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Mental Health and Its Socioeconomic Inequality in Sweden: The Role of Demographic Changes over Time

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Department of Economics
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Mental health and its socioeconomic inequality in Sweden: the role of demographic changes over time

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Abstract: Our aim is to study trends in mental ill-health and socioeconomic-related mental health inequalities over time in Sweden. We also make a first attempt at disentangling why we see such a development, by decomposing any changes in terms of changes in selected demographic and socioeconomic characteristics among the population. A secondary aim is to consider how different indicators for mental ill-health, as well as different measures of inequality, affect the conclusions we draw. Register data from the Swedish Interdisciplinary Panel and the Swedish Living Conditions Survey (administered by Statistics Sweden) are used to study trends in mental ill-health and mental health inequalities over the years 1994-2011. The study population comprises of working age individuals aged 31-64 living in Sweden. Four indicators of mental ill-health are used in the main analysis: self-reported anxiety, psychiatric inpatient diagnosis, psychiatric outpatient diagnosis and death by suicide. The results show that psychiatric diagnoses (in- and outpatient) increased substantially amongst 31 - 64 year olds between 1994 and 2011. Self-reported anxiety remained stable and suicides decreased. These results show that the different indicators of mental ill-health are not reflective of each other and how we measure mental ill-health largely affect the conclusions we draw. The mental ill-health indicators which suggest there is an increase in mental ill-health (in- and outpatient diagnosis) partly depend on attitudes, help-seeking behaviour and diagnostic practice. Thus, we cannot say that mental ill-health actually has increased. However, all mental ill-health indicators are becoming increasingly concentrated among women and among those not participating in the labour force, and psychiatric diagnoses are increasingly concentrated among those lowest educated. Income-related mental health inequalities in Sweden are substantial, and have increased significantly between 1994 and 2011, both regarding absolute and relative inequalities. More than 30 percent of self-reported anxiety and suicides, and half or all psychiatric in- and outpatient diagnoses, are found among the poorest fifth of the population. The decomposition results show that distributional changes in the population explain the increase in suicide inequality and partly explain the increase in psychiatric inpatient diagnosis inequality. However, overall, only small changes in the level of mental ill-health and mental health inequalities are explained by changes in the population characteristics we study.

Key words: Mental health; Inequality in health; Concentration index; Decomposition

JEL Classification: I10; I14

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1 Background

It has been suggested that mental ill-health is increasing in Sweden and that the increase is stronger among some population subgroups (1, 2). Thus, mental health inequalities could also be increasing. Is this true for all indicators of mental ill-health and across different measures of inequality? In this study, we assess how different indicators of mental ill-health, and its inequalities, have developed. We also make a first attempt at disentangling why we see such a development.

Box 1 The Concept of Mental Health

The WHO describes mental health as “*a state of well-being in which an individual realises his or her own abilities, can cope with the normal stresses of life, can work productively and is able to make a contribution to his or her community*” (3). Key aspects in this definition are positive emotions and positive functioning. However, it is important to note that mental health is more than lack of mental ill-health. So, what is mental ill-health? The European Commission states “*mental ill-health includes mental health problems and strain, impaired functioning associated with distress, symptoms, and diagnosable mental disorders*” (4). Thus, the terms mental health and mental ill-health are broadly defined and may very well overlap. In this report, we study trends in mental health and trends in mental health inequalities using four different indicators of mental ill-health: self-reported anxiety, psychiatric inpatient diagnosis, psychiatric outpatient diagnosis and death by suicide.

There is no published research that measures the changes in socioeconomic-related mental health inequality in Sweden, either recently or historically. However, a great deal of research has been done on physical health inequality. For instance, it is known that relative socioeconomic-related health inequality (using education level as a socioeconomic ranking variable) has increased in the Nordic countries in recent decades, and this increase has been larger than for other parts of Western Europe (5, 6). The increase in relative physical health inequality has happened over a period where overall health has improved.

Box 2 Socioeconomic-related inequality in mental health

The term socioeconomic refers to social or economic status, generally thought of as a combination of income, education and occupation. It is often proxied by one of these. In this report, we measure socioeconomic-related inequality in health, which is the joint distribution of income (or education) and health, ranked by income (or education). We refer to these as income- (or education-) related health inequality.

We also know a few things about the causes of mental ill-health and its socioeconomic gradient. Research from Sweden has found a weak association of parental background with children's mental health (7) and adolescent's mental health (8). On the other hand there is evidence of a very large correlation between own educational attainment at 9th grade in Sweden and mental ill-health (measured by suicide rate) in young adulthood (9). Interestingly, when controlling for parental characteristics the results hardly change, suggesting again that parental background is not particularly important in explaining mental health outcomes (9).

It is possible that the degree of socioeconomic-related mental health inequality has changed over-time. Sweden has seen a large increase in unemployment, during 1975-1990 the average unemployment rate was 2.5% whereas in 1991-2005 it was 7.3% (10). This is important because unemployment has well documented scarring effects on future employment chances and mental health that remain long after the period of unemployment (11). It may also be linked to education; while overall education levels in Sweden are increasing, the share of individuals not completing upper secondary school is also growing (12). These students have a lower probability of finding work in adulthood, which potentially points to an increase in poor mental health amongst those low educated over the same time period. A reversed causal relationship is also possible, that increased mental ill-health increases the risks of dropping out of school. This motivates our interest of looking at changes in mental ill-health, and its inequality, over the past decades.

1.1 Aim

Our aim is to study trends in mental ill-health and socioeconomic-related mental health inequalities over time in Sweden, and to explain any changes in terms of changes in selected demographic and socioeconomic characteristics. A secondary aim is to consider how different indicators for mental ill-health (self-reported anxiety, psychiatric in- and outpatient diagnosis and death by suicide), different measures of inequality (relative and absolute), and different

socioeconomic ranking variables (disposable family income, own education level and father's education level), affect the conclusions we draw.

1.2 Policy relevance

In this project we will identify the existence and extent of mental ill-health and socioeconomic-related mental health inequality in Sweden. We will show how these trends have developed over time, and which factors may have impacted any changes. This is a first step in understanding what may be the best ways to tackle mental ill-health and inequalities in mental health. Our work will help policy prioritization by identifying the subgroups of the population that have the greatest potential in reducing any potential inequalities identified. Further research can then assess which policies impact the groups identified as observing the greatest inequality in mental health or addressing the groups who have seen the greatest increase in mental ill-health.

2 Method

2.1 Data

Two data sources are used to study trends in mental ill-health and mental health inequalities: register data from the Swedish Interdisciplinary Panel (SIP) administered by the Centre for Economic Demography at Lund University and the Swedish Living Conditions Survey (ULF) administered by Statistics Sweden (SCB). The study population comprises of repeated cross sections of all individuals aged 31-64 years, living in Sweden between the years 1994 and 2011. The time perspective was chosen in such a way so that we could study changes in the selected mental ill-health indicators over the longest possible time period, until the most recent year available in our data material. In 2011, the youngest individuals in our study sample are 31 years of age, and in 1994 the oldest individuals in our sample are 64 years of age. Four indicators of mental ill-health are used in the main analysis: self-reported anxiety, psychiatric inpatient diagnosis, psychiatric outpatient diagnosis and death by suicide. Psychiatric outpatient diagnosis data was only available during the years 2001-2011, thus mental ill-health indicated by outpatient diagnosis is only studied for these years.

We use the SIP data to analyse mental ill-health measured by suicide and psychiatric in- and outpatient diagnosis, and the ULF survey to analyse mental ill-health measured by self-reported anxiety. SIP provides data from various Swedish administrative databases such as the cause of death register (Swedish National Board on Health and Welfare, SoS), hospital registers (SoS), the Longitudinal Integration Database for Health Insurance and Labour Market Studies (LISA) (SCB), and the Register of the Total population (RTB) (SCB). The panel covers the entire Swedish population (all individuals living in Sweden) born between 1930-1980. As of year 1968 and on-wards it also includes information on parents and children records connected via the Swedish Multi-generation register (SCB). Since the study population consists of repeated cross-sections of the population aged 31-64 years, around one third of the study population in 1994 remain in our analysis in 2011; the other two thirds have become too old and replaced by individuals who were too young in 1994. Data on main cause of death and top three additional causes of death was used to define the variable suicide in our population sample for each year in 1994-2011. Data on main diagnosis, top three bi-diagnoses and top three external causes of diagnosis was used to define variables for psychiatric in-and outpatient diagnoses for the same population and years (2001-2011 for outpatient diagnosis). Individuals were coded as having a psychiatric diagnosis if they had at least one such

diagnosis in the given year, zero otherwise. The coding system for diseases changed in 1997 from ICD-9 to ICD-10. We used conversion tables provided by the National Board on Health and Welfare in Sweden to achieve a feasible mapping of ICD codes across the two time-periods (13). See table A1 in appendix for a detailed description of which ICD codes were used to define suicide and psychiatric in- and outpatient diagnosis.

The survey data from ULF covers the years 1980-2012 and includes a population representative sample of individuals aged 16-84 years. Data in ULF is linked to LISA (SCB), and the Multi-generation register (SCB). The data in ULF cannot be linked to the data in SIP, but almost all information available in SIP are available for those sampled in ULF. Data from ULF was used to define a variable for self-reported anxiety for each year in 1994-2011. Individuals were coded as self-reportedly anxious if they reported to suffer from any nervousness, uneasiness or anxiety (mild or severe).

As mentioned, both SIP and ULF are matched with register data from Statistics Sweden where we obtain information on several demographic and socioeconomic characteristics which are used in the analysis. We use household disposable income to rank individuals by income in the main analysis. Household disposable income is equivalised (taking into account the household composition) according to Statistics Sweden equivalence scale from 2001 both in SIP and ULF. We use own education level and father's education level (by seven education levels) as alternative socioeconomic ranking variables in the sensitivity analysis. We investigate the effects of several sociodemographic characteristics such as gender (female or male), age (continuous by year, age 31= 0), marital status (married/registered partner or not), foreign background (two variables: foreign born or not; foreign born parents or not), own education level by years of schooling (mandatory <10 years, secondary 10-12 years, and higher >12 years), mother's and father's education level by years of schooling (>9 years or not), and labour market participation (positive labour income or not). We include two variables as indicators of social capital, proportion of individuals on welfare in municipality of residence (continuous), and social isolation (socially isolated or not). Welfare share in residential municipality is calculated as number of people receiving welfare benefits (ekonomiskt bistånd) divided by the total population in each municipality. Social isolation is constructed from information in ULF (thus only available to study self-reported anxiety) according to the definition from Statistics Sweden: living alone and meet with close family, relatives and friends less frequently than every week. Data on income, own education level,

marital status, labour market participation and welfare share are extracted from the year before death or diagnosis in SIP (data on other variables are extracted on year of death or diagnosis). All data is extracted from the year of survey in ULF. Individuals with missing information on income or education are deleted from the sample and we control for missing information on foreign background or parent's education in our analyses.

Our aim is to explain changes in mental ill-health and mental health inequalities in terms of some selected characteristics among the population. Several social and economic background factors such as gender, age, education, marital status and immigrant status have been linked to mental health, and changes in the population regarding the distribution of these characteristics may have contributed to changing trends in mental ill-health. Since we study mental ill-health only among the working-age population (31-64 years) we cannot expect any large shifts in the population structure regarding gender or age to explain changes in mental health, but it is possible that the associations of these factors have changed over time. The relationship between gender and prevalence of mental illness is well established, females are more likely than males to suffer from most internalizing mental disorders, such as mood and anxiety disorders, while most externalizing disorders, such as disruptive behavioural disorders and alcohol and substance use disorders, are more common among men (14). Suicidal thoughts manifest themselves in both men and women (14), but men are at higher risk of dying from suicide (15). It has been suggested that suicide as a cause of death has decreased over the past decade, but only among men (15). The prevalence of different mental health problems also differs between age-groups. Depressive disorders are less common among older individuals (16), and several reports point to increases in mental ill-health among the young Swedish population (2, 17). Suicide is most common in age groups 45-64 years and above 85 years, but is still the leading cause of death among men aged 15-44 and the second leading cause of death among women in the same age group (18). Suicide as a cause of death is decreasing, but not among those under 25 years of age (19).

Immigrant status has been linked to poorer mental health (20), as well as better mental health (21). Moreover, both own immigrant status and parents' immigrant status have been linked to poor physical and mental health (20). It is possible that attitudes towards immigrants, and society's ability to integrate immigrants have changed during the last few decades. This, in combination with increased immigration, may have contributed to changes in mental health and mental health inequalities. The association between education and mental ill-health is also

well established. Mental illness is more common among the low educated (22, 23), but parents' education have been found to have little impact on children's mental health (7). Living in a deprived area is also linked to poorer mental health (24). However, society is changing. It is possible that the impact of being low educated or living in a socially deprived area on mental health has changed, and that parents' education had greater impact on their children's mental health historically compared to now. Society is also changing regarding the way we interact with each other and the perception of social relations. Perceived social isolation is related to poor mental health (25), and it is possible that this relationship has changed over the past decades due to, for example, the introduction of social media.

2.2 The empirical approach

Our empirical approach is divided into three main parts. First, we describe how trends in mental ill-health and socioeconomic-related mental health inequalities have changed over time in Sweden. Second, we explain the levels of mental ill-health, and their changes, in terms of changes in contributing factors. Third, we explain socioeconomic-related mental health inequalities, and their changes, in terms of changes in contributing factors.

To summarize the degree of relative inequality in each year we use the Relative Concentration Index (RCI), which is a mean-standardized measure allowing for comparison of inequality over time. We estimate the RCI of relative socioeconomic-related mental health inequality using the following formula:

$$(1) \text{RCI} = \frac{2}{\mu_H} \text{cov}(Y_H, R)$$

where Y_H represents the mental ill-health variables we consider (self-reported anxiety, psychiatric in- and outpatient diagnosis and deaths due to suicide), the mean of mental ill-health is given by μ_H , and R is socioeconomic rank running from zero to one (poorest to richest). The RCI is a summary statistic that reflects the degree of inequality in the population, it does however not tell us much about how the inequality is distributed along the income rank. In order to more comprehensively illustrate the inequalities in mental health we produce concentration curves in the years 1994 and 2011.

Box 3 The Concentration Index and Curve

Relative inequality measured by the RCI can range from -1 to +1, where 0 would reflect an equal distribution, and -1 (+1) would reflect complete concentration of the outcome among the poorest (richest). Since the outcomes are measured by mental ill-health, a negative RCI would mean that mental ill-health is disproportionately concentrated among the poor.

The concentration curve is a mapping of the cumulative share of mental ill-health along the y-axis with the cumulative share of population ranked by (increasing) income along the x-axis. The further away from the line of equality (45° line) the concentration curves are situated, the greater is the inequality.

There is no consensus among researchers regarding which measures should be used to evaluate changes in health inequality (5). Yet, the choice between different measures of health inequality could radically change the interpretation of the same underlying data. For example, the development of absolute and relative health inequalities can go in different directions depending on the initial levels of health and the rate of health improvements between different subgroups. If the goal is to reduce inequalities between subgroups and this goal is independent of other considerations, for example regarding overall health and absolute rates of health, relative inequality could be preferable to study (26). This measure is also useful for evaluation of the progress in eliminating inequalities, since a reduction in the relative inequality imply a relatively better rate of improvement among the disadvantaged (26). However, reporting only relative changes is a partial assessment of the progress in eliminating inequalities. In order to ensure that a health improvement (or impairment) is improving (impairing) health for all groups similarly, it is necessary to evaluate the relative change in combination with the absolute change in inequality (26). Therefore, we estimate the *absolute* socioeconomic-related mental health inequality using the following formula:

$$(2) ACI = 2 * cov(Y_H, R)$$

The above formula is identical to (1) if multiplied by $1/\mu_h$. The ACI is a summary statistic of the level of absolute health inequality. The magnitude of absolute inequality lies between 0 and the mean of mental ill-health, the sign is determined by a pro-rich (+) or a pro-poor (-) concentration of mental ill-health.

Box 4 Relative and Absolute Inequality in Health

Absolute health inequality refers to the magnitude of difference in health among subgroups, while relative health inequality refers to the proportional difference in health among subgroups. For example, the difference in mean values of a health indicator between two groups would reflect the absolute inequality, and the ratio of these mean values would show the relative inequality.

To decompose the levels of mental health and their changes we use a (binary) Linear Probability Model for the years 1994 and 2011:

$$(3) Y_H = X'\beta + \epsilon$$

where Y_H represents the mental ill-health variables we consider (death due to suicide, psychiatric in- and outpatient diagnosis and self-reported anxiety), X is a vector of our potential explanatory factors, β is a vector of coefficients of the explanatory factors on mental ill-health status and ϵ is the error term. The coefficients in vector β can be interpreted as the associated impact a marginal increase in X would have on Y_H .

We use the well-known Oaxaca-Blinder (OB) decomposition technique to decompose changes in the level of mental ill-health into its contributing factors (27, 28). Let $\hat{\beta}_{94}$ and $\hat{\beta}_{11}$ respectively be the regression estimates from eq. (3) in 1994 and 2011 and assume that X and ϵ are independent ($E(\epsilon|X) = 0$). Then we can express the change in mean level of mental health as:

$$(4) \overline{Y}_{94} - \overline{Y}_{11} = \overline{X}_{94}'\hat{\beta}_{94} - \overline{X}_{11}'\hat{\beta}_{11} = \underbrace{\hat{\beta}_{94}(\overline{X}_{94} - \overline{X}_{11})}_{\text{Explained part}} + \underbrace{\overline{X}_{11}'(\hat{\beta}_{94} - \hat{\beta}_{11})}_{\text{Unexplained part}}$$

which breaks down the change in mean level of mental ill-health, $\overline{Y}_{94} - \overline{Y}_{11}$, into *an explained part* and *an unexplained part*; the first and second parts of the right-hand side of eq. (4), respectively. The explained part reflects the contribution of overall changes in the distribution of the selected socioeconomic and demographic factors among the population if the coefficients had remained unchanged from their 1994 values, and the unexplained part reflects the contribution of change in the coefficients of these factors (the change in association

between the explanatory factors and mental ill-health). These parts can be broken down further into the contribution of each explanatory factor. For example, how much of the change in mental ill-health is due to a change in proportion with foreign background in the population, and how much of the change is due to an increasing/decreasing concentration of mental ill-health among those with foreign background (an increasing/decreasing association between mental ill-health and foreign background).

The same technique can be applied to decompose (relative) socioeconomic-related mental health inequalities into its contributing factors, with one difference, instead of decomposing mean level of mental health Y_H we decompose the Recentered Influence Function (RIF) for the distribution statistic of interest, the RCI. The RIF of the RCI is a transformation of the RCI that tells us how each individual influences the RCI. Each individual thus has their own RIF value, and the average of these values is the RCI itself. Because of this property, we can use standard regression techniques to decompose the RIF of the RCI, which allows the marginal effects of potential explanatory factors on the RCI to be estimated in a simple linear regression. The following linear model is used to decompose socioeconomic-related mental health inequality of each mental ill-health indicator into its contributing factors in 1994 and 2011:

$$(5) \text{RIF(RCI)} = X'\gamma + \mu$$

where RIF(RCI) denotes the RIF of the RCI and the coefficients γ have a similar interpretation as the β coefficients in eq. (3), but for socioeconomic-related mental health inequality rather than the level of mental health. Thus, we are able to identify which factors have the greatest impact on socioeconomic-related mental health inequality. We use a novel technique for RIF regression developed by Heckley et al. (29). An advantage of this form of decomposition is that the same technique as in eq. (4) can be used to decompose the changes in socioeconomic-related mental health inequality. Let $\hat{\gamma}_{94}$ and $\hat{\gamma}_{11}$ respectively be the regression estimates from eq. (5) in 1994 and 2011 and assume that X and μ are independent ($E(\mu|X) = 0$). We use the results to express the change in socioeconomic-related mental health inequality as:

$$(6) \overline{\text{RIF(RCI)}_{94}} - \overline{\text{RIF(RCI)}_{11}} = \overline{X}_{94}' \hat{\gamma}_{94} - \overline{X}_{11}' \hat{\gamma}_{11} = \hat{\gamma}_{94}(\overline{X}_{94} - \overline{X}_{11}) + \underbrace{\overline{X}_{11}(\hat{\gamma}_{94} - \hat{\gamma}_{11})}_{\text{Unexplained part}}$$

Explained part

which breaks down the changes in socioeconomic-related mental health inequalities into explained and unexplained parts, the first and second parts of right hand-side of eq. (6), respectively (see explanation for eq. (4)).

3 Results

The descriptive statistics of the sample in SIP and ULF are presented in table 1. Statistics are presented for the years 1994 and 2011 for both study samples, as well as statistics for year 2001 for the SIP sample. The statistics show that several population characteristics changed over the study period. For example, the proportions with foreign background increased during the study period, both for those foreign born and for those with foreign born parents. The proportion who are married and participate in the labour market decreased between the two time periods, as well as mean municipality-level welfare share. In general, education levels increased, both among the study population and their parents, and interesting to note is that the proportion of individuals with less than 10 years of schooling have decreased by roughly the same as the proportion of individuals with more than 12 years of schooling have increased. Comparing the SIP and ULF samples shows that the ULF sample is slightly higher educated, more often married and participating in the labour market, and are less often of foreign background. The proportion who report to be socially isolated is constant over time. (only available in ULF).

Our results are presented as follows. First, we show the trends in levels of mental ill-health and socioeconomic-related mental health inequalities (relative and absolute) over time in Sweden. Thereafter, we present the decomposition results where we explain the changes in levels of mental ill-health, and the changes in mental health inequalities, in terms of changes in contributing factors. We present results on how much of the change in mental health and its inequality can be explained by overall changes in the population, i.e. overall contribution of changes in the distribution of the selected socioeconomic and demographic factors, and how much is unexplained by such population changes, i.e. the contribution of change in the coefficients of these factors (overall decomposition results). These parts are further broken down into the contribution of each individual explanatory factor (detailed decomposition results).

Table 1 Descriptive Statistics

<i>Variables</i>	Mean			sd			N		
	1994	2001	2011	1994	2001	2011	1994	2001	2011
SIP									
<i>Inpatient diagnosis</i>	0.00583		0.00668	0.0761		0.0814	3660610		4096793
<i>Outpatient diagnosis</i>		0.00511	0.02826		0.0713	0.1657		3979501	4096793
<i>Suicide</i>	0.00019		0.00015	0.0139		0.0124	3660610		4096793
<i>Family disposable income</i>	1081	1359	1933	705	5274	5600	3660610	3979501	4096793
<i>Sex (female)</i>	0.4947	0.4929	0.4948	0.5000	0.5000	0.5000	3660610	3979501	4096793
<i>Age</i>	46.5	46.9	47.4	9.3	9.6	9.7	3660610	3979501	4096793
<i>Education < 10 yrs</i>	0.3079	0.2191	0.1453	0.4616	0.4136	0.3524	3660610	3979501	4096793
<i>Education 10-12 yrs</i>	0.4422	0.4828	0.4704	0.4967	0.4997	0.4991	3660610	3979501	4096793
<i>Education > 12 yrs</i>	0.2498	0.2981	0.3843	0.4329	0.4574	0.4864	3660610	3979501	4096793
<i>Marital status (married)</i>	0.6170	0.5452	0.5024	0.4861	0.4980	0.5000	3660610	3979501	4096793
<i>Foreign-born</i>	0.1185	0.1388	0.1783	0.3232	0.3457	0.3828	3660424	3979246	4096530
<i>Foreign-born parents</i>	0.0140	0.0203	0.0318	0.1175	0.1411	0.1754	2792889	3315555	3436013
<i>Non-labour participation</i>	0.1017	0.1142	0.1238	0.3023	0.3180	0.3294	3660610	3979501	4096793
<i>Welfare share</i>	0.0408	0.0316	0.0254	0.0147	0.0141	0.0100	3660610	3979501	4096793
<i>Father > 9 yrs education</i>	0.4191	0.5004	0.6167	0.4934	0.5000	0.4862	1315538	1598153	1819013
<i>Mother > 9 yrs education</i>	0.3366	0.4468	0.6176	0.4726	0.4972	0.4860	1925258	2286539	2443995
ULF									
<i>Self-reported anxiety</i>	0.1766		0.1862	0.3814		0.3894	3193		2454
<i>Family disposable income</i>	1159		2173	1100		1306	3193		2454
<i>Sex (female)</i>	0.5080		0.5240	0.5000		0.4995	3193		2454
<i>Age</i>	46.4		48.1	9.3		9.9	3193		2454
<i>Education < 10 yrs</i>	0.2390		0.1007	0.4265		0.3009	3193		2454
<i>Education 10-12 yrs</i>	0.4441		0.4503	0.4969		0.4976	3193		2454
<i>Education > 12 yrs</i>	0.3169		0.4491	0.4654		0.4975	3193		2454
<i>Marital status (married)</i>	0.6427		0.5473	0.4793		0.4979	3193		2454
<i>Foreign born</i>	0.1218		0.1598	0.3271		0.3665	3193		2447
<i>Foreign born parents</i>	0.0085		0.0253	0.0916		0.1572	3193		2447
<i>Non-labour participation</i>	0.0899		0.0896	0.2861		0.2857	3193		2454
<i>Social isolation</i>	0.0207		0.0185	0.1424		0.1347	3188		2436
<i>Welfare share</i>	0.0425		0.0245	0.0167		0.0099	3193		2454
<i>Father > 9 yrs education</i>	0.4138		0.6414	0.4927		0.4798	1172		1057
<i>Mother > 9 yrs education</i>	0.3544		0.6294	0.4785		0.4831	1659		1441

Source: SIP (all individuals aged 31-64 years living in Sweden in the given years) and ULF (all individuals in the Living Condition Survey aged 31-64 years in the given years)

3.1 Trends in mental ill-health and socioeconomic-related mental health inequalities over two decades

3.1.1 Time trends in the level of mental ill-health in Sweden

The prevalence of self-reported anxiety and the rates of psychiatric in- and outpatient diagnosis and suicide during the time period 1994 and 2011 are plotted in figures 1-4. Our results indicate that the prevalence of reporting anxiety increased from roughly 17,700 per 100,000 in 1994 to around 18,600 per 100,000 in 2011. The level of self-reported fluctuated during the study period from a lowest rate of around 15,000 per 100,000 in 1997 to a highest rate of 23,000 per 100,000 in 2001. Psychiatric inpatient diagnoses rates decreased from around 580 per 100,000 in 1994 to a lowest rate of 500 per 100,000 in 2002, and increased thereafter to 670 per 100,000 in 2011. The psychiatric outpatient diagnosis rate increased dramatically from 500 per 100,000 in 2001 to 2,800 per 100,000 in 2011, almost a six-fold increase in one decade. The suicide rate decreased during the study period from around 19 per 100,000 in 1994 to around 15 per 100,000 in 2011. The results show a substantial increase in self-reported anxiety in the period before 2001, while an increase in inpatient diagnosis appears in the subsequent period. When investigating the trends in psychiatric inpatient diagnosis further by subcategories we found that the trend break in inpatient diagnoses in 2002 to a large extent is explained by a substantial increase in mood and anxiety-related diagnoses (ICD-10 F30-F49).

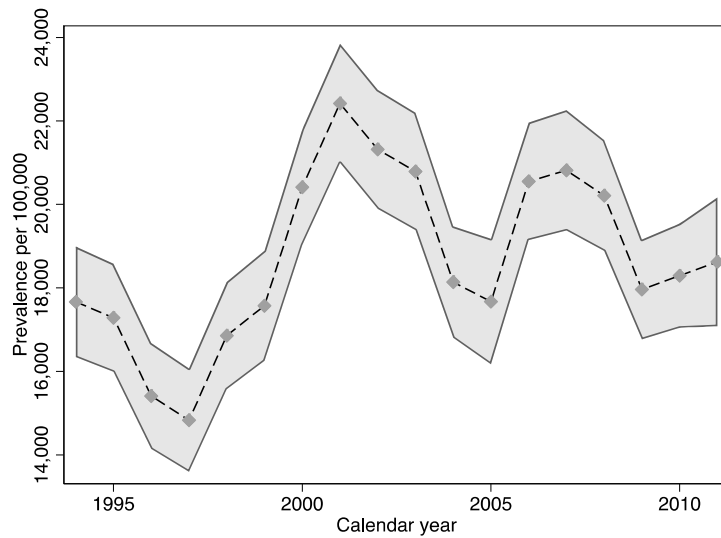


Figure 1 Prevalence of Self-Reported Anxiety

Note: In this figure, the prevalence of self-reported anxiety among individuals aged 31-64 years is plotted along the y-axis for calendar years 1994- 2011 along the x-axis. 95% confidence intervals are shown as the shaded area. Source: Living Conditions Survey. Own calculations.

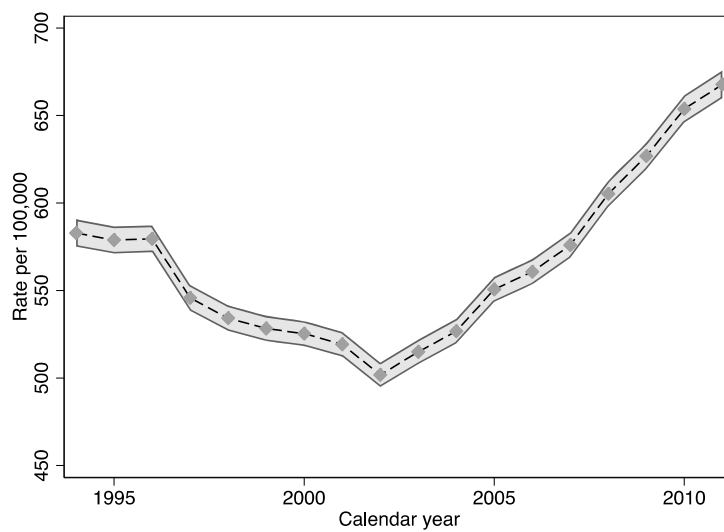


Figure 2 Psychiatric Inpatient Diagnosis Rate

Note: In this figure, the psychiatric inpatient diagnosis rate among individuals aged 31-64 years is plotted along the y-axis for calendar years 1994- 2011 along the x-axis. 95% confidence intervals are shown as the shaded area. Source: SIP. Own calculations.

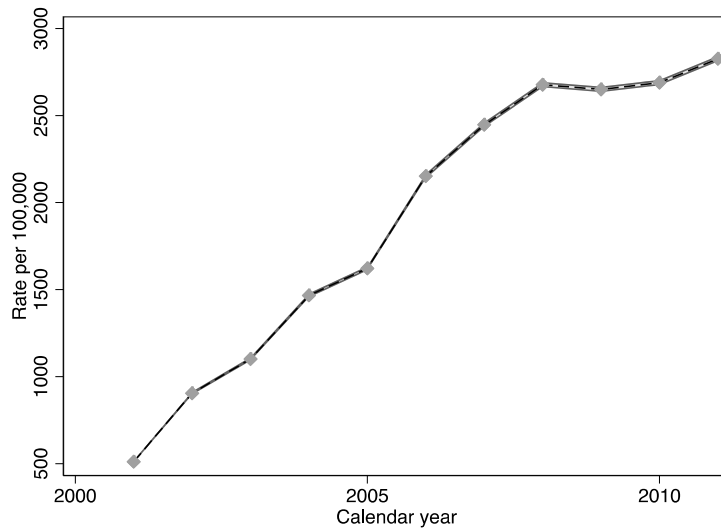


Figure 3 Psychiatric Outpatient Diagnosis Rate

Note: In this figure, the psychiatric outpatient diagnosis rate among individuals aged 31-64 years is plotted along the y-axis for calendar years 2001- 2011 along the x-axis. 95% confidence intervals are shown as the shaded area. Source: SIP. Own calculations.

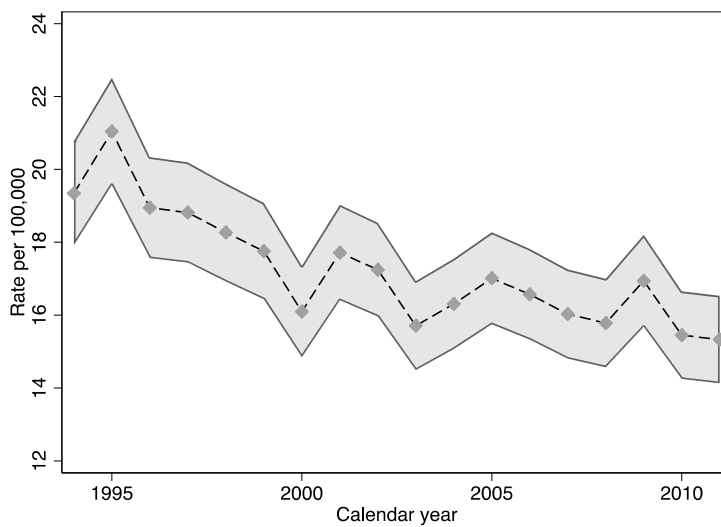


Figure 4 Suicide Rate

Note: In this figure, the suicide rate among individuals aged 31-64 years is plotted along the y-axis for calendar years 1994- 2011 along the x-axis. 95% confidence intervals are shown as the shaded area. Source: SIP. Own calculations.

3.1.2 Time trends in the level of socioeconomic-related inequality in mental health in Sweden

3.1.2.1 Relative Inequality

The Concentration Index of relative inequality (RCI) for each of the mental ill-health indicators (self-reported anxiety, psychiatric in- and outpatient diagnoses and suicide) between years 1994 and 2011 (2001 to 2011 for outpatient diagnosis) are plotted in figures 5-8. The concentration curves for the same indicators and years are plotted in figures 9-12. Our results show that self-reported anxiety, psychiatric in- and outpatient diagnosis and suicide are all disproportionately concentrated among those with lower socioeconomic rank. This can be seen both from the negative RCIs (figures 5-8), and from the concentration curves which are situated above the line of equality (45° line) (figures 9-12). Our results further show that relative mental health inequalities are increasing for all the indicators of mental-ill-health. This can be seen from the upward sloping trends of the RCIs in figures 5-8, and from the concentration curves where those in 2011 are further away from the diagonal compared to the concentration curves in 1994 (2001 for outpatient diagnosis). Relative inequalities in self-reported anxiety three-folded over the study period from a relatively low RCI of -0.06 in 1994 to RCI -0.18 in 2011, still the level of inequality is lower for self-reported anxiety compared to the other mental ill-health indicators. The relative inequality in suicide doubled, the RCI of suicide increased from -0.11 in 1994 to -0.22 in 2011. Relative inequalities in psychiatric diagnosis increased roughly by half over the study period, the RCI of inpatient diagnosis increased from -0.26 in 1994 to -0.39 in 2011 and the RCI of outpatient diagnosis increased from -0.21 in 2001 to -0.33 in 2011. It appears as though inequalities in psychiatric diagnosis are larger than inequalities in self-reported anxiety and suicide.

From the concentration curves in figures 9-12 we can see how the inequality is distributed along the income rank. For example, in figure 9 we can see that there was no inequality in self-reported anxiety among the poorest third of the population in 1994; the disproportionate concentration of self-reported anxiety appeared somewhere in the middle of the income rank. However, in 2011 the distance between the concentration curve and the diagonal increased more along the lower end of the income rank, implying that self-reported anxiety has become more concentrated among those with lowest income. Similar but less pronounced trends are seen for the other mental ill-health indicators. The concentration curves show that more than

30 percent of all self-reported anxiety and suicides, and half of all psychiatric in- and outpatient diagnoses, are concentrated among the poorest fifth of the population in 2011.

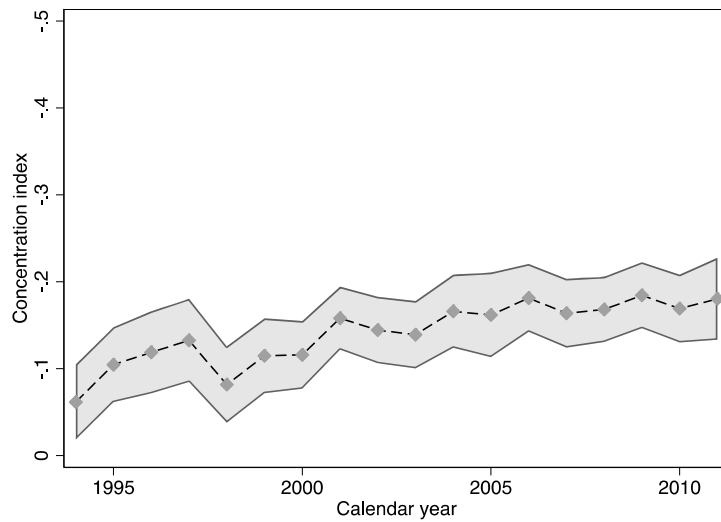


Figure 5 Relative Inequality in Self-Reported Anxiety

Notes: In this figure, the concentration index of income-related inequality in self-reported anxiety for individuals aged 31-64 years is plotted along the y-axis for calendar years 1994 to 2011 along the x-axis. 0 = no inequality, -1 = all cases of self-reported anxiety are concentrated among the poorest individuals. A more negative RCI value therefore equals greater inequality, note that the y-axis is reversed. 95% confidence intervals are shown as the shaded area. Source: Living Conditions Survey. Own calculations.

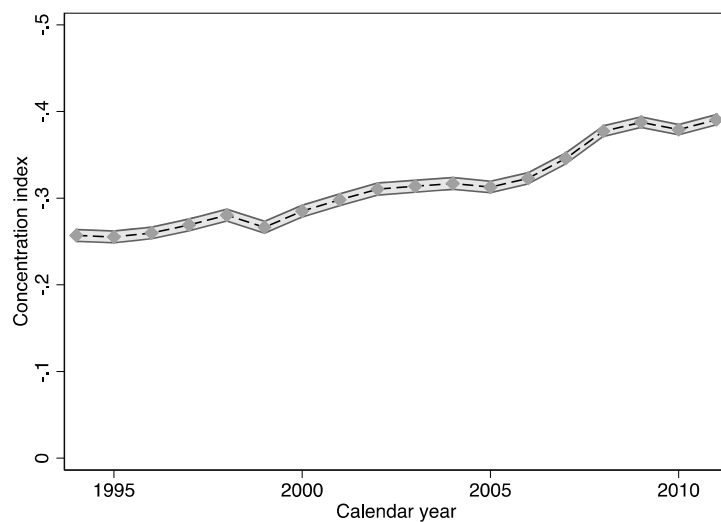


Figure 6 Relative Inequality in Psychiatric Inpatient Diagnosis

Notes: In this figure, the concentration index of income-related inequality in psychiatric inpatient diagnosis for individuals aged 31-64 years is plotted along the y-axis for calendar years 1994 to 2011 along the x-axis. 0 = no inequality, -1 = all diagnoses are concentrated among the poorest individuals. A more negative RCI value therefore equals greater inequality, note that the y-axis is reversed. 95% confidence intervals are shown as the shaded area. Source: SIP. Own calculations.

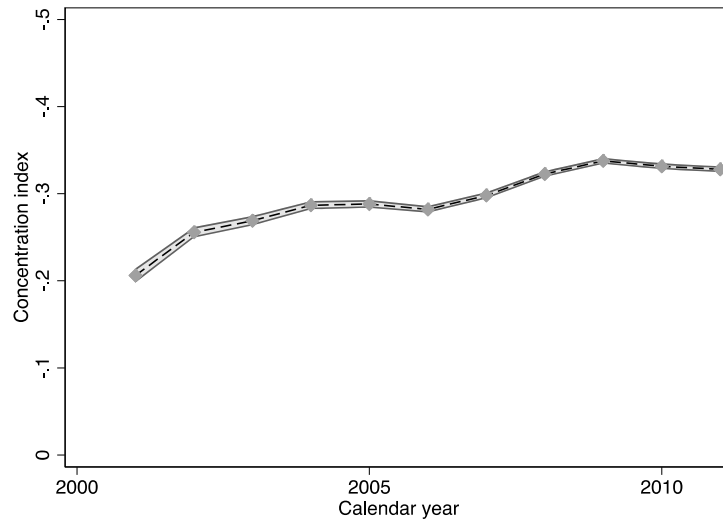


Figure 7 Relative Inequality in Psychiatric Outpatient Diagnosis

Notes: In this figure, the concentration index of income-related inequality in psychiatric outpatient diagnosis for individuals aged 31-64 years is plotted along the y-axis for calendar years 2001 to 2011 along the x-axis. 0 = no inequality, -1 = all diagnoses are concentrated among the poorest individuals. A more negative RCI value therefore equals greater inequality, note that the y-axis is reversed. 95% confidence intervals are shown as the shaded area. Source: SIP. Own calculations

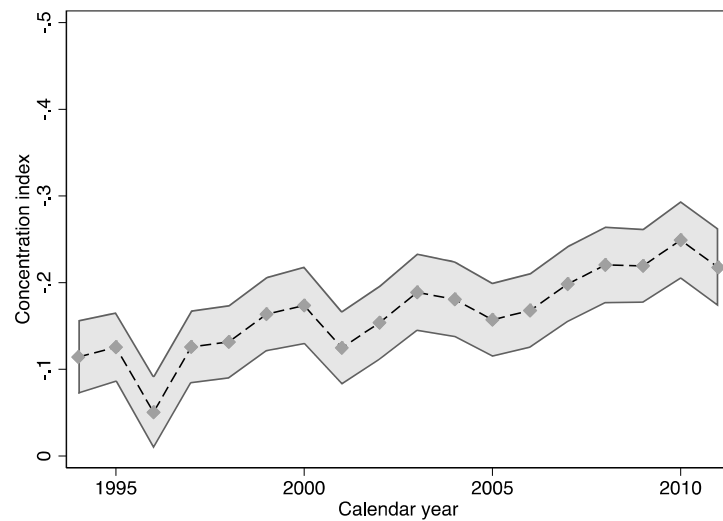


Figure 8 Relative Inequality in Suicide

Notes: In this figure, the concentration index of income-related inequality in suicide for individuals aged 31-64 years is plotted along the y-axis for calendar years 1994 to 2011 along the x-axis. 0 = no inequality, -1 = all suicides are concentrated among the poorest individuals. A more negative RCI value therefore equals greater inequality, note that the y-axis is reversed. 95% confidence intervals are shown as the shaded area. Source: SIP. Own calculations.

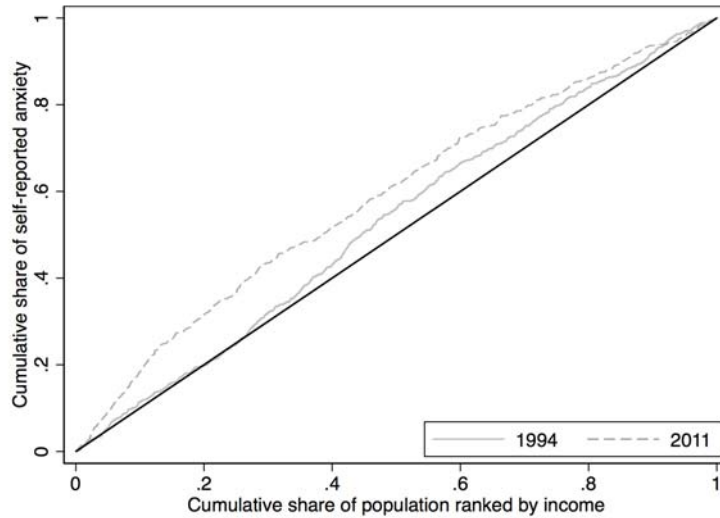


Figure 9 Concentration Curve of Inequality in Self-Reported Anxiety

Notes: In this figure, the concentration curve of income-related inequality in self-reported anxiety is plotted in the years 1994 and 2011, for individuals aged 31-64 years. The diagonal (45-degree line) represents no inequality. If the concentration curve is situated above (below) the diagonal, the health outcome is disproportionately concentrated among the poor (rich). The concentration index relates to the concentration curve as 2 times the area between the diagonal and the concentration curve divided by the whole area above the diagonal. Source: Living Conditions Survey. Own calculations

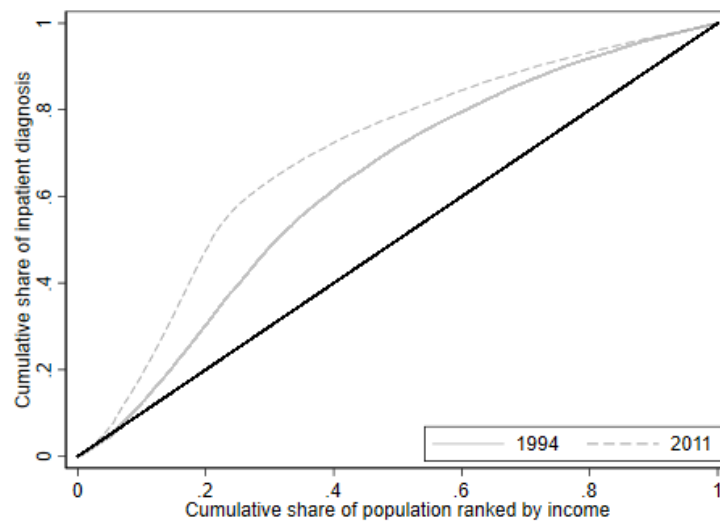


Figure 10 Concentration Curve of Inequality in Psychiatric Inpatient Diagnosis

Notes: In this figure, the concentration curve of income-related inequality in psychiatric inpatient diagnosis is plotted in the years 1994 and 2011, for individuals aged 31-64 years. The diagonal (45-degree line) represents no inequality. If the concentration curve is situated above (below) the diagonal, the health outcome is disproportionately concentrated among the poor (rich). The concentration index relates to the concentration curve as 2 times the area between the diagonal and the concentration curve divided by the whole area above the diagonal. Source: SIP. Own calculations

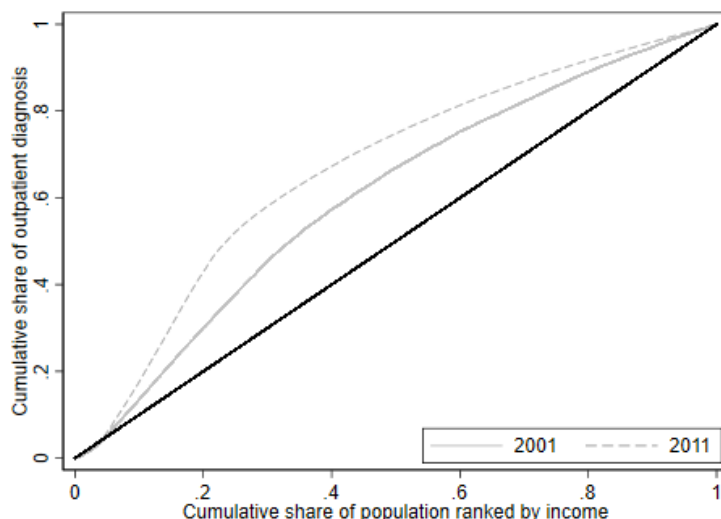


Figure 11 Concentration Curve of Inequality in Psychiatric Outpatient Diagnosis

Notes: In this figure, the concentration curve of income-related inequality in psychiatric outpatient diagnosis is plotted in the years 2001 and 2011, for individuals aged 31-64 years. The diagonal (45-degree line) represents no inequality. If the concentration curve is situated above (below) the diagonal, the health outcome is disproportionately concentrated among the poor (rich). The concentration index relates to the concentration curve as 2 times the area between the diagonal and the concentration curve divided by the whole area above the diagonal. Source: SIP. Own calculations

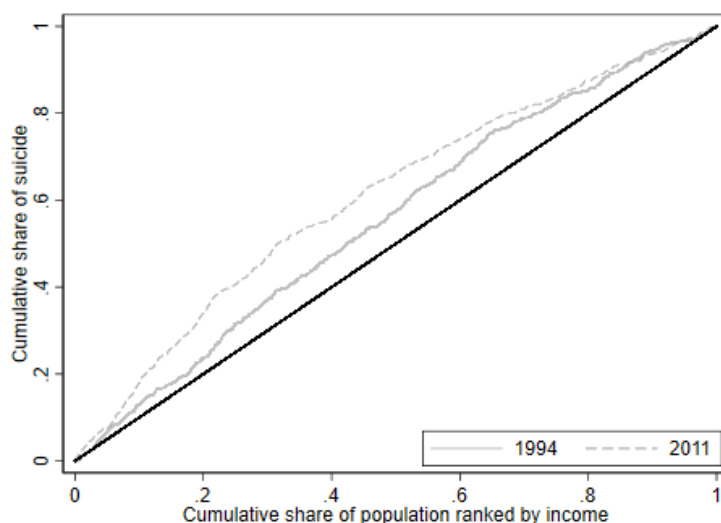


Figure 12 Concentration Curve of Suicide Inequality

Notes: In this figure, the concentration curve of income-related suicide inequality is plotted in the years 1994 and 2011, for individuals aged 31-64 years. The diagonal (45-degree line) represents no inequality. If the concentration curve is situated above (below) the diagonal, the health outcome is disproportionately concentrated among the poor (rich). The concentration index relates to the concentration curve as 2 times the area between the diagonal and the concentration curve divided by the whole area above the diagonal. Source: SIP. Own calculations

3.1.2.2 Absolute Inequality

As mentioned in the methods section, evaluating changes in health over time in terms of inequality may depend on which inequality measure is used. For example, our results show that the suicide rate has decreased over time, while the relative inequality has increased. This could reflect different scenarios; suicides may have decreased in all socioeconomic groups but relatively more among the rich; suicides may have decreased only among the rich, or suicides may have decreased among the rich and increased (less) among the poor. In figures 13-16, changes in mean level of mental ill-health are plotted along the x-axes, changes in absolute inequality are plotted along the y-axes, and changes in relative inequality are represented by how the curves sits relative to the contour lines (themselves representing different levels of relative inequality). Levels of mental ill-health and relative inequalities have already been presented in previous figures (for all years during the study period), this section is simply to see how the changes in prevalence, and the changes in relative and absolute inequalities relate to each other, and particularly what it means when these go in different directions. Note that the magnitude of relative inequality (RCI) lies between zero and one, and the magnitude of absolute inequality (ACI) lies between zero and the mean of health. For both the RCI and the ACI the sign is determined by a pro-rich (+) or a pro-poor (-) concentration of mental ill-health. Maximum relative inequality is -1 and maximum absolute inequality follows the RCI = -1 contour line which is a one to one relationship between absolute inequality and the mean. If relative inequality is zero, so is absolute inequality. If relative inequality has increased, so has absolute inequality.

The prevalence of self-reported anxiety increases somewhat over the study period (from roughly 17,700 per 100,000 in 1994 to around 18,600 per 100,000 in 2011) while the relative and absolute inequalities three-fold (RCI -0.06 in 1994 to RCI -0.18 in 2011; ACI -1,086 in 1994 to ACI -3,358 in 2011) (figure 13). Worth noting here is that the increase in absolute inequality is larger than the increase in mean self-reported anxiety, which implies that self-reported anxiety has increased among the poorer population and decreased among the richer population.

Psychiatric inpatient diagnoses rates, as well as the relative and absolute inequalities increased between 1994 and 2011 (from a rate of 580 per 100,000, RCI of -0.26 and ACI of -149 in 1994 to a rate of 670 per 100,000, RCI of -0.39 and ACI of -260 in 2011). Similarly as for

self-reported anxiety, the absolute inequality in inpatient diagnosis increases more than the mean diagnosis rate, which means that the increase is fully driven by the poorer population. In fact, it is possible that the diagnosis rate has decreased among the richer population.

Psychiatric outpatient diagnosis rate nearly six-folded from 510 per 100,000 in 2001 to 2,830 per 100,000 in 2011. The relative inequality increased, and thus did the absolute inequality (from a RCI of -0.21 and an ACI of -106 in 2001 to a RCI of -0.33 and an ACI of -940 in 2011). The increase in psychiatric outpatient diagnosis occurred among the whole population but was disproportionately concentrated among the poorer population (the rate of increase was higher).

Finally, while the suicide rate decreased during the study period (from 19 per 100,000 in 1994 to 15 per 100,000 in 2011), the relative and absolute inequality increased (from a RCI of -0.11 and an ACI of -2.2 in 1994 to a RCI of -0.22 and an ACI of -3.3 in 2011). These results imply that suicides have not decreased proportionally among the whole population and have become increasingly concentrated among the poorer population.

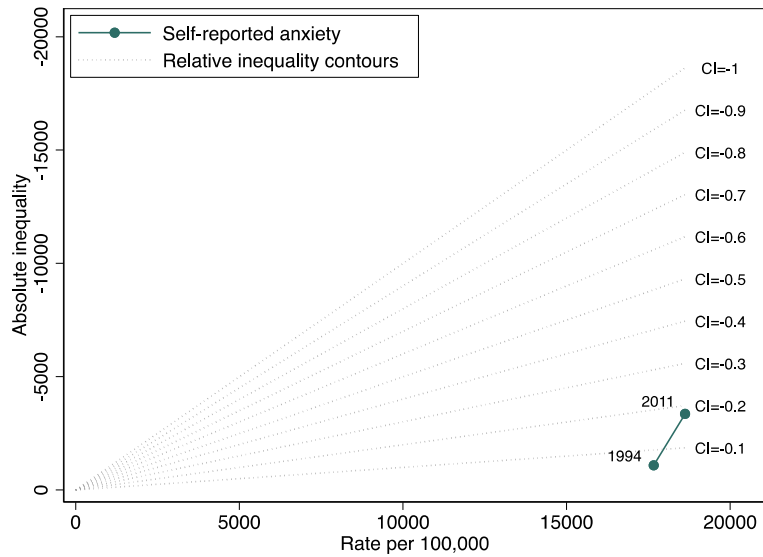


Figure 13 Absolute and Relative Inequality in Self-Reported Anxiety

Notes: In this figure, mean level of self-reported anxiety is plotted along the x-axis, absolute inequality is plotted along the y-axis, and relative inequality is plotted along the contour lines, in years 1994 and 2011, for individuals aged 31-64 years. Relative inequality is measured with the concentration index (RCI) and bounded between -1 and +1. Absolute inequality is measured as $RCI \times \text{mean level of self-reported anxiety}$ and the magnitude of absolute inequality lies between 0 and the mean, the sign is determined by a pro-rich or a pro-poor concentration. More negative inequality values equal greater inequality, note that the y-axis is reversed. Socioeconomic status is ranked by family disposable income. Source: Living Conditions Survey. Own calculations.

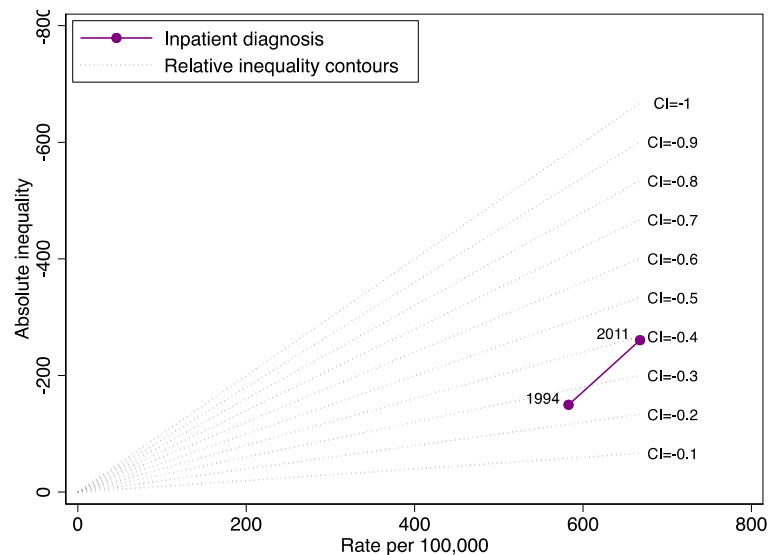


Figure 14 Absolute and Relative Inequality in Psychiatric Inpatient Diagnosis

Notes: In this figure, the psychiatric inpatient diagnosis rate is plotted along the x-axis, absolute inequality is plotted along the y-axis, and relative inequality is plotted along the contour lines, in years 1994 and 2011, for individuals aged 31-64 years. Relative inequality is measured with the concentration index (RCI) and bounded between -1 and +1. Absolute inequality is measured as $RCI \times \text{mean level of diagnosis}$ and the magnitude of absolute inequality lies between 0 and the mean, the sign is determined by a pro-rich or a pro-poor concentration. More negative inequality values equal greater inequality, note that the y-axis is reversed. Socioeconomic status is ranked by family disposable income. Source: SIP. Own calculations.

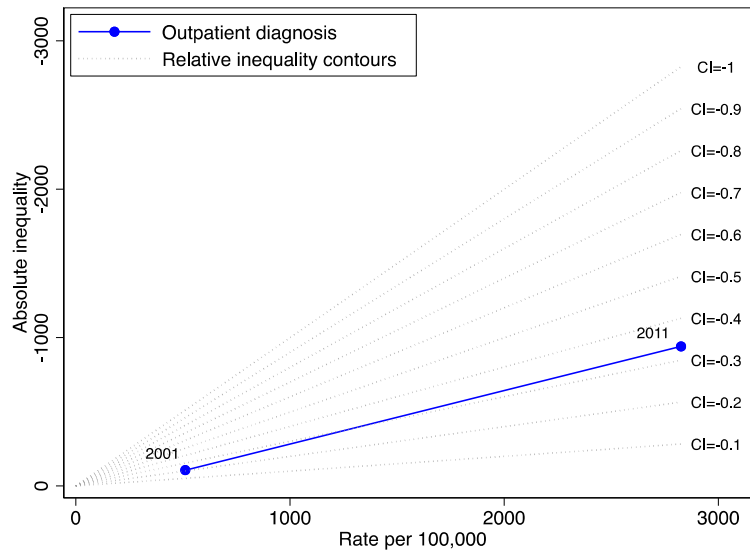


Figure 15 Absolute and Relative Inequality in Psychiatric Outpatient Diagnosis

Notes: In this figure, the psychiatric outpatient diagnosis rate is plotted along the x-axis, absolute inequality is plotted along the y-axis, and relative inequality is plotted along the contour lines, in years 2001 and 2011, for individuals aged 31-64 years. Relative inequality is measured with the concentration index (RCI) and bounded between -1 and +1. Absolute inequality is measured as $RCI \times \text{mean level of diagnosis}$ and the magnitude of absolute inequality lies between 0 and the mean, the sign is determined by a pro-rich or a pro-poor concentration. More negative inequality values equal greater inequality, note that the y-axis is reversed. Socioeconomic status is ranked by family disposable income. Source: SIP. Own calculations.

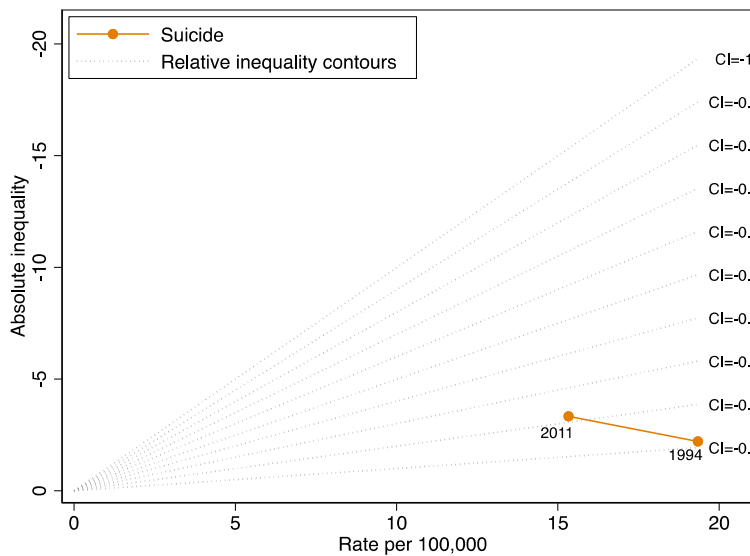


Figure 16 Absolute and Relative Inequality in Suicide

Notes: In this figure, the suicide rate is plotted along the x-axis, absolute inequality is plotted along the y-axis, and relative inequality is plotted along the contour lines, in years 1994 and 2011, for individuals aged 31-64 years. Relative inequality is measured with the concentration index (RCI) and bounded between -1 and +1. Absolute inequality is measured as $RCI \times \text{mean level of diagnosis}$ and the magnitude of absolute inequality lies between 0 and the mean, the sign is determined by a pro-rich or a pro-poor concentration. More negative inequality values equal greater inequality, note that the y-axis is reversed. Socioeconomic status is ranked by family disposable income. Source: SIP. Own calculations.

3.2 Explaining the level of mental ill-health and the changes over time

3.2.1 Self-reported anxiety

The prevalence of self-reported anxiety increased from 17,664 per 100,000 in 1994 to 18,623 per 100,000 in 2011, a non-significant increase of 959 per 100,000. The Oaxaca-Blinder decomposition results which are presented in table 2 show that changes in the study sample regarding the characteristics we have chosen to examine does not explain this increase. Changes in the sample characteristics would actually explain a decrease of 3,050 per 100,000 cases of self-reported anxiety over the study period, which implies that an increase of 4,009 per 100,000 is left unexplained by changes in the sample characteristics.

Several of the selected demographic and socioeconomic factors are significantly associated with self-reported anxiety in both 1994 and 2011 (see table 2, columns 3 and 4). Our results show that being a woman, low educated, foreign-born, socially isolated and not participating in the labour market are all risk factors of self-reported anxiety in both time periods. Being married is protective of self-reported anxiety in both periods, and neither parents' years of schooling, parents foreign background, nor the welfare share in residential municipality, are associated with self-reported anxiety. Decomposing changes in mental ill-health into its contributing factors depends both on the direction of the association between the mental ill-health indicator and the explanatory factor, as well as the initial distribution of these factors. The detailed decomposition results show that given the positive association between low education and self-reported anxiety in 1994 (β 1994 = 2,932), a decreasing proportion of low educated individuals in the study sample (mean 1994 = 0.293 to mean 2011 = 0.101), would contribute to a decreasing prevalence in self-reported anxiety of 1,104 per 100,000 cases (see table 2, column 5). Similarly, a decreasing proportion of married individuals in the sample (mean 1994 = 0.643 to mean 2011 = 0.547), and a negative association between being married and reporting anxiety (β 1994 = -4,101), explains an increasing prevalence of self-reported anxiety of 321.8 per 100,000 cases. An increasing proportion of foreign born individuals (mean 1994 = 0.122 to mean 2011 = 0.159) and a positive association between being foreign born and reporting anxiety (β 1994 = 9,079) also explains increasing self-reported anxiety of 307.8 per 100,000 cases.

Of the unexplained part of the decomposition, we observe that self-reported anxiety is significantly more concentrated among women, and among those not participating in the

labour market, which relates to increases in self-reported anxiety of 2,037 per 100,000 and 604.7 per 100,000, respectively, between 1994 and 2011 (see table 2, column 6). This could imply that the negative impact of being a woman, and not working, on self-reported anxiety have intensified over time.

Social isolation does not seem to explain any change in self-reported anxiety (the proportion who report being socially isolated has not changed and the association between being socially isolated and reporting anxiety has not changed significantly). Still, worth noting is that the negative impact of being socially isolated has increased quite a lot over the study period.

Table 2 OB-decomposition prevalence of self-reported anxiety

<i>Panel A: Overall decomposition</i>						
VARIABLES	Mean 1994	Mean 2011	Difference		Explained	Unexplained
<i>Self-reported anxiety</i>	17,664*** (676.5)	18,623*** (788.4)	959.0 (1,039)		-3,050* (1,587)	4,009** (1,866)
<i>Panel B: Detailed decomposition</i>						
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Mean 1994	Mean 2011	β 1994	β 2011	Explained	Unexplained
<i>Sex (female)</i>	0.508 (0.500)	0.524 (0.500)	6,621*** (1,332)	10,631*** (1,542)	170.7 (144.8)	2,037** (1,036)
<i>Age (0=31 yrs)</i>	15.40 (9.332)	17.14 (9.923)	-37.87 (97.40)	-103.1 (101.5)	-178.7 (177.8)	-1,005 (2,166)
<i>Education <10 yrs</i>	0.239 (0.427)	0.101 (0.301)	2,932* (1,735)	7,984*** (2,716)	-1,104*** (383.6)	1,207 (771.2)
<i>Education >12 yrs</i>	0.317 (0.465)	0.449 (0.498)	-635.9 (1,572)	-2,452 (1,644)	-323.9 (219.5)	-575.6 (721.1)
<i>Marital status (married)</i>	0.643 (0.479)	0.547 (0.498)	-4,101*** (1,427)	-3,374** (1,584)	321.8** (157.5)	467.5 (1,370)
<i>Foreign-born</i>	0.122 (0.327)	0.159 (0.366)	9,079*** (2,235)	8,209*** (2,462)	307.8** (120.3)	-106.1 (405.1)
<i>Foreign-born parents</i>	0.00846 (0.0916)	0.0253 (0.157)	9,775 (7,293)	2,640 (4,901)	44.37 (82.91)	-60.33 (75.20)
<i>Non-labour participation</i>	0.0899 (0.286)	0.0896 (0.286)	9,887*** (2,442)	16,614*** (2,817)	-3.897 (127.5)	604.7* (336.8)
<i>Social Isolation</i>	0.0207 (0.142)	0.0183 (0.134)	9,496** (4,793)	16,835*** (5,788)	-39.27 (63.72)	151.7 (156.4)
<i>Welfare share</i>	4.250 (1.667)	2.452 (0.986)	331.5 (404.7)	1,160 (782.9)	-2,085 (1,408)	3,521 (3,746)
<i>Mother >9 yrs education</i>	0.184 (0.388)	0.370 (0.483)	-2,896 (2,014)	-2,680 (2,225)	-497.0 (413.9)	39.68 (552.7)
<i>Father >9 yrs education</i>	0.152 (0.359)	0.276 (0.447)	-832.5 (2,312)	1,776 (2,533)	220.9 (315.6)	396.2 (521.1)
<i>Constant</i>			12,038*** (2,745)	12,377*** (3,606)		3,193 (3,193)
<i>Observations</i>	3,193	2,454	3,193	2,454	5,647	5,647
<i>R-squared</i>			0.037	0.061		

Note: In table 2, the results from the Oaxaca-Blinder decomposition are presented. The overall decomposition results (panel A) show the change in mean level of self-reported anxiety between 1994 and 2011, the contribution of overall changes in the distribution of the selected socioeconomic and demographic factors among the population (explained), and the contribution of changes in the coefficients of these factors (unexplained). The detailed decomposition results show mean of each variable (columns 1 and 2), the regression estimates from eq. 3 for each variable (linear probability model) (columns 3 and 4), how a distributional change in each variable has contributed to a change in self-reported anxiety (explained), and how a change in the association between each variable and self-reported anxiety has contributed to a change in self-reported anxiety (unexplained). We controlled for missing information on foreign background and parent's education. Age is continuous in years, 0=31 years. Secondary education (10-12 years of schooling) is reference group for education. Welfare share is continuous in percentage points. Standard errors in parentheses, ***p<0.01, **p<0.05, *p<0.1. Source: Living Conditions Survey

3.2.2 Psychiatric inpatient diagnosis

Psychiatric inpatient diagnosis increased from 583 per 100,000 in 1994 to 668 per 100,000 in 2011, a significant increase of 85 per 100,000. The Oaxaca-Blinder decomposition results which are presented in table 3 show that changes in population characteristics significantly explains 53 per 100,000 of the increase, and changes in the impacts of these factors explain another 31 per 100,000 cases.

Most of the selected demographic and socioeconomic factors are significantly associated with psychiatric inpatient diagnosis in both 1994 and 2011 (see table 3, columns 3 and 4). Our results show that being a woman, low educated, not participating in the labour market and having parents that are foreign born or have more than 9 years of schooling are all risk factors of psychiatric inpatient diagnosis in both time periods (mother's >9 years of schooling is only a significant risk factor in 2011). Increasing age, as well as being high educated or married are protective of psychiatric inpatient diagnosis in both periods. Being foreign born also seems to have a (weaker) protective relationship with inpatient diagnosis in 2011.

The detailed decomposition results show increasing mean age and increasing proportion of high educated and foreign born individuals in the population, in combination with protective relationships between these variables and inpatient diagnosis, contribute to decreasing diagnosis rates (see table 3, column 5). A decreasing proportion of married individuals in the population contribute to increasing diagnosis rates, due to a negative (protective) association between being married and inpatient diagnosis. Increasing proportions of non-labour force participants and individuals with parents who are foreign born or have more than 9 years of schooling also contribute to increasing diagnosis, due to their positive association (risk-factors) with diagnosis.

The unexplained part of the decomposition show that psychiatric inpatient diagnosis is significantly more concentrated among women, older individuals, as well as among those low educated, married and not participating in the labour market, in 2011 compared to 1994 (see table 3, column 6). This could imply that the impact of these factors on inpatient diagnosis have increased over time. Interesting to note is that the contribution of a smaller proportion of low educated in the population is offset by an increasing concentration of diagnosis among those lowest educated, that is, although a smaller proportion of the population is low educated

(decreased mental ill-health) the negative effect of being low educated appear to have increased. The protective impact of being high educated also appears to have intensified over time.

Table 3 OB-decomposition of psychiatric inpatient diagnosis rate

Panel A: Overall decomposition

	Mean 1994	Mean 2011	Difference		Explained	Unexplained
<i>Inpatient diagnosis</i>	582.8***	667.7***	84.87***		53.41***	31.46***
	(3.979)	(4.024)	(5.658)		(7.504)	(9.369)
Panel B: Detailed decomposition						
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Mean 1994	Mean 2011	β 1994	β 2011	Explained	Unexplained
<i>Sex (female)</i>	0.495	0.495	86.85***	161.4***	0.00517	36.88***
	(0.500)	(0.500)	(7.947)	(8.055)	(0.0580)	(5.598)
<i>Age (0=31 yrs)</i>	15.47	16.44	-13.64***	-9.496***	-9.168***	64.08***
	(9.347)	(9.687)	(0.593)	(0.529)	(0.515)	(12.30)
<i>Education <10 yrs</i>	0.308	0.145	30.04***	204.2***	-33.19***	53.61***
	(0.462)	(0.352)	(9.629)	(12.30)	(2.000)	(4.809)
<i>Education >12 yrs</i>	0.250	0.384	-114.8***	-167.1***	-22.46***	-13.08***
	(0.433)	(0.486)	(10.08)	(8.940)	(1.203)	(3.366)
<i>Marital status (married)</i>	0.617	0.502	-644.9***	-495.8***	56.80***	92.00***
	(0.486)	(0.500)	(8.368)	(8.204)	(0.956)	(7.231)
<i>Foreign-born</i>	0.118	0.178	-19.30	-31.75*	-1.901*	-1.475
	(0.323)	(0.383)	(15.38)	(18.94)	(1.134)	(2.891)
<i>Foreign-born parents</i>	0.0107	0.0267	113.1***	199.8***	3.191***	0.926*
	(0.103)	(0.161)	(38.79)	(25.08)	(0.401)	(0.493)
<i>Non-labour participation</i>	0.102	0.124	1,787***	2,122***	46.90***	34.06***
	(0.302)	(0.329)	(13.73)	(12.79)	(0.558)	(1.910)
<i>Welfare share</i>	4.077	2.541	4.377	5.041	-7.743	2.709
	(1.467)	(1.000)	(2.760)	(4.041)	(6.207)	(19.95)
<i>Mother >9 yrs education</i>	0.177	0.368	18.67	30.20***	5.781***	2.042
	(0.382)	(0.482)	(12.24)	(11.35)	(2.172)	(2.955)
<i>Father >9 yrs education</i>	0.151	0.274	34.75**	46.14***	5.684***	1.715
	(0.358)	(0.446)	(14.01)	(12.79)	(1.575)	(2.857)
<i>Constant</i>			877.4***	682.4***		-195.1***
			(16.80)	(18.04)		(24.66)
<i>Observations</i>	3,660,610	4,096,793	3,660,610	4,096,793	7,757,403	7,757,403
<i>R-squared</i>			0.007	0.009		

Note: In table 3, the results from the Oaxaca-Blinder decomposition are presented. The overall decomposition results (panel A) show the change in psychiatric inpatient diagnosis rate between 1994 and 2011, the contribution of overall changes in the distribution of the selected socioeconomic and demographic factors among the population (explained), and the contribution of changes in the coefficients of these factors (unexplained). The detailed decomposition results (panel B) show mean of each variable (columns 1 and 2), the regression estimates from eq. 3 for each variable (linear probability model) (columns 3 and 4), how a distributional change in each variable has contributed to a change in psychiatric inpatient diagnosis rate (explained), and how a change in the association between each variable and psychiatric inpatient diagnosis contributed to a change in the psychiatric inpatient diagnosis rate (unexplained). We controlled for missing information on foreign background and parent's education. Age is continuous in years, 0=31 years. Secondary education (10-12 years of schooling) is reference group for education. Welfare share is continuous in percentage points. Standard errors in parentheses, ***p<0.01, **p<0.05, *p<0.1. Source: SIP

3.2.3 Psychiatric outpatient diagnosis

Psychiatric outpatient diagnosis nearly six-folded over the study period from 511 per 100,000 in 2001 to 2,826 per 100,000 in 2011, a significant increase of 2,315 per 100,000. The Oaxaca-Blinder decomposition results which are presented in table 4 show that only a relatively small part of this dramatic increase is explained by changes in population characteristics, 160 per 100,000 cases, while an increase of 2,154 per 100,000 is left unexplained by population characteristics.

As for inpatient diagnosis, most of the selected demographic and socioeconomic factors are significantly associated with psychiatric outpatient diagnosis in both 2001 and 2011 (see table 4, columns 3 and 4). Most of these associations also go in similar direction as for inpatient diagnosis; being a woman, low educated, not participating in the labour market and having parents that are foreign born or have more than 9 years of schooling are all risk factors of psychiatric outpatient diagnosis. Both indicators of foreign background, being foreign born and having foreign born parents, are important risk-factors in 2011, but not in 2001. Moreover, the share of individuals receiving welfare in municipality of residence appear to be a risk factor of outpatient diagnosis in 2001, but instead has a protective association in 2011.

Similarly to the other indicators of mental ill-health, increasing mean age and education level among the population explain reduced outpatient diagnosis rates, and increased proportion of individuals with foreign background, non-labour force participation and higher education level among parents explain increased diagnosis rates (see table 4, column 5). Moreover, a lower proportion of married individuals and welfare share in municipality of residence explain increased diagnosis rates.

For the unexplained part of the decomposition we find that outpatient diagnosis is significantly more concentrated in women, non-labour force participants, among those with low education, foreign background, and those with parents who have more than 9 years of schooling, in 2011 compared to in 2001 (see table 4, column 6). Outpatient diagnosis also becomes significantly less concentrated in high educated, older and married individuals over the same period, as well as among individuals living in municipalities with high share of welfare recipients.

Table 4 OB-decomposition of psychiatric outpatient diagnosis rate

Panel A: Overall decomposition

	Mean 2001	Mean 2011	Difference		Explained	Unexplained
<i>Outpatient diagnosis</i>	511.2*** (3.575)	2,826*** (8.187)	2,315*** (8.933)		160.4*** (6.754)	2,154*** (11.04)
Panel B: Detailed decomposition						
	(1)	(2)	(3)	(4)	(5)	(6)
<i>VARIABLES</i>	Mean 2001	Mean 2011	β 2001	β 2011	Explained	Unexplained
<i>Sex (female)</i>	0.493 (0.500)	0.495 (0.500)	199.7*** (7.162)	1,028*** (16.27)	1.883*** (0.363)	408.0*** (8.766)
<i>Age (0=31 yrs)</i>	15.93 (9.594)	16.44 (9.687)	-8.168*** (0.494)	-44.90*** (1.069)	-22.98*** (0.626)	-585.1*** (18.76)
<i>Education <10 yrs</i>	0.219 (0.414)	0.145 (0.352)	53.68*** (9.487)	350.5*** (24.84)	-25.87*** (1.836)	65.04*** (5.827)
<i>Education >12 yrs</i>	0.298 (0.457)	0.384 (0.486)	-53.46*** (8.473)	-461.0*** (18.06)	-39.72*** (1.564)	-121.5*** (5.947)
<i>Marital status (married)</i>	0.545 (0.498)	0.502 (0.500)	-266.4*** (7.412)	-1,706*** (16.57)	72.92*** (0.928)	-784.9*** (9.904)
<i>Foreign-born</i>	0.139 (0.346)	0.178 (0.383)	-26.36* (15.38)	298.2*** (38.27)	11.80*** (1.516)	45.04*** (5.723)
<i>Foreign-born parents</i>	0.0169 (0.129)	0.0267 (0.161)	-16.15 (27.87)	786.6*** (50.65)	7.646*** (0.499)	13.59*** (0.980)
<i>Non-labour participation</i>	0.114 (0.318)	0.124 (0.329)	848.8*** (11.76)	6,755*** (25.83)	65.45*** (1.559)	674.2*** (3.374)
<i>Welfare share</i>	3.162 (1.409)	2.541 (1.000)	101.5*** (2.582)	-97.22*** (8.163)	60.43*** (5.075)	-628.4*** (27.08)
<i>Mother >9 yrs education</i>	0.257 (0.437)	0.368 (0.482)	-26.19*** (10.10)	182.0*** (22.92)	20.33*** (2.561)	53.46*** (6.431)
<i>Father >9 yrs education</i>	0.201 (0.401)	0.274 (0.446)	0.308 (11.73)	317.6*** (25.83)	23.14*** (1.884)	63.76*** (5.701)
<i>Constant</i>			247.7*** (14.06)	3,085*** (36.45)		2,837*** (39.06)
<i>Observations</i>	3,979,501	4,096,793	3,979,501	4,096,793	8,076,294	8,076,294
<i>R-squared</i>			0.003	0.024		

Note: In table 4, the results from the Oaxaca-Blinder decomposition are presented. The overall decomposition results (panel A) show the change in psychiatric outpatient diagnosis rate between 2001 and 2011, the contribution of overall changes in the distribution of the selected socioeconomic and demographic factors among the population (explained), and the contribution of changes in the coefficients of these factors (unexplained). The detailed decomposition results (panel B) show mean of each variable (columns 1 and 2), the regression estimates from eq. 3 for each variable (linear probability model) (columns 3 and 4), how a distributional change in each variable has contributed to a change in psychiatric outpatient diagnosis rate (explained), and how a change in the association between each variable and psychiatric outpatient diagnosis contributed to a change in the psychiatric outpatient diagnosis rate (unexplained). We controlled for missing information on foreign background and parent's education. Age is continuous in years, 0=31 years. Secondary education (10-12 years of schooling) is reference group for education. Welfare share is continuous in percentage points. Standard errors in parentheses, ***p<0.01, **p<0.05, *p<0.1. Source: SIP

3.2.4 Suicide

The suicide rate decreased from 19 per 100,000 in 1994 to 15 per 100,000 in 2011, a significant decrease of 4 per 100,000. The Oaxaca-Blinder decomposition results, which are presented in table 5, show that changes in the population regarding the characteristics we have chosen to examine does not explain this decrease. In fact, changes in the population would instead explain an increase of 2 per 100,000 cases of suicide over the study period, which means that the actual decrease is left unexplained by population changes.

Suicide is the first of our mental ill-health indicators where being female is a protective factor (see table 5, columns 3 and 4). Similarly as for the other mental ill-health indicators, being married and higher educated is also protective, however it seems as though the protective impact of being high educated on suicide loses importance over time. Instead, being foreign born gains protective impact on suicide over time. Interesting to note here is that while being foreign born is protective of suicide, having foreign born parents is an important risk-factor. Not participating in the labour force and being low educated are also associated with higher suicide rates (for low educated only in 2001).

The distributional changes that explain decreasing suicide rates are related to a decreasing proportion of low educated (risk-factor) individuals, and an increasing proportion of foreign born (protective factor) individuals in the population (see table 5, column 5). Decreasing marital rates (protective factor), as well as increasing non-labour force participation and foreign born parents (risk-factors), would instead contribute to increased rates of suicide. Of the unexplained part, suicides are increasingly concentrated among women, married individuals and non-labour force participants (see table 5, column 6). As mentioned in the section above, suicide is negatively associated with female gender and being married, that is, suicide is more common among men and unmarried individuals. This protective association is stronger in 2001 compared to 2011, thus differences in suicides between men and women, and between married and unmarried, have decreased. Our results also suggest that suicides are decreasingly concentrated among foreign born individuals, and among those in high welfare share municipalities.

Table 5 OB-decomposition of suicide rate

Panel A: Overall decomposition

	Mean 1994	Mean 2011	Difference		Explained	Unexplained
<i>Suicide</i>	19.34***	15.33***	-4.012***		2.374**	-6.386***
	(0.727)	(0.612)	(0.950)		(1.143)	(1.486)
<i>Panel B: Detailed decomposition</i>						
	(1)	(2)	(3)	(4)	(5)	(6)
<i>VARIABLES</i>	Mean 1994	Mean 2011	β 1994	β 2011	Explained	Unexplained
<i>Sex (female)</i>	0.495	0.495	-16.21***	-12.78***	-0.000410	1.697*
	(0.500)	(0.500)	(1.457)	(1.230)	(0.00459)	(0.943)
<i>Age (0=31 yrs)</i>	15.47	16.44	0.144	-0.0364	-0.0352	-2.798
	(9.347)	(9.687)	(0.109)	(0.0808)	(0.0780)	(2.097)
<i>Education <10 yrs</i>	0.308	0.145	1.553	3.137*	-0.510*	0.488
	(0.462)	(0.352)	(1.765)	(1.878)	(0.305)	(0.794)
<i>Education >12 yrs</i>	0.250	0.384	-4.328**	-2.083	-0.280	0.561
	(0.433)	(0.486)	(1.848)	(1.365)	(0.184)	(0.574)
<i>Marital status (married)</i>	0.617	0.502	-19.18***	-12.47***	1.428***	4.144***
	(0.486)	(0.500)	(1.534)	(1.253)	(0.144)	(1.222)
<i>Foreign-born</i>	0.118	0.178	2.824	-8.345***	-0.500***	-1.323***
	(0.323)	(0.383)	(2.821)	(2.893)	(0.173)	(0.479)
<i>Foreign-born parents</i>	0.0107	0.0267	2.939	9.679**	0.155**	0.0720
	(0.103)	(0.161)	(7.112)	(3.829)	(0.0612)	(0.0863)
<i>Non-labour participation</i>	0.102	0.124	22.97***	31.97***	0.707***	0.916***
	(0.302)	(0.329)	(2.518)	(1.953)	(0.0438)	(0.324)
<i>Welfare share</i>	4.077	2.541	0.663	-0.997	1.532	-6.769**
	(1.467)	(1.000)	(0.506)	(0.617)	(0.948)	(3.254)
<i>Mother >9 yrs education</i>	0.177	0.368	0.945	-0.439	-0.0839	-0.245
	(0.382)	(0.482)	(2.244)	(1.733)	(0.332)	(0.502)
<i>Father >9 yrs education</i>	0.151	0.274	-0.0618	-0.660	-0.0813	-0.0901
	(0.358)	(0.446)	(2.569)	(1.953)	(0.241)	(0.486)
<i>Constant</i>			30.49***	26.92***		-3.564
			(3.081)	(2.755)		(4.133)
<i>Observations</i>	3,660,610	4,096,793	3,660,610	4,096,793	7,757,403	7,757,403
<i>R-squared</i>			0.000	0.000		

Note: In table 5, the results from the Oaxaca-Blinder decomposition are presented. The overall decomposition results (panel A) show the change in suicide rate between 1994 and 2011, the contribution of overall changes in the distribution of the selected socioeconomic and demographic factors among the population (explained), and the contribution of changes in the coefficients of these factors (unexplained). The detailed decomposition results (panel B) show mean of each variable (columns 1 and 2), the regression estimates from eq. 3 for each variable (linear probability model) (columns 3 and 4), how a distributional change in each variable has contributed to a change in suicide rate (explained), and how a change in the association between each variable and suicide contributed to a change in the suicide rate (unexplained). We controlled for missing information on foreign background and parent's education. Age is continuous in years, 0=31 years. Secondary education (10-12 years of schooling) is reference group for education. Welfare share is continuous in percentage points. Standard errors in parentheses, ***p<0.01, **p<0.05, *p<0.1. Source: SIP

3.3 Explaining income-related mental health inequalities and the changes over time

3.3.1 Self-reported anxiety

While there was no significant increase in the prevalence of self-reported anxiety between 1994 and 2011, income-related inequality in self-reported anxiety nearly three-folded from a RCI of -0.0615 in 1994 to a RCI of -0.180 in 2011, a significantly increased concentration of self-reported anxiety among the poor. The Oaxaca-Blinder decomposition results, which are presented in table 6, show that distributional changes in the population characteristics we study does not explain this increase (the explained part is non-significant). Some of the explanatory factors are however associated with the RCI of self-reported anxiety. Welfare share in municipality of residence in 1994 ($\gamma = -0.0362$), non-labour participation in 2011 ($\gamma = -0.340$), as well as high education in both years ($\gamma_{1994} = -0.107$, $\gamma_{2011} = -0.0899$), are negatively associated with the RCI (associated with an increased concentration of anxiety among the poor) (see table 6, columns 3 and 4). Increasing age is positively associated with the RCI (associated with a decreased concentration of anxiety among the poor) in 2011 ($\gamma = 0.00548$), moreover is social isolation positively associated with the RCI in 1994 ($\gamma = 0.297$) and negatively associated with the RCI in 2011 ($\gamma = -0.315$).

For the detailed decomposition results the increasing mean age explains an increase in the RCI of 0.0095 (decreased inequality) (see table 6, column, 5). To clarify, income-related inequality in self-reported anxiety has indeed increased over the study period, *but* if we look at only the impact of increasing age on the inequality, it would explain a decrease in inequality. An increase in the proportion of high educated individuals in the population explains a decrease in the RCI of -0.0119 (increased inequality). The association between income-related inequality in self-reported anxiety and non-labour force participation has increased over time which is related to a decrease in RCI of -0.0246 (increased inequality). Similarly, it appears as though the impact of social isolation on income-related inequality in self-reported anxiety also has increased, contributing to a decrease in RCI of -0.0127 (increased inequality). The negative association of welfare share on income-related inequality in self-reported anxiety appear to have disappeared over the study period, the contribution of this change is related to an increase in the RCI of 0.291, that is a decrease in inequality. Important to note is that we rank individuals by disposable family income, since non-labour

force participation is defined as zero labour income, it is by design highly correlated with the outcome variable.

Table 6 OB-decomposition of inequalities in self-reported anxiety

Panel A: Overall decomposition

VARIABLES	RCI 1994	RCI 2011	Difference		Explained	Unexplained
<i>self-reported anxiety</i>	-0.0615***	-0.180***	-0.119***		-0.0495	-0.0693
	(0.0215)	(0.0245)	(0.0326)		(0.0500)	(0.0595)
Panel B: Detailed decomposition						
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Mean 1994	Mean 2011	γ 1994	γ 2011	Explained	Unexplained
<i>Sex (female)</i>	0.508	0.524	0.0111	0.0376	0.000604	0.0135
	(0.500)	(0.500)	(0.0429)	(0.0491)	(0.000936)	(0.0331)
<i>Age (0=31 yrs)</i>	15.40	17.14	-0.000	0.00548*	0.00950*	0.0859
	(9.332)	(9.923)	(0.00313)	(0.00323)	(0.00578)	(0.0693)
<i>Education <10 yrs</i>	0.239	0.101	-0.0907	-0.117	0.0161	-0.00618
	(0.427)	(0.301)	(0.0558)	(0.0865)	(0.0120)	(0.0246)
<i>Education >12 yrs</i>	0.317	0.449	-0.107**	-0.0899*	-0.0119*	0.00551
	(0.465)	(0.498)	(0.0506)	(0.0524)	(0.00701)	(0.0231)
<i>Marital status (married)</i>	0.643	0.547	0.0433	0.0137	-0.00131	-0.0190
	(0.479)	(0.498)	(0.0459)	(0.0504)	(0.00481)	(0.0438)
<i>Foreign-born</i>	0.122	0.159	-0.129*	-0.0783	-0.00294	0.00624
	(0.327)	(0.366)	(0.0719)	(0.0784)	(0.00303)	(0.0130)
<i>Foreign-born parents</i>	0.00846	0.0253	-0.289	0.152	0.00255	0.00372
	(0.0916)	(0.157)	(0.235)	(0.156)	(0.00268)	(0.00249)
<i>Non-labour participation</i>	0.0899	0.0896	-0.0666	-0.340***	7.99e-05	-0.0246**
	(0.286)	(0.286)	(0.0786)	(0.0897)	(0.00261)	(0.0108)
<i>Social Isolation</i>	0.0207	0.0183	0.297*	-0.315*	0.000735	-0.0127**
	(0.142)	(0.134)	(0.154)	(0.184)	(0.00124)	(0.00520)
<i>Welfare share</i>	4.250	2.452	-0.0362***	0.0323	-0.0581	0.291**
	(1.667)	(0.986)	(0.0130)	(0.0249)	(0.0448)	(0.120)
<i>Mother >9 yrs education</i>	0.184	0.370	0.000908	-0.00924	-0.00171	-0.00187
	(0.388)	(0.483)	(0.0648)	(0.0709)	(0.0131)	(0.0177)
<i>Father >9 yrs education</i>	0.152	0.276	0.0410	-0.0199	-0.00248	-0.00925
	(0.359)	(0.447)	(0.0744)	(0.0807)	(0.0100)	(0.0167)
<i>Constant</i>			0.141	-0.288**		-0.429***
			(0.0883)	(0.115)		(0.145)
<i>Observations</i>	3,193	2,454	3,193	2,454	5,647	5,647
<i>R-squared</i>			0.010	0.013		

Note: In table 6, the results from the Oaxaca-Blinder decomposition are presented. The overall decomposition results (panel A) show the change in the RCI of income-related inequality in self-reported anxiety between 1994 and 2011, the contribution of overall changes in the distribution of the selected socioeconomic and demographic factors among the population (explained), and the contribution of overall changes in the coefficients of these factors (unexplained). The detailed decomposition results (panel B) show mean of each variable (columns 1 and 2), the regression estimates from eq. 5 for each variable (linear probability model) (columns 3 and 4), how a distributional change in each variable has contributed to a change in the RCI (explained), and how a change in the association between each variable and the RCI has contributed to a change in the RCI (unexplained). We controlled for missing information on foreign background and parent's education. Age is continuous in years, 0=31 years. Secondary education (10-12 years of schooling) is reference group for education. Welfare share is continuous in percentage points. Standard errors in parentheses, ***p<0.01, **p<0.05, *p<0.1. Source: Living Conditions Survey

3.3.2 Psychiatric inpatient diagnosis

Income-related inequality in psychiatric inpatient diagnosis increased from a RCI of -0.257 in 1994 to a RCI of -0.390 in 2011, a significant increase in inequality of -0.133. While the rate of increase for inequality is slower than for the previous mental ill-health indicator, the RCI for inpatient diagnosis is twice as high as the RCI for self-reported anxiety in 2011. The Oaxaca-Blinder decomposition results which are presented in table 7, show that almost one-sixth of the increase in inequality, -0.0202, is explained by changes in population characteristics. Thus, the unexplained part (changes in the coefficients of these characteristics) contributes to an increase of -0.113.

All of the explanatory factors are associated with the RCI of psychiatric inpatient diagnosis. Female gender, being married and foreign born positively associated with the RCI of inpatient diagnosis (associated with a decreased concentration of diagnosis among the poor), while the other characteristics are associated with an increased concentration of diagnosis among the poor (see table 7, columns 3 and 4). Having foreign born parents and mothers with more than 9 years of schooling is only associated with income-related inequality in inpatient diagnosis in 2011, welfare share in municipality of residence only in 1994.

For the detailed decomposition results of each explanatory factor we find that distributional changes in most of these explain (small) increases in inequality (see table 7, column 5). A decreasing proportion of low educated individuals and an increasing proportion of foreign born individuals are instead related to (small) decreases in income-related inequality in inpatient diagnosis.

A changing association between the RCI of inpatient diagnosis and almost all of the explanatory variables contribute significantly to changes in income-related inequalities in inpatient diagnosis (except foreign born parents and mother's education level). The changing impact of being a woman, low educated and married has contributed to increased inequality. The changing impact of age, welfare share in municipality of residence, high education, foreign born, non-labour force participation and having a father with more than 9 years of schooling have contributed to decreased inequality, the last four factors of negligible size.

Table 7 OB-decomposition psychiatric inpatient diagnosis inequality

Panel A: Overall decomposition

	RCI 1994	RCI 2011	Difference		Explained	Unexplained
<i>Inpatient diagnosis</i>	-0.257***	-0.390***	-0.133***		-0.0202***	-0.113***
	(0.00342)	(0.00300)	(0.00455)		(0.00560)	(0.00721)
Panel B: Detailed decomposition						
	(1)	(2)	(3)	(4)	(5)	(6)
<i>VARIABLES</i>	Mean 1994	Mean 2011	γ 1994	γ 2011	Explained	Unexplained
<i>Sex (female)</i>	0.495	0.495	0.0755***	0.0340***	1.09e-06	-0.0205***
	(0.500)	(0.500)	(0.00686)	(0.00603)	(1.22e-05)	(0.00452)
<i>Age (0=31 yrs)</i>	15.47	16.44	-0.00822***	-0.00459***	-0.00443***	0.0561***
	(9.347)	(9.687)	(0.000512)	(0.000396)	(0.000384)	(0.0100)
<i>Education <10 yrs</i>	0.308	0.145	-0.00543	-0.0517***	0.00841***	-0.0143***
	(0.462)	(0.352)	(0.00831)	(0.00920)	(0.00150)	(0.00382)
<i>Education >12 yrs</i>	0.250	0.384	-0.0514***	-0.0115*	-0.00154*	0.00998***
	(0.433)	(0.486)	(0.00870)	(0.00669)	(0.000899)	(0.00274)
<i>Marital status (married)</i>	0.617	0.502	0.134***	0.0502***	-0.00575***	-0.0515***
	(0.486)	(0.500)	(0.00723)	(0.00614)	(0.000703)	(0.00585)
<i>Foreign-born</i>	0.118	0.178	0.0938***	0.148***	0.00889***	0.00648***
	(0.323)	(0.383)	(0.0133)	(0.0142)	(0.000849)	(0.00230)
<i>Foreign-born parents</i>	0.0107	0.0267	-0.00104	-0.0311*	-0.000497*	-0.000322
	(0.103)	(0.161)	(0.0335)	(0.0188)	(0.000300)	(0.000410)
<i>Non-labour participation</i>	0.102	0.124	-0.317***	-0.264***	-0.00584***	0.00535***
	(0.302)	(0.329)	(0.0119)	(0.00957)	(0.000220)	(0.00155)
<i>Welfare share</i>	4.077	2.541	-0.00817***	-0.000334	0.000513	0.0319**
	(1.467)	(1.000)	(0.00238)	(0.00302)	(0.00464)	(0.0157)
<i>Mother >9 yrs education</i>	0.177	0.368	-0.00858	-0.0211**	-0.00405**	-0.00223
	(0.382)	(0.482)	(0.0106)	(0.00849)	(0.00162)	(0.00240)
<i>Father >9 yrs education</i>	0.151	0.274	-0.0594***	-0.0170*	-0.00209*	0.00639***
	(0.358)	(0.446)	(0.0121)	(0.00957)	(0.00118)	(0.00232)
<i>Constant</i>			-0.166***	-0.361***		-0.195***
			(0.0145)	(0.0135)		(0.0198)
<i>Observations</i>	3,660,610	4,096,793	3,660,610	4,096,793	7,757,403	7,757,403
<i>R-squared</i>			0.001	0.001		

Note: In table 7 the results from the Oaxaca-Blinder decomposition are presented. The overall decomposition results (panel A) show the change in the RCI of income-related inequality in psychiatric inpatient diagnosis between 1994 and 2011, the contribution of overall changes in the distribution of the selected socioeconomic and demographic factors among the population (explained), and the contribution of overall changes in the coefficients of these factors (unexplained). The detailed decomposition results (panel B) show mean of each variable (columns 1 and 2), the regression estimates from eq. 5 for each variable (linear probability model) (columns 3 and 4), how a distributional change in each variable has contributed to a change in the RCI (explained), and how a change in the association between each variable and the RCI has contributed to a change in the RCI (unexplained). We controlled for missing information on foreign background and parent's education. Age is continuous in years, 0=31 years. Secondary education (10-12 years of schooling) is reference group for education. Welfare share is continuous in percentage points. Standard errors in parentheses, ***p<0.01, **p<0.05, *p<0.1. Source: SIP

3.3.3 Psychiatric outpatient diagnosis

Psychiatric outpatient diagnosis rates nearly six-folded over the period between 2001 and 2011. During the same period the inequality in outpatient diagnosis increased from a RCI of 0.208 in 2001 to a RCI of 0.333 in 2011. The Oaxaca-Blinder decomposition results, which are presented in table 8, show that this increase in inequality is not explained by changes in population characteristics. In fact, changes in population characteristics would actually explain a (small) decrease in inequality (increase in the RCI of 0.00739). The unexplained part, that is the impact of changes in the associations between income-related inequality in outpatient diagnosis and the explanatory factors, contributes to an increase in inequality (decrease in the RCI of -0.132).

Income-related inequalities in outpatient diagnosis are significantly associated with most of the population characteristics we have chosen to study. Similarly as for inequalities in *inpatient* diagnosis, female gender, being married and foreign born are positively associated with the RCI (decreased inequality). High education is also associated with decreased inequality in 2011, but the results imply that this relationship has changed over the study period. Age, non-labour participation, welfare share, low education (only in 2011) and parents years of schooling (only in 1994), are associated with decreased RCI (increased inequality).

The detailed decomposition shows that increased education levels, a larger share of foreign born individuals in the population, as well as changes in the municipalities welfare shares, explain decreases in income-related inequalities in psychiatric outpatient diagnosis. An increasing share of females also explain a significant (yet small) decrease in inequality. Increasing age and non-labour force participation, as well as decreases in marriage rates explain increasing inequality.

A changing association between the RCI of outpatient diagnosis and most of the explanatory variables contribute significantly to changes in income-related inequalities in outpatient diagnosis. The changing impact of being a woman, high educated, foreign born, having a father with more than 9 years of schooling and the municipal welfare share has contributed to decreased inequality. The changing impact of age, low education and non-labour force participation has contributed to decreased inequality, the contribution of the last two factors was however small.

Table 8 OB-decomposition psychiatric outpatient diagnosis inequality

Panel A: Overall decomposition

	RCI 2001	RCI 2011	Difference		Explained	Unexplained
<i>Outpatient diagnosis</i>	-0.208*** (0.00378)	-0.333*** (0.00152)	-0.124*** (0.00407)		0.00729*** (0.00122)	-0.132*** (0.00425)
Panel B: Detailed decomposition						
<i>VARIABLES</i>	(1)	(2)	(7)	(8)	(9)	(10)
	Mean 2001	Mean 2011	γ 2001	γ 2011	Explained	Unexplained
<i>Sex (female)</i>	0.493 (0.500)	0.495 (0.500)	0.0253*** (0.00758)	0.0426*** (0.00305)	7.81e-05*** (1.60e-05)	0.00853** (0.00403)
<i>Age (0=31 yrs)</i>	15.93 (9.594)	16.44 (9.687)	-0.00236*** (0.000523)	-0.00379*** (0.000200)	-0.00194*** (0.000106)	-0.0227** (0.00892)
<i>Education <10 yrs</i>	0.219 (0.414)	0.145 (0.352)	-0.0153 (0.0100)	-0.0378*** (0.00465)	0.00279*** (0.000344)	-0.00494** (0.00242)
<i>Education >12 yrs</i>	0.298 (0.457)	0.384 (0.486)	-0.0150* (0.00896)	0.0284*** (0.00338)	0.00245*** (0.000292)	0.0130*** (0.00286)
<i>Marital status (married)</i>	0.545 (0.498)	0.502 (0.500)	0.0628*** (0.00784)	0.0548*** (0.00310)	-0.00234*** (0.000134)	-0.00434 (0.00460)
<i>Foreign-born</i>	0.139 (0.346)	0.178 (0.383)	0.0291* (0.0163)	0.103*** (0.00717)	0.00409*** (0.000285)	0.0103*** (0.00247)
<i>Foreign-born parents</i>	0.0169 (0.129)	0.0267 (0.161)	-0.0478 (0.0295)	-0.000589 (0.00949)	-5.72e-06 (9.22e-05)	0.000799 (0.000524)
<i>Non-labour participation</i>	0.114 (0.318)	0.124 (0.329)	-0.170*** (0.0124)	-0.240*** (0.00484)	-0.00233*** (7.20e-05)	-0.00797*** (0.00152)
<i>Welfare share</i>	3.162 (1.409)	2.541 (1.000)	-0.0223*** (0.00273)	-0.0119*** (0.00153)	0.00737*** (0.000951)	0.0330*** (0.00990)
<i>Mother >9 yrs education</i>	0.257 (0.437)	0.368 (0.482)	-0.0221** (0.0107)	-0.00530 (0.00429)	-0.000593 (0.000480)	0.00430 (0.00296)
<i>Father >9 yrs education</i>	0.201 (0.401)	0.274 (0.446)	-0.0398*** (0.0124)	-0.00630 (0.00484)	-0.000459 (0.000353)	0.00673** (0.00268)
<i>Constant</i>			-0.103*** (0.0149)	-0.320*** (0.00683)		-0.217*** (0.0164)
<i>Observations</i>	3,979,501	4,096,793	3,979,501	4,096,793	8,076,294	8,076,294
<i>R-squared</i>			0.000	0.002		

Note: In table 8, the results from the Oaxaca-Blinder decomposition are presented. The overall decomposition results (panel A) show the change in the RCI of income-related inequality in psychiatric outpatient diagnosis between 2001 and 2011, the contribution of overall changes in the distribution of the selected socioeconomic and demographic factors among the population (explained), and the contribution of overall changes in the coefficients of these factors (unexplained). The detailed decomposition results (panel B) show mean of each variable (columns 1 and 2), the regression estimates from eq. 5 for each variable (linear probability model) (columns 3 and 4), how a distributional change in each variable has contributed to a change in the RCI (explained), and how a change in the association between each variable and the RCI has contributed to a change in the RCI (unexplained). We controlled for missing information on foreign background and parent's education. Age is continuous in years, 0=31 years. Secondary education (10-12 years of schooling) is reference group for education. Welfare share is continuous in percentage points. Standard errors in parentheses, ***p<0.01, **p<0.05, *p<0.1. Source: SIP

3.3.4 Suicide

Our results show that while the suicide rate decreased from a rate of around 19 per 100,000 in 1994 to around 15 per 100,000 in 2011, the income-related inequality in suicide increased from a RCI of -0.114 in 1994 to a RCI of -0.217 in 2011, a significant increase in inequality of -0.103. Thus, whilst the suicide rate decreased, the reduction was not equal among all socioeconomic groups. The Oaxaca-Blinder decomposition results, presented in table 9, show that changes in the distribution of population characteristics significantly explain the increase in suicide inequality.

Being foreign born is positively associated with the RCI of income-related inequality in suicide (decreased inequality) (see table 9, columns 3 and 4). Interestingly we find that our other indicator for foreign background, having foreign born parents, go in the opposite direction and is negatively associated with the RCI (increased inequality), at least in 2011. Non-labour force participation is, as for all the other indicators of mental ill-health, associated with increased inequalities in suicide. Mother's years of schooling is associated with increased suicide inequality, only in 1994. Moreover, the welfare shares in municipalities of residence are positively associated with the RCI of suicide (decreased inequality).

The detailed decomposition shows that an increased proportion of foreign born explain decreased inequality (see table 9, column 5). Again, this is taking into account only the effect of a distributional change of those foreign born in the population, inequalities in suicide have indeed increased. Increased proportions of those with foreign born parents and those not participating in the labour force have contributed to increases in income-related inequality in suicide. For welfare share in municipalities of residence, the results imply that a distributional shift in these explain an increase in inequality, however, the changing association between the municipal welfare shares and income-related inequalities in suicide contributes to decreased inequality (see table 9, column 6). Moreover, the association between income-related suicide inequality and non-labour participation has changed, contributing to increased suicide inequality.

Table 9 OB-decomposition of suicide inequality

Panel A: Overall decomposition

	RCI 1994	RCI 2011	Difference		Explained	Unexplained
<i>Suicide</i>	-0.114***	-0.217***	-0.103***		-0.109**	0.00587
	(0.0208)	(0.0228)	(0.0309)		(0.0426)	(0.0526)
Panel B: Detailed decomposition						
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Mean 1994	Mean 2011	γ 1994	γ 2011	Explained	Unexplained
<i>Sex (female)</i>	0.495	0.495	0.00794	-0.0656	-2.10e-06	-0.0364
	(0.500)	(0.500)	(0.0417)	(0.0459)	(2.36e-05)	(0.0307)
<i>Age</i>	15.47	16.44	-0.00461	-0.000280	-0.000270	0.0670
	(9.347)	(9.687)	(0.00311)	(0.00301)	(0.00291)	(0.0670)
<i>Education <10 yrs</i>	0.308	0.145	-0.0764	0.00313	-0.000509	0.0245
	(0.462)	(0.352)	(0.0505)	(0.0700)	(0.0114)	(0.0266)
<i>Education >12 yrs</i>	0.250	0.384	-0.0330	-0.0285	-0.00383	0.00114
	(0.433)	(0.486)	(0.0529)	(0.0509)	(0.00684)	(0.0183)
<i>Marital status (married)</i>	0.617	0.502	0.0560	0.0524	-0.00601	-0.00220
	(0.486)	(0.500)	(0.0439)	(0.0467)	(0.00535)	(0.0395)
<i>Foreign-born</i>	0.118	0.178	0.171**	0.204*	0.0122*	0.00393
	(0.323)	(0.383)	(0.0807)	(0.108)	(0.00646)	(0.0160)
<i>Foreign-born parents</i>	0.0107	0.0267	-0.0423	-0.333**	-0.00532**	-0.00311
	(0.103)	(0.161)	(0.203)	(0.143)	(0.00228)	(0.00265)
<i>Non-labour participation</i>	0.102	0.124	-0.280***	-0.705***	-0.0156***	-0.0433***
	(0.302)	(0.329)	(0.0720)	(0.0728)	(0.00162)	(0.0104)
<i>Welfare share</i>	4.077	2.541	-0.0180	0.0399*	-0.0613*	0.236**
	(1.467)	(1.000)	(0.0145)	(0.0230)	(0.0353)	(0.111)
<i>Mother >9 yrs education</i>	0.177	0.368	-0.107*	-0.0768	-0.0147	0.00538
	(0.382)	(0.482)	(0.0642)	(0.0646)	(0.0124)	(0.0161)
<i>Father >9 yrs education</i>	0.151	0.274	0.0278	-0.0119	-0.00147	-0.00598
	(0.358)	(0.446)	(0.0735)	(0.0728)	(0.00897)	(0.0156)
<i>Constant</i>			0.0469	-0.235**		-0.282**
			(0.0881)	(0.103)		(0.135)
<i>Observations</i>	3,660,610	4,096,793	3,660,610	4,096,793	7,757,403	7,757,403
<i>R-squared</i>			0.000	0.000		

Note: In table 9, the results from the Oaxaca-Blinder decomposition are presented. The overall decomposition results (panel A) show the change in the RCI of income-related inequality in suicide between 1994 and 2011, the contribution of overall changes in the distribution of the selected socioeconomic and demographic factors among the population (explained), and the contribution of overall changes in the coefficients of these factors (unexplained). The detailed decomposition results (panel B) show mean of each variable (columns 1 and 2), the regression estimates from eq. 5 for each variable (linear probability model) (columns 3 and 4), how a distributional change in each variable has contributed to a change in the RCI (explained), and how a change in the association between each variable and the RCI has contributed to a change in the RCI (unexplained). We controlled for missing information on foreign background and parent's education. Age is continuous in years, 0=31 years. Secondary education (10-12 years of schooling) is reference group for education. Welfare share is continuous in percentage points. Standard errors in parentheses, ***p<0.01, **p<0.05, *p<0.1. Source: SIP

4 Sensitivity analysis

4.1 Alternative socioeconomic ranking variables

In order to assess the sensitivity of our results to the choice of socioeconomic ranking variable, in this section, we present relative inequalities for all the indicators of mental ill-health using: 1) equivalised household disposable income (as used in the main analyses); 2) own education (by seven education levels), and 3) father's education (by seven education levels), separately as ranking variables in figures 17-20. These results suggest that the level of inequality in a given year is sensitive to the choice of socioeconomic ranking variable. It is highest when using household disposable income, lower when using individual's own education level and lower again when using father's level of education. In fact, when using father's education level as a proxy of SES, the concentration indices for relative inequalities in mental health are between 0 and +0.1 for all mental ill-health indicators. Thus, there are relatively small inequalities in mental health based on father's education level, and a slightly larger concentration of mental ill-health among those with higher SES (based on father's education). Important to note is that father's education was observed for less than half of the individuals from SIP and a third of the individuals in ULF. It is possible that there is unobserved heterogeneity between those with and without information on father's education level. Divergence between the different ranking variables is smallest for inequalities in self-reported anxiety (see figure 17). Income-related inequalities in suicide are moreover similar to education-related inequalities in suicide, but there is a large gap to inequalities based on father's education level (see figure 20). The trends in inequality are less affected by choice of socioeconomic ranking variable. According to all three measures of SES, self-reported anxiety has become more concentrated amongst those with lower SES. Income-related and education-related inequalities in in- and outpatient diagnosis and suicide all increase over the study period, while inequalities based on father's education are more stable over time (or even decrease slightly as for inpatient diagnosis, see figure 18).

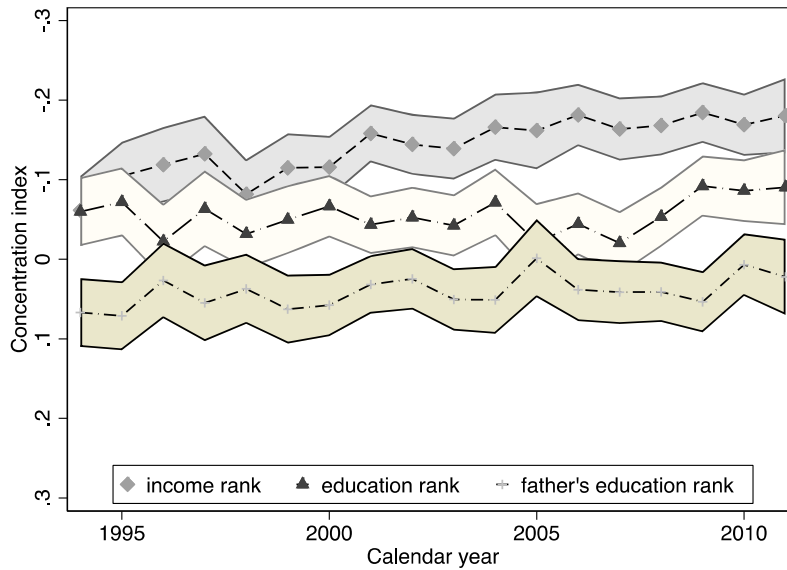


Figure 17 Inequality in self-reported anxiety by different socioeconomic ranks

Notes: In this figure, the concentration index of socioeconomic-related inequality in self-reported anxiety is plotted between the years 1994 and 2011 for individuals aged 31-64 years. Socioeconomic status is ranked by family disposable income, own education level and father's education level. 0 = no inequality, -1 = all cases of self-reported anxiety are concentrated in individuals with lowest socioeconomic rank. A more negative RCI value therefore equals greater inequality (note that the y-axis is reversed). 95% confidence intervals are shown as the shaded area. Source: Living Conditions Survey. Own calculations.

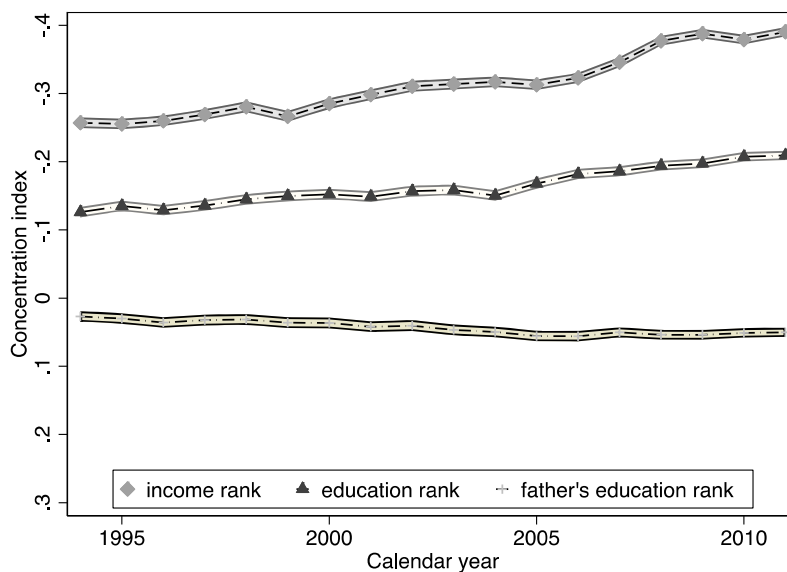


Figure 18 Inequality in psychiatric inpatient diagnosis by different socioeconomic ranks

Notes: In this figure, the concentration index of socioeconomic-related inequality in psychiatric inpatient diagnosis is plotted between the years 1994 and 2011 for individuals aged 31-64 years. Socioeconomic status is ranked by family disposable income, own education level and father's education level. 0 = no inequality, -1 = all cases of diagnosis are concentrated in individuals with lowest socioeconomic rank. A more negative RCI value therefore equals greater inequality (note that the y-axis is reversed). 95% confidence intervals are shown as the shaded area. Source: SIP. Own calculations.



Figure 19 Inequality in psychiatric outpatient diagnosis by different socioeconomic ranks

Notes: In this figure, the concentration index of socioeconomic-related inequality in psychiatric outpatient diagnosis is plotted between the years 1994 and 2011 for individuals aged 31-64 years. Socioeconomic status is ranked by family disposable income, own education level and father's education level. 0 = no inequality, -1 = all cases of diagnosis are concentrated in individuals with lowest socioeconomic rank. A more negative RCI value therefore equals greater inequality (note that the y-axis is reversed). 95% confidence intervals are shown as the shaded area. Source: SIP. Own calculations.

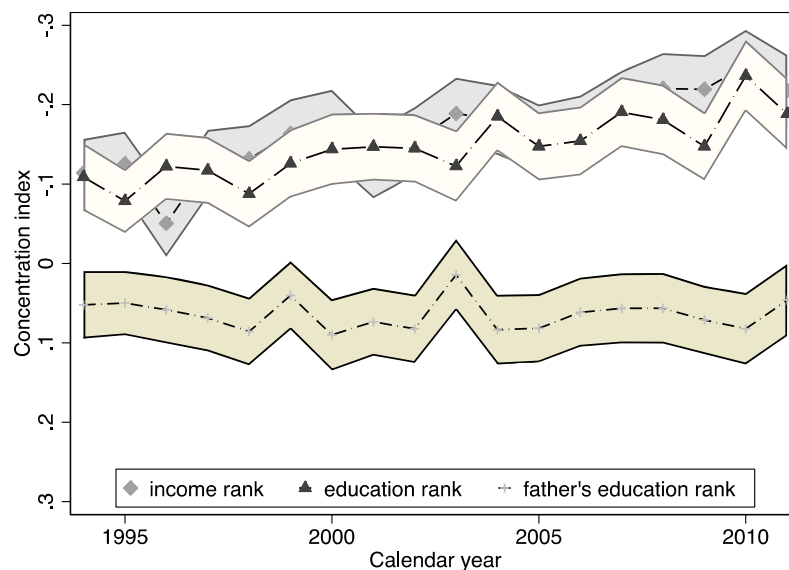


Figure 20 Inequality in suicide by different socioeconomic ranks

Notes: In this figure, the concentration index of socioeconomic-related inequality in suicide is plotted between the years 1994 and 2011 for individuals aged 31-64 years. Socioeconomic status is ranked by family disposable income, own education level and father's education level. 0 = no inequality, -1 = all suicides are concentrated in individuals with lowest socioeconomic rank. A more negative RCI value therefore equals greater inequality (note that the y-axis is reversed). 95% confidence intervals are shown as the shaded area. Source: SIP. Own calculations.

5 Discussion

Our results show that the risk of being diagnosed with a psychiatric diagnosis increased between 1994 and 2011, while the suicide rate decreased. The prevalence of reporting anxiety was similar in 1994 and 2011, but there were large fluctuations in the reporting of anxiety during this period. A substantial increase in self-reported anxiety was noted in the period before 2001, while an increase in psychiatric inpatient diagnosis appears in the subsequent period. Moreover, the largest increase was found in psychiatric outpatient diagnoses, which nearly six-folded between 2001 and 2011. This is interesting because it seems as though the different measures are picking up different trends, and that self-reported anxiety is not necessarily reflective of in- and outpatient diagnosis of anxiety (and the opposite). Our results further show that relative mental health inequalities are substantial, and more importantly, increasing for all mental ill-health indicators. In 2011, more than 30 percent of all self-reported anxiety and suicides, and half of all psychiatric in- and outpatient diagnoses, are concentrated among the poorest fifth of the population. Absolute inequalities are also increasing. In fact, for self-reported anxiety and psychiatric inpatient diagnosis the increase in absolute inequality was even larger than the total increase in level of mental ill-health. This means that the increase was entirely driven by the poorer population and that self-reported anxiety and inpatient diagnosis even decreased among the richer population.

Self-reported anxiety and psychiatric diagnoses indeed depend on level of mental ill-health among the population. However, they also depend on attitudes toward reporting mental ill-health and behaviour regarding use of health care services. Worth noting here is also that while we use in- and outpatient diagnosis as indicators of mental ill-health, they also reflect access to health care, that is, if individuals are getting the help they need, which could be seen as something positive. Suicide, in contrast, is a more objective indicator of mental ill-health. If attitudes towards mental ill-health, behaviour regarding help seeking behaviour or even access to care differ between different socioeconomic groups, this could also be reflected in the different outcomes. Inequalities are greatest for psychiatric inpatient diagnoses, followed by inequalities in outpatient diagnosis, suicide and self-reported anxiety. These findings show that inequalities are greater for serious mental ill-health which require hospitalisation, which could imply there is no inequality in access to health care.

Our aim was to try to explain the changes in mental ill-health and its inequalities, in terms of changes in some selected socioeconomic and demographic characteristics. The results show that the Swedish population changed in several ways regarding these characteristics during the study period. For example, the population is slightly older, more educated, less often married and more often have foreign background in 2011 compared to 1994. Labour force participation (measured by positive labour income) decreased, as well as the mean of municipality-level welfare share. Self-reported anxiety did not change significantly between 1994 and 2011, but the inequality increased three-fold. This increase was not explained by changes in population characteristics. Moreover, while the changes in suicide rate are not explained by overall changes in the distribution of characteristics among the population, the increase in suicide inequality (relative) is fully explained by such distributional changes. According to our results an increased proportion of non-labour force participants and individuals with foreign born parents, who are more likely to commit suicide, contribute to increased suicide inequality. The results also suggest that municipal-level welfare shares are related to decreased levels of suicide inequality, and that a decrease in welfare share therefore contributes to large increases in suicide inequality, which seems unlikely. Comparing suicides between two years can be tricky due to relatively few cases and fluctuations between the years, thus some of the results should be interpreted with caution. Both the increase in inpatient diagnosis rate, and its inequality, are partly explained by population changes. For the large increase in outpatient diagnosis a small (yet significant) part is explained by population changes, but the increase in inequality is left unexplained. The decomposition results suggest that the reduction in labour force participation and marital rates over the study period are the most important contributors of increased psychiatric diagnoses, and inequalities therein.

Looking at the detailed decomposition, that is the impact of changes in specific factors, we find that changes in some of these had common (expected) impacts across our mental ill-health measures. For example, the observed increase in education level was expected to contribute to decreases in mental ill-health rates (for all the indicators of mental ill-health). Our results suggest that the impact of increased education levels in Sweden was to stunt the increasing trend in inpatient diagnosis substantially and contribute to the decreasing trend in suicide. However, psychiatric diagnoses became significantly more concentrated among those with less years of schooling, both when comparing mandatory to secondary education level but also when comparing secondary to higher education. This implies that individuals who have less years of schooling are increasingly vulnerable to mental ill-health and, as we also

can see from the sensitivity analysis, education-related inequalities in mental health are indeed growing. Educational attainment in 9th grade has in prior research been linked to mental ill-health among young adults in Sweden (9), our findings suggest that this relationship sustain into working age. Earlier findings also imply that parents education does not matter for children's mental health (7) and adolescent's mental health (8). Interestingly, we find that parent's education (more than 9 years of schooling) is a significant risk factor for inpatient diagnosis (mother's education only in 2011) and outpatient diagnosis in 2011, but not for the other mental ill-health indicators. Perhaps this is an indication that parents' education impact not on mental ill-health but on help seeking behaviour when mentally ill. Even though we are investigating mental ill-health among the working population, it is possible that several of those who are diagnosed with a psychiatric diagnosis had a first contact with health care providers in childhood or young adulthood, which might depend more on parents' education, and that this behaviour has sustained into adulthood.

The proportion foreign born individuals in the population increased by almost a third between 1994 and 2011, which contributed to increases in self-reported anxiety (being a risk factor) and decreases in inpatient diagnosis and suicides (being protective). An increasing proportion of foreign born individuals also contributed to increased outpatient diagnosis rates. The impacts of these distributional changes on actual changes in mental ill-health were quite small but significant and considering a present situation with increased immigration these findings may be of increasing importance. Also interesting to note here is that the association between mental ill-health and foreign background depends largely on how foreign background is defined; by birth country or parents birth country.

Internalizing problems such as mood and anxiety disorders are in general more prevalent among women (14), while suicide deaths are more common among men (31). Our results imply that *all* mental-ill-health indicators are becoming increasingly concentrated among women, thus that the gender gap for internalizing problems is increasing to the disadvantage of women, and the gap between men and women regarding suicide deaths is decreasing. All mental ill-health indicators are also increasingly concentrated among those not participating in the labour force. Non-labour force participation appears to be the single most important contributor of mental ill-health, from the variables we have studied. However, labour force participation is at relatively high risk of being endogenous to the outcome since it is likely that there is a reciprocal relationship between these variables and mental ill-health (reversed

causality). This is true for several of the explanatory factors, while some are fixed, e.g. gender, foreign background, it is possible that health selection in education, labour force participation, social isolation and marriage result in endogenous relationships. There are other limitations in this study. The analyses are based on repeated cross-sections of the population and while this study is performed on reliable register data (SIP), as well as a large representative large sample of the Swedish population (ULF), no causal inference can be drawn from these results. Still, we present interesting and highly relevant results on how the difference in associations between mental ill-health and the selected demographic and socioeconomic characteristics change over time. Moreover, the Oaxaca-Blinder decomposition “explained part” is calculated based on the “assumption” that the coefficients are as they were in 1994. That is, given the association in 1994, the change in the population explains X much change between 1994 and 2011. This is only true for a marginal increase of the certain factor, and several of the associations change substantially over time, even changes direction, which this approach cannot explain. Finally, we can see from the very low R^2 (columns 3 and 4 in tables 2-9) that the selected characteristics do not explain level of mental ill-health and its inequalities very well. This is worth noting, although it has not been our aim to fully explain the levels of mental ill-health and its inequalities, but instead to see how much of the change in these levels can be derived from changes in the selected explanatory factors.

6 Conclusions

In Sweden, psychiatric diagnoses (in- and outpatient) increased substantially amongst 31 - 64 year olds between 1994 and 2011. Self-reported anxiety remained stable and suicides decreased. These results show that the different indicators of mental ill-health are not reflective of each other and how we measure mental ill-health largely affect the conclusions we draw. The mental ill-health indicators which suggest there is an increase in mental ill-health (in- and outpatient diagnosis) partly depend on attitudes, help-seeking behaviour and diagnostic practice. Thus, we cannot say that mental ill-health actually has increased.

It appears as though mental ill-health is becoming increasingly concentrated among some already disadvantaged groups. All mental ill-health indicators are becoming increasingly concentrated among women and among those not participating in the labour force, and psychiatric diagnoses are increasingly concentrated among those lowest educated, further increasing mental health inequalities between these groups. One exception is for suicide where an increased concentration of suicides among women actually decreases gender inequalities in suicide.

Income-related mental health inequalities in Sweden are substantial, and have increased significantly between 1994 and 2011, both regarding absolute and relative inequalities. More than 30 percent of self-reported anxiety and suicides, and half or all psychiatric in- and outpatient diagnoses, are found among the poorest fifth of the population in 2011. Over the same period Sweden has observed a large increase in the average education level of the population aged 31 – 64 years and seen a large increase in individuals either born abroad or with foreign born parents. 2011 was also a high point for joblessness in Sweden after the financial crises and subsequent euro crisis. The decomposition results show that distributional changes in the population fully explain the increase in suicide inequality and partly explain the increase in psychiatric inpatient diagnosis inequality. However, overall, only small changes in the level of mental ill-health and mental health inequalities are explained by changes in the population characteristics we study, which implies that something else is driving the increase.

7 Appendix

Table A1 ICD codes for identification of suicide and psychiatric in- and outpatient diagnoses

<i>ICD-9 (diagnoses until 1997)</i>	<i>ICD code</i>
Schizophrenic disorders	295
Episodic mood disorders	296
Delusional disorders	297
Other non-organic disorders	298
Anxiety, dissociative and somatoform disorders	300
Personality disorders	301
Sexual and gender identity disorders	302
Psychological malfunction arising from mental factors	306
Acute reaction to stress	308
Adjustment reaction	309
Depressive disorders (not elsewhere classified)	311
Suicide and self-inflicted injury	E950-E959
<i>ICD-10 (diagnoses from 1997 and onwards)</i>	<i>ICD code</i>
Schizophrenia, schizotypal and delusional disorders	F20-F29
Mood (affective) disorders	F30-F39
Neurotic, stress-related and somatoform disorders	F40-F49
Disorders of adult personality and behaviour	F60-F69
Intentional self-harm	X60-X84

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