DO RELIEF PROGRAMS OFFSET 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 construct a novel dataset that tracks a large sample of individuals alive in 1930 until their deaths, linking them to county-level measures of economic crisis severity and New Deal relief transfers. First, we document the dynamic effects of the Great Depression on survival and longevity, showing that individuals—in particular, young men—living in the most severely affected locations experienced significantly shorter lifespans. Second, we assess whether the New Deal mitigated these adverse effects. To identify its causal impact, we leverage variation in politically driven New Deal spending across counties that were equally affected by the Great Depression. We find that the New Deal increased longevity and more than offset the negative effects of the Depression. In its absence, individuals would have lived, on average, 14 months less. The benefits were significantly larger for men than for women, with children and young individuals also experiencing greater gains from New Deal relief. These effects appear to be mediated, at least in part, by improvements in income and educational attainment in the 1940s.

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1. Introduction

Economists have long been concerned about the effects of recessions on well-being and health. Yet empirical studies disagree whether these effects are positive or negative (Ruhm, 2000; Ruhm, 2005; Arthi et al., 2022). These opposite findings can be partially attributed to the use of different settings and data. For example, recessions appear to be more damaging in poor countries (Doerr and Hofmann, 2022) and over the long run (Schwandt and Von Wachter, 2020). More importantly, previous studies have ignored a crucial aspect: Government responses to recessions might also affect health. Ignoring government responses might lead researchers to underestimate the negative effects of recessions.

We study the short- and long-term effects of the Great Depression and its governmental response—the New Deal—on longevity. The Great Depression was the deepest and longest downturn in modern US history, and since it occurred in the 1930s, only now has enough time passed to analyze its long-term effects.[1] The New Deal featured the first major social welfare programs and the first countercyclical unemployment programs in the US.

We first document whether the Great Depression affected longevity and survival to various ages. Second, we present causal evidence that New Deal relief compensated individuals for the negative effects of the Great Depression. We obtain causal estimates of the impact of New Deal relief on longevity by analyzing whether individuals living in counties that received larger amount of funds lived longer as a result. To identify the causal effects of New Deal relief, we use an instrumental variable approach that leverages an important source of exogeneity in relief funds distribution: political incentives.

We estimate the impact of the Great Depression and 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

[1] It is difficult to find exogenous sources of variation to predict the severity of the Depression. Therefore, our analysis of these effects is descriptive.

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 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 negative effects of the recession; hence, the federal government targeted the states and counties the hardest hit by the crisis (Fishback et al., 2003; Fishback et al., 2007). Thus, individuals in these areas would have likely fared worse even in the absence of the relief, which negatively biases estimates of the relief. For the same reason, estimates of the Great Depression that do not account for the New Deal are also biased and likely underestimate the impact of the Great 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

[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.

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 although the Great Depression was bad for the health of the population, New Deal relief more than compensated for its negative effects. First, we 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

[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.

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 et al., 2020).

We identify two main mechanisms behind the beneficial effects of the New Deal on longevity: increases in income and years of education. We linked 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 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

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

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 et al., 2020), 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

[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).

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.

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 track individuals from the 1940 Census who died between 1985 and 2005 and find a one-month life expectancy extension for each 100% increase in New Deal spending. We extend the analysis to the entire mainland US and cohorts alive in 1930, use an IV approach to address potential biases, and follow individuals' deaths from 1930 to 2020, which is critical for the longevity analysis.

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

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

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 both absolute and per capita terms. By comparing it with Figure I—which shows the spatial distribution of the severity of the crisis—we find that the government targeted areas with more pronounced economic downturns. Indeed, Figure III shows that relief spending

[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.16 for robustness checks going program by program.

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

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.

[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. 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.

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 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., 2020a; 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.

[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 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.

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. Some additional problems would appear when using these records, since these data have only been linked to the 1940 Census (And 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 determined as much by what happened within states as by what happened

[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

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

[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 ($1,060.41 in 1967$). 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.

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]

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

[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.14.

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

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 $\tilde{\$}$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 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.12).

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. (2020a), we show that our results are robust to weighting by the predicted probability of being linked (Appendix Table A.20).

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 $\mathbb{1}(\text{Survived to } m) = 1$ if the person died after the year m,

[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.11, 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

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, 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 in-

older ages. Then, we group older cohorts by groups of 10.

dependently 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 is based on the political incentives that influenced the geographic allocation of New Deal relief funds. Political models in the literature agree that the main variables that affected relief include voter turnout levels, local support for Democrats, how tight the elections were, the number of loyal and swing voters, and congressional influence, among others (Anderson and Tollison, 1991; Wright, 1974; Fleck, 1999; Fishback et al., 2005; Fishback et al., 2006). However, it is hard to identify which political variables affected New Deal relief the most; many of these variables could matter, and their interactions could also matter. In total, we identified 25 potential instruments for New Deal spending that have previously been used in the literature, and if we account for their interactions and second-order terms, the set of potential instruments could include more than 1,000 variables.

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

[26] See Appendix Table A.8.

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.[27]

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". 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 (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.[28] When using the LASSO algorithm, we partial out

[27] 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.

[28] All county controls defined at the beginning of this section, including our crisis severity index, are selected

cohort fixed effects and state of birth fixed effects—in other words, we always include these controls.[29] The post-LASSO estimator refits the regression via 2SLS to alleviate LASSO's shrinkage bias.[30]

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.[31] 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.

The key identification assumptions are that the IV is relevant and that the exclusion restriction holds. We will now discuss each assumption. Voting culture exploitability is strongly correlated with New Deal relief spending per capita, as shown in the binned scatter

using our IV-LASSO approach.

[29] 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.

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

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

plot in Figure IV. Appendix Table A.3 presents the county-level first stage, showing that the instrument strongly predicts New Deal relief. The F-statistic is 652.88, 86.48, and 50.21 across different specifications—well above recommended cutoffs for strong instruments. Table III reports the individual-level first stage in columns 1, 3, and 5, with F-statistics ranging from 54.30 to 18.70.[32] Figure V documents that there is substantial cross-county variation in the instrument. The South had the lowest values since voter turnout was typically very low in the region. Interestingly, this area also appears to have received less relief on average.

We also gather empirical evidence to support the exclusion restriction assumption. For this restriction to hold, we need the instrument to affect longevity only through New Deal relief funds, conditional on the severity of the crisis and on other controls. A possible way to obtain this evidence is to test the correlation between health variables and the instrument before the New Deal. Thus, we examine whether county-level mortality rates from 1920 to 1928 are correlated with our instrument. Appendix Figure A.8 shows that voting culture exploitability is not correlated with prevailing mortality rates before the New Deal. This provides evidence that the selected instrument is valid.[33]

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. Appendix Table A.1 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,

[32] Appendix Figure A.7 shows the distribution of the voters' importance instrument. The instrument is concentrated between the values 0.04 and 0.06, with some counties having values between 0 and 0.2. Counties with lower values have either very low or very high voter turnout.

[33] Appendix Figure A.22 also shows that county-level mortality rates from 1920 to 1928 are not correlated with our measure of crisis severity

the effect becomes statistically insignificant when applying alternative weighting strategies in columns (4) and (5), indicating 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.[34]

In Table III 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.[35] 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.[36][37]

The effects of the Great Depression may vary by age, as some groups were likely more vulnerable to economic shocks than others. Appendix Table A.5 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,

[34]The coefficients are not statistically different when we analyze them by gender in Appendix Table A.4.

[35]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.

[36]See Appendix Table A.2.

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

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.[38]

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.[39] Figure VII presents 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

[38]For a detailed breakdown of the effects by each specific age cohort, see Figure VI. 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.

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

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.10 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%.[40][41]

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

[40]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%).

[41]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.

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.

Appendix Table A.1 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 III presents post-IV-LASSO estimates of longevity. Odd-numbered columns display 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.[42]

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 2—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

[42]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).

significant. In our preferred specification (Column 6), 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)[43] extended longevity by an average of 14 months.[44]

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 VIII 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.

[43] $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.

[44] 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.

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.2 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 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 III, 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.[45] 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 VI). Significant effects are observed for individuals born between 1891 and 1925, with the largest impacts among children, teenagers, and young adults.[46]

[45] In Appendix Table A.11, 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.

[46] 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.

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.12. 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 IX and Appendix Figures A.13 to A.16 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 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%.[47]. For the rest of the cohorts, the effects on survival are smaller.

Appendix Figure A.17 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

[47]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%.

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.[48]

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.[49] 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.[50]

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 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.6, 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 different. Among those with a recorded occupation

[48] OLS coefficients on survival by gender are available upon request.
[49] See Appendix Figure A.5.
[50] See Appendix Figure A.11.

score, relief effects vary somewhat across quartiles, though there is no strong evidence that lower-income groups benefited disproportionately.[51] 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 occupation score, we also examine whether the effects of New Deal relief varied by industry and type of occupation. The economic impact of the Great Depression and subsequent relief efforts likely differed depending 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.[52] As shown in Appendix Table A.18, 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.[53]

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 sepa-

[51] 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.

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

[53] 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.

rately for the 11 largest occupational categories in 1930. As shown in Appendix Table A.19, 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 relief, while white-collar occupations experienced more muted effects.[54]

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.7. 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.[55] 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.8, we compare IV estimates for men who moved to a

[54]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.

[55]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.

different county between 1930 and 1940 (movers) with estimates for those who remained in the same county (stayers).[56] 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 explore potential mechanisms underlying the effects of the Great Depression and New Deal on longevity. Specifically, we examine whether changes in employment, income, educational attainment, demographics, and health help explain the observed long-term impacts. By analyzing these intermediate outcomes, we aim to understand how the economic downturn and relief policies translated into lasting effects on longevity. To do so, we first use data from the 1940 Census to examine how New Deal relief and the severity of the Great Depression influenced labor market and demographic outcomes (Appendix Figures A.18 and A.19).

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

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

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 appears to be associated with negative labor market effects. We find wage reductions for young men and working-age women, along with imprecise but negative effects on employment for young men and women in the labor force. Similarly, labor force participation for women declined in areas more severely affected by the recession. Finally, schooling outcomes for young men and women show some negative associations with the severity of the Great Depression, though estimates are not always precisely estimated.

We also examine demographic outcomes using the same 1940 Census data, as shown in Appendix Figures A.20 and A.21. 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.[57]

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.21). Specifically, we introduce 1940 labor market outcomes as mitigating controls to evaluate whether improve-

[57]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.

ments in employment, wages, or other economic factors account for the observed increase in lifespan. When these controls are included, the coefficient for New Deal relief decreases from 0.034 to 0.017, suggesting that approximately 50% of the effect is mediated through these economic factors. For men, the coefficient drops from 0.048 to 0.030, implying that 37.5% of the effect is explained by labor market improvements. For women, the coefficient decreases more modestly, from 0.020 to 0.003, indicating a 85% reduction, though the effect remains less precisely estimated. 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.[58] [59] 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.

[58] Only reliable data are included, excluding records with fewer than 10 deaths per county per year.
[59] We report results for the five leading causes of death; additional results are available upon request.

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.

8. Robustness Checks

In this section, we present a series of robustness checks to address potential biases in our data and validate the reliability of our results. Specifically, we re-estimate our main specifications using alternative approaches, including: (1) county-level analyses, (2) level rather than log specifications, (3) weighted regressions, (4) restricting the sample to individuals who survived to at least age 20, (5) excluding deaths that occurred during World War II, (6) using alternative economic measures, (7) employing different instrumental variables proposed in the literature, and (8) disaggregating the effects by specific New Deal relief programs.

Since New Deal spending data are available only at the county level, we conduct robustness checks using county-level estimates of longevity and find results consistent with our main analysis.[60] OLS estimates for the effects of the New Deal and the Great Depression on average longevity (Appendix Table A.9) closely align with individual-level estimates (Appendix Table A.1), though the estimated effects for both programs are now positive but

[60] In county-level specifications, the dependent variable is the average logarithm of individual age at death at the county level. In addition to county controls, we also include individual covariates as county-level averages.

remain very close to zero. One possible explanation is that when aggregating data at the county level, bias may operate differently, leading the Great Depression to partially absorb the positive effects of the New Deal. The county-level IV estimates (Appendix Table A.10) remain consistent with individual-level results, exhibiting very similar magnitudes. This reinforces the validity of our findings, suggesting that our estimates are robust across different levels of data aggregation.

When analyzing the effects on longevity, we follow an accelerating failure time model, using the logarithm of age at death as the dependent variable rather than longevity in levels. This transformation stabilizes variance, mitigates the influence of outliers, and improves interpretability by capturing proportional effects. In Appendix Table A.11, we present the main results in levels, which remain broadly consistent with our preferred log specification. However, estimates in levels are less precise, not significant for women, and exhibit a weaker first stage, with substantially lower F-tests. These differences likely stem from the greater absolute variability in longevity, which increases residual variance and weakens the instrument's predictive power. Thus, the log specification provides more stable and reliable estimates of the long-term effects of the New Deal on longevity.

Another robustness check we perform is re-estimating our main specifications using weights to adjust for potential positive selection and improve representativeness. We apply two types of weights: county-cohort level weights and inverse probability weights. Appendix Table A.20 presents the unweighted estimates in the first column alongside the weighted ones, showing that the coefficients remain very similar. The estimates for New Deal relief become slightly larger, though less precise when using inverse probability weights, which also weaken the instrument. The coefficients for the severity of the Great Depression are slightly smaller and less precisely estimated. Appendix Figure A.12 shows that cohort-specific estimates remain highly consistent across specifications, though they become less precise, particularly when using inverse probability weights.[61] These findings further support our main results.

[61] A similar pattern is observed in Appendix Figures A.18 to A.21, where we present the effects on 1940

Young deaths are underrepresented in our sample, as individuals who die young are less likely to be linked to their death records (see Appendix Figure A.4). To address this issue, we re-estimate our main model restricting the sample to individuals who survived to age 20, with the results reported in Appendix Table A.12. The estimates remain consistent with our main specification, though the magnitudes are somewhat smaller.[62] However, when expressed in months of increased longevity, the effects remain largely similar: a one-standard-deviation increase in New Deal relief extends life expectancy by approximately 13 months for the full sample, 19 months for men, and 5 months for women (if significant).

Another robustness check we perform is excluding deaths that occurred during World War II. Evidence suggests that men from counties receiving more New Deal funds were more likely to volunteer for military service (Caprettini and Voth, 2023), potentially making our estimates a lower bound. However, as shown in Appendix Table A.13, the results remain nearly identical to our main specification, indicating that WWII-related deaths do not drive or bias our findings. This suggests that the long-term effects of the Great Depression and New Deal relief on longevity are not merely a consequence of differential wartime mortality patterns but persist beyond WWII selection effects.

Finally, we conduct additional robustness checks by using alternative economic measures as proxies for the severity of the Great Depression, employing different instrumental variables proposed in the literature, and disaggregating the effects by specific New Deal relief programs.

Appendix Table A.14 presents results using unemployment in 1930 and the change in retail sales from 1929 to 1933 as alternative measures of economic conditions. The estimates for New Deal relief remain highly consistent with those in our main specification. However, the estimates for the severity of the Great Depression become less precise when using these alternative measures.

outcomes alongside their weighted versions.

[62] The coefficient decreases from 0.034 to 0.023 for the full sample, from 0.048 to 0.036 for men, and from 0.020 to 0.009 for women (though the latter remains statistically insignificant).

Appendix Table A.15 reports estimates using alternative instruments from the literature, along with their corresponding F-statistics. While all other instruments appear weaker than the one selected through our IV-LASSO approach, results remain consistent when using the mean Democratic vote share from 1896 to 1928 as an instrument. For some other relatively strong instruments, the estimates remain positive but exhibit smaller magnitudes and are less precisely estimated.

Lastly, Appendix Table A.16 presents results disaggregated by New Deal relief programs. We find that the instrument is strongest for the largest relief programs—FERA and Public Assistance—where the estimated effects align with our main findings. Additionally, we observe positive effects on longevity for total New Deal expenditures, as well as for the Works Progress Administration (WPA). However, the instrument is weaker for the remaining programs, and we do not detect significant effects for them.

9. 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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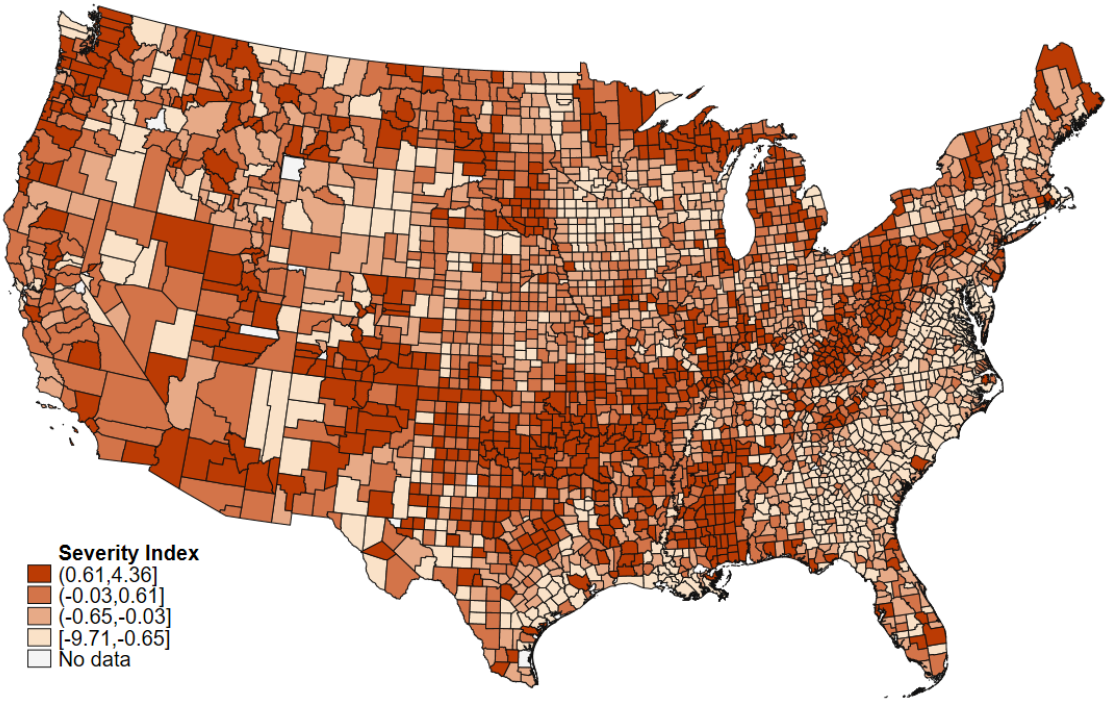
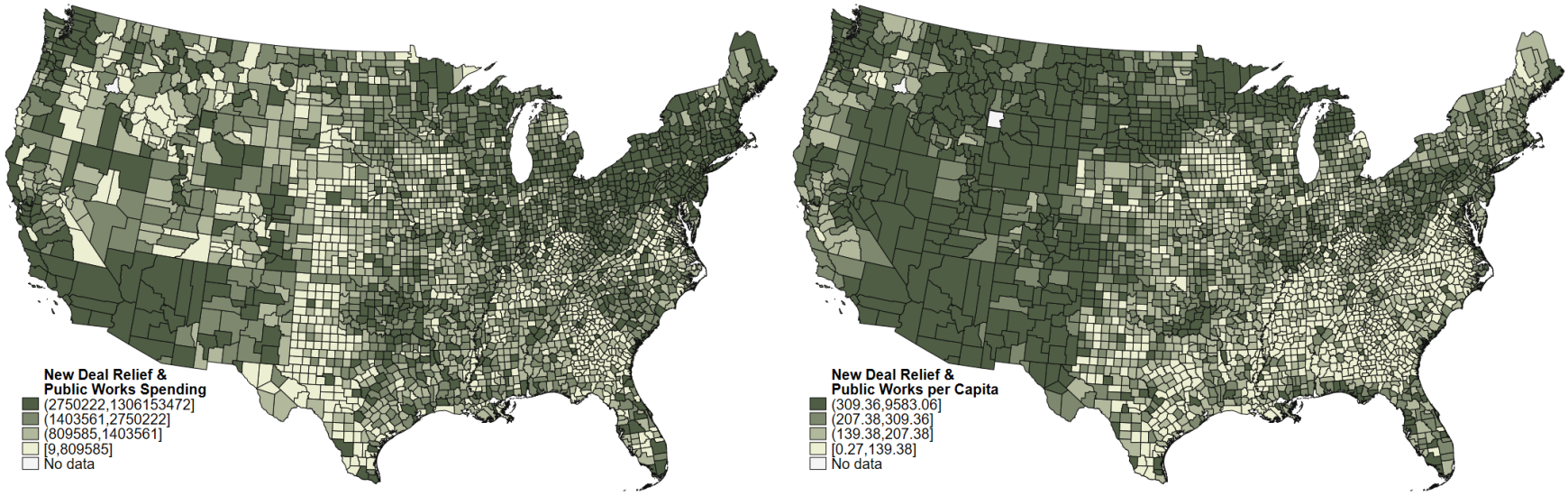
Figures and Tables

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.

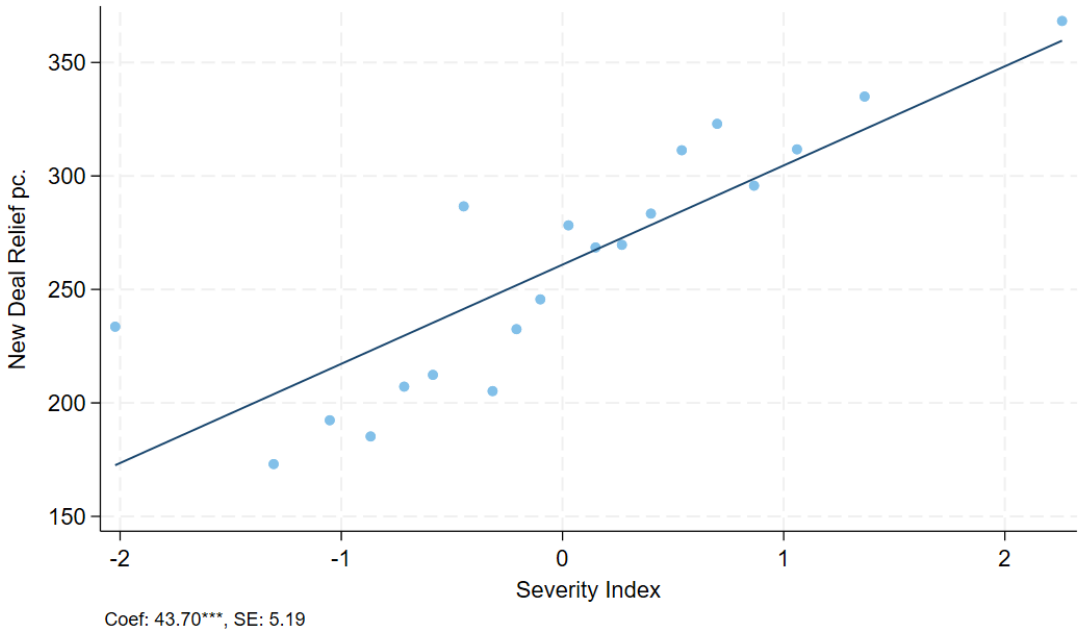
Figure II: Geographic Distribution of New Deal Relief and Public Works



(a) Total Funds **(b)** 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: The figure is a binned scatter plot.

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

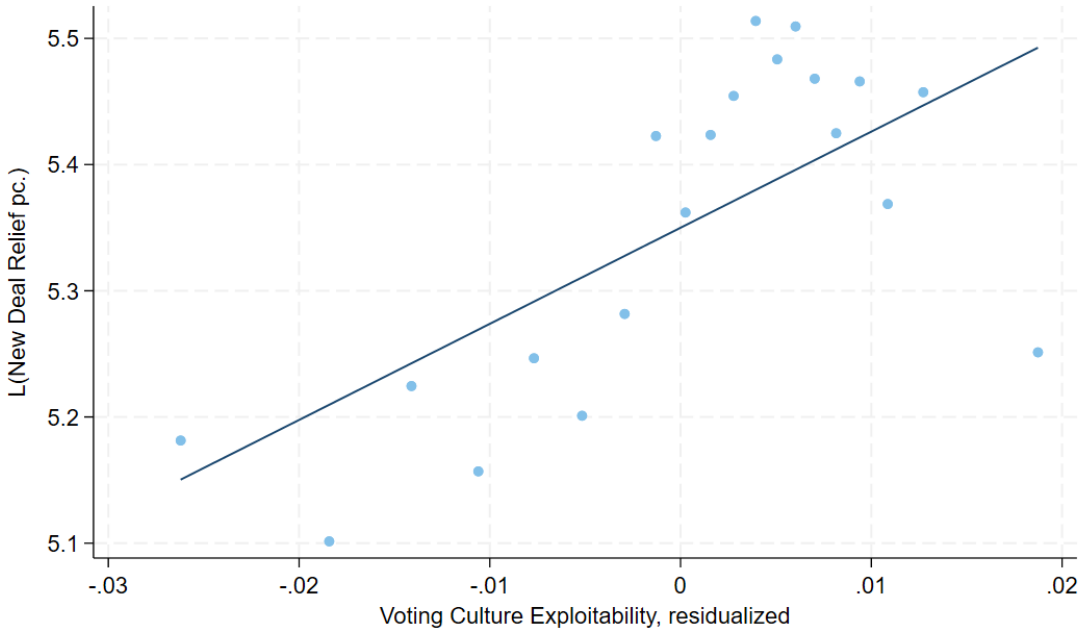
Notes. Column 1 represents the complete 1930 Census, and all other columns are restricted as described by Sample Restrictions and column titles. Counties with All Data includes only counties that have data for all county-level controls used in our main IV specification. Linked to Death Record includes 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. (2020b).

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

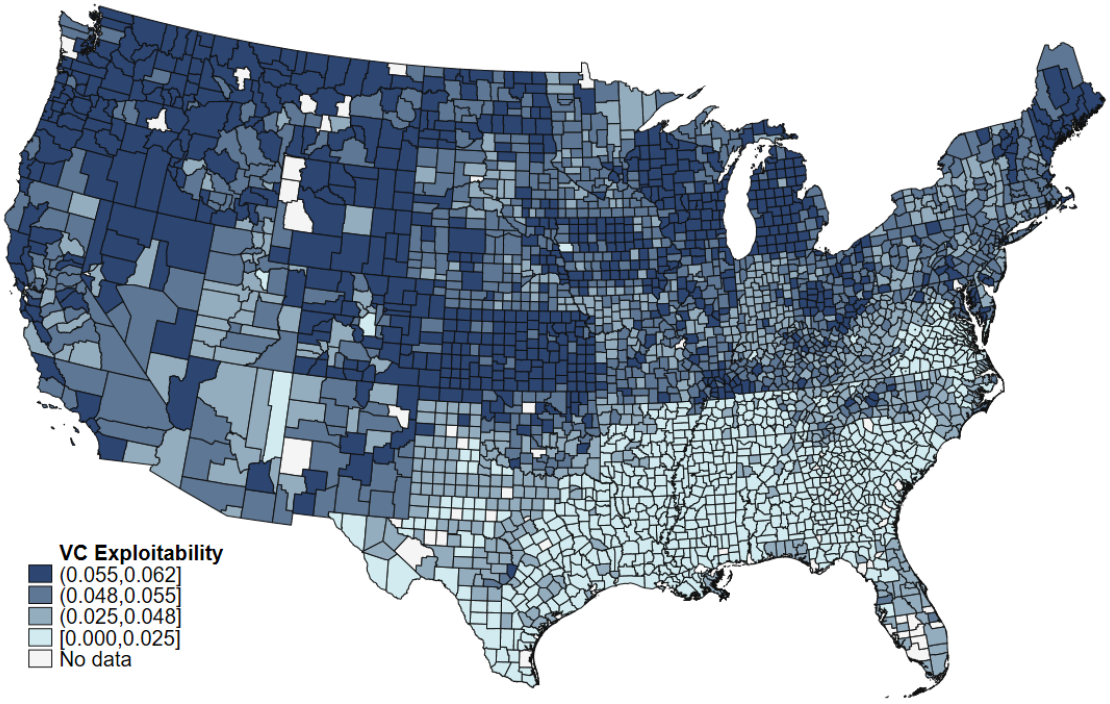
Note: The sample includes all white native individuals in the 1930 US Census for whom we have county-level data. The regression includes cohort and state of birth fixed effects. Standard errors are clustered at county level. 10%*, 5%**, 1%***.

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



Notes: The figure is a binned scatter-plot.

Figure V: Geographic Distribution of Voting Culture Exploitability Instrument



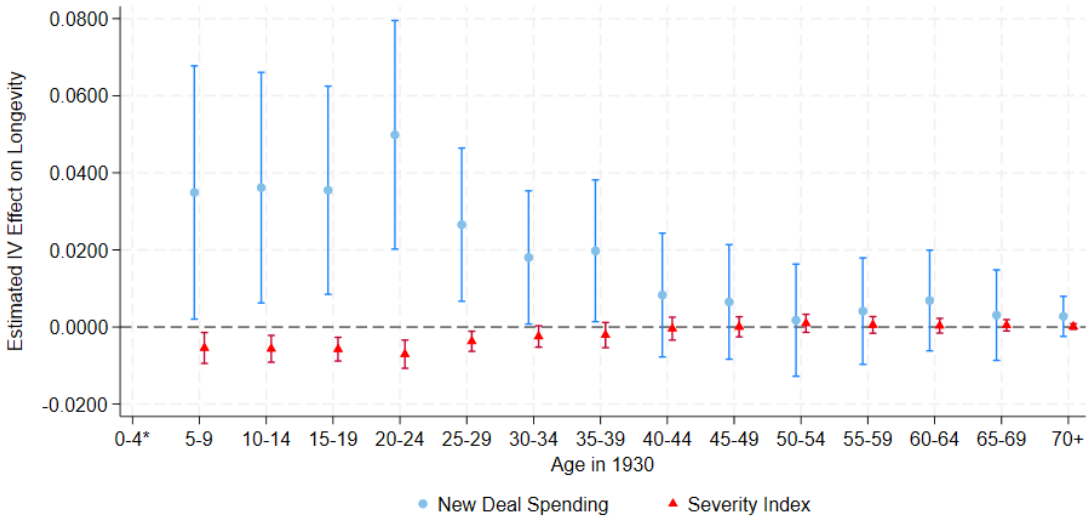
Notes: Black lines represent the limits of the counties in 1930. Counties are colored in blue scale to depict the distribution of our voting culture exploitability instrument.

Table III: 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

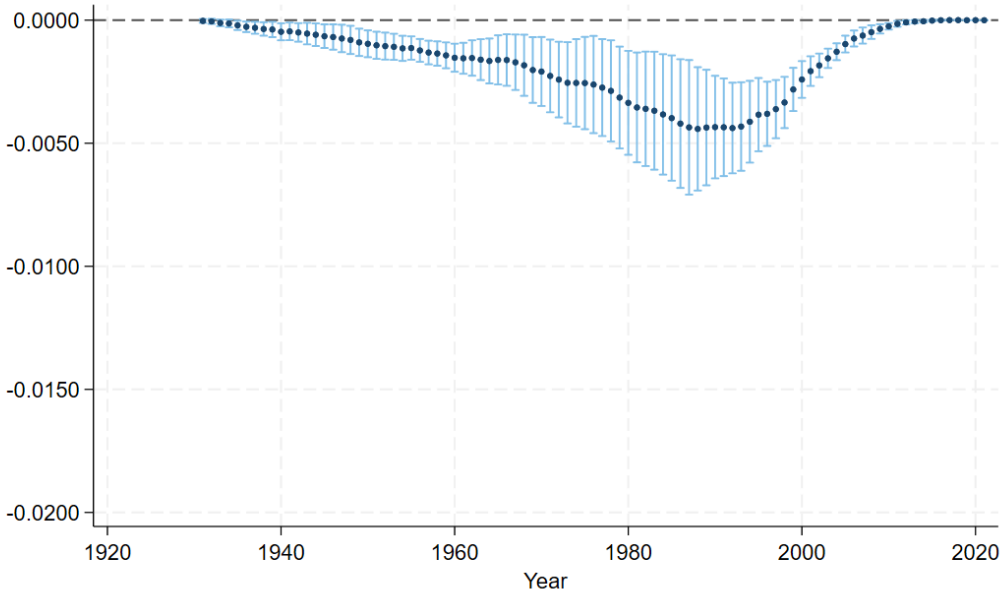
Notes. The sample includes all white, native-born individuals in the 1930 US Census linked to both FamilySearch deaths and county-level data. All specifications include state of birth and cohort fixed effects. Standard errors are clustered at the county level. 10%*, 5%**, 1%***.

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

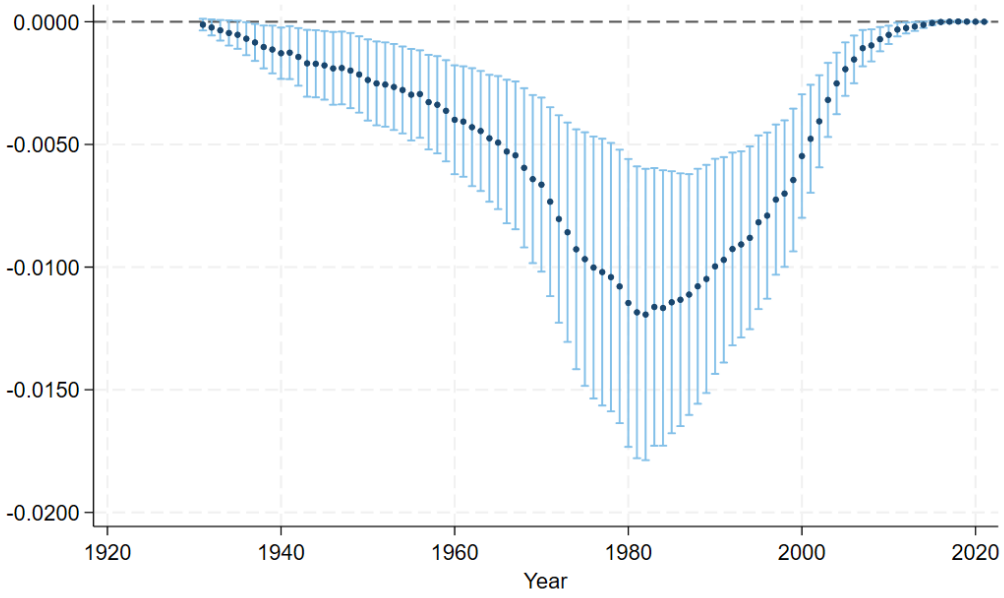


Notes: This figure charts coefficient estimates (and their corresponding 95% confidence intervals) for both New Deal relief spending and our depression severity index obtained by estimating our main IV specification on each given age cohort of White, U.S. born people.
*Estimates for the 0-4 cohort are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

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



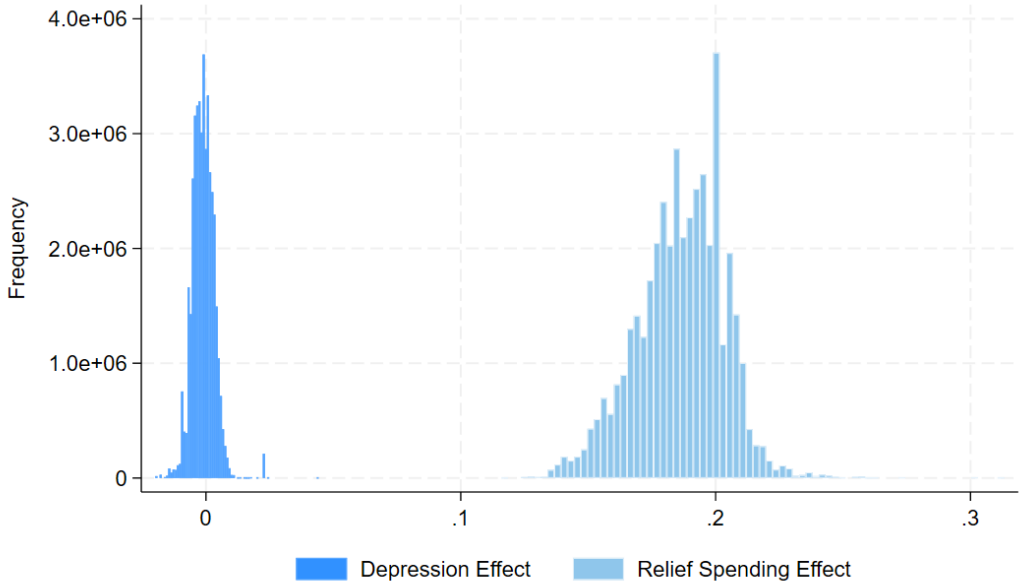
(a) OLS Estimates



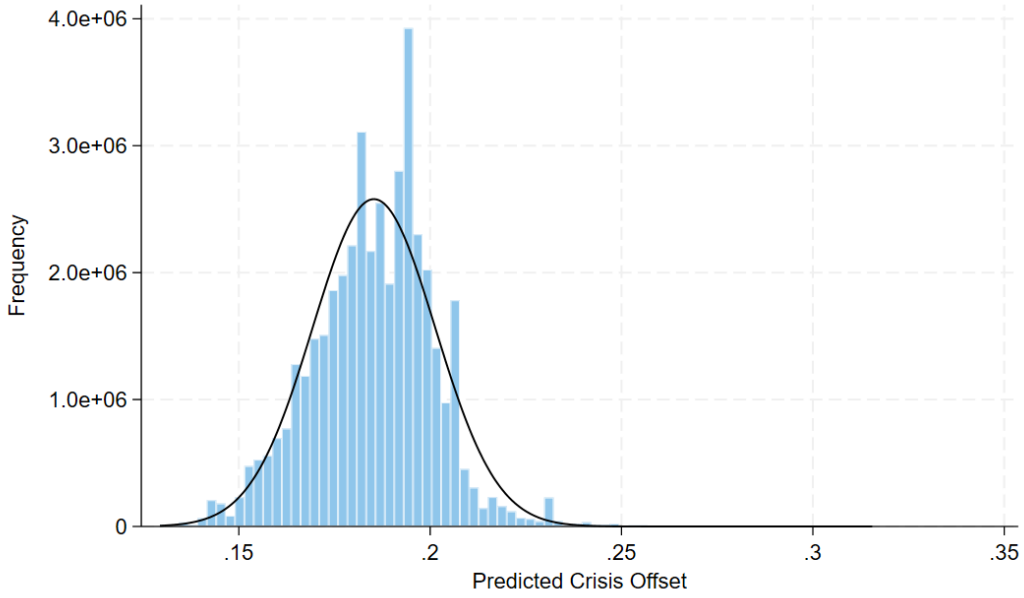
(b) IV Estimates

Notes: The figures show the OLS and IV coefficient estimates and 95% confidence intervals of the effects of crisis severity on survival from 1933 to 2020 for cohorts aged 16 to 25 in 1930. IV coefficients come from the regression in which we instrument New Deal relief, and the coefficients plotted are for the uninstrumented severity of the crisis. 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 VIII: IV-Predicted Effects of the Great Depression and New Deal Relief on Longevity



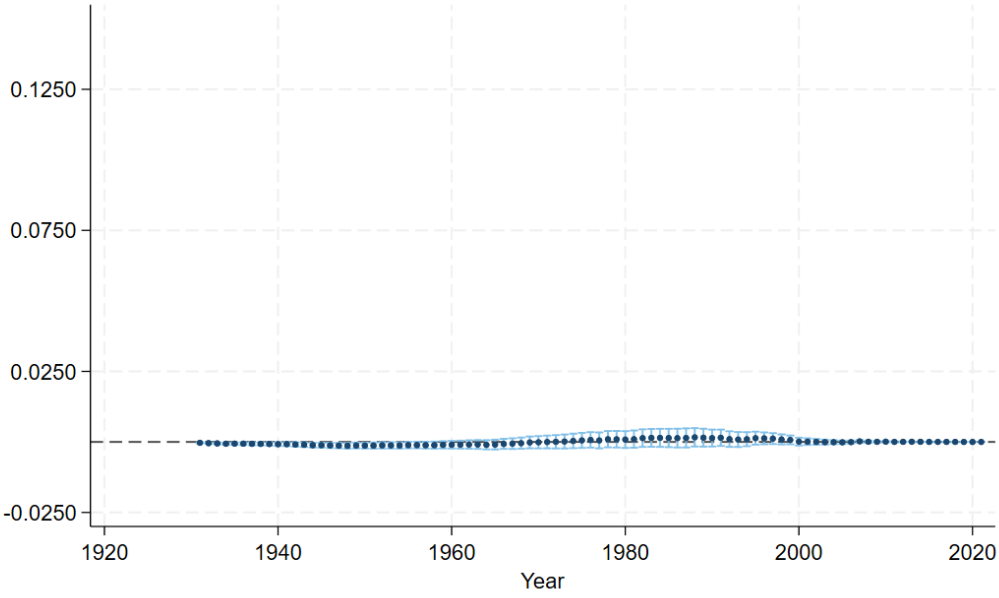
(a) Predicted IV Effects on Longevity



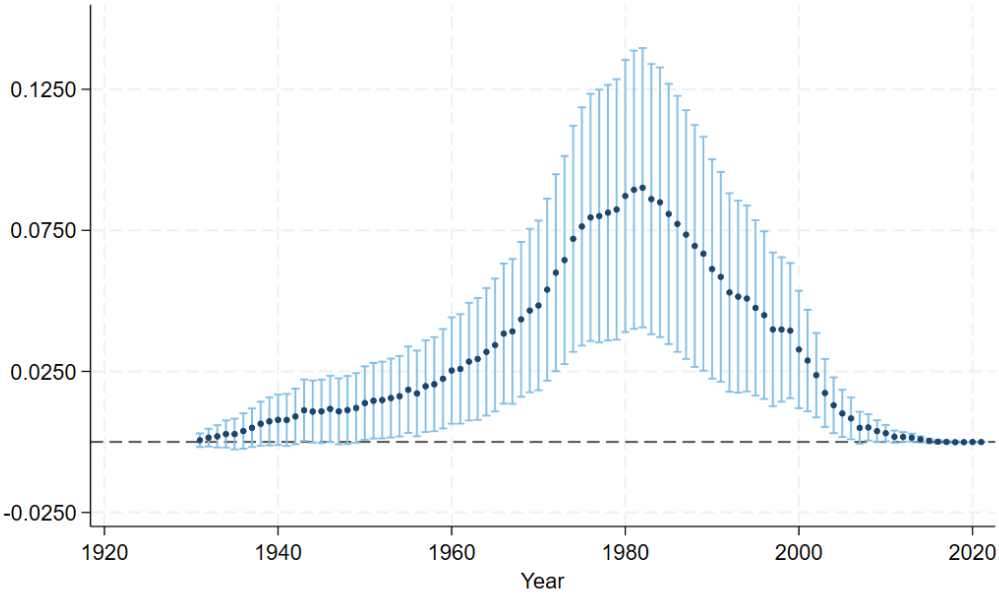
(b) Predicted IV crisis offsetting

Notes: The figures present the IV predicted effects of the Great Depression and New Deal relief on longevity. The specification to predict effects include 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 IX: Effects of New Deal Relief on Survival for Cohorts 16-25



(a) OLS Estimates

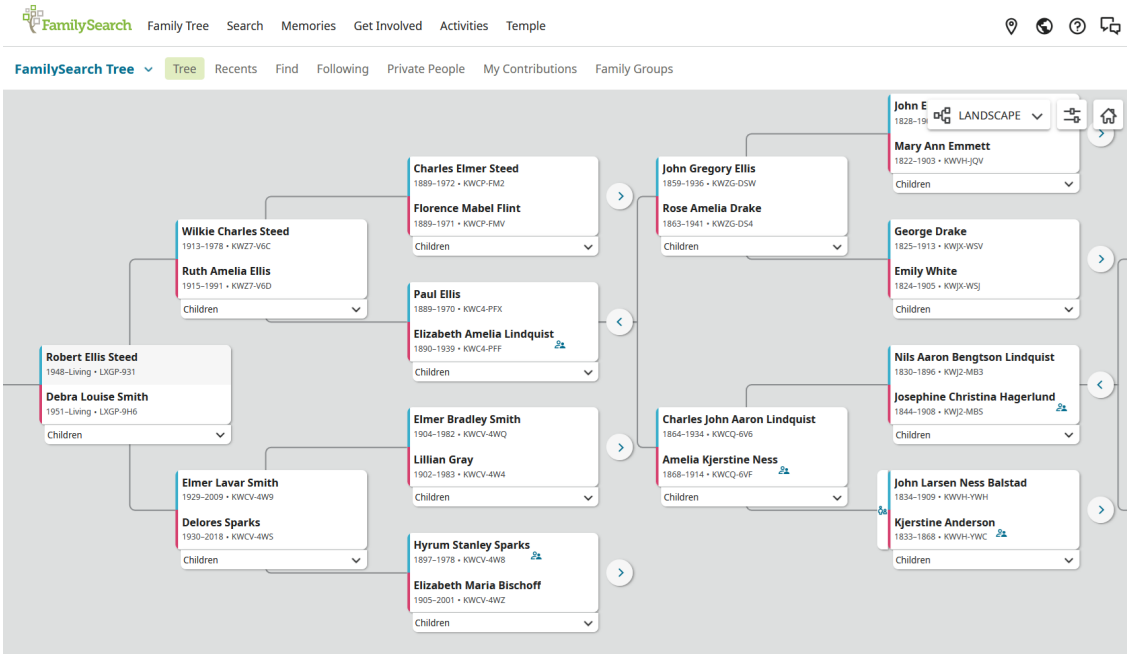


(b) IV estimates

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.

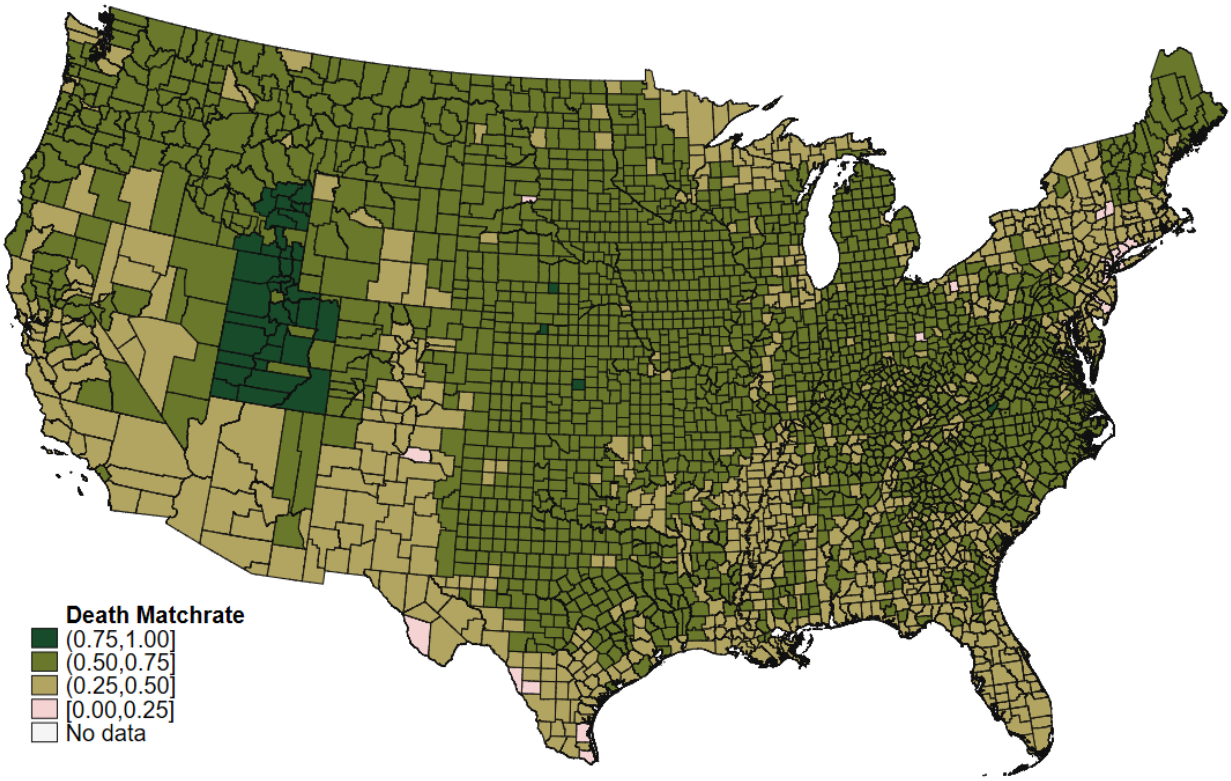
A Appendix Figures and Tables

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



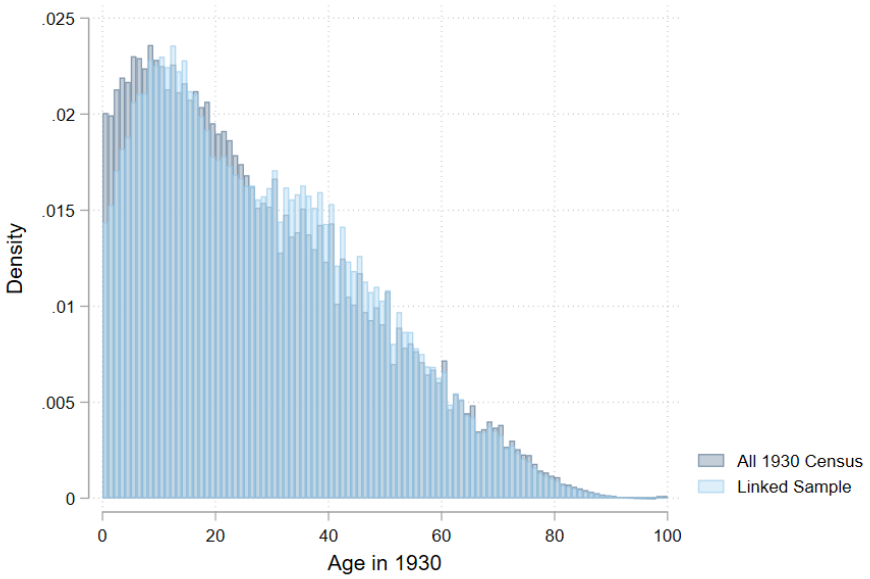
Note: The figure presents an example of a FamilySearch Tree from the point of view of a regular user.

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



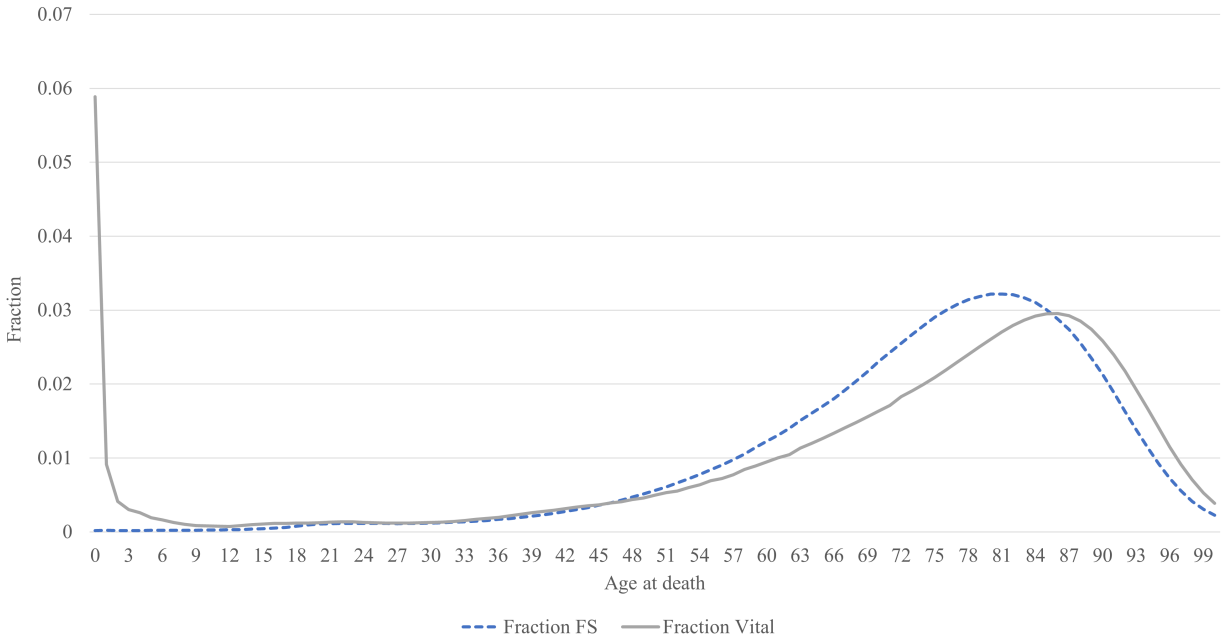
Notes: Black lines represent the limits of counties in 1930. Counties are colored in green scale to depict the level of match rates for the linkage from the white native population in the 1930 Census to their FamilySearch deaths.

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



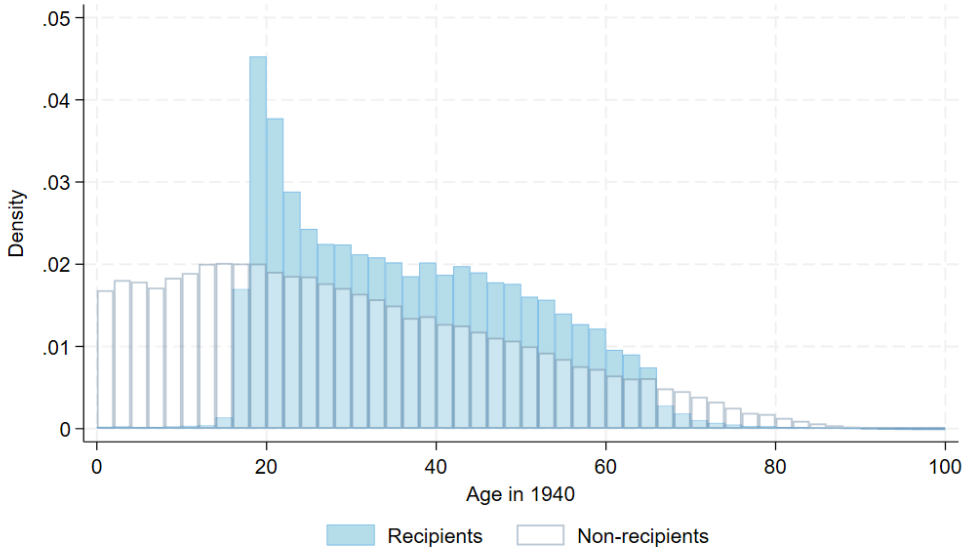
Notes: The histogram presents the distribution of age in 1930 of the two samples of interest: the white native US population in the 1930 Census in grey and our linked sample to FamilySearch deaths in blue.

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



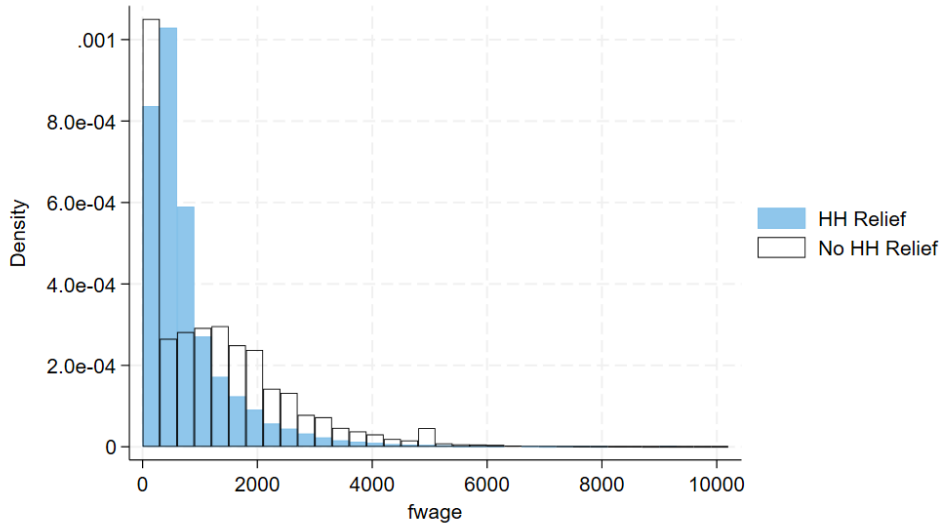
Note: The graph presents the distribution of the age at death for individuals born in 1930. The blue line represents the fraction of deaths at each age in our 1930 Census sample linked to FamilySearch deaths. The grey line represents the fraction of deaths from Social Security Life Tables. Since some individuals born in 1930 were born after the date of the 1930 census, we report the fraction of deaths at each age for the 1929 cohort.

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



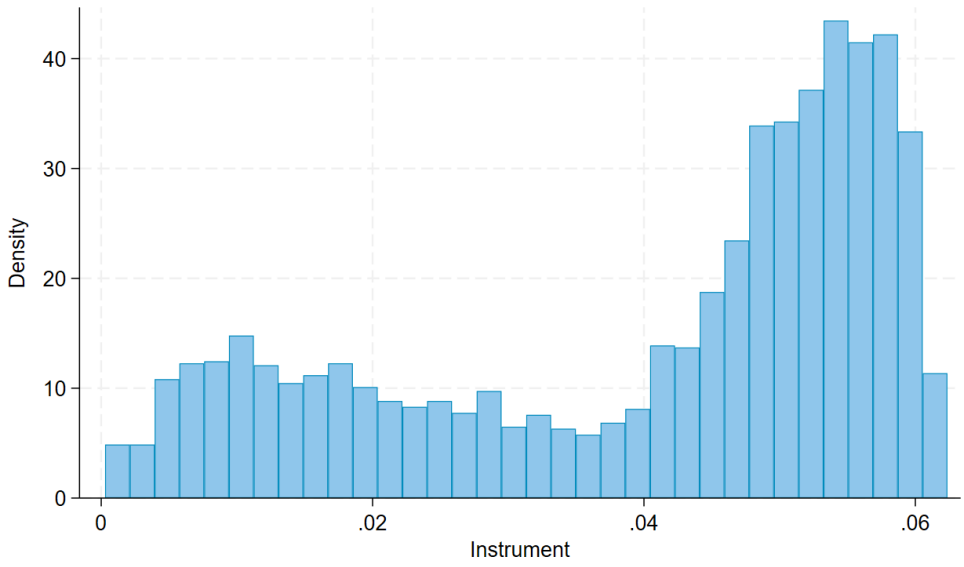
Note: In blue, we present the age distribution in 1940 of relief receivers and in white for non-receivers. The sample includes the population in the 1940 US full-count Census.

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



Note: In blue, we present the family wage distribution in 1940 of households that had at least one relief recipient in 1940 and in white for households that had no relief recipients. The sample includes 1% of the population in the 1940 US Census.

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



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

Table A.1: 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. (2020b). All specifications include state, cohort, and state of birth fixed effects. Standard errors in parentheses are clustered at the county level. 10%*, 5%**, 1%***

Table A.2: Households Receiving and Not Receiving Relief in 1940

	Not Receiving (1)	Receiving (2)	Difference (3)
Male	0.498	0.524	-0.026***
Age	29.667	26.278	3.389***
Age^2	1270.932	1037.111	233.821***
Spouse	0.420	0.347	0.072***
Children	0.319	0.323	-0.004***
Farm	0.233	0.223	0.010***
Urban Pop.	3002.727	1940.625	1062.102***
Homeowner	0.471	0.347	0.124***
Family Size	4.280	5.368	-1.089***
Income	475.575	272.367	203.207***
Non-Mover	0.861	0.895	-0.034***
Census Divisions			
New England	0.064	0.063	0.001***
Middle Atlantic	0.206	0.156	0.050***
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	0.107	-0.012***
Mountain	0.034	0.050	-0.016***
Pacific	0.078	0.061	0.017***
Observations	99,145,418	7,893,456	107,038,874

Notes. The table compares the means of individual characteristics in households (not) receiving relief in the US full-count Census. Column (3) reports the differences in means. 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.3: 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. Robust standard errors in parentheses. 10%*, 5%**, 1%***

Table A.4: 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.5: 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%***.

Table A.6: IV Estimates by Occupation Score Quartiles

Occupation Score Quartiles:	Missing score (1)	1st quartile (2)	2nd quartile (3)	3rd quartile (4)	4th quartile (5)	Positive score (6)
First Stage Outcome: New Deal Relief Spending pc.						
Voting Culture Instrument	4.1295***	4.9713***	4.4144***	3.3870***	4.3182***	4.3660***
	(1.0486)	(0.8762)	(1.0183)	(1.1807)	(1.1033)	(0.9391)
Severity Index	0.0897***	0.1519***	0.0950***	0.0851***	0.0651**	0.1011***
	(0.0309)	(0.0114)	(0.0294)	(0.0327)	(0.0306)	(0.0270)
Constant	5.7731***	5.7004***	5.7674***	5.7844***	5.8441***	5.7066***
	(0.0906)	(0.0722)	(0.1057)	(0.1094)	(0.1587)	(0.0838)
Observations	1,813,480	4,038,196	2,459,808	2,904,130	3,052,495	12,454,629
F-stat	18.1	32.2	18.8	8.2	15.3	21.6
Second Stage Outcome: L(Longevity)						
L(Relief pc.)	0.0383***	0.0290***	0.0331***	0.0522**	0.0279**	0.0328***
	(0.0144)	(0.0075)	(0.0113)	(0.0218)	(0.0112)	(0.0091)
Severity Index	-0.0057***	-0.0040***	-0.0036**	-0.0057**	-0.0022	-0.0038***
	(0.0018)	(0.0012)	(0.0015)	(0.0029)	(0.0016)	(0.0014)
Constant	3.9413***	4.0027***	4.0000***	3.7412***	3.9051***	3.9593***
	(0.0875)	(0.0504)	(0.0734)	(0.1404)	(0.1293)	(0.0554)
Observations	1,813,480	4,038,196	2,459,808	2,904,130	3,052,495	12,454,629
R-squared	0.01	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% (**), 10% (***).

Table A.7: 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 state, 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.8: IV Estimates of the New Deal and Great Depression on Longevity for Men by Mover Status

	Movers	Stayers
Dep. Var: L(Age at Death)	(1)	(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 state, 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.9: 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. In all specifications, the dependent variable is the logarithm of the average age at death at county level. There are no women linked to death data in Pickaway County, Ohio as explained in our Data Appendix. 10%*, 5%**, 1%***

Table A.10: 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. All columns estimate our main IV specification on the specified subset of our sample, including state fixed effects, county-level controls and individual controls averaged at the county level. Robust standard errors in parentheses. 10%*, 5%**, 1%***

Table A.11: 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 state, 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 and Great Depression on Longevity for Those Surviving to 20

	Everyone	Men	Women
	(1)	(2)	(3)
First Stage Outcome: L(Relief per capita)			
Voting Culture Instrument	4.161***	4.190***	4.125***
	(0.961)	(0.964)	(0.959)
Severity Index	0.102***	0.100***	0.104***
	(0.028)	(0.029)	(0.028)
Constant	5.592***	5.599***	5.586***
	(0.090)	(0.090)	(0.089)
Observations	42,051,031	22,694,424	19,356,607
F-stat	18.73	18.89	18.49
Second Stage Outcome: L(Longevity)			
Instrumented L(Relief p.c.)	0.023***	0.036***	0.009
	(0.007)	(0.010)	(0.006)
Severity Index	-0.003***	-0.005***	-0.02**
	(0.001)	(0.001)	(0.001)
Constant	4.134***	3.987***	4.208***
	(0.041)	(0.055)	(0.034)
Observations	42,051,031	22,694,424	19,356,607

Notes. People who died before turning 20 are excluded from these results. All columns estimate our main IV specification on the specified subset of our sample, including state, 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.13: IV Estimates of the New Deal and Great Depression on Longevity Excluding WWII Deaths

	Everyone (1)	Men (2)	Women (3)
First Stage Outcome: L(Relief per capita)			
Voting Culture Instrument	4.139***	4.163***	4.111***
	(0.964)	(0.967)	(0.961)
Severity Index	0.102***	0.100***	0.104***
	(0.028)	(0.029)	(0.028)
Constant	5.591***	5.598***	5.585***
	(0.090)	(0.090)	(0.089)
Observations	40,769,438	21,880,129	18,889,309
F-stat	18.45	18.55	18.28
Second Stage Outcome: L(Longevity)			
Instrumented L(Relief p.c.)	0.035***	0.048***	0.020**
	(0.010)	(0.013)	(0.009)
Severity Index	-0.005***	-0.006***	-0.003***
	(0.002)	(0.002)	(0.001)
Constant	3.754***	3.621***	3.816***
	(0.059)	(0.073)	(0.050)
Observations	40,769,438	21,880,129	18,889,309

Notes. People who died during WWII (1942-1945) are excluded from these results. All columns estimate our main IV specification on the specified subset of our sample, including state, 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.14: 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. Standard errors in parentheses are clustered at the county level. 10%*, 5%**, 1%***

Table A.15: IV Estimates of the New Deal with Instruments from the Literature

Instrument	First Stage		Second Stage	
	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 state, 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.16: IV Estimates of the New Deal by New Deal Program

Program Abbreviation:	NDEXP	WPA	CWA	FERA	PUBASS	FSARR2	PBA	PWAF	PWANF2	USHAH
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(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. 10%*, 5%**, 1%***.

Table A.17: County-level IV Estimates by Cause of Death

Cause of Death:	Men					Women				
	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. The regression model includes year fixed effects and county-level controls. We report results for the 5 largest causes of death and other results are available upon request. Standard errors in parentheses 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.18: 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.19: 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.20: 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

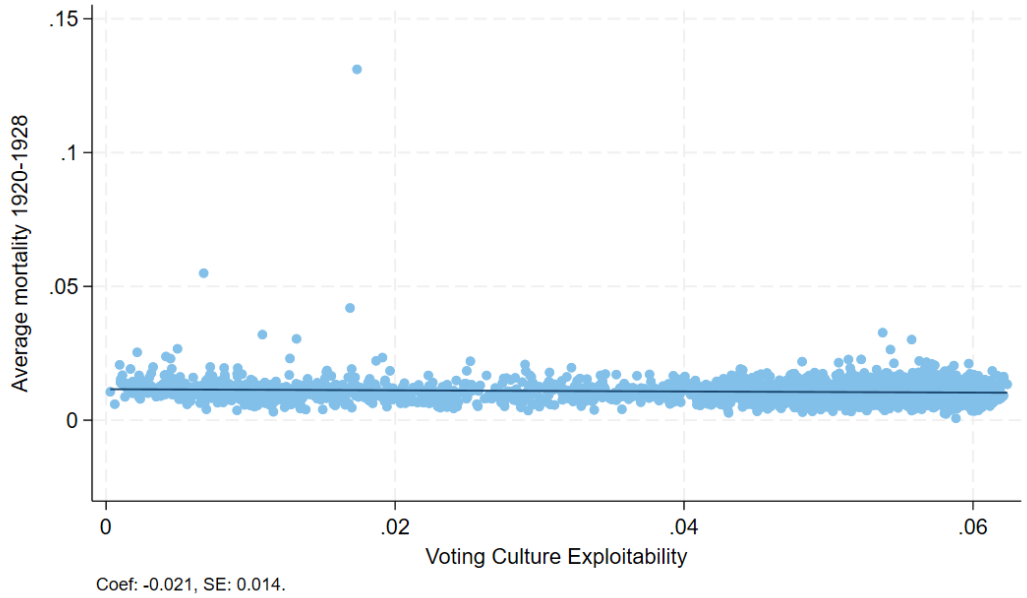
Notes. County-Cohort Weights are calculated as the inverse of the proportion of White, U.S. born people belonging to a given county and birth year cohort who were linked to a FamilySearch death record. Inverse Probability Weights are calculated according to Bailey et al. (2020b). All columns estimate 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.21: IV Estimates with 1940 Outcomes as Mitigating Controls

	Everyone (1)	Men (2)	Women (3)
First Stage Outcome: L(Relief per capita)			
Voting Culture Instrument	4.090***	4.114***	4.060***
	(1.011)	(1.019)	(1.012)
Severity Index	0.105***	0.103***	0.108***
	(0.028)	(0.028)	(0.27)
Highest Grade Completed, 1940	0.000	0.000	0.001
	(0.001)	(0.001)	(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	0.007***	0.006**	0.007**
	(0.003)	(0.003)	(0.003)
Married in 1940	-0.002*	-0.003***	-0.001
	(0.001)	(0.001)	(0.002)
Moved County, 1930-1940	-0.001	-0.001	-0.002
	(0.003)	(0.003)	(0.003)
Observations	31,513,117	17,528,648	13,984,469
F-stat	17.78	17.79	17.72
Second Stage Outcome: L(Longevity)			
Instrumented L(Relief p.c.)	0.017***	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	0.024***	0.027***	0.009***
	(0.000)	(0.000)	(0.001)
In Labor Force in 1940	-0.000	0.001***	-0.002***
	(0.000)	(0.000)	(0.001)
Married in 1940	0.014***	0.011***	0.009***
	(0.000)	(0.000)	(0.000)
Moved County, 1930-1940	-0.007***	-0.009***	-0.004***
	(0.000)	(0.000)	(0.000)
Observations	31,513,117	17,528,648	13,984,469

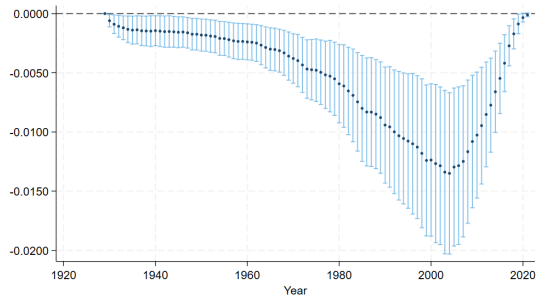
Notes. All columns estimate our usual specification, adding the listed 1940 outcomes plus a dummy for missing income in 1940. Standard errors in parentheses are clustered at the county level. F-stats calculated following Kleibergen and Paap (2006). 10%*, 5%**, 1%***

Figure A.8: Relationship of Average Mortality Rates 1920-1928 and Voting Culture Instrument

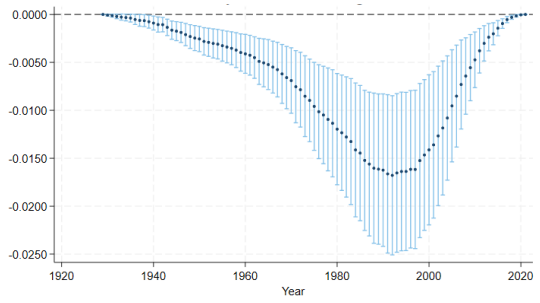


Notes. The graph plots the county-level relationship between our voting culture exploitability instrument and a county's average mortality rate from 1920 to 1928. It shows the relationship without controls, but it is robust to controlling for the severity of the crisis and county-level controls selected by LASSO.

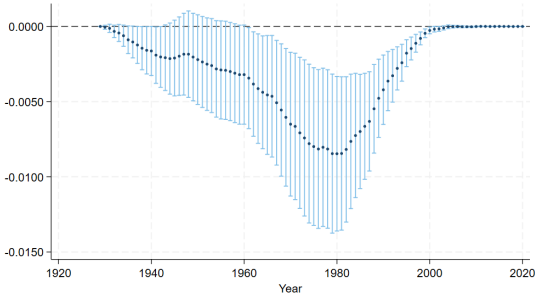
Figure A.9: IV Estimates of the Effects of the Great Depression on Survival



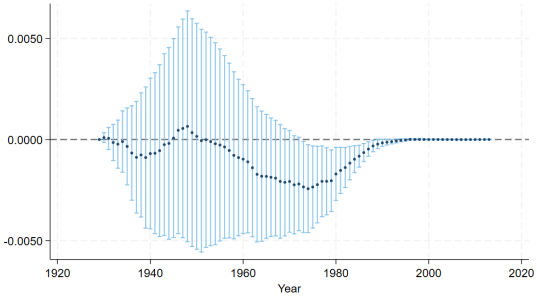
(a) Ages 0 to 5 in 1930



(b) Ages 6 to 15 in 1930



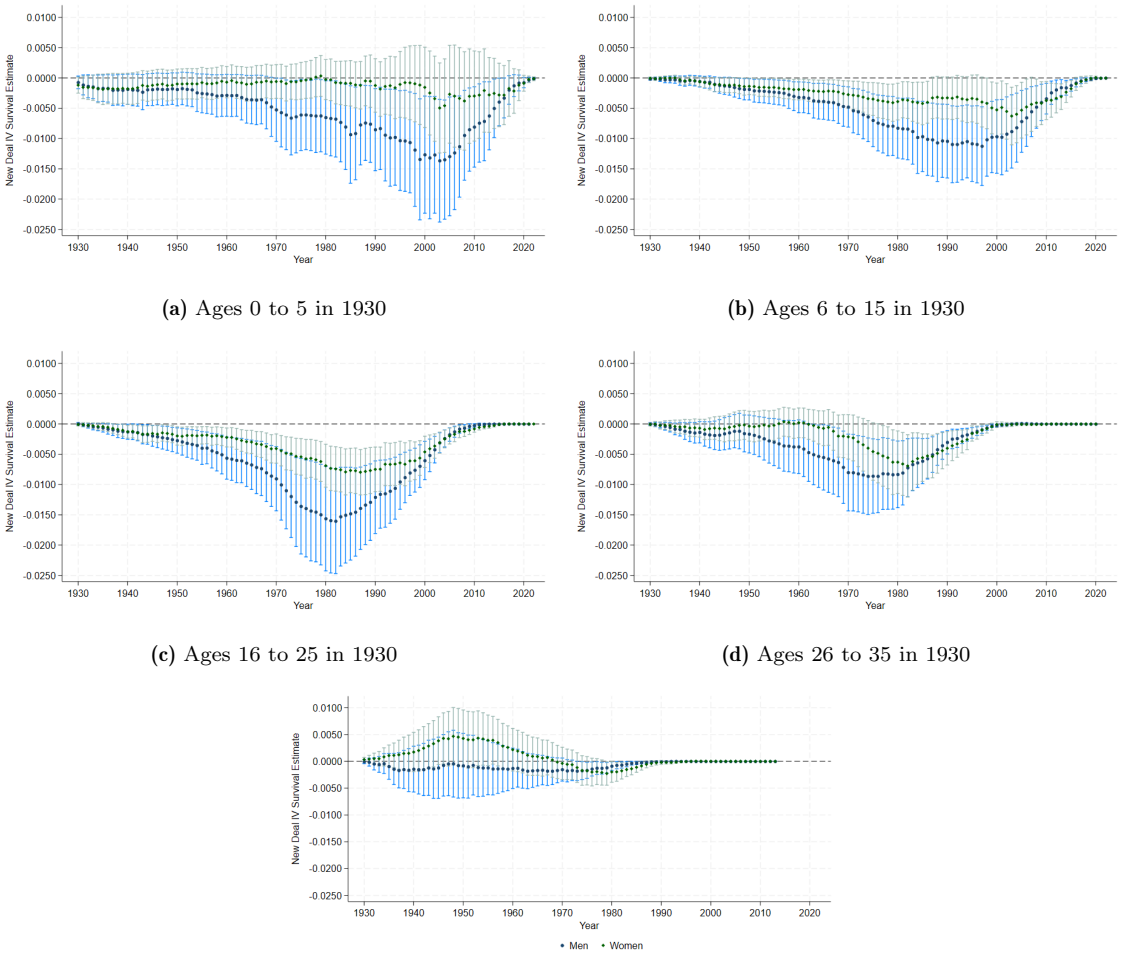
(c) Ages 26 to 35 in 1930



(d) Ages over 35 in 1930

Notes: The figures present IV coefficient estimates and 95% confidence intervals of the effects of crisis severity on survival from 1933 to 2020 for different groups of birth cohorts. 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.

Figure A.10: 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

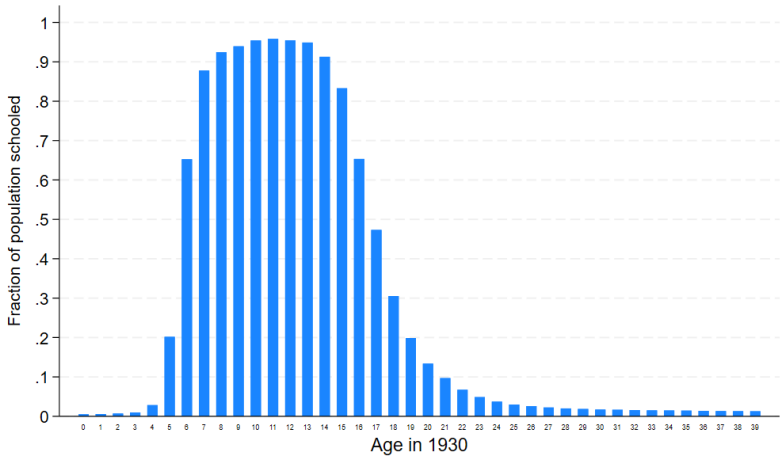
(c) Ages 16 to 25 in 1930

(d) Ages 26 to 35 in 1930

(e) Ages over 35 in 1930

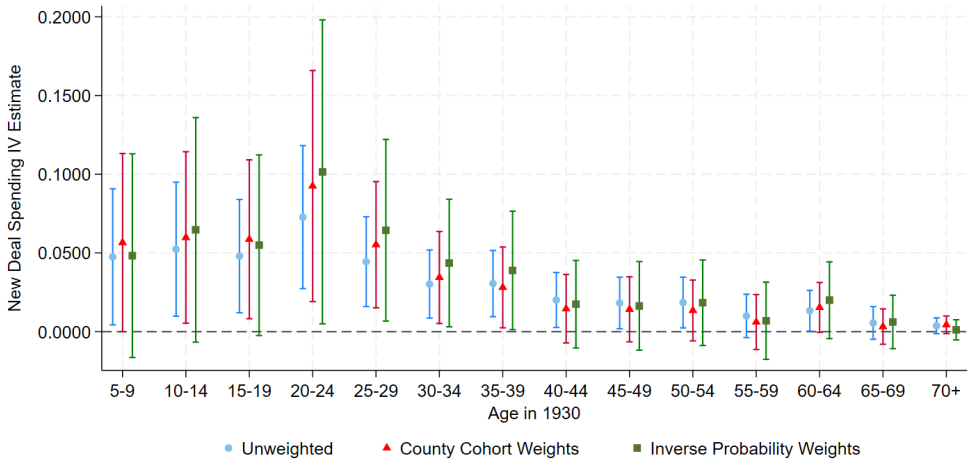
Notes: The figures present IV coefficient estimates and 95% confidence intervals of the effects of the severity of the Great Depression on survival from 1933 to 2020 for men and women of different ages in 1930. Regressions include county controls, individual covariates, and state of birth and cohort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

Figure A.11: Fraction of Individuals in School in the 1930 Census by Age

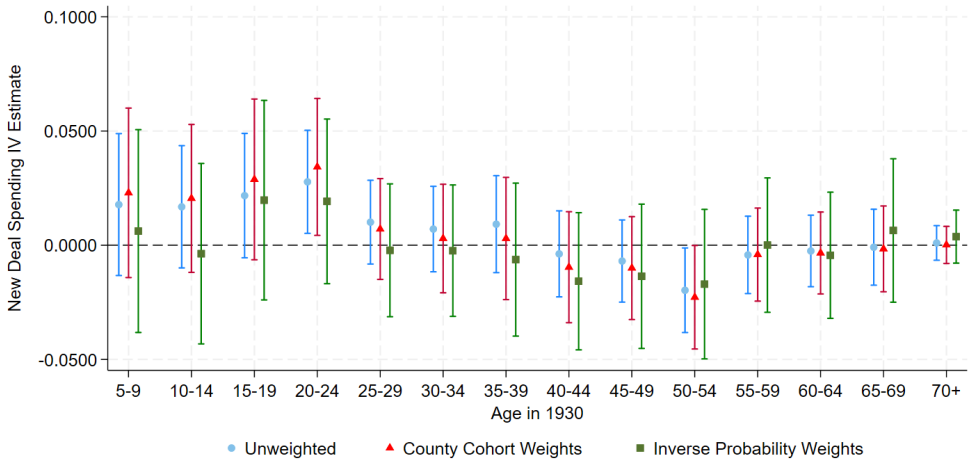


Notes: The sample includes all individuals in the 1930 full-count US Census.

Figure A.12: IV Estimates of the Effect of New Deal Relief on Longevity by Gender



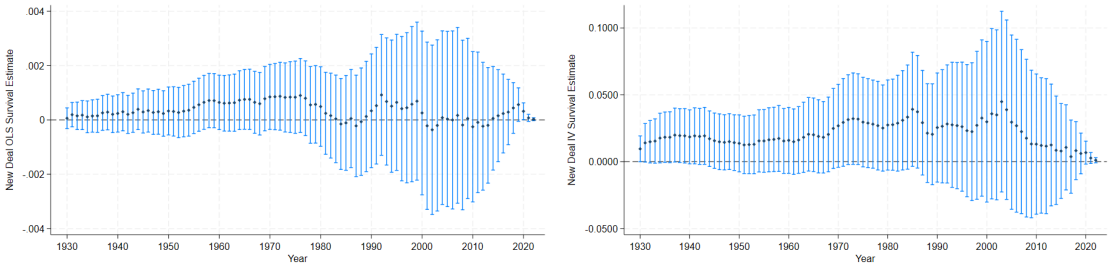
(a) Men



(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. (2020b). Standard errors used to compute confidence intervals are clustered at the county level.

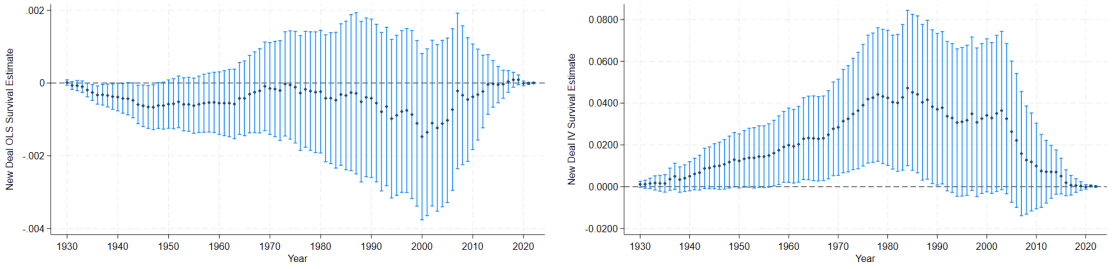
Figure A.13: The Effects of New Deal Relief on Survival for Cohort 0-5



(a) OLS Estimates **(b)** IV estimates

Notes: The figures present the OLS and IV coefficient estimates and 95% confidence intervals of the effects of New Deal relief on survival from 1933 to 2020 for the cohort aged 0 to 5 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.

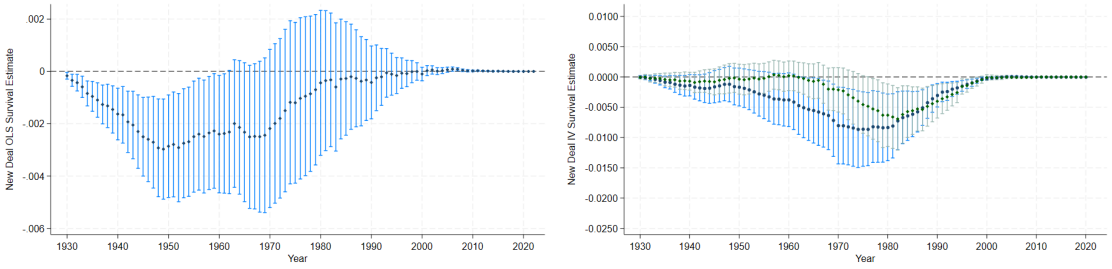
Figure A.14: The Effects of New Deal Relief on Survival for Cohorts 6-15



(a) OLS Estimates **(b)** IV estimates

Notes: The figures present the OLS and IV coefficient estimates and 95% confidence intervals of the effects of New Deal relief on survival from 1933 to 2020 for the cohort aged 6 to 15 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.

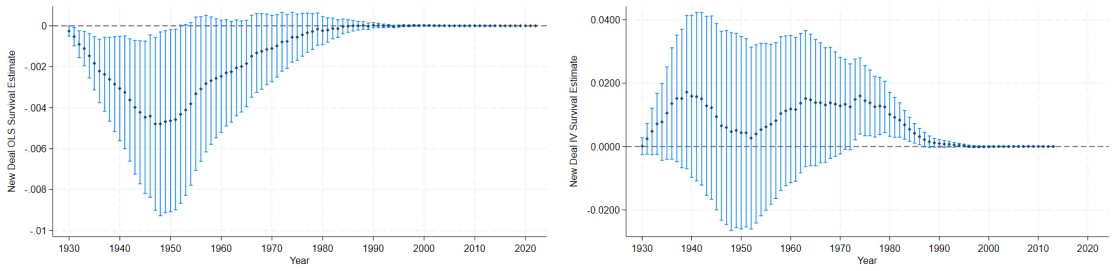
Figure A.15: The Effects of New Deal Relief on Survival for Cohort 26-35



(a) OLS Estimates **(b)** IV estimates

Notes: The figures present the OLS and IV coefficient estimates and 95% confidence intervals of the effects of New Deal relief on survival from 1933 to 2020 for the cohort aged 26 to 35 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.

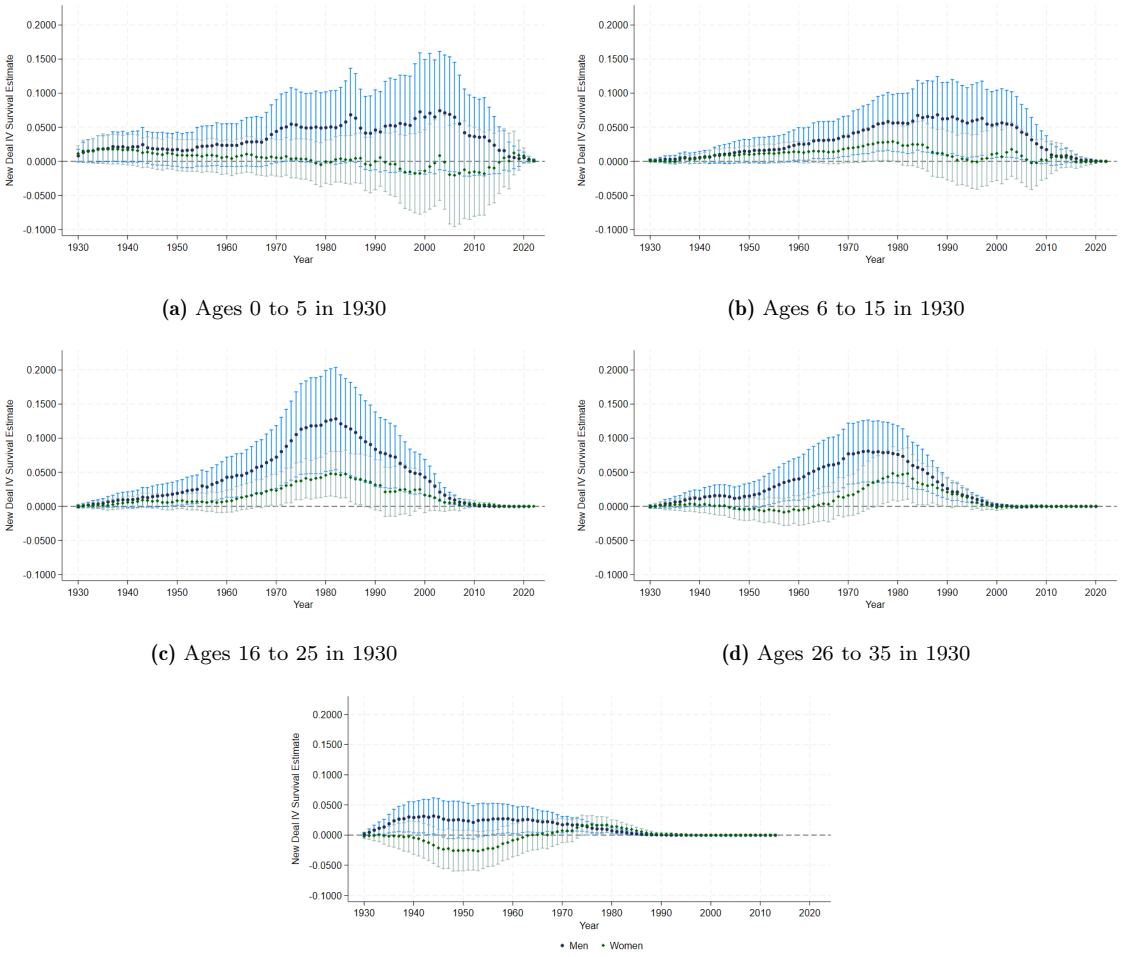
Figure A.16: The Effects of New Deal Relief on Survival for Cohort +35



(a) OLS Estimates **(b)** IV estimates

Notes: The figures present the OLS and IV coefficient estimates and 95% confidence intervals of the effects of New Deal relief on survival from 1933 to 2020 for cohorts older than 35 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.

Figure A.17: 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

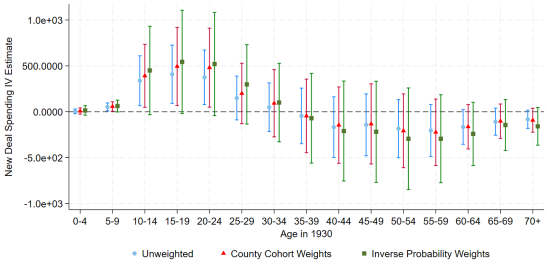
(d) Ages 26 to 35 in 1930

(e) Ages over 35 in 1930

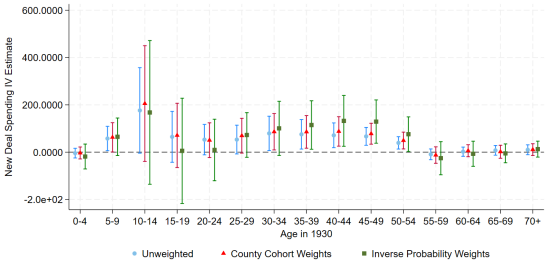
Notes: The figures present IV coefficient estimates and 95% confidence intervals of the effects of New Deal relief on survival from 1933 to 2020. Regressions include county controls, individual covariates, and state of birth and cohort fixed effects. Standard errors used to compute the confidence intervals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

Figure A.18: The IV Estimates of New Deal Relief on 1940 Labor Market Outcomes

1940 Income Wage

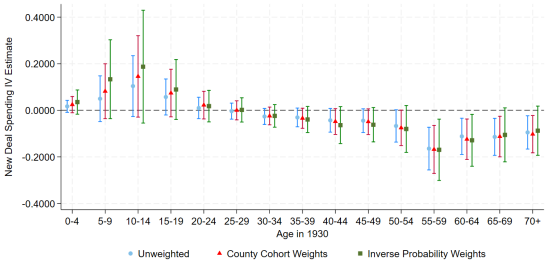


(a) Men

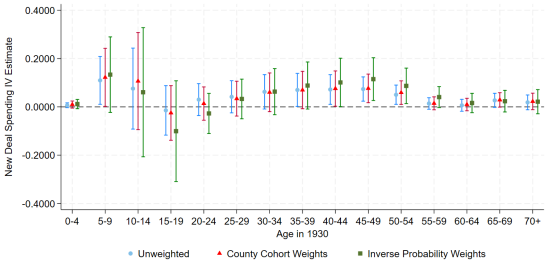


(b) Women

Employed in 1940

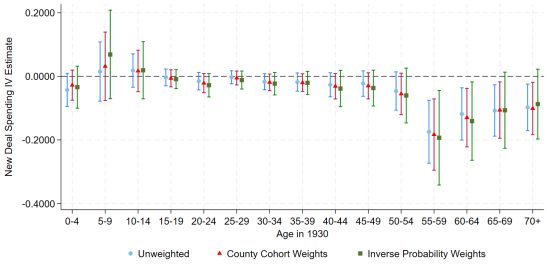


(c) Men

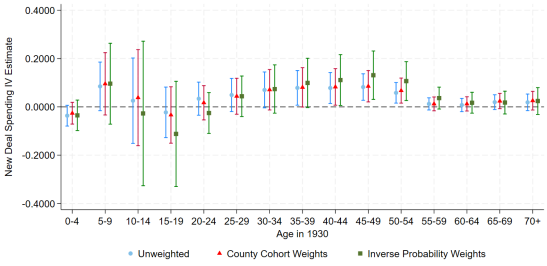


(d) Women

In Labor Force in 1940

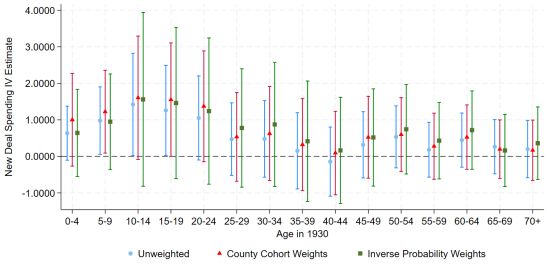


(e) Men

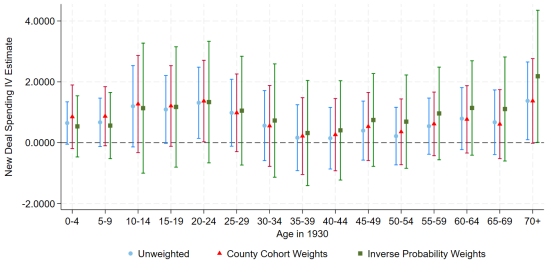


(f) Women

Years of Education in 1940



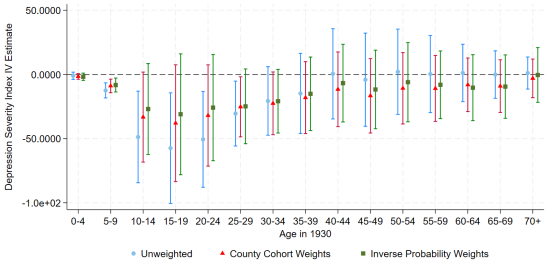
(g) Men



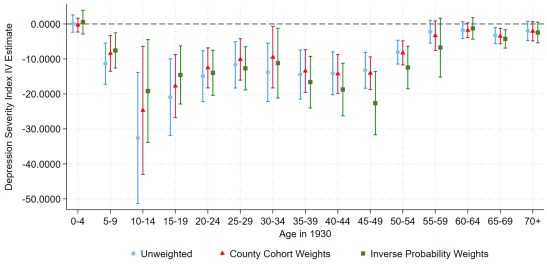
(h) Women

Figure A.19: The IV Estimates of the Great Depression on 1940 Labor Market Outcomes

1940 Income Wage

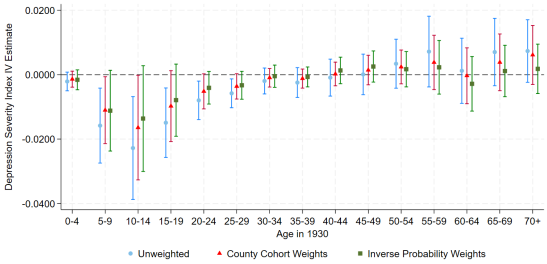


(a) Men

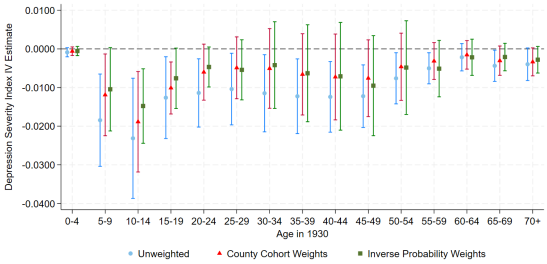


(b) Women

Employed in 1940

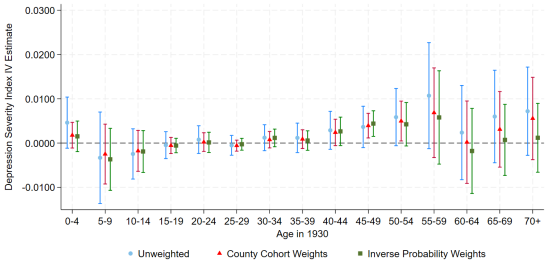


(c) Men

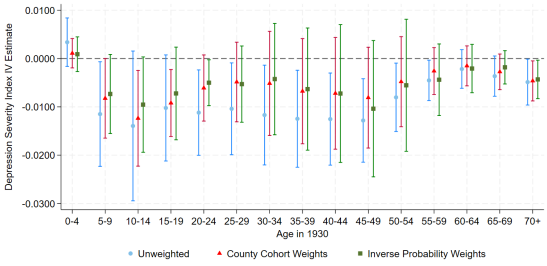


(d) Women

In Labor Force in 1940

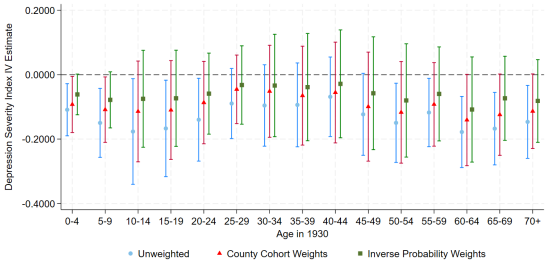


(e) Men

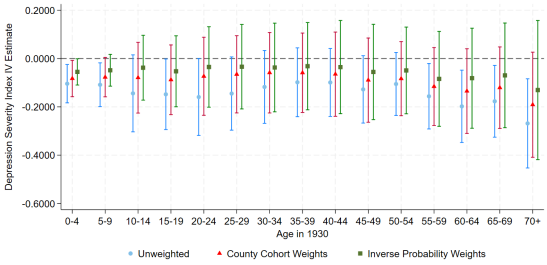


(f) Women

Years of Education in 1940



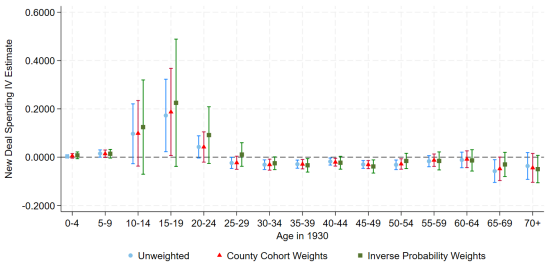
(g) Men



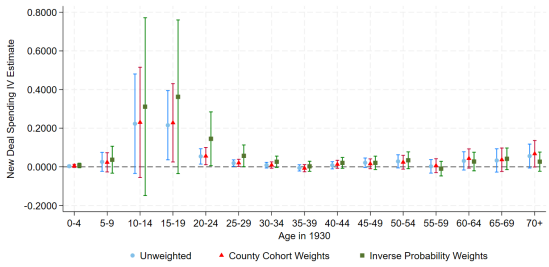
(h) Women

Figure A.20: The IV Estimates of New Deal Relief on 1940 Demographic Outcomes

Married in 1940

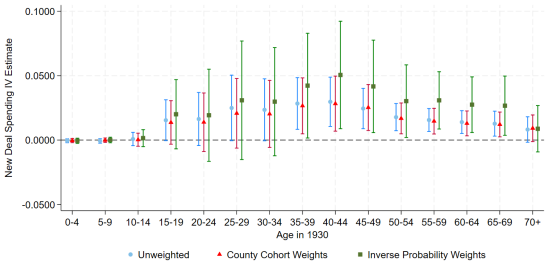


(a) Men

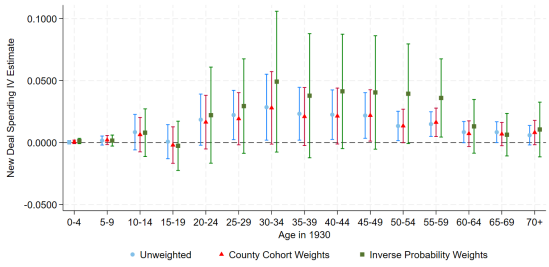


(b) Women

Divorced in 1940

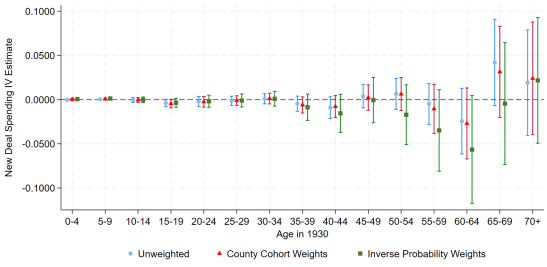


(c) Men

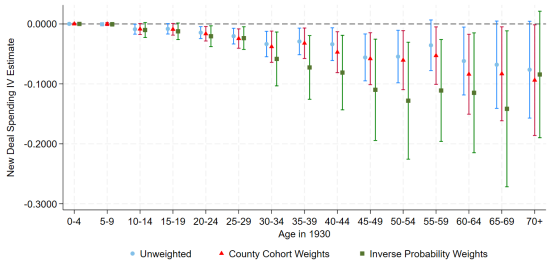


(d) Women

Widowed in 1940

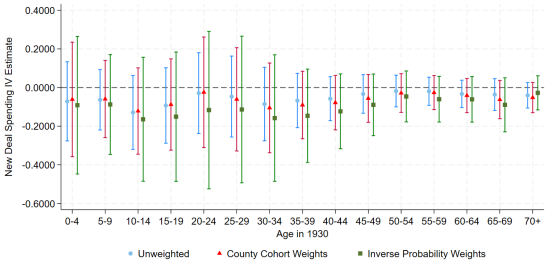


(e) Men

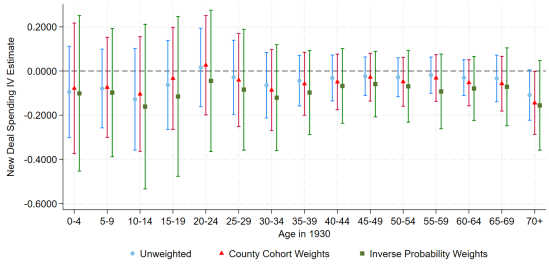


(f) Women

Moved Counties from 1930 to 1940



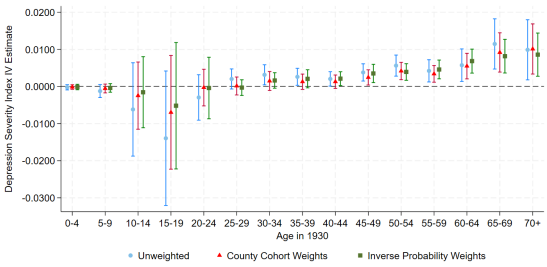
(g) Men



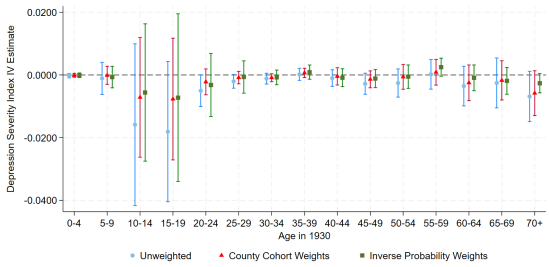
(h) Women

Figure A.21: The IV Estimates of the Great Depression on 1940 Demographic Outcomes

Married in 1940

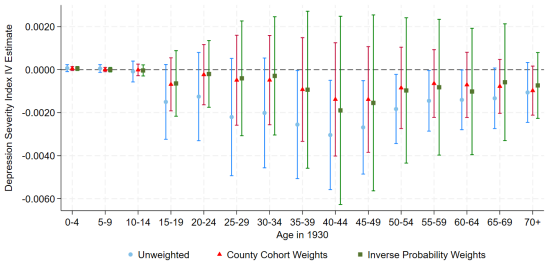


(a) Men

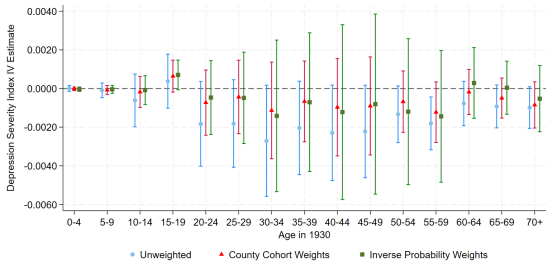


(b) Women

Divorced in 1940

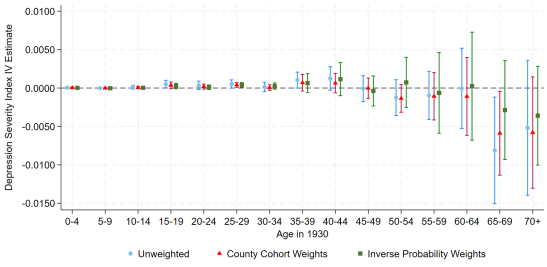


(c) Men

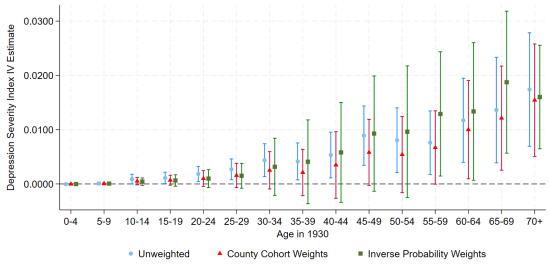


(d) Women

Widowed in 1940

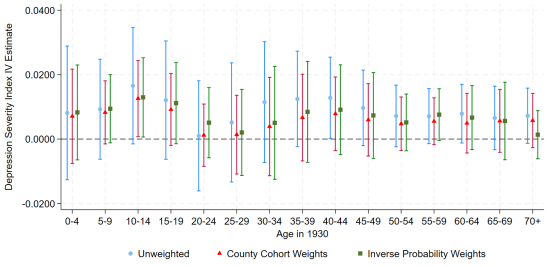


(e) Men

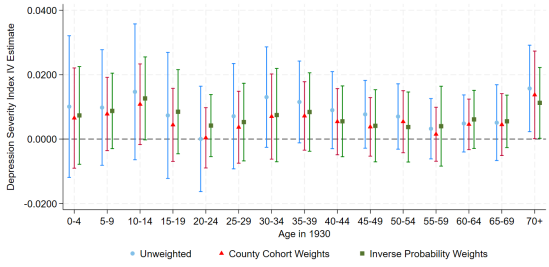


(f) Women

Moved Counties from 1930 to 1940

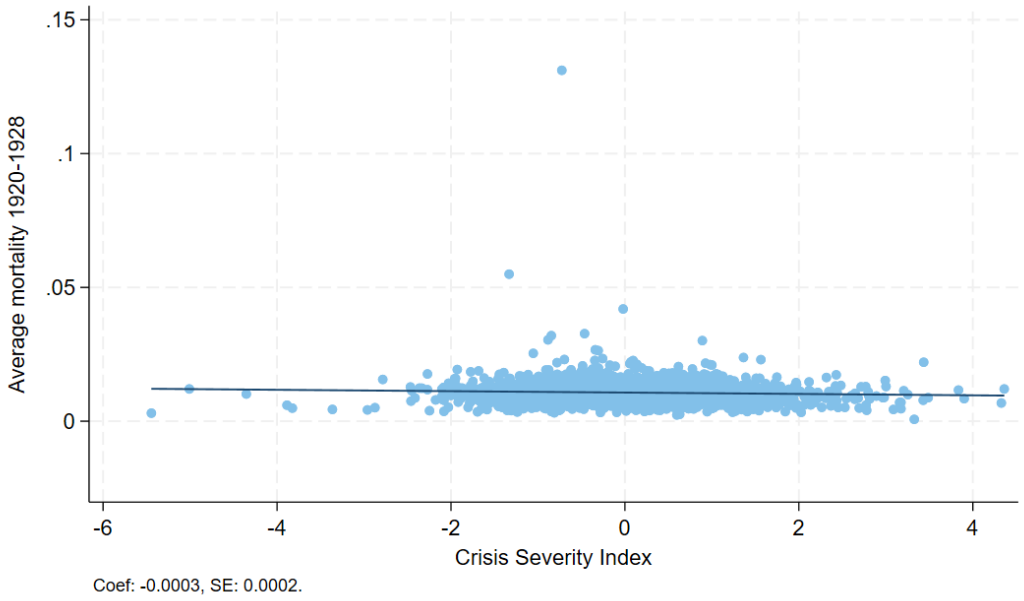


(g) Men



(h) Women

Figure A.22: Relationship of Average Mortality Rates 1920-1928 and Crisis Severity Index



Notes. The graph plots the county-level relationship between our depression severity index and a county's average mortality rate from 1920 to 1928.

B Data Appendix

Our analysis relies on linking data from several sources. We begin by narrowing our sample to the set of white, US-born people recorded in the 1930 full-count US Census (Ruggles et al., 2024, 2025). We link those individuals to 1) themselves in the 1940 full-count US census; and 2) their death year as recorded on FamilySearch. This appendix will describe our methods for obtaining and linking that data in order to create the datasets we used for our analysis. It will also describe match rate outcomes at several levels (including geographic breakdowns at the state and county levels) and discuss potential issues.

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

IPUMS USA provides the high quality pre-cleaned full-count US Census datasets from which we obtain the majority of our useful variables, like a person's birth year and place of residence. Their full-count census datasets identify individuals within that census by a uniquely assigned HISTID. These HISTIDs are not consistent between census years; i.e. a person's HISTID in the 1930 census is not the same as their HISTID in the 1940 census.

We link people in our dataset from 1930 to 1940 using the Census Tree method (Price et al., 2021; Buckles et al., 2023) developed in part at the BYU Record Linking Lab (hereafter RLL). The newly-public project provides HISTID-based links across pairs of censuses and is one of the most representative sets of census links currently available, especially for linking women. The public availability of these links coupled with their position at the frontier of record linking make them a perfect fit for our research.

As described more fully in its documentation, the Census Tree uses genealogical data as training data to extrapolate extra inter-census links via supervised machine learning. As such, some links in the dataset are likely to be more reliable than others. If the Census Tree used a certain hand-matched link as training data and also suggested via machine

learning that the same match is valid, we would trust such a link more than a link found (for example) only by imputing two other existing Census Tree links. One additional quirk of the Census Tree links is their inclusion of links found only in other well-known linking projects such as IPUMS' Multigenerational Longitudinal Panel (Helgertz et al., 2022). Happily, the datasets include a total of seven indicators for the sources of a given match, such as "XGB" (the ML algorithm used to construct the dataset) and "MLP" (IPUMS' Multigenerational Longitudinal Panel).

In an attempt to remove the most suspicious links from our cross-census analysis, we filter some of the 1930-1940 Census Tree links. If a link in those datasets is found by only one of the seven methods, we exclude it from our analysis. In addition, if a link is found only by the two external sources included in the Census Tree (the MLP and the Census Linking Project), we exclude the link. We argue that these two filters grant us a reasonably robust set of links that makes the best use of the special properties inherent to the construction of the Census Tree, and they result in us matching 59.168% of our 1930 sample into 1940.

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

We used the 1930 IPUMS census dataset as our base dataset for all linking. As described above, their datasets index individuals by HISTID. Because census records provide no information about a person's death, we need to link the individuals in that dataset to a different dataset that does provide death information. We use data from the public wiki-style Family Tree from FamilySearch.org as our source for that death information.

Like IPUMS, FamilySearch, one of the world's largest genealogical organizations, also maintains indexed versions of the full-count US Census datasets. In place of HISTIDs, they identify individuals by a uniquely assigned Archival Resource Key (hereafter ARK). Like HISTIDs, these ARKs are not consistent between census years. In addition, FamilySearch's Family Tree is built on ARKs, not HISTIDs, so we have to link our HISTID-based data to

its corresponding ARK-based FamilySearch data in order to access the incredible death data contained on the tree. Examples of a matched HISTID and an ARK from 1940 are presented below:

histid1940
00000256-F115-4E18-A124-D78C70F2C985

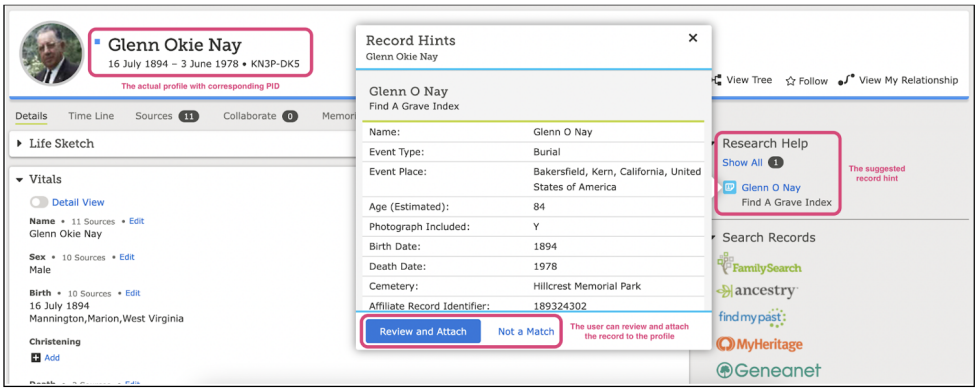
ark1940
VTWB-WZP

This process of linking from HISTID to ARK is not as easy in reality as it feels like it would be. Though the two datasets should ostensibly be identical indexes of identical images, this is far from the case. For example, FamilySearch is missing the entire 1930 census for Pickaway County, Ohio, making it impossible to link the $\tilde{2}$7,000 HISTIDs belonging to the people in that county to their ARK correspondents, as those ARKs are not presently available to anyone. As such, it is also impossible to link those people to their death data as recorded on the Family Tree. Though this issue is isolated (Pickaway, OH is the only county with this issue), it is illustrative of the difficulty of linking historical records even among copies of themselves. To further complicate matters, linking from HISTID to ARK is not even the final linking step necessary to obtain death data from the Family Tree.

As described above, FamilySearch indexes their census records at the individual level by ARK. Those indexed records are made available to the public on FamilySearch.org, where users are encouraged to contribute to a shared Family Tree. The tree itself is not composed of ARKs, but of individual profiles assigned uniquely to a deceased individual. Those profiles are created by the deceased's descendants, and each profile is uniquely assigned a PersonID, or PID. An example profile is presented below, with its PID highlighted:

Users search FamilySearch's indexed records (identified by ARKs) and attach information from matching records to a given profile's PID. FamilySearch's record matching algorithms also frequently suggest potential record matches on a given person's profile, allowing users to find and verify potential record matches with minimal effort. An example of one such

record "hint" is presented below:



Importantly, the records (ARKs) that a user might attach to a given profile (PID) can include both death records and census records, giving us an extremely reliable set of links from people's entries in census records to their death information. We therefore have a path to link people in our 1930 IPUMS dataset to reliable death information. Doing so involves three distinct linking steps:

1. Use a HISTID-ARK crosswalk developed by the RLL to link the 1930 IPUMS data to the 1930 FamilySearch data (HISTID1930 → ARK1930).

2. Use a list of census ARKs that are either already attached to or likely to match with existing PIDs on the Family Tree to link the 1930 FamilySearch data to those people's profiles on the Family Tree (ARK1930 → PID).

3. Pull the death year information recorded on the public profiles of each of the matched PIDs from said PIDs and incorporate it into our dataset (PID → Death Year).

Those three steps result in a linking process that uses RLL crosswalks and a list of attached or likely-match ARK-PID sets from FamilySearch to go from HISTID1930 → ARK1930 → PID → Death Year, thereby linking many of the individuals in our 1930 IPUMS dataset to their respective death years.

Again, this process is not perfect; FamilySearch's user base has not historically been representative of the United States as a whole, so the set of people whose death information can be linked is likely to suffer from selection. Specifically, FamilySearch's primary user base is composed of members of The Church of Jesus Christ of Latter-day Saints, who are more likely to be of white European descent than the average person in the United States. Though projects like the African-American Families Project from the RLL are improving the representativeness of the Family Tree as a whole, our dataset still reflects some selection in favor of the ancestors of FamilySearch's users.

III. Overall match rates

No individual step in any of our matching processes ever matches 100% of the individuals it was meant to match, but this is not unexpected. The match rates from each step of the HISTID1930 → Death Year matching process and its overall match rate are presented below:

Step of HISTID1930 → Death Year Process	*Matching Success Rate*
HISTID1930 → ARK1930	99.536%
ARK1930 → PID	63.075%
PID → Death Year	71.385%
HISTID1930 → Death Year	**44.817%**

Each of the step match rates presented above is dependent on the step that precedes it; a person whose HISTID1930 does not match an ARK1930 cannot match to either an ARK1940 or a PID. This makes the key HISTID1930 → Death Year match rate equal to the product of the match rates of its steps. Luckily, the match rate for people who matched from HISTID1930 to both HISTID1940 and a death year is not a product of the two end match rates:

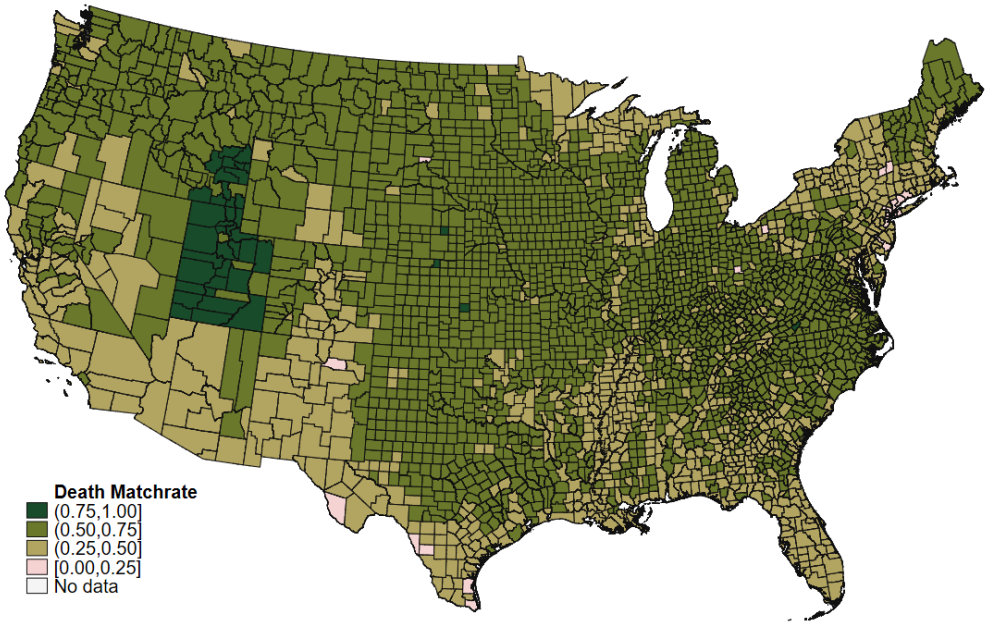
Matching Process	*Matching Success Rate*
HISTID1930 → HISTID1940	59.168%
HISTID1930 → Death Year	44.817%
HISTID1930 → HISTID1940 & Death Year	**33.376%**
Product of rows 1 & 2	**26.517%**

The fact that our HISTID1930 → HISTID1940 & Death Year match rate is higher than the product of the two individual match rates suggests that the probability that a person matches to a HISTID1940 is not independent from the probability that a person matches to a death year.

IV. Match rate breakdowns by county

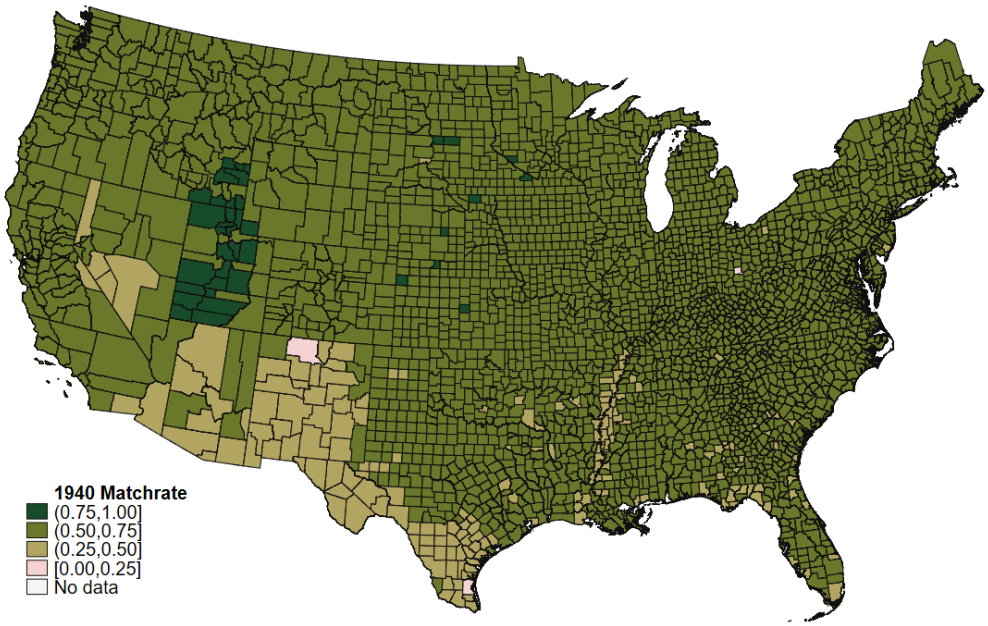
In our dataset, match rates of every kind vary by state and county. Some of this variation could introduce interesting challenges to the interpretation of our results. We present choropleth maps of match rates by county that show possible issues in regional selection. We first examine variation in match rates at the county level. Below are three choropleth maps showing match rates from HISTID1930 to death years, HISTID1930 to HISTID1940, and HISTID1930 to both death years and HISTID1940, respectively. First, the map of HISTID1930 to death year:

Several trends stand out. First, counties in Utah and Idaho drastically outperform counties in other states. Because we can only link a person in the census to their death year if that year is recorded on FamilySearch, this huge green region reflects an overrepresentation of FamilySearch users' ancestors having lived and died in those counties compared to other counties in the country. Next, we have a 0% at the back end of our color key and a very light county in central Ohio. That is Pickaway County, OH, where the Record Linking Lab's 1930 crosswalk from HISTID to ARK has almost zero coverage. It is a clear outlier as the only county in our dataset whose 1930 HISTID-ARK match rate is below 40%, and it drastically



underperforms the overall 1930 HISTID-ARK match rate of 99.5%.

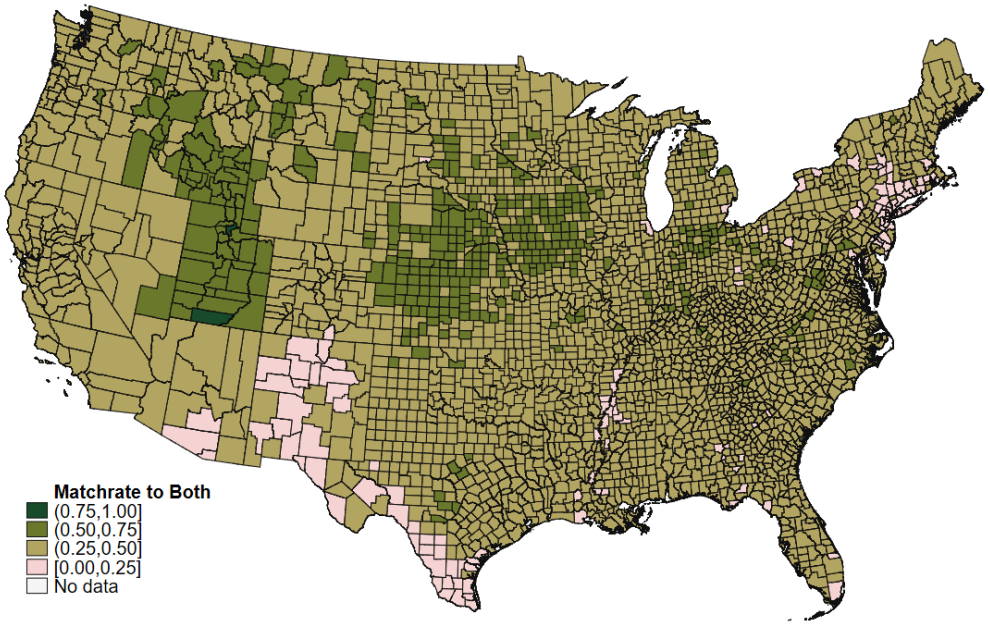
We next consider the map of match rates from 1930 HISTIDs to 1940 HISTIDs:



This map presents fewer immediate problems for our sample, though it is not free from areas of concern. The lower Mississippi River basin and southwestern U.S. seem to be regions in which linking white, U.S.-born people across censuses is particularly difficult. The reasons for this may be due to increased movement, especially in the southwest, but are largely left

to future research. In addition, as FamilySearch users continue to link records by hand, these gaps will eventually close.

To conclude, we consider the map of match rates for people who matched from their 1930 HISTID to both their 1940 HISTID and their death year:



This map reflects all of the concerns discussed in our examination of the first two county-level maps. Outside of those areas, this relatively lighter-shaded map is probably more reflective of the difficulty of matching multiple sets of historical records than any kind of selection in match rates. Nevertheless, we are satisfied with matching at least 1 of every 4 people in 1930 in the vast majority of counties to themselves in 1940 and their death year. Additionally, as matching techniques and data cleaning improve in the future, we look forward to revisiting and possibly revising our analysis based on the availability of better links.