DO RELIEF PROGRAMS COMPENSATE FOR LONGEVITY LOSSES FROM RECESSIONS? EVIDENCE FROM THE GREAT DEPRESSION AND THE NEW DEAL

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Abstract

This paper examines the short- and long-run effects of the Great Depression and the New Deal on well-being, measured by longevity. We build a novel dataset that links individuals alive in 1930 to their death records and to county-level measures of economic distress and relief. Individuals—especially young men—in the hardest-hit areas lived significantly shorter lives. Leveraging politically driven variation in New Deal spending, we find that relief increased longevity, with larger benefits for men and for those who were young during the Depression. These effects appear partly mediated by gains in income and education by 1940.

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1. Introduction

Understanding the long-run consequences of government spending is central to both economic theory and policy design. In response to large-scale economic shocks or periods of crisis, governments often implement massive fiscal interventions aimed at stabilizing the economy and supporting vulnerable populations. Yet, the long-term impacts of these expenditures—particularly those related to relief and social welfare—remain an open question (e.g., Aizer et al., 2024; Modrek et al., 2022; Noghanibehambari and Engelman, 2022; Duque and Schmitz, 2023; Price and Song, 2018). This paper investigates whether large-scale public relief programs can mitigate the adverse long-run effects of economic downturns on health and longevity. We study this question in the context of the United States during the 1930s, when the federal government deployed unprecedented levels of relief spending through the New Deal in response to the Great Depression.

We study the short- and long-term effects of the New Deal—the first large-scale federal response to economic downturn in U.S. history—on longevity. Launched during the Great Depression, the New Deal introduced the country's first major social welfare programs and set a precedent for countercyclical government intervention. While the Great Depression was the deepest and most prolonged economic crisis in modern U.S. history, it also prompted an unprecedented expansion of federal relief efforts. This historical episode provides a unique setting to assess how large-scale public programs implemented in response to economic shocks shape long-run outcomes such as health and survival.

We first document whether the Great Depression affected longevity and survival to various ages.[1] Second, we provide causal evidence that New Deal relief programs improved long-term health outcomes, highlighting the potential of government spending to mitigate the lasting effects of economic downturns. We estimate the impact of New Deal relief on longevity by analyzing whether individuals living in counties that received greater amounts of relief funding lived longer. To identify the causal effect of relief, we use an instrumental variable strategy that leverages political incentives as an exogenous source of variation in the distribution of funds.

We estimate the impact of the New Deal on longevity by creating a novel dataset that follows white native-born individuals alive in 1930 until their deaths. We use the 1930 full-count US Census as a baseline and link it to death dates using information available on family trees from the genealogical site FamilySearch. Since we observe individuals' residence in 1930, we can also match them to county-level data on the severity of the Great Depression and to information on spending on New Deal programs. We focus on relief programs that provided unconditional cash

[1] Because exogenous variation in the severity of the Great Depression is difficult to identify, our estimates of its effects are descriptive.

transfers or relief through work; these programs were most directly intended to provide relief, and thus more likely to affect health outcomes.[2] Finally, we can also match individuals to the 1940 Census to investigate potential mechanisms. These data offer many advantages. Because we can track individuals from 1930 until the present, we can compare the short- and long-run effects of the Great Depression and the New Deal on survival. The resulting dataset is exceptionally large (43 million observations) and includes a substantial proportion of women, an uncommon feature in historical settings that allows for a detailed heterogeneity analysis.

We estimate causal effects of New Deal relief by employing an instrumental variable approach, since geographic allocation of New Deal relief was not random. The main purpose of New Deal relief was to alleviate the economic and social hardships caused by the recession; hence, the federal government targeted the states and counties most affected by the crisis (Fishback et al., 2003; Fishback et al., 2007). Individuals in these areas would have likely experienced worse outcomes—economic or otherwise—even in the absence of the relief, which negatively biases estimates of the relief's effect. For the same reason, estimates of the Great Depression that do not account for the New Deal are also biased and may misstate the overall impact of the Depression, since the most affected areas received more relief.

We leverage variation in spending that was driven by political considerations to create our instrumental variable. Previous literature has documented that political incentives influenced the distribution of funds: In addition to targeting affected areas, the government favored areas that could help ensure their reelection (Wright, 1974; Wallis, 1998; Fleck, 2001). We use an instrumental variable (IV) approach based on these political incentives to predict where the relief was allocated, while controlling for the severity of the crisis. The novelty of our IV strategy relative to prior studies of the New Deal is our use of an IV-LASSO approach. We collect all variables identified as political predictors of New Deal spending (Wright, 1974; Fleck, 2001; Fishback et al., 2005; Fishback et al., 2006; Fishback et al., 2007). These variables, together with their higher terms and interactions, are considered as potential instruments. We then select the best instruments (and set of controls) using a parsimonious IV-LASSO approach following Chernozhukov et al. (2015). The instrument selected, which we term *voting culture exploitability*, is a function that combines voter turnout for the 1932 presidential election and the 1928 congressional election. This *voting culture exploitability* variable takes larger values in areas in which relief funds would most effectively increase the chance of winning elections.

Our findings suggest that New Deal relief programs substantially improved long-term health outcomes, highlighting the potential of government intervention during economic crises. First, we

[2]The programs included in our analysis are the Works Progress Administration (WPA), the Federal Emergency Relief Administration (FERA), Social Security Administration Public Assistance (SSAPA), Civil Works Administration grants (CWA), and Public Work grants.

find that the Great Depression reduced survival rates in the short and long run, but the effects on survival only become substantial after individuals reach age 50 and decline after age 70. Thus, short-term estimates of the effects of the Great Depression substantially underestimate its negative consequences. Moreover, failure to account for the New Deal and its endogeneity also substantially biases estimates of the effects of the crisis. Second, we find that on average, the New Deal extended longevity and positively affected survival rates in both the short and long run. Our IV estimates show that a one-standard-deviation increase in relief per capita ($\$164$) extended longevity by 14 months.[3]

We find that primarily men were hurt by the Great Depression and that they also were the main beneficiaries of the New Deal. The Great Depression disproportionately affected blue-collar and unskilled workers, particularly those in manufacturing and construction (Margo, 1991; Wallis, 1989; Chandler, 1970). As in other recessions, youth also suffered larger losses in employment. When we re-estimate our model separately by gender, we find that a one-standard-deviation increase in relief extended men's (women's) longevity by 20 (9) months.

We also find that young adults suffered the largest longevity declines from the Great Depression and obtained the greatest benefits from the New Deal for two main reasons. First, men between the ages of 16 and 21 years had large unemployment rates and, as result, were more likely to receive relief.[4] Second, because relief programs were most often provided through employment, these programs could have improved their labor opportunities in the future; this could explain part of the extension in longevity (Schwandt and Von Wachter, 2020). In fact, recent research shows that young men participating in the CCC program (a New Deal employment program that targeted young men) increased their lifetime incomes and longevity (Aizer et al., 2024).

The effects of the Great Depression and the New Deal are also larger among those born during the Great Depression or who were children at the time. This evidence is consistent with observations in the economic literature highlighting the heightened vulnerability of children to adverse shocks during their early years (Currie and Almond, 2011; Heckman, 2007; Duque and Schmitz, 2023).

We identify two main mechanisms behind the beneficial effects of the New Deal on longevity: increases in income and years of education. We link our sample to 1940 Census schedules and find that a standard-deviation increase in New Deal relief resulted in a 40% increase in income for those who were teenagers in 1930. We also find increases in years of education for teenagers and young adults, but don't find effects on employment or labor force participation, consistent with Modrek

[3] $\$164$ in 1967$ is equivalent to 15% of the average annual income in the 1940 Census. $\$164$ in 1967 is equivalent to approximately $\$1545.95$ in 2024. The relief is not in annual terms; it is the total amount of funds from 1933 to 1939.

[4] Individuals aged 15 to 19 had unemployment rates of 60% in 1934 in the State of Pennsylvania (Margo, 1991).

et al. (2022).

This paper mainly contributes to three strands of the literature. First, it studies the relationship between recessions and health outcomes, specifically mortality and longevity. In this area, studies on developed countries in contemporary times show that in the short run, recessions improve health outcomes and lower mortality rates (Ruhm, 2000; Ruhm and Black, 2002; Dehejia and Lleras-Muney, 2004; Ruhm, 2005; Miller and Urdinola, 2010; Stevens et al., 2015; Strumpf et al., 2017; Tapia Granados and Ionides, 2017).[5] However, this procyclical pattern does not appear to hold in the medium and long run. A growing body of research finds that recessions have lasting negative effects on life expectancy, disability, and lifetime earnings (Coile et al., 2014; Thomasson and Fishback, 2014; Cutler et al., 2016; Schwandt and Von Wachter, 2020; Duque and Schmitz, 2023), though Finkelstein et al. (2024) document reductions in mortality among older adults following the Great Recession. Meanwhile, studies in developing countries generally find that recessions increase mortality, a pattern often attributed to the absence of well-developed safety net programs (Doerr and Hofmann, 2022).

A few studies have investigated the effects of the Great Depression on health and mortality. Using aggregate data, the literature finds that the Great Depression resulted in short-term declines in mortality, despite the fact that during this time in the US there were very few safety-net programs available to the population (Tapia Granados and Diez Roux, 2009; Stuckler et al., 2012). Our findings differ from this literature. One reason is that we use individual data, which allow us to track individuals even if they move. Arthi et al. (2022) demonstrate that in settings in which individuals move in response to economic shocks, aggregate mortality rates for a given region will fall artificially because those who might die in badly affected areas die elsewhere. Another reason is that our data might not include all affected populations; it is possible that individuals who are not in our study (immigrants and non-whites) benefited from the Great Depression.

Our study expands on the literature of the effects of recessions on health outcomes by comparing the short- and long-term effects of a recession using individual-level deaths for the same economic shock—the Great Depression—and the same population. We also improve on previous studies by accounting for the effects of anti-recessionary programs, which could be a reason why we find more negative effects of the recession than previous studies that only considered the effects of the Great Depression.

[5]The literature has documented several reasons for these surprising results: Health improves in the short run, because during recessions there is a reduction in alcohol use and smoking (Ruhm, 2000; Ruhm and Black, 2002; Ruhm, 2005; Krüger and Svensson, 2010). Also, during recessions individuals have more time to care for their dependent children and elderly family members (Dehejia and Lleras-Muney, 2004; Aguiar et al., 2013). Finally, the quality of healthcare appears to increase during recessions due to the greater availability of health care workers (Stevens et al., 2015).

We also contribute to the literature on the effects of the New Deal. Many studies examine the effects of the New Deal on various outcomes (Wallis and Benjamin, 1981; Balkan, 1998; Fleck, 1999; Cole and Ohanian (2004); Fishback et al. (2005); Fishback et al., 2007; Neumann et al., 2010; Stoian and Fishback, 2010; Taylor and Neumann, 2013; Fishback and Kachanovskaya, 2015; Arthi, 2018; Liu and Fishback, 2019). However, few explore the effects of the programs on health (Fishback et al., 2007; Modrek et al., 2022; Noghanibehambari and Engelman, 2022). Fishback et al. (2007) find that the New Deal reduced infant mortality, while Aizer et al. (2024) demonstrate that the CCC extended the longevity of young men in Colorado and New Mexico. Modrek et al. (2022) found no effects; however, their analysis follows individuals only until 2011, many of whom could still be alive. A similar approach is used by Noghanibehambari and Engelman (2022), who link individuals from the 1940 U.S. Census to Social Security death records and find that a doubling of New Deal relief spending increased life expectancy by about one month. In contrast, our study extends the analysis to the entire mainland United States and to individuals alive in 1930, following their deaths through 2020. This broader coverage allows us to examine both short- and long-run effects without conditioning on survival. We find substantially larger impacts: a doubling of New Deal relief spending is associated with an increase in average lifespan of over one year, indicating that the long-term benefits of New Deal programs were much greater than previously documented.

Finally, our research also relates to the literature on the effects of social programs and programs to compensate for negative shocks on health outcomes (Aizer et al., 2016; Barham and Rowberry, 2013; Hoynes et al., 2016; Guarín et al., 2022). Our findings are consistent with most of this literature. For example, Aizer et al. (2016) find extensions in longevity when studying the long-term effects of the US mothers' pensions program in the 1920s. Guarín et al. (2022) find positive effects on health outcomes when investigating economic compensation for victims of the Colombian armed conflict.

The paper is organized as follows. Section 2 provides background on New Deal relief and allocation of the funds. Section 3 describes the datasets used. Section 4 explains the identification strategy. Section 5 presents the effects of the Great Depression. Section 6 studies the causal effects of the New Deal. Section 7 discusses potential mechanisms. Section 8 presents some robustness checks, and section 9 concludes.

2. Background: The Great Depression and the New Deal

The Great Depression was the deepest and longest economic decline in modern history. To offset its negative effects, the federal government created the New Deal, which was a set of policies designed to promote economic growth and help the most affected citizens. This section describes

the background of the Great Depression, the New Deal, and the geographic allocation of public funds.

2.1 The Great Depression (1929-1941)

The Great Depression is usually defined as the period that started with the stock market crash in October 1929 and lasted until 1941. This period was characterized by 4 years of large economic declines (1929-1933) and 8 years of slow recovery. In the United States, real GDP dropped by around 30%, prices went down by 27%, unemployment rose to 25%, about one-third of workers were employed only part-time, and one-third of all banks failed (Chandler, 1970; Romer, 2003; Richardson, 2007).

The negative effects on the economy had massive consequences for the well-being of the population, including increases in poverty, homelessness, hunger and malnutrition, and lack of medical care (Kiser and Stix, 1933; Jacobs, 1933; Chandler, 1970; Poppendieck, 1997; Kusmer, 2002). Moreover, the context of economic crisis and job losses resulted in negative psychological impacts on a great share of the population (Zivin et al., 2011). The Dust Bowl, a period of drought and dust storms, occurred during the same period. Damage to the American ecology led to an agricultural depression, intensifying the impact on hunger and malnutrition (Phillips, 1999). However, the Great Depression did not affect everybody equally. Young people, the elderly, and non-white individuals faced the largest levels of unemployment. Some sectors, such as construction, iron and steel, durable goods and automobiles, manufacturing, and real estate, were more affected than others (Chandler, 1970; Margo, 1991).

The economic effects of the Great Depression also varied across the country. Figure I shows the county variation of an index for the severity of the crisis from 1929-1933 (more details on how this index is constructed are provided below). Some areas in the South and Southwest were relatively more affected, whereas the east coast and Northeast were less affected. The difference in industrial composition across regions is one reason for the geographic variation in the severity of the crisis, since manufacturing of durable goods and construction fared the worst (Rosenbloom and Sundstrom, 1999). Our analysis exploits this county-level variation to identify the effects of the Great Depression on longevity.

2.2 The New Deal

In 1933, President Roosevelt approved a vast set of programs for relief and recovery commonly known as the New Deal.[6] The New Deal included some programs for public assistance, public works, housing, and loans, some of which were precursors of modern welfare programs. However, most New Deal programs offered relief through employment.

We focus on relief programs, which accounted for 63% of New Deal non-repayable grants, and public works grants, which accounted for 24% (Fishback et al., 2003). These programs operated through direct work contracts and public assistance. They targeted the most affected individuals and provided assistance to satisfy basic needs such as food, housing, and health care. Hence, they are the programs most likely to have had direct effects on health outcomes.

Our analysis includes the following programs: the Federal Emergency Relief Administration (FERA), which involved direct and employment relief payments; the Social Security Administration Public Assistance (SSAPA), which provided public assistance payments, especially for children, single mothers, and people with disabilities; the Works Progress Administration (WPA), which provided work relief with hour and wage limits; and Civil Works Administration grants (CWA), which created jobs for millions of people who were unemployed (Schwartz, 1976; Fishback et al., 2003). We also include all grants from the Public Works Administration. During this period, the federal government became the largest employer in the nation, because these programs employed millions of citizens. The programs we concentrate on account for 87% of non-repayable spending, and we analyze them together because the distribution of funds is highly spatially correlated, and thus it is hard to separately identify the effects of any single program.[7] Although we exclude some programs, we investigate as a robustness check whether our results are sensitive to which programs we include.[8]

2.3 Geographic allocation of New Deal funds

The geographic allocation of funds was not random, which resulted in geographic variation at both county and state level.[9] Figure II shows the spatial distribution of New Deal funds in per capita terms. By comparing it with Figure I—which shows the spatial distribution of the severity of the

[6] New Deal grants between 1933 and 1939 totalled $16 billion (in 1967$).

[7] For example, the county-level correlation between CWA and WPA is 0.94.

[8] Programs not included are the Agricultural Adjustment Administration (AAA), which accounts for 12.1% of grants; Farm Security Administration (FSA), 0.6%; and US Housing Authority (USHA), 0.8%. We also exclude loans. See Appendix Table A.13 for robustness checks going program by program.

[9] The federal government distributed funds across states, and states distributed funds across counties and municipalities.

crisis—we find that the government targeted areas with more pronounced economic downturns. Indeed, Figure III shows that relief spending and economic severity are highly correlated across counties.

Yet the most affected regions did not always get the largest amounts of money. Previous research shows that in addition to targeting more affected areas, other factors also affected the allocation of funds. For example, southern states received less money (Fishback et al., 2007) because politicians argued that the cost of living in the region was lower (Couch and Shughart, 1998). States in the West received more funds because they had more federal land, where more public works and infrastructure projects could be undertaken (Wallis, 1998; Fleck, 2001). Bureaucratic hurdles also affected where some programs received more funding.[10]

Finally, more funds were sent to areas as a function of political considerations, which we use as an exogenous determinant of the geographic allocation of funds. An extensive literature documents that political incentives partly determined where funds were disbursed. Wright (1974) finds that voter turnout was an important determinant of funds distribution. Anderson and Tollison (1991) find that indicators of relative political influence are strongly correlated to spending patterns. More recently, Fleck (2001) shows that the fraction of loyal and swing voters across counties affected the allocation of New Deal spending, as predicted by a model of political choice. The underlying mechanism in the model is that the government uses the relief to try to ensure reelection. Fishback et al. (2005) and Fishback et al. (2007) find that different electoral variables, such as voter turnout in different elections, the fraction of votes for Democrats, and the variance in Democrats' votes over time, are strongly correlated with New Deal spending per capita. In summary, it is well established by previous research that political variables predict the allocation of New Deal relief, and we consider all these variables as potential instruments for New Deal funds.

3. Data

To study the long-term effects of the Great Depression and New Deal on longevity, we match individual-level data from the 1930 and 1940 full-count US Censuses to genealogical death records from FamilySearch, county-level data on New Deal spending and the severity of the crisis, and county-level election results.

[10]For some programs, the state's governor had to sign a statement justifying the need for relief and provide diverse information. Other programs had funding requirements the state had to match, and this could result in richer states' receiving more funds.

3.1 Individual-level data

3.1.1 US Census

Our baseline sample is the full-count 1930 Census (Ruggles et al., 2024, 2025), which provides the county of residence of all 120 million individuals living in the US at the very beginning of the Great Depression and 3 years prior to the New Deal. It also details various predetermined characteristics of individuals, such as age, gender, race, nationality, and marital status. We link the 1930 Census to the 1940 Census using the Census Tree links developed in Price et al. (2021) and Buckles et al. (2023). The 1940 Census includes information on intermediate outcomes such as income, education, employment, number of children, and marital status. By matching both censuses, we also know whether a person moved between 1930 and 1940. We use these variables to understand the mechanisms behind the effects of New Deal relief and the severity of the Great Depression on individuals' longevity.

3.1.2 FamilySearch—The Family Tree

To compute individual longevity, we match the 1930 census with genealogical data from FamilySearch. FamilySearch hosts both the world's largest interconnected family tree and an archive of billions of historical records that contain information on deceased individuals. Instead of creating their own personal family trees, FamilySearch's users connect their genealogies to the public, Wiki-style Family Tree by creating profiles for their deceased ancestors, attaching historical records to those profiles, and linking those profiles to the profiles of those ancestors' relatives.[11] The sources users can attach to these profiles include various types of death records, including death certificates, obituaries, gravestones, funeral home records, and Social Security records. Appendix Figure A.1 shows an example view of the Family Tree from the point of view of a regular user.[12] While anyone can access individual records on Family Search's website, the large-scale compilation of the dataset used in this paper is maintained by the Record Linking Lab at Brigham Young University (BYU). Using this dataset, we are able to link 45% of our population of interest[13] in the 1930 Census to their death records, a higher rate than that achieved in other historical studies.[14] Our Data

[11] FamilySearch's machine algorithms use these user-made links to suggest potential record links to other profiles as well, eventually increasing the number of profiles linked to death records.

[12] www.familysearch.org/tree

[13] In this study, we focus on the white and native-born population for whom we have New Deal data at the county level. If we linked the entire U.S. population in the 1930 Census to their death records, our match rate would be 37%.

[14] The Life-M Project links by hand between 35.8% and 37.8% of men and 21.5% and 24.4% of women from birth certificate to death for a subsample of individuals in the States of Ohio and North Carolina. For the full sample, they link individuals to death at a rate of $22.9\% - 27.8\%$ for men and $12.7\% - 19.3\%$ for women (Bailey et al., 2022). Abramitzky et al. (2014) link 16% of native men from the 1900 Census to the 1910 and 1920 Censuses. Abramitzky

Appendix explains the linking process from the 1930 Census records to FamilySearch deaths and 1940 Census records in detail.

The resulting dataset has two main advantages. First, our data includes almost 50% women. Because women tend to change their last name after marriage, they are more difficult to link through time and therefore not usually included in similar historical studies using Census data. As a result, the study of women has been notably scant in the economic history literature (Abramitzky et al., 2014; Feigenbaum, 2016; Bailey et al., 2017; Bailey et al., 2020; Abramitzky et al., 2021). Because the Family Tree often includes information on parents' names, we frequently observe women's maiden and married last names so that we can link them at nearly the same rate as men.

Second, the FamilySearch death data includes deaths from 1930 to the present day. This allows us to study and compare both short- and long-run effects on longevity. For comparison, a commonly used source of death and birth dates is the Death Master Files (DMF), which only includes information on birth and death dates for men who died between 1975 and 2005. In addition, these data have only been linked to the 1940 Census, not to the 1930 Census, which is our base data.[15]

Our dataset has some limitations: The sources of death data might be of uneven quality; all counties are not equally represented due to limitations of the matching process; and not everyone is equally likely to have a profile on the Family Tree. For these reasons and others, there may be some selection problems in our sample; we discuss these issues below.

3.2 County-level data

3.2.1 New Deal Relief Data

We use data on New Deal spending by program at county level published in 1940 by the Statistical Section of the Office of Government. It reports all federal spending on New Deal programs from March 1933 to June 1939.[16] The data include information on loans and grants given to different agencies, such as the Federal Works Agency, the Federal Security Agency, the Department of Agriculture, and the Federal Housing Administration. To our knowledge, this is the only source of New Deal spending by county, and unfortunately the data are not broken down by year.

Using data at the county level is important for two main reasons. First, New Deal programs entailed multiple layers of political administration. Therefore, the final success of each program was

et al. (2012) link 29% of men from the 1865 Norwegian Census to either the 1900 Norwegian or US Census. Craig et al. (2019) match 30% of married women of specific cohorts from marriage certificates in Massachusetts to the 1850, 1880, and 1900 US Censuses.

[15] The linkage was done by the CenSoc project. https://censoc.berkeley.edu

[16] These reports were digitized by Fishback et al. (2005). New Deal Studies. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor], 2018-11-18. https://doi.org/10.3886/E101199V1

determined as much by what happened within states as by what happened across states (Fishback et al., 2003). Second, to evaluate the effects of the relief on longevity, it is important to measure the relief received by individuals, and the most disaggregated data available are at county level.[17]

More than $\$16$ billion were distributed from March 1933 to June 1939 in different non-repayable New Deal grants. Of those, $\$14.1$ billion (87%) were allocated to the relief programs of interest here. On average, each county received, for the whole duration of the New Deal (1933-1939), $\$261.94$ per capita in $1967\$$, with a standard deviation of \$288.34. In $2024\$$, this would be an average of $\$2,465.41$ per capita.[18] Average total relief from 1933 to 1939 represented 25% of average annual income in 1939.[19] Mohave County, Arizona was the county with the highest per capita funds—more than $\$9,000$ per capita—and Arthur County, Nebraska had the lowest, receiving less than $\$30$ per capita.

3.2.2 Severity of the Economic Crisis (1929-1933)

To assess the severity of the crisis, we create an index using economic variables from different data sources. This allows us to obtain a single estimate of the effects of the Depression on mortality and longevity and to compare counties that differed on relief spending but had the same crisis severity.

The index is the standardized sum of the following standardized variables measured at the county level and adjusted such that larger values correspond to greater severity of the crisis: 1930, 1937 and 1940 unemployment rates (from the full-count US Census and the Census of Employment); the change in retail sales from 1929 to 1933 and from 1929-1935 (from Fishback et al. (2005)); and the change in farm value (from the Agricultural Census). Some of these variables are based on estimates and might not be exact, which might cause some measurement error.[20]

[17] In the 1940 Census there is an individual measure of relief participation; however, most participants would be missed, since most of New Deal relief programs ended in 1939. Only 1% of the population reports working on relief in the 1940 Census. Modrek et al. (2022) use this data to create a county-level index of New Deal exposure. Individual participation in these programs is available in the National Archives, but the records have not been digitized. To our knowledge, the only individual-level records of participants that have been digitized were digitized by Aizer et al. (2024) for men participating in the CCC in Colorado and New Mexico.

[18] These are the total amounts of relief per capita for the full 1933-1939 period; annually it would be equivalent to $\$352.20$ in $2024\$$.

[19] The average income in 1939 was $\$442.12$ ($\$9995.99$ in $2024\$$). This data come from the 1940 full-count US Census, and it is top coded at $\$5,001$. If we divide the amount of relief by 7 years, it represents 3.5% of the average income.

[20] We investigate whether our results are sensitive to the construction of the index as a robustness check. We also re-estimated our results including all variables instead of the index. See Appendix Table A.11.

3.2.3 US Election results 1920-1932

We use information on election results from 1920 to 1932 to understand how political incentives affected the distribution of New Deal funds. The political variables come from data available in the "United States Historical Election Results, 1824–1968" (ICPSR 1), which reports how many votes each party got for different elections. The variables used include voter turnout in presidential and congressional elections, averages and standard deviations of turnout from 1920 to 1932, fractions of votes for Democrats and Republicans, averages and standard deviations of the fractions of votes for Democrats and Republicans, numbers and fractions of loyal and swing voters, number of representatives and their tenures, and closeness of the elections. In Section 4, we explain how we use these political variables in our identification strategy.

3.3 Estimation Sample and Summary Statistics

Table I shows summary statistics of individuals in the full-count 1930 US Census (columns 1, 2 and 4) and our FamilySearch linked sample (columns 3, 5, 6 and 7). Less than 1% of our linked sample is non-white, and only around 3% are foreign born. Since these populations are underrepresented in our data, we restrict our analytic sample to white, US-born individuals.[21] Columns 4 and 5 of Table I present the same summary statistics as columns 2 and 4, but for our analytic sample. Columns 6 and 7 present the same summary statistics as column 5, weighting the population by county and cohort link rates in the former and using inverse probability weights in the latter.

There are 93,352,226 white, native-born individuals in the full-count 1930 US Census for the counties we have the full county-level data. We link 42,339,779 individuals to their death dates—45.35% of the 1930 census sample. This match rate is higher than that achieved in other historical studies, as described previously.

Table I shows that once we restrict our sample and weight it (column 6), our analytic sample is broadly representative of the 1930 population we target. Average New Deal relief per capita in our analytic sample is $\$265$, which is close to the $\$261$ county-level average reported in Section 3.2.1. The average age of individuals in our sample in 1930 is 28. Although women are slightly underrepresented (we link 49% of the men and 42% of the women), about half of our sample are women, which is significantly higher than other studies that use linked historical records (Craig et al., 2019; Abramitzky et al., 2021). Individuals in our sample are also more likely to be married. This likely happens because of the construction of the Family Tree, as married people are more likely to be on the tree because they are more likely to have had descendants who could later add

[21] Other studies that use FamilySearch data also face this issue and take the same approach (Lleras-Muney et al., 2022.

them to the tree.

3.4 Matching and Sample Selection

Not all counties are equally represented in our sample. Match rates to death years at the county level are presented in Appendix Figure A.2, and range from 9% to 88%. The larger match rates are in Utah and Idaho, where FamilySearch's modern users are overrepresented, but the lowest match rate counties are scattered broadly around the country. To address this problem, we weight our dataset at cohort and county level, and—as previously discussed and shown in Table I—using these weights, we obtain a sample that is mostly representative of the white, US-born 1930 US population.

Nevertheless, our final linked sample suffers from sample selection in some dimensions for various reasons. First, we are more likely to observe the ancestors of people who are interested in their genealogy. Second, our linked sample has a smaller fraction of people who were relatively young in 1930 compared with the full-count census. This is shown in Appendix Figure A.3 and could be due in part because individuals who are still alive do not have their death on the tree. Finally, FamilySearch's users tend to enter information regarding their own ancestors. People who died very young are less likely to be known by their family members or appear in records, so they are less likely to appear in our sample. Compared to Vital Statistics deaths for the 1929 cohort, our sample misses a significant number of infant and very young deaths (Appendix Figure A.4). To account for this selection, we restrict our sample to individuals who survived to age 20 in the robustness checks (Appendix Table A.10).

To account for other types of selection, we identify who has missing longevity information and whether individuals who lack this information differ from the general population. Table II presents estimates of the effects of different individual characteristics on an indicator for whether the individual has a death record. Some individuals have higher probabilities to be linked to their deaths than others. In our sample, linked individuals have larger families and higher socioeconomic status, and they live in areas in which the recession was less severe and that received less relief. Thus our analytic sample is a positively selected sample of individuals who would be expected to live longer than average. As stated above, to solve some of these issues we weight the population at the county-cohort level and control for factors that affect the probability of being linked when conducting our analysis.[22]

[22]Following Bailey et al. (2020), we show that our results are robust to weighting by the predicted probability of being linked (Appendix Table A.17).

4. Empirical Strategy

To obtain the causal effects of New Deal relief and the Great Depression on longevity, we would like to estimate the following accelerated failure time (AFT) model of duration:[23]

$$\begin{aligned} Log(\text{Age at Death})_{ict} = \beta_0 + \beta_1 Log(\text{Relief Spending})_c + \delta \text{Crisis Severity}_c \\ + \alpha_1 X_i + \alpha_2 X_c + \gamma_t + \gamma_s + u_{ict} \end{aligned} \tag{1}$$

where ict stands for an individual i living in county c and born in the year t. X_i are individual covariates from the 1930 census: age, urban status, and an indicator for being married. X_c are county controls selected using LASSO: our severity index, % black, % rural farm, farms per capita, % of land area used for farms, % of county farms between 50-99 acres, and % of county farms between 500-999 acres. γ_t are cohort fixed effects, γ_s are birth state fixed effects, and u_{ict} is a typical stochastic error term.[24]

To estimate and compare the short- and long-run effects of the Great Depression and the New Deal, we also estimate a survival model using the following regression for several groups of birth-year cohorts:

$$\begin{aligned} \mathbb{1}(\text{Survived to } m)_{ict} = \ \beta_0 + \beta_1 Log(\text{Relief Spending})_c + \delta \text{Crisis Severity}_c \\ + \alpha_1 X_i + \alpha_2 X_c + \gamma_t + \gamma_s + u_{ict} \end{aligned} \tag{2}$$

for each year m between 1930 and 2020. Since we estimate this for a given cohort (e.g., those who were between 6 and 15 years old in 1930), surviving to a given year approximates surviving to a given age.[25] Thus $\mathbb{1}$(Survived to m) = 1 if the person died after the year m, and $\mathbb{1}$(Survived to m) = 0 if the person died in year m or before. ict denotes individual i living in county c and born in the year t. Covariates are the same as in equation 1. In both specifications, standard errors are clustered at county level.

Even accounting for county-level severity, some counties received different amounts of relief. To address this, we include the set of county controls described above that are predictors of both relief and longevity. We only observe the distribution of relief spending at the county level. However, we know that some kinds of people were more likely to actually receive relief than others,

[23] This is one of two main models used to study durations, and it assumes that covariates have proportional effects on the duration. Alternatively, we could use a proportional hazard model. Since we do not have time-varying covariates, it is not clear whether this alternative presents any advantages, but it would present large computational difficulties since the data would have to be transformed into a panel of individual-by-year observations.

[24] In Appendix Table A.9, we present results for the analysis of longevity using levels instead of logs.

[25] We group the youngest cohorts up to age 5 because under-5 mortality tends to differ from mortality at older ages. Then, we group older cohorts by groups of 10.

depending on their demographic characteristics. For this reason, we include predetermined individual covariates from the 1930 Census, as defined above.

The coefficient δ estimates the effect of the recession on outcomes in relative terms. Since the index has been normalized, the coefficient measures the impact of an increase of one standard deviation in the index on outcomes. The coefficient β_1 estimates the effect of one additional log point in New Deal relief on outcomes. For a causal interpretation of β_1 and δ to be valid, we further require that New Deal relief spending and crisis severity be orthogonal to other determinants of longevity that are not controlled for in the model. We do not have access to an instrument for severity, and thus the analysis of these effects will be descriptive. However, we attempt to obtain causal estimates of the effects of the New Deal.

Naive OLS estimates of the effects of New Deal relief on longevity from equations (1) and (2) might be biased for several reasons. First, there might be omitted variables related to crisis severity. Although we control for the severity of the Great Depression, this severity might be poorly measured. For example, there might be relevant variables that we can't observe, such as a change in personal income or individual wages, which we cannot include in our computation of the severity index. Second, different sources of measurement error can be related to both New Deal relief spending and crisis severity, leading to attenuation bias. Available data on New Deal spending provides information on funds from the federal government to counties but, for example, there could be missing transfers if there are independently funded programs at the city or individual levels. Finally, there could also be error from assuming that people suffering the recession and received relief in their county of residence in 1930. We separate movers from stayers in our robustness checks.[26]

4.1 Identification Strategy using IV-LASSO

To assess the long-term effects of New Deal relief and address the issues described above, we use an instrumental variable approach based on political variables from 1920 to 1932. The ideal instrument predicts where funds are allocated (relevance assumption) and is otherwise uncorrelated with predictors of longevity, conditional on the severity of the crisis (exclusion restriction).

Our instrumental variable (IV) approach exploits political incentives that shaped the geographic allocation of New Deal relief funds. Existing political-economy models highlight several relevant factors—voter turnout, local Democratic support, electoral competitiveness, the share of loyal versus swing voters, and congressional influence, among others (Anderson and Tollison, 1991; Wright, 1974; Fleck, 1999; Fishback et al., 2005, 2006). Because many of these variables, as well

[26] See Appendix Table A.6.

as their nonlinearities and interactions, could have influenced relief, we compile 54 predetermined political variables drawn from the prior literature—including measures of turnout and Democratic vote shares in presidential and congressional elections between 1920 and 1932, their theoretical variances, and indicators of congressional representation—and include their higher-order terms and interactions, yielding over 1,000 potential instruments in total.[27]

We use a sparse model that identifies and uses optimal and parsimonious controls to select our instruments from this set of potential instruments. We use a least absolute shrinkage and selection operator (LASSO) for instrumental variables to select the best predictors of relief (Belloni et al., 2012; Belloni et al., 2014; Chernozhukov et al., 2015). This machine learning methodology results in the selection of optimal instruments and a sparse set of controls, given the assumption of approximate sparsity. This assumption supposes that the conditional expectation of endogenous variables given the instruments can be well approximated by a parsimonious yet unknown set of variables, and it imposes a restriction whereby only some of the variables have nonzero coefficients.[28]

Thus, we select only the instruments and controls with non-zero penalized effects $\hat{\beta}_{j,\text{LASSO}}$ by estimating:

$$\hat{\beta}_{j,\text{LASSO}} = \underset{\beta_j}{argmin} \sum_{i=1}^{n}(y_i - \sum_{j=1}^{n} x_{i,j}\beta_j)^2 + \lambda \sum_{j=1}^{p} |\beta_j|\gamma_j, \tag{3}$$

where λ is the "penalty level" and γ_j are "penalty loadings".[29] Penalty loadings are estimated from the data to ensure the equivalence of coefficient estimates to a rescaling of x_{ij} and to address heteroskedasticity, clustering, and non-normality in model errors. Similarly, standard errors are clustered at county level to address within-county correlation.

The algorithm for the IV-LASSO methodology does the following: First, it estimates a LASSO regression with New Deal relief as a dependent variable which includes all potential instruments

[27]The 54 variables include turnout and Democratic vote shares in presidential elections (1920–1932) and in congressional elections (1920–1932); their Bernoulli variances in each year, $p(1-p)$; averages of turnout and vote share across those election years; and congressional representation characteristics such as the presence, number, seniority, and party affiliation of county congressmen.

[28]The potential set of county controls includes total population, population for different age intervals, population density, % black, % foreign born, % schooled in different age intervals, % urban and rural population, % people in urban and rural farms, % people not in farms in rural areas, illiteracy rates, manufacturing establishments per capita (pc.), % wage earners in manufacturing, average manufacturing wages, manufacturing product value, manufacturing added value, manufacturing added value pc., % gainful workers, % out of work, % layoff, whole establishments pc., whole average wages, % stocks, retail stores pc., % retail employment, retail sales pc., retail stocks pc., average retail payroll, value of crops pc., number of farms, farms pc., area, area of farms, % farms' area, average farm size, area for crop, area for pasture, % farms of different sizes, and farmland value pc.

[29]We implement the `ivlasso` command from `lassopack` (Ahrens et al., 2020) using its default penalty grid. The penalty levels λ are exponentially spaced between $\lambda_{\max}$ and $\lambda_{\min} = \text{lminratio} \times \lambda_{\max}$, with $\text{lminratio} = 0.001$ and $\text{lcount} = 100$. The maximum penalty level $\lambda_{\max}$ corresponds to the smallest value for which the model is empty under the square-root LASSO specification. These defaults follow the theoretical penalty calibration proposed by Belloni et al. (2012) and Belloni et al. (2014).

(Z) and potential controls (X). From this first regression, we obtain a group of instruments and controls. Second, it estimates a LASSO regression of longevity on all control variables (X), but not the instruments. From this second regression, we get a second set of controls. Third, it estimates a LASSO regression in which New Deal relief spending is the dependent variable and all controls (X) are the regressors. Finally, we estimate a 2SLS regression using the selected instruments in step 1 and the selected controls in steps 2 and 3, to get the post-LASSO IV estimator.[30] When using the LASSO algorithm, we partial out cohort fixed effects and state of birth fixed effects—in other words, we always include these controls.[31] The post-LASSO estimator refits the regression via 2SLS to alleviate LASSO's shrinkage bias.[32]

After this process, the LASSO algorithm selects 1) an instrument for New Deal spending which we label "voting culture exploitability"; and 2) the sparse set of controls defined at the beginning of Section 4. The voting culture exploitability instrument is constructed as the interaction of the dispersion of voter turnout in the 1932 presidential election and the dispersion of voter turnout in the 1928 congressional election.[33] By construction, the instrument takes values between 0 and 0.0625, since each dispersion term ranges from 0 to 0.25. The instrument reaches its highest values in counties with moderate levels of voter turnout and takes lower values in areas where turnout was either very low or very high.

This instrument reflects voting culture exploitability in different counties—that is, how easy it is to obtain additional votes in a given location based on voting behavior. Places with very low turnout do not have a strong voting culture, so obtaining an extra vote in these locations may be very expensive; even if the incumbent spends money in those areas, it will be hard to induce additional people to vote. Places with very high turnout have a robust voting culture, and as a result there are fewer people left to be convinced to vote. Places with medium-level turnout have some voting culture, so it might be possible to induce people to vote, and there are also more potential voters, so obtaining more votes there is likely cheaper. Thus, it would be efficient to allocate funds in places with medium-level turnout.[34]

The key identification assumptions are that the instrument is relevant and that the exclusion restriction holds. We begin with the first assumption. Voting-culture exploitability is strongly correlated with New Deal relief spending per capita, as shown in Figure IV. Appendix Table A.2

[30] All county controls defined at the beginning of this section, including our crisis severity index, are selected using our IV-LASSO approach.

[31] We partial out fixed effects because they are important in our model from a theoretical point of view. We want to compare individuals born in the same year and same state, since both will affect the age at death.

[32] We use the *ivlasso* package to compute these estimators (Ahrens et al., 2020).

[33] We measure dispersion using the Bernoulli variance formula, turnout*(1-turnout), which captures how much voter participation deviates from extreme values within a county.

[34] Appendix Table A.12 presents estimates from our main model using alternative instrumental variables previously employed in the literature.

reports the county-level first stage, where the instrument is a strong predictor of New Deal relief. The F-statistics—652.88, 86.48, and 50.21 across specifications—exceed conventional thresholds for strong instruments. Table IV presents the individual-level first stage, with F-statistics ranging from 54.30 to 18.70.[35] Figure V illustrates the spatial distribution of the instrument, revealing substantial cross-county variation: the South shows lower values, consistent with historically low turnout, and also received less relief on average.

Turning to the exclusion restriction, our identifying assumption is that voting-culture exploitability affects longevity only through New Deal relief spending, conditional on the severity of the crisis and county characteristics. Conceptually, this assumption is plausible because the instrument captures pre-existing political mobilization patterns that influenced the Roosevelt administration's ability to allocate relief efficiently but are unlikely to have directly affected mortality decades later through other channels. To assess this empirically, we test whether counties with different levels of voting-culture exploitability exhibited systematic differences in health outcomes before the New Deal. Figure VII shows that the instrument is uncorrelated with county-level mortality rates from 1920 to 1928. This absence of a pre-treatment relationship provides supporting evidence that the exclusion restriction is likely to hold. We also find no systematic association between other potential political instruments used in the LASSO selection and pre–New Deal mortality.[36] Figure VIII further shows that pre–New Deal mortality is also unrelated to our measure of crisis severity. The absence of any pre-treatment correlation between the instrument and mortality strengthens confidence in the validity of the exclusion restriction underlying our 2SLS estimates.

5. Short- and Long-term Effects of the Great Depression

In this section, we descriptively analyze the short- and long-run effects of the Great Depression on longevity and survival.

We begin by examining the impact on longevity. Table III presents OLS estimates of the relationship between the severity of the Great Depression and longevity. The coefficient on our severity index is negative and statistically significant in the first three specifications, suggesting that individuals in harder-hit areas had shorter lifespans. However, the effect becomes statistically insignificant when applying alternative weighting strategies in columns (4) and (5), indicating

[35] Appendix Figure A.7 shows the distribution of the voting-culture exploitability instrument. The instrument is concentrated between 0.04 and 0.06, with some counties having values between 0 and 0.2. Counties with lower values typically exhibit either very low or very high voter turnout.

[36] Appendix Figure A.8 summarizes the coefficients from regressions of pre–New Deal county-level mortality (1920-1928) on each of the 54 potential instruments, with and without controls. Only a small fraction of coefficients are statistically significant, and the significant variables differ across specifications, suggesting no systematic pre-treatment correlation.

sensitivity to sample composition. The estimated effects are very small, implying limited economic significance. Nonetheless, given the non-random nature of economic distress and the allocation of New Deal funds, these OLS estimates are likely biased.[37]

In Table IV we present post-IV-LASSO estimates, in which we use voting culture exploitability as an instrumental variable for New Deal relief. Compared to the OLS results, the coefficient on the severity index is about five times larger, indicating a substantially stronger relationship between crisis severity and longevity. A one-standard-deviation increase in the severity index is associated with a reduction in longevity of approximately 4.43 months on average.[38] Examining heterogeneity by gender, we find that the effect is larger for men, with an estimated reduction of 5.14 months, while for women, the decline is smaller at 2.76 months. These results suggest that the adverse effects of the Great Depression on longevity were more pronounced among men, potentially reflecting their greater exposure to both economic distress and relief programs.[39][40] [41]

The effects of the Great Depression may vary by age, as some groups were likely more vulnerable to economic shocks than others.Table V presents estimates of the impact of the Depression on longevity by birth cohort, where each cohort is defined as a 10-year birth group. We find that individuals who were aged 0–9 in 1930 experienced the largest effects, with a reduction in lifespan of 9.38 months for a one-standard-deviation increase in crisis severity. However, this estimate is only statistically significant at the 5% level, while the effects for the next two age groups are more precisely estimated. Those aged 10–19 and 20–29 experienced reductions of 5.33 months and 4.43 months, respectively. In contrast, the estimated effects for individuals older than 30 are small—at most 1.77 months for the 30–39 cohort—and not statistically significant, suggesting that the longevity effects of the Depression were concentrated among younger cohorts.[42]

We want to understand when declines in longevity occur by analyzing the effects of crisis severity on annual survival rates from 1930 to 2020, focusing on each birth cohort individually. Since survival rates vary with age, we adopt a cohort-specific approach.[43] Figure IX presents

[37] The coefficients are not statistically different when we analyze them by gender in Appendix Table A.3.

[38] We compute the effect in months by multiplying the estimated log-longevity coefficient by the average lifespan in months for each subgroup. For example, the estimated coefficient of -0.005 for the full sample implies a reduction of 0.005×886.44 months = 4.43 months.

[39] See Appendix Table A.1.

[40] Severity coefficients for men and women are statistically different in the IV specification.

[41] Appendix Tables A.7 and A.8 report results for the same specifications estimated at the county level, confirming the robustness of our main findings.

[42] For a detailed breakdown of the effects by each specific age cohort, see Figure X. This figure illustrates the estimated impacts of both New Deal relief spending and our depression severity index across finer age cohorts. While the effects are particularly pronounced for the youngest cohorts, it is important to note that for cohorts aged 30 and above, the estimates are not statistically different from zero, emphasizing the concentration of impacts among younger individuals.

[43] To further account for trends in longevity, these regressions also control for cohort fixed effects.

OLS and IV estimates for cohorts aged 16 to 25 in 1930, one of the most affected and precisely estimated groups. Notably, the OLS estimates are likely attenuated due to measurement error and endogeneity, leading to a downward bias in the estimated effects. This issue is partly mitigated in the IV specification, which instruments for New Deal relief, yielding larger estimates.

For these cohorts, negative effects on longevity appear soon after the onset of the Great Depression and become statistically significant by 1937, when the cohort reached ages 23 to 32. The magnitude of these effects increases steadily with age, peaking around age 70—40 years after the Depression ended. This delayed effect may be partly explained by the relatively low mortality before age 60: the survival rate to age 60 is 82%. The largest impact is observed in 1982, when these cohorts were 68–77 years old, with a one-standard-deviation increase in crisis severity reducing survival by 1.19 percentage points, equivalent to a 2% decrease relative to the mean survival rate of 60.54%.

We find a similar pattern for all cohorts, reported in Appendix Figure A.9: larger negative effects in the long run compared to the short run. However, for older cohorts, the effects are much smaller, and the patterns appear more attenuated compared to younger cohorts. This delay in effects likely occurs because health responses to economic shocks take time to accumulate enough to cause individuals to die. Schwandt and Von Wachter (2020) document an increasing pattern of mortality effects of the 1982 recession similar to the pattern found here. These cumulative and delayed effects are also predicted by the model of Lleras-Muney and Moreau (2022), who simulate how temporary shocks affect cohort mortality profiles among 20-year-olds.

If we disaggregate the effects by gender, we observe in Appendix Figure A.9 that the magnitude of the effects for men is larger than for women; however, they are not always statistically different. The largest effects for men are observed in 1997 for those who were 6 to 15 years old in 1930, for whom a one-standard-deviation increase in the severity of the Great Depression reduces the probability of survival by 1.13 percentage points, or approximately 3% relative to the mean survival rate of 38.7%. For women, the largest effects occur in 2003 for the same age group, where a one-standard-deviation increase in the severity of the Great Depression reduces the probability of survival for women by 0.63 percentage points, or approximately 1.8% relative to the mean survival rate of 36%.[44][45]

In summary, we find that the Great Depression is associated with long-term negative effects on

[44] The effects are similar in magnitude for cohorts aged 16 to 25 in 1930. For men (women), the largest effect occurs in 1982 (1987), when a one-standard-deviation increase in the severity of the Great Depression reduces the probability of survival by 1.6 (0.8) percentage points, or approximately 2.6% (1.1%) relative to the mean survival rate of 61% (70%).

[45] We repeat our estimation using mortality rates instead of survival rates, and the results are very similar. However, the effects on mortality are less precise. These results are available upon request.

population well-being. The impacts on health are more pronounced in the long run, with teenagers, children, and men experiencing the largest effects. One possible explanation for the heightened impact on young men is that they faced the highest unemployment rates during the recession, making them one of the most affected groups in the 1930s. Additionally, they entered the labor market during a severe economic downturn, which had lasting negative consequences for both income and longevity (Schwandt and Von Wachter, 2019, 2020). We explore some of these mechanisms in section 7.

6. Short and Long-term Effects of New Deal Relief

In this section, we estimate the casual short- and long-term effects of New Deal relief spending, using the identification strategy explained in Section 4.1.

Table III presents OLS estimates of the impact of New Deal relief on longevity. Columns 1–3 show results sequentially: first without controls, then adding county controls, and finally incorporating individual covariates. Columns 4 and 5 further adjust for county-cohort weights and inverse probability weights, respectively. In Column 1, New Deal relief appears to have a significantly negative association with longevity. However, after controlling for regional differences in Column 2, the coefficient magnitude decreases, and the relationship becomes statistically indistinguishable from zero in subsequent specifications.

To address potential bias in the OLS estimates, we present results from the IV specifications. Recall the intuition behind this identification strategy: we compare individuals in counties that received more relief due to political motivations with individuals in counties that experienced the same severity of the Great Depression but received less funding for political reasons. Table IV presents post-IV-LASSO estimates of longevity. The panel on top displays first-stage estimates. As noted earlier, the coefficients on the severity index are positive and statistically significant, indicating that more New Deal funds were allocated to areas where the crisis was more severe. The voting culture exploitability instrument is also positive and statistically significant, confirming that counties with higher instrument values received more relief.[46]

The coefficient on relief is now positive and statistically significant. Unlike the OLS estimates, these results suggest that New Deal relief extended longevity. In Column 1—the specification without controls—the coefficient for New Deal relief is positive, whereas the corresponding OLS estimate was negative. Moreover, the magnitude is now economically significant. In our preferred

[46]F-statistics ranging from 54.3 to 18.7 for the general sample indicate that the instrument is strong. Additionally, it passes the Stock and Yogo test, and the Anderson-Rubin test rejects the null hypothesis that the coefficient of the effect of relief on longevity is zero in all specifications (Lee et al., 2021).

specification (Column 3), which includes all controls, the coefficient remains positive and statistically significant, with an even larger magnitude. A one-standard-deviation increase in total New Deal relief ($164)[47] extended longevity by an average of 14 months.[48] [49]

Next, we examine whether the New Deal compensated for the negative effects of the Great Depression. To do so, we estimate the predicted effects of both New Deal relief and crisis severity and compute the net impact. Panel (a) of Figure VI presents histograms of the predicted effects using the post-IV-LASSO specification, showing that the Great Depression generally reduced longevity, while the New Deal had a positive impact. Panel (b) displays the density of the computed net effects, indicating that, on average, the New Deal more than offset the negative consequences of the recession. Overall, net longevity increased by an average of 9 months.

6.1 Heterogeneity across Gender, Age, and Other Categories

Understanding how the effects of New Deal relief on longevity vary across the population is crucial for policy evaluation and future policy design. Individuals who received relief during their working years may have been affected differently than children. Moreover, men and women worked in different industries and occupations, experienced distinct economic hardships during the Great Depression, and received relief at different rates. To assess who was most likely to benefit from New Deal relief, we use the full-count 1940 Census, which includes a question on whether an individual was employed in a public emergency project or local work relief. The main limitation of this data source is that, by 1939, far fewer people were receiving relief compared to earlier years.

By 1940, we find that only 2% of individuals were working on relief, and 8% of households had at least one member receiving relief. Appendix Table A.1 presents regression results examining the likelihood of living in a household that received relief in the 1940 Census based on individual characteristics. Individuals in relief-receiving households were less likely to be married, own a home, or live in urban areas, and they had lower incomes. They were more likely to be male, had more children, and belonged to larger families.

These patterns can be partly explained by age differences. Appendix Figure A.5 compares the age distribution of individuals who worked on relief in 1940 with those who did not. A large

[47] $\$164$ in New Deal relief is equivalent to approximately $\$1,550$ in 2024 dollars for the full period 1933–1939. This translates to about $\$221.4$ per year for 7 years in 2024 dollars.

[48] We compute the effect in months by first converting a one-standard-deviation increase in New Deal relief into a log percentage change: $\log(1+\frac{\sigma}{\mu})$. We then multiply this value by the estimated coefficient from the IV regression, which captures the elasticity of log(longevity) with respect to log(New Deal relief). Finally, we multiply the result by the average longevity in months to express the effect in absolute terms.

[49] As a robustness check, we exclude deaths during WWII. Since men in counties receiving more New Deal funds were more likely to enlist (Caprettini and Voth, 2023), our main estimates may be a lower bound. However, Appendix Table A.10 shows nearly identical results, suggesting that WWII mortality does not bias our findings.

fraction were young individuals between 18 and 22 years old, a group less likely to be married or have children. In fact, most relief workers were young adults, likely just entering the labor market. Moreover, as Appendix Figure A.6 shows, individuals receiving relief were poorer and had lower family wages.

When we analyze the causal effects of New Deal relief on longevity by gender in Table IV, we find that the main effects come from men, while the impact on women is smaller and less significant. For men (women), a one-standard-deviation increase in New Deal relief ($164) extended longevity by 20 (9) months.[50] These differences likely stem from the fact that many New Deal programs operated through the labor market, where women had much lower participation at the time. Additionally, since women were less affected by the Great Depression overall, their potential gains from relief may have been smaller. We explore these mechanisms in more detail in the following sections.

We examine the causal impact of the New Deal on longevity by cohort using post-IV-LASSO estimates (Figure X). Significant effects are observed for individuals born between 1891 and 1925, with the largest impacts among children, teenagers, and young adults.[51] Particularly, individuals aged 20–24 in 1930 experienced a 21-month increase in longevity following a one-standard-deviation increase in relief ($164). This finding aligns with the results of Aizer et al. (2024) on the CCC, emphasizing the long-term benefits of New Deal and training programs targeting young adults.

We further disaggregate these cohort effects by gender in Appendix Figure A.11. We find that men experienced significant longevity gains from New Deal relief if they were aged 5 to 39 in 1930, whereas the effects for women were much more muted. While the coefficients for women are generally positive, they are smaller in magnitude and only statistically significant for the 20–24 cohort, with no significant effects observed for younger groups. Among the most affected cohorts—those aged 20–24 in 1930—a one-standard-deviation increase in New Deal relief extended longevity by 38 months for men and 16 months for women.

To study the dynamic effects of New Deal relief, we investigate the effects on survival. Figure XI and Appendix Figure A.12 show the dynamic effects for different groups of cohorts estimated by both OLS and IV-LASSO. We can see in the figures that OLS estimates for all cohorts are practically zero. However, when we look at IV estimates, New Deal relief has positive effects on

[50] In Appendix Table A.9, we present these estimates using specifications in levels instead of logarithms. The results are very similar: An increase of one standard deviation in New Deal relief per capita extended, on average, longevity by 13 months when we account for all of the white native population, and by 24 months for men. For women, the effects are not statistically significant, although the magnitude would be 7 months.

[51] The figure excludes results for the 0–4 cohort due to high noise and scale distortion, though these estimates are statistically different from zero and available upon request.

survival rates for all cohorts, with larger magnitudes in the long run. The cohorts that benefited the most are individuals aged 16 to 25 and 6 to 15 in 1930. For the cohort aged 16 to 25 in 1930, the effects are largest in 1982, when the cohorts are around ages 68 to 77, which is again consistent with the model of cohort mortality of Lleras-Muney and Moreau (2022). For that period, a one-standard-deviation increase in New Deal relief is associated with a 4.34 percentage point increase in the probability of survival, representing a 7.16% relative increase compared to the mean survival rate of 60.54%.[52]. For the rest of the cohorts, the effects on survival are smaller.

Appendix Figure A.13 presents IV estimates of survival by gender and confirms that men were much more affected by New Deal relief than women. The figure also shows that the largest effects are estimated for cohorts aged 16 to 25 in 1930. For men, the strongest effect is observed for survival to 1982, where a one-standard-deviation increase in New Deal relief increases the probability of survival by 6.18 percentage points, or approximately 10.14% relative to the mean survival rate of 60.95%. For women, the largest effect appears in 1981, with a one-standard-deviation increase in relief increasing survival probability by 2.3 percentage points, or approximately 2.9% relative to the mean survival rate of 79.20%. While women also experience their largest effects in the 16–25 cohort, their coefficients are smaller than those estimated for men.[53]

In summary, our findings highlight that men, teenagers, and children were the primary beneficiaries of New Deal relief. This may be attributed to their heightened vulnerability to the crisis, leading to positive compensation effects. Additionally, the substantial receipt of relief by men relative to women and teenagers relative to other age groups aligns with our observations in Section 3.[54] These outcomes resonate with existing studies indicating that men exhibit greater sensitivity to adverse shocks (Autor et al., 2019; Van den Berg et al., 2016; Bertrand and Pan, 2013). Furthermore, teenagers may experience amplified effects due to their transition from school to the labor market, enhancing the benefits of relief employment in such circumstances.[55]

We also investigate whether there are other sources of heterogeneity. First, we examine whether the relief had a larger compensatory effect for the poor. To do this, we divide the sample of men aged 16 to 65 by their occupation score in 1930, which serves as a proxy for income since the 1930 US Census did not include questions about income. As shown in Appendix Table A.4, the estimated effects of relief are positive across all groups, but the differences between quartiles do not follow a clear pattern. The coefficient for individuals with missing occupation scores (0.0383) is slightly higher than that for those with any positive score (0.0328), but they are not statistically

[52]For the cohort aged 6-15 in 1930, the largest effect is in 1984, a one-standard-deviation increase in New Deal relief increases the probability of survival by 2.27 percentage points, or approximately 2.95% relative to the mean survival rate of 77%.

[53]OLS coefficients on survival by gender are available upon request.

[54]See Appendix Figure A.5.

[55]See Appendix Figure A.10.

different. Among those with a recorded occupation score, relief effects vary somewhat across quartiles, though there is no strong evidence that lower-income groups benefited disproportionately.[56] Meanwhile, the effects of the Great Depression suggest that men with lower or missing occupation scores were generally more negatively affected, except for those in the third quartile, who do not fit this pattern.

Beyond differences by occupational score, we also examine whether the effects of New Deal relief varied across industries and types of occupations. The economic impact of the Great Depression and subsequent relief efforts likely depended on the sector in which individuals were employed.

To investigate these differences, we first estimate our main specification separately for the eight largest industries in 1930.[57] As shown in Appendix Table A.15, we find positive effects of New Deal relief on longevity across most industries, though the magnitudes vary. The strongest effects are observed in agriculture, retail trade, and professional services—industries that also experienced the largest negative impact from the recession. In contrast, the effects are smaller and less precisely estimated in manufacturing, transportation, and construction, with some estimates not statistically significant. These results suggest that industries more directly linked to public relief programs—such as agriculture and retail trade—experienced larger benefits, while industries like manufacturing and transportation saw more limited effects.[58]

Second, we examine whether the effects of New Deal relief varied by occupation type for men aged 18 to 65 in 1930. The economic impact of the Great Depression and subsequent relief efforts likely depended on the nature of individuals' work, with some occupations more exposed to instability. To explore these differences, we estimate our main specification separately for the 11 largest occupational categories in 1930. As shown in Appendix Table A.16, we find positive effects of New Deal relief on longevity across most occupational groups, though with notable variation in magnitude. The largest effects are observed for operatives, farm laborers, and service workers. In contrast, the effects are smaller and less precisely estimated for sales and clerical workers, with some estimates not statistically significant. These results suggest that occupations more directly linked to manual labor, agriculture, and public-sector employment benefited more from New Deal

[56] The estimated effects of New Deal relief on longevity, when converted to months, range from approximately 12 to 21 months across occupation score quartiles. While all estimates are positive, there is no clear pattern indicating that lower-income groups benefited substantially more. Additionally, the coefficients for the third quartile (0.0522) and the fourth quartile (0.0279) are somewhat less precise, making it difficult to draw strong conclusions about differential impacts by income level.

[57] We limit this sample to men aged 18 to 65 in 1930.

[58] It is important to note that our instrument does not perform as well in some of these specifications, particularly for nondurable manufacturing and mining. This is likely due to the geographic concentration of these industries, which may weaken the strength of the instrument.

relief, while white-collar occupations experienced more muted effects.[59]

Since we find significantly smaller effects for women, we examine whether married women benefited from New Deal relief through their spouses in Appendix Table A.5. Interestingly, we find no evidence supporting this. Single women were more affected by the Great Depression and also benefited more from relief funds. In contrast, the estimates for married women are much smaller and not statistically different from zero. A one-standard-deviation increase in New Deal relief extended longevity by 15 months for single women but by less than 2 months for married women.[60] This suggests that single women may have relied more directly on relief funds, whereas married women may not have experienced a strong income effect from their spouses.

A similar pattern is observed for men, with relief increasing longevity by around 30 months for single men but only 10 months for married men. One possible explanation is that single men may have received more relief than their married counterparts, as they did not have to support a family and could more easily participate in public works programs. Additionally, without family obligations, single men may have had greater flexibility to take full advantage of relief efforts, leading to larger long-term benefits.

Finally, in Appendix Table A.6, we compare IV estimates for men who moved to a different county between 1930 and 1940 (movers) with estimates for those who remained in the same county (stayers).[61] Since we assign New Deal relief and Great Depression values based on an individual's county of residence in 1930, migration could introduce measurement error. We find that stayers were more affected by the recession and benefited slightly more from New Deal relief. Although the point estimates for New Deal relief are slightly larger for stayers than for movers, the differences are not statistically significant. In contrast, the effects of the severity index are statistically different between movers and stayers, but the differences in magnitude are very small. Given that individuals in areas hit hardest by the recession were more likely to migrate, we would expect that movers have slightly attenuated point estimates.

7. Mechanisms

In this section, we investigate potential mechanisms linking the Great Depression and New Deal to longevity. We assess whether changes in employment, income, education, demographics, and

[59] It is important to note that the instrument does not perform as well in certain specifications, particularly for operatives, sales workers, and private household workers.

[60] We also examine these effects by relief program. Married women do not appear to benefit more from any specific program, while single women particularly benefited from FERA and Public Assistance. These results are available upon request.

[61] About 22% of our linked sample relocated from one county to another between 1930 and 1940.

health help explain the observed long-term effects. Using 1940 Census data, we examine how New Deal relief and crisis severity influenced labor market and demographic outcomes (Appendix Figures A.14 and A.15).

New Deal relief had positive effects on wages, particularly for young men aged 15 to 34, while the effects for women were more muted, with positive wage impacts emerging for those aged 15–19 and 40–64. However, we detect no significant effects on employment or labor force participation for young men. Instead, we find some negative effects on employment for men aged 65 and older, suggesting that relief may have facilitated earlier retirement in counties that received more funds. We also observe positive but imprecisely estimated effects of New Deal relief on education for both young men and women.

In contrast, the Great Depression is associated with adverse labor market outcomes. We find wage declines for young men and working-age women, as well as imprecise but negative effects on employment and labor force participation—particularly among women. Schooling outcomes for young men and women also appear negatively associated with crisis severity, though estimates are less precise.

We also examine demographic outcomes using the same 1940 Census data, as shown in Appendix Figures A.16 and A.17. We find that New Deal relief increased the probability of being married for both men and women aged 20 to 39 in 1940. Additionally, it is associated with a higher likelihood of divorce among adults, particularly for women aged 45 to 70 and even older for men. The results also indicate fewer widowed women, which aligns with the large positive effects of New Deal relief on men's longevity. However, we find no statistically significant effects on county-to-county migration between 1930 and 1940.[62]

Meanwhile, the Great Depression appears to have had different effects on demographic outcomes. It is associated with a higher probability of marriage for men aged 55 and older in 1940, but no effects for women. We also find fewer divorces among middle-aged men and women, though the estimates for women are less precise. Additionally, the Great Depression is linked to an increase in widowhood among women across all ages, while no effects are observed for men. As with New Deal relief, we find no significant impact on county-to-county migration.

Next, we conduct a mediation analysis to assess which mechanisms play the largest role in explaining the longevity effects of New Deal relief (Appendix Table A.18). Specifically, we introduce 1940 labor market outcomes as mitigating controls to evaluate whether improvements in employment, wages, or other economic factors account for the observed increase in lifespan.[63] When

[62]The sample for these four figures includes all men and women in our death-linked sample who we were also able to link to the 1940 Census, representing 74.43% of our original linked sample.

[63]For this analysis, we restrict the sample to individuals who can be linked from the 1930 Census to the 1940

these controls are included, the coefficient for New Deal relief decreases from 0.020 to 0.018, suggesting that approximately 10% of the effect is mediated through these economic factors. For men, the coefficient drops from 0.032 to 0.030, implying that 6% of the effect is explained by labor market improvements. For women, the coefficient decreases from 0.007 to 0.003, but the coefficients are not statistically different than zero. These findings suggest that mid-run labor market improvements contributed to the longevity gains from New Deal relief, particularly for men, but do not fully explain them. Since all included labor market controls appear to influence longevity, the New Deal's positive effects on employment and income in the 1940s likely played a role in extending survival. However, as only a fraction of the total effect is mediated, additional economic factors—such as later-life earnings stability or occupational opportunities—may also be contributing. Further research is needed, as 1940 may be too soon after the implementation of New Deal programs for their full effects to have materialized.

To further explore the mechanisms behind the effects of New Deal relief on longevity, we examine its impact on mortality by cause of death using county-level, age-adjusted mortality rates from 1968 to 2016, obtained from the CDC WONDER (Wide-ranging Online Data for Epidemiologic Research) database.[64] [65] For men—who saw the largest mortality reductions—New Deal relief significantly decreased deaths from circulatory, respiratory, and digestive diseases. For women, the effects are more mixed, with lower mortality from circulatory diseases but increased deaths from cancer, possibly due to longer life expectancy and higher detection rates. While men exhibit stronger positive effects across multiple causes, women's results are less consistent. These findings suggest that long-term health improvements, particularly for men, may be linked to better nutrition, reduced occupational hazards, or increased economic security.

Understanding these mechanisms is critical for evaluating the broader implications of economic crises and policy interventions. The historical context of the Great Depression differs from modern downturns, as social safety nets were far more limited. While recent crises—such as the 2008 recession and the COVID-19 pandemic—prompted more extensive policy responses, our findings highlight the lasting importance of targeted relief in mitigating long-term harm. Additionally, our analysis may underestimate the full impact due to sample bias toward individuals with above-average lifespans. Future research could expand on these findings by leveraging improved record-linking techniques and additional datasets—such as the full-count 1950 US Census—to explore medium-term effects and assess heterogeneity across different population groups.

Census. This ensures that any observed changes in the coefficient estimates are due to the inclusion of mitigating controls rather than differences in sample composition.

[64] Only reliable data are included, excluding records with fewer than 10 deaths per county per year.

[65] We report results for the five leading causes of death; additional results are available upon request.

8. Conclusion

Using a large novel dataset that links the population alive in 1930 to their deaths, we provide evidence that the Great Depression was bad for people's health. Although we find negative effects in both the short and long run, the effects are larger in the latter. More importantly, we find that failing to account for the New Deal—the government's response to the economic crisis—results in biased estimates that underestimate the negative effects of the recession. This could partly explain why our results differ from the traditional literature, which finds short-run positive effects of recessions on health (Ruhm, 2000; Ruhm and Black, 2002; Dehejia and Lleras-Muney, 2004; Ruhm, 2005; Miller and Urdinola, 2010; Stevens et al., 2015; Strumpf et al., 2017; Tapia Granados and Ionides, 2017; Tapia Granados and Diez Roux, 2009; Stuckler et al., 2012). Another reason could be that we can follow individuals even if they moved (Arthi et al., 2022).

We also present causal evidence that New Deal relief extended individuals' longevity, and the effects are also larger in the long run. On average, the New Deal extended longevity by 14 months. Our results on the effects of the New Deal are consistent with Fishback et al. (2007), who find reductions in infant mortality, and Aizer et al. (2024), who find positive effects of a specific New Deal program, the CCC, on longevity. New Deal relief more than compensated for the negative consequences of the Great Depression; we find a predicted average net effect of a 9-month increase in longevity.

These findings are driven by men and teenagers and children; we do find smaller effects for women. It is well documented that young men suffered the largest levels of unemployment during the Great Depression and were therefore among the most affected sectors, so this result is encouraging. We find that much of the effect of New Deal spending on longevity for the most affected groups likely came through increases in income and education using outcomes from the 1940 US Census. Interestingly, we find that New Deal spending had no effect on employment or labor force participation.

The results in this paper could have important implications when evaluating or designing public policy, since they provide evidence that both recessions and the policies designed to address them can have large effects on individuals' lives in the long run. For example, the US suffered two main recessions in the last two decades, in 2008 and 2020, during the financial crisis the covid pandemic, respectively. Our results could shed light on whom to target during an economic downturn, since we have seen that the most affected also benefit the most from relief. However, when trying to generalize these findings, we need to consider that in our setting a "social safety net" was nonexistent in the United States. Currently, there are several types of policies that may dampen the negative effects of a recession. In addition, our sample is positively selected toward individuals

with above-average lifespans, which could cause our results to underestimate the effects of both the Great Depression and the New Deal. As new data become available and record-linking processes continue to improve, future research building on this study will benefit from higher linking rates and the ability to examine a broader range of outcomes beyond lifespan. For example, with the increasing accessibility of the full-count 1950 US Census, researchers can replicate our methods to explore medium-term effects on income, employment, and other socioeconomic outcomes. Additionally, as matching techniques advance, this analysis could be extended to populations we were unable to study, such as minorities.

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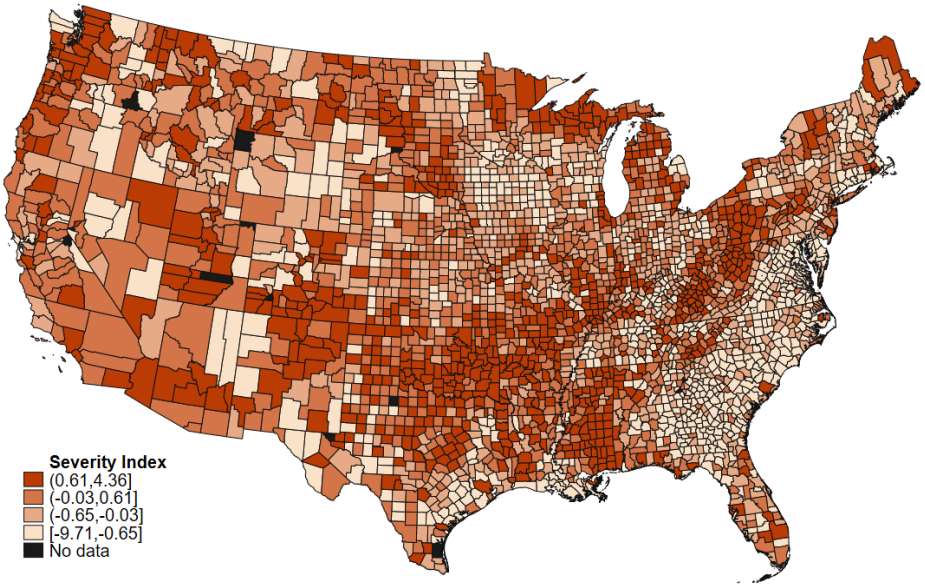
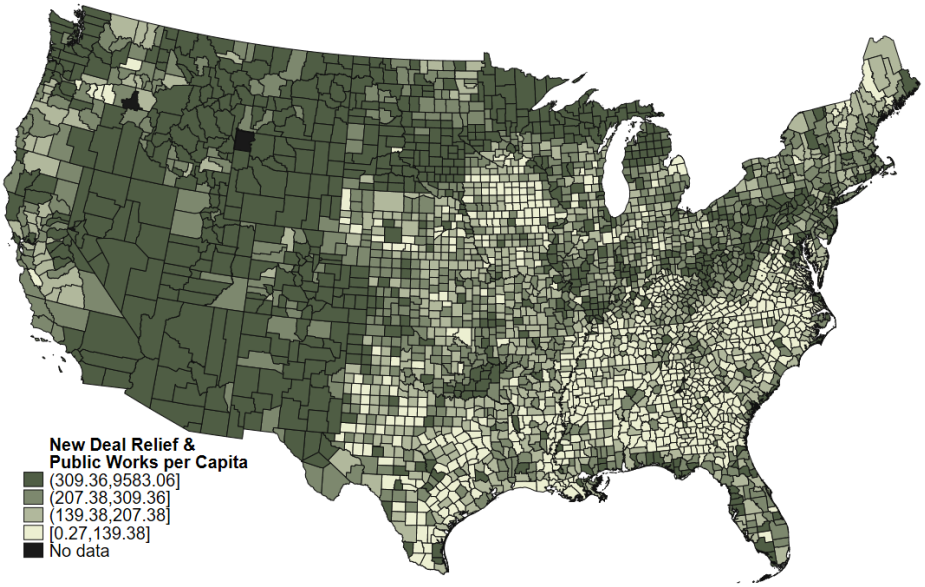
Figures and Tables

Figure I: Variation of the Severity of the Great Depression by County



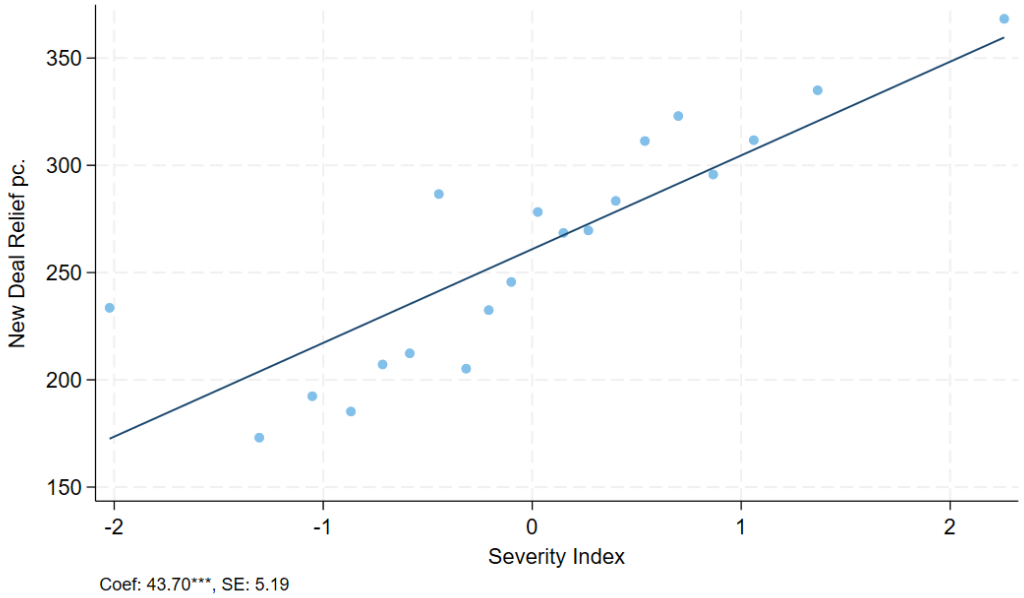
Notes. Black lines represent the limits of the counties in 1930. Counties are colored in red scale to depict the severity of the crisis from 1929 to 1933 as measured by our constructed severity index.

Figure II: Geographic Distribution of New Deal Relief and Public Works Funds per Capita



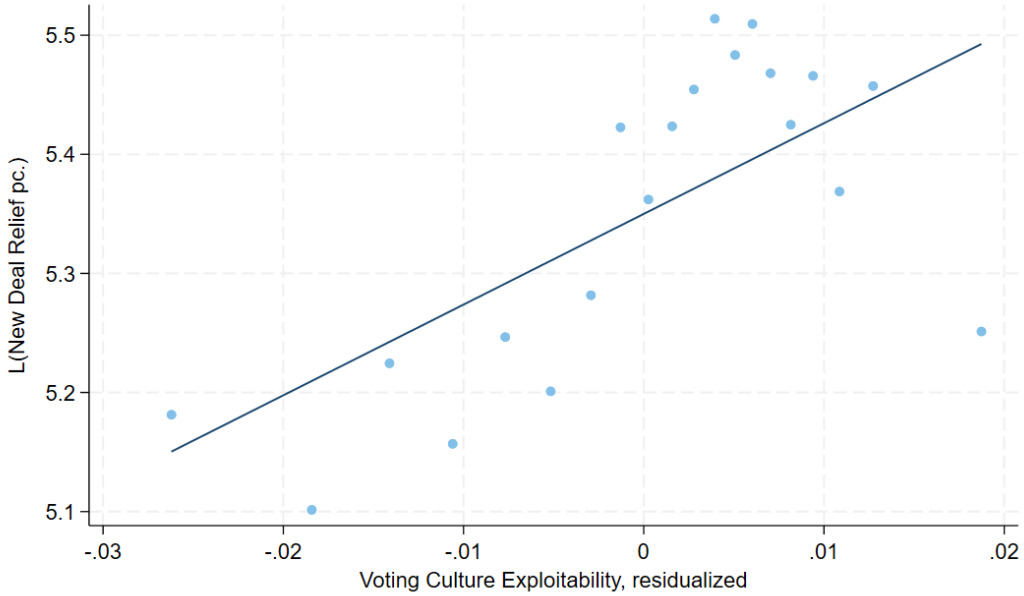
Notes. Black lines represent the limits of the counties in 1930. Counties are colored in green scale to depict the amount of New Deal relief they received. Relief spending data come from the Statistical Section of the Office of Government reports published in 1940, digitized by Fishback et al. (2005).

Figure III: Relationship between New Deal Relief and the Severity Index



Notes. This figure presents a binned scatter plot of the relationship between the severity of the Great Depression (x-axis) and per capita New Deal relief spending (y-axis) at the county level. The severity index is standardized, with higher values indicating greater economic distress. It is constructed as the standardized sum of county-level measures, including changes in retail sales (1929–1933, 1929–1935), changes in farm values, and unemployment rates.

Figure IV: Relationship between Voting Culture Exploitability Instrument and New Deal Relief per Capita



Notes. This figure presents a binned scatter plot of the relationship between the residualized voting culture exploitability instrument (x-axis) and log per capita New Deal relief spending (y-axis) at the county level. The instrument is residualized with respect to baseline county-level controls.

Table I: Summary Statistics

	Full 1930 Census			White US-born Only			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
County-level Measures							
Relief p.c. 1933-1939	280.34	280.66	267.17	280.01	265.30	280.03	290.16
	(163.56)	(162.68)	(164.69)	(161.54)	(163.95)	(161.49)	(158.80)
Severity Index	0.20	0.21	0.24	0.24	0.24	0.24	0.25
	(1.18)	(1.17)	(0.96)	(1.11)	(0.95)	(1.11)	(1.16)
1930 Demographics							
Year of Birth	1901.17	1901.19	1901.24	1903.07	1902.09	1903.08	1904.02
	(19.78)	(19.80)	(19.31)	(19.48)	(19.00)	(19.46)	(19.95)
Year of Death	-	-	1975.13	-	1975.96	1976.83	1978.08
	-	-	(23.04)	-	(22.91)	(23.21)	(23.54)
Age in 1930	28.83	28.81	28.76	26.93	27.91	26.92	25.98
	(19.78)	(19.80)	(19.31)	(19.48)	(19.00)	(19.46)	(19.95)
Age at Death	-	-	73.90	-	73.87	73.75	74.06
	-	-	(15.16)	-	(15.24)	(15.30)	(15.36)
Male	0.51	0.51	0.54	0.50	0.54	0.54	0.47
	(0.50)	(0.50)	(0.50)	(0.50)	(0.50)	(0.50)	(0.50)
White	0.90	0.90	0.98	-	-	-	-
	(0.30)	(0.30)	(0.13)	-	-	-	-
U.S. Born	0.88	0.88	0.95	-	-	-	-
	(0.32)	(0.32)	(0.22)	-	-	-	-
Urban	0.56	0.55	0.45	0.54	0.44	0.52	0.61
	(0.50)	(0.50)	(0.50)	(0.50)	(0.50)	(0.50)	(0.49)
Married	0.43	0.43	0.49	0.39	0.48	0.45	0.32
	(0.49)	(0.49)	(0.50)	(0.49)	(0.50)	(0.50)	(0.47)
In School	0.23	0.23	0.25	0.26	0.26	0.26	0.27
	(0.42)	(0.42)	(0.43)	(0.44)	(0.44)	(0.44)	(0.44)
Geographic Regions							
Northeast	0.28	0.29	0.20	0.28	0.19	0.28	0.34
	(0.45)	(0.45)	(0.40)	(0.45)	(0.39)	(0.45)	(0.47)
Midwest	0.32	0.32	0.39	0.34	0.39	0.34	0.30
	(0.46)	(0.46)	(0.49)	(0.47)	(0.49)	(0.47)	(0.46)
South	0.30	0.29	0.30	0.27	0.31	0.27	0.25
	(0.46)	(0.46)	(0.46)	(0.45)	(0.46)	(0.45)	(0.44)
West	0.10	0.10	0.11	0.10	0.11	0.10	0.11
	(0.30)	(0.30)	(0.32)	(0.30)	(0.31)	(0.30)	(0.31)
Sample Restrictions							
Counties with All Data	-	X	X	X	X	X	X
Linked to Death Record	-	-	X	-	X	X	X
County-Cohort Weights	-	-	-	-	-	X	-
Inverse Probability Weights	-	-	-	-	-	-	X
Observations	122,777,512	119,026,959	45,460,251	93,352,226	42,339,779	42,339,779	42,339,779

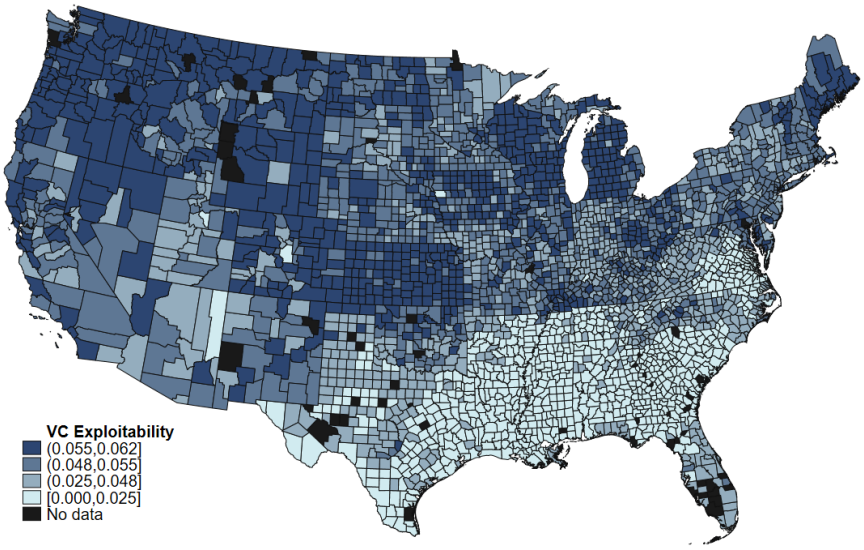
Notes. Column 1 represents the complete 1930 Census, and all other columns are restricted as described by Sample Restrictions and column titles. Counties with All Data includes only counties that have data for all county-level controls used in our main IV specification. Linked to Death Record includes all observations linked to death data from FamilySearch. County-Cohort Weights are calculated as the inverse of the proportion of White, U.S. born people belonging to a given county and birth year cohort who were linked to a FamilySearch death record. Inverse Probability Weights are calculated according to Bailey et al. (2020).

Table II: Analyzing Whom we Match from the 1930 US Census to the FamilySearch Deaths

Dep. Var.	1(Linked to FS deaths)
Family Size	-0.0001***
	(0.0000)
Number of Children	0.0259***
	(0.0005)
Married	0.2089***
	(0.0034)
Student	0.0658***
	(0.0016)
In the Labor Force	-0.0230***
	(0.0020)
Employed	0.0375***
	(0.0018)
Occupation Score	0.0004***
	(0.0001)
Age	-0.0095
	(1.9749)
Age^2	0.0001
	(0.0190)
Severity Index	-0.0098
	(0.0124)
Relief per Capita	-0.0001***
	(0.0000)
Constant	0.2925***
	(0.0095)
Observations	93,352,226
R-squared	0.10

Notes. The sample includes all white native individuals in the 1930 US Census for whom we have county-level data. The regression includes cohort and state of birth fixed effects. Standard errors are clustered at county level. 10%*, 5%**, 1%***.

Figure V: Geographic Distribution of Voting Culture Exploitability Instrument



Notes. Black lines represent the limits of the counties in 1930. Counties are colored in blue scale to depict the distribution of our voting culture exploitability instrument.

Table III: OLS Estimates of the Effects of the New Deal and the Great Depression on Longevity

Dep. Var: L(Age at Death)	(1)	(2)	(3)	(4)	(5)
L(Relief p.c.)	-0.004***	-0.000	0.000	-0.000	-0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Severity Index	-0.002***	-0.001***	-0.001***	-0.001	-0.001
	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)
Constant	4.816***	4.790***	3.948***	3.956***	3.968***
	(0.004)	(0.005)	(0.008)	(0.011)	(0.012)
County-level Controls		X	X	X	X
Individual Controls			X	X	X
County-Cohort Weights				X	
Inverse Probability Weights					X
Observations	42,339,779	42,339,779	42,339,779	42,339,779	42,339,779
R-squared	0.029	0.029	0.041	0.040	0.040

Notes. County-Cohort Weights are calculated as the inverse of the proportion of White, U.S. born people belonging to a given county and birth year cohort who were linked to a FamilySearch death record. Inverse Probability Weights are calculated according to Bailey et al. (2020). All specifications include cohort and state of birth fixed effects. Standard errors in parentheses are clustered at the county level. 10%*, 5%**, 1%***

Table IV: IV Estimates of the New Deal on Longevity

	Everyone			Men	Women
	(1)	(2)	(3)	(4)	(5)
First Stage Outcome: L(Relief per capita)					
Voting Culture Instrument	8.425***	4.154***	4.159***	4.188***	4.125***
	(1.143)	(0.962)	(0.962)	(0.965)	(0.960)
Severity Index	0.173***	0.102***	0.102***	0.100***	0.104***
	(0.045)	(0.028)	(0.028)	(0.029)	(0.028)
Constant	4.099***	5.086***	5.591***	5.598***	5.585***
	(0.117)	(0.148)	(0.090)	(0.090)	(0.089)
Observations	42,339,779	42,339,779	42,339,779	22,869,683	19,470,096
F-stat	54.30	18.66	18.70	18.85	18.47
Second Stage Outcome: L(Longevity)					
Instrumented L(Relief p.c.)	0.020***	0.032***	0.034***	0.048***	0.020***
	(0.005)	(0.010)	(0.010)	(0.013)	(0.009)
Severity Index	-0.006***	-0.005***	-0.005***	-0.006***	-0.003***
	(0.002)	(0.001)	(0.002)	(0.002)	(0.001)
Constant	4.714***	4.621***	3.753***	3.615***	3.813***
	(0.022)	(0.052)	(0.059)	(0.073)	(0.051)
Observations	42,339,779	42,339,779	42,339,779	22,869,683	19,470,096
R^2	0.03	0.03	0.04	0.03	0.03
Mean Longevity (Years)	73.87	73.87	73.87	71.43	76.74
County Controls		X	X	X	X
Individual Controls			X	X	X

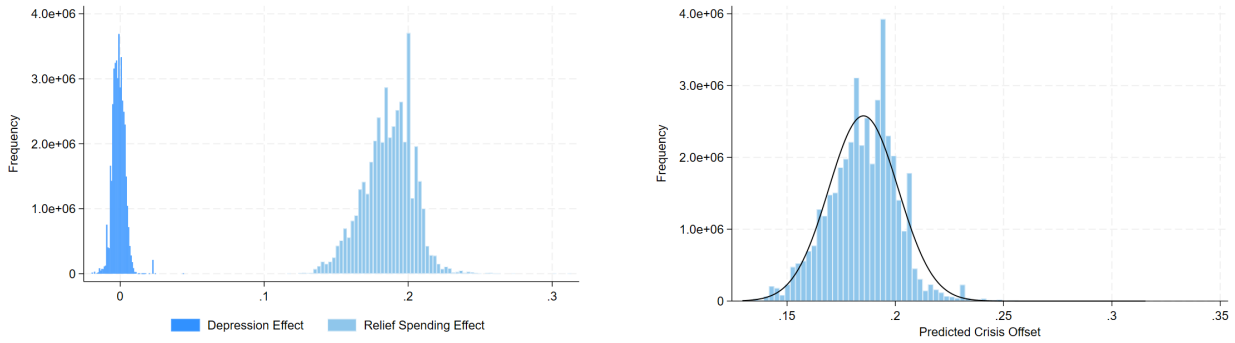
Notes. The sample includes all white, native-born individuals in the 1930 US Census linked to both FamilySearch deaths and county-level data. All specifications include state of birth and cohort fixed effects. Standard errors are clustered at the county level. 10%*, 5%**, 1%***.

Table V: IV Estimates of the New Deal by 10-year Cohort

1930 Age Cohort:	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80+
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
First Stage Outcome: L(Relief p.c.)									
Voting Culture Instrument	3.107***	3.521***	3.999***	4.271***	4.521***	4.794***	5.075***	5.468***	5.821***
	(1.154)	(1.035)	(0.993)	(0.970)	(0.917)	(0.889)	(0.887)	(0.887)	(0.894)
Severity Index	0.104***	0.096***	0.093***	0.100***	0.112***	0.115***	0.117***	0.124***	0.124***
	(0.029)	(0.030)	(0.028)	(0.026)	(0.024)	(0.025)	(0.026)	(0.025)	(0.024)
Constant	5.591***	5.611***	5.618***	5.606***	5.578***	5.574***	5.580***	5.579***	6.504***
	(0.100)	(0.096)	(0.089)	(0.085)	(0.080)	(0.083)	(0.088)	(0.089)	(0.122)
Observations	8,137,636	9,042,484	7,019,742	6,608,137	5,143,531	3,436,553	1,899,876	853,408	198,412
F-stat	6.84	11.57	16.22	19.41	24.32	29.10	32.70	38.04	42.39
Second Stage Outcome: L(Longevity)									
Instrumented L(Relief p.c.)	0.093**	0.036***	0.038***	0.019**	0.007	0.003	0.005	0.005	-0.001
	(0.043)	(0.014)	(0.012)	(0.009)	(0.008)	(0.007)	(0.006)	(0.003)	(0.002)
Severity Index	-0.011**	-0.006***	-0.005***	-0.002	-0.000	0.001	0.000	0.000	0.000
	(0.005)	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)
Constant	3.402***	4.071***	4.075***	4.157***	4.169***	4.130***	4.023***	3.867***	3.737***
	(0.244)	(0.080)	(0.068)	(0.050)	(0.043)	(0.039)	(0.033)	(0.018)	(0.016)
Observations	8,137,636	9,042,484	7,019,742	6,608,137	5,143,531	3,436,553	1,899,876	853,408	198,412
R^2	0.020	0.031	0.032	0.034	0.029	0.022	0.025	0.068	0.516
Mean Longevity (Years)	71.04	74.04	73.83	73.66	74.09	75.36	77.75	81.60	88.41

Notes. Both the First Stage and Second Stage panels present results from estimating our main specification for the specified age cohort. All specifications include state of birth and cohort fixed effects, county-level controls, and individual controls. Standard errors are clustered at the county level. The reported F-statistics are clustered-adjusted F-statistic from the Kleibergen-Paap Wald rk test. 10%*, 5%**, 1%***.

Figure VI: IV-Predicted Effects of the Great Depression and New Deal Relief on Longevity

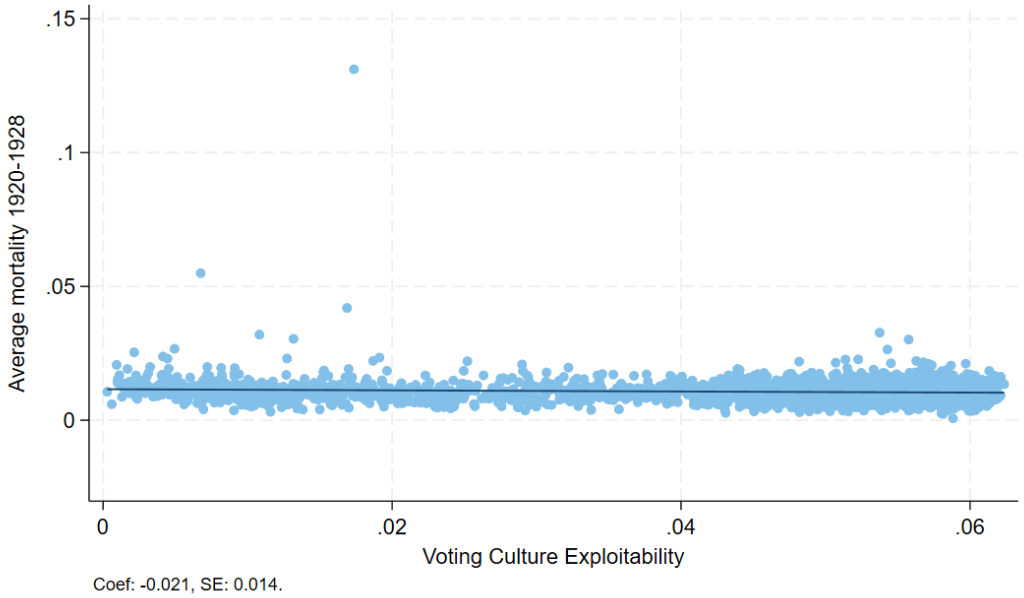


(a) Predicted IV effects on longevity

(b) Predicted IV crisis offsetting

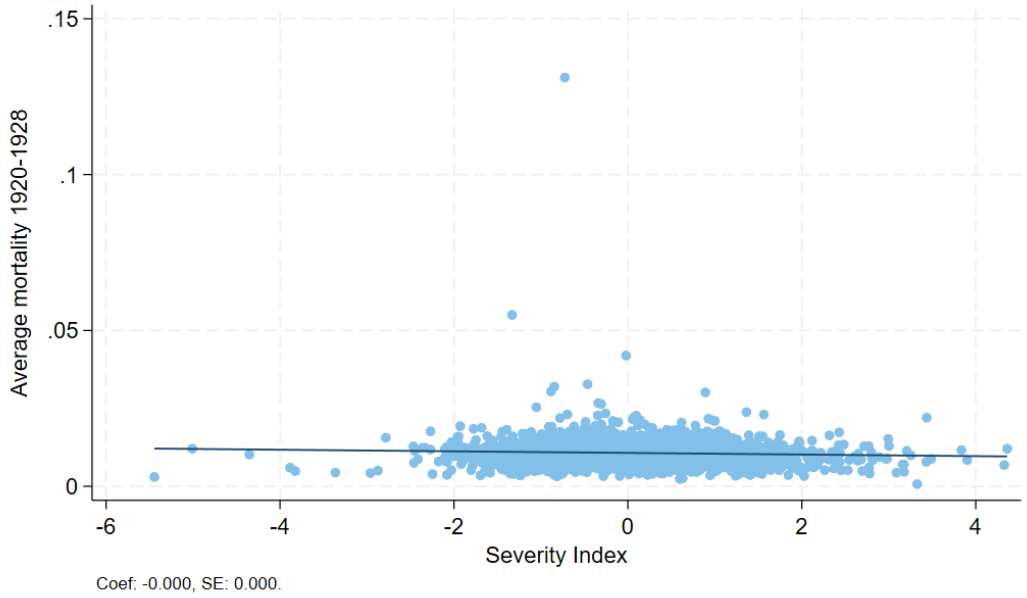
Notes. The figures present the IV-predicted effects of the Great Depression and New Deal relief on longevity. The specification to predict effects includes county controls selected by LASSO and individual covariates from the 1930 Census, as well as state-of-birth and cohort fixed effects. The sample includes all white, native-born individuals in the 1930 Census linked to their FamilySearch deaths.

Figure VII: Relationship of Average Mortality Rates 1920-1928 and Voting Culture Instrument



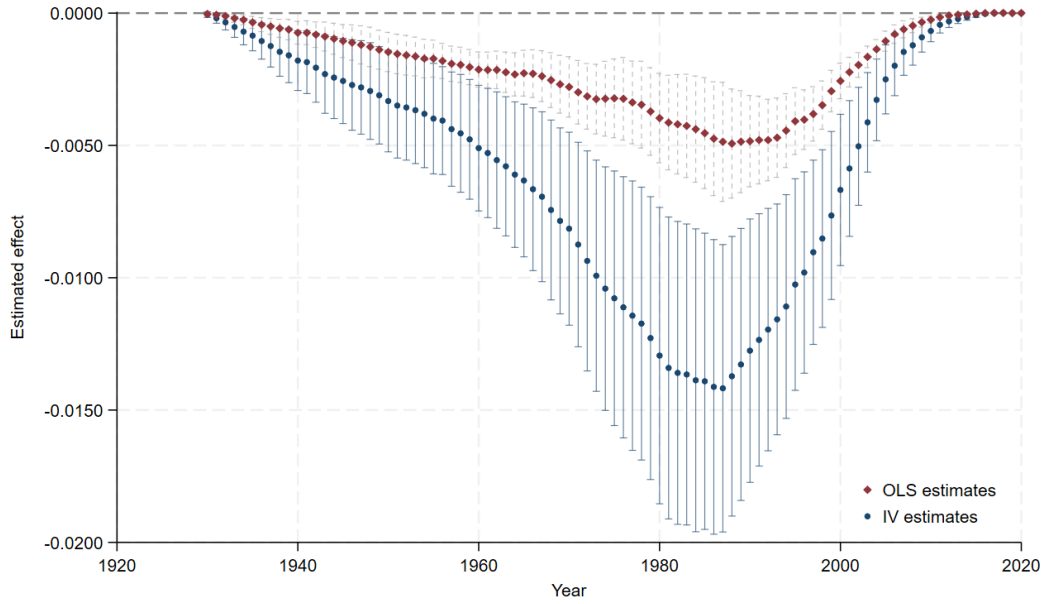
Notes. The figure shows the cross-county relationship between the voting-culture exploitability instrument and the average mortality rate from 1920 to 1928. The fitted line is obtained from a bivariate OLS regression without controls. Results are robust to including the severity of the crisis and county-level covariates selected via LASSO. The coefficient and clustered standard error reported in the bottom left correspond to the regression used for the fitted line and indicate a statistically insignificant association.

Figure VIII: Relationship of Average Mortality Rates 1920-1928 and Crisis Severity Index



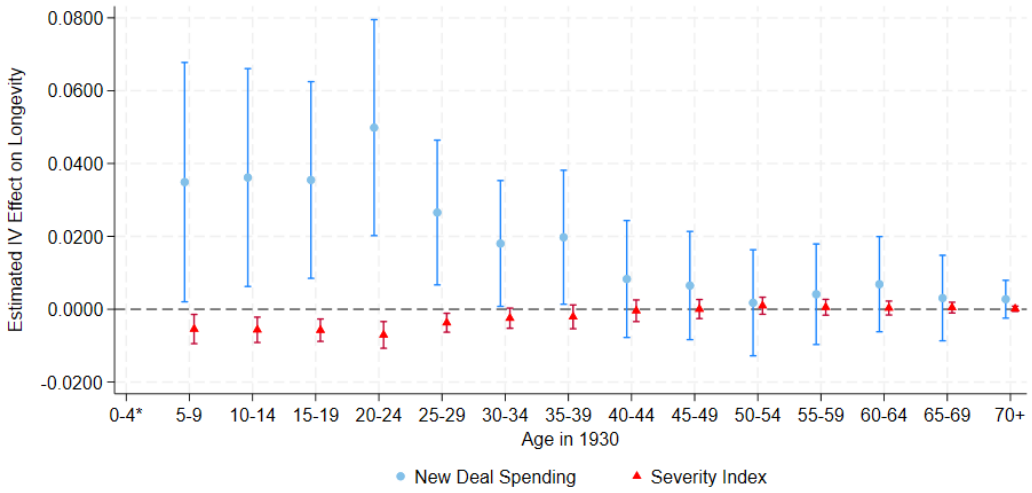
Notes. This figure plots the relationship between the severity of the Great Depression (x-axis) and average mortality rates from 1920 to 1928 (y-axis) at the county level. The severity index is standardized, with higher values indicating greater economic distress. It is constructed as the standardized sum of county-level measures, including changes in retail sales (1929–1933, 1929–1935), changes in farm values, and unemployment rates.

Figure IX: The Effects of the Great Depression on Survival for Cohorts Ages 16-25 in 1930



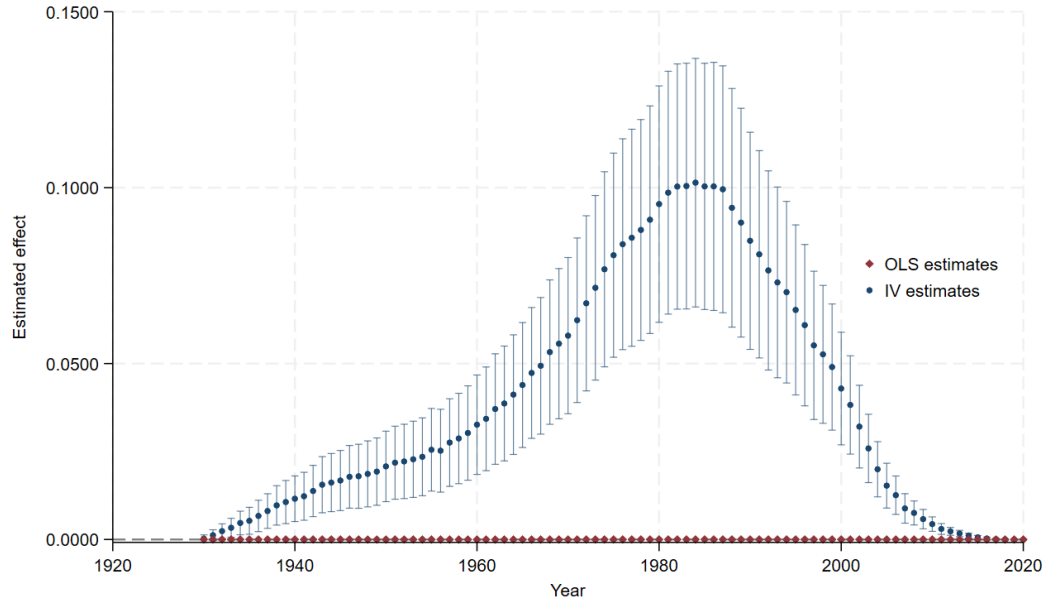
Notes. The figures display OLS and IV coefficient estimates with 95% confidence intervals for the effects of crisis severity on survival from 1933 to 2020 for cohorts aged 16 to 25 in 1930. The estimates are obtained from the IV specification of Equation (2), where New Deal relief is instrumented, while the plotted coefficients correspond to the uninstrumented severity of the crisis. All regressions include county-level controls, individual covariates, and state-of-birth and cohort fixed effects. Standard errors used to compute confidence intervals are clustered at the county level.

Figure X: The Effects of the Great Depression and the New Deal on Longevity by Cohort



Notes. This figure charts coefficient estimates (and their corresponding 95% confidence intervals) for both New Deal relief spending and our depression severity index obtained by estimating our main IV specification on each given age cohort of White, U.S. born people.
*Estimates for the 0-4 cohort are removed to improve the scale of the graph; they are positive and not statistically different from 0 and are available upon request.

Figure XI: Effects of New Deal Relief on Survival for Cohorts 16-25

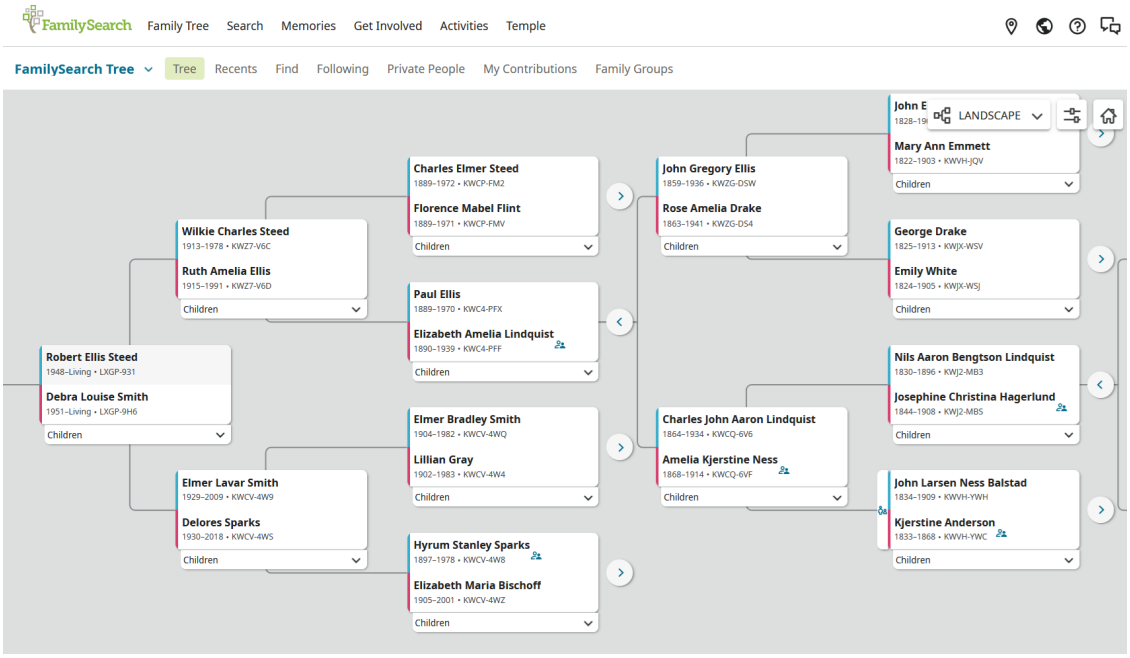


Notes. The figures present OLS and IV coefficients and 95% confidence intervals of the effects of New Deal relief on survival from 1933 to 2020 for cohorts aged 16-25 in 1930. Regressions include county controls, individual covariates, and state of birth and cohort fixed effects. Standard errors used to compute confidence intervals are clustered at county level.

Online Appendix

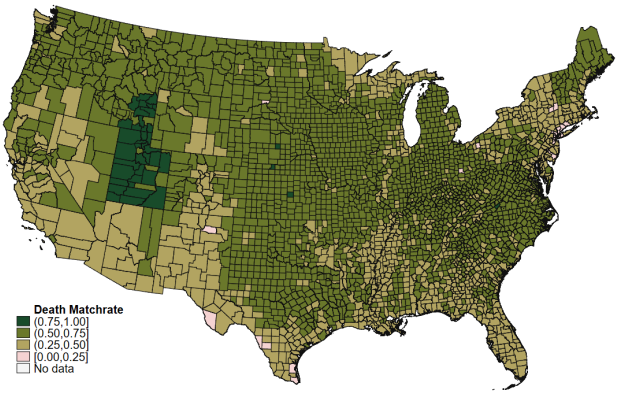
A Additional Figures and Tables

Figure A.1: FamilySearch Tree from the Point of View of a Regular User



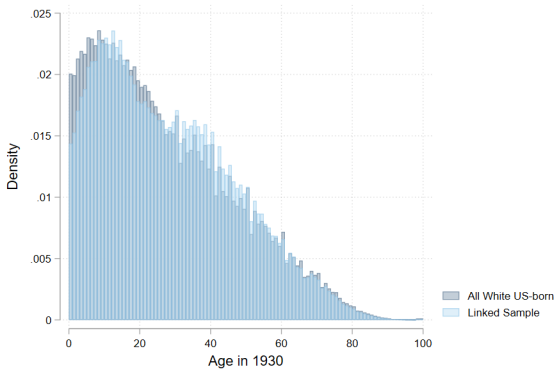
Note: The figure presents an example of a FamilySearch Tree from the point of view of a regular user.

Figure A.2: Match Rates from the White Native Population in the 1930 Census to their FamilySearch Deaths



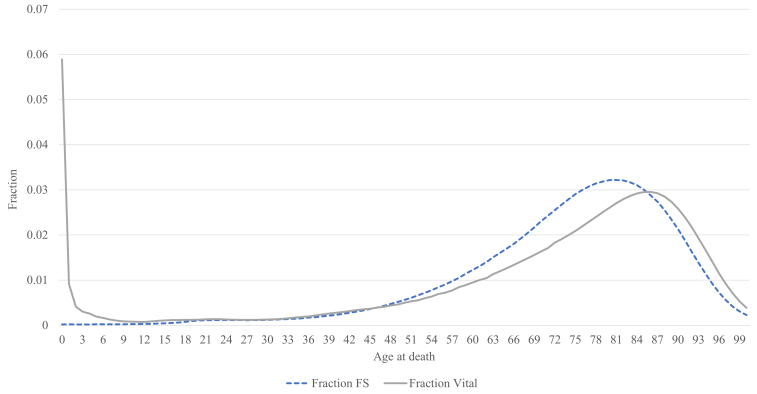
Notes. Black lines represent the limits of counties in 1930. Counties are colored in green scale to depict the level of match rates for the linkage from the white native population in the 1930 Census to their FamilySearch deaths.

Figure A.3: Age Distribution in the 1930 Census Sample and the FamilySearch Linked Sample



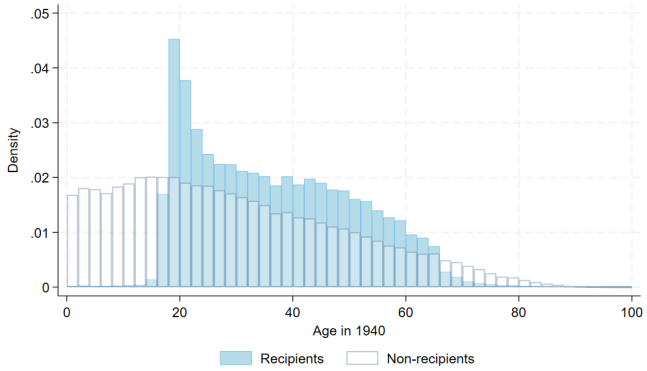
Notes. Age distribution in 1930 for the white native-born population: Census (gray) vs. FamilySearch-linked sample (blue).

Figure A.4: Distribution of the Age of Death for the 1930 Cohort Using Our Linked Sample and the Vital Statistics Data



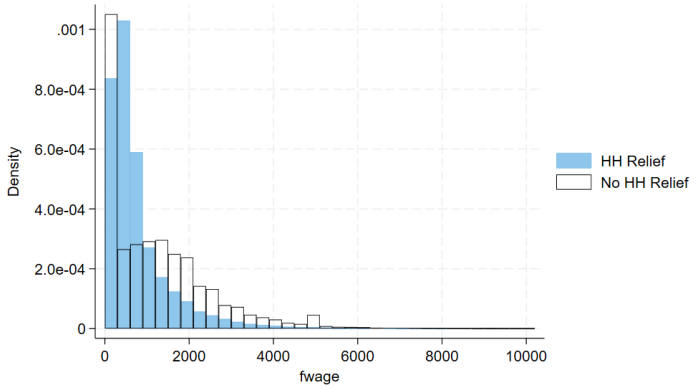
Notes. Age-at-death distribution for the 1929 cohort: linked 1930 Census–FamilySearch sample (dashed blue) vs. Social Security Life Tables (solid gray). The 1929 cohort is used because some 1930 births postdated the census.

Figure A.5: Age Distribution of the Relief Recipients in the 1940 Census



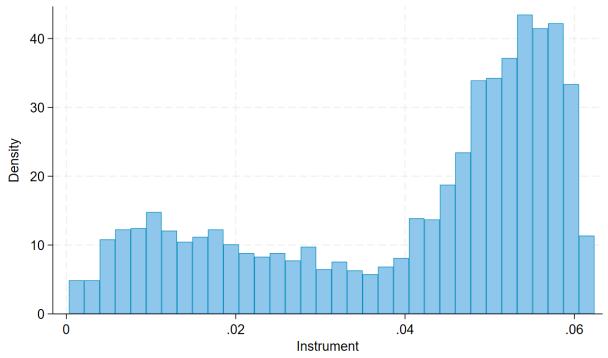
Notes. The figure presents the age distribution in 1940 for relief recipients (blue) and non-recipients (white). The sample includes the population from the full-count 1940 US Census.

Figure A.6: Family Wage Distribution of Relief Recipients in the 1940 Census



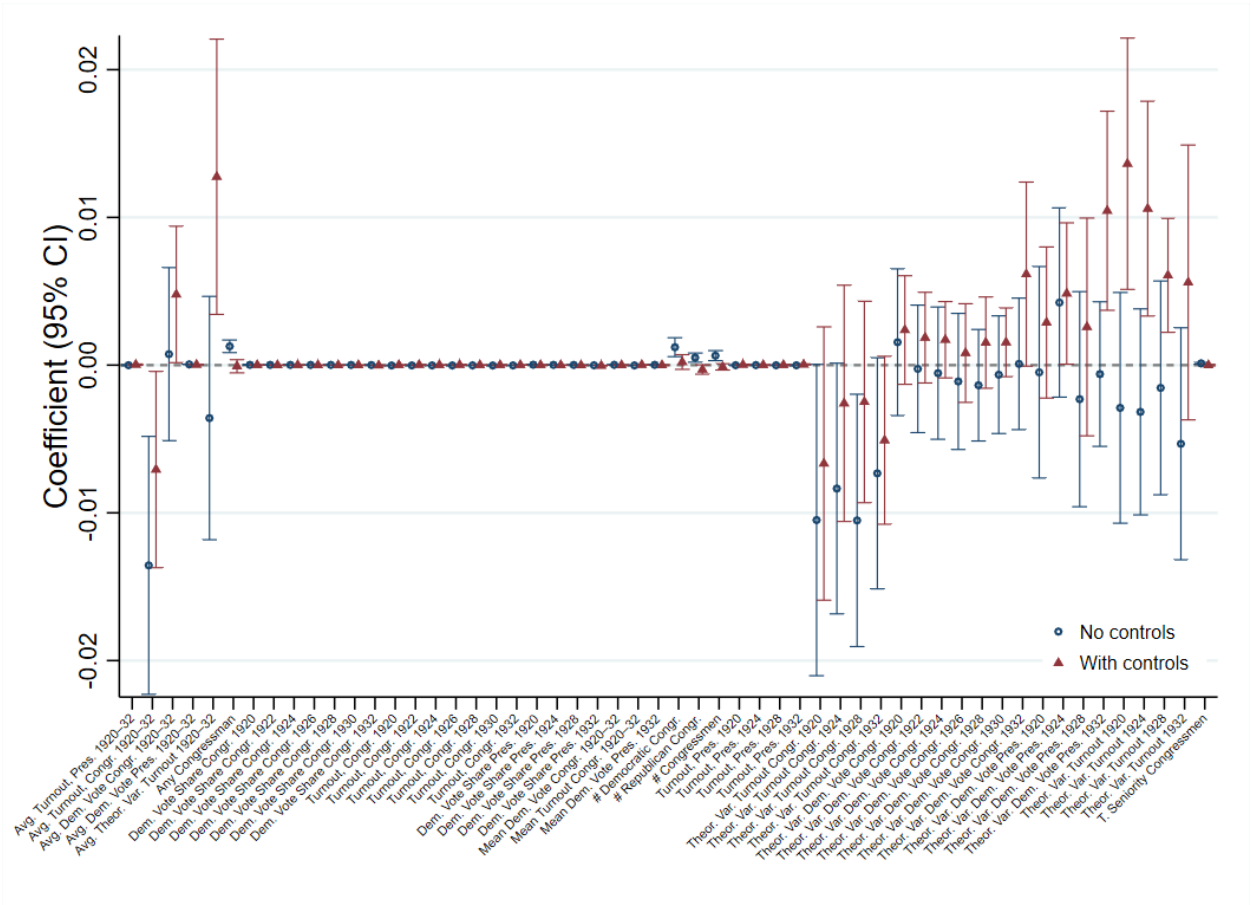
Notes. The figure presents the family wage distribution in 1940 for households with at least one relief recipient (blue) and households with no relief recipients (white). The sample includes 1% of the population from the 1940 US Census.

Figure A.7: Distribution of the Voting Culture Exploitability Instrument



Notes. The histogram presents the distribution of the voting culture exploitability instrument.

Figure A.8: Relationship between potential instruments used in LASSO and average mortality rates, 1920–1928



Notes. Each point represents the coefficient from a regression of pre–New Deal average mortality (1920–1928) on a potential instrument used as input in the lasso specification. Blue circles correspond to regressions without controls, and red triangles to regressions that include county controls. Bars denote 95% confidence intervals, with standard errors clustered by state.

Table A.1: Households Receiving and Not Receiving Relief in 1940

	Not Receiving (1)	Receiving (2)	Difference (3)
Male	0.498	0.524	0.026***
Age	29.654	26.266	-3.389***
Age^2	1270.318	1036.406	-233.912***
Spouse in Home	0.442	0.372	-0.070***
Child in Home	0.319	0.324	0.004***
Farm	0.233	0.223	-0.009***
Urban	0.546	0.476	-0.070***
Homeowner	0.459	0.339	-0.120***
Household Size	4.420	5.879	1.459***
Income	313.056	172.610	-140.446***
Non-Mover	0.686	0.668	-0.017***
Census Divisions			
New England	0.064	0.063	-0.001***
Middle Atlantic	0.206	0.155	-0.051***
East North Central	0.215	0.217	0.002***
West North Central	0.115	0.126	0.011***
South Atlantic	0.120	0.126	0.006***
East South Central	0.073	0.094	0.021***
West South Central	0.096	0.108	0.012***
Mountain	0.034	0.050	0.016***
Pacific	0.078	0.061	-0.017***
Total Observations	98,897,859	7,840,471	106,738,330

Notes. The table compares the means of White, US-born individuals' characteristics in households (not) receiving relief in the 1940 US full-count Census. Column (3) reports the differences in means, subtracting Not Receiving from Receiving. We classify individuals as receiving relief if they answer yes to the 1940 Census question asking "Was the person at work on, or assigned to, public Emergency Work (WPA, NYA, CCC, etc.) during the week of March 24-30?". Households received relief if at least one person in the household received any relief spending. 10%*, 5%**, 1%***.

Table A.2: County-level First Stage: Voting Culture Exploitability Instrument and New Deal Relief

Dep. Var: L(Relief p.c.)	(1)	(2)	(3)
Voting Culture Instrument	13.528***	7.614***	5.889***
	(0.529)	(0.819)	(0.850)
Severity Index	0.179***	0.131***	0.148***
	(0.013)	(0.011)	(0.012)
Constant	4.803***	5.767***	6.033***
	(0.023)	(0.064)	(0.148)
County-level Controls		X	X
Averaged Individual Controls			X
Observations	3,012	3,012	3,012
F-Test	652.88	86.37	47.98

Notes. This table presents county-level first-stage estimates for the relationship between the Voting Culture Exploitability instrument and log per capita New Deal relief spending. The dependent variable is $\ln(\text{Relief p.c.})$. Column (1) reports the baseline specification. Column (2) adds county-level controls, and column (3) further includes averaged individual controls. Robust standard errors are reported in parentheses. F-tests refer to the Kleibergen-Paap Wald rk statistic for instrument strength. 10%*, 5%**, 1%***.

Table A.3: OLS Estimates of the New Deal and the Great Depression on Longevity by Gender

	Men			Women		
Dep. Var: L(Age at Death)	(1)	(2)	(3)	(4)	(5)	(6)
L(Relief p.c.)	-0.003***	0.000	0.000	-0.003***	-0.000	-0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Severity Index	-0.002***	-0.001***	-0.001***	-0.002**	-0.001**	-0.001**
	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)
Constant	4.823***	4.780***	3.885***	4.729***	4.709***	3.928***
	(0.004)	(0.006)	(0.009)	(0.011)	(0.010)	(0.008)
County-level Controls		X	X		X	X
Averaged Individual Controls			X			X
Observations	22,869,683	22,869,683	22,869,683	19,470,096	19,470,096	19,470,096
R-squared	0.035	0.036	0.036	0.025	0.026	0.026

Notes. All specifications include state of birth and cohort fixed effects. Standard errors in parentheses are clustered at the county level. 10%*, 5%**, 1%***

Table A.4: IV Estimates by Occupation Score Quartiles

Occupation Score Quartiles:	No Score (1)	1st quartile (2)	2nd quartile (3)	3rd quartile (4)	4th quartile (5)	Any Score (6)
First Stage Outcome: New Deal Relief Spending pc.						
Voting Culture Instrument	4.265***	5.015***	4.473***	3.517***	4.279***	4.387***
	(1.061)	(0.880)	(1.016)	(1.173)	(1.098)	(0.940)
Severity Index	0.084***	0.152***	0.097***	0.084***	0.066**	0.101***
	(0.031)	(0.012)	(0.029)	(0.032)	(0.031)	(0.027)
Constant	5.650***	5.528***	5.646***	5.722***	5.704***	5.605***
	(0.093)	(0.070)	(0.090)	(0.098)	(0.086)	(0.086)
Observations	1,190,069	3,866,785	2,371,049	3,192,281	2,706,717	12,136,832
F-stat	16.17	32.64	21.39	9.78	16.15	24.29
Second Stage Outcome: L(Longevity)						
L(Relief pc.)	0.034**	0.028***	0.033***	0.050**	0.027**	0.032***
	(0.016)	(0.007)	(0.011)	(0.020)	(0.011)	(0.009)
Severity Index	-0.005**	-0.004***	-0.004**	-0.005*	-0.002	-0.004***
	(0.002)	(0.001)	(0.002)	(0.003)	(0.002)	(0.001)
Constant	3.989***	3.997***	3.967***	3.866***	4.018***	3.978***
	(0.092)	(0.042)	(0.066)	(0.120)	(0.067)	(0.052)
Observations	1,190,069	3,866,785	2,371,049	3,192,281	2,706,717	12,136,832
R-squared	0.02	0.03	0.02	0.02	0.02	0.03

Notes. Both the First Stage and Second Stage panels present results from estimating our main specification by occupation score quartiles for males aged 18 to 65 in 1930. All specifications include state of birth and cohort fixed effects, county controls, and individual covariates. Standard errors are clustered at the county level. The reported F-statistics are clustered-adjusted F-statistic from the Kleibergen-Paap Wald rk test. Significance levels: 10% (*), 5% (**), 1% (***).

Table A.5: IV Estimates of the New Deal and Great Depression on Longevity by Gender and Marital Status

	Men		Women	
	Married	Single	Married	Single
Dep. Var: L(Age at Death)	(1)	(2)	(3)	(4)
L(Relief p.c.)	0.024***	0.073***	0.004	0.034**
	(0.007)	(0.025)	(0.007)	(0.016)
Severity Index	-0.002*	-0.009***	-0.001	-0.005**
	(0.001)	(0.003)	(0.001)	(0.002)
Constant	4.028***	3.461***	4.310***	3.723***
	(0.052)	(0.146)	(0.045)	(0.093)
Observations	10,602,809	12,266,874	9,670,139	9,799,957
R-squared	0.06	0.02	0.01	0.03

Notes. All columns estimate our main IV specification on the specified subset of our sample, including cohort, and state of birth fixed effects along with county-level and individual controls. Standard errors in parentheses are clustered at the county level. 10%*, 5%**, 1%***

Table A.6: IV Estimates of the New Deal and Great Depression on Longevity for Men by Mover Status

Dep. Var: L(Age at Death)	Movers (1)	Stayers (2)
L(Relief p.c.)	0.024***	0.035***
	(0.006)	(0.011)
Severity Index	-0.003***	-0.005***
	(0.001)	(0.001)
Constant	4.003***	3.962***
	(0.037)	(0.061)
Observations	3,819,603	13,709,045
R-squared	0.031	0.049

Notes. Movers are men who did not reside in the same county in 1940 as they did in 1930. All columns estimate our main IV specification on the specified subset of our sample, including cohort and state of birth fixed effects along with county-level and individual controls. Standard errors in parentheses are clustered at the county level. 10%*, 5%**, 1%***

Table A.7: OLS Estimates of the New Deal and Great Depression on Longevity at the County Level

Dep. Var: L(Age at Death)	Everyone (1)	Men (2)	Women (3)
L(Relief p.c.)	0.001	0.001	0.001*
	(0.001)	(0.001)	(0.001)
Severity Index	0.000	0.000	-0.000
	(0.000)	(0.000)	(0.000)
Constant	4.262***	4.205***	4.318***
	(0.005)	(0.006)	(0.006)
Observations	3,012	3,012	3,012
R-squared	0.51	0.58	0.35

Notes. This table reports OLS estimates of the effects of New Deal relief and the severity of the Great Depression on longevity at the county level. The dependent variable in all specifications is the logarithm of the average age at death at the county level. Column (1) includes the full sample, while columns (2) and (3) present results separately for men and women. Robust standard errors are in parentheses. 10%*, 5%**, 1%***

Table A.8: IV Estimates of the New Deal and Great Depression on Longevity at the County Level

	Everyone (1)	Men (2)	Women (3)
First Stage Outcome: L(Relief per capita)			
Voting Culture Instrument	5.990***	4.822***	7.116***
	(0.819)	(0.885)	(0.808)
Severity Index	0.148***	0.152***	0.139***
	(0.012)	(0.012)	(0.012)
Constant	3.808***	5.892***	5.961***
	(0.604)	(0.142)	(0.143)
Observations	3,012	3,012	3,012
F-stat	53.50	29.73	77.54
Second Stage Outcome: L(Longevity)			
Instrumented L(Relief p.c.)	0.027***	0.047***	0.014***
	(0.005)	(0.010)	(0.003)
Severity Index	-0.004***	-0.007***	-0.002***
	(0.001)	(0.002)	(0.001)
Constant	4.223***	3.924***	4.240***
	(0.028)	(0.062)	(0.022)
Observations	3,012	3,012	3,012

Notes. The dependent variable in all specifications is the logarithm of the average age at death at the county level. All columns estimate our main IV specification for the specified sample subset, controlling for state fixed effects, county-level controls, and individual characteristics averaged at the county level. Robust standard errors are in parentheses. 10%*, 5%**, 1%***

Table A.9: IV Estimates of the New Deal and Great Depression on Longevity in Levels

	Everyone (1)	Men (2)	Women (3)
First Stage Outcome: Relief per capita			
Voting Culture Instrument	835.44**	837.63**	832.96**
	(351.42)	(355.38)	(347.63)
Severity Index	21.65***	20.91***	22.56***
	(7.49)	(7.52)	(7.46)
Constant	322.02***	324.51***	318.99***
	(23.96)	(24.02)	(23.91)
Observations	42,339,779	22,869,683	19,470,096
F-stat	5.65	5.56	5.74
Second Stage Outcome: L(Longevity)			
Instrumented Relief p.c.	0.008**	0.012**	0.004
	(0.004)	(0.006)	(0.003)
Severity Index	-0.25**	-0.35**	-0.16**
	(0.11)	(0.15)	(0.07)
Constant	63.57***	60.54***	67.38***
	(1.34)	(1.99)	(0.91)
Observations	42,339,779	22,869,683	19,470,096

Notes. With the exception of using levels instead of logs, all columns estimate our main IV specification on the specified subset of our sample, including cohort and state of birth fixed effects along with county-level and individual controls. Standard errors in parentheses are clustered at the county level. 10%*, 5%**, 1%***

Table A.10: IV Estimates of the New Deal and Great Depression on Longevity: Excluding Early and Wartime Deaths

	Survived to 20			Exclude WWII Deaths		
	Everyone (1)	Men (2)	Women (3)	Everyone (4)	Men (5)	Women (6)
First Stage Outcome: L(Relief per capita)						
Voting Culture Instrument	4.161***	4.190***	4.125***	4.139***	4.163***	4.111***
	(0.961)	(0.964)	(0.959)	(0.964)	(0.967)	(0.961)
Severity Index	0.102***	0.100***	0.104***	0.102***	0.100***	0.104***
	(0.028)	(0.029)	(0.028)	(0.028)	(0.029)	(0.028)
Constant	5.592***	5.599***	5.586***	5.591***	5.598***	5.585***
	(0.090)	(0.090)	(0.089)	(0.090)	(0.090)	(0.089)
Observations	42,051,031	22,694,424	19,356,607	40,769,438	21,880,129	18,889,309
F-stat	18.73	18.89	18.49	18.45	18.55	18.28
Second Stage Outcome: L(Longevity)						
Instrumented L(Relief p.c.)	0.023***	0.036***	0.009	0.035***	0.048***	0.020**
	(0.007)	(0.010)	(0.006)	(0.010)	(0.013)	(0.009)
Severity Index	-0.003***	-0.005***	-0.02**	-0.005***	-0.006***	-0.003***
	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)
Constant	4.134***	3.987***	4.208***	3.754***	3.621***	3.816***
	(0.041)	(0.055)	(0.034)	(0.059)	(0.073)	(0.050)
Observations	42,051,031	22,694,424	19,356,607	40,769,438	21,880,129	18,889,309

Notes. Left block (*Survived to 20*) excludes individuals who died before age 20. Right block (*Exclude WWII Deaths*) excludes those who died during WWII (1942–1945). All columns estimate the main IV specification on the indicated subsample, including cohort and state of birth fixed effects plus county-level and individual controls. Standard errors in parentheses are clustered at the county level. 10%*, 5%**, 1%***.

Table A.11: IV Estimates of the New Deal with Alternate Measures of the Great Depression

	Everyone				Men	Women
	(1)	(2)	(3)	(4)	(5)	(6)
L(Relief p.c.)	0.034***	0.037***	0.036***	0.023***	0.032***	0.012**
	(0.010)	(0.012)	(0.011)	(0.006)	(0.007)	(0.006)
Severity Index	-0.005***					
	(0.001)					
Unemployment Rate, 1930		-0.001		0.001***	0.001***	0.001*
		(0.001)		(0.000)	(0.000)	(0.000)
Adj. ΔRetail Sales, 1929-1933			0.002	-0.004**	-0.005*	-0.004**
			(0.002)	(0.002)	(0.003)	(0.002)
Adj. ΔRetail Sales, 1929-1935				0.006***	0.007***	0.005**
				(0.002)	(0.003)	(0.002)
Adj. ΔFarm Values, 1930-1935				-0.001	-0.003**	0.000
				(0.001)	(0.001)	(0.001)
Unemployment Rate, 1937				-0.001***	-0.001***	-0.001***
				(0.000)	(0.000)	(0.000)
Unemployment Rate, 1940				-0.001***	-0.001***	-0.000***
				(0.000)	(0.000)	(0.000)
Constant	3.753***	3.735***	3.738***	3.838***	3.726***	3.872***
	(0.058)	(0.068)	(0.064)	(0.033)	(0.039)	(0.033)
Observations	42,339,779	42,339,779	42,339,779	42,339,779	22,869,683	19,470,096
R-squared	0.039	0.039	0.039	0.040	0.035	0.025

Notes. All columns estimate our main IV specification except for substituting our severity index for other measures of the severity of the crisis. Adjusted variables have their signs reversed so that an increase in the variable suggests a more severe crisis. All specifications include cohort and state of birth fixed effects along with county-level and individual controls. Standard errors in parentheses are clustered at the county level. 10%*, 5%**, 1%***

Table A.12: IV Estimates of the New Deal with Instruments from the Literature

	First Stage		Second Stage	
Instrument	L(Relief p.c.)	F-stat	L(Age at Death)	R-squared
	(1)	(2)	(3)	(4)
Our voting culture instrument	4.159***	18.70	0.034***	0.039
	(0.962)		(0.010)	
Turnout, Pres. 1932	0.006***	11.46	0.004	0.041
	(0.002)		(0.006)	
Turnout, Pres. 1928	0.003	2.22	0.019	0.040
	(0.002)		(0.016)	
% of population voting, 1932	0.006***	13.21	0.004	0.041
	(0.002)		(0.006)	
County land area	-0.000	0.03	0.044	0.039
	(0.000)		(0.282)	
Sd. Dem vote share, 1896-1928	-0.003**	5.72	0.031**	0.040
	(0.001)		(0.014)	
Mean Dem vote share, 1896-1928	-0.003***	12.54	0.043**	0.039
	(0.001)		(0.022)	
Roosevelt vote share over mean, 1896-1928	-0.000	0.05	-0.401	-0.104
	(0.001)		(1.783)	
Average tenure in House of Reps, 1933	0.000	2.02	-0.014	0.040
	(0.000)		(0.024)	
All outside instruments at once	-	7.38	0.004	0.040
			(0.003)	

Notes. All rows estimate our main IV specification using the specified instrument from the literature, including cohort and state of birth fixed effects along with county-level and individual controls. Standard errors in parentheses are clustered at the county level. F-tests refer to the Kleibergen-Paap Wald rk statistic for instrument strength. 10%*, 5%**, 1%***

Table A.13: IV Estimates of the New Deal by New Deal Program

Program Abbreviation:	NDEXP (1)	WPA (2)	CWA (3)	FERA (4)	PUBASS (5)	FSARR2 (6)	PBA (7)	PWAF (8)	PWANF2 (9)	USHAH (10)
First Stage Outcome: L(Program Spending)										
Voting Culture Instrument	3.022***	3.629**	0.658	6.223***	17.964***	16.199**	10.333	25.243*	1.616	12.547
	(0.892)	(1.568)	(1.593)	(1.172)	(1.844)	(7.929)	(16.628)	(14.317)	(5.890)	(20.612)
Severity Index	0.081***	0.238***	0.094***	0.233***	0.049***	0.507***	-0.236*	-0.032	-0.577***	0.179
	(0.026)	(0.067)	(0.020)	(0.052)	(0.017)	(0.106)	(0.125)	(0.124)	(0.121)	(0.341)
Constant	4.734***	3.757***	1.997***	3.123***	0.217**	-6.390***	-0.425	0.021	3.346***	-6.814***
	(0.081)	(0.195)	(0.094)	(0.141)	(0.108)	(0.502)	(0.968)	(0.871)	(0.456)	(1.478)
Observations	42,339,779	42,339,779	42,339,779	42,339,779	42,339,779	42,339,779	42,339,779	42,339,779	42,339,779	42,339,779
F-stat	11.48	5.36	0.17	28.22	94.87	4.17	0.39	3.11	0.08	0.37
Second Stage Outcome: L(Longevity)										
L(Program Spending)	0.047***	0.039**	0.216	0.023***	0.008***	0.009**	0.014	0.006*	0.088	0.011
	(0.016)	(0.018)	(0.526)	(0.006)	(0.002)	(0.004)	(0.022)	(0.003)	(0.322)	(0.019)
Severity Index	-0.005***	-0.010**	-0.021	-0.006***	-0.002***	-0.006**	0.002	-0.001	0.050	-0.003
	(0.002)	(0.005)	(0.050)	(0.002)	(0.000)	(0.002)	(0.006)	(0.001)	(0.187)	(0.004)
Constant	3.721***	3.797***	3.512***	3.872***	3.942***	4.000***	3.950***	3.944***	3.650***	4.021***
	(0.079)	(0.070)	(1.063)	(0.023)	(0.006)	(0.028)	(0.012)	(0.008)	(1.102)	(0.123)
Observations	42,339,779	42,339,779	42,339,779	42,339,779	42,339,779	42,339,779	42,339,779	42,339,779	42,339,779	42,339,779
R^2	0.04	0.04	-0.15	0.04	0.04	0.04	0.00	0.03	-0.40	0.03

Notes. Both the First Stage and Second Stage panels present results from estimating our main specification, except substituting the log of total per-capita relief spending for the given individual New Deal spending program. All specifications include state of birth and cohort fixed effects, county-level controls, and individual controls. Standard errors are clustered at the county level. F-tests refer to the Kleibergen-Paap Wald rk statistic for instrument strength. 10%*, 5%**, 1%***.

Table A.14: County-level IV Estimates by Cause of Death

	Men					Women				
Cause of Death:	Circulatory System Diseases	Neoplasms, Cancer	Respiratory System Diseases	External Causes of Injury and Poisoning	Digestive System Diseases	Circulatory System Diseases	Neoplasms, Cancer	Respiratory System Diseases	External Causes of Injury and Poisoning	Digestive System Diseases
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
First Stage Outcome: New Deal Relief pc.										
Voting Culture Instrument	8.1734***	6.9503***	5.3451***	5.4408***	4.2443**	7.8614***	6.1325***	4.8206***	3.9680**	4.1154*
	(0.7848)	(0.8765)	(1.1680)	(1.1021)	(2.0888)	(0.7851)	(0.9284)	(1.2080)	(1.7611)	(2.1729)
Severity Index	0.1507***	0.1464***	0.1328***	0.1205***	0.0760***	0.1505***	0.1449***	0.1279***	0.0792***	0.0713***
	(0.0098)	(0.0118)	(0.0166)	(0.0157)	(0.0261)	(0.0099)	(0.0130)	(0.0173)	(0.0235)	(0.0266)
Constant	5.6455***	5.6770***	5.7346***	5.7664***	5.7973***	5.6488***	5.7140***	5.7659***	5.8601***	5.7870***
	(0.0619)	(0.0692)	(0.0955)	(0.0903)	(0.1559)	(0.0617)	(0.0739)	(0.0998)	(0.1358)	(0.1645)
Observations	115,795	87,435	44,352	50,192	17,888	115,502	76,980	38,022	22,467	16,823
F-stat	108.5	62.9	20.9	24.4	4.1	100.3	43.6	15.9	5.1	3.6
Second stage outcome: Age-adjusted mortality rate (1968-2016)										
Log(Relief pc $)	-54.9669***	-3.1695	-31.9601**	-16.7527	-25.6419*	-38.8033***	29.7509***	-13.9579*	-7.1994	-14.3761
	(14.0095)	(7.4798)	(12.7496)	(12.1724)	(13.9761)	(9.9372)	(6.6543)	(7.8363)	(9.1561)	(8.9708)
Severity Index	20.8355***	6.4489***	11.0801***	10.0670***	3.5722***	16.1498***	-1.8981*	5.3315***	3.1330***	2.0129***
	(2.5117)	(1.1580)	(1.9076)	(1.4756)	(1.3329)	(1.8375)	(1.0527)	(1.0823)	(0.7839)	(0.7727)
Constant	1,193.9002***	244.7100***	306.5010***	250.6987***	219.9025***	813.4935***	-10.6239	137.1109***	95.7317*	124.4944**
	(85.5898)	(45.5323)	(76.9903)	(74.9427)	(85.1014)	(60.5515)	(40.3460)	(47.2331)	(56.2577)	(54.4260)
Mean Dep. Variable	569.5	264.1	120.5	116.8	44.05	370.1	169.2	72.99	41.89	29.09
Observations	115,795	87,435	44,352	50,192	17,888	115,502	76,980	38,022	22,467	16,823
R-squared	0.7528	0.217	0.1175	0.3968	-0.1465	0.7093	-0.1023	0.2715	0.2504	-0.2885

Notes. Age-adjusted mortality rates (1968–2016) are obtained from the CDC WONDER (Wide-ranging Online Data for Epidemiologic Research) database, which provides county-level mortality data. Only reliable data are included, excluding records with fewer than 10 deaths per county per year. Mortality rates are age-adjusted to the 2000 U.S. standard population to ensure comparability across counties and years. We report results for the 5 largest causes of death and other results are available upon request. The unit of analysis is county-year. All specifications include county-level controls and year fixed effects. Standard errors are clustered at the county level (in parentheses). The reported F-statistics refer to the clustered-adjusted F-statistic using the Kleibergen-Paap Wald rk test. *** p<0.01, ** p<0.05, * p<0.1.

Table A.15: IV Estimates by Industry

Industry:	Agriculture, Forestry, Fishing	Manufacturing Durable Goods	Retail Trade	Manufacturing Nondurable Goods	Transportation	Construction	Professional & Related Services	Mining
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
First Stage Outcome: New Deal Relief Spending pc.								
Voting Culture Instrument	5.3806***	4.4035***	3.9381***	3.0687**	5.1778***	4.5755***	4.2587***	3.7351
	(0.7981)	(1.1758)	(1.0450)	(1.2542)	(1.1131)	(1.1170)	(1.0569)	(2.2872)
Severity Index	0.1575***	0.081**	0.0787***	0.0612*	0.0929***	0.0775***	0.0713**	0.1953***
	(0.0098)	(0.0317)	(0.0297)	(0.0333)	(0.0318)	(0.0272)	(0.0310)	(0.0193)
Constant	5.7139***	5.7532***	5.8532***	5.7783***	5.7343***	5.7647***	5.9007	5.3535***
	(0.0603)	(0.0956)	(0.0853)	(0.0999)	(0.0949)	(0.0894)	(.)	(0.1506)
Observations	4,549,295	1,605,711	1,193,196	1,061,837	946,266	945,536	458,991	412,071
F-stat	45.5	14.0	14.2	6.0	21.6	16.8	16.2	2.7
Second Stage Outcome: L(Longevity)								
L(Relief pc.)	0.0258***	0.0144	0.0292**	0.0474*	0.0011	0.0216*	0.0391***	0.0696
	(0.0059)	(0.0111)	(0.0116)	(0.0253)	(0.0092)	(0.0110)	(0.0150)	(0.0504)
Severity Index	-0.0038***	-0.0016	-0.0022*	-0.0045*	0.0012	-0.0018	-0.0042**	-0.0144
	(0.0010)	(0.0012)	(0.0013)	(0.0026)	(0.0011)	(0.0015)	(0.0018)	(0.0104)
Constant	3.7670***	4.0420***	3.9841***	3.8787***	4.1544***	3.5811***	3.8855***	3.3453***
	(0.0858)	(0.0753)	(0.0781)	(0.1561)	(0.0849)	(0.2559)	(0.1171)	(0.5448)
Observations	4,549,295	1,605,711	1,193,196	1,061,837	946,266	945,536	458,991	412,071
R-squared	0.05	0.03	0.04	0.02	0.04	0.05	0.03	0.03

Notes. Both the First Stage and Second Stage panels present results from estimating our main specification by industry for males aged 18 to 65 in 1930. We report results for the 8 largest industries and other results are available upon request. Standard errors are clustered at the county level. The reported F-statistics refer to the clustered adjusted F-statistic using the Kleibergen-Paap Wald rk test. $10\%*$, $5\%**$, $1\%***$.

Table A.16: IV estimates by Occupation

Occupation:	Farmers and farm managers	Craftsmen, foremen, kindred workers	Laborers (except farm and mine)	Operatives, kindred workers	Managers, officials, proprietors (except farm)	Farm laborers and foremen	Sales workers	Clerical, kindred workers	Professional, technical, kindred workers	Service workers (except private household)	Private household workers
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
First Stage Outcome: New Deal Relief Spending pc.											
Voting Culture Instrument	5.6020***	4.2067***	5.0710***	2.9105**	4.2267***	4.7473***	3.3991***	3.9559***	4.0446***	4.1077***	2.8036*
	(0.7911)	(1.2574)	(1.0043)	(1.3434)	(1.0302)	(0.8679)	(1.0948)	(1.2136)	(1.1395)	(1.0724)	(1.4678)
Severity Index	0.1638***	0.0622**	0.1106***	0.1092***	0.0782***	0.1608***	0.0561*	0.0346	0.0567*	0.0652**	0.0747***
	(0.0093)	(0.0268)	(0.0269)	(0.0330)	(0.0295)	(0.0099)	(0.0314)	(0.0293)	(0.0320)	(0.0295)	(0.0271)
Constant	5.6863***	5.7643***	5.7321***	5.7514***	5.6755	5.7096***	5.8834***	5.8966***	5.6953***	5.7659***	5.7329***
	(0.0616)	(0.0920)	(0.0864)	(0.1079)	(.)	(0.0708)	(0.0909)	(0.0999)	(0.0887)	(0.0814)	(0.1145)
Observations	3,097,616	2,054,528	1,778,846	1,625,197	1,240,349	1,228,194	905,459	715,191	657,048	335,145	10,241
F-stat	50.1	11.2	25.5	4.7	16.8	29.9	9.6	10.6	12.6	14.7	3.6
Second Stage Outcome: L(Longevity)											
L(Relief pc.)	0.0253***	0.0356**	0.0248***	0.1017**	0.0187*	0.0391***	0.0239*	0.0279	0.0320**	0.0467***	0.0655
	(0.0055)	(0.0147)	(0.0089)	(0.0515)	(0.0097)	(0.0116)	(0.0136)	(0.0178)	(0.0145)	(0.0174)	(0.1375)
Severity Index	-0.0035***	-0.0021	-0.0027*	-0.0130*	-0.0016	-0.0072***	-0.0016	-0.0014	-0.0033**	-0.0009	-0.0117
	(0.0010)	(0.0015)	(0.0014)	(0.0067)	(0.0013)	(0.0019)	(0.0014)	(0.0014)	(0.0016)	(0.0022)	(0.0111)
Constant	3.8104***	3.8529***	3.7262***	3.2681***	4.0144***	3.5985***	4.0304***	3.7485***	3.9712***	3.7069***	3.4019***
	(0.0992)	(0.1325)	(0.0794)	(0.3404)	(0.0769)	(0.1978)	(0.0977)	(0.3368)	(0.1181)	(0.1462)	(0.9868)
Observations	3,097,616	2,054,528	1,778,846	1,625,197	1,240,349	1,228,194	905,459	715,191	657,048	335,145	10,241
R-squared	0.05	0.03	0.04	0.00	0.05	0.02	0.03	0.02	0.02	0.07	0.05

Notes. Both the First Stage and Second Stage panels present results from estimating our main specification by occupation for males aged 18 to 65 in 1930. We report results for the 11 largest occupations and other results are available upon request. Standard errors are clustered at the county level. The reported F-statistics refer to the clustered adjusted F-statistic using the Kleibergen-Paap Wald rk test. $10\%*$, $5\%**$, $1\%***$.

Table A.17: Weighted IV Estimates of the New Deal and Great Depression on Longevity

	Unweighted	County-Cohort	Inverse Probability
	(1)	(2)	(3)
First Stage Outcome: L(Relief per capita)			
Voting Culture Instrument	4.159***	4.142***	3.695***
	(0.962)	(1.096)	(1.238)
Severity Index	0.102***	0.055*	0.041
	(0.028)	(0.032)	(0.031)
Constant	5.591***	5.687***	5.749***
	(0.090)	(0.090)	(0.090)
Observations	42,339,779	42,339,779	42,339,779
F-stat	18.70	14.29	8.91
Second Stage Outcome: L(Longevity)			
Instrumented L(Relief p.c.)	0.034***	0.049***	0.042**
	(0.010)	(0.016)	(0.019)
Severity Index	-0.005***	-0.004*	-0.002
	(0.001)	(0.002)	(0.002)
Constant	3.753***	3.668***	3.715***
	(0.058)	(0.097)	(0.116)
Observations	42,339,779	42,339,779	42,339,779

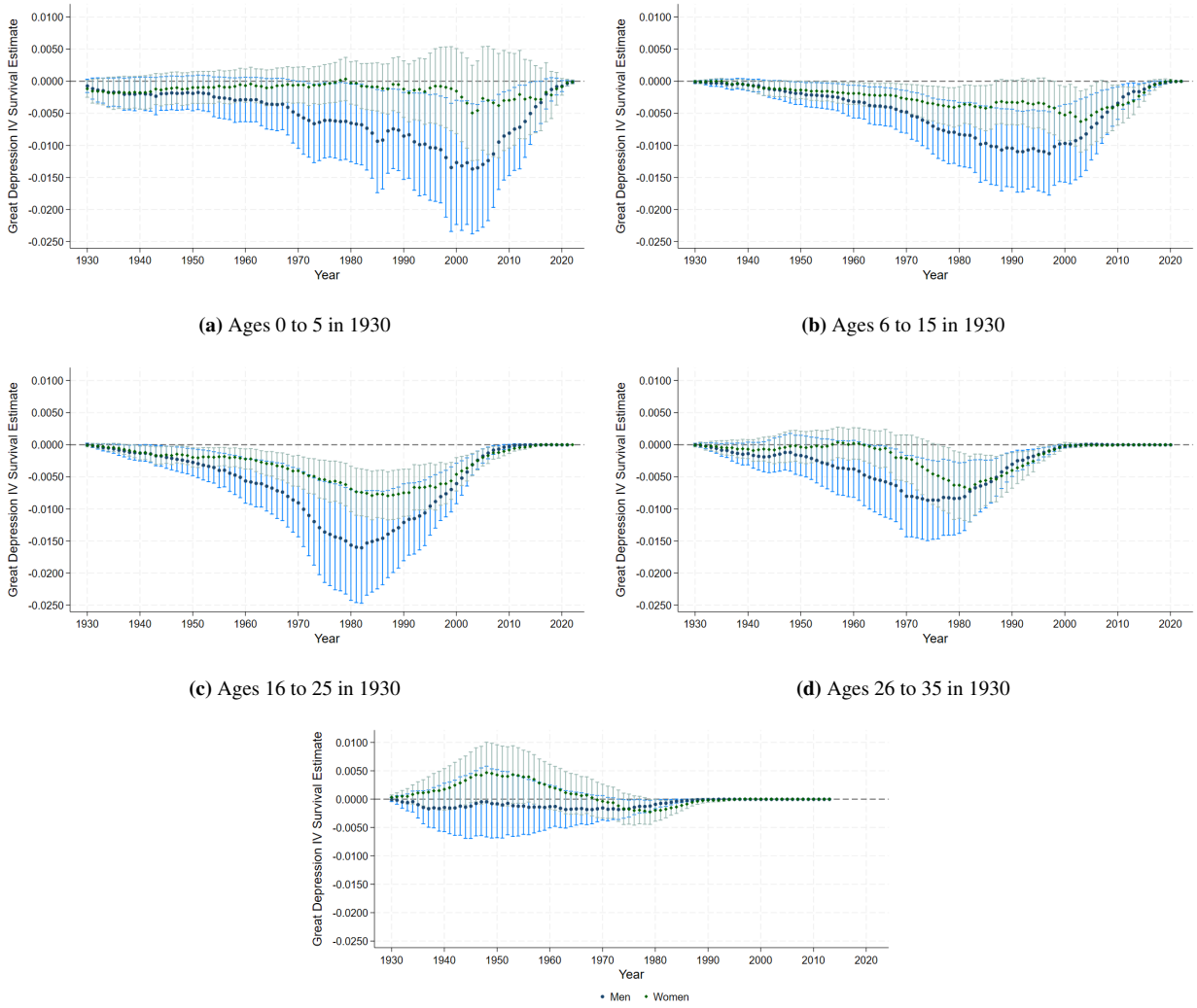
Notes. County-Cohort Weights are calculated as the inverse of the proportion of White, U.S. born people belonging to a given county and birth year cohort who were linked to a FamilySearch death record. Inverse Probability Weights are calculated according to Bailey et al. (2020). All columns estimate our main IV specification on the specified subset of our sample, including state of birth and cohort fixed effects along with county-level and individual controls. Standard errors in parentheses are clustered at the county level. F-stats calculated following Kleibergen and Paap (2006). 10%*, 5%**, 1%***

Table A.18: IV Estimates with 1940 Outcomes as Mitigating Controls

	Everyone (1)	Men (2)	Women (3)
First Stage Outcome: L(Relief per capita)			
No 1940 Outcomes			
Voting Culture Instrument	4.087***	4.112***	4.056***
	(0.969)	(0.975)	(0.963)
Severity Index	0.105***	0.103***	0.108***
	(0.028)	(0.028)	(0.027)
F-stat	17.77	17.77	17.73
Including 1940 Outcomes			
Voting Culture Instrument	4.090***	4.114***	4.060***
	(0.970)	(0.975)	(0.964)
Severity Index	0.105***	0.103***	0.108***
	(0.028)	(0.028)	(0.027)
Highest Grade Completed, 1940	0.000	0.000	0.000
	(0.001)	(0.000)	(0.001)
L(Income, 1940)	0.000***	0.001***	-0.000
	(0.000)	(0.000)	(0.000)
Employed in 1940	-0.016***	-0.017***	-0.009**
	(0.003)	(0.003)	(0.004)
In Labor Force in 1940	0.008***	0.006**	0.008**
	(0.003)	(0.003)	(0.003)
F-stat	17.77	17.79	17.72
Second Stage Outcome: L(Longevity)			
No 1940 Outcomes			
Instrumented L(Relief p.c.)	0.020***	0.032***	0.007
	(0.006)	(0.009)	(0.006)
Severity Index	-0.003***	-0.005***	-0.002**
	(0.001)	(0.001)	(0.001)
Including 1940 Outcomes			
Instrumented L(Relief p.c.)	0.018***	0.030***	0.003
	(0.006)	(0.008)	(0.006)
Severity Index	-0.003***	-0.004***	-0.001
	(0.001)	(0.001)	(0.001)
Highest Grade Completed, 1940	0.005***	0.004***	0.005***
	(0.000)	(0.000)	(0.000)
L(Income, 1940)	-0.000***	-0.001***	0.000***
	(0.000)	(0.000)	(0.000)
Employed in 1940	0.026***	0.029***	0.009***
	(0.000)	(0.000)	(0.000)
In Labor Force in 1940	-0.002***	0.001***	-0.004***
	(0.000)	(0.000)	(0.000)
Observations	31,513,117	17,528,648	13,984,469

Notes. All columns estimate our main specification, including cohort and state-of-birth fixed effects, as well as baseline individual and county controls. The listed specifications additionally include the specified 1940 outcomes and a dummy for missing income in 1940. Standard errors (in parentheses) are clustered at the county level. F-statistics are calculated following Kleibergen and Paap (2006). 10%*, 5%**, 1%***.

Figure A.9: IV Estimates of the Effects of the Great Depression on Survival by Gender



(a) Ages 0 to 5 in 1930

(b) Ages 6 to 15 in 1930

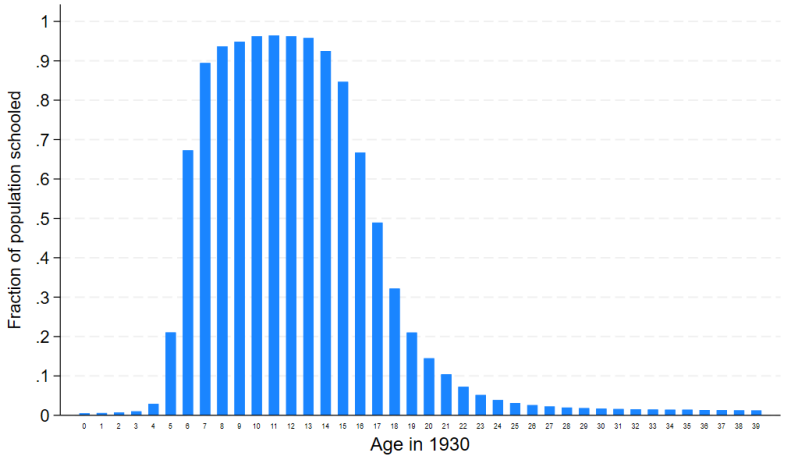
(c) Ages 16 to 25 in 1930

(d) Ages 26 to 35 in 1930

(e) Ages over 35 in 1930

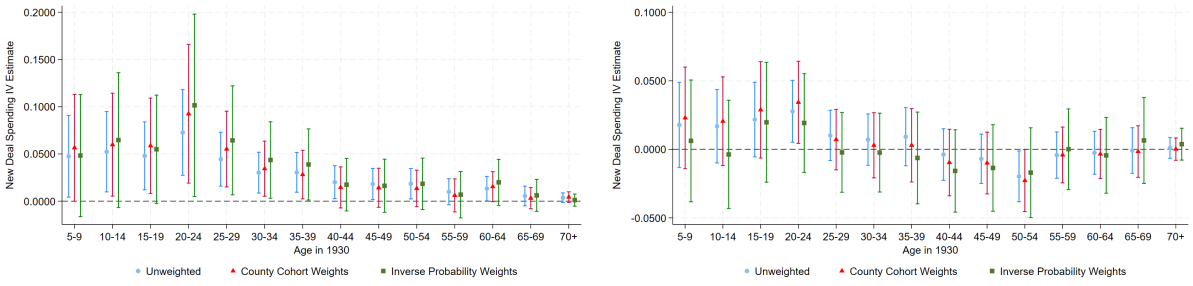
Notes. The figures present coefficient estimates and 95% confidence intervals for the effects of the uninstrumented severity of the Great Depression on survival from 1933 to 2020 for men and women of different ages in 1930. The estimates come from the IV specification for New Deal relief. All regressions include county controls, individual covariates, and state-of-birth and cohort fixed effects. Standard errors used to compute confidence intervals are clustered at the county level.

Figure A.10: Fraction of Individuals in School in the 1930 Census by Age



Notes. The figure displays the fraction of individuals enrolled in school by age in the 1930 full-count U.S. Census. The sample includes all individuals recorded in the census.

Figure A.11: IV Estimates of the Effect of New Deal Relief on Longevity by Gender

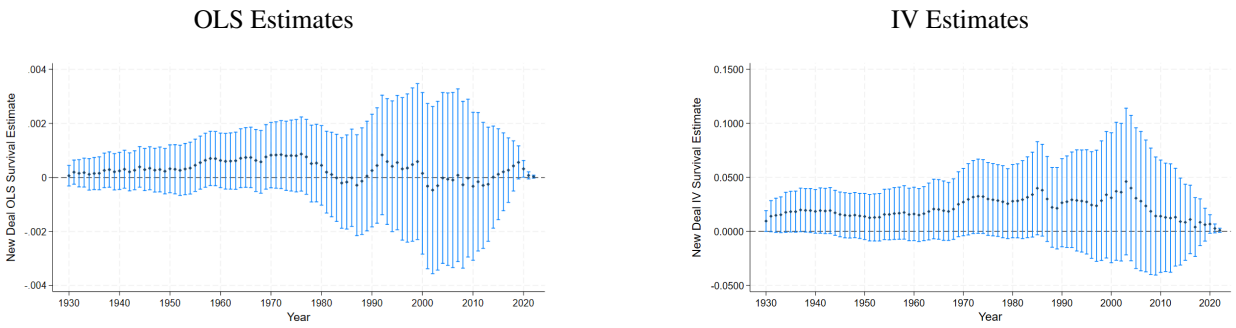


(a) Men **(b)** Women

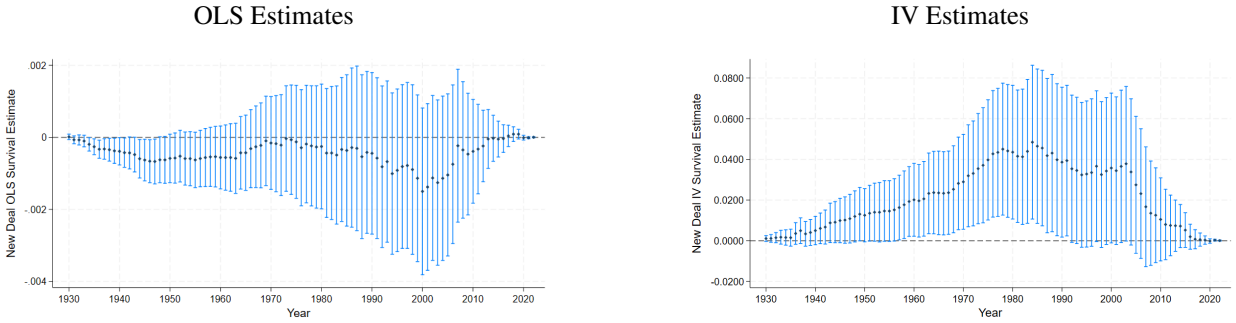
Notes. The figures show IV coefficient estimates and 95% confidence intervales for the effect of New Deal relief spending obtained by estimating our main IV specification on each given age cohort of White, U.S. born people by gender. The estimates for the 0-4 cohort are removed from both graphs to improve the scale of the graph; they are not statistically different from zero and are available upon request. County-Cohort Weights are calculated as the inverse of the proportion of White, U.S. born people belonging to a given county and birth year cohort who were linked to a FamilySearch death record. Inverse Probability Weights are calculated according to Bailey et al. (2020). Standard errors used to compute confidence intervals are clustered at the county level.

Figure A.12: The Effects of New Deal Relief on Survival by 1930 Age Cohort

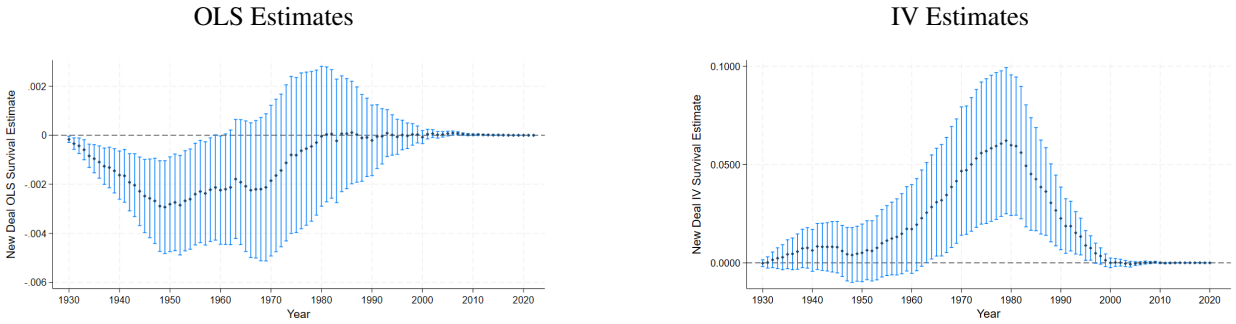
(a) Cohort 0–5



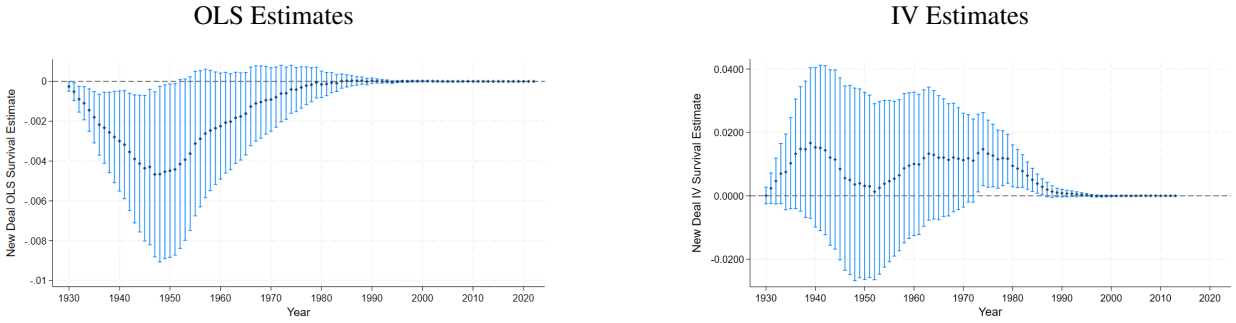
(b) Cohorts 6–15



(c) Cohorts 26–35

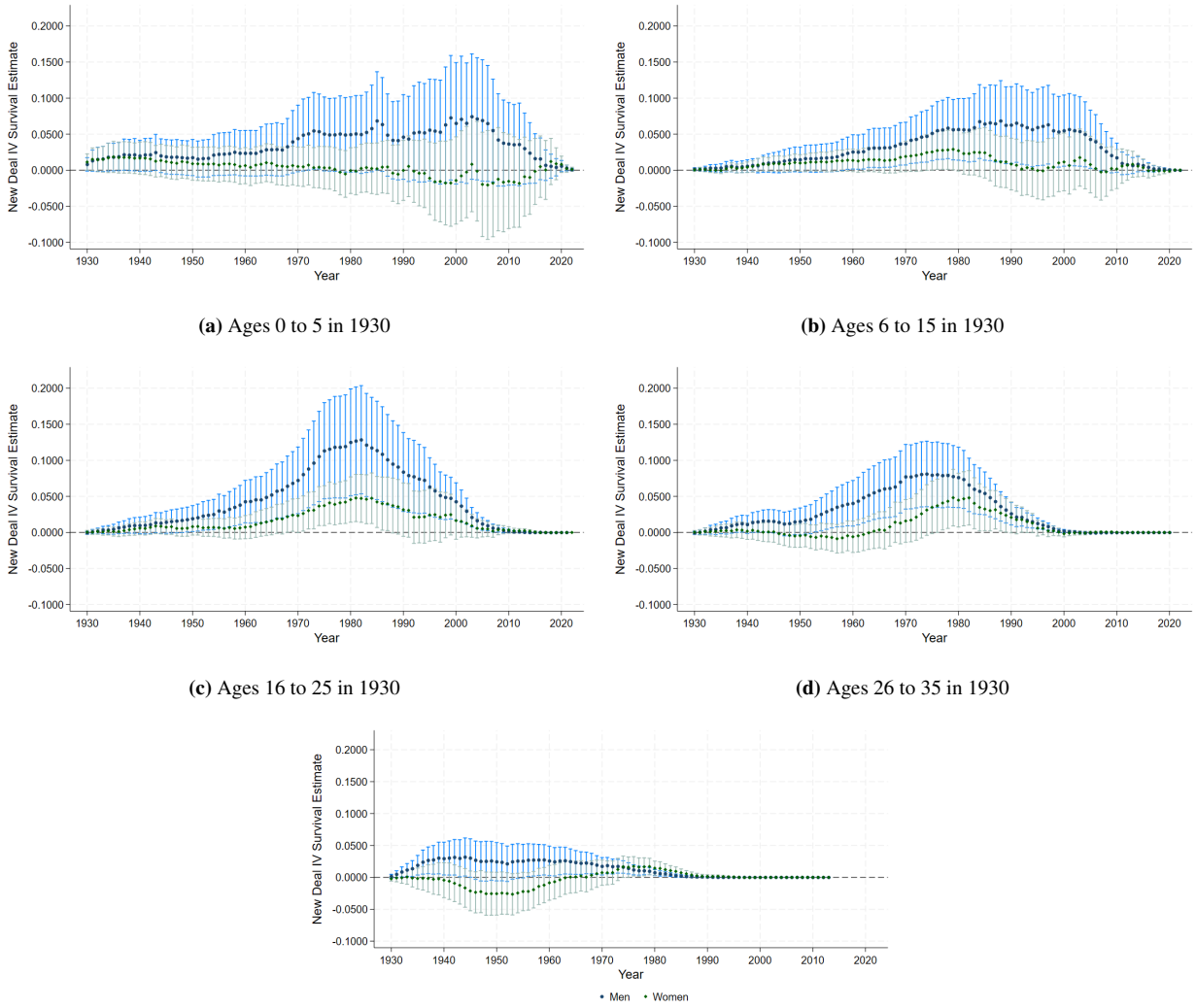


(d) Cohorts >35



Notes. Panels show OLS and IV coefficient estimates with 95% confidence intervals for the effect of New Deal relief on survival from 1933 to 2020. Regressions include county controls, individual covariates, and state-of-birth and cohort fixed effects. Standard errors are clustered at the county level. Cohort titles refer to age in 1930.

Figure A.13: IV Estimates of the Effects of New Deal Relief on Survival by Gender



(a) Ages 0 to 5 in 1930

(b) Ages 6 to 15 in 1930

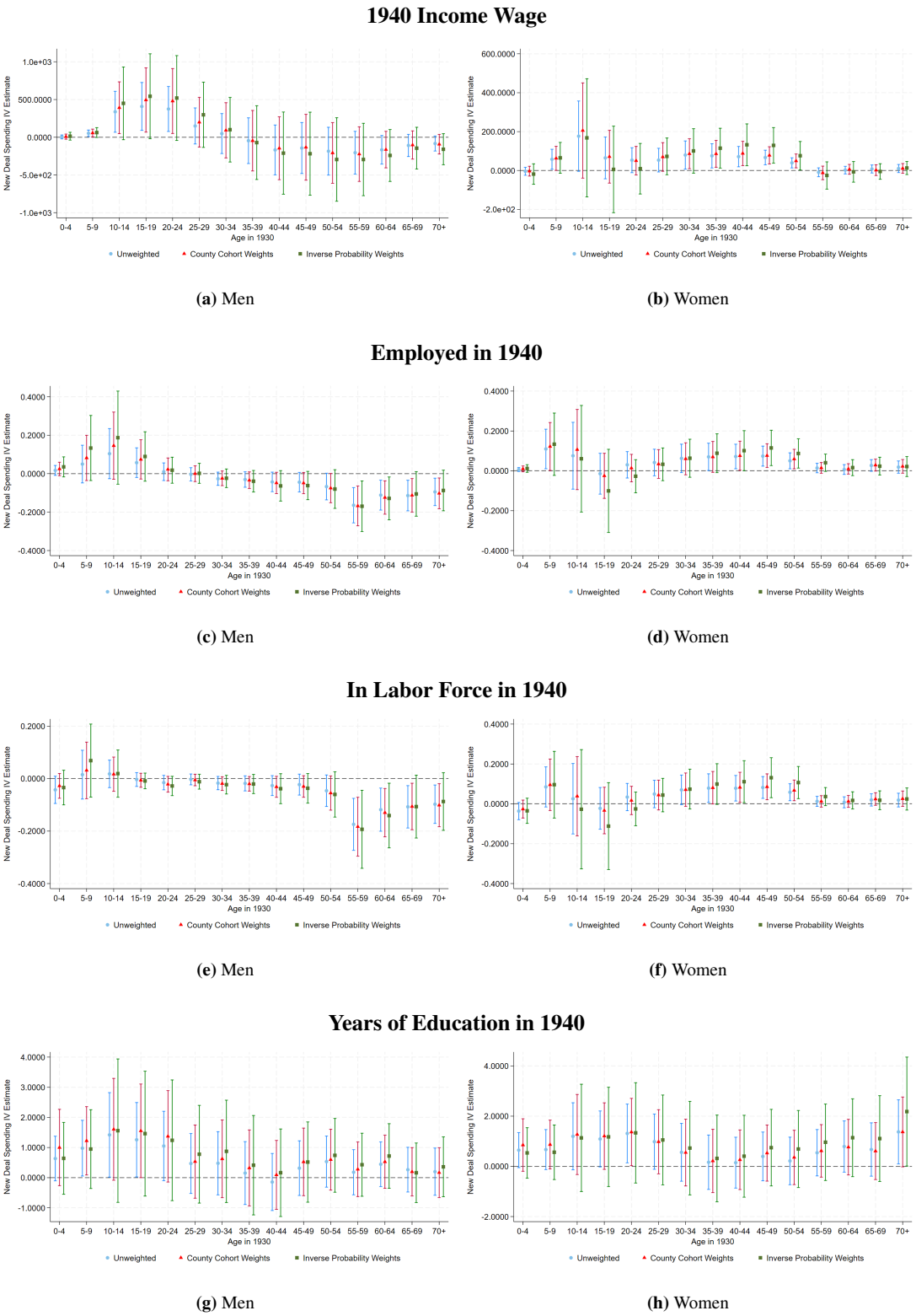
(c) Ages 16 to 25 in 1930

(d) Ages 26 to 35 in 1930

(e) Ages over 35 in 1930

Notes. The figures present IV coefficient estimates and 95% confidence intervals of the effects of New Deal relief on survival from 1933 to 2020. Regressions include county controls, individual covariates, and state of birth and cohort fixed effects. Standard errors used to compute the confidence intervals are clustered at county level.

Figure A.14: The IV Estimates of New Deal Relief on 1940 Labor Market Outcomes



(a) Men **(b)** Women

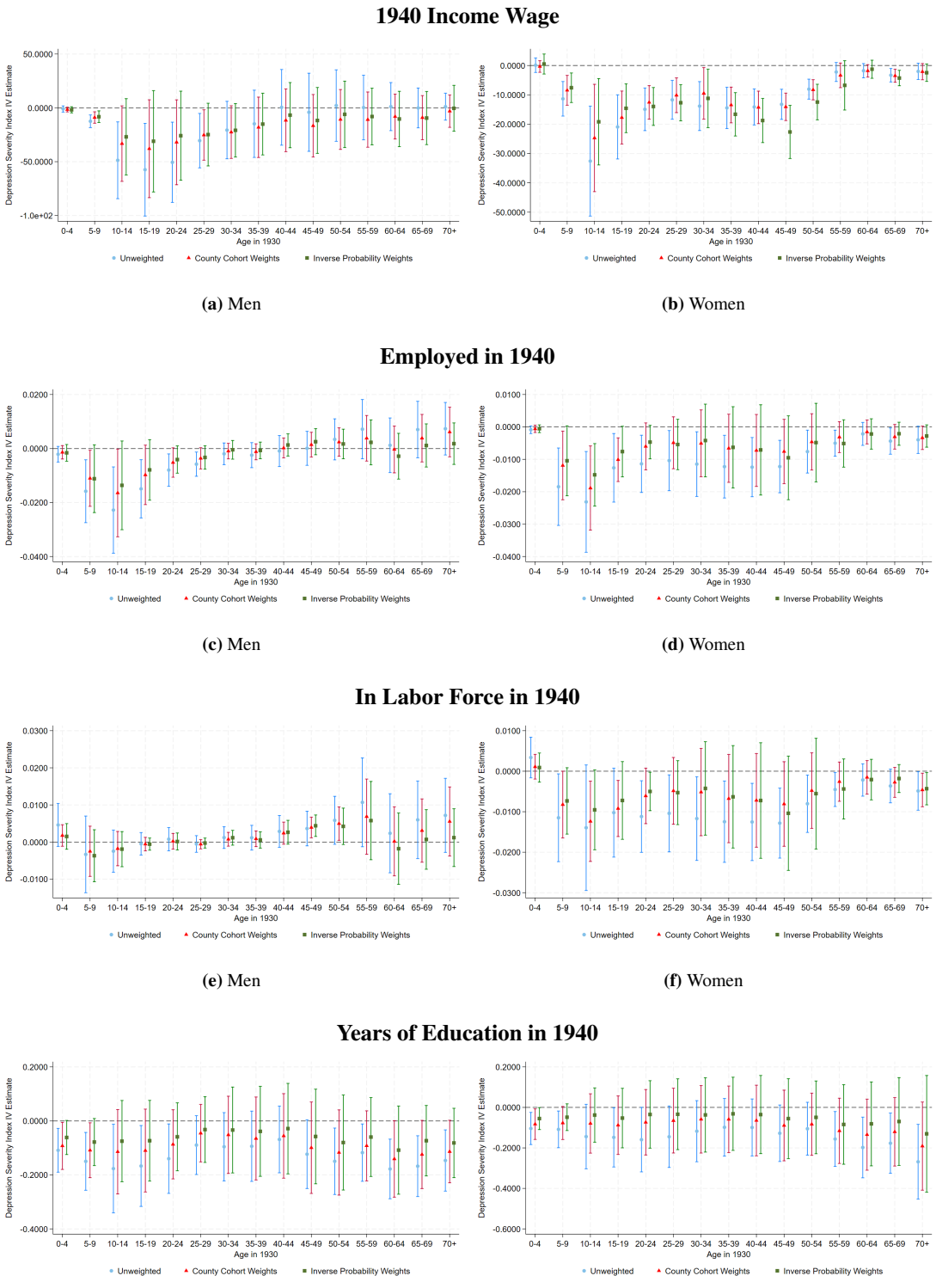
(c) Men **(d)** Women

(e) Men **(f)** Women

(g) Men **(h)** Women

Notes. The figure presents IV estimates of the effects of New Deal relief on 1940 labor market outcomes, separately for men and women. Each panel corresponds to a different outcome: income wage, employment, labor force participation, and years of education. The estimates are plotted by age in 1940, with 95% confidence intervals. The figure displays results for three specifications: unweighted (blue), weighted by county cohort size (red), and weighted using inverse probability weights (green). Regressions include county controls, individual covariates, and state-of-birth and cohort fixed effects. Standard errors are clustered at the county level.

Figure A.15: The IV Estimates of the Great Depression on 1940 Labor Market Outcomes



(a) Men **(b)** Women

(c) Men **(d)** Women

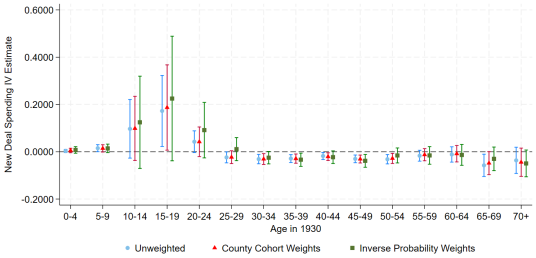
(e) Men **(f)** Women

(g) Men **(h)** Women

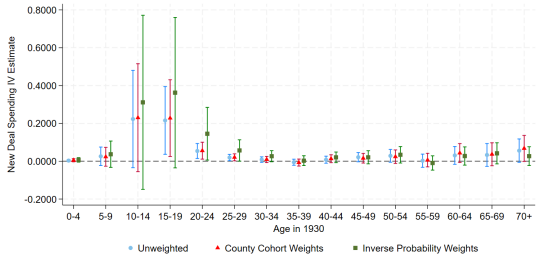
Notes. The figure presents estimates and 95% confidence intervals of the effects of the Great Depression on 1940 labor market outcomes, separately for men and women. The estimates are derived from the IV specification, where New Deal relief is instrumented, but the severity of the Great Depression is not. Each panel corresponds to a different outcome: income wage, employment, labor force participation, and years of education. The figure displays results for three specifications: unweighted (blue), weighted by county-cohort (red), and using inverse probability weights (green). Regressions include county controls, individual covariates, and state-of-birth and cohort fixed effects. Standard errors are clustered at the county level.

Figure A.16: The IV Estimates of New Deal Relief on 1940 Demographic Outcomes

Married in 1940

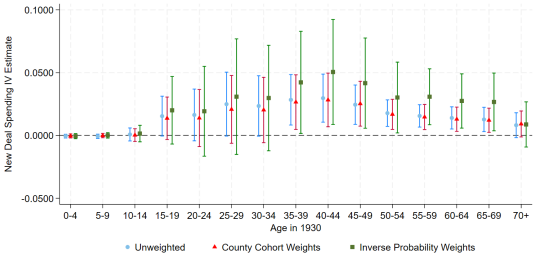


(a) Men

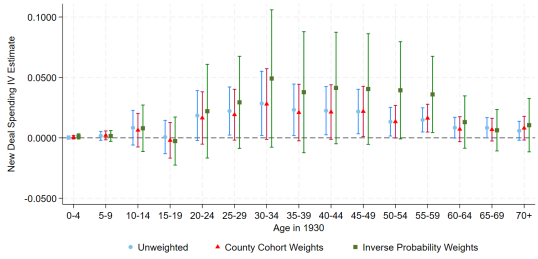


(b) Women

Divorced in 1940

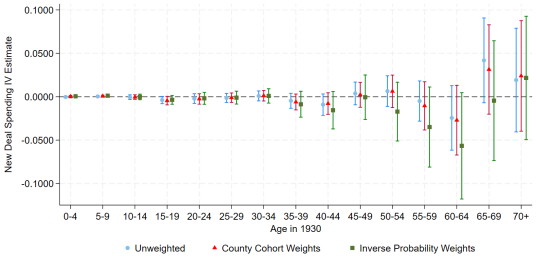


(c) Men

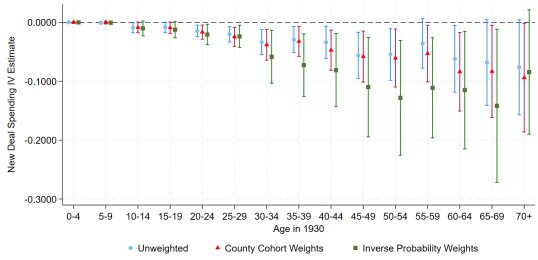


(d) Women

Widowed in 1940

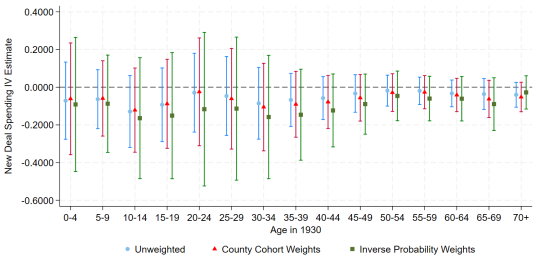


(e) Men

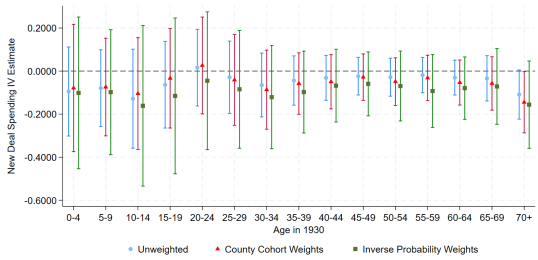


(f) Women

Moved Counties from 1930 to 1940



(g) Men

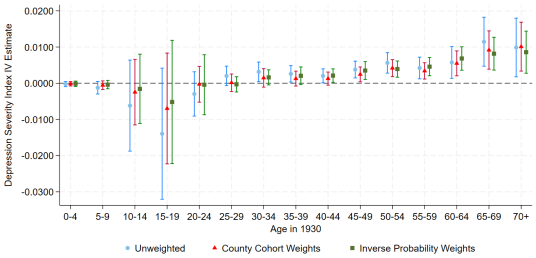


(h) Women

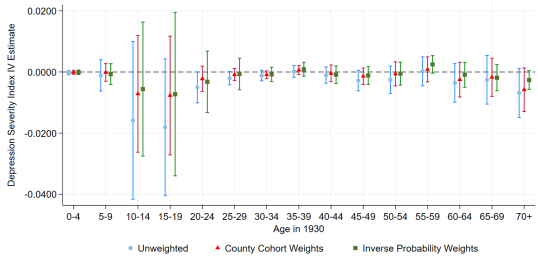
Notes. The figure presents IV estimates of the effects of New Deal relief on 1940 demographic outcomes, separately for men and women. Each panel corresponds to a different outcome: married, divorced, widowed and whether the individual moved to another county. The estimates are plotted by age in 1940, with 95% confidence intervals. The figure displays results for three specifications: unweighted (blue), weighted by county cohort size (red), and weighted using inverse probability weights (green). Regressions include county controls, individual covariates, and state-of-birth and cohort fixed effects. Standard errors are clustered at the county level.

Figure A.17: The IV Estimates of the Great Depression on 1940 Demographic Outcomes

Married in 1940

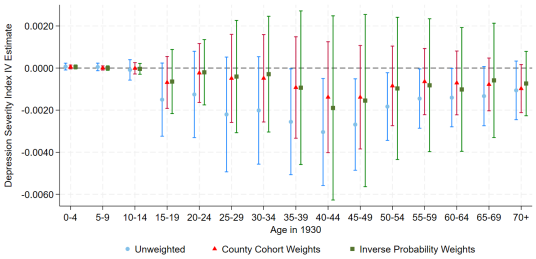


(a) Men

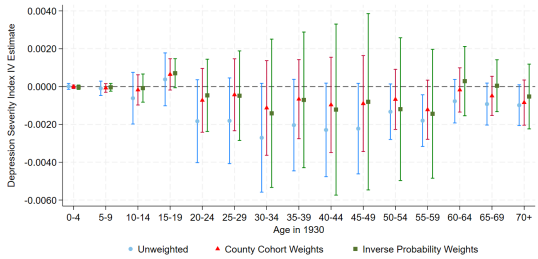


(b) Women

Divorced in 1940

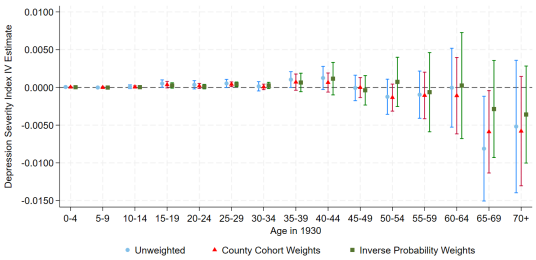


(c) Men

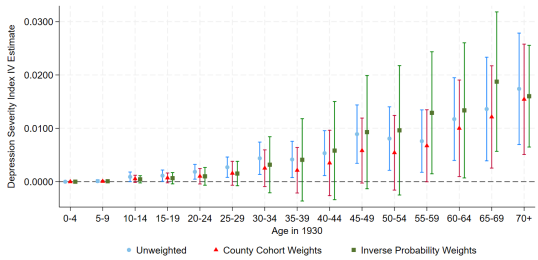


(d) Women

Widowed in 1940

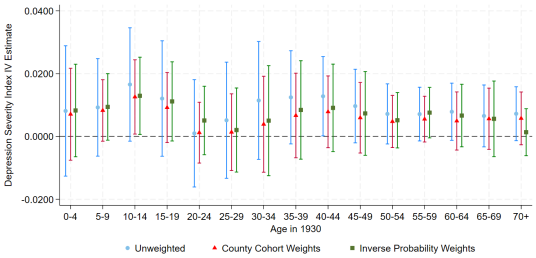


(e) Men

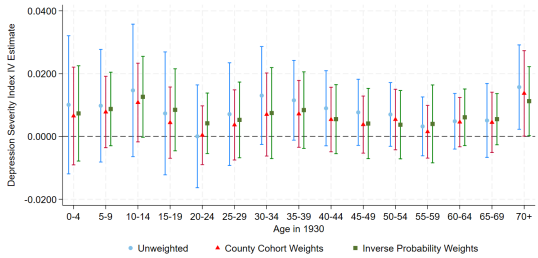


(f) Women

Moved Counties from 1930 to 1940



(g) Men



(h) Women

Notes. The figure presents estimates and 95% confidence intervals of the effects of the Great Depression on 1940 labor market outcomes, separately for men and women. The estimates are derived from the IV specification, where New Deal relief is instrumented, but the severity of the Great Depression is not. Each panel corresponds to a different outcome: married, divorced, widowed and whether the individual moved to another county. The figure displays results for three specifications: unweighted (blue), weighted by county-cohort (red), and using inverse probability weights (green). Regressions include county controls, individual covariates, and state-of-birth and cohort fixed effects. Standard errors are clustered at the county level.

B Data Linking Appendix

Our analysis combines several linked data sources. We restrict the sample to white, US-born individuals in the 1930 full-count US Census (Ruggles et al., 2024, 2025), and link them to (1) their 1940 Census records and (2) death years from FamilySearch. This appendix details the linkage procedures, match rates, and potential data issues. Appendix figures and tables are labeled "B."

I. Linking individuals from the 1930 Census to the 1940 Census

We link individuals between the 1930 and 1940 Censuses using the Census Tree method (Price et al., 2021; Buckles et al., 2023). This project provides one of the most representative sets of census links available, particularly for women, and its public accessibility and state-of-the-art methodology make it well suited to our analysis.

The Census Tree uses genealogical records as training data to generate inter-census links via supervised machine learning, so link reliability varies across observations. The dataset includes seven indicators for each match source; we retain only links identified by at least two internal methods and exclude those found solely by the two external sources. After applying these filters, 59.2% of individuals in our 1930 sample are successfully matched to 1940.

II. Linking individuals from the 1930 Census to their death information

FamilySearch, one of the world's largest genealogical organizations, maintains indexed versions of the full-count US Censuses using a distinct identifier. We link our IPUMS-based census index to the corresponding FamilySearch index to obtain death information from its genealogical tree. Figure B.1 illustrates an example of matched identifiers.

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FamilySearch's indexed records are publicly available on FamilySearch.org, where users contribute to a collaborative Family Tree. The tree consists of individual profiles—each uniquely identified by a PersonID (PID)—representing deceased individuals created by their descendants. Figure B.2 shows an example profile with its PID highlighted. Users can attach records to profiles manually or through FamilySearch's matching algorithms, which suggest and verify potential record links.

Because users can attach both census and death records to a profile, the Family Tree provides a reliable link between census entries and death information. We connect individuals in the 1930 IPUMS dataset to verified death records by first linking the 1930 IPUMS records to the corresponding FamilySearch records, then linking those records to profiles on the Family Tree, and finally retrieving the death year recorded on each matched profile (PID).

Linking errors are unlikely to be randomly distributed. Because FamilySearch's primary users are members of The Church of Jesus Christ of Latter-day Saints—disproportionately of white European descent—our data may overrepresent their ancestors. Although ongoing efforts are improving the Tree's coverage, some selection remains. We discuss how we address these issues in the main text.

III. Overall match rates

Table B.1 reports match rates for each step of the linking process and the overall rate. Because each step in the "Linking to FamilySearch Deaths" panel depends on the previous one, the final match rate equals the product of its component rates. Our overall match rate to both 1940 and death data exceeds this product, indicating that successful linkage to 1940 is not independent of linkage to a death record.

IV. Match rate breakdowns by county

Figure B.3 presents county-level match rates from the 1930 IPUMS Census to FamilySearch deaths, illustrating potential regional selection. The map reveals notably higher match rates in the western U.S.—particularly in Utah and Idaho—where FamilySearch users' ancestors are disproportionately represented in the Family Tree.

Figure B.4 shows county-level match rates from 1930 to 1940. Linking white, U.S.-born individuals is more difficult in the lower Mississippi River basin and the southwestern U.S., for reasons that remain to be explored. As FamilySearch users continue to add manual links, these regional gaps are expected to narrow over time.

Finally, Figure B.5 maps match rates for individuals linked from 1930 to both 1940 and a death record. The lighter shading reflects the general difficulty of linking across multiple historical sources rather than additional selection. We successfully match at least one in four individuals in most counties—an encouraging rate given that some people alive in 1930 had died before 1940 and could not be linked forward.

Data Linking Appendix Figures & Tables

Figure B.1: Linked HISTID and ARK from the IPUMS & FS 1940 Census Indexes

histid1940
00000256-F115-4E18-A124-D78C70F2C985

ark1940
VTWB-WZP

Figure B.2: Example of a FamilySearch Person ID Profile

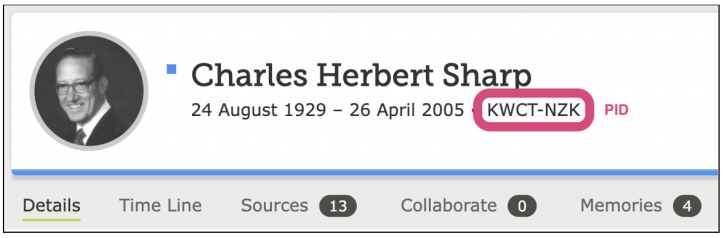

Table B.1: Linking Steps from IPUMS 1930 Census

	Stepwise Link Count (1)	Stepwise Link Rate (2)	Cumulative Link Rate (3)
Linking to FamilySearch Deaths			
IPUMS 1930 Census	96,161,792	100%	100%
to FS 1930 Census	95,714,792	99.54%	99.54%
to Family Tree PID	60,371,650	63.07%	62.78%
to Death Year Data	43,393,377	71.88%	45.13%
Linking to 1940 & Deaths			
IPUMS 1930 Census	96,161,792	100%	100%
to IPUMS 1940 Census	56,896,923	-	59.17%
to FS Death Data	43,393,377	-	45.13%
to both 1940 & Death Data	32,294,853	-	33.58%
(1940 Rate * Death Rate)	-	-	26.70%

Figure B.3: County-level Link Rates from the IPUMS 1930 Census to FamilySearch Deaths

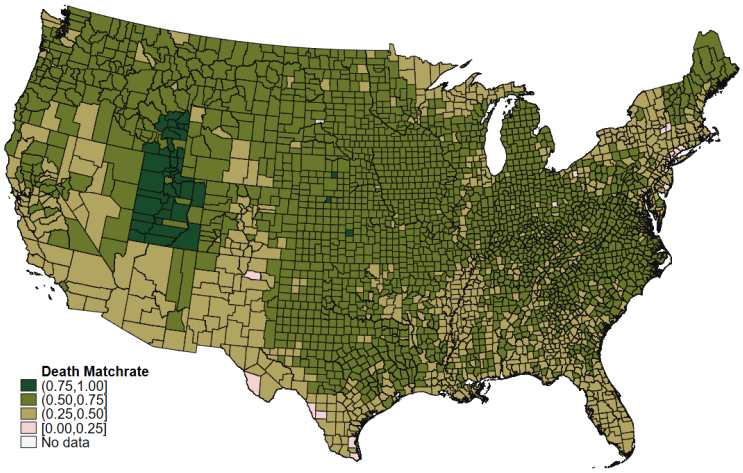

Figure B.4: County-level Link Rates from the IPUMS 1930 Census to FamilySearch Deaths

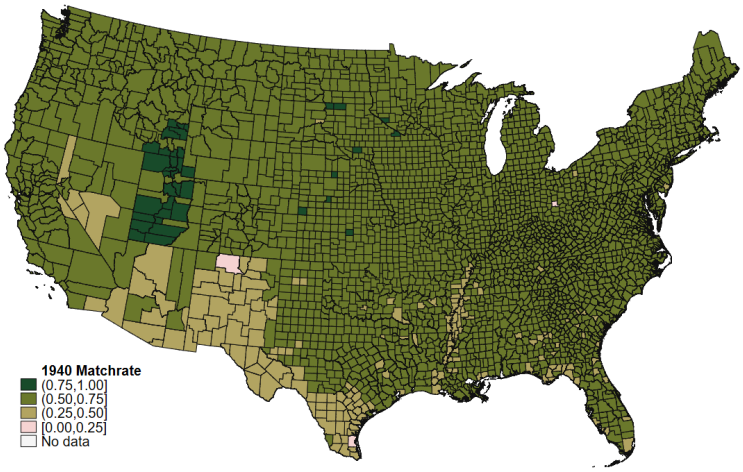

Figure B.5: County-level Link Rates from the IPUMS 1930 Census to 1940 & Deaths