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Mortality, morbidity, and occupational decline

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Mortality, morbidity, and occupational decline[a]

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Abstract

Does the long-term economic stress of occupational decline cause health problems, or even death? This paper explores this question using Swedish administrative data, and a measure of occupational decline obtained from detailed US data on employment changes over almost 30 years. I investigate whether people who experience occupational decline have higher mortality or hospitalization rates, and in particular if they are more likely to suffer from cardio-vascular disease or deaths of despair: deaths caused by alcohol, drug or suicide. I find that workers who in 1985 worked in occupations that subsequently declined, had a 5-11 percent higher risk of death in the 30 years that followed, compared to same-aged, similar workers in non-declining occupations. For men in declining occupations, the risk of death by cardio-vascular disease was 7-14 percent elevated, while women in declining occupations faced 31-37 percent higher risk of death by despair. The risk was higher for workers who were lowest paid in their occupations.

KEYWORDS: Technological change, Occupations, Health. JEL CLASSIFICATION: O33, J24, I11.

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Contents

1 Introduction

Do workers in declining occupation suffer from poorer health or earlier death than others? As technology replaces human labor in an increasing number of occupations and tasks (Acemoglu & Restrepo 2018), we worry about what happens to workers in the occupations no longer in demand. Policy makers should care about the economic consequences for these workers, but also the impact on their overall welfare, where health and longevity are integral parts. Occupational decline is neither a new nor an outdated phenomenon: Along with economic transformation and technological change, telephone operators, typists and assemblers have seen the demand for their services decline, as may taxi drivers, shop assistants and even doctors and lawyers in the future.

In this paper, I study the health and mortality consequences of occupational decline. I use an indicator of large occupational declines, derived from US data.[1] I match this with population-wide data on Swedish workers' income, employment, mortality and morbidity. This allows me to compare the health outcomes of similar workers, who happened to face different labor demand in their respective occupations.

I find that workers who in 1985 worked in occupations that subsequently declined faced an increased risk of death of 5-11 percent of the mean death rate in the 30 years that followed. For men in declining occupations, the risk of death by cardio-vascular disease was 7-14 percent elevated, while women in declining occupations faced 31-37 percent higher risk of death by despair. The bottom tercile in each 1985 occupation's earnings distribution fared worst: The average individual in the bottom tercile who faced occupational decline increased their risk of death in 1986-2015 by almost 20 percent of the bottom tercile mean. Their increased risk of death by cardio-vascular disease was 28 percent (of the bottom tercile mean) when facing decline.

I follow our previous work in Edin et al. (forthcoming) in my empirical approach: I regress (health related) outcomes on an indicator for occupational decline, and control for a detailed set of covariates. The estimated coefficient is then composed of the relative effect of decline on those in declining occupations versus those in non-declining occupations, plus some selection effect. The selection may come about since different types of workers sort into declining and non-declining occupations, in addition to the fact that occupations might have evolved differently over time even in absence of decline. I describe in detail how I deal with this selection problem – in particular, what covariates I include in my regressions – in Section 2.

Given that I deal with the selection described, the reported coefficients represent the difference in the effect of occupational decline between workers in declining versus non-declining occupations. Two pieces of suggestive evidence indicate that the effect of decline on mortality among the workers in non-declining occupations is weakly negative: first, the impact on their economic situation should be weakly positive, as described below and discussed at length in our other work (Edin et al. forthcoming). Second, since their relative position improves compared to peers in declining occupations, and if social status is positively correlated with health, their health outcomes should at least not be made worse. Consequently, one might view the estimates I provide as an upper bound of the effect of decline. Alternatively, they can be taken at face value as the increase in health inequality caused by occupational decline.

There is ample evidence that economic distress caused by job loss can lead to increased mortality.

[1] We have previously used this measure in Edin et al. (forthcoming) where we investigate the earnings and employment consequences of occupational decline, using the same Swedish administrative data and methodology as I do in this paper.

In the US context, Sullivan & von Wachter (2009) find that mortality is 50-100 percent higher in the year after job loss due to plant closures, and stays 10-15 percent elevated, compared to non-displaced peers, for 20 years. But even in more egalitarian countries with a safety net, job loss due to mass layoffs following plant closures may be detrimental to health and death risk. Eliason & Storrie (2009*a*) find a 44 percent higher risk of death in the first 4 years after plant closure induced job loss in Sweden. Using Danish data, Browning & Heinesen (2012) find that mortality increases by almost 80 percent in the year of job loss due to plant closure, and 34 percent in the year after. Here, too, the increased death risk remains 20 years after displacement.

Job loss following plant closure also increases morbidity: It increases the risk of being hospitalized for mental illness and alcohol-related illness (Eliason & Storrie 2009*b*, Eliason & Storrie 2010 and Eliason 2015 for Sweden, Browning & Heinesen 2012 for Denmark).

But even in absence of sharp shocks to individuals, long-term decline of living conditions, social status, and economic opportunities may affect health and longevity negatively. In fact, such deterioration of social and economic life is what Case & Deaton (2020) focus on when attempting to explain the increase in "deaths of despair" – deaths due to alcohol, drugs or suicide – in the US over the last 20-30 years. In particular, if this negative development exacerbates inequality, the impact on health might be detrimental (Case & Deaton 2020), which echoes findings about a socio-economic gradient in health: The ones at the top are not only richer, but also healthier and live longer.[2] Furthermore, several models in health economics demonstrate how lower life-time earnings, or increased earnings instability, may reduce longevity.[3] To complicate matters, it is not simply material deprivation that is the culprit of worsening health (Marmot 2006). Instead, it is the lack of two "fundamental human needs: autonomy and full social participation" (Marmot 2006:1305). Although money matters, the notion of "despair" goes beyond material deprivation. The lack of autonomy and feeling of meaning at work, together with increased differences in both financial and other aspects of life, contributes to the despair that can have such detrimental consequences.

Occupational decline is an identifiable indicator of such deterioration of socio-economic conditions. I differ from the literature on job loss and health consequences in that I do not study a sharp, individual shock, but a more gradual decline that may contribute to a low-intensity but long-term stress. I thus contribute to the literature championed by Case & Deaton (2020) by using an identifiable marker of decline, and by studying a welfare state that is different in multiple dimensions from the US. My choice of causes of death and hospitalization – despair (suicide, drugs or alcohol) and cardio-vascular disease – mirrors findings of previous literature. Despair (Case & Deaton 2020), its constituent parts (Eliason & Storrie 2009*b*, Eliason & Storrie 2010, Eliason 2015) and cardio-vascular disease (Marmot et al. 1991, Marmot 2006) have all been demonstrated to be consequences of bad and worsening socio-economic conditions.

One potential mechanism is that bad socio-economic conditions cause stress, which has long been understood to increase the risk of alcohol abuse (e.g. Anthenelli 2012), drug abuse (e.g. Sinha 2008) and suicide (e.g. Gould et al. 1996). Stress is also known to increase the incidence cardio-vascular disease because it directly affects some parts of the cardiac system (Marmot 2006).

In Edin et al. (forthcoming), we find indications that occupational decline leads to relatively modest economic losses for the average worker: 2-5 percent of mean earnings are lost over 28

[2] See for instance Marmot et al. (1991), Adler & Ostrove (1999), Marmot (2006), Mackenbach et al. (2008), Deaton (2016).

[3] See p.1267 in Sullivan & von Wachter (2009).

years. However, this does not necessarily imply that health consequences will be modest. Firstly, the seemingly low earnings losses on average hide substantial heterogeneity: For those at the bottom tercile of an occupation's wage distribution, losses amount to around a tenth of earnings over 28 years. Exploring the health consequences of occupational decline for this group is an important contribution of this paper. Secondly, as described above, some health impact may go through channels other than the economic: Workers may have a strong identity as, for instance, assemblers in a car factory, and not feel as fulfilled or valued as, for instance, shop attendants or taxi drivers. Occupational switching may recuperate economic losses but still have mental and social consequences. Of this, we know little.

The rest of the paper is organized as follows: Section 2 features a description of the empirical strategy and the data. Thereafter, I demonstrate results in Section 3. Section 4 concludes.

2 Empirical strategy and data

2.1 Empirical strategy

My goal is to study the difference in health outcomes for workers who, in 1985, worked in an occupation that subsequently declined, compared to what would have happened, had their occupation not declined. To this end, I estimate the following equation, using ordinary least squares (OLS):

$$y_i = \beta_0 + \beta_1 D_{k(i)} + \beta_2 X_{i,k(i)} + u_i$$

where y_i is the outcome: an indicator for whether or not person i died or was hospitalized (due to some specific cause), or the number of days the person was hospitalized (due to some cause), during the sample period (1986-2015 for deaths, 1987-2015 for hospitalizations). $D_{k(i)}$ is an indicator for whether or not the occupation of worker i in 1985, $k(i)$, subsequently declined.[4] $X_{i,k(i)}$ is a vector of covariates at the individual and occupation level, and u_i is the error term.[5]

The estimated coefficient of interest, β_1, is (in the probability limit) equal to the difference in the conditional mean outcome between those in declining and those in non-declining occupations. This can be decomposed into a treatment effect on those in declining occupations, minus a treatment effect on those in non-declining occupations, plus some selection bias. Call the set of declining occupations A and the set of non-declining occupations B. Equation (1) describes the probability limit of the estimated coefficient of interest (as in Edin et al. (forthcoming)):

[4]See Section 2.2 for a more detailed account of the construction of the indicator for decline.

[5]I also estimate a logistic regression of the corresponding form:

$$\ln\left(\frac{\mathrm{P}(y_i = 1)}{\mathrm{P}(y_i = 0)}\right) = \beta_0 + \beta_1 D_{k(i)} + \beta_2 X_{i,k(i)} + u_i$$

where $\mathrm{P}(y_i = 1)$ indicates the probability of death in the sample period, and $\mathrm{P}(y_i = 0)$ indicates the probability of survival during the whole sample period. The results in Table B.1 are similar to those in the linear probability model, why I select the linear probability model for my main tables. For instance, take the first column of Panel A in Table 4. The outcome – the probability of death at any point in the sample period – has a mean of 5.8, and it increases by 1.63 if the individual experiences decline. This means the probability goes up by 28 percent, which is the number displayed in the corresponding position in Table B.1. The same exercise can be done on all numbers in Table 4 and Table B.1. The table entries with very low (or very high) coefficients in the logistic regression are those we might worry are not accurately estimated in the linear probability model. But even the entry in Panel A, column 6 of Table 4 shows a percentage increase close to the one in the corresponding position of Table B.1: the probability of death increases by 5.3 percent in the linear probability model, compared to 5.5 percent in the logistic model.

$$\text{plim } \hat{\beta}_1 = \underbrace{\begin{matrix} \mathbb{E}[y_i|k(i) \in A, D_A = 1, D_B = 0, X_{i,k(i)}] \\ -\mathbb{E}[y_i|k(i) \in B, D_A = 1, D_B = 0, X_{i,k(i)}] \end{matrix}}_{\text{Observed difference in means}}$$

$$= \underbrace{\begin{pmatrix} \mathbb{E}[y_i|k(i) \in A, D_A = 1, D_B = 0, X_{i,k(i)}] \\ -\mathbb{E}[y_i|k(i) \in A, D_A = 0, D_B = 0, X_{i,k(i)}] \end{pmatrix}}_{\text{Effect of occupational decline on } A \text{ workers}}$$

$$- \underbrace{\begin{pmatrix} \mathbb{E}[y_i|k(i) \in B, D_A = 1, D_B = 0, X_{i,k(i)}] \\ -\mathbb{E}[y_i|k(i) \in B, D_A = 0, D_B = 0, X_{i,k(i)}] \end{pmatrix}}_{\text{Effect of occupational decline on } B \text{ workers}}$$

$$+ \underbrace{\begin{pmatrix} \mathbb{E}[y_i|k(i) \in A, D_A = 0, D_B = 0, X_{i,k(i)}] \\ -\mathbb{E}[y_i|k(i) \in B, D_A = 0, D_B = 0, X_{i,k(i)}] \end{pmatrix}}_{\text{Selection bias}}. \quad (1)$$

The selection bias thus demonstrates the difference in means between workers in A and B that would have occurred, had no occupational decline happened in any occupation. To reduce or remove this bias, I add a range of control variables, listed in detail in Section 2.6.

Turning to the treatment effect, this comprises of the treatment effect both on the workers in declining occupations (set A) and non-declining occupations (set B). This means that although my focus in this paper is on how decline affects workers in declining occupations, I need to consider the effect on *other* workers in the economy, too. In fact, I am estimating the difference in effect (plus some selection bias) of decline on these two groups, which ties into the discussion on health inequality.

Let me first consider the *economic* impact of decline on workers in non-declining occupations, as we do in Edin et al. (forthcoming). On the one hand, workers in non-declining occupations might experience increased demand for their labor, since one reason for decline might be substitution away from some occupations to others. Additionally, new technologies that enter the economy may replace some workers but complement others. On the other hand, if occupations experience large inflows of workers from declining occupations, the incumbent workers may suffer. In our other work, on balance, we conclude that the effect should be at least weakly positive on workers in non-declining occupations, when it comes to their earnings and employment (Edin et al. forthcoming).

When it comes to the health impact of decline on workers in non-declining occupations, some effect should go through the economic channel described above, and thus be weakly positive. Moreover, if the absence of occupational decline leads to a relative improvement in social status, this might impact health positively, as the social gradient in health operates along the whole distribution: It is not only those at the bottom that fare worse (Adler & Ostrove 1999, Marmot 2006).

Apart from that, we might consider that more unequal societies generally have worse health outcomes (Pickett & Wilkinson 2015). If occupational decline happens in concurrence with a general increase in inequality, this may have different health effects across the distribution. However, in order for this to perturb my estimates, this would have to disproportionally affect workers depending on whether or not they are in a declining occupation.

In all, the estimates I present on increased mortality may be viewed as an upper bound of the effect of occupational decline on mortality, given that the treatment effect on mortality for workers in non-declining occupations might be weakly negative. Alternatively, one might view the estimates as an indication of the widening health inequalities that come about due to occupational decline.

2.2 Data sources

I measure outcomes and covariates using Swedish data: I obtain demographic and labor market variables from the administrative dataset Louise, which includes all residents in Sweden aged 16-64 for 1985-2014. The variables include gender, year of birth, county of residence, education as well as earnings and industry. All of these but industry are included in the demographic and earnings covariates, where I use earnings to determine a relative position in the earnings ranking.

I obtain data on occupations from censuses 1960, 1970, 1980, 1985 and 1990. Thereafter, I use the Wage Structure Statistics (1996-2014), which include all workers in public sector as well as a representative, 50 percent sample of the private sector.

I connect persons to their parents via the Multi-Generation Register (*Flergenerationsregistret*).

The outcome variables are mainly related to health: morbidity and mortality. I obtain individual time and cause of death from the Cause of Death Registry (*Dödsorsaksregistret*), covering deaths from 1961-2020. I use these data to compute the covariate pre-period mortality, too. Hospitalizations are retrieved from the National Patient Register (*Patientregistret*). It covers in-patient care from 1964-2019, but suffers from underreporting before 1987.

2.3 Sample restriction

The full sample includes persons in Sweden aged 16-64 in 1985: 5,279,432 persons. Of these, 4,185,336 were employed (in November 1985), and 3,773,775 earned at least one base amount.[6]

I exclude the very youngest, who are unlikely to be strongly attached to the labor market, so I have 3,190,467 25-64 year olds who fulfill the above mentioned criteria. When I require observable education level, occupation and industry code, around half a million observations disappear. I am left with a sample of 2,634,933 persons, which I divide into three groups: young (25 to 36 years old in 1985), middle-aged (37 to 48) and old (49 to 64), for continuity with Chapter 2. The first category is the one I use for the main results table, and the number of observations there is 877,259. The other two groups consist of 976,556 and 781,118 persons, respectively.

In columns 1-3 in Table 2, I show that the sample of 25-36 year olds who were employed at earned at least one base amount have similar characteristics to those remaining when I impose restrictions on observable education, occupation and industry variables.

As for the time period, although I have data on mortality and hospitalization up until 2020 and 2019, respectively, the causes of death and hospitalization are more narrowly classified up until 2015, allowing me to distinguish between, e.g., death and hospitalizations due to despair and due to cardio-vascular disease. I therefore decide to end my main sample period in 2015.

My baseline sample is sampled in November 1985. I evaluate hospitalizations from 1987 (when the data starts), and deaths from 1986. However, 10 persons out of the 3,773,775 persons in the

[6] A base amount (basbelopp) is an annually determined administrative measure upon which some benefits or fees are based. In 1985 it was 21,800 SEK. Since I do not have universal data on hours worked or wages, I use this measure to exclude persons with weak labor market attachment.

16-64 age sample die in 1985 (after being sampled). I classify them as having died in 1986, instead. Thus, my time period of evaluation is 1986-2015.

2.4 Treatment variable: Occupational decline

I define declining occupations as we do in Edin et al. (forthcoming): first, we record employment changes in 401 US occupations from the *Occupational Outlook Handbooks* between 1986-87 and 2016-17 (Bureau of Labor Statistics 1986, 2017). Then, we match this information to 1,396 Swedish occupations from the 1985 classification, where we adjust for many-to-one matches using appropriate employment weights.[7] Lastly, for each Swedish occupation, we record the (weighted) employment change in the corresponding US occupation(s).[8] If this employment change is below minus 25 percent, we assign the treatment "Declining" to the Swedish occupation. This allows me to define treatment at a very granular level for Swedish workers: for instance, typists are *treated* (declining), while secretaries are not. The rationale behind using US data to study Swedish outcomes is the same as in Edin et al. (forthcoming): Since the occupational classifications in Sweden changed in 1996, the level of detail from the 1985 codes (1396 occupations) is not preserved when using Swedish occupational codes to compute employment changes from the 1980s to 2010s. Instead of the detailed 1985 codes, harmonized codes (which build on the new classification from 1996) amount to 172 occupations. Moreover, this classification is likely endogenous to the decline I want to capture, since it was determined in 1996 – 9 years after my desired study period starts. It is likely that declining occupations were pooled into larger occupations. The US occupational classification, on the other hand, remains more stable over the study period, allowing me to observe occupations that declined heavily between the mid-1980s and the mid-2010s. An additional benefit of using US employment declines is that this external information is more likely to be exogenous to other factors that may impact Swedish individuals' economic situation and thus health.

The prerequisite of using US data in this way is that occupational decline is correlated across countries, which has indeed been demonstrated by e.g. Goos et al. (2014) and Adermon & Gustavsson (2015). I also demonstrate the validity of the US proxy in Section 3.1.[9]

2.5 Outcome variables

I study deaths and hospitalizations by cause. To identify cause of death, I use the International Classification of Disease (ICD), versions 9 and 10, coupled with information in the Swedish Cause of Death Registry and the Patient Registers. A detailed table on the classification codes I use can be found in Table 1. Below, I outline some details related to deaths and hospitalizations of despair, as well as the imputation used to deal with underreporting of causes of death in the early years of my sample.

[7] More specifically, we succeed in mapping 379 US occupations from the 1986-87 Occupational Outlook Handbook to 1,094 Swedish occupations. This means we match information from the US to 91 percent of Swedish workers in 1985. Whenever there is a many-to-one match, we use US employment in 1984 as weights for the US occupations. The details of this procedure can be found in the appendix to Edin et al. (forthcoming).

[8] Employment change is measured from the two OOH versions 1986-87 and 2016-17 (Bureau of Labor Statistics 1986, 2017), which record employment from 1984 and 2016, respectively. So the employment changes we consider are therefore between 1984 and 2016.

[9] For more details on the use of the US employment figures to study outcomes for Swedish workers, see Edin et al. (forthcoming).

Table 1: Diagnosis codes

Diagnosis descriptions	ICD-9 (used until 1996)	ICD-10 (used from 1997 onwards)
Alcohol related disease or condition*	291, 303, 305.0, 357.5, 425.5, 535.3, 571.0 – 571.3, 577.0 – 577.1, E980	Any below
Alcohol poisoning		T51, X45, X65, Y15
Alcohol use disorder		F10
Alcohol induced liver disease or pancreatis		K70, K85, K86.0 – K86.1
Cardio-vascular disease	390 – 459	I
Drug related disease or condition*	Any below	Any below
Drug and other poisoning	965, 966 – 969	T38 – T44
Drug abuse and addiction	304 – 305	F10 – F16, F18 – F20
External injuries		
Self-inflicted injuries*	E950 – E959, E980 – E989	X60 – X84, Y10 – Y34, T76

Notes: The entries in this table are taken directly from Eliason et al. (2010) and Eliason (2015) (for disaggregated alcohol related conditions), with the following additions: 1) Drug related diseases and condition codes and 2) T76 (suicide attempt) under Self-inflicted external injuries in the ICD-10 coding. * Alcohol, drugs and self-inflicated injuries are the three components of injuries of despair. Apart from the ICD codes, I also use two separate variables from the Cause of Death Registry to indicate whether a person died from despair: whether or not *alcohol* or *narcotics* is mentioned as a cause of death on the death certificate. The number of persons who are coded as dead from despair using this additional measure is 2,253 out of a total of 97,208 deaths of despair between 1961 and 2015.

Deaths and hospitalizations of despair I define deaths of (or hospitalization due to) despair as being caused by alcohol, drugs or suicide (or "self-inflicted injury", as the diagnosis code states). Furthermore, for deaths of despair, I can also use information from a note on the death certificate, which states whether or not alcohol was a cause of death, separate from the ICD codes. Using this information, 2253 more deaths were counted as deaths of despair, on top of 94,955 already classified.

Imputed deaths of despair and deaths by cardio-vascular disease Before 1987, the Cause of Death Registry gives unreliable information about some causes of death. Among others, the component parts of deaths of despair and deaths by cardio-vascular disease are underreported. Therefore, for mortality from despair and cardio-vascular disease in 1986, I use the mean mortality 1987-1991 for each gender, age group and education category (BA or non-BA), conditional on death, to impute the mortality in 1986. So, rather than a one or zero response for each person in 1986, I put a percentage probability of death of despair or cardio-vascular disease, given that the person died in that year.

2.6 Control variables

This section presents the covariates included in the result tables.

Demography, earnings & pre-period hospitalization Individual level variables, such as demographics, earnings and pre-period hospitalization are included to correct for sorting into declining occupations. Those in declining occupations are for instance lower educated, and more likely to be men, as evident from Table 2. Demography controls therefore include dummies for year of birth, county, education level, and gender. Earnings refer to (dummies for) ventiles in the 1985 income distribution. The pre-period hospitalization rate captures some measure of health before the treatment begins: I use two individual level control variables representing (spells and days of) hospitalization for each person in the sample in the time period 1961-1985.

Life-cycle profiles Even in absence of decline, occupations offer different earnings trajectories over workers' careers. Therefore, I control for the predicted life-cycle earnings of individuals per occupation. Life-cycle profiles are the predicted life-time earnings based on 1985 earnings in each 3-digit occupation. More specifically, they are constructed (as in Edin et al. (forthcoming)) in the following way: Using all workers who earned at least one base amount (see explanation of base amount in Footnote 6) aged 16-64 in 1985, we regress log earnings on a quartic of age, gender, county and education in each 3-digit occupation. Thus, we obtain a predicted value of each person's earnings in 1985. We then bring this prediction forward over time, using the coefficients on the age variables as persons grow older, and adjusting for average annual wage growth 1986-2013. We interpret this as the best, ex-ante prediction of what an individual's earnings would have been, had they stayed in their 1985 occupation, and had the occupation not declined.

Predictors of growth Workers may sort in anticipation of decline, or in response to already ongoing occupational decline. Therefore, I control for predictors of occupational growth. These include occupation level information on Swedish employment share in 1985, Swedish employment growth 1960-1985, and US employment forecasts by Bureau of Labor Statistics (1986). The Bureau of Labor Statistics (1986) classify occupations, according to their prediction of growth over the next decade, as likely to decline, stay approximately constant, increase slower than average, increase about as fast as average, and increase faster than average.

Occupation dummies I use 1-digit occupation indicators from the Standard for Swedish Occupational Classification (abbreviated SSYK in Swedish) from 1996, which builds on the International Standard Classification of Occupations (ISCO) from 1988.

Industry dummies I use the industry classifications from EUKLEMS, which divides economic activity into 28 industries.

In some specifications, I also control for one of the following:

Marriage Being married might shield individuals from economic or social consequences of occupational decline. Alternatively, it might be associated with having dependents, so that economic hardship is more stressful. In some specifications, I therefore control for whether or not an individual was married in the initial period (1985).

Parents' age at death The genetic disposition to early death and disease may affect longevity and correlate with other unobservables. To control for this, in some specifications I control for parents' age at death. I use three bins: at least one parent died before age 45, at least one parent died between ages 45 and 68 (but no parent died at an earlier age), and both parents (or the one parent if there is only information on one) died at age 69 or older.

Pre-period mortality Occupations may differ in how detrimental to workers' health they are, or in that differently healthy individuals sort into different occupations. To control for this, I include a measure of pre-period mortality per 3-digit occupation. Pre-period mortality refers to the mortality of workers, who were 25-36 years old in 1960, in each 3-digit occupation and of each gender from 1961-1985.

In tables with only two specifications per outcome variable, the two specifications are labelled as follows:

Individual controls Individual controls include demography, earnings and pre-period hospitalization. See above for details.

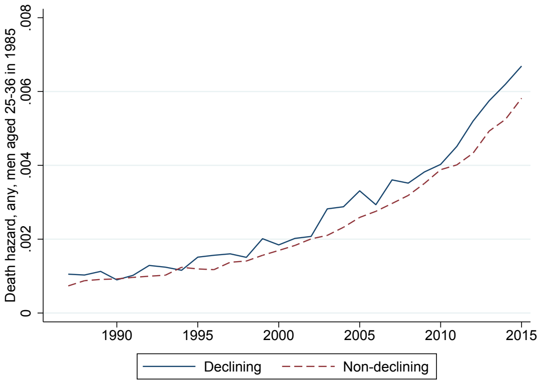
Occupation & industry controls Occupation & industry controls include the remaining covariates. See above.

3 Results

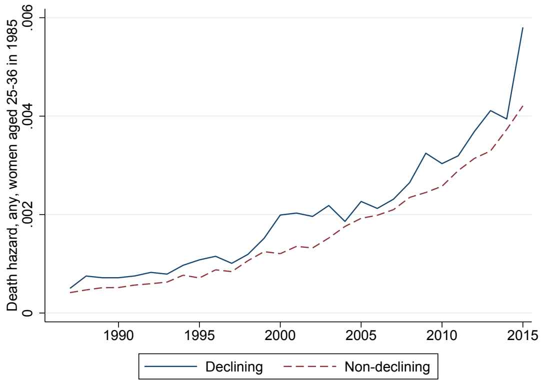
3.1 Descriptive statistics

People in declining occupations have slightly higher risk of death in almost every year of the sample period, as is evident from Figure 1. The first row plots the hazard rates of death for men and women, respectively: that is, what is the probability of death in a given year, given survival up until that year? The sample in the graph corresponds to the main, baseline sample of investigation in this paper: employed people aged 25 to 36 in 1985.

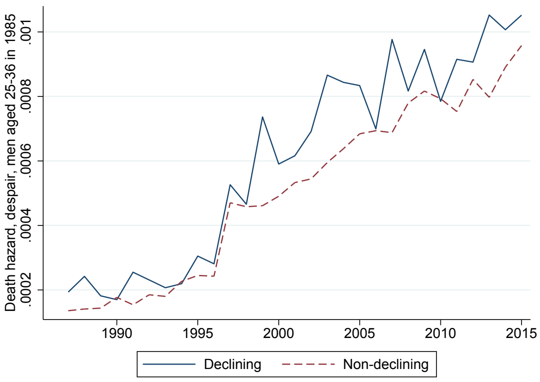
In the two rows that follow, hazard rates for deaths of despair and deaths due to cardio-vascular disease are plotted. Here, too, it seems that persons in declining occupations run higher risk of death, although the pattern for declining occupations is more erratic due to the rarity of the event and the fact that the number of persons in declining occupations is a seventh of the number in non-declining.



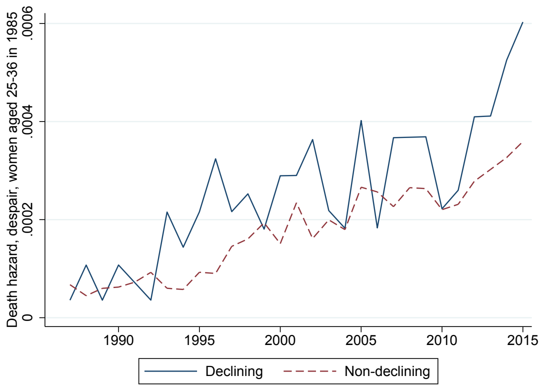
(a) Hazard rate of death, any cause, males



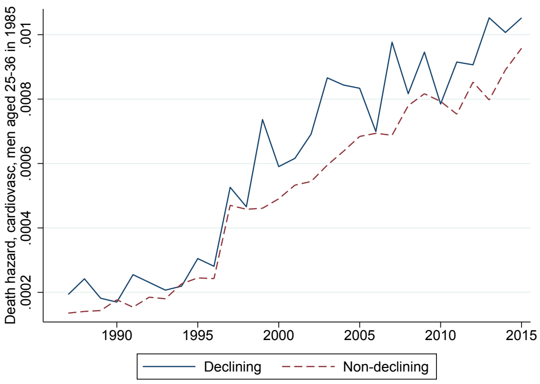
(b) Hazard rate of death, any cause,females



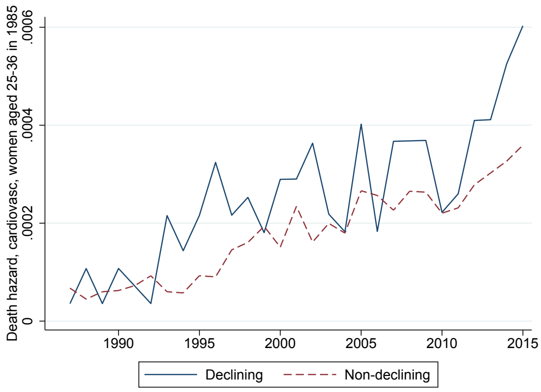
(c) Hazard rate of death, despair, males



(d) Hazard rate of death, despair, females



(e) Hazard rate of death, cardiovascular disease, males



(f) Hazard rate of death, cardiovascular disease, females

Figure 1: Hazard rate of death for workers in declining and non-declining occupations, aged 25 to 36 years in 1985

Notes: The graphs show the probability of death in the indicated year, conditional on having survived up until that point, for people in declining and non-declining occupations. The sample consists of 877,259 men and women who were employed, aged 25-36 years, and earned at least one base amount (see Footnote 6) in 1985. Details on outcomes and the definition of Declining can be found in Sections 2.4 and 2.5 respectively. There are 109,275 persons in the declining occupations and 767,984 persons in the non-declining.

However, these observationally different patterns might depend on different sorting across occupations. Table 2 describes some differences between non-declining and declining occupations in its columns (4) and (5). Declining occupations are male-dominated, lower educated and more concentrated in manufacturing. The first two factors could suggest longevity is lower in declining occupations. Income and age, however, are similar across declining and non-declining, and so are the mean number of spells and days hospitalized in the time-period leading up to 1985. As explained in Section 2, I control for all these differences in the regressions.

Table 2: Summary statistics for the 25-36 year old sample in 1985

	(1) Without restr.	(2) Non-miss. educ.	(3) Non-miss. educ., occ., ind.	(4) Non-decl.	(5) Decl.
Female	0.46	0.47	0.48	0.51	0.25
	(0.50)	(0.50)	(0.50)	(0.50)	(0.43)
Age	30.71	30.78	30.81	30.83	30.64
	(3.46)	(3.47)	(3.46)	(3.46)	(3.49)
Earnings	181.75	182.99	184.26	182.77	194.76
	(78.57)	(79.06)	(77.57)	(77.85)	(74.69)
Hosp. spells	0.03	0.03	0.03	0.03	0.03
	(0.09)	(0.09)	(0.09)	(0.09)	(0.09)
Hosp. days	0.90	0.90	0.90	0.89	0.95
	(9.35)	(9.30)	(9.24)	(9.17)	(9.76)
Comp. school		0.25	0.25	0.23	0.38
		(0.43)	(0.43)	(0.42)	(0.48)
High school		0.83	0.84	0.83	0.87
		(0.37)	(0.37)	(0.37)	(0.33)
College		0.12	0.12	0.13	0.05
		(0.33)	(0.32)	(0.33)	(0.21)
Manufacturing			0.28	0.23	0.61
			(0.45)	(0.42)	(0.49)
Observations	1,070,818	995,327	877,259	767,984	109,275

Notes: The rows show the mean (and standard deviation) of the fraction females, age, earnings in thousands of 2014 SEK (all in 1985), and yearly spells and days in hospital up until 1985. Then, the fraction with at most compulsory school, high school and college, and the fraction in manufacturing are listed (all in 1985). The first column includes all 25-36 year olds who were employed in November 1985 and earned at least one base amount in 1985. The second column imposes that education level is observable, and the third additionally imposes that occupation and industry are observed. This is the main sample used in the regressions. The fourth and fifth column divides this main sample into two parts: one with persons in non-declining occupations, and one with persons in declining occupations.

Table 3 exhibits the results from a regression of occupational growth in each person's (Swedish) occupation on the declining indicator. That is, what is the individual exposure to occupational decline indicated by my treatment variable? It shows that workers in occupations I classify as "Declining" are in occupations that experience 47 log points lower employment growth than other occupations. When controlling fully, the difference is still 22 log points.

Table 3: Quantifying workers' exposure to occupational decline

	(1)	(2)	(3)	(4)	(5)	(6)
A. Workers aged 16-64 in 1985 (3,060,582 observations)						
Declining	-0.49	-0.43	-0.42	-0.31	-0.28	-0.22
	(0.12)	(0.11)	(0.12)	(0.10)	(0.11)	(0.10)
B. Workers aged 25-36 in 1985 (877,259 observations)						
Declining	-0.47	-0.39	-0.38	-0.28	-0.27	-0.22
	(0.11)	(0.11)	(0.11)	(0.10)	(0.12)	(0.10)
Demography, earnings & pre-period hosp.		✓	✓	✓	✓	✓
Life-cycle profiles			✓	✓	✓	✓
Predictors of growth				✓	✓	✓
Occupation dummies					✓	✓
Industry dummies						✓

Notes: Results of a regression of the following form: on the left-hand side is the log employment change in each Swedish 3-digit occupation between 1986-2013. This value is matched to each individual worker via their 1985 5-digit occupation. Both samples are conditioned on being employed and earning at least one base amount (see Footnote 6 in November 1985, and having information on occupation, education level and industry. Details on the treatment and control variables can be found in Sections 2.4 and 2.6.

3.2 Main results

In Table 4, the outcome is the probability of death (in percent) by the cause specified at any point between 1986 and 2015, and in all regressions I control for year of birth.[10] From panel A we learn that 5.8 percent of persons in the sample die in the 30 year period under study. The absolute difference between declining and non-declining occupations – controlled only for year of birth – is 1.63 percentage points, or around 28 percent of the sample mean. Once I control for demographics, earnings and pre-period hospitalization rates, the difference shrinks to 0.62 percentage points, demonstrated in column (2) of the same table. This figure corresponds to almost 11 percent of the sample mean. As I add more controls, in columns (3)-(5), the estimate shrinks, but remains positive and precise. Even in my most conservative estimation, where I use life-cycle profiles, growth predictions and occupation and industry dummies, a difference between declining and non-declining remains: those who in 1985 worked in an occupation that would subsequently decline face an increased risk of death at almost 6 percent of the sample mean risk (namely, a 0.32 percentage point increase).[11] In absolute numbers, these numbers indicate that 678 (350) additional deaths occurred in the declining occupations, compared to in the non-declining, after controlling for individual (and occupation and industry) covariates.[12]

[10] The dependent variable for each individual is a binary indicator of 0 or 100 (rather than 0 or 1), in order to express coefficients in percent and avoid excessive use of zeroes and decimal points.

[11] Results from the logistic regressions of death on decline are very similar (see Table B.1). The logistic regression indicates that workers in declining occupations faced 5-10 percent higher risk of death in the sample period than workers in non-declining occupations.

[12] Computed as 0.0062 (0.0032) times the number of persons in declining occupations (109,275). The numbers 0.0062 and 0.0032 come from Table 4: The coefficient on decline is 0.62 percentage points in column (2), and 0.32 percentage points in column (6).

Panels B-E in Table 4 show the conditional correlation of occupational decline with workers' propensity to die from despair and each of its constituent parts: alcohol related disease, drug related disease and suicide. Although there exists a difference in probabilities of all these outcomes between workers in declining and non-declining occupations, conditional on age only, this difference vanishes once controls are included. The last panel, however, shows that workers affected by decline are more likely to die from cardio-vascular disease, even when adding controls. The difference shrinks from 0.94 percentage points to 0.35 (compared to a mean of 1.94 percent) when adding individual level controls, after which it does not change substantially when controlling for occupation level factors. However, the last column (6) shows that the point estimate shrinks to 0.14 percentage points when controlling for industry. Compared to the mean incidence of death by cardio-vascular disease, these numbers represent 18 and 7 percent increases, respectively.[13]

[13]The logistic regressions in Table B.1 show similar results: workers in declining occupations face 14 (7) percent higher risks of death by cardio-vascular disease than similar workers (in similar occupations) in non-declining occupations.

Table 4: Occupational decline and mortality 1986-2015

	(1)	(2)	(3)	(4)	(5)	(6)
A. Death, any cause (percent) (mean: 5.80)						
Declining	1.63	0.62	0.55	0.46	0.41	0.32
	(0.36)	(0.23)	(0.22)	(0.22)	(0.16)	(0.13)
B. Death of despair (percent) (mean: 1.03)						
Declining	0.51	0.15	0.12	0.096	0.061	0.057
	(0.14)	(0.096)	(0.075)	(0.075)	(0.071)	(0.059)
C. Death due to alcohol (percent) (mean: 0.60)						
Declining	0.32	0.087	0.061	0.034	0.025	0.023
	(0.091)	(0.068)	(0.058)	(0.057)	(0.058)	(0.046)
D. Death due to drugs (percent) (mean: 0.24)						
Declining	0.082	0.041	0.033	0.039	0.033	0.032
	(0.037)	(0.033)	(0.031)	(0.031)	(0.028)	(0.026)
E. Suicide (percent) (mean: 0.39)						
Declining	0.14	0.040	0.044	0.047	0.028	0.029
	(0.039)	(0.028)	(0.027)	(0.027)	(0.025)	(0.027)
F. Death due to cardio-vascular disease (percent) (mean: 1.94)						
Declining	0.94	0.35	0.30	0.26	0.24	0.14
	(0.19)	(0.12)	(0.13)	(0.13)	(0.092)	(0.074)
Demography, earnings & pre-period hosp.		✓	✓	✓	✓	✓
Life-cycle profiles			✓	✓	✓	✓
Growth predictors				✓	✓	✓
Occ. dummies					✓	✓
Industry dummies						✓

Notes: All outcomes refer to the percentage probability of death (by cause specified in panel) at any point between 1986-2015, controlled for year of birth. The sample consists of 877,259 men and women who were employed, aged 25-36 years, and earned at least one base amount (see Footnote 6) in 1985. Details on the outcome, treatment and control variables can be found in Sections 2.4 to 2.6.

Table 5 demonstrates the results separately for men and women. In panel A, the main effect (first row) refers to the coefficient on decline for men. The second row shows how the coefficient differs for women, compared to men. Panels B and C show the regressions separately for men and women. The conditional correlation between decline and death by any cause shows no statistical difference between men and women: The coefficient on the interaction between decline and female is imprecisely estimated in both columns (1) and (2).

Column (4) demonstrates that women in declining occupations have a 0.18 percentage point higher increase in the risk of death by despair than men in declining occupations. The estimate is, however, somewhat noisy. More specifically, men seem not to die by despair to any larger degree when experiencing occupational decline: Although I find a noisy, positive estimate when comparing similar individuals in panel B, this point estimate is reduced to a noisy zero when including all covariates. Women in declining occupations, however, face a rather precise, 0.19 percentage point higher risk of death by despair, compared to women in non-declining occupations, after controlling for all covariates. This amounts to a 37 percent increase in risk compared to the mean of 0.52 percent. This means that there were 52 additional deaths by despair among female workers in declining occupations, compared to in non-declining occupations.[14] The increase in deaths of despair for women in declining occupations is distributed among all causes of death of despair: alcohol and drug related diseases and suicide (See Table B.2).

It is worth reflecting on what we know about the gender differences in deaths of despair for workers in declining occupations. Women seem to run higher risk of death by despair when experiencing occupational decline – this coefficient is large and precise (panel C, column (4)). We cannot be sure about whether the risk increases or declines for men: Their coefficient is almost exactly zero, but imprecisely estimated (panel B, column (4)). Because the coefficient in the male regression is imprecise, we cannot discern statistical difference between the coefficients on men and women. In all, we know women face increased risk, but we do not know whether men do or not.

The opposite is true for deaths by cardio-vascular disease: Men's risk is higher when faced with decline, but we do not know whether women's risk is. Columns (5)-(6) show the impact of occupational decline on risk of death by cardio-vascular disease. When controlling for all covariates (column (6)), the risk is elevated by 0.18 percentage points for men, which corresponds to 7 percent of the mean among men. In absolute numbers, 147 more men died from cardio-vascular disease in declining occupations, compared to in non-declining occupations, after controlling for all covariates.[15] The coefficient on decline on the cardio-vascular death probability among women is indistinguishable from the men's increase in risk (see panel A, columns (5)-(6)), but panel C shows that, when controlling for all covariates, it is also indistinguishable from zero.

[14]Computed as 0.0019 times the number of women in declining occupations (27,560).

[15]Computed as 0.0018 times the number of men in declining occupations (81,715).

Table 5: Occupational decline and mortality 1986-2015: Heterogeneity between genders

	Death, any cause		Death by despair		Death, cardio-vasc.	
	(1)	(2)	(3)	(4)	(5)	(6)
A. Both genders (N = 877,259)						
Declining	0.50	0.22	0.091	0.0096	0.37	0.18
	(0.28)	(0.16)	(0.12)	(0.083)	(0.15)	(0.087)
Declining × female	0.13	0.22	0.069	0.18	-0.16	-0.085
	(0.33)	(0.27)	(0.13)	(0.10)	(0.16)	(0.12)
B. Men only (N = 455,972)						
Declining	0.50	0.22	0.091	0.0096	0.37	0.18
	(0.28)	(0.16)	(0.12)	(0.083)	(0.15)	(0.087)
C. Women only (N = 421,287)						
Declining	0.63	0.44	0.16	0.19	0.21	0.094
	(0.26)	(0.23)	(0.071)	(0.064)	(0.11)	(0.11)
Individual controls	✓	✓	✓	✓	✓	✓
Occupation & industry controls		✓		✓		✓
Mean of dep. var. (all)	5.80		1.03		1.94	
Mean of dep. var. (men)	6.81		1.50		2.62	
Mean of dep. var. (women)	4.70		0.52		1.21	

Notes: All outcomes refer to the percentage probability of death (by cause specified in panel) at any point between 1986-2015, controlled for year of birth. The sample consists of 877,259 men and women who were employed, aged 25-36 years, and earned at least one base amount (see Footnote 6) in 1985. Details on the outcome, treatment and control variables can be found in Sections 2.4 to 2.6.

What may cause these gender differences?[16] First, one may look at related literature in the medical field to find underlying causes that may explain the diverging pattern. For instance, there exists evidence that, while stress is a risk factor for alcohol abuse for both men and women, it is particularly important for women. Furthermore, women stand to suffer worse health problems than men when abusing alcohol (Peltier et al. 2019 and references therein). Second, I hypothesize that marriage could be a shielding factor differentially by gender, which combined with varying marriage rates in the initial period could explain some variation in outcomes for men and women.[17] Although including a control for married in 1985 changes some point estimates slightly, it does not seem to account for any sizeable share of the variations in the results (see Table B.3 and Table B.4). Other potential explanations include gender differences in seeking and receiving healthcare, differential economic conditions for men and women in declining occupations, and that men and women might react differently in terms of lifestyle changes on economic hardship.

[16] Again, note that the difference between genders is not statistically determinable within each cause. However, we know that women have positive coefficients in the deaths of despair regressions, and men do in the cardio-vascular disease regressions.

[17] I only record marriage (or cohabitation) in 1985 as a control, since marriage or cohabitation after that could be affected by treatment. Eliason & Storrie (2010), who find some gender differences in the hospitalization response to job loss, find that marriage seems to shield women somewhat but not men. However, their results concern different outcomes than those in this paper, and do not seem to give any indication as to why my results vary between men and women.

I also ask whether or not workers in declining occupations die *earlier* than others who died in the 30 year sample period. In Table 6, I present estimates from a censored regression model. They suggest that workers in declining occupations died between 7 and 13 months (i.e. 0.57-1.09 years) earlier than those in non-declining occupations.

Table 6: Tobit regression: Occupational decline and mortality 1986-2015

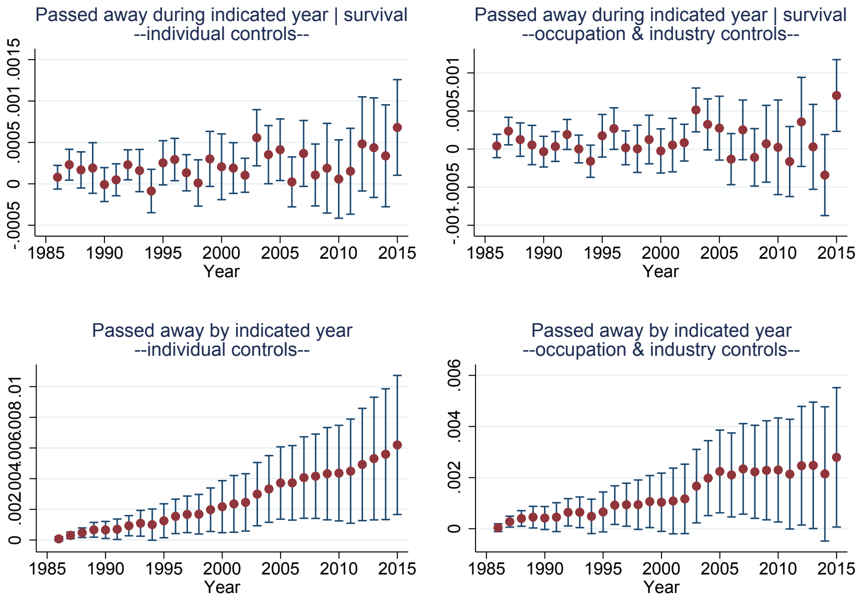
	(1)	(2)	(3)	(4)	(5)	(6)
Year of death (any cause)						
Declining	-2.98	-1.09	-1.03	-0.80	-0.66	-0.52
	(0.15)	(0.15)	(0.15)	(0.15)	(0.16)	(0.17)
Demography, earnings & pre-period hosp.		✓	✓	✓	✓	✓
Life-cycle profiles			✓	✓	✓	✓
Predictors of growth				✓	✓	✓
Occupation dummies					✓	✓
Industry dummies						✓

Notes: The outcome is year of death, controlled for year of birth, censored at the end year 2015. The sample consists of 877,259 men and women who were employed, aged 25-36 years, and earned at least one base amount (see Footnote 6) in 1985. Details on the included covariates can be found in Section 2.6.

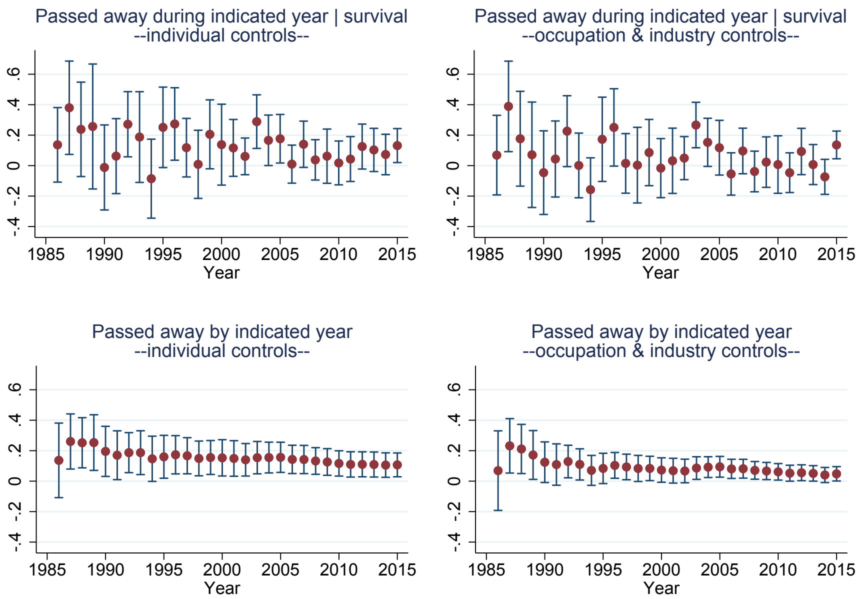
Additionally, I explore the dynamic pattern of the relationship between death and decline. Figure 2 shows the difference in mortality between workers in declining and non-declining occupations for each year in the sample period. The top row shows the impact of decline on the probability of death in each year, conditional on having survived up until then (the hazard rate of death). The bottom row depicts the impact of decline on the cumulative death rate: the dependent variable indicates whether or not a person passed away *by* each year. Since the treatment – decline – is a gradual process, I would expect to see differences in mortality building up over time. This is indeed what the bottom row of Figure 2a shows. In this panel, I estimate regressions using OLS. However, some of this effect is mechanic,[18] and disappears when I divide estimates by the average risk of death in each year (Figure 2b), or when I plot the coefficients from a logistic regression (Figure A.1). Although not in line with the expectation of a gradually increasing difference in mortality, I note that even when controlling for all covariates (the right column of the figure), the effect of decline on cumulative deaths stay above the zero line during the sample period.[19]

[18]Since very few persons die in the beginning of the sample period, the difference between declining and non-declining occupations is also (in absolute value) small.

[19]Except that there are some non-significant estimates around 1990.



(a) Linear probability model (LPM) coefficients



(b) Linear probability model (LPM) coefficients normalized by mean of dependent variable

Figure 2: Coefficient on decline in mortality regression, year-by-year 1986-2015

Notes: The top row in each figure plots the impact of decline on the probability of passing away in a given year, conditional on surviving up until that year. The bottom row plots the impact on the probability of passing away by each indicated year. The coefficients come from one regression per year of outcome on occupational decline and individual (first column), and occupation and industry controls (second column). The sample consists of 877,259 men and women who were employed, aged 25-36 years, and earned at least one base amount (see Footnote 6) in 1985. Details on the outcome, treatment and control variables can be found in Sections 2.4 to 2.6.

Turning to hospitalization, Table B.5 shows no evidence of occupational decline increasing the risk of ever being hospitalized between 1987 and 2015. Although there is a difference in unconditional means (column (1)) for all outcomes except for drug-related hospitalization, this difference vanishes once I control for individual level characteristics. Table B.6 does not, either, show strong evidence of decline leading to more days in hospitalization.

3.3 Heterogeneity over the earnings distribution

As we saw in Edin et al. (forthcoming), the lowest ranked in the earnings distribution in their occupation are hit the hardest by decline.

In panel A in Table 7, I interact the declining indicator with the individual's rank in the earnings distribution in their initial occupation, and explore the conditional correlation between occupational decline and risk of death in general, death of despair, and death from cardio-vascular disease. For all three outcomes, those lower ranked in their occupations are worse off in case of decline (i.e. the coefficient is negative), using both individual, occupation and industry level controls.

If I instead use dummy variables for being in the bottom and top terciles of the aforementioned earnings distribution, a similar picture is painted, at least for overall mortality: In columns (1)-(2), the bottom tercile face a 1.45 (with individual controls only, 1.18 with all controls) percentage point higher risk of death if they work in a declining occupation, which is a 24 (20) percent increase compared to the bottom tercile mean risk of death.

While the impact of decline on overall risk of death differs across the whole distribution, the impact on deaths by cardio-vascular disease seems to be driven by the bottom tercile. In columns (5)-(6), the imprecisely measured zero at the middle tercile increases by half a percentage point when looking at the bottom tercile. This is a quarter of the sample mean risk of death by cardio-vascular disease. However, the top tercile has no discernible difference in response to decline compared to the middle tercile.

However, in columns (3)-(4), which deal with deaths of despair, the differences in the distribution seem to be driven mainly by those at the top. When facing decline, their risk of death is actually reduced by around a third of the sample mean risk of death by despair.

In all, the risk of all three causes of death seem to disproportionally affect persons at the bottom of the earnings distribution in their initial occupation, but the pattern across the distributions differ between the causes of death.

Table 7: Occupational decline and mortality 1986-2015: Heterogeneous effects

	Death, any cause		Death by despair		Death, cardio-vascular	
	(1)	(2)	(3)	(4)	(5)	(6)
A. Linear interaction						
Declining	0.65	0.30	0.16	0.060	0.36	0.15
	(0.24)	(0.15)	(0.10)	(0.072)	(0.12)	(0.073)
Declining × rank	-1.01	-1.12	-0.44	-0.47	-0.43	-0.49
	(0.48)	(0.45)	(0.21)	(0.20)	(0.20)	(0.19)
B. Dummy interactions						
Declining	0.47	0.13	0.18	0.087	0.23	0.033
	(0.19)	(0.16)	(0.086)	(0.086)	(0.12)	(0.095)
Declining × bottom tercile	0.98	1.05	0.26	0.27	0.47	0.51
	(0.54)	(0.52)	(0.25)	(0.24)	(0.26)	(0.25)
Declining × top tercile	-0.44	-0.52	-0.33	-0.36	-0.10	-0.14
	(0.24)	(0.24)	(0.10)	(0.096)	(0.13)	(0.13)
Individual controls	✓	✓	✓	✓	✓	✓
Occupation & industry controls		✓		✓		✓
Mean of dep. var.	5.80		1.02		1.94	
Mean of dep. var., bottom	5.95		1.12		1.92	
Observations	877,259					

Notes: All outcomes refer to the percentage probability of death (by cause specified in panel) at any point between 1986-2013, controlled for year of birth. Workers are ranked according to annual earnings in their 1985 occupation. The rank is normalized to range between -1 to 1. The main effect in panel A thus refers to the effect on the median income worker (within each occupation), and the interaction effects give the inter-quartile range. The sample consists of 877,259 men and women who were employed, aged 25-36 years, and earned at least one base amount (see Footnote 6) in 1985. Details on the outcome, treatment and control variables can be found in Sections 2.4 to 2.6.

3.4 Robustness and additional results

Age heterogeneity Tables B.7 and B.8 show little evidence of impact of decline on death risk for middle-aged and older cohorts. Although both tables show reasonably precise estimates when only using individual-level controls, these estimates become small and/or imprecise when adding more occupation- and industry-level controls. This is in line with Edin et al. (forthcoming), where we hypothesize that these cohorts are not as vulnerable as they are not exposed to the treatment for a large enough share of their careers: those aged 49 to 64 in 1985, for instance, may retire before the bulk of the decline happens.

Controlling for parents' age at death The estimated effects of occupational decline on mortality are robust to including parents' age at death (constructed as described in Section 2.6). This control is meant to capture individual's genetic pre-disposition to a long life, but since the point estimates barely move and the sample size is reduced by a third, I relegate this result to the appendix (see Table B.9).[20]

Controlling for pre-period mortality Mortality rates in the pre-period, by 3-digit occupation, barely affect the point estimates in the main results tables (see Table B.10).[21] The sample size is heavily reduced when introducing this control, why I refrain from using it in my main specifications.

The sample composition, in terms of observables, does not change when using the reduced samples referred to above – i.e. either including only workers who have information on parents, or including only workers with information on occupational pre-period mortality, as I show in Table B.11.

Definition of decline In Table B.12, I run my main regressions for different definitions of the treatment variable "Declining". The estimates in the second panel, where I use my baseline definition of "Declining" are thus equal to estimates in columns (2) and (6) from Table 4.

For death (any cause) and death from cardio-vascular disease, larger declines seem associated with larger increases in mortality. But when I use a very "generous" definition of "Declining" – all occupations that grow less than the median growth rate are counted as declining – the sign of the effect is reversed. That is, persons who start out in occupations that grow less than the median growth rate have *lower* mortality than similar workers in growing occupations. Conversely, when cutting out all workers in occupations that grow at above median rate (as in the bottom panel), point estimates are large and precise.[22]

Mortality from deaths of despair follow a similar pattern, except for the very large declines: the effect of very large declines (top panel, where decline is defined as more than 50 percent decline) does not differ from the baseline measure (second panel).

In all, larger declines are associated with higher mortality. This mirrors the results for economic outcomes from Edin et al. (forthcoming). As in Edin et al. (forthcoming), I focus on large declines as treatment, since they are less likely to be driven by supply shifts.

4 Conclusion

In this paper, I study the consequences of occupational decline on mortality and morbidity. I use a measure of occupational decline derived from detailed, US data on occupations' size and nature (Bureau of Labor Statistics 1986, 2017), the validity of which we have corroborated in previous work (Edin et al. forthcoming). This index allows measuring unanticipated, large declines in occupational employment that happened over 32 years, which we have previously shown reduces workers' earnings and employment in the declining occupations (Edin et al. forthcoming). Apart

[20]The point estimates differ only in the fourth decimal point when including individual, occupation and industry controls. But why does this control not move estimates more? Although parents' death has negative impact on mortality – the coefficient on the categorical variable for the age bin of parents' age at death is precise and negative (omitted from table) – this control variable is not correlated with treatment. That is, it is balanced across declining and non-declining occupations in the relevant sample.

[21]The point estimates differ only in the third decimal place when including all controls. The reason for this absence of change in the coefficients of interest is two-fold: the pre-period mortality variable has no effect on the outcome, and it is also balanced across declining and non-declining occupations.

[22]This suggests a u-shape in the effect of occupational growth on mortality, but it seems weak when regressing deaths on the employment change in each person's occupation, where employment change is the change in the corresponding US occupation(s) as explained in Section 2.4 (see Table B.13). The effects of employment change and its quadratic are imprecisely estimated. Reassuringly, residualized cause-specific mortality rates seem to be elevated mainly for people in occupations experiencing large (more than 25 percent) declines (see Figure A.2).

from the economic consequences, is this long-term, gradual reduction in the demand for workers' services also connected with worse health outcomes?

The answer provided in this paper is yes. Workers in declining occupations face a 5-11 percent larger risk of death over the 30 year sample period than similar workers in similar, non-declining occupations, and they tend to die between 7 and 13 months earlier.

The estimates connecting the cause-specific mortality to occupational decline differ between men and women in the following way: Men in declining occupations have a 7-14 percent larger risk of death by cardio-vascular disease. Women in declining occupations, on the other hand, face a 31-37 percent higher risk of death of despair than women in non-declining occupations. Although the differences between genders are imprecisely estimated, the results highlighted are large and precise for men and women respectively. Looking more closely and separately at women and men who face economic or social hardship as a consequence of structural change and occupational decline is an important branch of future research. Sweden may be particularly suitable for this research, since women's labor force participation started rising sharply already in the 1970s.[23] Although controlling for initial marriage status did little to explain the variations in responses among men and women, one might imagine couple formation and fertility as *consequences* of the adversity of occupational decline. Future research should study this, as well as its inter-linkages with health and economic outcomes.

Furthermore, those in the bottom of each occupation's earnings distribution are more vulnerable to occupational decline, a finding that echoes our results on the economic consequences in Edin et al. (forthcoming). The bottom tercile of earners in each occupation face a 20-24 percent higher risk of death compared to those in non-declining occupations. Future research should investigate to what extent the drivers behind increased mortality are economic. In other words, do those who suffer early death also tend to suffer more economically from decline?

In all, the adverse health consequences of occupational decline should inspire action among policy makers. Apart from direct financial support for those suffering economic consequences, retraining and occupational switching should be helpful in mitigating negative socio-economic consequences of occupational decline. In a broader sense, health inequalities should interest and worry policy makers, who might want to tackle this in tandem with the economic inequality that might result from structural change.

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[23] In 1985, when this study begins, 83 percent of males and 78 percent of females (aged 16-64) were in the labor force (Torstensson 2022).

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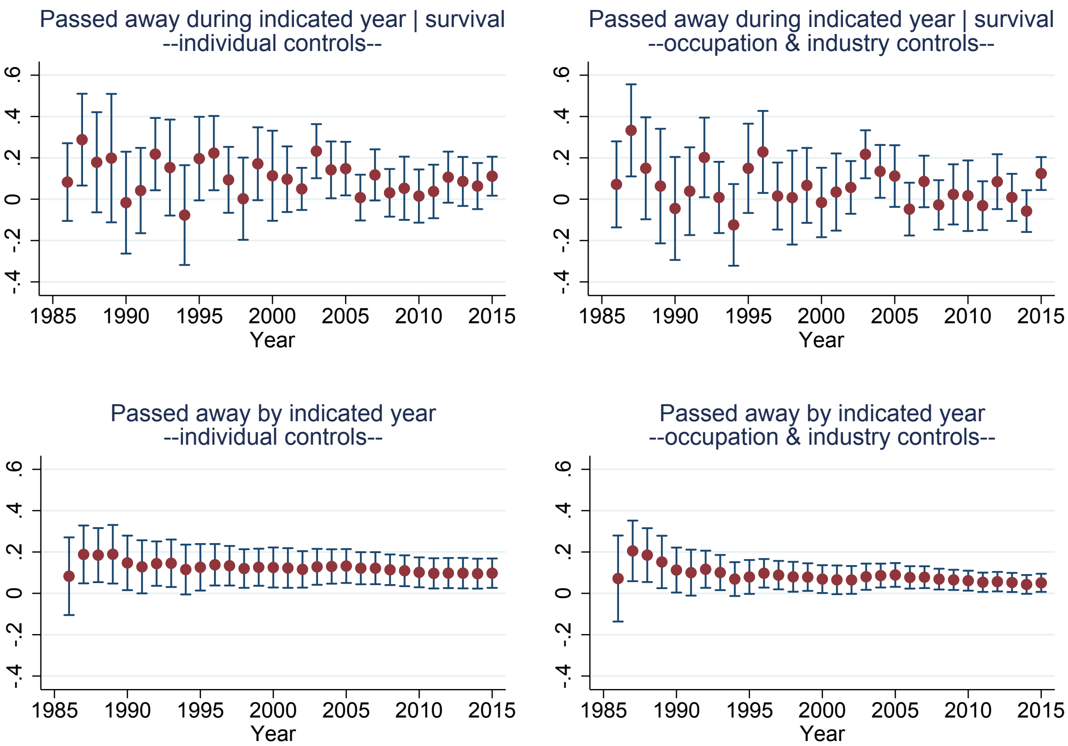
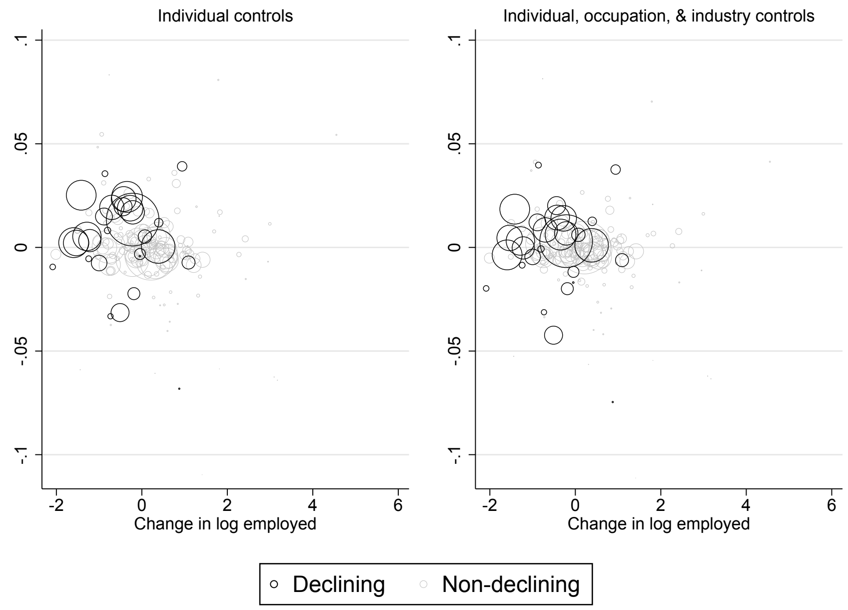
A Appendix figures

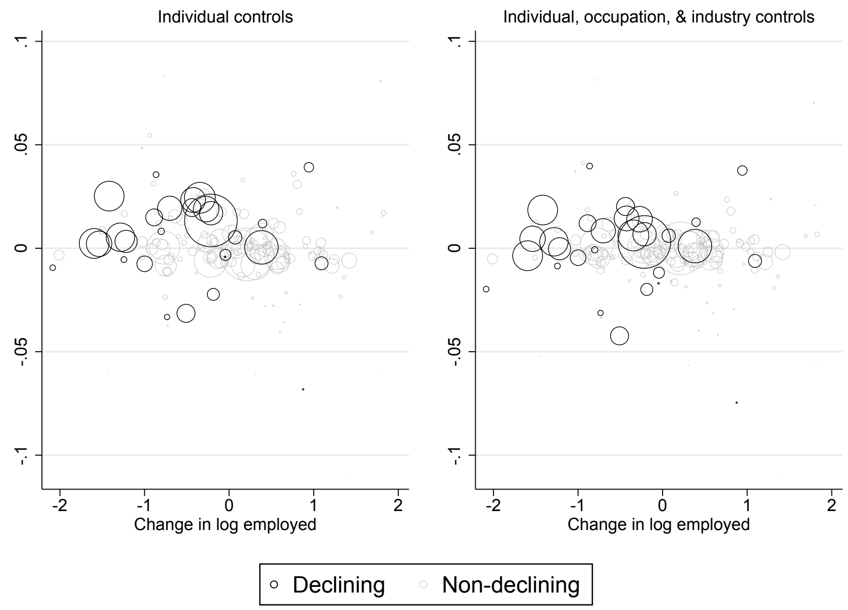


Notes: The top row plots the impact of decline on the probability of passing away in a given year, conditional on surviving up until that year. The bottom row plots the impact on the probability of passing away by each indicated year. The coefficients come from one regression per year of outcome on occupational decline and individual (first column), and occupation and industry controls (second column). The sample consists of 877,259 men and women who were employed, aged 25-36 years, and earned at least one base amount (see Footnote 6) in 1985. Details on the outcome, treatment and control variables can be found in Sections 2.4 to 2.6.

Figure A.1: Coefficient on decline in mortality regression, year-by-year 1986-2015, logistic regression



(a) Mortality, any cause, residualized



(b) Mortality, any cause, residualized and truncated

Figure A.2: Mortality and employment change

Notes: The graphs plot mortality for any cause on the log employment change in Swedish 3-digit occupations from 1985-2013. Each bubble represents one of the 172 3-digit Swedish occupations, and their size is proportional to their 1985 Swedish employment. Prior to aggregation, mortality was residualized in the following way: I regress mortality on log employment change, individual controls (left panel) and all controls (right panel). The value plotted on the vertical axis is then the coefficient on log employment change from this regression times log employment change, plus residuals from the above regression, i.e. $\hat{\beta} \times \ln \Delta \text{empl} + \hat{u}$.

B Appendix tables

Table B.1: Logistic regression: Occupational decline and mortality 1986-2015

	(1)	(2)	(3)	(4)	(5)	(6)
A. Death, any cause						
Declining	0.28	0.097	0.092	0.072	0.062	0.051
	(0.058)	(0.036)	(0.036)	(0.036)	(0.026)	(0.022)
B. Death of despair						
Declining	0.43	0.099	0.092	0.076	0.058	0.062
	(0.10)	(0.063)	(0.062)	(0.061)	(0.056)	(0.049)
C. Death due to alcohol						
Declining	0.46	0.096	0.089	0.059	0.055	0.054
	(0.12)	(0.078)	(0.077)	(0.074)	(0.071)	(0.062)
D. Death due to drugs						
Declining	0.30	0.14	0.13	0.16	0.14	0.15
	(0.13)	(0.11)	(0.11)	(0.11)	(0.095)	(0.095)
E. Suicide						
Declining	0.33	0.074	0.066	0.080	0.038	0.058
	(0.083)	(0.058)	(0.055)	(0.056)	(0.052)	(0.058)
F. Death due to cardio-vascular disease						
Declining	0.43	0.14	0.13	0.11	0.11	0.070
	(0.085)	(0.047)	(0.047)	(0.047)	(0.033)	(0.029)
Demography, earnings & pre-period hosp.		✓	✓	✓	✓	✓
Life-cycle profiles			✓	✓	✓	✓
Predictors of growth				✓	✓	✓
Occupation dummies					✓	✓
Industry dummies						✓

Notes: All outcomes refer to the log-odds of death (by cause specified in panel) at any point between 1986-2015, controlled for year of birth. The sample consists of 877,259 men and women who were employed, aged 25-36 years, and earned at least one base amount (see Footnote 6) in 1985. Details on the outcome, treatment and control variables can be found in Sections 2.4 to 2.6.

Table B.2: Occupational decline and mortality for women 1986-2015

	(1)	(2)	(3)	(4)	(5)	(6)
A. Death, any cause (percent) (mean: 4.70)						
Declining	1.08	0.63	0.59	0.55	0.42	0.44
	(0.34)	(0.26)	(0.24)	(0.24)	(0.20)	(0.22)
B. Death of despair (percent) (mean: 0.52)						
Declining	0.22	0.16	0.23	0.26	0.25	0.27
	(0.081)	(0.071)	(0.071)	(0.073)	(0.067)	(0.061)
C. Death due to alcohol (percent) (mean: 0.28)						
Declining	0.17	0.11	0.15	0.16	0.14	0.13
	(0.052)	(0.048)	(0.055)	(0.058)	(0.057)	(0.053)
D. Death due to drugs (percent) (mean: 0.19)						
Declining	0.067	0.055	0.10	0.13	0.14	0.17
	(0.040)	(0.036)	(0.034)	(0.034)	(0.032)	(0.032)
E. Suicide (percent) (mean: 0.22)						
Declining	0.031	0.023	0.036	0.061	0.060	0.086
	(0.035)	(0.033)	(0.035)	(0.034)	(0.036)	(0.036)
F. Death due to cardio-vascular disease (percent) (mean: 1.21)						
Declining	0.40	0.21	0.12	0.082	0.0019	0.024
	(0.15)	(0.11)	(0.10)	(0.10)	(0.099)	(0.11)
Demography, earnings & pre-period hosp.		✓	✓	✓	✓	✓
Life-cycle profiles			✓	✓	✓	✓
Predictors of growth				✓	✓	✓
Occupation dummies					✓	✓
Industry dummies						✓

Notes: All outcomes refer to the percentage probability of death (by cause specified in panel) at any point between 1986-2015, controlled for year of birth. The sample consists of 421,287 women who were employed, aged 25-36 years, and earned at least one base amount (see Footnote 6) in 1985. Details on the outcome, treatment and control variables can be found in Sections 2.4 to 2.6.

Table B.3: Occupational decline and mortality for men 1986-2015, including marriage control

	(1)	(2)	(3)	(4)
A. Death, any cause (percent) (mean: 6.81)				
Declining	0.50	0.22	0.43	0.19
	(0.28)	(0.16)	(0.25)	(0.15)
B. Death of despair (percent) (mean: 1.50)				
Declining	0.091	0.010	0.067	-0.0014
	(0.12)	(0.083)	(0.11)	(0.081)
C. Death due to cardio-vascular disease (percent) (mean: 2.62)				
Declining	0.37	0.18	0.33	0.16
	(0.15)	(0.087)	(0.14)	(0.084)
Individual controls	✓	✓	✓	✓
Occupation & industry controls		✓		✓
Marriage control			✓	✓

Notes: All outcomes refer to the percentage probability of death (by cause specified in panel) at any point between 1986-2015, controlled for year of birth. The sample consists of 455,972 men who were employed, aged 25-36 years, and earned at least one base amount (see Footnote 6) in 1985. Details on the outcome, treatment and control variables can be found in Sections 2.4 to 2.6.

Table B.4: Occupational decline and mortality for women 1986-2015, including marriage control

	(1)	(2)	(3)	(4)
A. Death, any cause (percent) (mean: 4.70)				
Declining	0.63	0.44	0.57	0.39
	(0.26)	(0.23)	(0.25)	(0.23)
B. Death of despair (percent) (mean: 0.52)				
Declining	0.16	0.19	0.15	0.18
	(0.071)	(0.064)	(0.070)	(0.063)
C. Death due to cardio-vascular disease (percent) (mean: 1.21)				
Declining	0.21	0.094	0.19	0.078
	(0.11)	(0.11)	(0.11)	(0.11)
Individual controls	✓	✓	✓	✓
Occupation & industry controls		✓		✓
Marriage control			✓	✓

Notes: All outcomes refer to the percentage probability of death (by cause specified in panel) at any point between 1986-2015, controlled for year of birth. The sample consists of 421,287 women who were employed, aged 25-36 years, and earned at least one base amount (see Footnote 6) in 1985. Details on the outcome, treatment and control variables can be found in Sections 2.4 to 2.6.

Table B.5: Occupational decline and hospitalization 1987-2015

	(1)	(2)	(3)	(4)	(5)	(6)
A. Hospitalization, any cause (percent) (mean: 72.53)						
Declining	-3.41	0.23	-0.17	-0.16	-0.54	-0.25
	(1.55)	(0.42)	(0.37)	(0.39)	(0.35)	(0.33)
B. Hospitalization by despair (percent) (mean: 3.07)						
Declining	0.88	0.14	0.085	0.058	0.053	0.061
	(0.23)	(0.15)	(0.14)	(0.14)	(0.14)	(0.12)
C. Hospitalization due to alcohol (percent) (mean: 2.60)						
Declining	0.90	0.15	0.094	0.048	0.047	0.060
	(0.22)	(0.14)	(0.13)	(0.13)	(0.13)	(0.11)
D. Hospitalization due to drugs (percent) (mean: 0.75)						
Declining	0.0023	-0.043	-0.036	-0.0084	-0.015	-0.011
	(0.076)	(0.052)	(0.047)	(0.041)	(0.043)	(0.044)
E. Hospitalization due to cardio-vascular disease (percent) (mean: 11.69)						
Declining	2.64	0.18	0.15	0.23	0.16	0.050
	(0.61)	(0.24)	(0.24)	(0.24)	(0.20)	(0.19)
Demography, earnings & pre-period hosp.		✓	✓	✓	✓	✓
Life-cycle profiles			✓	✓	✓	✓
Predictors of growth				✓	✓	✓
Occupation					✓	✓
Industry						✓

Notes: All outcomes refer to the percentage probability of ever being hospitalized (by cause specified in panel) between 1987-2015, controlled for year of birth. Hospitalization due to self-inflicted harm is excluded as it is missing in the data. Hospitalization by despair is therefore comprised of hospitalization due to alcohol and drugs only. The sample consists of 877,259 men and women who were employed, aged 25-36 years, and earned at least one base amount (see Footnote 6) in 1985. Details on the outcome, treatment and control variables can be found in Sections 2.4 to 2.6.

Table B.6: Occupational decline and days of hospitalization 1987-2015

	(1)	(2)	(3)	(4)	(5)	(6)
A. Hospitalization, any cause (days) (mean: 18.86)						
Declining	0.41	1.06	0.71	0.91	0.76	0.52
	(0.99)	(0.56)	(0.53)	(0.53)	(0.42)	(0.36)
B. Hospitalization by despair (days) (mean: 0.63)						
Declining	0.22	0.036	0.00075	-0.0089	-0.013	0.0086
	(0.071)	(0.058)	(0.051)	(0.053)	(0.051)	(0.045)
C. Hospitalization due to alcohol (days) (mean: 0.53)						
Declining	0.21	0.033	0.0063	-0.0099	-0.011	0.011
	(0.063)	(0.048)	(0.043)	(0.045)	(0.044)	(0.039)
D. Hospitalization due to drugs (days) (mean: 0.10)						
Declining	0.011	0.0026	-0.0055	0.0011	-0.0015	-0.0020
	(0.016)	(0.014)	(0.013)	(0.012)	(0.012)	(0.012)
E. Hospitalization due to cardio-vascular disease (days) (mean: 1.48)						
Declining	0.43	0.060	0.038	0.037	0.018	-0.054
	(0.10)	(0.050)	(0.048)	(0.048)	(0.039)	(0.045)
Demography, earnings & pre-period hosp.		✓	✓	✓	✓	✓
Life-cycle profiles			✓	✓	✓	✓
Predictors of growth				✓	✓	✓
Occupation					✓	✓
Industry						✓

Notes: All outcomes refer to cumulative days hospitalized (by cause specified in panel) between 1987-2015, controlled for year of birth. Hospitalization due to self-inflicted harm is excluded as it is missing in the data. Hospitalization by despair is therefore comprised of hospitalization due to alcohol and drugs only. The sample consists of 877,259 men and women who were employed, aged 25-36 years, and earned at least one base amount (see Footnote 6) in 1985. Details on the outcome, treatment and control variables can be found in Sections 2.4 to 2.6.

Table B.7: Occupational decline and mortality for middle-aged cohorts 1986-2015

	(1)	(2)	(3)	(4)	(5)	(6)
A. Death, any cause (percent) (mean: 16.80)						
Declining	4.21	1.37	1.20	0.93	0.57	0.27
	(0.88)	(0.46)	(0.45)	(0.47)	(0.33)	(0.29)
B. Death of despair (percent) (mean: 1.52)						
Declining	0.77	0.24	0.20	0.13	0.041	0.016
	(0.21)	(0.13)	(0.11)	(0.11)	(0.10)	(0.093)
C. Death due to alcohol (percent) (mean: 1.09)						
Declining	0.61	0.17	0.12	0.065	0.014	-0.038
	(0.17)	(0.11)	(0.089)	(0.086)	(0.086)	(0.081)
D. Death due to drugs (percent) (mean: 0.23)						
Declining	0.017	0.0011	0.0052	0.011	-0.00069	-0.010
	(0.023)	(0.024)	(0.023)	(0.024)	(0.025)	(0.025)
E. Suicide (percent) (mean: 0.36)						
Declining	0.13	0.049	0.046	0.040	0.0088	0.030
	(0.035)	(0.024)	(0.024)	(0.024)	(0.022)	(0.022)
F. Death due to cardio-vascular disease (percent) (mean: 7.11)						
Declining	2.94	0.94	0.85	0.71	0.46	0.27
	(0.63)	(0.31)	(0.31)	(0.31)	(0.20)	(0.19)
Demography, earnings & pre-period hosp.		✓	✓	✓	✓	✓
Life-cycle profiles			✓	✓	✓	✓
Predictors of growth				✓	✓	✓
Occupation					✓	✓
Industry						✓

Notes: All outcomes refer to the percentage probability of death (by cause specified in panel) at any point between 1986-2015, controlled for year of birth. The sample consists of 976,556 men and women who were employed, aged 37-48 years, and earned at least one base amount (see Footnote 6) in 1985. Details on the outcome, treatment and control variables can be found in Sections 2.4 to 2.6.

Table B.8: Occupational decline and mortality for older cohorts 1986-2015

	(1)	(2)	(3)	(4)	(5)	(6)
A. Death, any cause (percent) (mean: 49.11)						
Declining	6.53	1.20	1.02	0.94	0.77	0.27
	(1.84)	(0.64)	(0.66)	(0.66)	(0.47)	(0.38)
B. Death of despair (percent) (mean: 1.37)						
Declining	0.65	0.23	0.19	0.16	0.11	0.073
	(0.20)	(0.10)	(0.094)	(0.095)	(0.085)	(0.073)
C. Death due to alcohol (percent) (mean: 0.97)						
Declining	0.48	0.15	0.11	0.076	0.067	0.039
	(0.16)	(0.086)	(0.077)	(0.077)	(0.076)	(0.068)
D. Death due to drugs (percent) (mean: 0.19)						
Declining	0.053	0.039	0.047	0.062	0.053	0.039
	(0.017)	(0.018)	(0.018)	(0.019)	(0.018)	(0.022)
E. Suicide (percent) (mean: 0.27)						
Declining	0.10	0.036	0.028	0.022	-0.0051	-0.0087
	(0.034)	(0.023)	(0.023)	(0.025)	(0.024)	(0.026)
F. Death due to cardio-vascular disease (percent) (mean: 27.82)						
Declining	5.18	0.90	0.80	0.74	0.49	0.13
	(1.44)	(0.44)	(0.46)	(0.47)	(0.30)	(0.25)
Demography, earnings & pre-period hosp.		✓	✓	✓	✓	✓
Life-cycle profiles			✓	✓	✓	✓
Predictors of growth				✓	✓	✓
Occupation					✓	✓
Industry						✓

Notes: All outcomes refer to the percentage probability of death (by cause specified in panel) at any point between 1986-2015, controlled for year of birth. The sample consists of 791,118 men and women who were employed, aged 49-64 years, and earned at least one base amount (see Footnote 6) in 1985. Details on the outcome, treatment and control variables can be found in Sections 2.4 to 2.6.

Table B.9: Occupational decline and mortality 1986-2015, controlling for parents' age at death

	(1)	(2)	(3)	(4)
A. Death, any cause (percent) (mean: 6.08)				
Declining	0.67	0.30	0.67	0.30
	(0.23)	(0.15)	(0.23)	(0.15)
B. Death of despair (percent) (mean: 1.08)				
Declining	0.16	0.067	0.16	0.067
	(0.10)	(0.081)	(0.10)	(0.081)
C. Death due to cardio-vascular disease (percent) (mean: 2.08)				
Declining	0.40	0.17	0.40	0.17
	(0.13)	(0.086)	(0.13)	(0.085)
Individual controls	✓	✓	✓	✓
Occupation & industry controls		✓		✓
Parents' age at death control			✓	✓

Notes: All outcomes refer to the percentage probability of death (by cause specified in panel) at any point between 1986-2015, controlled for year of birth. The sample consists of 630,444 men and women who were employed, aged 25-36 years, earned at least one base amount (see Footnote 6) in 1985, and who have information on at least one parent. Details on the outcome, treatment and control variables can be found in Sections 2.4 to 2.6.

Table B.10: Occupational decline and mortality 1986-2015, controlling for pre-period mortality by occupation

	(1)	(2)	(3)	(4)
A. Death, any cause (percent) (mean: 5.89)				
Declining	0.58	0.32	0.58	0.32
	(0.22)	(0.13)	(0.22)	(0.13)
B. Death of despair (percent) (mean: 1.02)				
Declining	0.13	0.057	0.13	0.057
	(0.076)	(0.059)	(0.076)	(0.059)
C. Death due to cardio-vascular disease (percent) (mean: 1.99)				
Declining	0.31	0.14	0.31	0.14
	(0.13)	(0.074)	(0.13)	(0.074)
Individual controls	✓	✓	✓	✓
Occupation & industry controls		✓		✓
Pre-period mortality control			✓	✓

Notes: All outcomes refer to the percentage probability of death (by cause specified in panel) at any point between 1986-2015, controlled for year of birth. The sample consists of 726,693 men and women who were employed, aged 25-36 years, earned at least one base amount (see Footnote 6) in 1985, and who is matched to a 3-digit occupation where there is information on pre-period mortality. Details on the outcome, treatment and control variables can be found in Sections 2.4 to 2.6.

Table B.11: Summary statistics for the 25-36 year old sample in 1985, conditioning on availability of some auxiliary covariates

	(1) Baseline sample	(2) Non-missing parents' death	(3) Non-missing pre-period mortality
Female	0.48	0.48	0.46
	(0.50)	(0.50)	(0.50)
Age	30.81	31.04	31.01
	(3.46)	(3.46)	(3.42)
Earnings	184.26	185.21	188.94
	(77.57)	(77.94)	(77.89)
Hospital spells	0.03	0.03	0.03
	(0.09)	(0.09)	(0.09)
Hospital days	0.90	0.90	0.89
	(9.24)	(9.28)	(9.15)
Compulsory school	0.25	0.25	0.26
	(0.43)	(0.44)	(0.44)
High school	0.84	0.84	0.85
	(0.37)	(0.37)	(0.35)
College	0.12	0.12	0.10
	(0.32)	(0.32)	(0.30)
Manufacturing	0.28	0.28	0.30
	(0.45)	(0.45)	(0.46)
Observations	877,259	630,444	726,693

Notes: The rows show the mean (and standard deviation) of the fraction females, age, earnings in thousands of 2014 SEK (all in 1985), and yearly spells and days in hospital up until 1985. Then, the fraction with at most compulsory school, high school and college, and the fraction in manufacturing are listed (all in 1985). The first column includes all 25-36 year olds who were employed in November 1985 and earned at least one base amount in 1985, with education, industry and occupation variables are observed. This is the baseline sample. In the second column, I restrict the sample to those who have information on at least one parent. The third column instead imposes that there is information on pre-period mortality on the occupational level.

Table B.12: Occupational decline and mortality 1986 – 2015: Robustness to different cutoffs

	Death, any cause		Death of despair		Death, cardio-vascular	
	(1)	(2)	(3)	(4)	(5)	(6)
Percent change $\in [-100, -50)$	0.78	0.41	0.15	0.092	0.46	0.23
	(0.21)	(0.16)	(0.069)	(0.079)	(0.12)	(0.088)
Percent change $\in [-100, -25)$ (baseline)	0.62	0.28	0.15	0.054	0.35	0.14
	(0.23)	(0.14)	(0.096)	(0.070)	(0.12)	(0.069)
Percent change $\in [-100, 0)$	0.26	0.16	-0.011	-0.016	0.18	0.11
	(0.17)	(0.11)	(0.065)	(0.051)	(0.085)	(0.059)
Percent change $\in [-100, 31)$ (below median)	-0.33	-0.23	-0.13	-0.074	-0.071	-0.046
	(0.13)	(0.10)	(0.049)	(0.039)	(0.066)	(0.054)
Baseline; control: percent change $\in (-25, 31)$	0.99	0.45	0.27	0.096	0.48	0.23
	(0.23)	(0.12)	(0.090)	(0.060)	(0.13)	(0.075)
Individual controls	✓	✓	✓	✓	✓	✓
Occupation & industry controls		✓		✓		✓

Notes: All outcomes refer to the percentage probability of death (by cause specified in column) at any point between 1986 - 2015, controlled for year of birth. Each panel shows a different definition of the treatment variable “Declining”. In the last panel, I keep the “Declining” variable at the baseline definition (occupational growth < -25 percent), and change the control group instead. The sample consists of 877,259 men and women who were employed, aged 25-36 years, and earned at least one base amount (see Footnote 6) in 1985. Details on the outcome, treatment and control variables can be found in Sections 2.4 to 2.6.

Table B.13: Occupational employment change and mortality 1986-2015

	Death, any cause		Death by despair		Death, cardio-vasc.	
	(1)	(2)	(3)	(4)	(5)	(6)
Employment change	-2.94	-4.54	2.36	0.19	-2.24	-1.69
	(9.22)	(6.46)	(3.59)	(2.87)	(4.78)	(3.95)
Employment change squared	8.09	45.5	-19.8	7.83	4.47	10.0
	(62.8)	(45.4)	(24.4)	(19.6)	(32.0)	(27.5)
Individual controls	✓	✓	✓	✓	✓	✓
Occupation & industry controls		✓		✓		✓
Mean of dep. var.	5.80		1.02		1.94	
Observations			877,259			

Notes: All outcomes refer to the percentage probability of death (by cause specified) at any point between 1986-2015, controlled for year of birth. The explanatory variables are the changes in employment in the matched US occupations between 1984-2016, for each Swedish occupation, as described in Section 2.2, and this employment change squared. The change is in units, so that a 10 % increase is denoted by 0.1, etc. The sample consists of 877,259 men and women who were employed, aged 25-36 years, and earned at least one base amount (see Footnote 6) in 1985. Details on the outcome, treatment and control variables can be found in Sections 2.4 to 2.6.