO trend.

In our view, considering men and women together may be one of the confounding factors producing the reported "no change" or "unclear pattern" result: given the clear educational disadvantage of women in the first half of the 20th century (Schizzerotto & Barone, 2006), we anticipate that conclusions concerning IEO may be very different for the two genders, with women showing a clear downward trend, and men showing a much less pronounced decline of IEO, if any. Pooling women and men together may be misleading because it equals to averaging the association between social origin and educational attainment over the two genders and over time, thus concealing some of the relevant (downward) variations we are seeking for.

3. Our contribution to the debate

By reviewing the research literature about IEO in Italy under the light of the methodological issues outlined in the previous section, we intended to make clear the general frame in which our own study takes place – a frame of contradictory evidence coming from many studies that vary in several relevant aspects. Our contribution addresses the four issues discussed in this context, namely the amount and coverage of the data, the quality of measures used, the technique of analysis and the distinction between women and men.

As for the data basis used, our contribution consists in presenting an analysis of 20 datasets (five of which are panel continuations, see below) collected between 1963 and 2008, thus reaching a total of almost 50000 valid cases, covering cohorts born between 1899 and 1984. Our dataset encompasses the data sources used by previous research, as well as a number of data sets that have not been used yet in any other analysis on IEO in Italy. We thus intend to create a more powerful and conclusive data basis, while overcoming the problems of statistical power faced by a good number of previous studies on the topic.

As for the technique of analysis, we apply a class of log-linear models, namely conditional association models (Goodman, 1979; Clogg, 1982; Hauser, 1984), that bridges the distinctions between loglinear, sequential logit, ordinal logit and OLS regression models. These models offer a parsimonious and powerful test of the IEO trend over time, and allow to locate exactly where and when changes in the pattern of IEO have occurred, both with respect to social background and educational transitions. Furthermore, we extend the standard conditional association model by linearly constraining its heterogeneous row and column parameters, so to have a more parsimonious

model which still allows an insightful interpretation. Wong (1995, 2010) shows that specific constraints (either linear or nonlinear) can be placed on the overall trend parameter; we extend this feature to both row and column parameters. In order to assess possible advantages of our models for the analysis of IEO trends, our results will be compared against those obtained by an equally parsimonious but less insightful model, i.e. the log-multiplicative layer or UniDiff model (Erikson & Goldthorpe, 1992; Xie, 1992), as well as by the Constant Social Fluidity model (Hout, 1983).

The third issue, i.e. data quality, is related to the first one. The usual claim for using only two surveys (the 1985 and 1997 ones) has been that these are high quality data sets, with comparable (though different) sampling frames and measurement procedures (Pisati & Schizzerotto, 2004; Ballarino & Schadee, 2006), while data coming from other sources have been said to be of a lower quality (Pisati, 2000). In order to put these claims to an empirical test, and in line with the work of Breen et al. (2009; 2010), we run a separate set of analyses intended to ascertain whether any survey characteristics affect the origin-education association.

Relying upon our extended data base and on our elaboration of the conditional association model, the aim of the research reported here is to find a more conclusive assessment of the general trend in IEO in the Italian context for women and men. In particular our intent is to clarify: 1) what has been the general trend of IEO in Italy over the 20th century for women and men separately; 2) whether there have been any historical changes in this trend for the two genders, with respect to which social backgrounds and where in the educational system have such changes possibly occurred; 3), whether and how our findings depend upon the technique of analysis we apply; 4) whether and how our conclusions critically depend upon the magnitude, nature and quality of the data used.

4. Data

The best known among the data sources that form our data basis (Table 2), at both national and international level, are the 1985 survey on Social Mobility in Italy [Barbagli et al., 1985], and the (first wave of the) Italian Longitudinal Household Survey (ILFI) fielded in 1997 [Schizzerotto 1997]. As we already noted, a great part of the conclusions drawn by previous authors on IEO in Italy rely exclusively on these two datasets. Pisati & Schizzerotto (2004) have made strong claims about the comparability of these two data sources, although their sampling frames and measurement procedures differ considerably. However the two surveys are quite close in time, which is sub-optimal for assessing historical trends.

[TABLE 2 ABOUT HERE]

For these reasons we take into account many more data sources, covering most of the data used in previous research. Some of our older datasets have been available since a long time, but only a few of them have been included into published analyses on social stratification and IEO in Italy, while others have become available more recently. These surveys may have a variable quality and make use of different measures of the key concepts; however, by going back to the original data, we have been able to harmonize them to a satisfactory extent. Moreover, as announced, we test the influence of survey characteristics on our results; as we will show, relying on a small, highly comparable database does not lead to more reliable results than having a larger database, as heterogeneous as it may be. This parallels the conclusion that Breen et al. reach, when they say that "the effect of having a larger sample is not merely that it makes null hypotheses easier to reject, but also that it yields parameter estimates closer to their true value" and that "our use of multiple surveys … led to our estimates having less bias" (2009: 1514-5).

Our oldest data source dates back to 1963 [Lopreato, 1963] and was presented by Lopreato (1965). It has previously been used by Ganzeboom, Luijkx, & Treiman (1989), Ganzeboom and Treiman (1996a) and Pisati (2000). This is the only survey in our set that does not include women, since the sample refers to male heads of households. The measurement of education is detailed, but the distribution contains somewhat unexpected characteristics, like about 24% interviewees with incomplete or no primary education.

The 1968 and 1972 data come from the Italian Mass Election Survey [Barnes, 1968; Barnes & Sani, 1972], while the 1975 data [Barnes & Kaase, 1975] have been collected in the context of the Political Action project (Barnes & Kaase, 1979). The 1968 and 1972 surveys were (cluster) sampled from voter lists and are therefore samples of individuals; as for the 1975 survey, the available documentation does not clearly state the nature of the sample. The latter data set is the first Italian survey to use detailed occupation codes (ISCO-68) for fathers and respondents, while in the 1968 and 1972 a cruder (but still informative) classification was used.

As we said, the 1985 survey [Barbagli et al., 1985] was carried out under the direction of researchers belonging to three Italian universities (Trento, Bologna and Trieste) and has been used extensively by mobility scholars, both for describing the Italian social mobility patterns (Cobalti, 1990; Cobalti & Schizzerotto, 1993, 1994; Shavit & Westerbeek, 1998; Pisati & Schizzerotto, 2004), and for international comparisons (Breen & Luijkx, 2004; Breen et al., 2009, 2010). The sample is a three-stage stratified one; individuals were sampled from electoral registers in the selected municipalities (Pisati & Schizzerotto, 2004). Occupations are measured in the 93 categories

classification of the 1985 Italian scale of social desirability of occupations (de Lillo & Schizzerotto, 1985), which is quite conformable with ISCO-88.

The following two surveys come from the Social Inequality modules of the International Social Survey Programme [ISSP 1987, 1992]. According to information supplied by the ISSP, the 1987 survey has a random sample with quotas, while the 1992 survey has a random route sampling frame. The educational classification in the two ISSP files are among the most detailed ones in our collection. As for occupation, both surveys use a crude classification to code father's job; however the main distinctions available in other files – such as between small and large proprietors, farm and manual workers and between semi-skilled and skilled workers – are still traceable. Earlier research on the ISSP 1987 (Ganzeboom, 2005) has shown that the crude occupational classification used is this study is in some respects superior to more detailed classifications coded from open-ended questions.

A significant part of our data derives from the Bank of Italy Survey on Household Income and Wealth (SHIW), collected since 1993 at approximately two years time intervals [Bank of Italy, 1993-2004]. The SHIW series stands out in our set for several reasons. First, data are collected on full households; we extracted all possible intergenerational relationships (head of household or spouse and children; head of household or spouse and co-resident parents), and pooled them for our analysis. Since these multiple observations are not independent from one another; we have estimated an overall efficiency weight[4]. Second, the SHIW data has a refreshing panel design, which implies that most household members occur in the data more than once, be it at different stages of their life course. We adjusted this by weighing the duplicated individuals inversely to the number of times they occur in the data. Third and finally, the SHIW data come with a household post-stratification weight, which reflects the inclusion probabilities of the original sampling design. In sum, the weight used for the SHIW data was constructed as efficiency weight × replication weight × post-stratification weight. In total the SHIW data deliver over 104000 unweighted observations on parents-offspring dyads. After reweighing and selection, this becomes over 21000 cases, still over a 40% of the total number of cases in the remainder of our data.

The SHIW data are fairly consistent in the measures used, with only minor modifications over the years. Education is measured in a detailed fashion; however, with respect to parental occupation, the SHIW data only provide crude measurement compared to the distinctions available in some of the other surveys. For this reason, in reconstructing the occupational information we

[4] We calculated a design efficiency weight by estimating a basic status attainment equation (education regressed upon parental educations and occupation) using Stata's cluster correction, and the household identification number as the cluster indicator. The DEFF weight adjusts the overall N in such a way that the standard errors are close to the ones estimated with the cluster correction in Stata. For the SHIW data, the efficiency correction weight is 0.45, due to the fact that the same household sometimes provides information for two couples of parents-offspring, as we just said.

combined the questions on occupational level with that on industry, and mapped it as closely as possible into ISCO-68 and ISCO-88. While the SHIW data do not allow to distinguish between skilled and semi- or unskilled manual workers, on the other hand they do allow for clear distinction between farmers and farm workers, and between self-employed and salaried workers.

The Italian Longitudinal Household Survey (ILFI) [Schizzerotto, 1997] covers Italian women and men aged 18 or more, fielding a biannual survey from 1997 to 2005. We use the data from the first wave, since the panel is not augmented with fresh cases at subsequent waves and the core variables of our analysis (father's occupation and respondent's education) hardly change over the life course. The sampled unit is again the household, not the individual; it is worth noting that this differs from the 1985 survey, to which it has often been merged in previous research. The strict comparability with the 1985 data also breaks down with respect to measurement, as occupations are classified with much more detail in 1997, when they are recorded in the four-digit ISCO-88. Like in the case of the SHIW, we take account of the household nature of these data by developing an efficiency weight[5]. The procedure is more straightforward here, since we have no duplication of cases; the final weighting of these data then take the form of the original post-stratification weight × efficiency weight.

The second survey fielded in 1998 (the first being part of the SHIW collection) comes from the International Adult Literacy Survey (IALS) [Statistics Canada & OECD, 1998]. The Italian sample is drawn from the phone directory; it has a two-stages design in larger cities, and a three-stage design in the rest of the country. The occupational measurement is rather crude, combining one-digit ISCO-88 with an industry code, which was used to generate more detail in the ISCO-88 code itself.

Two datasets come from the first two rounds of the European Social Survey [ESS, 2002, 2004]. The ESS is a centrally monitored Europe-wide survey with strong enforcement of all aspects of the research design. The ESS questionnaire has an open-ended question on parents' occupation, though not coded; we obtained the original answers from the Italian ESS research team, and we ourselves coded them into ISCO-88 occupational titles at 4-digit level.

The first 2005 survey was carried out by the Osservatorio del Nord Ovest (North-Western Observatory), a research institute of the University of Turin [Ricolfi, 2005]. The original sample is a two-stage stratified one drawn from the phone directory, and refers to individuals. Measurement of father's occupation is rather crude, but conformable to the distinctions made in other data sources with a similar detail of measurement. The second 2005 data set comes from the project on

[5] We used the same procedure described in note 5, in order to account both for multiple parent-offspring dyads in the same household, as well as for the fact that we considered the head of household and his/her parents as separated cases, and the spouse and his/her parents too. This amounts to a correction weight of 0.80.

Occupational Prestige in Italy carried out by five Italian academic institutions (Universities of Eastern Piedmont, Milan, Milan Bicocca, Trento and Naples) [Meraviglia, 2005] with the aim of updating the 1985 Italian occupational prestige scale (Meraviglia, 2012). Open-ended questions on respondents' and their parents' occupation are modelled on the 1985 National Mobility Survey and the ILFI study; the job descriptions were coded by ourselves into the 4-digit ISCO-88 classification. The sampling scheme of this survey is a three-stage stratified one; cases have been drawn from electoral registers and include women and men aged 25-65. However the sample is not targeted at the general population, since respondents should be working at the time of the interview, or should have retired or quitted their job since no longer than five years before the survey took place.

The 2008 survey comes again from the ISSP [2008]. The sample is a four-stage stratified one, drawn from electoral registers and representative of the national population by gender, age and region of residence. Respondents' occupation is routinely collected by the ISSP surveys in a detailed fashion; mother's and father's occupation were also collected in 2008 using the same open-ended question format; again, we ourselves coded all information on occupations into ISCO-88 4-digit codes.

The actual cases in our analyses have been selected with respect to working age (25-64), availability of information on education, and father's occupation (Table 3).

[TABLE 3 ABOUT HERE]

Our weighted sample is formed by 24450 men and 23406 women aged 25-64 years; the oldest birth cohort includes respondents born between 1899 and 1910, while the youngest is formed by people born between 1971 and 1984. Fig. 1 illustrates how the different birth cohorts are distributed by study; it is important to note that all cohorts are drawn from multiple surveys. Even the oldest cohort, born between 1899 and 1910, is covered by three independent studies, so that some averaging of variations brought in by sampling design and measurement procedures will occur.

[FIG. 1 ABOUT HERE]

[TABLES 4a AND 4b ABOUT HERE]

5. Measurement

In our pooled data set, education in its most elaborate version is measured in nine categories (Tables 4a and 4b); for reasons of strict comparability, these categories can best be condensed into the following four levels:

1. primary school: includes those who completed primary school – whether of five or fewer years, according to the time the school was entered – as well as those who did not complete this level, and the illiterates. Here we also find the lower secondary dropouts..
2. Lower secondary school: refers to those who completed *scuola media inferiore* (lower secondary from 1962 onwards) or *avviamento professionale* (non-compulsory lower secondary school for the cohorts who entered the educational system before the reform of 1962), as well as other lower secondary tracks. As in the previuos level, this category also includes those who entered higher secondary school without completing it.
3. Higher secondary school: includes all higher secondary degrees (academic and technical-vocational tracks of 5 years), as well as the 2 and 3 years vocational schools. Again, here we also find those who enrolled in tertiary education without completing it.
4. Tertiary: refers to lower (*diploma universitario*) and upper (*laurea*) tertiary, as well as post-graduate training (PhD, medical specializations, etc.).

Actually most of the surveys allow for a considerably more detailed treatment of education, adding possible distinctions at the primary and tertiary level (Tables 4a and 4b). However, since these distinctions do not appear in all surveys, this would mean facing a significant missing values problem[6].

All our occupation data, as part of the International Stratification and Mobility File [Ganzeboom & Treiman, 2008], have been harmonized using either the 1968 or 1988 version of the International Standard Classification of Occupations (respectively, ISCO-68 and ISCO-88), which can accommodate both detailed and crude occupation codes; data originally coded in the ISCO-68 have been recoded into the later version on the basis of the mapping rules provided by Ganzeboom & Treiman (1992).

Class origin is measured by father's occupation in EGP classes, which were constructed on the basis of the ISCO-88 codes using the Ganzeboom & Treiman's (2003) algorithm, and adding to this the available information on occupational status (self-employment, and number of employees or

[6] The only distinction not taken into account, although present in almost all data sets, is the one between lower and upper tertiary. The reason is that, up to recent years, in Italy this distinction is almost meaningless, since the *diploma universitario* (a lower tertiary degree) had a short life before the 2001 "Bologna process" reform and regards a very limited number of observations.

subordinates). For the sake of strict comparability, we consider five classes (I+II, IIIab, IVab, V+VI+VIIa, IVc+VIIb). As shown in Table 3, after selecting for age, about 9% of the valid cases (rather evenly spread among the 20 studies) have missing information on father's occupation; therefore, we substituted father's missing information with mother's occupation, when available. This salvaged another 2% of our cases, leaving us with 47856 cases.

As for measurement of time, we use 12 birth cohorts of variable width: for respondents born between 1899 and 1930, we use 10-years wide cohorts (1899-1910, 1911-20, 1921-30), while cohorts for those who were born from 1931 to 1980 are 5-years wide (1931-35, 1936-40, 1941-45, 1946-50, 1951-55, 1956-60, 1961-65, 1966-70). The youngest cohort is 14-years wide, due to the small number of cases. This classification allowed us to take advantage of the ample sample size in the central years of the period under study, in order to model the IEO trend over time as accurately as possible.

[TABLE 5 ABOUT HERE]

6. Descriptive analyses

In order to illustrate the general features of our sample, in Tables from 4a to 5b and Fig. 1 to 5 we provide an overview of the distribution of the variables of interest by study and by cohort. Tables 4a and 4b show the classification of educational grades at the most detailed level found in the original data, while Table 5 adopts a more compact four-fold classification, which we used in our analyses. Two observations can be made. First, we see a rather regular pattern that vividly portrays the expansion of education in Italy, while deviations from a smooth pattern are minor. This points to an important conclusion: as far as education is concerned, the different sampling procedures, the variations in question wording and the different original coding schemes still have generated compatible and similar distributions.

[FIG. 2 AND FIG. 3 ABOUT HERE]

When listed by cohort (Fig. 2 and 3), educational expansion is brought out even more clearly, as was to be expected[7]. While the two earliest cohorts have almost identical distributions, from 1921 onwards education expands rather dramatically. The share of the primary educated (whether they completed the grade or not) goes down from 80% for men and 90% for women in the early 20th

[7] In all graphs, birth cohorts are identified by their mid-point; for example, the 10-years wide cohort labelled 1905 refers to those born between 1899 and 1920; for 5-years wide cohorts, 1932 refers to those born between 1911 and 1920.

century to a negligible share by the youngest cohort for both genders. The share of the other three educational levels more or less quadruple over time, getting to an overall 13% for tertiary education, 48% for higher secondary and 34% for lower secondary in the most recent cohort.

In line with official statistics (see for example Schizzerotto & Barone 2006), educational expansion took off a bit later for women than for men; however women reached men's level by the 1966-1970 birth cohort. As a matter of fact, our data for the most recent cohort suggest that women have made considerable headway compared to men, as shown by the relative size of higher secondary and tertiary educated women (51% and 14% respectively) against men (48% and 12%). In our sample these cohort is rather small; nevertheless, official statistics on university enrolment and completion (Istat 2010) confirm that women are now ahead of men, and that their advantage is growing.

[FIG. 4 AND 5 ABOUT HERE]

Fig. 4 and 5 show the distribution of class origin (as measured by father's class or, if missing, by mother's class, when available) by study and cohort respectively, for men and women together. Again, we note that, though these data are characterized by very different sampling designs and measurement procedures, nonetheless the resulting class distribution appears to be rather regular among studies. When listed by cohort (Fig. 5), the variation between surveys becomes less visible, and an even more regular pattern emerges.

From a substantive standpoint, our data show that the shrinkage of farm backgrounds (class IVc+VIIb) is the most dramatic feature of Italian society over the 20th century, as is the case in other industrialized societies. This is obviously caused by the decline of the farm sector, which – according to Census data – employed 61.7% of the Italian workforce in 1901, while in 2011 the share was only of 3.6%. However the decline of the fertility rate, that has been a very striking feature of Italian demography in the last century, may have also played an important role[8].

The share of the manual workers (V+VI, VIIa) remains more or less stable across time; by contrast, that of the non-manual categories, both dependent and self-employed (IIIab and IVab), has increased. The most dramatic growth is found at the top of the class distribution, ie. higher managers and professionals (I+II), whose share seems to vary across studies but that has undoubtedly risen (from around 2% to 14%) over the period of observation.

[8] According to the National Institute of Statistics, the total fertility rate decreased from 2.3 in 1952 to 1.3 in 2012. In some regions, however, and most notably in those where the primary sector was prominent during the first half of the 20th century, the decrease has been even more dramatic: from 3.0 in 1952 to 1.4 in 2012 in Sicily, from 3.8 to 1.2 in Calabria, from 3.4 to 1.3 in Puglia, from 3.2 to 1.4 in Campania.

In summary, we conclude that the 20 data sources are relatively homogeneous in representing the marginal distributions of respondent's education and father's occupational class, and that they conform nicely to plausible trends of these distributions. It remains to consider whether our data are also homogeneous with respect to their representation of the association between respondent's class origin and education, an issue that we will address in our modelling strategy.

7. Technique of analysis

The distribution of the core variables in stratification studies (occupation and education of both respondents and their parents) are known to vary dramatically between earlier and later periods, between men and women, and between countries. Linear additive models assume that a fairly regular model would fit these variations, if not that such model would be the bivariate normal distribution. However stratification variables are not smoothly (let alone normally) distributed, neither in the univariate nor in the bivariate case. Hence comparative mobility researchers have embraced the log-linear model as their favourite analysis tool, ever since these technique was introduced to the field (Hauser et al., 1975; Hauser, 1978; Goldthorpe, 1980).

There are many varieties of loglinear models for mobility tables (see Hout, 1983; Wong, 2010). One important choice is represented by association models, introduced to sociology by Goodman (1979) and popularised by Hauser (1984); applications of these models can be found in Ganzeboom et al. (1989), Vallet (2004) and the collection of papers by Breen (2004).

In this paper we propose and apply a new variety of the conditional association models, which we call the conditional association model with linearly constrained parameters (or, equivalently, linearly constrained conditional association model).

In order to unfold the logic of the variant of association models which we devised, let us start from the uniform association model, according to which all contiguous odds ratios have the same value (so that the model is 'uniform'), and a single parameter accounts for the pattern of association between rows and column (Hout, 1983). The Row-Column Model II is a modified version of the uniform association model proposed by Goodman (1979), which estimates the parameters relative to the distance between the row and column variables when no such information is available (Hout, 1983; Powers & Xie, 2000; Wong, 2010). The RC-II model can be written as follows:

$$\log f_{ij} = \mu + \mu_i^R + \mu_j^C + \beta\phi_i\varphi_j$$

and the log-odds ratio involving any two row categories i and i+1, and column categories j and j+1 is the following:

$$\ln \theta_{ij} = \varphi(\mu_{i+1} - \mu_i)(\nu_{j+1} - \nu_j) \quad [1]$$

The relationship between the row and column variables can be studied in *k* table, in order to detect for example whether there is any trend over time of the origin-education association, as described by *k* birth cohorts. An obvious baseline model is the one in which the uniform association parameter, φ, is allowed to vary freely among the *k* tables (i.e. over time), while at the same time the row and column parameters are held constant over the *k* tables, obtaining the heterogeneous uniform conditional association model (Clogg, 1982):

$$\begin{aligned} \mu_{i1} &= \mu_{i2} = \ldots = \mu_{ik} \\ \nu_{j1} &= \nu_{j2} = \ldots = \nu_{jk} \end{aligned} \quad [2]$$

A linear constraint placed on the overall association parameter, φ_k, means that the association between rows and columns follows a linear pattern over time, or some other regular pattern (Wong, 1995, 2010; Wong and Hauser, 1992). Then, instead of assuming that φ is either uniform (i.e. constant) over time, or heterogeneous (i.e. free to vary), we can model the association as varying linearly across tables:

$$\varphi_k = \varphi(1 + \beta Y) \quad [3]$$

The version of association models we propose extends this feature to the row and column parameters. Usually they are constrained to remain constant (or homogeneous) across tables; this entails a sociologically meaningful assumption, i.e. that the unit of measurement of the row and column variables remains constant over time, and that differences in the association pattern between rows and columns only result in the differences in the overall association parameter. After all, what could be said about differences in the association between rows and columns, when the baseline unit of measurement varies between tables?

However, relaxing the constraint of homogeneity across tables, while making the parameters follow a linear trend, still allows to model the relationship between rows and columns in a meaningful way, both from a technical and a sociological standpoint. Modifying equation [2] by using the specification of equation [3], we obtain the linearly constrained row and column parameters[9], as follows:

$$\begin{aligned} \mu_{ik} &= \mu_{i0}(1 + \beta Y) \\ \nu_{jk} &= \nu_{j0}(1 + \beta Y) \end{aligned} \quad [4]$$

The attractive property of this variant of the standard conditional association models is that it consumes a limited number of degrees of freedom, while at the same time providing considerable

[9] The row and column parameters, as well as the overall association ones, are estimated so to have a mean and a standard deviation of 1. In addition to that, in our models the scores are weighted by the data, which makes the association coefficient similar to a Pearson correlation coefficient.

room for the model to fit the empirical data. From a substantive standpoint, as we will show, they allow for elegant interpretation of empirical data, in which not only the strength, but also the pattern of association varies between tables.

As for the actual estimation of our models, due to limitations of the available software, a two-step procedure has been implemented. First, we estimate the heterogeneous (unconstrained) parameters using LEM (Vermunt, 1997). Since this software only allows us to estimate either the fully heterogeneous model (with parameters freely varying across tables) or its fully homogeneous counterpart (constant parameters across tables), we take a second step by using the heterogeneous parameters as constants in SPSS Genlog. Then we model them using a linear model with interactions, equivalent to an analysis of covariance. As we will see, we can proceed in a stepwise manner and find the relatively best fitting models[10].

[TABLE 6 ABOUT HERE]

8. Results

The estimated models are shown in Table 6. Models in panel A either belong to the UniDiff family or implement the Constant Social Fluidity hypothesis (Hout, 1983). The UniDiff (Erikson & Goldthorpe, 1992) or multiplicative layer (Xie, 1992) model represents the within-tables association pattern by a constant set of odd-ratios and compresses the differences between tables into a multiplicative parameter that varies between tables (A1) or develops linearly over time (A2). The UniDiff model has the advantage of not restricting the pattern of association itself, while at the same time providing a very parsimonious account of the between-table difference, and hence of historical change. On the other side, the Constant Social Fluidity model allows no change of the origin-education relationship over time.

Model A1 has a chi-squared value of 252 for men and 215 for women[11], which are far beyond the critical value (147.5) at 121 degrees of freedom and $p<.05$. Model A2 introduces a linear constraint on the multiplicative association parameter, thus reducing from 12 to 2 the number of parameters representing the between-table difference. The associated chi-squared statistic shows no significant deterioration of the model fit, thus suggesting that a linear trend gives a more

[10] While the Genlog command cannot estimate the Goodman RC-II model (i.e. the row/column scores), we find the SPSS Genlog routine much more flexible with respect to model specification and computing time. The L^2 obtained through LEM and Genlog differ sometimes, but only by a trivial amount. We will report L^2 as calculated by Genlog, but adjusted for the degrees of freedom associated with the parameters estimated in LEM.

[11] Given the limitations of chi squared based measures for large samples, we consider both the BIC values and the differences between the L^2 values of two different models, rather than the absolute value of L^2, so to put into light the improvement (or the worsening) of one model as compared to the other.

parsimonious account than the unconstrained UniDiff model A1. In model A3 we constrain the association parameter to be equal between tables, thus getting a Constant Social Fluidity model; the chi-squared differences show that this model fits worse than the linearly constrained UniDiff model (A2) for women, but not for men. This suggests that for men IEO can be regarded to be constant over time, while for women there is a significant change that can be summarized by a linear trend.

[FIG.6 ABOUT HERE]

Fig. 6 displays the estimated values of the association parameter in the UniDiff models A1 and A2 for men and women; as we see, the association for men is indeed essentially stable[12]. Here the only variation of some interest in the IEO trend occurs between the very first cohort and the others; however the number of cases in the first cohort is fairly small, which suggests some caution in interpreting this result. In the case of women, the UniDiff model finds a regularly declining trend in IEO, which appears to be relatively steeper in the early cohorts than more recently; again, this could be due to the small number of cases in the younger cohorts.

Models in panel B are conditional association models in which the origin and education parameters are heterogeneous (ie., free to vary across time), while the overall association parameter is either heterogeneous (model B1), or linearly constrained over time (model B2), or is removed altogether (model B3). Thus, model B1 in Table 6 estimates heterogeneous origin and education scores, without constraining their values. Similarly, it allows the overall association parameter to vary between tables, conditional upon the estimated row and column scores. As for L^2 value, model B1 fits the data better than model A1, however consuming considerably more degrees of freedom: according to BIC values, model B1 is clearly less parsimonious than model A1 either in the case of women, men or of the overall sample. In model B2 and B3 we take the same steps as in panel A: we first constrain the differences between tables (i.e. over time) to follow a linear trend, and then remove the trend altogether. The examination of models in panel B leads to the same conclusions as in panel A: in men's case we do not see any significant trend, while women experienced a decrease of IEO over time.

Models in panels C and D of Table 6 belong to the variant of conditional association models we propose, taking model B2 as a starting point. We first introduce linear constraints on the heterogeneous class origin (row) parameters (models in panel C), thus hypothesizing a linear trend over time for both the overall association and the relative advantage or disadvantage of each class

[12] In both models, the parameters are scaled relative to the first value, which is fixed at 1.0. Therefore the level of association cannot be compared between men and women.

origin as for educational attainment [13]. In model C1 all origin scores are constrained to follow a linear trend without being parallel, while in models from C2 to C5 we constrain each trend line at a time (ie. the trend over time relative to a class origin) to be parallel to a reference category (routine non manual, IIIab)[14]. The model in which all trend lines are parallel to each other (model C5) tests the hypothesis that the advantage or disadvantage of all class origins relative to one another as for the IEO trend over time followed the very same pattern (either downward, upward or constant over time), which is constrained to be linear. At every step we evaluate the change of model fit in order to consider whether any significant deterioration arises, given the more and more strict assumptions being made.

Model C1 is a more parsimonious model than its heterogenous counterpart (ie. model B2), since it compresses the between-table variation in 2 degrees of freedom (intercept and slope) for each class origin. As we see from Table 6, in terms of BIC, model C1 fits much better than the heterogeneous model B2. Going from model C2 to model C5, the fit significantly deteriorates only when constraining the parameters referring to farm background to be parallel to all others (model C5), both in the case of women and for the pooled sample. However, in men's case the same step gives a marginally significant difference in terms of L^2, while leading to a basically unchanged BIC value. This means that the difference in terms of odds between women of farm origin compared to women of other class origin have become smaller over time (the trend lines being slightly but significantly convergent), over and above the general trend that we observe in the rest of the table, while the same is not true for men.

[FIG. 7 AND 8 ABOUT HERE]

Fig. 7 shows the parameters of models B2 and C4, namely the heterogeneous origin scores and the regression-like lines of each class origin, for both women and men. In this model we see that the relative distance between classes – that is, the relative advantage or disadvantage of each class compared to another as for IEO over time – remains constant over the period under analysis, with the exception of class IVc+VIIb, which experienced an overall lesser decrease of IEO, while getting closer to the manual classes (V+VI+VIIa).

Models of group D start from the best fitting model in group C (that is, C4) and add to it the same sequence of constraints on education (column) scores, starting with all scores linearly

[13] The row and column scores were estimated for men and women together; this explains why some of the models are slightly sub-optimal when applied to men and women separately.
[14] Class IIIab has been chosen as the reference category on the ground that its scores in model C1 show a more regular pattern over time than the scores of the other class origins.

constrained but not parallel (D2), then progressively constraining the scores of each educational level to be parallel to a reference category, namely primary school (models D3 and D4). This does not harm the model fit, as far as tertiary and secondary education are involved (models D2 and D3); however the model fit clearly worsens when the trend line of lower secondary school is constrained to be parallel to the other three (model D4), for both women and men. The education parameters as constrained by model D3 are shown in Fig. 8, along with the heterogeneous ones under model B2[15]. The picture we get can be interpreted as follows: the odds of making the transition from primary to lower secondary school used to be very different between social classes at the beginning of the 20th century; however over recent cohorts this hurdle has moved up to the transition between lower and higher secondary education, and this appears to be true for both men and women.

[FIGURE 9 ABOUT HERE]

So far we commented on the relative distance between class origins and educational levels in respect to educational attainment over time. However we did not address yet a crucial question: what was the IEO trend over the 20th century? We answer this question by considering the overall association parameter (φ_k) in model D3 (Fig. 9), which combines the best fitting linear constraints on origin and education parameters, as well as on the overall IEO trend . As we see in the graph, in women's case we find a regularly declining trend, which can be modelled in a linear fashion, while this is not true in the case of men.

In order to explicitly test the hypothesis concerning the existence and linearity of the overall IEO trend, model D5 in Table 6 replicates model D3, however removing the influence of time in the association between origin and education[16]. This results in a significant fit deterioration for both women and men. We can then conclude that for both genders IEO decreased over the 20th century, though the trend is more substantial in women's than in men's case, as shown in Fig. 9. Furthermore, women's gap in respect to men closes over the century; more precisely, in the earlier cohorts we find a relative disadvantage of women over men as for IEO, while as of the cohort born around 1945 the level of association is indistinguishable between the two genders. The important message here is that the trend towards more equality between women and men begun independently from the major reform in Italian educational system of the early 1960s, since the observed change in the IEO trend for women started before the cohorts that were subjected to it entered secondary

[15] As far as the education scores are concerned, model B2 is identical to model C4, since in both cases they are heterogeneous, ie. varying across tables.
[16] Model D5 is analogous to a log-linear partial independence model, in which the three-way interaction is set to zero (Bishop, Fienberg, & Holland, [1975] 2007).

school, thus confirming the results of previous research (Shavit & Westerbeek, 1998; Ballarino & Schadee, 2006; Barone et al., 2010).

9. Comparability and quality checks

The conclusions we reached thus far come from analyses conducted on a large and wide-ranging data set. This raises several issues concerning data quality and comparability between surveys. Indeed, the various studies use a variable (and sometimes questionable) sampling design; incomparabilities may result from difference in sampling units (individual voters, households, addresses, and undocumented), sampling procedures (geographical clustering, strata used, probability sampling versus quota sampling) and non-response patterns (regular non-response, panel attrition, exclusion of non-working women or individuals no longer active on the labour market). In addition, as we discussed in Section 2.2, a wide variety of measurement procedures has been used, with respect either to education, class origin or time. Issues here concern detail used, question formats (closed- versus open-ended questions, question wording, and so on) and the availability of information on self-employment and supervising status for building class origin.

[TABLE 7 ABOUT HERE]

The descriptive analyses we illustrated in Section 7, and in particular those concerning the marginal distribution of respondents' class origin and education (Tables 4a, 4b and 5, and Fig. 1 to 5), showed an appreciable homogeneity among the surveys. In order to perform a more accurate test on whether the between-survey differences affect our findings, we estimated our preferred model (D3) for each of the 20 datasets separately. The key finding being the IEO trend over time, we comment only on the parameters relative to the linear trend by survey and over time for women and men (Table 7; Fig. 10 and 11).

[FIG. 10 AND 11 ABOUT HERE]

In the case of women (Fig. 10), the earlier surveys (fielded in 1968, 1972, 1975) show a clearly increasing IEO trend; in three later surveys (two of which are rather close in time, namely the SHIW 1993 and 1998 data, the other being the ESS data from round 2, fielded in 2006 in Italy) the trend is stable, while in all the 14 remaining ones (collected from the year 2000 on) we see a declining influence of parental class on educational attainment. Otherwise said, while the surveys

collected from the Seventies to the Nineties show either an increasing or a stable trend, only the ESS data from round 2 outlies the general tendency towards less inequality showed by the most recent data sources.

In men's case the pattern is less clear-cut. Like in the case of women, the earlier surveys (but not the 1968 one) show an increasing IEO trend (Fig. 11); stability characterizes a greater number of studies than in women's case, either collected from the Seventies to the Nineties (1974; 1985; ISSP 1987; SHIW 1993, 1995, 1998; ILFI 1997), or in the years from 2000 onwards (SHIW 2002 and 2004; ESS 2006). The remaining six surveys, again mixed as for the year of collection (ISSP 1992; IALS 1998; SHIW 2000 and 2005; ONO 2005; ESS 2003), show a declining IEO trend instead. Fig. 11 shows that the stability of the IEO (that was found by some scholars who analysed both the earlier surveys and those fielded until the late Nineties; see for example Schizzerotto, 1988; Cobalti, 1990; Cobalti & Schizzerotto, 1993, 1994; Ganzeboom & Treiman, 1996a), gradually turns into a decreasing trend according to (some, though not all of) the most recent data.

The conclusion we draw is that, were we to analyse a set of surveys fielded in a shorter time-span, or a lesser sample, in women's case it would not harm the conclusions we arrived at (see model D3), provided we include the surveys fielded from 2000 on. However in men's case we would run the risk of not detecting the long-term trend we are seeking for, which is one of a declining inequality. Put differently, in women's case the results seem not to be decisively influenced by the type of data analysed (exception made for the three early surveys), while the opposite could prove to be true in men's case, if one restricts the analysis to data collected over a shorter period or to a smaller sample. By contrast, then, this conclusion validates the effectiveness of the strategy we adopted, namely that of preferring an ample data set, made of surveys collected over a long period of time, instead than choosing a few ones because of quality (or in fact any other) considerations.

This finding is particularly noteworthy since the methodological concerns we raised in Section 2 on the measurement of the key variables do not apply here: these conclusions come from analysing a harmonized data set, in which the data (both those considered by previous research and the newer ones) have been coded so to attain the highest possible comparability.

[FIG. 12 ABOUT HERE]

For what regards the claim concerning the 1985 and the 1997 surveys as being the only two reliable data sets for analysing the IEO trend in Italy, and apart from any other considerations, Fig. 12 shows an interesting result. Were we to rely only on these two data sources, in women's case

(panel a) we would observe more or less the same downward trend we get by pooling all the data sources together: actually the red line in Fig. 12a, which is the trend line resulting from pooling the two data sources, has roughly the same slope as the red line in Fig. 10, which is relative to the total data set we used. Again, we can conclude that results concerning women are not crucially depending on the data set analysed, as small in size and narrowly delimited in time as it is. In men's case however (panel b), the 1985 and 1997 data sets would lead us to opposite conclusions, since the former points to a decreasing IEO, while a trend towards more inequality is found in the 1997 data. Thus, by pooling only these two data sets together, we would average the two opposite trends and get the familiar (and misleading) picture of stability of the IEO trend for men, represented by the red horizontal line in Fig. 12b.

10. Conclusions

This study assesses the long-term trends in the association between father's occupational class and educational attainment of Italian women and men born between 1899 and 1984. Using a dataset of large size and wide coverage, analysing women and men separately, harmonizing all variables to the highest possible degree, and using a our version of conditional association models, our analyses allow us to answer the four research questions we addressed in Section 3.

The first question concerned the general trend of IEO over the last century in Italy; our evidence shows that there has been a trend toward less association between father's class and educational attainment for both genders, though this trend is more pronounced in women's than in men's case.

The second research interrogative addressed the details of the IEO trend, ie. whether there has been any historical change in the association between origins and education over time, whether this came with a change in the relative inequality between classes, and in respect to what educational grades. We showed that in women's case these changes have occurred most dramatically for the cohorts that have completed school in the mid-century, i.e. before the major reforms of the Italian education, which favoured a more comprehensive system at the lower secondary level. As other scholars have already noticed (see for example Shavit & Westerbeek, 1998; Ballarino & Schadee, 2006; Barone et al., 2010), the reforms that were put in place during the 1960s did not start this trend: simply, they went along it.

An important insight into the features of the IEO trend, which results form the analysis of the linearly constrained column parameters, is the shift in the location of social inequalities between the various educational levels, for men and women alike. Like commonly observed in educational

systems all over the world, and in Italy too (Barone et al., 2010), the largest inequalities between social classes arise at the lower levels of education, in the early stages of the educational career. Indeed, for most of the century the largest inequalities between social classes were found with respect to the decision to complete only the primary level, or to continue to any secondary level. By the time the youngest cohorts in our data were in school, the inequality at the primary-to-lower secondary transition had almost been replaced by a shift of inequality at the lower-to-higher secondary transition. This is a case of dynamic selection bias: as more students complete primary and lower secondary degrees, the observed and unobserved heterogeneity in students at risk of entering higher secondary and tertiary education broadens, and selection mechanisms become more discriminatory. No such trends in shifting the location of inequality were found at the tertiary level yet; however the inequality of educational opportunity here is much smaller than at the lower levels of the educational hierarchy. As the number of tertiary students is far from saturated, it remains to be seen whether a similar widening of inequalities will occur at this level.

The last point we want to make concerning our second research question is that, unlike suggested by some previous studies, we find no evidence of a change in the relative position of the various social classes with respect to the educational opportunities of their offspring. Despite some dramatic decline in its representation, a farm background remains the least advantageous, and a higher non-manual background the most advantageous social origin, with the other occupational classes stably spaced in between. The distance is particularly large between the two top classes (managers and professionals, I+II, versus routine non-manual, IIIab), while the others are more or less equally interspaced. Coupled with the upward shift of major inequality towards the mid grades of the educational system, the stability of the relative inequalities between class origins witnesses the failure of the primary goal of the educational reforms of the Sixties and Seventies, namely that of granting substantial openness and reducing class disparities in respect to educational attainment.

As for our third research question, we found that the technique of analysis we propose do allow a better insight into the dynamics of IEO over the last century than standard association models, like the UniDiff or the Constant Social Fluidity model. In fact, we were able not only to detect the linearly decreasing IEO trend, but also to show that it results from the two coupled factors we just discussed, namely the persistent relative class advantages (or disadvantages) in respect to educational attainment on one side, and on the other side the shift of major inequalities from the primary-to-lower secondary transition to the lower-to-higher secondary transition. By linearly constraining all trend parameters, we reached a more simplified, yet clearer picture of the processes at stake.

Our last research question concerned the quality of the data we used in our analyses. We showed that in women's case the result we attained of a declining IEO trend (model D3) is relatively insensitive to the data set used (exception made for the oldest ones), while in men's case the trend gradually shifts from an upward to a downward one along the year of survey. We noted that this result comes from analysing a harmonized data set, so that the incomparability across data sources as for the measurement of the key variables is significantly reduced; a different case would be comparing different IEO trends which were the outcome of separate studies, as we did in our literature review (Section 2). The case of men, then, shows that when studying long-term trends (of the order of a century or so) the strategy we followed of pooling many data sets together, preferably collected over an adequately long time span, can prevent the researcher from getting to unreliable results, like finding stability whereas a decrease of inequality indeed took place. As a matter of fact, choosing to analyse only the data sets which are considered to be of better quality does not seem a preferable strategy over the one we pursued.

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Figure

Fig. 1. Distribution of cases by birth cohort (of variable width) and study (%)

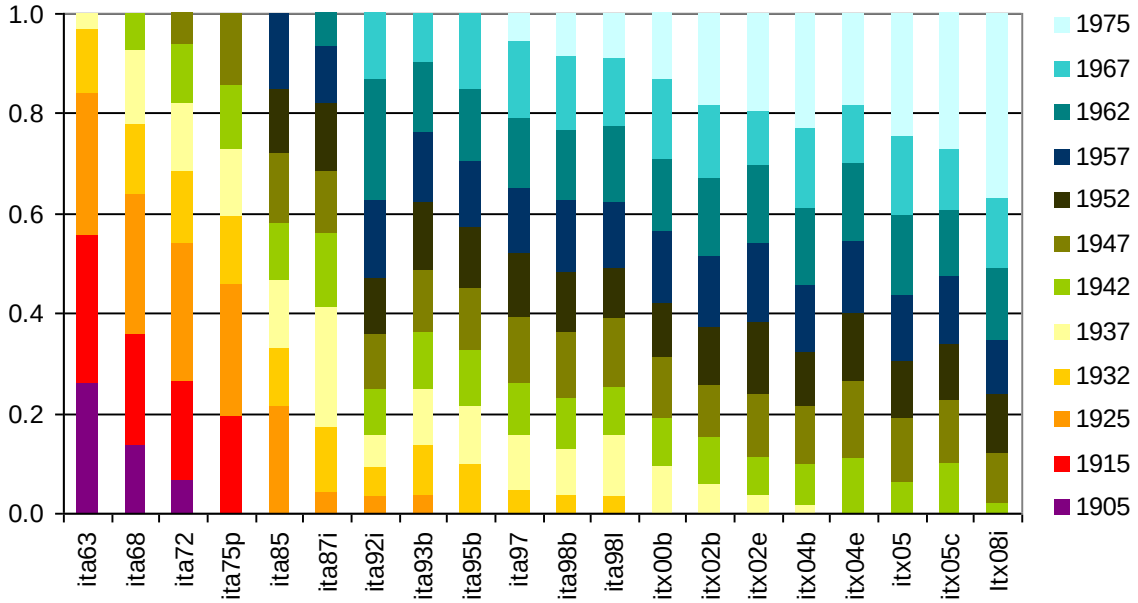


Fig. 2. Educational expansion by birth cohort, % (Men)

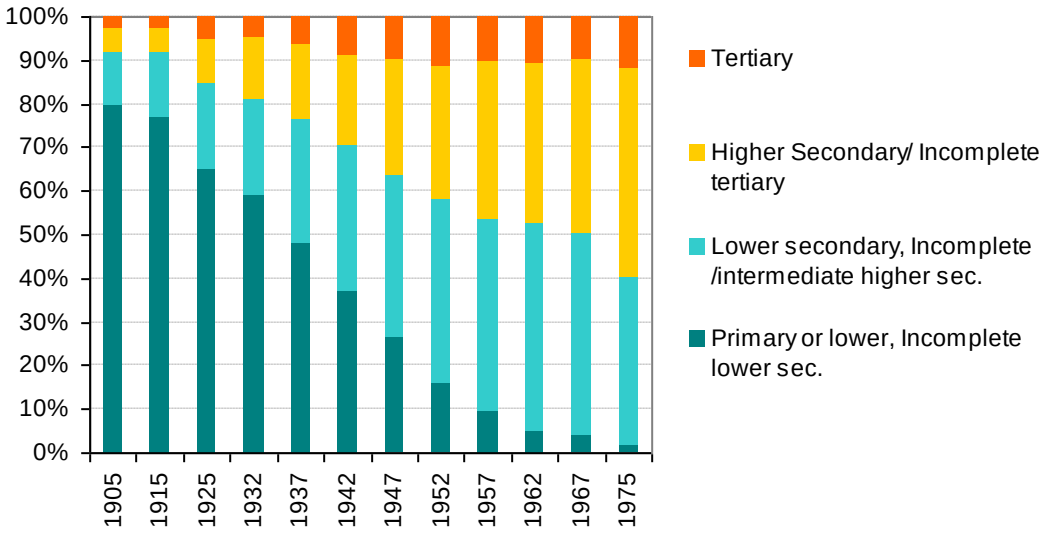


Fig. 3. Educational expansion by birth cohort, % (Women)

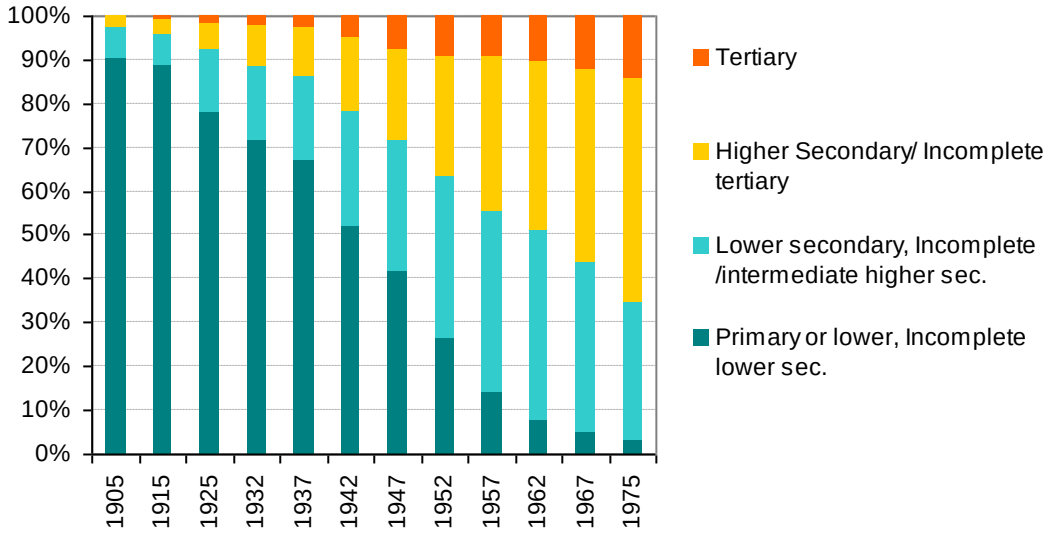


Fig. 4. Class origin by study, % (Men and women)

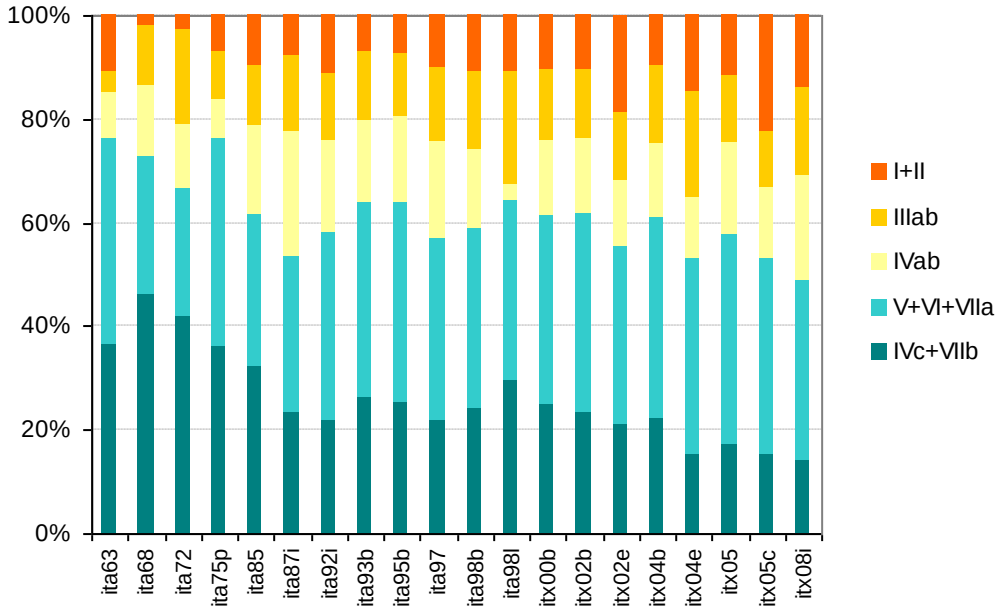


Fig. 5. Class origin by birth cohort, % (Men and women)

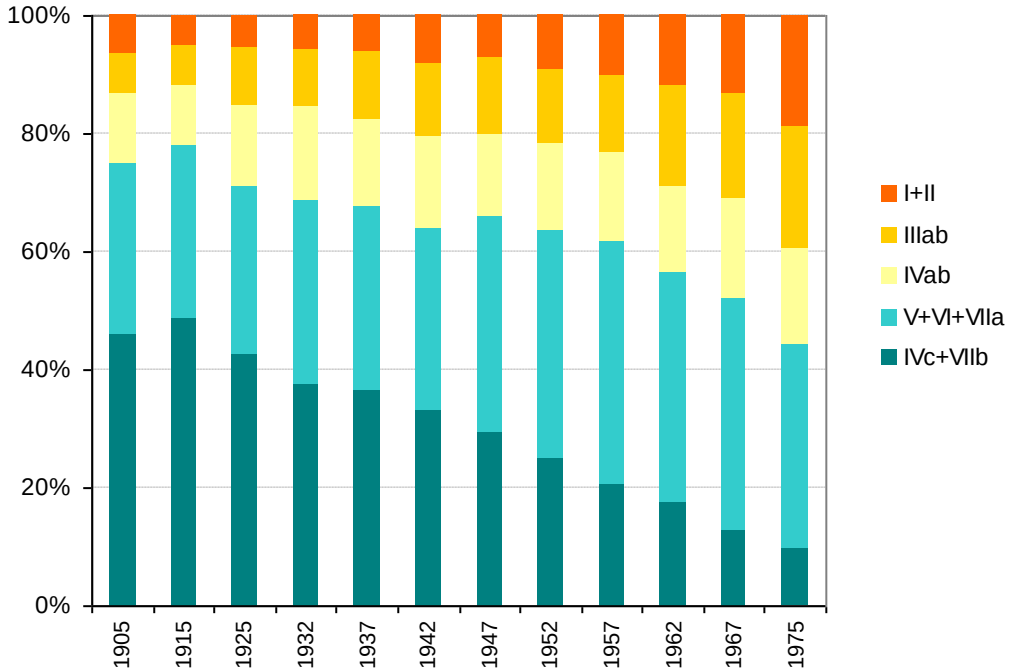


Fig. 6. IEO trend in Models A1 (heterogeneous) and A2 (linearly constrained) (Men, women and total)

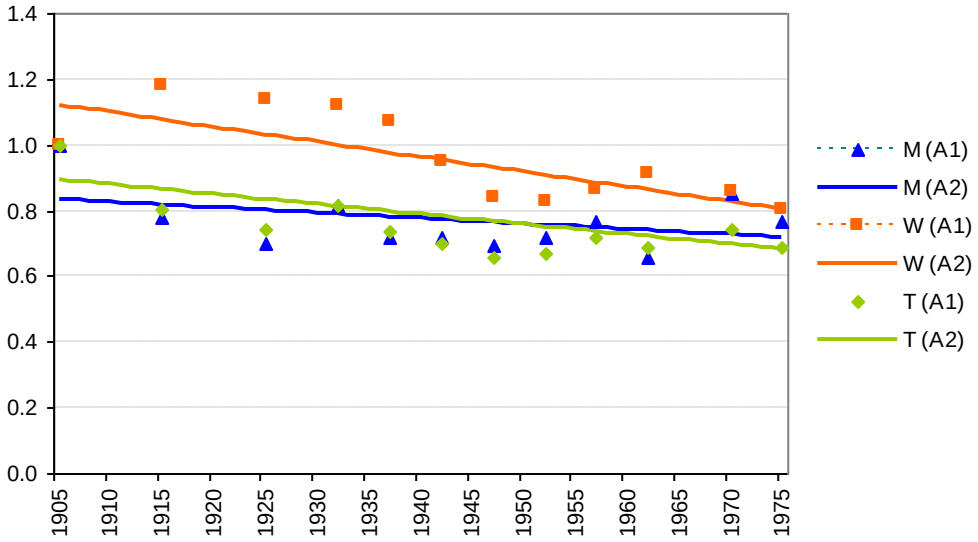


Fig. 7. Class origin scores, Models B2 and C4

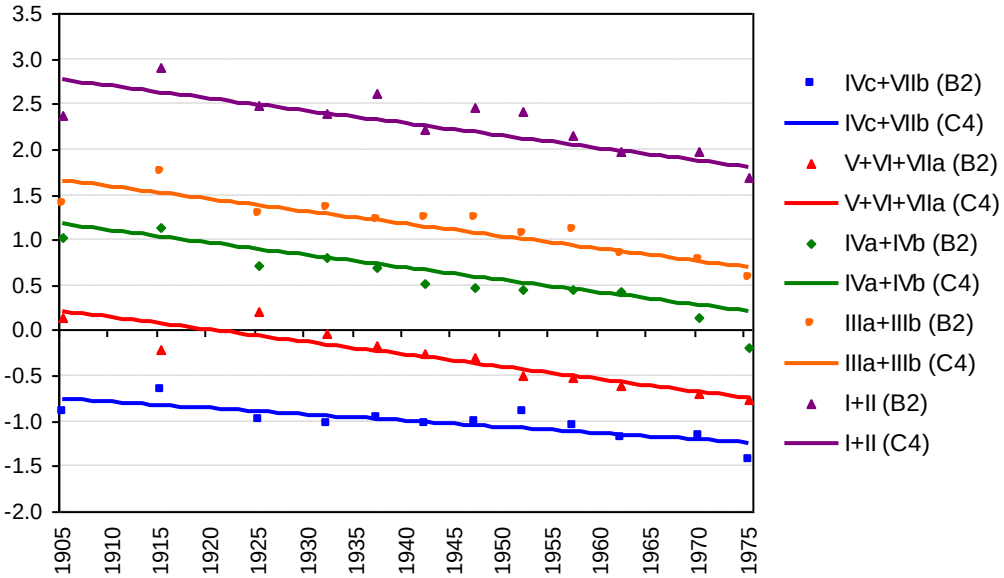


Fig. 8. Education scores, Models B2 and D3

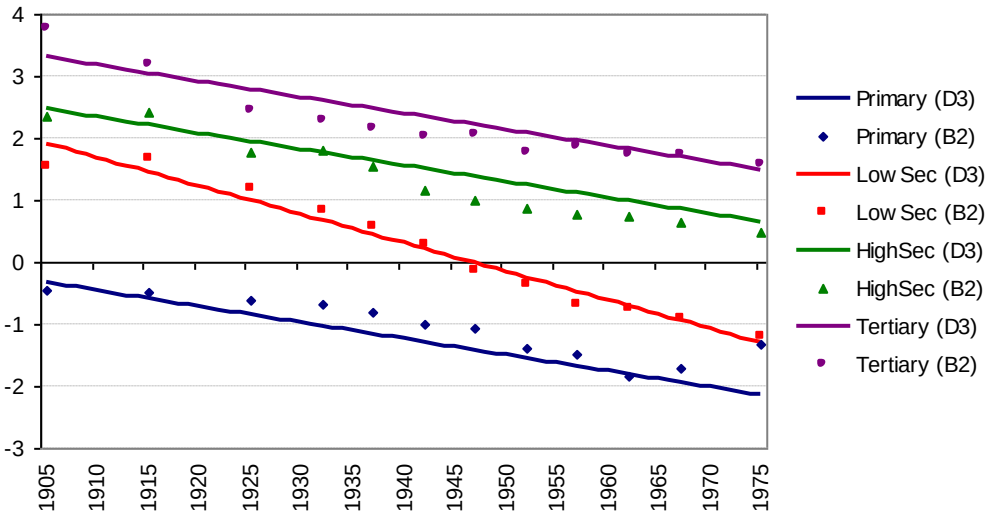


Fig. 9. IEO trend in Models B2 and D3 (Men, women and total)

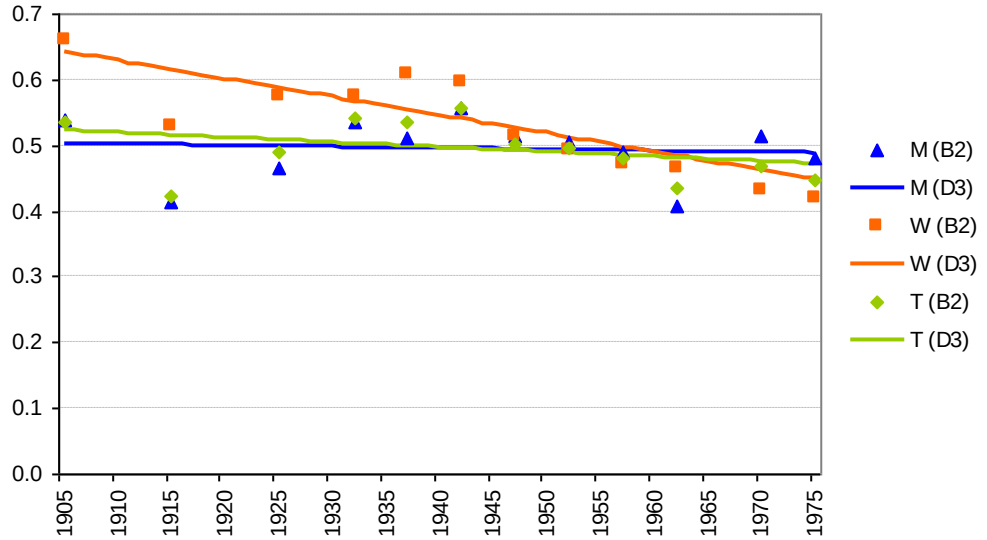


Fig. 10. IEO linear trends from model D3 in 20 surveys, Women

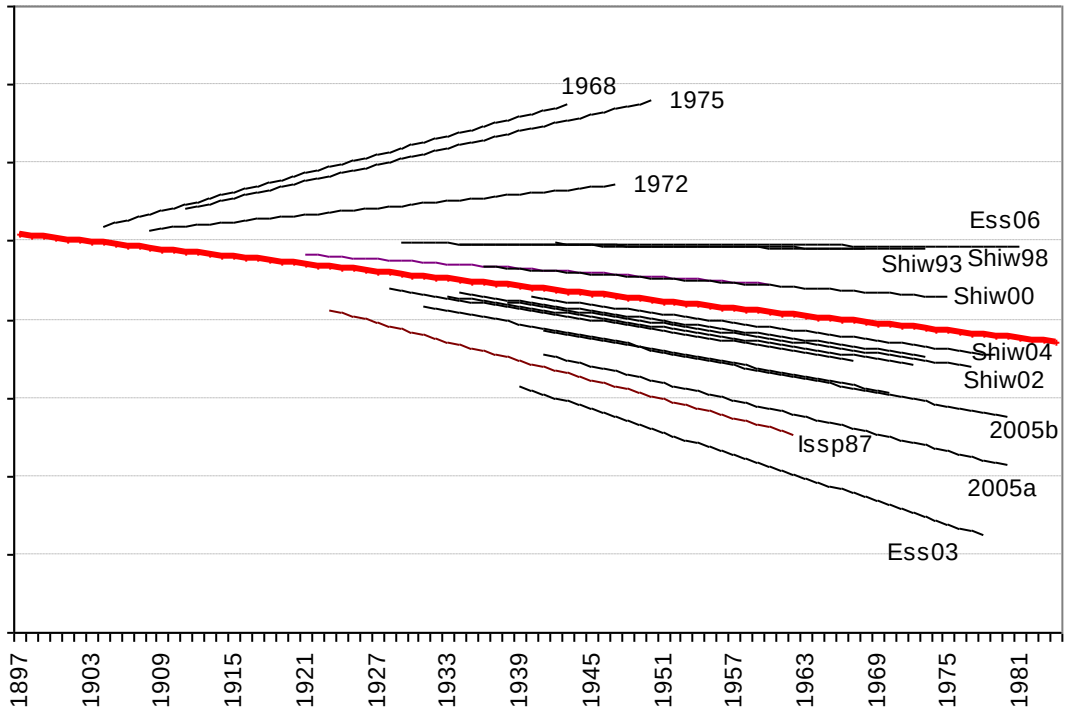


Fig. 11. IEO linear trends from model D3 in 20 surveys, Men

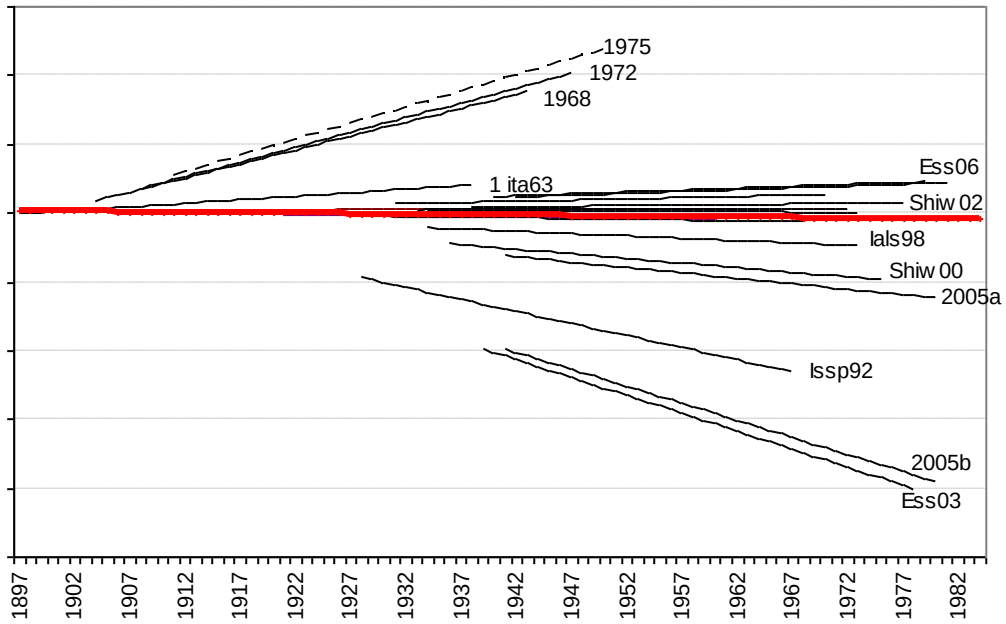
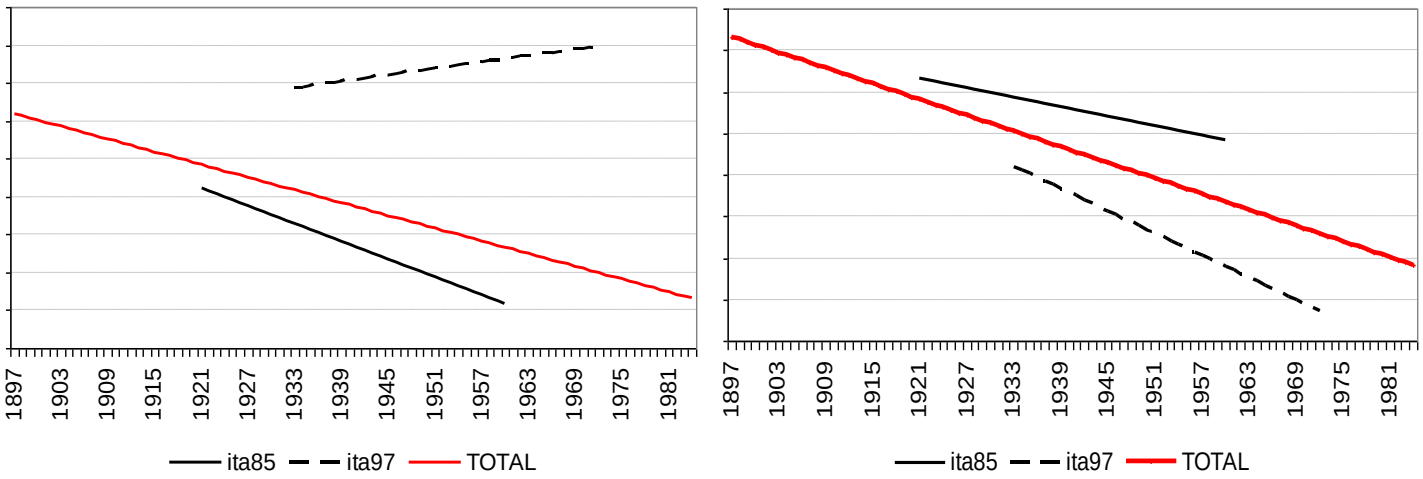


Fig. 12. IEO linear trends in the 1985 and 1997 surveys, Men (a) and women (b)



a) b)

Tables

Table 1. Summary of studies on IEO in Italy

Study		N	Data set(s)	Wo/men	Variables			Technique of analysis	Conclusions
					Origin	Education	Time		
1	Schizzerotto, 1988	4311	Barbagli *at al.* [1985]	Yes	Italian class scheme, five categories (B, MC, UPB+APB, WCL, AWC)	1. Primary or lower 2. Lower secondary 3. Higher secondary 4. Tertiary	Birth cohorts: 1920-44 1945-67	Log-linear models	No change
2	Cobalti, 1990	4029	Barbagli *at al.* [1985	Yes	Dominance, Italian class scheme, six categories (B, MC, UPB, APB, WCL, AWCL)	1. Primary or lower 2. Lower secondary 3. Higher secondary 4. Tertiary	Birth cohorts: 1920-33 1934-47 1948-61	Logit (Mare) models	No overall change; decrease of W/M difference in the 2nd cohort, irregular trend for other cohorts
3	Cobalti & Schizzerotto, 1993	4034	Barbagli *at al.* [1985]	Yes	Italian class scheme, six categories (B, MC, UPB, APB, WC, AWC)	1. Primary or lower 2. Lower secondary 3. Higher secondary 4. Tertiary	Birth cohorts: 1920-33 1934-47 1948-61	Logit (Mare) models	No change; reduction of IEO between women and men
4	Cobalti & Schizzerotto, 1993	4034	Barbagli *at al.* [1985]	Yes	- Social desirability score of father's occupation, or - dummy variables after class categories; - also years of father's education	Years of education	Birth cohorts: 1920-33 1934-47 1948-61	OLS regression	Limited increase of IEO
5	Ganzeboom & Treiman, 1996	9730	Lopreato [1963]; Barnes [1968]; Barnes & Sani [1972]; Barnes & Kaase [1975]; Barbagli et al. [1985]; Issp [1987]	Yes	Father's occ if available, otherwise mother's; ISCO68 score converted into ISEI score	Years of education	Birth years (age 25-64)	OLS regression with linear trend terms	No change for men, significant increase for women
6	Cobalti & Schizzerotto, 1994	4320	Barbagli *at al.* [1985]	Yes	Italian class scheme, six categories (B, MC, UPB, APB, WC, AWC)	1. Primary or lower 2. Lower secondary 3. Higher secondary 4. Tertiary	Birth cohorts: 1920-35 1936-51 1952-67	Log-linear models	No substantial change; AWC, WC, PB lower their probability of getting at most to the elementary level
7	Shavit & Westerbeek, 1998	2684	Barbagli *at al.* [1985]	Yes (as covariate)	Social desirability score of father's occupation + father's education	1. Lower secondary, or lower 2. Secondary vocational 3. Higher secondary 4. Tertiary	Paired years of birth (1930-31, …, 1958-59)	Logit models with interaction terms	(Partial) reduction of the influence of father's on repsindent's education

8	Pisati, 2002	9001	Schizzerotto [1997]	No	Italian class scheme, six categories (B, MC, UPB, APB, WC, AWC)	1. Lower secondary, or lower 2. Uncompleted higer secondary 3. Completed higher secondary 4. Uncompleted tertiary 5. Completed tertiary	Birth cohorts (10 years wide 1900- 79)	Logit (Mare) models with interaction terms	No change
9	Ballarino & Schadee, 2006	11036	Barbagli *at al.* [1985], Schizzerotto [1997]	No	Dominance; Italian class scheme, six categories (B, WCO, UPB, APB, WCL, AWCL)	1. Primary or lower 2. Lower secondary 3. Higher secondary 4. Tertiary	Birth cohorts (10 years wide from 1920-29 to 1960-69)	Cumulative logit models	Decrease of IEO at all educational levels, but mostly for agricultural classes
10	Checchi, Fiorio, & Leonardi, 2008	45000	Bank of Italy [1993, 1995, 1998, 2000]	Yes (as covariate)	Mother's and/or father's education	OLS: 5, 8, 13, 18 years; probit: less than lower secondary, higher secondary, tertiary	13 birth cohorts, 5 years wide from 1910	OLS regression and ordered probit	OLS: decrease of IEO; Probit: IEO is stable at lower sec., diverging probability for low/high families for higher secondary and tertiary
11	Ballarino & Schadee, 2008; Ballarino & Schadee, 2010	11036	Barbagli *at al.* [1985], Schizzerotto [1997]	No	Dominance; Italian class scheme, six categories (B, WCO, UPB, APB, WCL, AWCL) + Parental education (coded as resp.'s educ.)	1. Primary or lower 2. Lower secondary 3. Higher secondary 4. Tertiary	Birth cohorts (10 years wide from 1920-29 to 1960-69)	Cumulative logit models and Conditional logit models (Mare)	IEO decreasing at transition primary-to-lower secondary; thus IEO decreasing on aggregate
12 13	Ballarino et al., 2009	11036	Barbagli *at al.* [1985], Schizzerotto [1997]	No	Dominance; EGP scheme, six classes (I+II, IIIab, Ivab, IVc, V+VI+VIIa, VIIb)	1. Primary or lower 2. Lower secondary 3. Higher secondary 4. Tertiary	Birth cohorts (10 years wide from 1920-29 to 1960-69)	Cumulative logit models	Decrease of IEO, especially for agricultural classes
14	Barone, 2009	31673 / 33336 / 30743	Istat *Multiscopo* Survey 1998	Yes	Dominance; Italian class scheme, six categories (B, WCO, UPB, APB, WCL, AWCL) or in Ster.regr. (B+ WCO, UPB, APB, WCL, AWCL + Parental education (dominance) (coded as resp.'s educ.) or years-equivalent	1. Primary or lower 2. Lower secondary 3. Higher secondary 4. Tertiary	Birth cohorts (10 years wide from 1919-28 to 1959-68); Age 30-80	Loglinear (UniDiff, Constant association); Stereotype ordinal regression	Some decrease of IEO, however significant only for agricultural classes; different trends for M and W
15	Breen et al., 2009	7202	Barbagli *at al.* [1985],	No	EGP scheme, seven classes	CASMIN categories: 1. Compulsory	Birth cohorts 1908-27	Log-linear models, log-	Unclear pattern

			Schizzerotto [1997]		(I, II, IIIa, IVab, IVc, V+VI, VIIab+IIIb)	2. Secondary intermediate 3. Full secondary 4. Lower tertiary 5. Higher tertiary	1928-37 1938-47 1948-57 1958-72	multiplicative models, multinomial logit models, Mare models	
16	Barone, Luijkx & Schizzerotto, 2010	108501	Istat *Multiscopo* Surveys 1998, 2003	No	Father's class; Italian class scheme, six categories (B, WCO, UPB, APB, WCL, AWCL); Parental education (averaged father's and mother's years of education)	1. Primary or lower 2. Lower secondary 3. Higher secondary 4. Tertiary	Birth cohorts, 1918-27, 1928-37, 1938-47, 1948-57, 1958-67, 1968-81	Logistic regression; stereotype ordinal regression	Decrease of IEO for all classes, except for middle class
17	Breen et al., 2010	4242	Barbagli *at al.* [1985], Schizzerotto [1997	Yes	Father's class; EGP class scheme, seven classes (I, II, IIIa, IVab, IVc, V+VI, VIIab+IIIb)	CASMIN categories: 1. Compulsory 2. Secondary intermediate 3. Full secondary 4. Lower tertiary 1. Higher tertiary	Birth cohorts 1908-24 1925-34 1935-44 1945-54 1955-64	Ordered logit	Decrease of IEO ; decline of male advantage, differing trend between genders

Legend: B: Bourgeoisie; MC: Middle class; WCO: White collars; UPB: Urban petty burgeoisie; APB: Agricultural petty burgeoisie; WC: Working class; AWC: Agricultural working class.

Table 2. Data sources

N.	*Acronym*	*Study title*	*Producer / distributor*
1	Ita63	Social mobility in Italy Survey	Lopreato [1963]
2	Ita68	Italian mass election Survey 1968	Barnes [1968]
3	Ita72	Italian mass election Survey 1972	Barnes and Sani [1972]
4	Ita75p	Political Action Project	Barnes and Kaase [1979]
5	Ita85	National Social Mobility Survey	Barbagli et al. [1985]
6	Ita87i	Social Inequality (ISSP) 1987	Issp [1987]
7	Ita92i	Social Inequality II (ISSP) 1992	Issp [1992]
8	Ita93b	Survey on Household Income and Wealth (SHIW), 1993	Bank of Italy [1993]
9	Ita95b	SHIW Bank of Italy, 1995	Bank of Italy [1995]
10	Ita97	Italian Longitudinal Household Survey (ILFI) 1997	Schizzerotto [1997]
11	ita98b	SHIW Bank of Italy, 1998	Bank of Italy [1998]
12	ita98I	IALS, 1998	Statistics Canada and OECD [1998]
13	itx00b	SHIW Bank of Italy, 2000	Bank of Italy [2000]
14	itx02b	SHIW Bank of Italy, 2002	Bank of Italy [2002]
15	Itx02e	European Social Survey (ESS) 2003	ESS [2002]
16	itx04b	SHIW Bank of Italy, 2004	Bank of Italy [2004]
17	Itx04e	European Social Survey (ESS) 2006	ESS [2004]
18	Itx05	National Barometer (ONO) II, 2005	Ricolfi [2005]
19	Itx05c	Survey on Occupational Prestige in Italy	Meraviglia [2005]
20	Itx08i	Religion III (ISSP) 2008	Issp [2008]

Table 3. Number of cases by study and type of selection (women and men)

	Unweighted	*Weighted*	*Age 25-64*	*Valid information on education*	*Valid information on father's occupation*
1 ita63	1568	1568	1307	1280	1248
2 ita68	2500	2500	1909	1904	1852
3 ita72	1841	1841	1385	1383	1344
4 ita75p	1779	1779	1256	1255	1140
5 ita85	5016	5016	3984	3984	3910
6 ita87i	1027	1027	822	822	752
7 ita92i	996	996	853	853	832
8 ita93b	18324	6816	4578	4578	4281
9 ita95b	18529	6495	4385	4385	4163
10 ita97	10913	10913	7542	7542	7056
11 ita98b	16207	4743	3268	3268	3073
12 ita98I	2974	2974	2422	2422	2329
13 itx00b	17486	5323	3673	3673	3322
14 itx02b	16966	5306	3644	3644	3165
15 itx02e	1211	1207	853	853	761
16 itx04b	16584	5926	3983	3983	3379
17 itx04e	1529	1529	1047	1047	995
18 itx05	3000	3000	2039	1887	1735
19 itx05c	1958	1958	1939	1939	1850
20 itx08i	1010	1010	684	684	668
Total	141418	71928	51572	51385	47856

Table 4a. Detailed educational distribution by study, % (Men)

	No Degree/ Illiterate	*Incomplete Primary*	*Complete Primary*	*Incomplete lower secondary*	*Lower Secondary*	*Incomplete/ Intermediate Higer secondary*	*Higher Secondary*	*Lower Tertiary*	*Higher Tertiary*	*N*
1 ita63	4.6	24.3	41.7		13.5		8.7	3.6	3.6	1248
2 ita68		3.8	66.3		13.7	8.8	1.4	2.7	3.2	927
3 ita72		5.4	55.0		18.8	10.6	3.2	2.9	4.1	654
4 ita75p	2.7		11.3	38.7	19.5		16.8	4.5	6.5	558
5 ita85	1.1	6.1	34.8		24.6	4.3	20.9	.4	7.8	1928
6 ita87i	.3	3.3	19.4	3.6	21.0	5.7	29.5	5.5	11.7	366
7 ita92i	.5	1.5	19.2	4.0	22.5	9.0	27.0	9.0	7.2	400
8 ita93b	3.8		23.4		36.1		28.1		8.6	2168
9 ita95b	2.7		22.1		32.5	6.5	27.0	.5	8.8	2063
10 ita97	.3	1.9	17.4		34.2	5.6	29.8	1.0	9.9	3458
11 ita98b	1.5		16.0		32.3	7.4	32.2	.9	9.6	1492
12 ita98l	.3	1.6	18.2		23.9	9.6	36.6	1.3	8.6	1155
13 itx00b	1.8		15.1		33.7	8.5	29.6	1.0	10.2	1651
14 itx02b	1.1		13.1		37.0	8.1	30.2	.7	9.8	1552
15 itx02e	.6		11.3		37.8		39.5	1.7	9.0	344
16 itx04b	.8		10.9		36.1	8.1	33.2	1.0	9.9	1720
17 itx04e		.2	8.3		36.6		38.8	2.6	13.5	503
18 itx05	.6		5.6		43.8	9.5	29.0	1.5	10.0	810
19 itx05c	.1	1.0	9.9		32.2	7.8	35.8	1.1	12.2	1122
20 itx08i		.0	3.3	.6	32.9	8.8	36.6	6.6	11.2	331
Total	1.4	2.5	21.6	1.0	30.5	5.9	26.9	1.5	8.8	24450

Table 4b. Detailed educational distribution by study, % (Women)

	Illiterate	*Incomplete Primary*	*Complete Primary*	*Incomplete lower secondary*	*Lower Secondary*	*Incomplete/ Intermediate Higer secondary*	*Higher Secondary/ Incomplete tertiary*	*Lower Tertiary*	*Higher Tertiary*	*N*
1 ita63										
2 ita68		5.1	75.5		10.4	3.1	3.1	1.4	1.4	925
3 ita72		7.0	69.6		13.8	2.6	4.6	1.3	1.2	690
4 ita75p	4.0		23.0	41.4	14.4		11.2	1.5	4.5	582
5 ita85	2.0	11.3	38.5		19.5	4.9	16.8	1.5	5.4	1982
6 ita87i	1.0	7.0	28.9	2.3	17.4	5.7	25.0	4.9	7.6	384
7 ita92i	1.9	5.1	25.9	2.1	20.8	6.9	28.5	4.2	4.6	432
8 ita93b	6.7		30.3		30.8		25.0		7.2	2112
9 ita95b	5.8		29.0		27.6	5.6	25.2	.4	6.4	2100
10 ita97	.5	4.8	22.5		28.9	4.7	27.3	2.2	9.1	3598
11 ita98b	3.3		21.6		29.1	5.7	30.1	1.1	9.2	1580
12 ita98l	.1	3.7	31.2		20.7	7.2	29.5	1.7	6.0	1176
13 itx00b	3.3		21.7		29.6	7.8	27.3	1.3	9.0	1671
14 itx02b	2.2		19.2		29.7	6.6	31.6	1.1	9.7	1614
15 itx02e	1.2		16.8		32.9		40.0	2.2	7.0	417
16 itx04b	2.2		15.2		30.9	7.2	32.5	1.3	10.8	1661
17 itx04e		1.0	16.2		28.2		39.1	4.5	11.0	493
18 itx05	.2		9.3		36.0	10.9	29.3	3.5	10.9	926
19 itx05c		.8	9.3		23.5	9.1	39.3	1.1	16.9	728
20 itx08i		.3	4.2	2.7	30.7	6.9	37.0	7.8	10.4	335
Total	2.3	2.5	27.0	1.1	26.3	5.1	26.0	1.6	8.0	23406

Table 5. Aggregated educational distribution by study, % (Men and women)

	Primary or lower, Incomplete lower sec.		*Lower secondary, Incomplete /intermediate higher sec.*		*Higher Secondary/ Incomplete tertiary*		*Tertiary*		*N*	
	M	W	M	W	M	W	M	W	M	W
1 ita63	70.5	–	13.5	–	12.3	–	3.6	–	1248	–
2 ita68	70.1	80.6	22.5	13.5	4.1	4.5	3.2	1.4	927	925
3 ita72	60.4	76.6	29.4	16.4	6.1	5.9	4.1	1.2	654	690
4 ita75p	52.7	68.4	19.5	14.4	21.3	12.7	6.5	4.5	558	582
5 ita85	42.0	51.8	28.9	24.4	21.3	18.3	7.8	5.4	1928	1982
6 ita87i	26.4	39.5	27.0	23.1	34.9	29.9	11.7	7.5	366	384
7 ita92i	25.0	34.9	31.5	27.8	36.2	32.6	7.2	4.6	400	432
8 ita93b	27.2	37.0	36.1	30.8	28.1	25.0	8.6	7.2	2168	2112
9 ita95b	24.7	34.8	39.0	33.2	27.6	25.6	8.8	6.4	2063	2100
10 ita97	19.7	27.8	39.8	33.6	30.7	29.5	9.9	9.1	3458	3598
11 ita98b	17.5	24.9	39.7	34.7	33.2	31.1	9.6	9.2	1492	1580
12 ita98l	20.0	34.9	33.5	27.9	37.9	31.1	8.6	6.0	1155	1176
13 itx00b	17.0	25.0	42.2	37.4	30.6	28.6	10.2	9.0	1651	1671
14 itx02b	14.2	21.4	45.1	36.3	30.9	32.7	9.8	9.7	1552	1614
15 itx02e	11.9	18.0	37.8	32.9	41.3	42.2	9.0	7.0	344	417
16 itx04b	11.7	17.4	44.2	38.0	34.2	33.7	9.9	10.8	1720	1661
17 itx04e	6.2	9.5	53.3	46.9	30.5	32.7	10.0	10.9	810	926
18 itx05	11.0	10.1	39.9	32.6	36.9	40.4	12.2	16.9	1122	728
19 itx05c	8.5	17.2	36.6	28.2	41.4	43.6	13.5	11.0	503	493
20 itx08i	4.2	7.2	41.6	37.6	43.1	44.8	11.1	10.4	331	335
Total	26.5	33.0	36.4	31.5	28.4	27.6	8.8	8.0	24450	23406

Table 6. Fit statistics for models without and with linearly constrained scores

Model		df	Men		Women		Total	
			L^2	BIC	L^2	BIC	L^2	BIC
A. Models without row/column scores								
A1	UniDiff	121	252.6	-970.0	215.4	-1001.9	318.8	-985.1
A2	UniDiff + linear trend	131	280.9	-1042.8	233.5	-1084.5	346.0	-1065.6
A3	Constant Social Fluidity	132	282.8	-1051.0	260.8	-1067.2	355.2	-1067.2
B. Heterogeneous conditional association models								
B1	OC, EC, O_cE_cC	72	206.7	-529.2	213.0	-518.9	231.8	-552.0
B2	OC, EC, O_cE_cC_lin	82	237.2	-600.8	225.8	-606.9	272.1	-619.5
B3	OC, EC, O_cE_c	83	238.1	-610.6	272.2	-572.9	289.3	-615.6
C. Conditional association models with linear Origin scores (*)								
C1	B2 + O scores linear	114	268.7	-883.8	245.3	-900.0	323.3	-904.5
C2	C1 + O scores 4,3 parallel	115	269.1	-893.7	245.2	-910.1	323.7	-915.0
C3	C2 + O scores 4,3,5 parallel	116	269.6	-902.9	244.3	-922.2	323.5	-926.2
C4	C3 + O scores 4,2,3,5 parallel	117	269.9	-912.5	243.7	-933.2	323.1	-937.8
C5	C4 + O scores all parallel	118	274.7	-918.1	266.0	-920.7	351.0	-921.6
D. Conditional association models with linear Origin and Education scores (**)								
D1	C4 + E scores linear	133	294.7	-1059.6	248.9	-1099.0	356.5	-1087.5
D2	D1 + E scores 1,4 parallel	134	293.0	-1071.3	251.8	-1106.2	359.0	-1095.8
D3	D3 + E scores 1,3,4 parallel	135	295.3	-1079.1	255.2	-1112.8	365.9	-1099.6
D4	D4 + E scores all parallel	136	382.3	-1002.2	325.4	-1052.6	528.4	-947.9
D5	D4 - C_lin (no trend)	137	295.8	-1088.7	298.9	-1079.1	379.9	-1096.4

(*) Class origin in the following order: 1=IVc+VIIb, 2=V*VI*VIIa, 3=IVab, 4=IIIa, 5=I+II.
(**) Educational levels in the following order: 1=Primary; 2=Lower secondary; 3=Higher secondary; 4=Tertiary.

Table 7. Sensitivity checks: linear trend parameters (intercept and slope) by study

		Men			*Women*		
Study	*Birth years*	*N*	b_0	b_1	*N*	b_0	*Trend*
1 ita63	1899-38	1248	.444	.204	0		
2 ita68	1904-43	927	.448	.812	925	.564	.799
3 ita72	1908-47	654	.255	.859	690	.653	.291
4 ita75p	1911-50	558	.398	.936	582	.407	.709
5 ita85	1921-60	1928	.426	-.039	1982	.599	-.191
6 ita87i	1923-62	367	.715	.009	385	1.163	-.812
7 ita92i	1928-67	400	.952	-.702	432	.840	-.464
8 ita93b	1929-68	2168	.564	-.044	2113	.583	-.035
9 ita95b	1931-70	2063	.512	.071	2100	.962	-.564
10 ita97	1933-72	3458	.477	.014	3598	.761	-.447
11 ita98b	1934-73	1493	.562	-.003	1580	.559	-.036
12 ita98l	1934-73	1154	.424	-.135	1176	.719	-.411
13 itx00b	1936-75	1650	.788	-.268	1672	.729	-.200
14 itx02b	1938-77	1550	.549	.032	1614	.861	-.428
15 itx02e	1939-78	344	1.242	-1.042	417	1.139	-.978
16 itx04b	1940-79	1720	.484	.110	1660	.822	-.379
17 itx04e	1942-81	502	.389	.104	493	1.094	-.833
18 itx05	1941-80	810	.602	-.315	926	.970	-.728
19 itx05c	1941-80	1122	1.239	-.991	728	.924	-.573
20 itx08i	1945-84	333	.333	.105	335	.307	-.021
Overall	1899-1984	24449	.510	-.028	23408	.709	-.316

Note: All trends have been calculated for $B_0 = 1900$; the trend coefficients model the expected change over a century.