Gender-specific Socioeconomic Mortality Differences in Italy: New Insights from Indirect Orphanhood-Based Estimates

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Abstract

We analyze socioeconomic mortality differences among women and men in Italy by using the orphanhood method for the estimation of life expectancy on survey-based information about parental survival. We extend the classic orphanhood method to the application to populations from developed countries where in many cases no data exists for a direct analysis of recent SES-specific mortality differentials. Furthermore, in combination with the specific characteristics of the used surveys, this innovative approach helps to overcome several weaknesses of usual studies on SES-specific mortality differentials. Our analysis provides a time series of education- and occupation-specific life tables for women and men that enable both an analysis of socioeconomic mortality differences in Italy in terms of life expectancy and their changes between 1980 and 1995. Special attention is devoted to the trends and patterns among women since there are remarkable differences to the SES-specific mortality differentials among men: (i) the absolute extent of the differences is considerably lower among women, and (ii) whereas SES-specific mortality differences between the highest SES group and the others increased among men they decreased among women. We discuss the reliability of these results and possible causal mechanisms behind these trends.

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1. INTRODUCTION

The socioeconomic status (SES) gradient in mortality is an often examined and well-known phenomenon. Many studies have shown that these differences in survival chances are not only caused by specific health and mortality risks in connection with occupation but also (and mainly) by health behaviours since there is a strong relationship between individuals' lifestyles and their SES. Since women and men differ in all related aspects like labour-force participation, kind of occupation, and health lifestyles, it is only logical that SES differences in mortality also differ between them. This concerns both, the amount of differences between the SES groups and their specific patterns. Generally, among men the SES mortality differences are bigger (in absolute terms) and the SES mortality gradient is clearer than among women. This leads to the fact that the lowest SES-specific mortality levels of men are usually still higher than the highest female mortality levels (e.g., Vallin 1995).

The study of SES differences in mortality is of big interest not only for scientific reasons but also for policy purposes, e.g., for the determination of retirement ages for different SES groups. However, most studies on SES mortality differences contain several weaknesses for the practical use of policy makers. First, in most studies SES mortality differences are analyzed on the basis of standardized mortality rates for limited age segments or on the basis of relative risks. For most practical purposes, however, information on differences in life expectancy would be more informative. Second, most studies describe mortality differences by education level. For men, this might be a good proxy for other socioeconomic characteristics like kind of occupation or working sector. For women this is not necessarily the case. Additionally, the examination of mortality differences by occupation or working sector is faced with the major problem that the common data sources relate deaths to the current job of the deceased. Consequently, if people are already retired they are registered as retired and not in relation to the job they performed before. This feature has many consequences in industrialized societies since the majority of deceased persons is already retired since long. In this case no useful information for the analysis can be deducted from the data on occupation. Third, SES driven life conditions in young adulthood, rather than at older ages, could cause higher or lower mortality in population subgroups. Finally, the analysis of SES mortality differences among women contains an important conceptual problem regarding the definition of examined variables. The categories of social classes and the socio-professional conditions are usually oriented on working life profiles of men which not always

correspond equivalently to women. Consequently, the social hierarchies of men might not be representative from a more general point of view.

This paper deals with gender-specific socioeconomic mortality differences in Italy. Two aspects are the main reason for this study and make it of high interest for the general research on SES-specific mortality differences. First, existing data on SES-specific mortality based on the linkage of deaths with the Italian census data for the years 1981/1982 (Istat 1990) and 1991/1992 (Istat 2001) revealed unexpected changes in mortality differences by education among Italian women. While the typical and for men still constant mortality gradient of education was similarly visible for women at the beginning of the 1980s, it did not anymore exist at the beginning of the 1990s. In the period 1991/1992 mortality of women with secondary education was approximately at the mortality level of women with primary school education, and also the advantages of women with university degree compared to women with high school degree disappeared (see figure 1). The latter might be explained by an effect of increasing labour force participation leading women of these education groups to a life with higher health risks due to the occupation itself and due to changing lifestyles, i.e., regarding smoking habits. In fact, smoking as one of the most important risk factors for mortality is known to be higher in lower social classes among men. However, among women smoking is a typical habit for members of higher social classes rather than for lower SES groups.

Unfortunately, Istat stopped linking census data with the deaths of the successive months with the census of 1991. Thus, the most promising source for getting more recent data on SES-specific mortality in Italy is not anymore available. This raises the importance of the second main aspect of this paper that concerns the innovative way to estimate SES mortality differences for the Italian population. We propose the use of the so-called ‘orphanhood method’ – a special indirect estimation technique – to estimate mortality differences by SES on survey information about parental survival. Besides providing the possibility to gaining more recent results this method helps to overcome some of the above mentioned major problems of SES mortality studies. Furthermore, this new approach might provide new insights into SES-specific mortality since (i) the Italian Multipurpose Survey includes information about the survival status of respondents’ parents as well as their parents’ education and several job characteristics for the time when the respondents were 14 years old, (ii) the orphanhood method enables the estimation of complete life tables by SES and thus the estimation of differences in life expectancy, and finally (iii) the orphanhood method enables

the estimation of time trends. Combing these new results with the existing linkage data should help to shed light into the still open question of SES-specific mortality differences among Italian women and additionally provide information on SES-related differences in life expectancy for women and men – an information which is still missing in Italy as well as in many other countries with similar problems in SES related mortality data.

In detail, the research questions of this paper are:

- Can the orphanhood method provide reliable estimates for mortality differences by SES to overcome the problem of lacking statistical data?
- If so, do mortality estimates based on SES in young adulthood reveal the same patterns and trends as the well-known patterns and trends of current SES and what do these differences mean in terms of life expectancy?
- Do occupation-specific mortality differentials show the same gradient and trend as mortality differentials by education among women as it is known for men?
- Is the changing pattern of mortality differentials by education among Italian women as described by Istat on the basis of linked census data a real phenomenon or might the result be due to some confounding factors?

2. DATA AND METHODS

2.1. Italian multipurpose survey

For the analysis we use data stemming from the multipurpose survey "Family and social subjects" carried on by Istat (Italian national statistical institute) in the years 1998 and 2003 ("Istat, Famiglia, soggetti sociali e condizione dell'infanzia" 1998 and 2003). Both surveys belong to the system of cross-sectional surveys on Italian families and are representative for the Italian population at higher regional level. The first survey was carried out in June 1998 and includes in total 59,050 individuals from about 20,000 interviewed families. The 2003 survey belongs to the international project "Gender and Generation Program" (GGP) and includes 49,451 individuals. The data contain information about the parents of the respondents such as if they are still alive and if so their age, their highest education level reached and about several characteristics of their job activity when the respondent was about 14 years old. The specific questions are:

- What is the highest education degree your mother and your father obtained?
- Think back when you were 14 years old. What were your mother and father's condition in relation to employment?
- Think back when you were 14 years old. In what economic sector were your mother and father working?
- Think back when you were 14 years old. What was the professional position of both your mother and your father?

The information from these questions enables to link the mortality experiences of respondents' parents with their job in a way that is independent of the current age of the parents. Thus, our mortality analyses is based on SES characteristics of parents belonging to different cohorts, i.e. representing different periods of time, when they were all in active working ages. In this way we avoid that in most of the cases the analysed job status is falling into the 'retired' category.

2.2. The approach of the orphanhood method

The estimation of adult mortality from information on the parents' survival with the orphanhood method is the dominating tool for the indirect estimation of adult mortality levels in developing countries with a lack of existing population statistics (see United Nations 2006, Bradshaw and Timæus 2006). Methodological descriptions can be found in the United Nation's "Manual X" (Hill et al. 1983) or in some more recent publications (Timæus 1991c; Hill et al. 2005; Hill 2006). The demographic relationship between the proportion of orphaned persons and the mortality experiences of their parents has been first described by Lotka (1939) who proposed to estimate the number of orphans from life table functions for adult survivorship. Later, Henry (1960) suggested to reverse this approach in order to estimate adult mortality from the number of orphaned children in cases where the underlying mortality and fertility schedules were known or assumptions could be drawn for applying specific mortality and fertility models. Brass and Hill (1973) further developed this idea, proposing methods to estimate life table survivorship probabilities from proportions of respondents of successive five-year age groups with mother or father alive based on a set of weighting factors (the so-called 'Brass method'). In the subsequent years, several scholars suggested successively improved and modified methods for estimating adult mortality from orphanhood data (Hill and Trussell 1977; Hill et al. 1983; Chackiel and Orellana 1985; Timæus 1991a, Timæus

1991b, Timæus 1992; Timæus and Nunn 1997) or for using two sets of orphanhood data to estimate adult mortality for the time between the surveys (Zlotnik and Hill 1981; Timæus 1986).

The basic idea of the orphanhood method is that the age group of respondents represents the survival time of the mother (or father). Consequently, the proportion of respondents of a given age group with mother (or father) alive approximates a survivorship ratio from an average age at childbirth to that age plus the age of the respondents. The available methods model this relation using different patterns of fertility, mortality and age composition to allow the conversion of a proportion with parent surviving into a life table survivorship probability, controlling for the actual pattern of childbearing. Moreover, Brass and Bamgboye (1981) and Hill et al. (1983) developed general methods for estimating the reference date of estimates derived from data on the survival of parents. Chackiel and Orellana (1985) extended this approach for the case of known year of death of respondents' mothers.

The Italian multipurpose surveys provide all information necessary to apply the approach of the orphanhood method with very nearly a maximum of possibilities, since in addition to the age of respondents and the information whether their fathers and mothers are still alive even the age of the still-living parents is included. Therefore also age at childbirth can be determined for all examined subgroups when adjusted for the missing ages of deceased parents. Tables 1 and 2 summarize the numbers for the total population included in the 1998 and 2003 surveys, respectively, divided into five-year age groups. With the exception of maternal orphanhood in age group 20-24, the case numbers are sufficient to analyze mortality differentials by means of the orphanhood method.

2.3. The extended orphanhood method (EOM)

Regarding the application of the orphanhood method in developing countries there is no clear consensus among demographers on its validity and it has been applied with mixed success (a conclusion arrived at by Hill 1984; Timæus and Graham 1989; Timæus 1991c). Typical problems are seen in a possible adoption effect (respondents whose parents have died are likely to be reared by another adult and may not even know that this person is not their biological parent), multi-reporting (the frequency of reporting about each parent depends on his or her number of surviving children and thus is connected to both, mortality and fertility

levels of the family), selection effects (regarding fathers and mothers if there is a relationship between parity and mortality and regarding respondents if there is a relationship between parental and child mortality) and wrong age reports of the respondents. Another critical issue is the specific choice of theoretical fertility and mortality models underlying the different approaches to convert a proportion of not-orphaned respondents into life table estimates that do not necessarily reflect the real demographic conditions of the studied population in conjunction with the basic assumption of constant mortality.

In developing countries the use of such theoretical population models is necessary since no data exist about the basic fertility and mortality patterns. However, such basic data are well known for populations of developed countries. Consequently, there is no need to use uncertain demographic models or the assumption of constant demographic conditions in order to estimate overall levels and trends of fertility or mortality. Age-specific fertility and mortality patterns are available in detail for both, periods and cohorts. Similarly, an adoption effect and wrong age reporting are unlikely to bias orphanhood-based estimates in modern developed populations. Furthermore, the biases caused by multi-reporting and various kinds of selection are to some extent mutually offsetting and thus considered to be small and rather unimportant (Palloni et al. 1984).

In order to improve the availability of information on specific mortality differentials in cases where no official data are available, Luy (2009) modified and extended the orphanhood method to permit its application to populations of developed countries and provided the tools necessary to estimate group-specific life tables from the Italian multipurpose survey data. These tools are (i) a set of values to derive the average age at childbirth of all parents from the information about age at childbirth of still-living parents only, (ii) a set of weighting factors to convert the empirical values for S(n) into survivorship probabilities l(33+n)/l(30) and (iii) a set of parameters for determining the corresponding reference periods (thus, the calendar years to which the survivorship estimates refer to). Each tool is presented in tabulated form for five-year age groups of respondents and variable ages at childbirth (see Luy 2009). Either set is based on the real cohort survival experiences of respondents' parents and modeled for different age-specific fertility schedules representing average ages at childbirth from 22.0 to 35.0 for mothers and 24.0 to 37.0 for fathers, respectively. By using the Brass' logit life table model (Brass 1971; Brass 1975) with an appropriate Italian life table as standard, the derived survivorship probabilities can then be transferred into complete life tables from age 30

depending on the proportion of mothers/fathers alive and the corresponding age at childbirth as given from the analyzed survey data. Empirical tests of the extended orphanhood method (EOM) suggest that it can be used successfully and that it provides several new possibilities for the analysis of mortality differentials, as will be briefly summarized below. Then, we will apply this method to estimate life expectancy differentials by education level and occupation status of Italian women and men.

3. RESULTS

3.1. Functionality of the orphanhood method

Although the case numbers of the Italian multipurpose surveys are comparatively high, Luy (2009) and Luy et al. (2009) have shown that the orphanhood-based estimates for life expectancy are subject to irregular fluctuations. This could become a severe problem when population subgroups with lower case numbers are analyzed. In order to better control for this possible bias when analyzing mortality differentials we summarized the estimates for the five-year periods 1980-1984, 1985-1989 and 1990-1994 by calculating weighted averages for these periods (with the weights being the case numbers underlying the different estimates for life expectancy) and excluding the information on maternal orphanhood from respondents born between 1938 and 1942. (The estimates based on information of these cohorts show in both surveys extreme low mortality levels, affecting not only the estimates for life expectancy but also the derived reference periods. This obvious cohort effect is possibly due to the wartime years in which these respondents lived their early childhood and might reflect a specific adoption effect, see Luy 2009). Figure 2 shows the estimates obtained using the EOM averaged for the three quinquennials 1980-1984, 1985-1989 and 1990-1994 in comparison to estimates based on data from the Human Mortality Database (HMD) which refer to official Italian population statistics. The graph elucidates the functionality of the EOM for the analysis of mortality differentials since it shows that the two aspects required for approving reliable mortality estimates are reflected accordingly: the trends of rising life expectancy as depicted by the HMD estimates and the higher level of life expectancy that must be expected from orphanhood-based estimates.[1]

[1] By its pure nature, orphanhood-based estimates exclusively refer to parous women and men (with surviving children). Several studies have shown that women with children have significantly lower

The data on paternal orphanhood of the two surveys further allow to test if the proposed method can provide reliable results for analyzing the mortality of subgroups since estimates for the period 1985-1989 can be obtained from both the 1998 and the 2003 survey (see Fig. 2). Figure 3 displays the corresponding estimates for life expectancy at age 30 by education level and occupation status.[2] The 2003 survey provides lower estimates for life expectancy than the 1998 survey for the years 1985-1989, which holds for the total population as well as for every population subgroup (for further details, see Luy 2009). This is, however, no problem for the application of the method. First, as we have just seen, all population subgroups are affected similarly by this effect. Second, since the values for life expectancy obtained by the orphanhood method are difficult to assess by its pure nature, it is preferable to use the differences in life expectancy to a specific reference group instead of analyzing and comparing the total values. Since we can assume that both the causal effects and the structural

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mortality than nulliparous women, although among parous women mortality seems to increase at higher parities. However, since parities of four and more children are the minority among the parous Italian population we can assume that the positive effect of having children dominates the negative effect of higher parities. Furthermore, in Italy childbearing occurs almost exclusively among married women and men whose lower mortality as compared to unmarried persons has been shown in many studies and for many populations. Aside from these causal effects there is also a structural effect leading to a better survival of women and men with children. Regarding the survivorship curve, and thus life expectancy, deaths at younger ages have a stronger impact on overall mortality than deaths at older ages. The closer deaths occur to the beginning of the reproductive life span the more likely they affect childless individuals. Thus, the population of parents necessarily experiences better longitudinal survival than all individuals. Consequently, both the causal effects and the structural effect must entail a higher life expectancy for the population of parents as compared to the life expectancy of the total population including nulliparous women and men.

[2] The estimates were derived with the EOM transferring the resulting survivorship probabilities into complete life tables from age 30 with the Brass logit life table model. Values for the Brass parameter β were estimated from education- and occupation-specific death rates for age groups 18-29, 30-44, 45-54, 55-64 and 65-74 published by Istat (2001) for the years 1991-1992. The corresponding β's for males/females are: elementary education 0.84187/0.90674, lower secondary education 0.85633/0.96559, upper secondary education 0.95302/0.94881, tertiary education 1.07845/1.03771, manual workers 1.17250/1.00811, non manual workers 1.09398/1.00786 and professionals 0.94072/0.96267. For economically inactive and self-employed women and men β has been set to 1.0 because the death rates available from Istat are not fully comparable due to different compositions of the occupation groups as compared to the multipurpose survey.

effect affect all population subgroups similarly, the interpretation of differences in life expectancy in relation to a reference group seems the best way to interpret such orphanhood-based estimates.

Concerning the applicability of the EOM it is much more important whether the two surveys provide similar results regarding the patterns of education- and occupation-specific differences in life expectancy for the period 1985-1989. Figure 3 shows that this holds very well for the occupation groups analyzed. The data from both surveys provide the same order from the lowest to the highest level of life expectancy, i.e., economically inactive men, manual workers, non-manual workers, self-employed men and professionals. Even the relative differences between the groups are comparable. The same holds for the education groups elementary, lower secondary and upper secondary, with lower secondary education showing the lowest and upper secondary education the highest life expectancy of these three groups. Men with tertiary education are the only subgroup for which the results based on the two surveys differ. According to the 1998 survey men with tertiary education have the highest life expectancy, whereas according to the 2003 survey men with tertiary education fall in between men with lower and men with upper secondary education, being close to the level of elementary education. These differing results for tertiary education are probably due to the low case numbers for this education group (only one estimate based on 58 deaths of the 2003 survey falls into the years 1985-1989). Nevertheless, all other results indicate that the EOM provides stable results for the analysis of population subgroups.

3.2. SES-specific mortality differentials among Italian women and men

Figure 4 shows the obtained results for differences in life expectancy by education and occupation for women and men in the periods 1980-1984, 1985-1989, and 1990-1994. Due to the lower mortality of women and the resulting more recent reference periods as compared to men, estimates for the period 1980-1984 can be obtained for men only. Furthermore, since the reference periods for the life expectancy estimates from the two surveys overlap for men (see Figure 2), the estimates for male life expectancy are combined results from the two surveys with weighted averages of the single estimates falling into the corresponding five-year periods. For women, the estimates for the periods 1985-1989 and 1990-1994 refer exclusively to the data from the 1998 and 2003 survey, respectively.

Generally, results obtained by indirect methods from survey data should be interpreted with more caution than results from complete official statistics for the total population. Thus, results like those shown in Figure 4 should not be evaluated and interpreted by means of the exact values of the estimates. Nevertheless, indirect estimates provide insights into trends and levels of mortality differentials. Regarding the estimates for mortality differences by education among men three conclusions can be drawn from the results: (i) there is a clear and stable pattern of mortality differentials among lower secondary, upper secondary and tertiary education as already described in section 3.1, (ii) men with elementary school education (reference group) felt in the hierarchy during the observed time from being the group with the second highest life expectancy level to being the group with the lowest level, and (iii) the differences between elementary education and the higher education levels increased in the more recent years. Among women, a similar education gradient can be seen for the period 1985-1989. The differences between elementary education level on the one side and lower and upper secondary education level on the other side increased in the period 1985-1989 similar to what can be observed among men, however, on a lower level of differences as it is known from many other developed countries (see, e.g., Shkolnikov et al. 2006, Deboosere et al. 2008). Women with tertiary level education, however, felt below the level of elementary school education in the period 1990-1994. To some extent, this result is compatible to the results of Istat for women with university degree (see Figure 1). Similar observations have been made recently for instance in the Czech Republic (Rychtarikova, 2008). We expect this effect to be real and to be explained by harmful health lifestyles and increased occupational stress among higher educated women. Our future research will further investigate this hypothesis.

Some of the characteristics of mortality differences by education can be found similarly in mortality differences by occupation. Note that the information about the type of occupation does not refer to the current or last occupation of respondents' parents but to the time when the respondents were 14 years old. Among men, again, three conclusions can be drawn: (i) economically inactive men have the highest mortality, the differences seem to increase with time with a disadvantage of more than five years (according to the data even more than seven years) as compared to the manual workers (reference group), (ii) manual workers have higher mortality than self-employed men, non manual workers and professionals, however the differences to self-employed men and non manual worker being on a low and decreasing level, and (iii) the disadvantages of manual workers to professionals increased with time and

reached a level of around three years in the periods 1985-1989 and 1990-1994. Among women, in the period 1985-1989 the mortality differences by occupation show a similar picture as they do among men. The biggest difference is that the disadvantage of inactive persons is much lower among women as it is among men. This makes sense since inactive women are mainly housewives, whereas among men the group of inactive people usually contains predominantly ill persons and individuals of lowest socioeconomic status (see, e.g., Hemström 1999). The results for female mortality differentials for the second period 1990-1994 are similar to those of the first period 1985-1989. Notable is the decreased advantage of the professionals as compared to the other occupation groups. This is in line with the findings regarding mortality differences in education as described above.

4. SHORT SUMMARY AND DISCUSSION OF MAIN RESULTS

In the following we comment briefly our results in light of the research questions as outlined at the end of the introduction.

The tests of the proposed method for the indirect estimation of mortality differentials (EOM) have proven to provide reliable estimates. This is important since many developed countries lack of official population data to investigate SES mortality differentials. At the same time there exists an increasing number of high quality survey data with the necessary information about survival and SES characteristics of respondents' parents, like the Gender and Generations Program (GGP). The only minor qualification of estimating SES mortality differentials from survey data by means of the EOM is the extraordinary high mortality of mothers and fathers with unknown education (not shown in Figures 3 and 4). Several reasons might cause this effect. First, this group might contain mainly women and men with not reported lowest education (or even no final school education). Second, respondents connect the education of their parents with the job activity. Thus, it might be easier to assess higher parental education, e.g., when the father or the mother is working as a school teacher. Both factors would lead to causal effects between unknown parental education and the high mortality this population group. Third, it might be that the education of the respondents is linked to the quality of their answers. Thus, lower educated people might simply not know anything about the education of their parents. Since in most cases low education of children is correlated to low education of the parents, this would be mainly a third causal effect.

However, on the other side it might be that the education of parents is unknown because of their early death. If this were the case, the results would be affected by a kind of mortality bias. The latter is supported by the fact that lacking knowledge of parental education and professional position increases with age of respondents (regarding mothers: 14-339 persons from the youngest to the highest age group (0.3-10.7%), regarding fathers: 32-343 persons from the youngest to the highest age group (0.8-10.8%)). Since we expect this to be the main cause for the high mortality of parents with unknown education and since the case numbers are low we refrained from including cases with unknown education level and occupation status into the analysis. Regarding occupation status the situation is similar and we excluded parents with unknown occupation from the analysis as well (regarding mothers: 85-179 persons from the youngest to the highest age group (2.1-5.6%), regarding fathers: 132-278 persons from the youngest to the highest age group (3.2-8.8%)).

The results obtained by the EOM show basically the same education gradient in mortality among men as the results of Istat (linked census data) regarding lower secondary, upper secondary and tertiary education. For the last observation period 1990-1995 this holds for primary education as well. (In the periods 1980-1984 and 1985-1989 primary education falls in between the other education levels. In this respect, our estimates differ from the results of Istat.) The orphanhood-based estimates allow transferring this education gradient in mortality into terms of life expectancy. As compared to primary education level, men with lower secondary education have approximately the same life expectancy, men with upper secondary education have a higher life expectancy of about two years, and men with tertiary education have a higher life expectancy of around seven years. The estimates indicate that the advantage of men with tertiary education increased during the 1980s and 1990s, as reflected similarly by the results of Istat. Among women, the results obtained by the EOM confirm the results of Istat as well – at least to a certain extent. Whereas women with tertiary education had – according to our orphanhood-based estimates – a 2-3 years higher life expectancy than the other education groups in the second half of the 1980s, they lost this advantage completely during the first half of the 1990s. The differences between the other education groups are almost negligible and range on maximum around 1-2 years in life expectancy.

Our results indicate – regarding education-specific mortality differences in conjunction with the results of the Isat analysis – that the basic SES gradient in mortality is the same between women and men. However, there are two notable differences: (i) the absolute extent of these

differences (measures in terms of life expectancy) is considerably higher among men than among women, and (ii) whereas SES mortality differences between the highest SES group and the others increased among men they decreased among women. The first might be explained by an increasing variability of the SES composition of the population and a stronger selection of men with low SES. Among women, these effects seem to be overlaid by the effects of increased harmful lifestyles (mainly smoking) and occupational stress in the highest SES group.

Our results for mortality differences by occupation status confirm the results obtained for mortality differences by education. Among men we found increasing mortality differences between professionals on the one side and manual workers and self-employed men on the other side. Among women we found the effect of decreasing mortality differences between professionals and the other occupation groups what confirms the results of the loss of the survival advantage of women with tertiary education. Regarding our research question if occupation-specific mortality differences draw the same picture as education-specific mortality differences among women (as it is known for men) we found that this is in fact the case. Thus, also among women education seems to be a good and appropriate proxy for other characteristics of SES.

In the future it would be interesting to apply the EOM to the 2008 Italian multipurpose survey. This would enable to investigate whether this specific trend of socioeconomic mortality differences among Italian women vanished, still persists or even continued to reverse the typical SES mortality gradient since the beginning of the 1990s.

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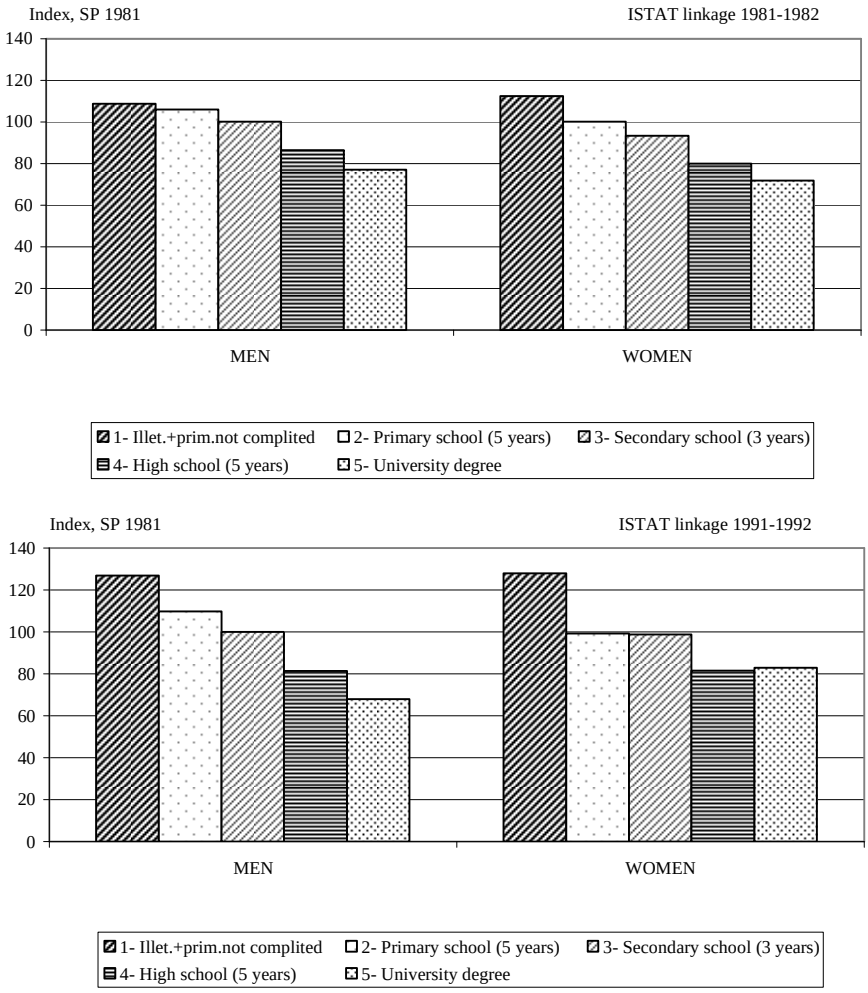
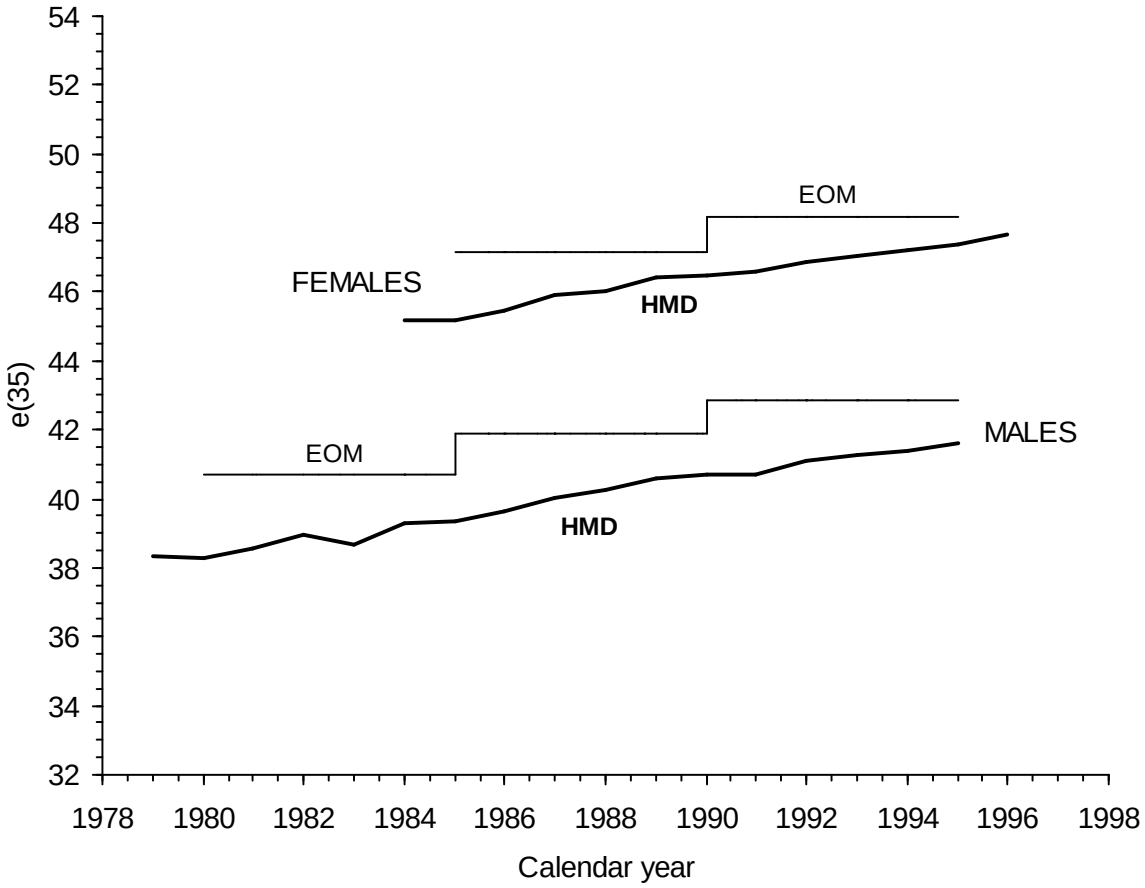
FIGURES AND TABLES

Figure 1: Relative standardized mortality rates by education for Italian women and men, periods 1981/1982 and 1991/1992, basic=100 (total mortality, sex-specific)



Note: for both periods the mortality rates are standardized with the total Italian census population of 1981; Source: Istat 1990, 2001, own calculations.

Figure 2: Estimates for female and male life expectancy at age 35 by applying the extended orphanhood method (EOM) averaged for the calendar years 1980-1984, 1985-1989 and 1990-1994 from the Italian 1998 and 2003 multipurpose surveys



Note: HMD = values for e(35) derived from life tables from the Human Mortality Database for the total Italian population

Figure 3: Estimates for male life expectancy at age 30 by education level and occupation status for the period 1985-1989 according to the Italian 1998 and 2003 multipurpose surveys

Figure 4: Differences in life expectancy at age 30 by education level (as difference from elementary education level) and occupation status (as difference from manual workers) for the periods 1980-1984 (males only), 1985-1989 and 1990-1994, Italian 1998 and 2003 multipurpose surveys

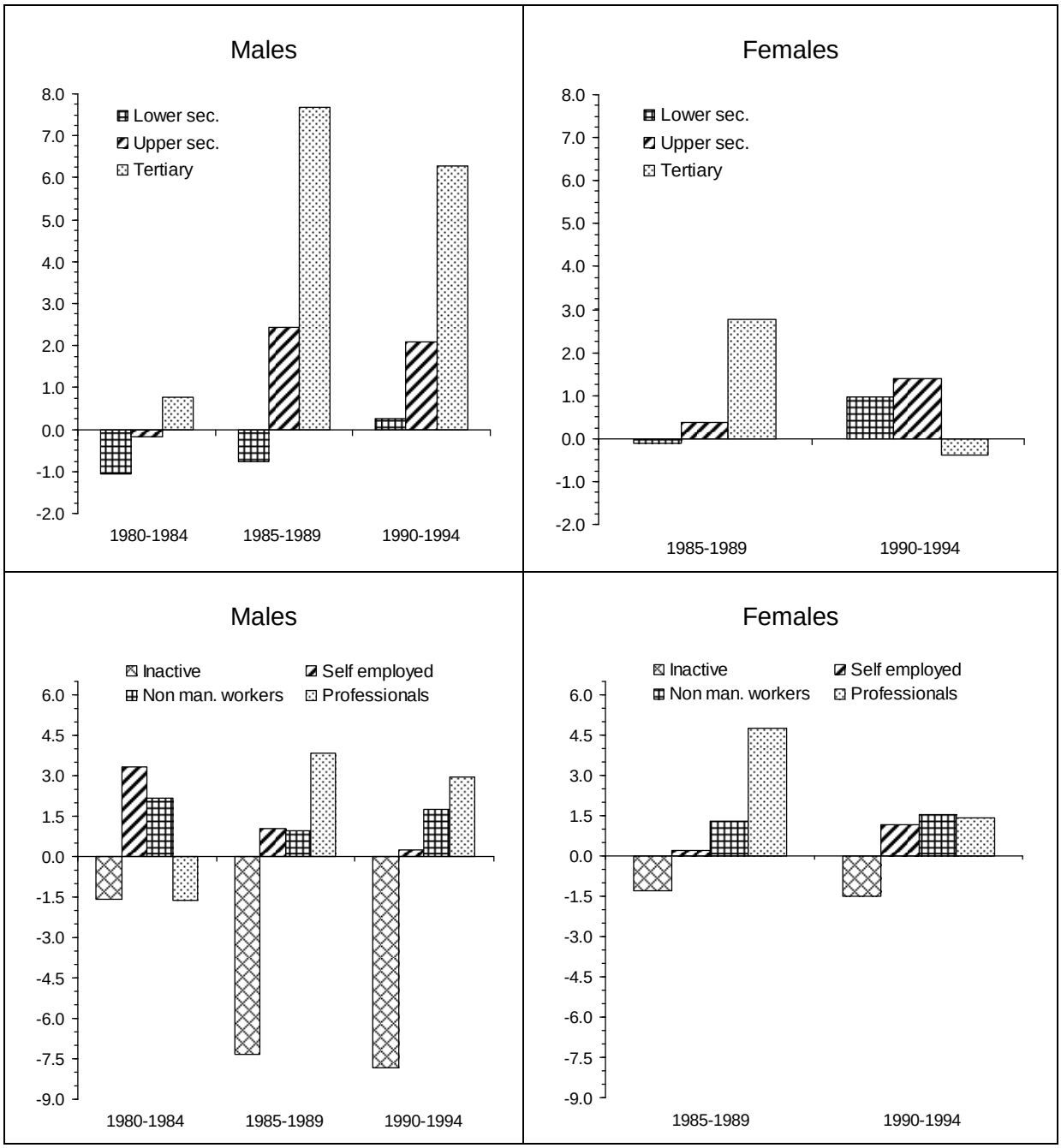


Table 1: Number of respondents aged (n, n+4) with mothers/fathers alive/dead and mean age at childbirth (A.C.B.) of still living mothers/fathers, Italian multipurpose survey 1998

Age n	Maternal orphanhood			Paternal orphanhood		
	Mothers alive	Mothers dead	Mothers' A.C.B	Fathers alive	Fathers dead	Fathers' A.C.B.
20	3,694	47	27.27	3,525	215	31.14
25	3,966	136	28.06	3,614	488	31.60
30	4,152	295	28.45	3,586	861	31.99
35	3,902	485	28.64	2,993	1,393	31.42
40	3,327	754	28.20	2,170	1,912	30.93
45	2,663	1,221	27.59	1,145	2,469	29.86
50	1,895	1,736	27.19	804	2,827	29.12
55	1,233	2,282	26.17	400	3,116	28.23
60	670	2,502	25.01	189	2,983	26.91

Table 2: Number of respondents aged (n, n+4) with mothers/fathers alive/dead and mean age at childbirth (A.C.B.) of still living mothers/fathers, Italian multipurpose survey 2003

Age n	Maternal orphanhood			Paternal orphanhood		
	Mothers alive	Mothers dead	Mothers' A.C.B	Fathers alive	Fathers dead	Fathers' A.C.B.
20	2,616	44	27.15	2,504	156	31.01
25	3,023	129	27.38	2,830	316	31.02
30	3,347	244	27.86	3,018	560	31.14
35	3,532	408	28.42	2,812	1,119	31.25
40	3,112	651	28.28	2,234	1,526	30.88
45	2,276	898	27.61	1,380	1,793	29.85
50	1,760	1,327	26.73	803	2,276	28.53
55	1,231	1,973	25.84	415	2,776	27.71
60	553	2,216	25.03	138	2,616	26.67