A gender-specific widening in social mortality differentials in France in the prism of the changing class distribution and careers

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ABSTRACT

Context: Occupational differentials in mortality in France are large and have widened over time. They are partly explained by socially differentiated health risks and exposures met over the life course and career. They are also explained by a health related selection process which regulates the access to a class. Mortality is therefore linked to the occupational mobility, beyond occupational classes. While occupational structure and drivers of careers have dramatically changed over the past decades, this study explores to what extent such structural changes have contributed to the widening of the occupational differentials in mortality and to the gender differences.

Data: We replicate the analysis presented in a previous study. Based on the French longitudinal census sample, we compute annual standardized mortality rates (AMR) for occupational classes in 1999 census, with a 5 year mortality follow-up (1999-03). We then compute standardized mortality ratios (SMR) associated to occupational mobility defined by current (1999) and past (1990) occupations (N= 295,472 subjects aged 30 to 84 years old in 1999). We compare the results with the previous study (based on 1968/1975 mobility and 1975-80 mortality). We finally estimate the contribution of the structural changes by estimating the classes' AMR and SMR which would have been obtained for 1999 if no structural changes would have occurred (with the 1968/1975 mobility and 1999-03 mortality).

Results: Occupational differentials for men have increased over the period (from 1.0 to 2.0 SMR differences). For women, differentials were almost inexistent in 1975 (0.3 SMR difference) but tended to slightly extend over the period due to a significant increase in the excess mortality for manual workers and the inactive. As in 1975, not only classes but past careers are strongly linked to mortality in the recent period. In 1999 the SMR associated with outflows towards inactivity have massively increased for both sexes as well as outflows towards clerks manual workers in the female population. Structural changes over the period have contributed to increase the SMR of male and female inactive and female manual workers and to limit the decrease in the other female classes.

Conclusion: This study has confirmed the widening gap in mortality for both men and women. It shows the contribution of population changes to these increasing differentials in mortality. The modification in the population distribution has clearly affected the size of the inequalities. These changes have differed in male and female populations, prolonging a gender specific association between mortality and the occupational classes in recent years, despite deep modifications observed.

INTRODUCTION

Social and occupational differentials in mortality are large in France. In early 2000's, men in highly qualified occupations at age 35 could expect to live 6 more years than manual workers [1]. While the difference is smaller in female population, with a 2 year gap in life expectancy, there are still some specific health and mortality risks associated with their occupational status. According to the scarce studies in France which have regarded trends over time, social differentials have widened over time, at least for male population; especially when considering the inactive class which has become more disadvantaged with time compared to the rest of the population [2-4]. Looking at causes of death, the increased differential is found more specifically for mortality by cancer and cardiovascular diseases which has decreased more over time in the upper occupational or educational classes [5-7]. Changing health factors partly explained the widening gap in France, and elsewhere, while they have modified the health and mortality risks to a greater extent in the already advantaged social groups [8-11]. Differentials are partly explained by socially differentiated health risks: health behaviours (tobacco consumption, diet, physical activities), but also for prevention (detection, monitoring, caring etc.) and exposition to health risks (damaging work conditions). And the social epidemiology suggests a marking impact of these health risks and exposures met all over the life course and career [12-16].

But social inequalities are also the result of a health related selection process which has been actively debated since the 1980's [17-19]. The selection process leads people who benefit favourable environments over their life course to be healthier, have greater chances to get qualified and to access the more favourable social position. On the opposite, unfavourable environment, limited training, poor health, job instability are factors of low qualified occupation, high risks of job loss or downward mobility. Indeed, social mobility in France is driven by such factors: high qualifications increases the chance of upward mobility or access to upper classes [20] or job instability (short term contracts), past period of unemployment and low qualifications reduce it [21, 22].

As a consequence of these exposures and selection process, a number of studies have highlighted the strong association between health and mortality and situation of job loss or upward and downward careers, beyond the association observed with occupational classes [17, 23-31].

Meanwhile, the occupational distribution of the population, as well as careers and the drivers for accessing occupational classes have significantly changed over time. In France, it has modified the distribution of the classes regarding the type of activity and job contents [20]. For instance, while the proportion of unskilled manual workers decreased, one can observe that the class has not benefitted the overall increase in the level of education. This class is today a selection of people who couldn't complete any school degree, being marginalized regarding the generalised access to education. In the other end of the social gradient, the increasing proportion of people involved in upper qualified occupation is linked to this generalised access to education, even to the higher degrees. Vallet has illustrated this pattern while he found "a weakening in the relative occupational advantage afforded by education" [32]. On the contrary to the unskilled manual workers,

the upper qualified occupation class is not as selective as it was before due to a larger proportion of highly educated people accessing this class.

The average mortality risks associated in the occupational could be affected by this reorganisation. Indeed, changes in the educational level in the population and within occupational classes, as well as changes in age structure of the classes, has contributed to the alteration of social gradient in older ages mortality differentials [3]. In the same line, Leclerc and colleagues also raised the assumption that the increase in the relative mortality risks for the inactive, observed in their study quoted before, has probably to do with a sharper selection on health or health related factors of those who become inactive [2].

Therefore, in this study we explore how far the changing distribution between and within the occupational classes has contributed to the changing occupational differentials in mortality. Our study is based on the French study which has highlighted the mobility-mortality gradient for the 1970's [30]. Thank to the recent update in the database used, it possible to reproduce the analysis and therefore to compare the situation at two points in time: the distribution of the classes according to past careers, the mortality risks associated to the classes and to past careers. In this new study, we prolonged the analysis to assess the contribution of the structural changes to the occupational observed in the recent period. This analysis finally aims to add new elements to explain the large gender differences in the mortality differentials.

Context

Mortality and mobility in the 1970's

The previous study for France allowed to identify disparities between occupational classes as reported in 1975 at census and disparities within the classes related to past career, ie the occupational class reported at previous census in 1968. For men, the study highlighted large mortality differences between 1975 occupational classes and differences within the classes between those who were stable in the class and those who were in another class earlier (in 1968). The inflows towards inactivity, considered as one of the class in the study, is systematically associated with the high mortality risk, being in between the risks of the stable inactive (being the highest risks) and the risk of the stable in past occupation classes. They represent small size groups and it is likely that these movers are, for a number of them, sick people being unable to remain in the labour force. This is confirmed by other studies and recently for France [33] and illustrate in a dynamic way the "healthy worker effect".

More generally, in the study downward mobility (ie. foreman to salaried manual worker) shows higher mortality risks than the stable in the class of origin. Meanwhile the upward movers (ie. qualified administrative clerks to managerial occupations) benefit a lower risks than the stable at origin. Interestingly, the relative risks of the movers were closer to the risk of the stable in the class they joined than to the risk of the stable in the class they left. This "healthy upward movers effect" extends the concept of "healthy worker effect". This pattern regarding the mobility-mortality gradient was common to the other studies, even if the age range and method

were not the same, and refers to the "gradient constraint" [27, 34]: the occupational mobility-mortality gradient for men is comprised within the occupational class gradient. This pattern might illustrate the fact that upward movers are the healthy individuals of their class at origin, downward movers being in poor health, as found in French cohort studies [33] and elsewhere [26, 35, 36]. This can also illustrate exposure to the life and work conditions at destination that could have change the risk of the movers over time.

The French study showed a contrasting pattern for women. Differences in mortality between occupational classes were small and the ranking of the classes was slightly different, farmer being clearly in a worst situation in the female gradient than in the male gradient. Few occupational pathways displayed significant different risks compared to the stable in the origin and destination classes. Only mobility towards inactivity from upper qualified occupations, clerks and manual workers is associated with an excess mortality. In female population, these group have higher risks than both origin and destination classes. The gradient constraint for mortality was not found for women in France and excess mortality risks of the movers referred to a "strong selection effect", suggesting that the movers are selected on health criteria more strongly than the average pattern in the class they joined [34]. Indeed, the female movers, falling in the "healthy mover effect" process, are probably selected on health related characteristics while the female occupation classes are not as systematically as in male population [37-40].

Changes in the occupational distribution and careers drivers

Over the past decades, there were concurrently a continuing decline in mortality and massive changes in the occupational distribution of the male and populations: a massive increase in the participation of women in the labour force, an increase in the proportion of people in the highly-qualified occupations and a sharp fall in the proportion in farming activity for both sexes. The increasing importance of the tertiary sector, together with the decline in agricultural activities are responsible for these changes have also impacted the structure of the occupational classes, regarding age, training, skill or past careers [20, 21, 41].

These changes have probably affected the job content and work conditions in the occupational classes. Furthermore, economic and social changes impact careers opportunities and the degree of selection on individual factors to access occupations [38, 42, 43]. While such factors are also strongly correlated to mortality the changes would impact the level of mortality in the occupational classes and the size of the differentials. In this study; we propose to use French data to measure the widening of the mortality differentials over a 25 year period and the contribution of the changing mobility-mortality patterns in the widening of the differentials.

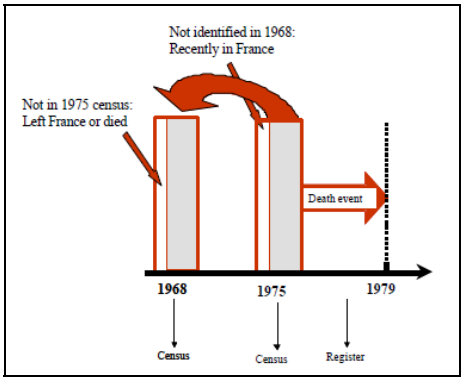
DATA AND METHODS

Database

To study the mobility related mortality, we need to document individual occupational class at two points in time and have a mortality follow-up. The EDP set up by INSEE is a French longitudinal census sample,

representative of the French population, matches census variables with the national identity register, which comprises death records for individuals born after 1890, of French nationality and living in France representing about 90% of the total population on the census (excluding foreign born and oversees born). It provides census information in 1968, 1975, 1982, 1990, 1999. The database was only partially matched with civil register until recently. Since, the database has been completed by INSEE allowing to repeat the study with the most recent censuses. In this paper, we focus only on the 1990 and 1999 to update the study. We only use the individual information relying on two censuses first to keep most of the sample in the study, while we would have to exclude those with missing information on occupation status to one or more censuses; second, to ensure a sufficient size of the mobility group after stratification by past occupation, sex, age groups (analysis would have been much less robust by multiplying the possible mobility patterns observable with more than 2 points in time). Finally, in this approach, we use the database in a retrospective way, as it was done in the previous study (Box 1). This retrospective approach aims to enhance the usual information on the differentials between classes by looking at the impact of past experiences and highlighting changing patterns. Indeed, being retrospective rather than prospective, this approach allows to analyse the mobility-mortality patterns getting rid of the mortality selection that operates between the two censuses. While mortality selection has also changed over time and in different ways for the occupational classes, it would have been difficult to compare the two periods. This database gives information about careers only at censuses, 9 years apart, and does not allow to precisely treat the information about careers for those who did not survived to the next census.

Box 1: Mortality related to occupational classes and past mobility: a retrospective approach



Source [30]

Study population

The French classification of occupational classes takes account of various social characteristics related to the occupation: qualifications and skill level, activity status (salaried, self-employed, etc.), type of work (manual, non-manual) and level of income [44]. It is intended to reflect not only working conditions but also general social background and material context, similarly to the UK occupational classification [45]. This study is based on the most aggregated level of the classification: 6 occupational classes of active (comprising the employed and unemployed), the retired classes and the economically inactive. The classification is summarised in Box 2.

As often in French studies on mortality differentials, the retired and the unemployed were classified according to their previous occupation. The economically inactive, other than retired, were left in a separate class in order to highlight the "healthy worker effect" in a dynamic way, by considering specifically pathways out of labour force for other reason than regular retirement. We do not have detailed information on this class: a small proportion are student and most are inactive who did not provide any information on any previous occupation, even if they might have one before). Meanwhile, it remains important to consider this class in such studies. Finally, given the small number of deaths in some classes and age groups, we combined the highly-qualified and intermediary occupations into a same class, the upper qualified occupations, in order to increase the statistical robustness of the estimates.

Box 2: The occupational classification

Short label	Example of occupations	Comments
Upper qualified occupations	**Highly-qualified:** Intellectual occupations, upper managerial staff and administrators, medical doctors, independent professionals, engineers	Salaried occupations, above-average income, higher qualifications through education or by career experience.
	Intermediary: Teachers, skilled technicians, foremen, medical and social workers, intermediary managerial and administrators, clergy	
Clerks	**Sale and clerical employees:** Civil servants, police and army, company administrative staff, sales and direct personal services	Salaried occupations, low income, low qualifications, hard working conditions above-average risk of unemployment.
Manual workers	**Manual workers** Skilled, unskilled and farm workers	
Farmers	**Farmers** Various size farm business	Self-employed occupations, gathering diverse social situations (size of business, etc.) but with common features (managing own business, past salaried job experience, etc.)
Craft and trade business owners	**Business, trade and craft self-employed occupations** Shop owners, firm managers, craft industry, independent workers (plumbers, electrician, etc.).	
Retired	**Retired** from highly qualified, intermediary, clerical and sales, manual workers and self-employment occupations.	Can be considered as a separate class or by re-introducing the sub-class into the class of their previous occupation.
Inactive people	**Economically inactive** Students, conscripts, disability pensioners, currently not working for other reason than employment or retirement.	Currently not employed (except retired and unemployed who can be classified in the class of previous occupation).

The previous study was constructed on sub-sample of individuals recorded in the 1975 census, looking at the occupational class reported in 1975 and retrospectively at the occupational class reported in the 1968 census (212,992 individuals aged 30 to 84 in 1975) and matched with mortality records over 1975-1980 (13,523 deaths). The new study examines the sub-sample of individuals recorded in the 1999 census (295,472 individuals aged 30 to 84) matched with mortality data collected over the 5 year-period 1999-2003 (13,399 death). Table 1 shows the distribution of the study population into the 7 occupational classes reported in the 1975 and 1999 censuses and the 49 mobile and stable groups occupations at previous censuses (1968 and 1975).

Over the first period, 80% of men and 72% of women were in the same occupational group at both census. Upper qualified occupations and the inactive in 1975 comprises the largest proportion of stable in female population, while the corresponding classes are farmers (90%) and manual workers (87%) in male population. Over the second period, they were only respectively 67% and 60%, with farmers, clerks and inactive being in 1999 being composed of the largest proportion of stable for female and with farmers, manual workers and upper qualified occupations for men.

Table 1.a Size of the occupational classes and mobility groups (and part of the population) based on reported occupation in 1990 and 1999 censuses and number of deaths recorded between 1999 and 2003

Men aged 30-84 years old in 1975, identified in 1968 and 1975 (EDP population)

Men	Class in 1975													
Class in 1968	Upper qualified occupations		Craft/trade business		Farmers		Clerks		Manual workers		Inactivity		Total & distribution in 1968	
	N	*% pop*	N	*% pop*	N	*% pop*	N	*% pop*	N	*% pop*	N	*% pop*	N	*% pop*
Upper qualified occup.	17,876	*18%*	643	*1%*	63	*0.1%*	845	*1%*	748	*1%*	260	*0.3%*	20,435	*31%*
Craft and trade business	481	*0.5%*	7,835	*8%*	115	*0.1%*	213	*0.2%*	860	*1%*	183	*0.2%*	9,687	*6%*
Farmers	79	*0.1%*	128	*0.1%*	12,125	*12%*	108	*0.1%*	697	*1%*	215	*0.2%*	13,352	*8%*
Clerks	1,771	*2%*	320	*0%*	72	*0.1%*	7,752	*8%*	1,061	*1%*	268	*0.3%*	11,244	*11%*
Manual workers	2,638	*3%*	1,378	*1%*	734	*0.7%*	1,880	*2%*	32,909	*33%*	1,141	*1%*	40,680	*37%*
Inactivity	950	*1%*	141	*0%*	141	*0.1%*	262	*0%*	686	*1%*	1,057	*1%*	3,237	*6%*
Total & distribution 1975	23,795	*24%*	10,445	*11%*	13,250	*13%*	11,060	*11%*	36,961	*37%*	3,124	*3%*	98,635	*100%*
Deaths over 1975-1980	1,079		742		1,294		983		2893		583		7,574	

Men aged 30-84 years old in 1999, identified in 1990 and 1999 census (EDP population)

Men	Class in 1999													
Class in 1990	Upper qualified occupations		Craft/trade business		Farmers		Clerks		Manual workers		Inactivity		Total & distribution in 1990	
	N	*% pop*	N	*% pop*	N	*% pop*	N	*% pop*	N	*% pop*	N	*% pop*	N	*% pop*
Upper qualified occup.	33,588	*24%*	2,165	*2%*	181	*0.1%*	2,848	*2%*	3,008	*2%*	750	*1%*	42,540	*31%*
Craft and trade business	1,449	*1%*	7,375	*5%*	191	*0.1%*	428	*0.3%*	1,456	*1%*	355	*0.3%*	11,254	*6%*
Farmers	214	*0.2%*	215	*0.2%*	7,115	*5%*	134	*0.1%*	820	*1%*	157	*0.1%*	8,655	*8%*
Clerks	3,134	*2%*	573	*0%*	97	*0.1%*	9,019	*7%*	2,356	*2%*	364	*0.3%*	15,543	*11%*
Manual workers	5,569	*4%*	2,178	*2%*	687	*0.5%*	3,829	*3%*	37,587	*27%*	1,727	*1%*	51,578	*37%*
Inactivity	3,716	*3%*	330	*0%*	191	*0.1%*	968	*1%*	2,159	*2%*	1,477	*1%*	8,841	*6%*
Total & Distribution 1999	47,670	*34%*	12,836	*9%*	8,462	*6%*	17,226	*12%*	47,386	*34%*	4,830	*3%*	138,411	*100%*
Deaths over 1999-2003	1,676		739		739		1,192		3,105		573		8,024	

Table 1b. Size of the occupational classes and mobility groups (and part of the population) based on reported occupation in 1990 and 1999 censuses and number of deaths recorded between 1999 and 2003

Women aged 30-84 years old in 1975, identified in 1968 and 1975 (EDP population)

Women	Class in 1975													
Class in 1968	Upper qualified occupations		Craft/trade business		Farmers		Clerks		Manual workers		Inactivity		Total & distribution in 1968	
	N	*% pop*	N	*% pop*	N	*% pop*	N	*% pop*	N	*% pop*	N	*% pop*	N	*% pop*
Upper qualified occup.	7,330	*6%*	89	*0.1%*	12	*0.0%*	571	*0.5%*	89	*0.1%*	737	*1%*	8,828	*8%*
Craft and trade business	99	*0.1%*	3,943	*3%*	65	*0.1%*	394	*0.3%*	185	*0.2%*	1,196	*1%*	5,882	*5%*
Farmers	14	*0.0%*	51	*0.0%*	6,654	*6%*	152	*0.1%*	155	*0.1%*	2,322	*2%*	9,348	*8%*
Clerks	1,293	*1%*	463	*0%*	128	*0.1%*	15,051	*13%*	904	*1%*	3,760	*3%*	21,599	*19%*
Manual workers	178	*0.2%*	165	*0.1%*	138	*0.1%*	1,203	*1%*	7,277	*6%*	2,413	*2%*	11,374	*10%*
Inactivity	1,201	*1%*	1,537	*1%*	2,692	*2%*	6,403	*6%*	3,844	*3%*	41,649	*36%*	57,326	*50%*
Total & Distribution 1975	10,115	*9%*	6,248	*5%*	9,689	*8%*	23,774	*21%*	12,454	*11%*	52,077	*46%*	114,357	*100%*
Deaths over 1975-1980	286		357		741		955		765		2,845		5,949	
Women	Class,in,1999													
Class in 1990	Upper qualified occupations		Craft/trade business		Farmers		Clerks		Manual workers		Inactivity		Total & distribution in 1990	
	N	*%,pop*	*N*	*%,pop*	N	*%,pop*	N	*%,pop*	N	*%,pop*	N	*%,pop*	N	*%,pop*
Upper qualified occup.	21,960	*14%*	625	*0.4%*	76	*0.0%*	3,723	*2%*	504	*0.3%*	1,715	*1%*	28,603	*18%*
Craft and trade business	515	*0.3%*	3,327	*2%*	109	*0.1%*	1,340	*1%*	427	*0.3%*	911	*1%*	6,629	*4%*
Farmers	133	*0.1%*	136	*0.1%*	4,509	*3%*	432	*0.3%*	616	*0.4%*	950	*1%*	6,776	*4%*
Clerks	6,343	*4%*	1,328	*1%*	287	*0.2%*	38,961	*25%*	3,091	*2%*	5,495	*3%*	55,505	*35%*
Manual workers	823	*1%*	367	*0.2%*	240	*0.2%*	4,042	*3%*	9,757	*6%*	2,156	*1%*	17,386	*11%*
Inactivity	4,684	*3%*	1,150	*1%*	1,246	*1%*	10,555	*7%*	4,097	*3%*	20,430	*13%*	42,162	*27%*
Total & Distribution 1999	34,458	*22%*	6,933	*4%*	6,467	*4%*	59,053	*38%*	18,492	*12%*	31,657	*20%*	157,061	*100%*
Deaths over 1999-2003	578		286		425		1,660		957		1,469		5,375	

Data source : *Echantillon démographique permanent, INSEE.*

The lower age limit for the study population was set at 30 to avoid including too many young people not yet active in 1990 and 1999 and therefore to limit the share of unspecified occupational status in our population study. The upper age limit was set at 84 so that comparison could be made with the 1970s study (for which matching with death registers could not be done above this age). An advantage in the French study is the possibility to consider individuals over the retirement ages and to assign the previous social class to better picture the link between mortality and occupation. Although it enlarges considerably the sample, the inclusion of retired individuals raises some questions while studying mobility related gradient. People were already retired at first census (between 10% to 15% of 1999 classes), have reported the same class at both censuses being considered as "stable" in the class, in this study. Meanwhile, they are no longer exposed to working conditions, as are their active counterparts. But, on the other hand including the retired allows to take into account longer-term effects of occupational exposure knowing that, by the way, a large number of retired people were actually stable in their class for many years before they retired (stability in a class being the most frequent case at all ages). As we describe in the discussion section, patterns and conclusions are similar (although less statistically robust) if the persons retired at the 1990 or 1968 census are excluded from the study.

Mortality indicators

Mortality level for each occupational class in 1975 and in 1999 was first estimated by mortality rates, based on the death recorded over the period (respectively 1975-1980 and 1999-2003). As in the previous study, we computed annual standardized mortality rate (AMR) for each class with the following method. Assuming that 1999-2003 deaths were equally distributed over the 5 year period, we first estimated the person-years exposed in each 5 year age group to obtained age-specific mortality rates. Standardized rates for each occupational class are obtained by direct standardization, ie by applying their age specific mortality rates to the total male and female person-years. It gives the average level of mortality in each classes if they would all have the age structure of the total male and female populations.

Regarding occupational mobility, we computed standardised mortality ratios (SMR) for each mobility groups based on the male and female average mortality rates. These ratios are indirect standardisation allowing to handle small size groups. They also allows to set the general population as the reference group to compare mortality in occupational classes to compare mobile and stable groups and within classes and to compare the patterns in the earliest and the most recent periods. We computed 95% confidence intervals using different methods which actually provided the same results [46, 47]. They indicate the extent to which the SMR are significantly different from the male or female average.

But in this study, we also use the confidence intervals to explore whether the SMR of mobile groups were different than the SMR of the stable (overlapping confidence intervals or not). Due to small size of some of the mobile groups, and in order to draw larger conclusions, we indicate (on the graph) the significance of the difference with 90% confidence intervals. In the previous study, the method used to test the significance was providing smaller intervals than the one apply in this study to the 1999 and 1975 figures. Some of the patterns for

1975 have lost their significance compared with the previous paper, but the trends observed in the recent period actually confirmed the earlier conclusions.

Statistical analysis

In this paper we first comment trends regarding the AMR and the SMR for the 1975 and 1999 occupational classes for male and female population. Second we display the mortality risks associated with past careers looking at 1968-1975 classes and 1990-1999 classes. We provide the SMR figures and graphs for mobility-mortality gradient for men and women and for both periods. In the graphs, the X axis shows the occupational classes reported in 1968 for the first period and in 1990 for the second. For each of them, the SMRs associated with the occupational status respectively in 1975 and in 1999 are plotted on the vertical axis. As we work on a closed population, the graphs could have been plotted in the other way round to represent for each destination class, the SMR according to the origin class. But because of the gradient constraint patterns, and the fact that the SMR of movers are close to the SMR in the destination class, the differentials in this representation are smaller and less visible, even it shows the same reality.

The SMRs for those who are in the same class at both census are plotted with circles. Triangles show the SMR's of the so-called downward and upward mobility that were statistically different from risks of the stable. Indeed, to facilitate the presentation of our results, we qualified the mobility as upward or downward by referring to the class-specific mortality gradient: upward trajectories are those leading to a class with lower mortality than the initial class (for instance, from manual worker to foreman in the upper class) and downward trajectories are those that lead to a class with higher mortality (for instance, from managerial administrative activity to administrative clerical job). This definition allows to figure out how the mortality risks of the movers fit within the occupational gradient, in reference to risks the origin and destination classes. Most importantly, this definition also allows to display all the relative risks without to prejudge of what is a socially favourable (upward) or unfavourable (downward) occupational pathways. Indeed, it is not always possible to qualify them as improvement or deterioration in the overall situation or to figurate out if the change are deliberate or imposed (for instance, pathways from self-employment to salaried job or towards inactivity). However, most of the identified pathways are usual and well documented occupational pathway (promotions with job experience or downward moves for unemployed who could not found job in their initial occupational class), and results can be interpret in this line.

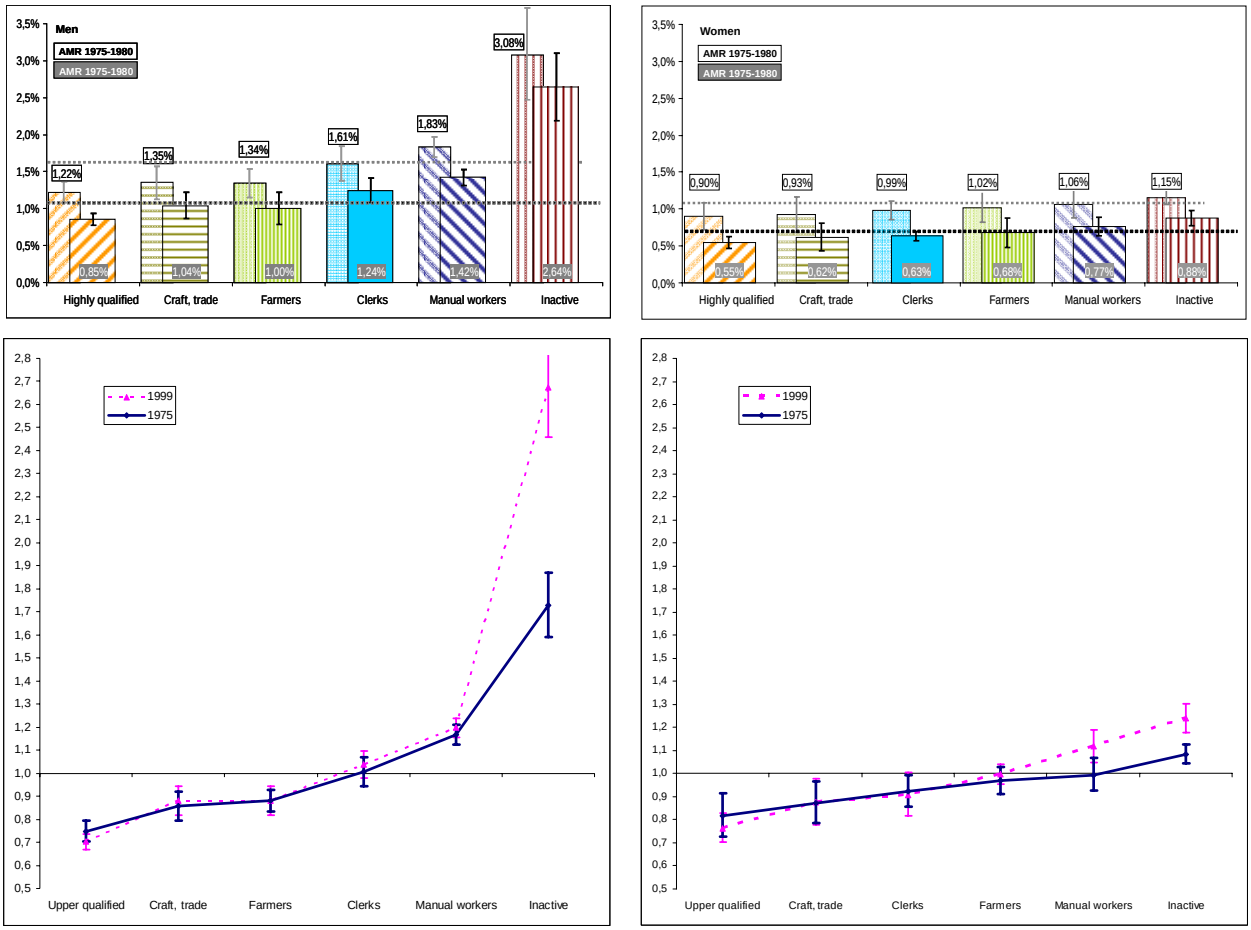
Third, to account for the changes in the occupational distribution in the French population when interpreting trends over time, we produced new AMR and SMR for the recent period based on an hypothetical scenario. We fixed the population structure both on age and occupation mobility distribution as in 1975 and applied the mortality pattern of 1999-2003. We obtain the simulated occupational differentials for 1999 if only mortality patterns had changed over time. This simulation shows how changes in the occupational differentials rely on changes in the population structure.

RESULTS

1. Mortality gradients regarding occupational classes of 1975 and 1999

Mortality in France has fallen sharply since the 1970s. Mortality rate in the male population aged 30 to 84 fell from 1.6% over the period 1975-80 to 1.2% over the period 1999-2003 (from 1.1% to 0.7% for women). Interestingly, in the 1999-2003 period, men has reached the 1975-1980 female mortality rate. Mortality risks also fell in every classes although to different extents. The highest class' rate in female population (inactive) is at the level of the lowest class' rate in male population (upper qualified occupation) (Figure 1). Farmers in female population are in relatively less favourable situation than farmers in male population. The different mortality decrease in each class has changed the shape of the SMR gradient (excess or under mortality compared to the whole population) (Figure 1 and Table 2 in annex).

Figure 1. Annual Mortality Rates and Standardized mortality risks and SMR for men and women aged 30 to 84,in the occupational classes over two periods (1975-1980 and 1999-2003), and 95% confidence intervals



SMR values reported in Table 2 in annex

For men, the SMR gradient is wider in the recent period from (1.0 to 2.0 points SMR differences): the upper qualified occupations gained a little more than the whole male population over the period, resulting in a even lower SMR for the recent period. At the other end of the gradient, the inactive group gained much less, resulting in a dramatically higher SMR. The other occupational classes had similar SMR in both periods, but still the

gradient between upper qualified occupations and manual workers has slightly increased. For women, the gradient has also increased, but to a much smaller extent. Female manual workers and inactive gained a little less than the rest of the population, while SMR in the upper qualified occupations slightly decreased, even not significantly. The female gradient in SMR has widened and except for the inactive class, which remains a very specific group in men, tends to look more like the male SMR gradient in the recent period.

Patterns and trends in the mobility-mortality gradient

For both periods, the SMR of the stable group is close to the SMR of the whole class as showed in Figure 1, the stable groups representing the majority of the class (except for inactive men or craft and trade business owner for women) (Figure 2 and Table 2 in annex).The SMR of the male stable groups draw a line between the excess mortality of the downward mobility and the relatively lower mortality associated with the upward mobility. In most cases, SMR associated with mobile groups fall between the SMR of the stable in the classes at origin and at destination; there are closer to the SMR at destination.

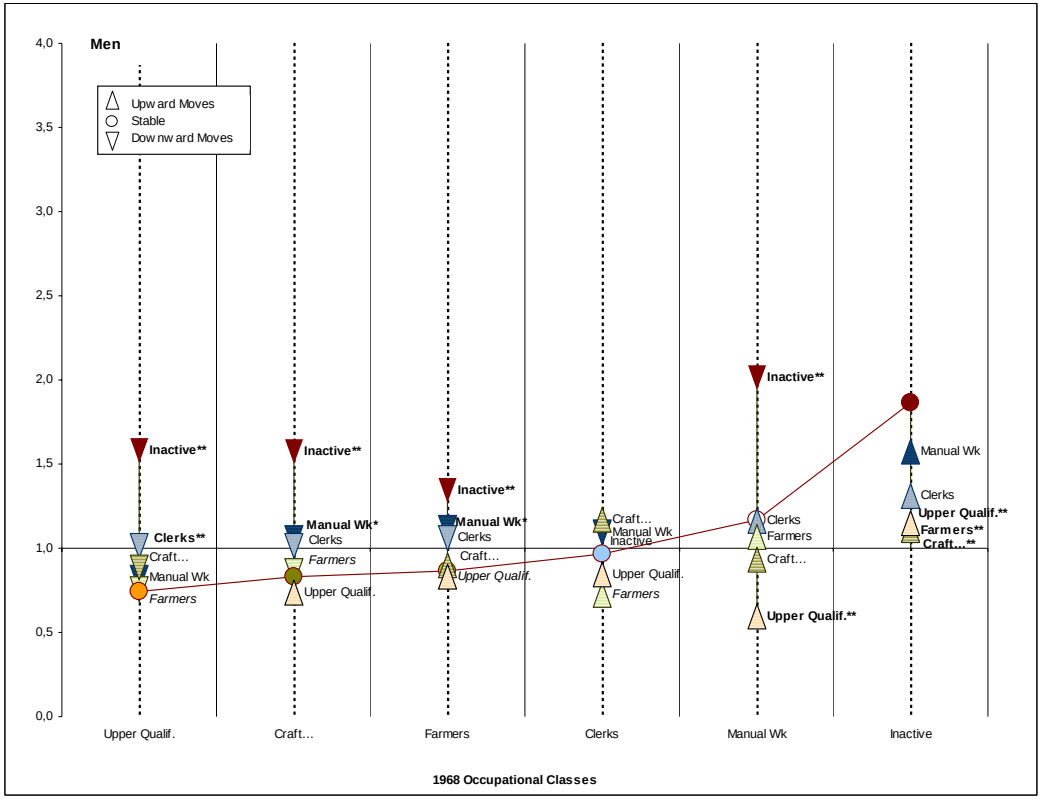
Among men, the massive increase in the SMR of the inactive over the period is found for the stable inactive, as well as for the inflows from the craft and trade business owner, clerk and manual worker classes. The outflows from inactivity towards other classes are also associated with higher SMR than in the 1970's. The SMR of the manual workers slightly increased: this is not due to change in the stable manual workers but due to the increase in the SMR of those who moved down towards inactivity and, to a smaller extent towards manual workers. In the recent period, the SMR of the movers from clerks to manual worker class became significantly higher than the stable clerks and higher than the stable manual workers. It is actually equal to the SMR of the movers from manual worker to clerk classes which means, above the risks of the stable manual workers.

Among women, as in the 1970's, differences between classes are small, even if they increased, and only few mobility groups show significantly different SMR. Mortality risks for most upward movers do not differ from risks in initial and destination classes except for mobility from inactivity towards other classes which is associated with lower SMR than the stable inactive. Regarding downward mobility, a clear excess mortality emerged in the recent period for mobility towards manual workers and clerks, while in the 1970s this feature only concerned outflows towards inactivity. Unlike for male, the SMRs associated with such downward pathways are higher than the average risk in both origin and destination classes. Female farmers are poorly placed on the SMR gradient while they are in favourable situation in male population. This patterns is slightly more pronounced in the recent period. Craft and trade business owners also show a different pattern in male and female population regarding those who became inactive in 1999: for men they have a much higher SMR than those who remained in the class while for female the SMR is not different.

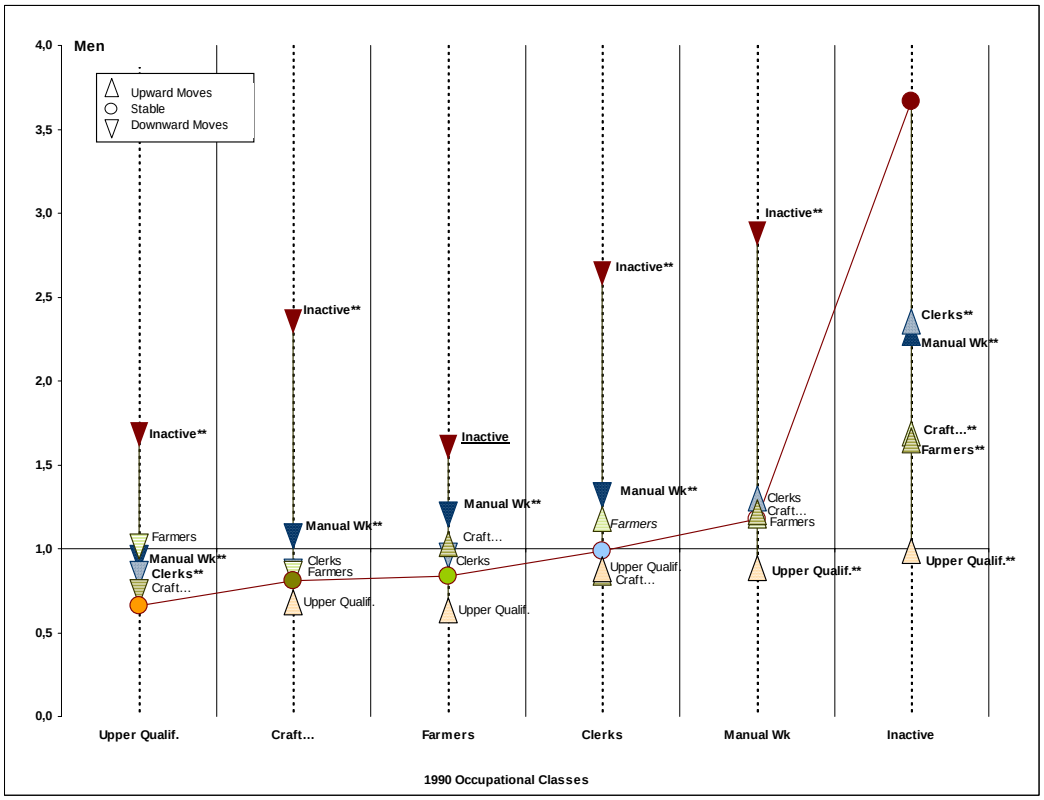
Figure 2a. SMR associated with occupational mobility, in reference to the risk of mortality in the total population for men and women (aged 30 to 84 years)

Labels in bold correspond to SMR for which confidence interval do not overlap with the one of the stable group of the class (with ** for95% IC and with * for 90%IC. Labels in italic for groups with less than 0.1% of the population in the group (about 100 individuals).

a- Male 1975-1980 SMR associated with occupational mobility over 1968-1975



b- Male 1999-2003 SMR associated with occupational mobility over 1990-1999

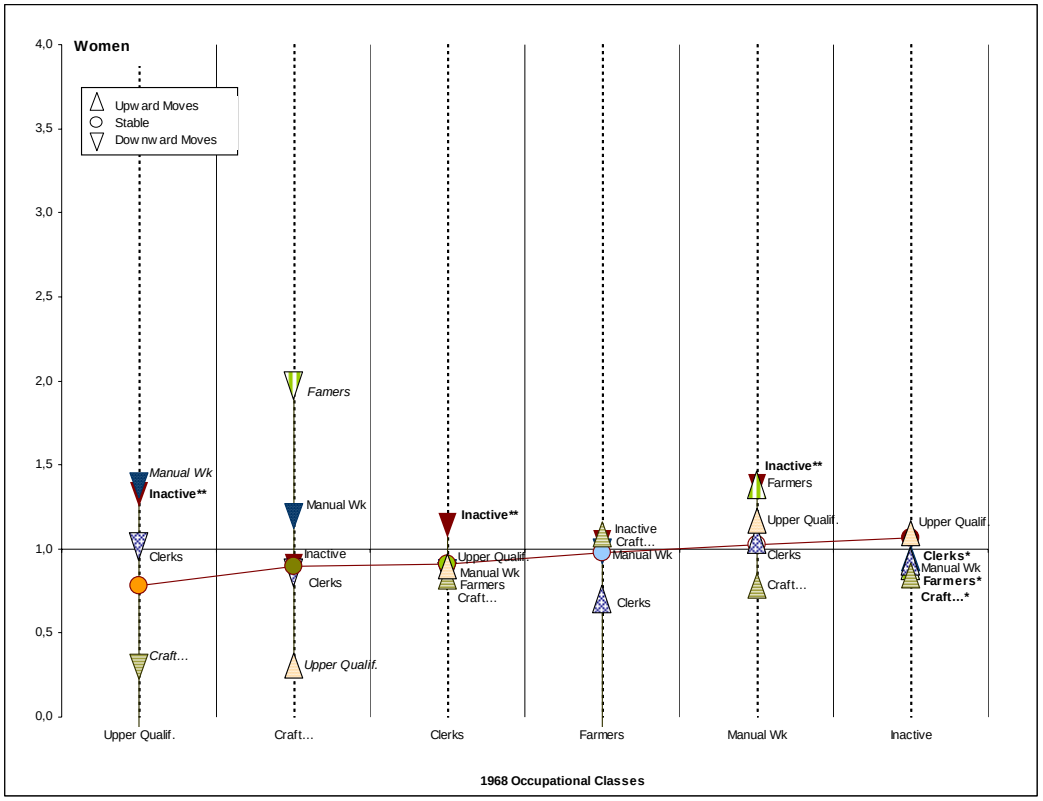


See figure in annex, Table 4a

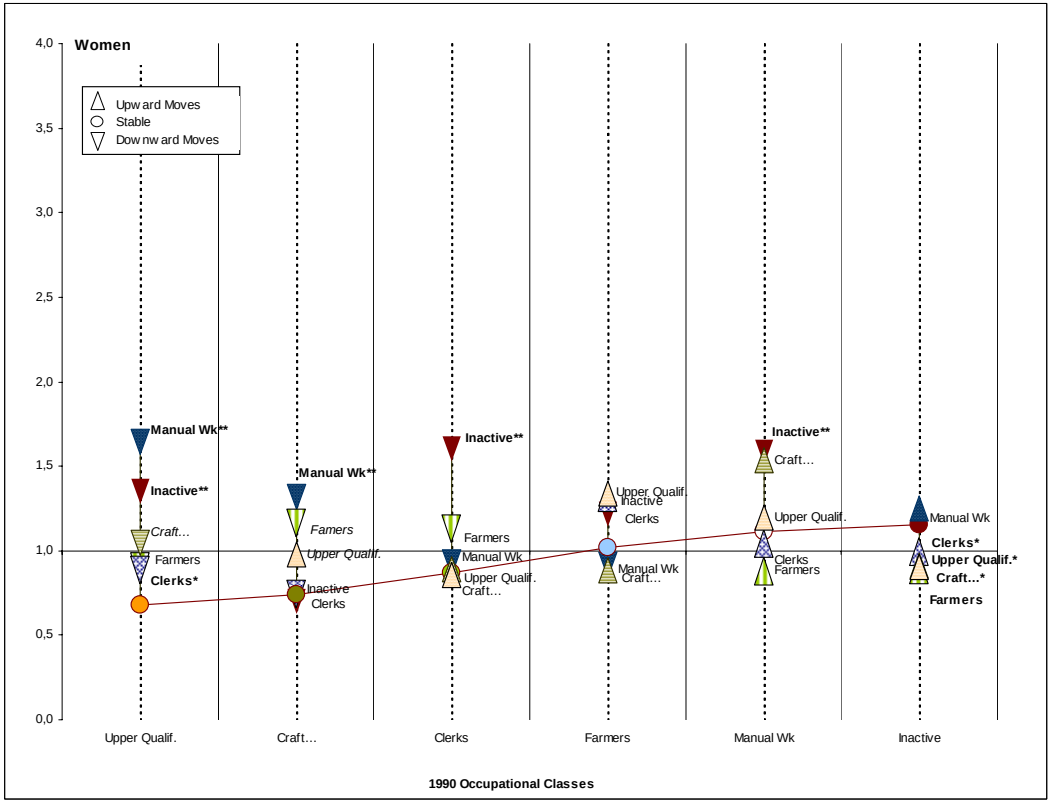
Figure 2 b. SMR associated with occupational mobility, in reference to the risk of mortality in the total population for men and women (aged 30 to 84 years)

Labels in bold correspond to SMR for which confidence interval do not overlap with the one of the stable group of the class (with ** for95% IC and with * for 90%IC. Labels in italic for groups with less than 0.1% of the population in the group (about 100 individuals).

a- Female 1975-1980 SMR associated with occupational mobility over 1968-1975



b- Female 1999-2003 SMR associated with occupational mobility over 1990-1999



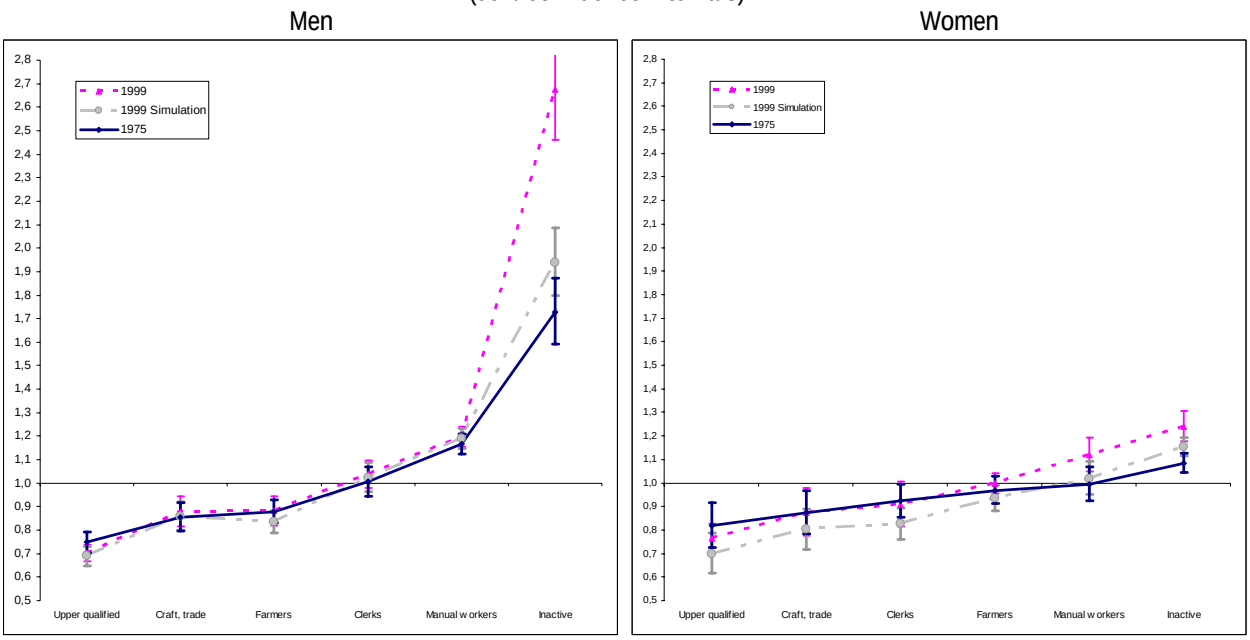
See figure in annex, Table 4b

Changes in differentials, changes in population structure

The simulation of the AMR and SMR for 1999 occupational class, keeping the same age specific mobility distribution as in the previous period, shows the impact of the change in the population structure over time along the changes in the mortality risks. If only the mortality associated with the occupational moves had changed over the period, the levels of mortality in the population would have improved less than it actually did: the AMR for the men would have been 1.25% instead of the observed 1.19% and the AMR for women would have been 0.82% instead of the observed 0.69%. This pattern is found in all the occupational classes meaning that age and mobility distribution has contributed to the overall mortality decrease.

In terms of SMR for each occupational class, the simulation shows that male and female inactive would have been in a better situation with the distribution of the class in 1975 compared to what it was in 1999 (Figure 3). It means that this class has concentrated over time on groups of people with higher mortality risks, both regarding inflows and stable inactive. For the other classes, the changes are small and not of a significant magnitude. However, the patterns were different for women and for men. For men only farmers situation seems to be affected by the structural changes: they would have been better off with the age and mobility pattern that prevailed in 1975. The structural changes for men has contributed to the widening of the differentials only when including the inactive in the gradient. For women, what was observed for inactive is true for all the classes. If only mortality had changed over time, the SMR of the manual workers would have remained the same instead of increasing, the SMR of the clerks would have decreased instead of remaining the same, the SMR of the upper qualified occupations craft and trade business owners and farmers would have been even lower. The structural changes in the female has limited the potential decrease in the mortality risks of the occupational classes and has contributed to widen the differentials.

Figure 3. SMR for men and women aged 30 to 84,in the occupational classes over two periods (1975-1980 and 1999-2003) and simulated SMR with age and occupational mobility of the earlier period and mortality of the recent period (95% confidence intervals)



DISCUSSION

Mortality in France has fallen sharply since the 1970s. Estimates show that all occupational classes have benefitted a declining risk over the period, but to a smaller extent in the classes that were already in the worst situation. As a consequence, the SMR gradient has increased over the period for men and for women; we observe a massive deterioration in the relative situation of the inactive group, especially for men. This new study confirm the widening differential patterns found in the other studies, using here more recent data [2, 4].

But our study also identified both similar and changing patterns in the two periods regarding in the association between past careers and mortality. For men, in 1999 as in 1975, both current and past occupations predict mortality. This pattern lead to an homogenisation of the risks in the class [18]. Inflows bring in the movers from other class but with similar mortality risks and outflows exclude the different ones. The movers are therefore resembling to the members of the class they join regarding mortality in our study. And other findings in social mobility studies for France clearly show that the movers are also resembling to the members of the class they join on health related factors which can therefore explain the link with mortality [20-22]. Regarding trends, our study has shown that for mobility towards inactivity, the decrease in mortality over the period has been considerably less important than the rest of the population.

For women, the magnitude of the overall mobility-mortality gradient also increased and new patterns emerged. Still in 1999, the occupational differentials are small while other factors might show larger variations in mortality when appraised by other factors such as spouse occupation or household characteristics as shown in various studies [40, 48-50]. On the other hand, outflows towards clerk, manual worker and inactive class has become associated with a higher SMR than the stable at origin and destination. The "strong selection" found in the earlier period has been reinforced and extended to other pathways. The selection process on health related factors for these downward moves have become more determinant with the increasing participation of women to the labour force.

Based on these results, our study has further proved that changes over time in the mortality gradient has to do with the reorganisation the classes regarding the age and mobility distribution. If the age and mobility structure had remained the same than in 1975, with the mortality pattern observed in the early 2000's, the differentials would have been different. The SMR of male inactive would have been increasing compred to 1975, but much less than it actually did. The SMR would have been lower in most classes for women compared to what is observed; it would have been slightly lower for male farmers. Regarding female inactive and manual workers, the increase in SMR would have been much less pronounced than it really been has been. Reorganization of the classes has mechanically limited gains in life expectancy for these classes, especially for the inactive males and has contributed to the widening of the differentials.

For inactive men, examination of the drivers of these changes revealed the massive modification in the age structure in this class: within the 30-84 year old inactive group the proportion of individuals aged between 30 and

60 grew from 50% in 1975 to 80% in 1999, with a massive increase in the proportion of the 50-60 age group. The selection process seems to have changed in the population concentrating more on people in active ages. Inactivity at these ages, except for highly qualified students, means inability to work due to health problems, and have a very differentiated relative risk if mortality than the rest of the population. The changing pattern is partly responsible for the higher SMR for this class in 1999.

For women, the changing distribution in the inactive class has also contributed to the increase in the SMR. But not due to notable modification in the age structure. A change in the inflows' SMR explains the structural effect. Female pathways to inactivity has become more systematically linked to excess mortality, as it has always been for men. The degree of health or health related selection might have increased for these pathways.

But for both men and women, our figures indicate that other patterns might explain the increasing SMR of the inactive, while the structural effect account for only a part of the change. First of all, if inactive are selected on health characteristics, it is improbable that inactive gain as much years of life expectancy as the overall population. Indeed, sick people whose naturally high mortality risk changes little over time compared to the progress achieved in the rest of the population. Another explanation would be the deterioration of the life condition of the inactive. Job loss (definitive or through unemployment) goes with more harmful living conditions in period of economic hardship, and increasing relative risks and could then be explained by a more damaging causal effect of being inactive (or unemployed) in recent years [43, 51].

Some of these mechanisms may also play for the female downward mobility for which the SMR has increased. Indeed, the changes over time have been more pronounced for these groups, especially in women, but also for male mobility between manual workers and clerks for men have similar SMR. They might be increasingly selected on health and health related factors such as level of education, skills, job instability, unemployment etc. Indeed, the new finding concerning "clerks-manual workers" mobility goes also along the weaker frontier between the unskilled occupations in both manual worker and clerk classes and concerned a selected group of people with similar characteristics among which low qualifications and unskilled jobs [52, 53].

Regarding the upper qualified occupation we also found gender differentiated patterns. For men, the SMR tends to slightly decrease, even not significantly. And for women, the SMR has decreased a little more. For men, the simulation did not impact the SMR for this class, although it has increased in size and the distribution regarding past careers has changed. Over the period, there were a decreasing proportion of access through upward mobility and an increasing proportion of stable and direct access from inactivity. This has been also reported by social mobility studies [52]. The combination of age structure and mobility patterns with a very small changes in SMR associated with these mobility groups explain the inexistent impact of structural changes.

Unlike men, the class for women has benefitted more pronounced change and reorganization. There was a relatively greater part of female in upper qualified occupations who came from clerk class, importing a relatively higher SMR compared to women who were already in the class. The distribution of upper class is less

advantageous in 1999 regarding mortality and has therefore contributed to have limited the decrease in mortality compared to what it could have been with the 1975 structure.

Our results also show gender differences in craft and trade business owner. Male and female careers around such activities are very different. Interestingly, women who have quitted these activities did not show a clear disadvantage compared to those who remained in while, it was the case in male population. The gender difference is also striking in farmer occupation class: while farmers have a favorable situation in male, they are close to the situation of manual workers in female. In this class again, the activities are gender differentiated and probably more concentrated on manual tasks and harmful work conditions in female farmers while a greater part of the farmer activities in male might be close to managerial tasks. The size of the group did not allow to be more precise in this study while it could have been useful to account for the size of the business to get a better picture of gender differences regarding self employed activities.

Limitations

This study has shown that the EDP data are extremely useful for this type of analysis, especially because of the size and representative nature of the sample available (the whole French population and all occupational situations can be examined) but there are also limitations [30]. The occupational changes for our sample are recorded nine years apart, a period during which the individuals may have changed status and occupational category more than once without this being recorded or documented. Furthermore, we do not know the date of the occupational change. Therefore it is not possible to evaluate the impact of the duration of exposure to work and life conditions prevailing in the initial class or at destination.

Our results also indicate that, despite the size of the sample, some infrequent occupational trajectories are hard to isolate in the analysis, since the number of deaths is too small. The confidence intervals can be very large and partly hide results that could have been more apparent with larger size groups. In this study, we applied the recommended method to compute confidence interval for SMR. Another method was applied in the previous publication that gave larger approximations of the intervals which was not specific to SMR. The appropriate method decreased the number of results that appear statistically significant. Nevertheless, the conclusions remain the same, although the lower risk of the upward movers for men are less frequently significant than it was in the other publication.

We have also mentioned the problem of including older people who were already retired in 1990 and who are considered to be “occupationally stable”. For reasons we described in the methods section and in order to increase the statistical robustness of the estimates, we kept this group in our study and checked that it only slightly alters the results. For instance, people were retired in 1990 and classified in upper classes in 1999 are considered as stable, even those who were actually in less favourable position just before their retirement and probably have a higher mortality risk than the “true stable”: the impact tend to over-estimate the mortality level of the upper class. Those classified in manual worker class in 1999 comprise a number of people who were actually in more favourable position before retirement and have lower risks than the stable (higher for women). But in

general, most retired people were actually stable before retirement with mortality risks as the stable represent in average 70% of the class. Therefore excluding the retired would extend the gradient shown here but not change the conclusion.

Time trends and gender specific patterns

Despite these limitations, our results are consistent with the various analyses and conclusions regarding social and occupational mobility produced by INSEE, on the basis of other data sources. Regarding mortality and health, our results are also in line with the results of cohort or panel studies in France an elsewhere showing a combination of selection and exposure effect in the relationships between health and social status [15, 33, 36, 54-57]. In France, different studies identified a number of risk factors (diet, excess weight, smoking, etc.) that may explain excess-mortality related to some unfavourable occupational trajectories [55-57]. And the role of deteriorated health has been identified as determinant in trajectories such as loss of job [33].

Therefore, based on the literature, even if the data does not allow to address the question, our results can be interpreted in the light of the debates on selection and causal effects on mortality differentials [17, 18, 27, 55, 58].

With a selection effect on health and health related characteristics, movers tend to present similar profiles than members of the class they join. There are evidence of a health selection of the movers showed in France and elsewhere [23, 24, 26, 31, 33, 35, 36, 51, 55-64]. But if only selection effect exist, the movers could have reached the level of mortality that prevails in the destination class, which is not the case in our study. Probably because of the effect of past and current exposition on health. Movers are also marked by health related characteristics of the life and work environment they passed through over their life and careers, as shown in life course approaches [12-16]. Therefore, downward movers might have a higher risk than stable because of a selection on health related characteristics but also because they are exposed to worst work and life conditions at destination after the mobility. Upward movers might have better health than the stable, due to their characteristics, but also due to more favourable life condition, health practices and knowledge at destination. Furthermore, the impact of mobility itself might interfere through the loss long term habits, environment or social network and associated stress [19, 65].

Our results have also highlighted clear gender differentiated patterns. The gradient constraint was found for men but not for female in the French study, while it was in another study [34]. In France, the degree of selection for women in downward moves appear stronger than for men regarding the origin and destination class. For women, social class members are not only selected on their own health and health related factors, but on a combination of these factors and their family context and career opportunities [38]. This pattern results in the weaker association between social class and mortality compared to men, as observed in various studies [37, 40, 48, 49, 66-68]. But the female downward movers might be selected on health and health related factors exacerbating the difference with the situation in the classes. In our study we see that even if the patterns tend to be closer to what is found for men, there are still many specificities both in the occupational structure and in the drivers for mobility that explain this weaker association in recent years compared to male.

CONCLUSIONS

The occupational differentials in mortality has widened for both men and women. Changing mortality and changing distribution in the population and in the occupational class matters. While biological or behavioural factors has contributed to change to different extent the mortality risks in the classes, changes in the structure of the population, in the degree of selection, in the detrimental effect of downward mobility has contributed to the widening in the occupational gradient. These changes have considerably differs in male and female populations contributing to keep a gender specific association between mortality and the occupational status.

We observe emerging patterns in women mobility-mortality gradient that are resembling to what we found in male at both periods. The increasing female implication in labour force over the past decades contribute to this trends. Nevertheless, the gender differences in careers opportunities and determinants are still strong making the association between occupation, careers and mortality far from being similar for both sexes. Our results confirm the complexity of the relationship between mobility and mortality and the need to interpret changes and gender disparities in mortality differentials in the light of trends in the structural pattern and changes.

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Table 2a. SMR associated with occupational mobility, in reference to the risk of mortality in the total population for men and women (aged 30 to 84 years)

Male 1975-1980 SMR associated with occupational mobility over 1968-1975

		Occupational classes in 1975						
Classes in 1968:		Upper qualified	Craft & trade	Farmers	Clerks	Manual workers	Inactive	Total 68
Upper qualified	SMR	0,7	0,9	*0,8*	1,0	0,8	1,6	0,8
	95% IC	[0,7-0,8]	[0,6-1,2]	*[0,2-1,7]*	[0,8-1,3]	[0,6-1,1]	[1,2-2,0]	[0,7-0,8]
Craft & trade business	SMR	0,7	0,8	0,9	1,0	1,1	1,6	0,9
	95% IC	[0,5-1,0]	[0,8-0,9]	[0,4-1,4]	[0,6-1,6]	[0,8-1,3]	[1,1-2,1]	[0,8-0,9]
Farmers	SMR	*0,8*	0,9	0,9	1,1	1,1	1,3	0,9
	95% IC	*[0,3-1,6]*	[0,5-1,4]	[0,8-0,9]	[0,5-1,7]	[0,8-1,4]	[1,0-1,8]	[0,8-0,9]
Clerks	SMR	0,8	1,2	*0,7*	1,0	1,1	1,1	1,0
	95% IC	[0,7-1,0]	[0,7-1,7]	*[0,3-1,4]*	[0,9-1,0]	[0,9-1,3]	[0,8-1,4]	[0,9-1,0]
Manual workers	SMR	0,6	0,9	1,1	1,2	1,2	2,0	1,2
	95% IC	[0,4-0,8]	[0,7-1,2]	[0,8-1,3]	[1,0-1,4]	[1,1-1,2]	[1,8-2,3]	[1,1-1,2]
Inactive	SMR	1,1	1,1	1,1	1,3	1,6	1,9	1,5
	95% IC	[0,8-1,6]	[0,7-1,6]	[0,7-1,6]	[0,9-1,7]	[1,3-1,9]	[1,6-2,2]	[1,4-1,7]
Total 75	SMR	0,7	0,9	0,9	1,0	1,2	1,7	1,0
	95% IC	[0,7-0,8]	[0,8-0,9]	[0,8-0,9]	[0,9-1,1]	[1,1-1,2]	[1,6-1,9]	[1,0-1,0]

Male 1990-1999 SMR associated with occupational mobility over 1999-2003

		Occupational classes in 1999						
Classes in 1990:		Upper qualified	Craft & trade	Farmers	Clerks	Manual workers	Inactive	Total 90
Upper qualified	SMR	0,7	0,7	1,0	0,9	0,9	1,7	0,7
	95% IC	[0,6-0,7]	[0,6-0,9]	[0,6-1,5]	[0,8-1,0]	[0,8-1,1]	[1,4-2,0]	[0,7-0,8]
Craft & trade business	SMR	0,7	0,8	0,9	0,9	1,1	2,4	0,9
	95% IC	[0,5-0,8]	[0,7-0,9]	[0,5-1,2]	[0,6-1,2]	[0,9-1,3]	[1,8-3,0]	[0,8-0,9]
Farmers	SMR	0,6	1,0	0,8	1,0	1,2	1,6	0,9
	95% IC	[0,4-0,9]	[0,7-1,4]	[0,8-0,9]	[0,6-1,4]	[1,0-1,4]	[1,1-2,2]	[0,8-0,9]
Clerks	SMR	0,9	0,9	*1,2*	1,0	1,3	2,6	1,0
	95% IC	[0,8-1,0]	[0,6-1,1]	*[0,7-1,7]*	[0,9-1,1]	[1,2-1,5]	[2,1-3,3]	[1,0-1,1]
Manual workers	SMR	0,9	1,2	1,2	1,3	1,2	2,9	1,2
	95% IC	[0,8-1,0]	[1,1-1,4]	[1,0-1,4]	[1,2-1,4]	[1,1-1,2]	[2,6-3,2]	[1,2-1,2]
Inactive	SMR	1,0	1,6	1,7	2,4	2,3	3,7	2,3
	95% IC	[0,8-1,3]	[1,1-2,3]	[1,0-2,5]	[1,8-3,0]	[2,0-2,6]	[3,2-4,1]	[2,1-2,5]
Total 99	SMR	0,7	0,9	0,9	1,0	1,2	2,7	1,0
	95% IC	[0,6-0,7]	[0,8-0,9]	[0,8-0,9]	[1,0-1,1]	[1,2-1,2]	[2,5-2,9]	[1,0-1,0]

In italic group size with less than 100 subjects

Table 2b. SMR associated with occupational mobility, in reference to the risk of mortality in the total population for men and women (aged 30 to 84 years)

Female 1975-1980 SMR associated with occupational mobility over 1968-1975

		Occupational classes in 1975						
Classes in 1968:		Upper qualified	Craft & trade	Farmers	Clerks	Manual workers	Inactive	Total 68
Upper qualified	SMR	0,8	-	-	1,0	*1,4*	1,3	0,8
	95% IC	[0,7-0,9]			[0,7-1,4]	*[0,5-2,7]*	[0,9-1,8]	[0,7-0,9]
Craft & trade business	SMR	*0,3*	0,9	2,0	0,9	1,2	0,9	0,9
	95% IC	*[0,0-1,2]*	[0,8-1,0]	[1,0-3,3]	[0,4-1,4]	[0,7-1,8]	[0,7-1,1]	[0,8-1,0]
Farmers	SMR	-	*1,1*	1,0	0,7	1,0	1,0	1,0
	95% IC		*[0,3-2,4]*	[0,9-1,1]	[0,3-1,4]	[0,5-1,7]	[0,9-1,2]	[0,9-1,1]
Clerks	SMR	0,9	0,8	0,8	0,9	0,9	1,1	0,9
	95% IC	[0,6-1,3]	[0,5-1,3]	[0,4-1,4]	[0,8-1,0]	[0,6-1,1]	[1,0-1,3]	[0,9-1,0]
Manual workers	SMR	1,2	0,8	1,4	1,1	1,0	1,4	1,1
	95% IC	[0,4-2,3]	[0,3-1,4]	[0,8-2,1]	[0,8-1,4]	[0,9-1,1]	[1,2-1,6]	[1,0-1,2]
Inactive	SMR	1,1	0,8	0,9	0,9	0,9	1,1	1,0
	95% IC	[0,8-1,5]	[0,7-1,0]	[0,8-1,0]	[0,8-1,1]	[0,8-1,1]	[1,0-1,1]	[1,0-1,1]
Total 75	SMR	0,8	0,9	1,0	0,9	1,0	1,1	1,0
	95% IC	[0,7-0,9]	[0,8-1,0]	[0,9-1,0]	[0,9-1,0]	[0,9-1,1]	[1,0-1,1]	[1,0-1,0]

Female 1990-1999 SMR associated with occupational mobility over 1999-2003

		Occupational classes in 1999 for Women						
Classes in 1990:		Upper qualified	Craft & trade	Farmers	Clerks	Manual workers	Inactive	Total 90
Upper qualified	SMR	0,7	1,0	*0,9*	0,9	1,6	1,4	0,8
	95% IC	[0,6-0,7]	[0,7-1,5]	*[0,3-1,8]*	[0,7-1,0]	[1,2-2,1]	[1,1-1,7]	[0,7-0,9]
Craft & trade business	SMR	1,0	0,7	1,2	0,7	1,3	0,7	0,8
	95% IC	[0,6-1,4]	[0,6-0,9]	[0,6-1,9]	[0,6-1,0]	[1,0-1,7]	[0,5-0,9]	[0,7-0,9]
Farmers	SMR	*1,3*	*0,9*	1,0	1,3	0,9	1,2	1,1
	95% IC	*[0,7-2,2]*	*[0,5-1,4]*	[0,9-1,1]	[1,0-1,7]	[0,7-1,2]	[1,0-1,4]	[1,0-1,1]
Clerks	SMR	0,9	0,9	1,1	0,9	0,9	1,6	0,9
	95% IC	[0,7-1,0]	[0,7-1,1]	[0,8-1,6]	[0,8-0,9]	[0,8-1,1]	[1,4-1,8]	[0,9-1,0]
Manual workers	SMR	1,2	1,5	0,9	1,0	1,1	1,6	1,2
	95% IC	[0,9-1,6]	[1,2-2,0]	[0,6-1,3]	[0,9-1,2]	[1,0-1,2]	[1,4-1,8]	[1,1-1,2]
Inactive	SMR	0,9	0,9	0,9	1,0	1,3	1,2	1,1
	95% IC	[0,7-1,1]	[0,7-1,2]	[0,7-1,1]	[0,9-1,1]	[1,1-1,4]	[1,1-1,2]	[1,1-1,1]
Total 99	SMR	0,8	0,9	1,0	0,9	1,1	1,2	1,0
	95% IC	[0,7-0,8]	[0,8-1,0]	[0,9-1,1]	[0,9-0,9]	[1,1-1,2]	[1,2-1,3]	[1,0-1,0]

- Not enough subject in the group

In italic group size with less than 100 subjects