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Income, Inequality, and Geography

Disparities in Age at Death

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Introduction

Throughout the world there is a clear health and mortality gradient by education, social class, and income (Chetty et al. 2016; Hederos et al. 2018; Kondo et al. 2014). It is debated to what extent such a gradient has always existed (see Bengtsson and Dribe 2011; Bengtsson et al. 2020; Chapter 9), but it is well established that socioeconomic health differences have widened in many countries over the past decades (Mackenbach 2019) and thus become a key topic for epidemiologists, sociologists, demographers, and economists.

The idea that income and socioeconomic status are important for people's health and well-being seems reasonable. Having more resources can directly or indirectly allow for different lifestyles and behaviors compared to when resources are scarce, which can in turn have health consequences. At the same time, research shows that the pattern of socioeconomic health disparities is very different when evaluated across countries and societies. Specifically, the slope of the gradient is much steeper in some contexts than others (Beckfield et al. 2013; Vågerö and Lundberg 1989). It was particularly notable early on that the health gradient was more evident in societies that were less equal in economic terms (Bergh 2021; Wilkinson 2001; Wilkinson and Pickett 2009). This pattern gave rise to the so-called *income inequality hypothesis* (IIH) which states that income inequality affects health over and above own socioeconomic status and that income inequality in society is harmful to the health of every individual regardless of whether they are at the top or bottom of the income distribution.[1]

Independent of underlying mechanisms, the idea that income inequality is detrimental for individual health is clearly suggestive. If income differences within society matter for our well-being, progressive and pro-poor transfers could be a way of improving general health both because such economic resources directly can facilitate and improve access to, for example, high-quality healthcare, proper nutrition, and education, but also that such transactions would per se reduce economic inequality. Research in several academic fields

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has studied the relationship between income inequality and health using a plethora of health outcomes and has also asked whether inequality can make us ill. Most studies use population data from which one cannot disentangle the individual impacts of own absolute income, relative income, and income inequality on health outcomes (see Pickett and Wilkinson 2015; Tibber et al. 2021 for reviews).[2] More recent contributions to the literature therefore generally use individual-level data. A recent extensive summary of the state of this research concludes that the evidence is mixed, with a considerable amount of variation across studies (Bergh et al. 2016) present. Many studies using individual-level data find no support for the IIH, although there are several empirical studies suggesting that inequality significantly harms or, in contrast, even improves individual health (Du et al. 2019; Gerdtham and Johannesson 2004; Grönqvist et al. 2012; Jen et al. 2009; Karlsson et al 2010; Zagorski et al. 2014).

One clear pattern in the literature is the assumption about an instant connection between income inequality and health. Studies generally consider a contemporary correlation, assessing income inequality and health outcomes at around the same point in time. A few studies explore the lagged effects of income inequality, suggesting that the association between health and exposure to inequality over a period of up to 15 years is stronger than the association between health and current inequality (Blakely et al. 2000; Kondo et al. 2014; Zheng 2012). However, these cannot follow individuals over time in the sense of successfully identifying the individual's long-term exposure to inequality. Moreover, the health consequences of income inequality may not manifest themselves until after some time, and the long-term effects of income inequality on individual health may be stronger in some periods or life stages than in others. Hence, inequality is either measured with errors or not necessarily measured at stages that really matter for health and which could explain the mixed evidence regarding the IIH. To improve the accuracy and precision of these measurements, we need information about individuals' residence and income over time.

A second pattern in the literature shows that most studies use measures based on income inequality that are aggregated at coarse geographical levels, such as at country, state, or region. Some studies highlight the role of the geographical level (and which level of aggregation regarding inequality that is relevant in evaluating health effects) by examining the relationship between inequality and health in US metropolitan areas and counties, respectively. For example, no relationship between income inequality across metropolitan areas and self-assessed health (Blakely et al. 2002), whereas research focusing on state and county inequality and various self-reported health measures (including insurance status, influenza vaccination, and self-assessed health) found some evidence in line with the IIH (Chen and Crawford 2012). Few studies have focused on the role of local or micro-level inequality in health and longevity. An exception is one study on the role of inequality in self-reported health in the urban capital area of Stockholm which finds some support for the idea that high and very high inequality are detrimental to individual well-being (Rostila et al. 2012).

Local (neighborhood) income inequality may be a relevant aggregation level when studying the implications for individual health (the underlying potential mechanisms are described in detail in this chapter under "Data, Analytical Strategy, and Methods"). In addition, there are advantages in measuring exposure to inequality over a longer period and having the exact information on the individual's residence. The scarcity of appropriate data is the main reason that exposure to income disparities over time and the role of local inequality in health in later life are areas that have been neglected in the literature. To investigate such effects, we need to know an individual's migration history to measure properly their long-term exposure to income inequality together with later-life information on health or mortality, which requires detailed individual residential histories. It also requires geocoded information and adequate income data from historical times.

This chapter brings light to the relationship between income, income inequality, and health in Landskrona, Sweden. We first examine how neighborhood inequality developed over time and study if long-term exposure to local income inequality had an impact on adult mortality. We use detailed geocoded data and evaluate changes and persistence in spatial inequality for the period 1939–1967. This spatial analysis complements the analyses in Chapter 3 on the general trend in income inequality and social mobility in Landskrona across the twentieth century.

Second, we discuss the theoretical relationship between income inequality and mortality and present three interconnected hypotheses. In addition to the IIH, we discuss another two hypotheses. The first is the *absolute income hypothesis* (AIH), which says income is important for how long people live, but the health benefits from higher income lessen over higher levels of income. The second is the *relative income hypothesis* (RIH), which suggests that their economic position may influence a person's health and life span compared to others around them. This means that if someone compares their income to others and feels worse off, it could negatively affect their health.

Finally, we use the information derived in the spatial analysis together with our individual-level data to assess these three hypotheses. The results section summarizes the findings from the empirical analysis, which addresses the question of temporality and locality using the information on characteristics regarding income and income inequality in the neighborhood and age at death. That is, we test the hypothesis that long-term exposure to local inequality can affect adult health and mortality.

We use rich individual-level longitudinal information on income and demographic outcomes, including death, for individuals residing in the town of Landskrona geocoded at the address level (Hedefalk and Dribe 2020). This information provides a unique opportunity to examine the development of spatial inequality and test the relationship between local inequality and mortality. In addition, Landskrona is an interesting case for our purposes. First, the setting allows us to study the development in local inequality and its role in health during a period when income inequality first decreased, then stagnated, and then increased again in less than 30 years. While the underlying processes determining income inequality are generally known to be very stable and change little over time, the Gini coefficient for working-age individuals in Landskrona decreased from 0.44 to 0.25 and then increased again to 0.28 between 1935 and 1965 (see Chapter 3). Second, the socioeconomic mortality gradient in Sweden today has mostly appeared in the post-World War II period, an aspect that has been observed for both social class and income (Bengtsson and Dribe 2011; Bengtsson et al. 2020; Debiasi et al. 2023; see also Chapter 9), making Landskrona a relevant context for testing the AIH as well. This in turn makes it relevant to test the IIH in the Landskrona setting.

Theory

Economic inequality in Landskrona changed markedly over just a few decades in the mid-twentieth century. The analysis in Chapter 3 suggests that inequality significantly declined between 1930 and 1950, followed by almost no changes until the early 1990s. Can such a development have had an impact on people's health and well-being? And what would be the possible explanations for such a relationship? Below we discuss three parallel hypotheses[3] and their related mechanisms that are compatible with a negative association between income inequality and health.

The Income Inequality Hypothesis (IIH)

One explanation for why inequality might vary with health is that every individual suffers when there is an increase in income inequality, regardless of where they stand on the income ladder. This explanatory model is traditionally referred to as the "income inequality hypothesis." Several mechanisms may explain the observed relationship between income inequality and health: social structures, psychological phenomena, monetary factors, and political processes. These mechanisms primarily work at the micro level—among individuals or households—through either individual experience or interpersonal connections. Other mechanisms generally operate at the macro level, where societal structures related to the healthcare system, economic growth, and redistribution of resources matter.

A first possible mechanism relates to trust and social cohesion. Research has demonstrated that societies with high income inequality are often characterized by low levels of trust and confidence between people and by minimal involvement in civic society and social networks (see Jordahl 2007; Putnam 2000). Some believe that significant income differences reduce trust. The reasons are that inequality can be interpreted as a sign that some individuals in society act in unreliable ways and entrench their position at the expense of others, and experimental research also shows that we tend to trust others who are relatively similar to ourselves in terms of, say, income (Coleman 1990; Fukuyama 1995). The link to health is mainly based on psychosocial mechanisms. Trust can increase the individual's sense of security. Access to social networks can affect health when the individual is offered social support in a stressful situation and given access to health-related knowledge (Baum 1999; Kawachi et al. 2008).

A second possible mechanism that may allow income inequality to affect health is that societies with large income disparities often have problems with crime and violence. According to sociological theory, high crime rates go hand in hand with income inequality as those who feel permanently locked into their economic situation experience frustration and alienation. Over time, this feeling of alienation eventually breaks down societal values and results in greater levels of crime (Merton 1968). Economic theory also predicts a positive relationship between economic inequality and property crime. Large income disparities can encourage the view that the expected returns from crime are generally greater than the returns from legal activities (Becker 1968; Ehrlich 1973). Crime and violence can in turn have direct negative health effects on victims of crime as well as trigger mental health problems in others out of fear and concern that they, too, or their loved ones will be exposed to crime and violence (Demombynes and Ozler 2005; Green and Grimsley 2002).

A third possible mechanism relates to policy and the supply of public goods. When high income means greater political power as well, the self-interests of elite groups may dictate which political reforms are implemented (Krugman 1996). In this scenario, tax cuts and the setting of priorities in public healthcare may be more detrimental to the poor than the rich, which may in turn be more detrimental to population health. Even in the context of a democratic political process, healthcare expenditures and the funding of the healthcare system may be related to economic inequality. For example, the richer and poorer may have conflicts of interest regarding how public resources should be used (Alesina et al. 1999; Zweifel et al. 2009).

In summary, the aggregation level of inequality can be crucial for identifying the mechanisms we believe may be at work for the IIH. In our setting, where we examined neighborhood income inequality and its relevance for adult mortality, the most likely mechanisms are the two that mirror either trust and social cohesion or crime and violence. Our assumption is that the political mechanism must be less relevant in this setting since there was surely no large variation in terms of access to public goods or differences in taxation across neighborhoods in Landskrona during the period of our study.

The Relative Income Hypothesis (RIH)

A somewhat different starting point as to why inequality matters for our well-being and health is that people make social comparisons and assess their lives by comparing their social status to that of others. From an economic perspective, we can think of social status in monetary terms and the fact that individuals perceive their place in the "social hierarchy" to be relative to others in the income distribution. The greater the income differences in a society, the more aware people presumably are of their social status in this respect. The social comparisons we make to others who have greater (more visible) economic resources may cause chronic stress, which could in turn give rise to poor physical health over time and consequently also affect mortality. For example, people with a lower income may feel lower self-esteem and greater shame when comparing themselves to wealthier individuals living in the same neighborhood (Wilkinson and Pickett 2009). Social status comparisons could also cause stress by making the individual feel that they are not in control of their life (Marmot et al. 1991).

Consequently, a relative income effect on health may exist, which is referred to in the literature as the "relative income hypothesis." Essential here for individual health and well-being is the difference between an individual's income and the income of a reference group; that is, the individual's income is seen in relation to the average income of others and used by the individual for comparison. According to this hypothesis, an individual who feels that everyone else is becoming better off in terms of their income and economic position while his or her own is unchanged will consequently feel worse off.[4] Hirschman (1973) compared this to a situation in which a driver who is stuck in traffic and sees the cars in the other lanes starting to move forward will become frustrated. The argument that making social comparisons will in turn affect the individual's general health refers to a body of literature on primate health (see, e.g., Sapolsky et al. 1997 on subordinate baboons having higher stress levels than their superiors) and also to experimental research on how the stimulation of anger and frustration gives rise to stress, which in turn has physiological effects.

The RIH is consistent with a negative relationship between income inequality and population health (Wagstaff and van Doorslaer 2000). Thus, the RIH is a competing hypothesis to the IIH and should be tested in parallel. Since the RIH thesis concerns the relationship between an individual's economic position and that of their peers, an appropriate test of the RIH is to see how the average income of the individual's neighborhood affects their health or longevity while also controlling for individual income. Such a test will show how the average income in a neighborhood affects individual health when everyone else, but not the individual him- or herself, on average gets economically better off.

The Absolute Income Hypothesis (AIH)

If health depends on economic resources and if this relationship is nonlinear, then the level of absolute income provides another possible explanation for the negative relationship between inequality and population health. There are several reasons why income matters for health and well-being. First, those with a low income probably cannot afford certain goods that are important for health or, to a lesser extent, cannot consume health services (Deaton 2002). Second, the quality of medical treatment may depend on the ability to pay. Third, income can be relevant to health when a low-paid job is associated with more health risks (e.g., jobs with higher danger or negative exposures). And, last, there may be differences in health-related behaviors between rich and poor, such as smoking, alcohol consumption, diet, and exercise (Östling et al. 2020). It is also likely that health returns to income, regardless of the mechanisms that are driving the relationship, diminish with a rise in income. In other words, one extra dollar given to a deprived individual will increase their health status more than the same extra dollar spent on a rich individual.

Notably, health and well-being may also affect earnings. Individuals with poor health face reduced work opportunities and lower earnings when they are able to work. This is, for example, illustrated in research revealing that hospitalizations among adults lead to subsequent declines in earnings (Dobkin et al. 2018). Moreover, it is crucial to acknowledge that various factors can contribute to both good health and higher income. For instance, self-control or better knowledge of the health production function is a potential third factor that may be associated with income, and more affluent parents may be more inclined to invest in the healthcare of their children while also striving to ensure their economic prosperity. Taken together, it is a difficult task to make causal statements about the relationship between income and health, and systematic empirical evaluations suggest causal effects of income appear to vary over time, space, and context (Lleras-Muney 2022).

To sum up, three parallel hypotheses are compatible with a negative association between income inequality and population health. This implies that they should be tested simultaneously, including all three factors in the same empirical model.

Data and Methods

Data

We used the Scanian Economic-Demographic Database (SEDD) with individual-level longitudinal data for Landskrona (Bengtsson et al. 2021; see also Chapter 1). The database includes annual information on income, occupation, and mortality for all individuals and their families in Landskrona during 1939–1967. For the same period, we also have geocoded the residential histories of the entire population of Landskrona at the address level (Hedefalk and Dribe 2020). Because each move has been traced within the city boundaries, we have continuous information about an individual's place of residence at a very detailed geographic level (Figure 10.1). In addition, individuals have been linked with accuracy to the buildings where they resided because the start and end dates of the buildings and streets in Landskrona are known.[5]

Our first step was to describe the pattern and development of spatial inequality over time in Landskrona. Next, we tested the three hypotheses regarding income, income inequality, and mortality (the AIH, RIH, IIH). To do so, we focused on two mortality outcomes: early-adulthood death (dying before age 50) and dying before the life expectancy of the cohorts studied (age 70) (see Dribe and Eriksson 2023). We observed and followed the individuals who were present in Landskrona between 1939 and 1967 and aged between 18 and 70 years.

We used total annual income at the family level, which was derived as the equivalized family income for each family *j* in a given year *t*. This method of equivalence follows the guidelines of the Organisation for Economic Co-operation and Development (OECD) adopted in most studies dealing with family poverty and economic inequality and helps us understand how much income a family has available to meet their basic needs (Brea-Martinez et al., 2023). It considers the family's size and income accordingly so we can compare the financial situations of different families more accurately (OECD 2011).

$$\textit{Equivalized family income}_{jt} = \Sigma\left(\textit{income}\right)_{jt} / \sqrt{\left[\Sigma\left(\textit{size}\right)_{jt}\right]} \qquad (10.1)$$

The descriptive results display Landskrona's evolving demographic and economic spatial patterns for the study period (see Table 10.1). We present three indicators by 250 m^2 grids for 6 benchmark years covering (1) neighborhood population density, (2) average family income per neighborhood, and (3) the annual within-neighborhood Gini coefficient.[6]

We analyzed the adult long-term exposure to inequality by using the income information in two ways. First, to study mortality before age 50, we followed

Table 10.1 Descriptive statistics of the variables used in the logistic regressions.

Sample P(mortality before age 50): exposure ages 18–50					
Variables	**N**	**Mean**	**SD**	**Min**	**Max**
Deaths before age 50 (percent)	9,337	5		0	100
Ln average family inc.	9,088	9.84	0.74	3.5	12.68
Ln average grid income	9,337	9.78	0.51	6.49	11.49
Average grid Gini	9,337	0.33	0.05	0.01	0.66
Women (percent)	9,337	50		0	100
Birth year	9,337	1904	8.54	1888	1947
Maximum HISCLASS	9,337	3.85	1.81	1	7
Born in Landskrona (percent)	9,337	42		0	100
N of observations	9,337	13.74	7.86	1	29
Sample P(mortality before age 70): exposure ages 18–70					
Variables	**N**	**Mean**	**SD**	**Min**	**Max**
Deaths before age 70 (percent)	6,103	33		0	100
Ln average family inc.	5,843	9.63	0.83	5.7	12.83
Ln average grid income	6,103	9.82	0.46	6.77	11.73
Average grid Gini	6,103	0.33	0.05	0.02	0.62
Women (percent)	6,103	52		0	100
Birth year	6,103	1889	12.03	1868	1947
Maximum HISCLASS	6,103	4.17	1.94	1	7
Born in Landskrona (percent)	6,103	38		0	100
N of observations	6,103	15.17	7.77	1	29

Source: Own calculations based on Scanian Economic-Demographic Database (SEDD) (Bengtsson et al. 2021).

those individuals living in Landskrona between 1939 and 1967 from age 18 either until death before age 50 or until they were censored from our study on turning 50. We then repeated the procedure for individuals aged 18–70.

In examining the AIH, we averaged the annual family income for each individual studied over the period of observation (aged 18–49 or 18–69). In addition, we averaged the annual family income by neighborhood to examine the RIH. We averaged the income of all neighborhoods in which the individual resided during the period of observation. Finally, we examined the IIH by calculating the within-municipality Gini coefficient for each year and averaged this for the individual's period of observation by the neighborhood in which they lived.

In the regressions we used basic demographic and socioeconomic controls. The control variables were gender, year of birth, the total number of observations of the individual, the highest social class achieved in the period of observation (using HISCLASS), and whether the individual was born in Landskrona. Table 10.1 presents the descriptive statistics for all variables.

We were interested in the individual's long-term and cumulative exposure to income inequality at the neighborhood level, so the data used has a pooled format that merges all individuals' observations into only one, averaging all the characteristics from individuals. In this regard, we can capture the cumulative health exposure of people across their adult life. We used logistic regressions to model the probability of dying before ages 50 and 70, respectively. We display the results in terms of average marginal effects to make correct comparisons across subsamples (Mood 2010). The modeling strategy has been done stepwise. First, we included a regression model with sociodemographic controls and the averaged family income (for testing AIH). Next, we added the average neighborhood income (for testing RIH), and finally, we included the averaged neighborhood annual Gini coefficient (for testing IIH). We estimated the models for both men and women together and separately to capture possible gender differences in the association between income, relative income, income inequality, and health.

Results

Descriptive Results

Figure 10.1 displays the evolving population density by neighborhood in Landskrona for 6 benchmark years (1940, 1945, 1950, 1955, 1960, and 1965). The colors scaled from light (lower levels) to dark (higher levels) were classified using sextiles and represent each neighborhood's population density over time. Moreover, the maps show reference points for the city's main square, secondary

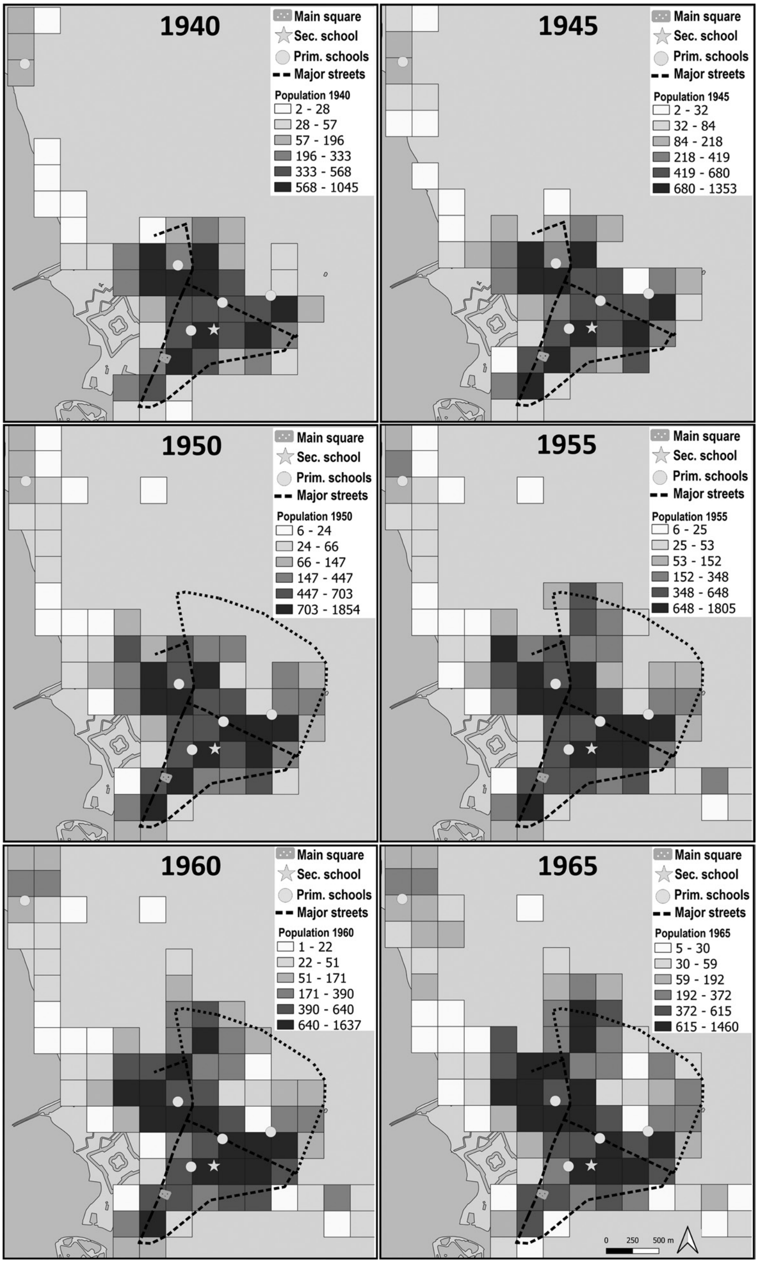

Figure 10.1 Population in Landskrona by 250 m^2 grids in six different years (1940–1965).

Quantiles (sextiles) are used to group the population values. Only populated grid-cells are shown in the maps.

Source: Own calculations based on Scanian Economic-Demographic Database (SEDD) (Bengtsson et al. 2021).

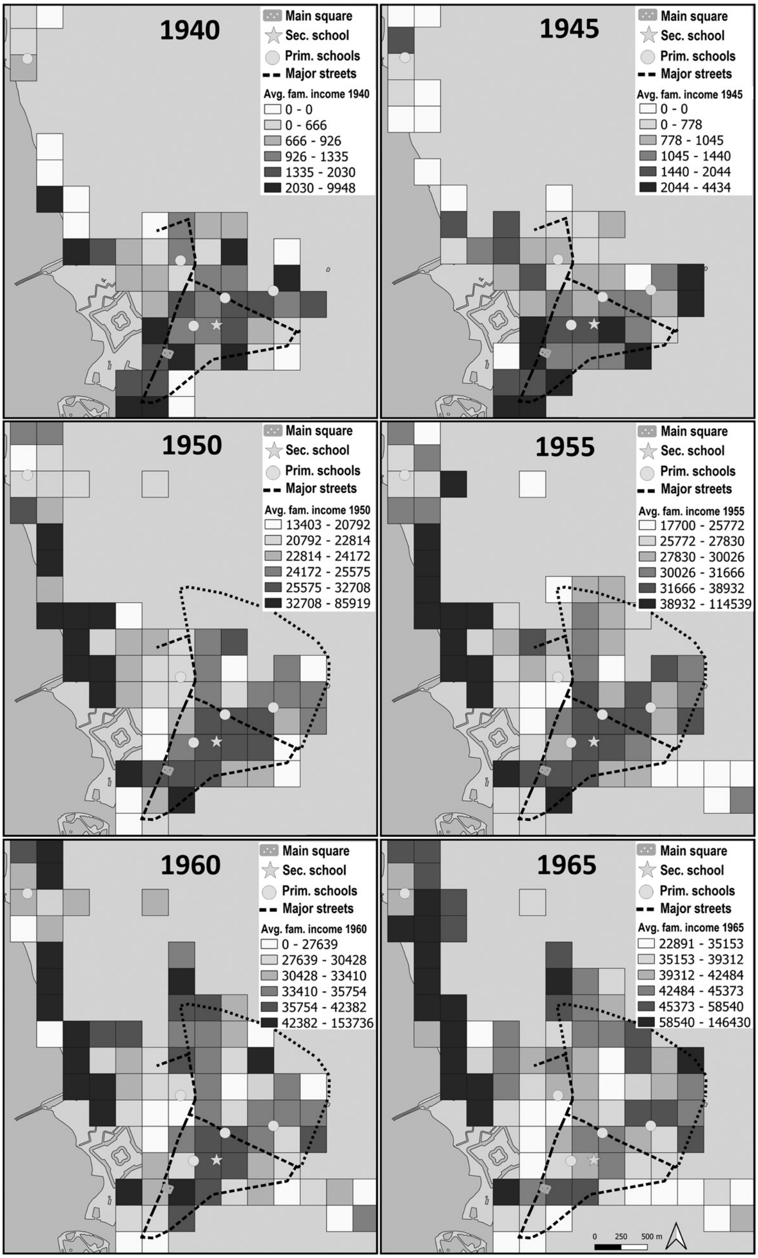

Figure 10.2 Mean family income in Landskrona by 250 m^2 grids in six different years (1940–1965).

Quantiles (sextiles) are used to group the mean family income values. Only populated grid-cells are shown in the maps.

Source: Own calculations based on Scanian Economic-Demographic Database (SEDD) (Bengtsson et al. 2021).

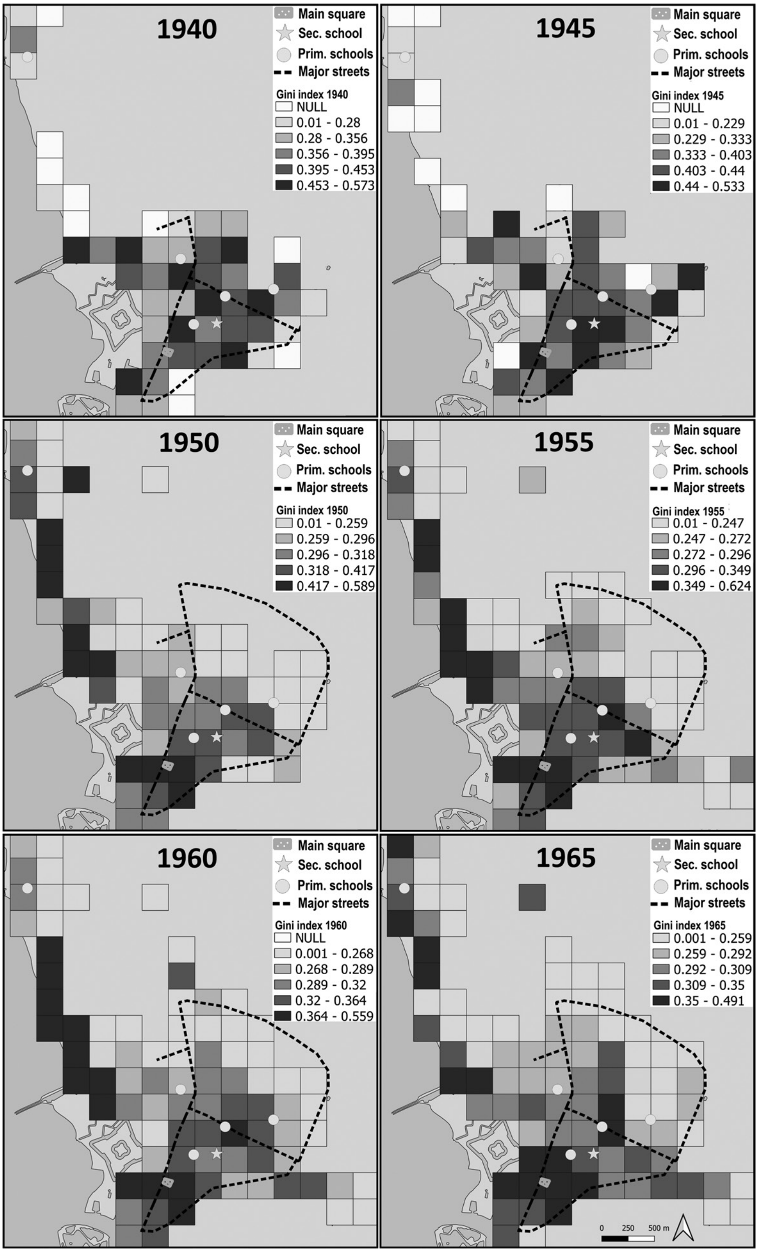

Figure 10.3 Gini index in Landskrona by 250 m^2 grids in six different years (1940–1965).

Quantiles (quintiles) are used to group the Gini coefficients. Populated grid cells that have a missing Gini index (due zero mean family income) belong to the NULL group.

Source: Own calculations based on Scanian Economic-Demographic Database (SEDD) (Bengtsson et al. 2021).

and primary schools, and the principal streets (in black dashed lines). In the first half of the twentieth century, the town experienced rapid industrialization connected to shipbuilding, sugar, and textiles. The population grew from 13,000 in 1900 to 30,000 in 1970 (see Chapter 2). From the 1960s, and especially from the mid-1970s onward, the industrial crisis hit Landskrona hard in the form of population decline and a contracting labor market. As a result of intense population growth in Landskrona from the early twentieth century until the 1970s, the city often faced problems with housing shortages. This is illustrated in Figure 10.1, which shows both rapid urban growth and high levels of population density throughout the period.

Across all the years under study, the most densely populated neighborhoods were located in the eastern part of the Citadel, along or near the main city thoroughfares. In contrast, the more peripheral neighborhoods, including those that emerged as the city grew, were usually less densely populated. An example of this is the former fishing village of Borstahusen on the north coast, which over time became a new residential area.

Figure 10.2 shows how the average family income by neighborhood changed and varied over time (see also Chapter 5 for segregation patterns based on social class). The figure reveals patterns of the economic concentration of neighborhoods in Landskrona from the 1940s until 1970. The average income level to which the inhabitants were exposed in their own neighborhoods and in others is intrinsically related to the individual's perception of inequality and works as a proxy for testing the RIH. In the maps, the average family income by neighborhood is categorized into sextiles, whereby a light color denotes the bottom of the income distribution and a darker color denotes the top.

Overall, Landskrona's spatial segregation in terms of average income levels increased during our period of study. In the beginning, relatively poor neighborhoods were often located close to the relatively wealthy. However, the pattern of income concentration changed gradually during the near 30 years of observation and was seemingly in line with urban growth. For instance, the neighborhoods with the highest average income in 1940 and 1945 were located in the more central areas of the city, especially near the main square and south of the Citadel. However, from 1950 onward, and especially in the 1960s, most of the wealthiest neighborhoods were clustered near the coast and north of the Citadel, where new residential areas were built. The concentration of wealthy neighborhoods in the city center east of the Citadel gradually shrank during this period.

In contrast, the poorer areas followed the opposite trend. They were initially clustered on the north coast near the fishing village of Borstahusen in the 1940s, but, by the 1960s, the poorest neighborhoods were increasingly found in the city center and the outskirts southwest of Landskrona.

Finally, we illustrate spatial inequality in Landskrona using Gini coefficients for the years under study. Figure 10.3 illustrates the Gini trend shown in quintiles and labeled by intensity, with a light color representing low inequality and a dark color higher income disparity. The figure shows important within-city inequality variation as the Gini coefficients are almost four times higher in some neighborhoods than others. This variation follows a marked spatial and temporal pattern. We can see a particular change in the concentration of low and high income inequality neighborhoods from the 1940s to the 1960s.

Figure 10.3 also indicates the overall pattern of income inequality in the city during this period (see Chapter 3). For instance, almost all neighborhoods in 1940 and 1945 are dark colors, when the Gini coefficient measure for overall inequality in Landskrona was about 0.4. Conversely, we see neighborhoods in light colors, from 1950 onward, that denote lower within-neighborhood inequality, and this was at a time when inequality in the city overall was below 0.3. More specifically, in 1940 and 1945, within-neighborhood inequality was usually concentrated at higher levels (with the Gini above 0.3) in the city center, an area also characterized by higher mean income. At the same time, areas further away from the city center show a low concentration of within-neighborhood disparity, with Gini coefficients below 0.25.

It is notable that, for the years 1960 and 1965, we observe how the pattern of within-neighborhood inequality, one that was initially high, started to vary as income inequality increased in areas where it had previously been low. This change may be explained in part by the new residential areas built in the north of the city from the end of the 1950s, and by the new socioeconomic configuration, which progressively changed from being an area of low inequality to one with a much more mixed pattern.

When we relate Figure 10.3 to Figure 10.2, we observe two compositions of high-inequality grids. On the one hand, several neighborhoods with high income inequality also had a relatively high average income, an aspect one might expect since within-neighborhood inequality tends to be high among relatively wealthy groups. On the other hand, some neighborhoods representing the lowest average income group also had relatively high income inequality.

Regression Results

We now move on to the regression results. We estimated three regression models to examine the association between adult mortality and long-term exposure to inequality at the neighborhood level and the relative economic position of individuals in comparison to peers in their neighborhood, as well as their absolute income. Table 10.2 displays the marginal effects for the three main variables

Table 10.2 Marginal effects for variables of interest from all models.

	Mortality age 50 (1)			Mortality age 70 (2)		
All: exposure since age 18 (A)	**Model 1**	**Model 2**	**Model 3**	**Model 1**	**Model 2**	**Model 3**
Ln average family income	-0.03^{***}	-0.01^{***}	-0.01^{***}	-0.05^{***}	0.01	0.01^{*}
Ln average grid income		-0.08^{***}	-0.08^{***}		-0.39^{***}	-0.38^{***}
Standardized average grid Gini			0.01^{***}			0.05^{***}
Men: exposure since age 18 (B)	**Model 1**	**Model 2**	**Model 3**	**Model 1**	**Model 2**	**Model 3**
Ln average family income	-0.04^{***}	-0.01^{**}	-0.01^{**}	-0.05^{***}	0.03^{*}	0.03^{**}
Ln average grid income		-0.11^{***}	-0.10^{***}		-0.41^{***}	-0.40^{***}
Standardized average grid Gini			0.01^{***}			0.05^{***}
Women: exposure since age 18 (C)	**Model 1**	**Model 2**	**Model 3**	**Model 1**	**Model 2**	**Model 3**
Ln average family income	-0.02^{***}	-0.01^{***}	-0.01^{***}	-0.05^{***}	0	0
Ln average grid income		-0.06^{***}	-0.06^{***}		-0.36^{***}	-0.35^{***}
Standardized average grid Gini			0.01^{***}			0.05^{***}
All–exposure since 10 years before; age 40 (1) and age 60 (2) (D)	**Model 1**	**Model 2**	**Model 3**	**Model 1**	**Model 2**	**Model 3**
Ln average family income	-0.01^{***}	-0.01^{***}	-0.01^{**}	0.01	0.03^{***}	0.03^{***}
Ln average grid income		-0.03^{***}	-0.03^{***}		-0.13^{***}	-0.14^{***}
Standardized average grid Gini			0			0.02^{***}

Note: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Source: Own calculations based on Scanian Economic-Demographic Database (SEDD) (Bengtsson et al. 2021).

of interest; namely, the logarithm of the mean family income, neighborhood mean income, and mean within-neighborhood inequality to which individuals were exposed over time based on the neighborhood in which they resided over the years. We present the marginal effects for both our main outcomes: mortality before ages 50 and 70.

Panel A at the top of Table 10.2 presents the results for the full sample regarding long-term exposure (averaged information from age 18). Model 1 includes mean family income for the individual, which shows a slightly negative association with mortality; the increase in the long-term family income reduced the probability of dying before age 50 or 70 by 3–5 percentage points. Model 2 includes the mean neighborhood income for all individuals. Here we note contrasting magnitudes for the two outcomes studied. For individuals dying before age 50, an increase in the mean neighborhood income is associated with a decrease of 0.08 in the probability of dying, whereas for those dying before age 70, the increase is associated with a decrease of almost 40 percentage points.

Model 3 includes the within-neighborhood inequality exposure. Once again, we find negative and statistically significant associations for mean family income, in line with the AIH, and a negative relationship for mean neighborhood income. The result for average Gini exposure indicates a positive and statistically significant association, in line with the IIH stating that inequality is bad for individual health over and above one's absolute level of income. Each unit increase by one standard deviation in the average Gini coefficient increases the probability of dying before ages 50 and 70 by 0.01 and 0.05, respectively, a relatively big increase given the small number of individuals dying before these ages.

Panels B and C present estimation results by gender. Overall, these results suggest similar patterns for both men and women and for that observed in Panel A for the pooled sample, with only some difference in magnitudes. For example, we note slightly lower magnitudes for women, especially regarding the impact of mean neighborhood income and within-neighborhood inequality on mortality at ages 50 and 70.

We also see similar patterns in the baseline regression when restricting the span of observation for the individual's exposure from age 18 up to 10 years before the cut-off points (i.e., up to ages 40 and 60 on the probability of dying before ages 50 and 70, respectively; Panel D). One main difference between the results of the two models concerns magnitudes, which are generally lower in this specification and explore more recent exposure compared to the baseline. Similarly, the neighborhood inequality estimate is lower in Panel D than in Panel A. This finding gives an indication of the relevance of accurately capturing long-term exposure in studying the role between relative income and income inequality and health and well-being.

In all specifications, the marginal effects for the control variables are in line with what we expected based on theory and previous empirical work (see Tables A10.1–A10.6 for full specifications). Notably, men had a higher probability of dying than women, and, similarly, individuals born in the city of Landskrona had a higher probability of dying than those born outside of the city.

As a final test of sensitivity, we ran the models without adding information on social class. In Table A10.7, we see that, by excluding HISCLASS for likely disparities in the risk of dying, all three variables of interest (family income, neighborhood income, and the neighborhood Gini) still show the same associations noted in the baseline setting. Finally, by adding the squared term of the Gini index in Table 10.1 we conclude that the relationship between income inequality and the risk of dying before ages 50 and 70 is still weak and mainly linear.

Conclusion

This chapter provides insights into the spatial development of income inequality in an industrial city in Sweden over a period when overall income disparities decreased and there was rapid expansion of the welfare state. Despite the notable overall decline in income inequality, we find remarkable spatial differences in income concentration and distribution across neighborhoods in Landskrona. In our empirical analysis, we explore this variation in order to understand the possible health effects in relation to such economic inequalities.

We tested three hypotheses linking income inequality and mortality and focusing particularly on long-term exposure and the role of local neighborhood influences. The results from our full regression models show that exposure to high mean neighborhood incomes can increase survival. This association between relative income (RIH) and mortality is stronger in the case of mortality before age 70 than in that of mortality before age 50. One should bear in mind here that the incidence of early-adult deaths before age 50 was low in our sample (around 3 percent).

Taken together, we find no support for the RIH as stated in the literature, which finds other people's average income, conditioned on own income, to be harmful for one's own health and well-being (Daly et al. 2013; Eibner and Evans 2005; Jones and Wildman 2008). Instead, our results align with what Hirschman (1973) called a "signaling effect" when he likened this to a situation where an individual who is stuck in traffic sees the cars in the other lanes starting to move forward. If the individual interprets this as meaning that he or she, too, will soon start rolling, then this inequality could actually reduce stress and increase well-being and health. Similarly, knowing that the neighbors have a higher income or have been given a pay raise might also improve health and well-being if this is interpreted as: "If she can do it, so can I" or "Soon it will be my turn to receive a higher income." Given that individuals in the neighborhood are quite similar, our testing of the RIH on this very local geographical level partially relates to studies considering reference groups based on common characteristics other than just geographical proximity. Miller and Paxson (2006) suggest that the RIH should be tested with reference to average income within the subgroup of the population to which the individual belongs. Their study, focusing on the United States, uncovers no support for the notion that residing in close proximity to prosperous neighbors leads to heightened mortality, but they find evidence that certain age cohorts experience a decrease in mortality risks when residing in communities with relatively affluent neighbors.[7] Interestingly, our results also align with research that focuses on the role of contemporary relative income in Swedish municipalities, finding a positive RIH effect of mortality (Gerdtham and Johannesson 2004).

Regarding the question of whether income inequality is detrimental to individual health in the case of long-term exposure and when disparities are measured at the local level, we find support for the IIH. As noted in reviews of the literature and in a meta-analysis (Wilkinson and Pickett 2006; Kondo et al. 2014), the literature on inequality and health has found more evidence in support of the IIH at relatively high geographic scales. Our results show that, in the case of long-term exposure, we may also find support for the hypothesis at a lower geographic aggregation, such as the neighborhood level, even if income inequality in small areas may be affected by the residential segregation of rich and poor—segregation that serves to increase inequality between areas and diminish inequality within them.

A main contribution of this chapter in relation to the existing literature is that we focus on long-term inequality exposure. If it takes time for the health effects of income inequality to manifest themselves, approaches that use near simultaneous measures of income inequality and health will underestimate the long-term effects. Our results suggest that temporality and cessation of exposure matter, and estimated magnitudes across the different empirical models indicate that long exposure in adulthood to income inequality is more detrimental to individual health than is more recent exposure. Our study thus confirms previous research that claims that the association between health outcomes and exposure to inequality over a span of up to 15 years holds greater significance compared to the association between health and immediate levels of inequality (Blakely et al. 2000; Kondo et al. 2012; Zheng 2012).

We cannot test possible mechanisms, but the level of aggregation used for the period of exposure in our study suggests that the positive relationship between income inequality and mortality is channeled through either (1) trust and social cohesion, or (2) crime and violence, or both. Theoretically, the positive relationship between income inequality and adult mortality could also be explained by public policy decisions on issues such as healthcare and educational expenditure taken at the city rather than the neighborhood level. The results are thus consistent with growing evidence that certain social outcomes associated with disadvantage in society are more common in contexts with greater inequality between rich and poor (Pickett and Wilkinson 2015).

Finally, when comparing all three of the main variables studied, we find mixed evidence for the AIH. This is interesting when seen in relation to—and possibly also explained in part by—the fact that the socioeconomic gradient in health in Sweden only seems to appear near the end of the study period.

Taken together, factors such as own family income, living in wealthier neighborhoods for a long time, and exposure to more unequal neighborhoods can all impact individual health and survival. It is worth noting that the association between relative income and income inequality with mortality moves in opposite directions when mortality is measured at the neighborhood level. This suggests that the health effects of a person's relative position in the income distribution, compared to their peers, can differ from the health effects of income inequality in the broader neighborhood context.

Appendix

Table A10.1 Full model marginal effects for the probability of dying before age 50.

	Model 1	**Model 2**	**Model 3**
Women (Men ref.)	−0.02***	−0.02***	−0.02***
	(0.00)	(0.00)	(0.00)
Birth year	0.01***	0.01***	0.01***
	(0.00)	(0.00)	(0.00)
Low skilled (ref)			
Higher managers	−0.01	−0.00	−0.01
	(0.01)	(0.01)	(0.01)
Lower managers	−0.00	−0.00	−0.00
	(0.00)	(0.00)	(0.00)
Skilled workers	−0.01	−0.01	−0.01
	(0.01)	(0.00)	(0.00)
Unskilled workers	−0.01	−0.01	−0.01
	(0.01)	(0.01)	(0.01)
NA	0.01	0.02	0.02
	(0.01)	(0.01)	(0.01)
Born in Landskrona	0.03***	0.02***	0.02***
	(0.00)	(0.00)	(0.00)
N of observations	−0.00***	−0.00***	−0.00***
	(0.00)	(0.00)	(0.00)
Ln of average family income	−0.03***	−0.01***	−0.01***
	(0.00)	(0.00)	(0.00)
Ln of average grid income		−0.08***	−0.08***
		(0.01)	(0.01)
Average Gini (standardized)			0.01***
			(0.00)
N	9,088	9,088	9,088

Note: ***p < 0.01, **p < 0.05, *p < 0.1.

Source: Own calculations based on Scanian Economic-Demographic Database (SEDD) (Bengtsson et al. 2021).

Table A10.2 Marginal effects of the full logistic regression models on the probability of dying before age 70 in Landskrona, 1939–1967.

	Model 1	Model 2	Model 3
Women (Men ref.)	−0.02***	−0.02***	−0.02***
	(0.00)	(0.00)	(0.00)
Birth year	0.01***	0.01***	0.01***
	(0.00)	(0.00)	(0.00)
Low skilled (ref)			
Higher managers	−0.01	−0.00	−0.01
	(0.01)	(0.01)	(0.01)
Lower managers	−0.00	−0.00	−0.00
	(0.00)	(0.00)	(0.00)
Skilled workers	−0.01	−0.01	−0.01
	(0.01)	(0.00)	(0.00)
Unskilled workers	−0.01	−0.01	−0.01
	(0.01)	(0.01)	(0.01)
NA	0.01	0.02	0.02
	(0.01)	(0.01)	(0.01)
Born in Landskrona	0.03***	0.02***	0.02***
	(0.00)	(0.00)	(0.00)
N of observations	−0.00***	−0.00***	−0.00***
	(0.00)	(0.00)	(0.00)
Ln of average family income	−0.03***	−0.01***	−0.01***
	(0.00)	(0.00)	(0.00)
Ln of average grid income		−0.08***	−0.08***
		(0.01)	(0.01)
Average Gini (standardized)			0.01***
			(0.00)
N	9,088	9,088	9,088

Note: ***p < 0.01, **p < 0.05, *p < 0.1

Source: Own calculations based on Scanian Economic-Demographic Database (SEDD) (Bengtsson et al. 2021).

Table A10.3 Marginal effects of the full logistic regression models on the probability of dying before age 50 with exposure measured on ages 40–50 in Landskrona, 1939–1967.

	Model 1	**Model 2**	**Model 3**
Women (Men ref.)	−0.02***	−0.02***	−0.02***
	(0.00)	(0.00)	(0.00)
Birth year	0.00***	0.01***	0.01***
	(0.00)	(0.00)	(0.00)
Low skilled (ref)			
Higher managers	−0.01*	−0.01	−0.01
	(0.01)	(0.01)	(0.01)
Lower managers	−0.01	−0.00	−0.00
	(0.00)	(0.00)	(0.00)
Skilled workers	−0.01	−0.01	−0.01
	(0.00)	(0.00)	(0.00)
Unskilled workers	−0.01	−0.01	−0.01
	(0.01)	(0.01)	(0.01)
NA	0.01	0.01	0.01
	(0.01)	(0.01)	(0.01)
Born in Landskrona	0.02***	0.02***	0.02***
	(0.00)	(0.00)	(0.00)
N of observations	−0.01***	−0.01***	−0.01***
	(0.00)	(0.00)	(0.00)
Ln of average family income	−0.01***	−0.01***	−0.01**
	(0.00)	(0.00)	(0.00)
Ln of average grid income		−0.03***	−0.03***
		(0.00)	(0.00)
Average Gini (standardized)			0.00
			(0.00)
N	8,873	8,873	8,873

Note: ***p < 0.01, **p < 0.05, *p < 0.1.

Source: Own calculations based on Scanian Economic-Demographic Database (SEDD) (Bengtsson et al. 2021).

Table A10.4 Marginal effects of the full logistic regression models on the probability of dying before age 70 with exposure measured on ages 60–70 in Landskrona, 1939–1967.

	Model 1	**Model 2**	**Model 3**
Women (Men ref.)	−0.04***	−0.03***	−0.04***
	(0.01)	(0.01)	(0.01)
Birth year	0.01***	0.02***	0.02***
	(0.00)	(0.00)	(0.00)
Low skilled (ref)			
Higher managers	−0.01	−0.01	−0.02
	(0.02)	(0.02)	(0.02)
Lower managers	−0.01	−0.00	−0.01
	(0.01)	(0.01)	(0.01)
Skilled workers	−0.03*	−0.03*	−0.03*
	(0.01)	(0.01)	(0.01)
Unskilled workers	−0.00	−0.00	−0.00
	(0.02)	(0.02)	(0.02)
NA	−0.05***	−0.05***	−0.05***
	(0.01)	(0.01)	(0.01)
Born in Landskrona	0.03**	0.02**	0.02**
	(0.01)	(0.01)	(0.01)
N of observations	−0.04***	−0.04***	−0.04***
	(0.00)	(0.00)	(0.00)
Ln of average family income	0.01	0.03***	0.03***
	(0.01)	(0.01)	(0.01)
Ln of average grid income		−0.13***	−0.14***
		(0.02)	(0.02)
Average Gini (standardized)			0.02***
			(0.00)
N	4,839	4,839	4,839

Note: ***p < 0.01, **p < 0.05, *p < 0.1.

Source: Own calculations based on Scanian Economic-Demographic Database (SEDD) (Bengtsson et al. 2021).

Table A10.5 Marginal effects of the full logistic regression models on the probability of dying before age 50 in Landskrona, 1939–1967, by gender.

	Model 1: Men	Model 1: Women	Model 2: Men	Model 2: Women	Model 3: Men	Model 3: Women
Birth year	0.01***	0.01***	0.01***	0.01***	0.01***	0.01***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Low skilled (ref)						
Higher managers	−0.00	0.00	0.00	0.00	−0.00	0.00
	(0.01)	(0.00)	(0.01)	(0.00)	(0.01)	(0.00)
Lower managers	−0.00	−0.00	0.00	0.00	−0.00	−0.00
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Skilled workers	−0.00	−0.01*	−0.00	−0.01*	−0.00	−0.01*
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Unskilled workers	−0.01	−0.02*	−0.00	−0.01*	−0.00	−0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
NA	0.06	−0.00	0.09	0.01	0.08	0.01
	(0.07)	(0.01)	(0.07)	(0.01)	(0.07)	(0.01)
Born in Landskrona	0.03***	0.02***	0.02**	0.01**	0.02**	0.01**
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
N of observations	−0.00**	−0.00***	−0.00***	−0.00***	−0.00**	−0.00***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Ln of average family income	−0.04**	−0.02***	−0.01**	−0.01***	−0.01**	−0.01***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Ln of average grid income			−0.11***	−0.06***	−0.10***	−0.06***
			(0.01)	(0.01)	(0.01)	(0.01)
Average Gini (standardized)					0.01***	0.01***
					(0.00)	(0.00)
N	4,524	4,450	4,524	4,450	4,524	4,450

Note: ***p < 0.01, **p < 0.05, *p < 0.1.

Source: Own calculations based on Scanian Economic-Demographic Database (SEDD) (Bengtsson et al. 2021).

Table A10.6 Marginal effects of the full logistic regression models on the probability of dying before age 70 in Landskrona, 1939–1967, by gender.

	Model 1: Men	Model 1: Women	Model 2: Men	Model 2: Women	Model 3: Men	Model 3: Women
Birth year	0.03***	0.03***	0.04***	0.04***	0.05***	0.04***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Low skilled (ref)						
Higher managers	0.03	0.09*	0.05	0.08	0.00	0.03
	(0.03)	(0.04)	(0.03)	(0.04)	(0.02)	(0.04)
Lower managers	−0.01	−0.01	−0.00	0.01	−0.01	−0.01
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Skilled workers	−0.01	−0.05**	−0.01	−0.04*	−0.01	−0.03*
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Unskilled workers	−0.04	0.01	−0.01	−0.01	−0.01	−0.01
	(0.02)	(0.03)	(0.02)	(0.02)	(0.02)	(0.02)
NA	−0.23***	−0.03	−0.16**	−0.02	−0.16**	−0.02
	(0.06)	(0.02)	(0.05)	(0.01)	(0.05)	(0.01)
Born in Landskrona	0.05***	0.02	0.04**	0.01	0.03**	0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
N of observations	−0.02***	−0.01***	−0.02***	−0.02***	−0.02***	−0.02***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Ln of average family income	−0.05***	−0.05***	0.03*	−0.00	0.03**	0.00
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Ln of average grid income			−0.41***	−0.36***	−0.40***	−0.35***
			(0.02)	(0.02)	(0.02)	(0.02)
Average Gini (standardized)					0.05***	0.05***
					(0.00)	(0.01)
N	2,851	2,992	2,851	2,992	2,851	2,992

Note: ***p < 0.01, **p < 0.05, *p < 0.1.

Source: Own calculations based on Scanian Economic-Demographic Database (SEDD) (Bengtsson et al. 2021).

Table A10.7 Marginal effects of the full logistic regression models on the probability of dying before age 50 and 70 without HISCLASS in Landskrona, 1939–1967.

	Age 50	**Age 70**
Women (Men ref.)	−0.01***	−0.04***
	(0.00)	(0.01)
Birth year	0.01***	0.04***
	(0.00)	(0.00)
Born in Landskrona	0.02***	0.02**
	(0.00)	(0.01)
N of observations	−0.00***	−0.02***
	(0.00)	(0.00)
ln Family Income	−0.01***	0.02**
	(0.00)	(0.01)
ln Grid Income	−0.08***	−0.40***
	(0.01)	(0.01)
Grid Gini	0.01***	0.05***
	(0.00)	(0.00)
N	9,015	5,843

Note: ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

Source: Own calculations based on Scanian Economic-Demographic Database (SEDD) (Bengtsson et al. 2021).

Table A10.8 Marginal effects of the full logistic regression models on the probability of dying before age 50 and 70 in Landskrona 1939–1967, adding Gini and squared Gini terms for controlling for non-linear associations.

	Age 50	**Age 70**
Women (Men ref.)	−0.02***	−0.04***
	(0.00)	(0.01)
Birth year	0.01***	0.04***
	(0.00)	(0.00)
Low skilled (ref)		
Higher managers	−0.01	0.01
	(0.01)	(0.02)
Lower managers	−0.00	−0.01
	(0.00)	(0.01)
Skilled workers	−0.01	−0.02
	(0.00)	(0.01)
Unskilled workers	−0.01	−0.01
	(0.01)	(0.01)
NA	0.02	−0.03*
	(0.01)	(0.01)
Born in Landskrona	0.02***	0.02*
	(0.00)	(0.01)
N of observations	−0.00***	−0.02***
	(0.00)	(0.00)
Ln of average family income	−0.01***	0.01*
	(0.00)	(0.01)
Ln of average grid income	−0.08***	−0.40***
	(0.01)	(0.01)
Average Gini (standardized)	0.01***	0.04***
	(0.00)	(0.00)
Average Gini ^2 (standardized)	−0.00	0.01***
	(0.00)	(0.00)
N	9,015	5,843

Note: ***p < 0.01, **p < 0.05, *p < 0.1

Source: Own calculations based on Scanian Economic-Demographic Database (SEDD) (Bengtsson et al. 2021).

Notes

1. The income inequality hypothesis was given impetus early on by the Whitehall Studies for the United Kingdom and by parallel studies for France (Desplanques 1976) and the United States (Kitagawa and Hauser 1973), which showed that social position mattered for death patterns despite the existence of a well-developed welfare state. A dominant idea before the publication of these studies was that socioeconomic health differences were a remnant of the past and would completely disappear in the mature welfare state and with the introduction of medical innovations that made a significant difference in healthcare (cf. Bengtsson and van Poppel 2011).
2. The problem is that we may have an *ecological fallacy* when drawing conclusions about individuals based on aggregate data on population health. An ecological fallacy occurs when correlations found in aggregate observations differ from the correlations in the underlying individual observations (Robinson 1950). In the specific case of the income inequality hypothesis, an ecological fallacy is likely to occur because the relationship between individual income and health tends to be nonlinear (Karlsson et al. 2010).
3. The three hypotheses are parallel and interconnected in the sense that it is in fact possible to find support for all of them at the same time when using individual-level data. This also means that a negative relationship between income inequality and population health (i.e., one at the aggregate rather than the individual level) is compatible with all three hypotheses in that it is not possible to distinguish whether inequality or relative or absolute income explains a noted relationship at this aggregation.
4. It is, however, unclear to whom individuals primarily compare themselves. Do income differences within society matter, or do we primarily compare ourselves to people who are of the same age, who do the same kind of work, who are at the same workplace, who live in our neighborhood, or who are our closest friends? See Deaton (2008) for an elaborate discussion on the difficulty of defining appropriate reference groups.
5. See Hedefalk and Dribe (2020) and Hedefalk et al. (2023) for more details on the geocoding and its match rate. For the purposes of this chapter, we used grids of 250 m^2 to spatially analyze the neighborhoods.
6. The Gini coefficients are calculated using yearly equivalized family incomes, whereby each family is regarded as one unit per year. This is a different approach to that used in Chapter 3, where Gini coefficients were computed by individual income at an active age. Despite these differences, the overall trends and levels in income inequality are highly similar.
7. However, there is evidence that other outcomes are affected by such relative deprivation. For example, the risk of teenage childbearing has shown to be especially high for individuals residing in poor neighborhoods surrounded by more affluent neighborhoods (South and Crowder 2010).

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