The Determinants of U.S. Wage Inequality During the Great Depression

Felipe Benguria[1]

June 2015

******* PRELIMINARY VERSION *******

Abstract

This paper studies a new dataset on U.S. wage inequality during the Great Depression. Newly-digitized data on wages of white-collar and blue-collar workers from the Census of Manufactures indicates that wage inequality increased during the 1920s and early 1930s, declining from 1933 onwards. This aggregate trend masks substantial heterogeneity across states and across industries. The disaggregated nature of the data allows me to study the determinants of wage inequality during the Depression exploiting variation across states in the depth of the crisis and the response to it. At the same time, it allows me to control for the different industrial composition across states. First, I measure the impact of the contraction in bank lending during 1929-1933 on labor market outcomes, focusing on the differential effect on white-collar and blue-collar workers. I find a stronger impact of financial conditions on the growth rate of employment for blue-collar workers and no significant effect on wages for either group. Second, I study the impact of New Deal spending on the wages and employment of these two groups of workers during 1933-1937, finding a positive effect of federal spending on employment growth for blue-collar workers, but no effect on wages.

[1]Assistant Professor, Department of Economics, University of Kentucky. Email: fb4k@virginia.edu.

1. Introduction.

How did inequality evolve during the Great Depression in the U.S.? Was it driven by the deteriorating financial conditions? Did New Deal spending ameliorate it? As in recent times, concerns about inequality were present in the political discourse during the Depression and might have had an influence on policy. To date, however, there is limited information on the path of inequality during this important period, due to the scarcity of surveys that would allow to measure it. This paper studies wage inequality during the 1920s and 1930s using newly-digitized data on wages of white-collar and blue-collar workers in the manufacturing sector in the U.S., spanning the largest industries in every state. The geographical variation of the data allows me to disentangle the effect of financial conditions and fiscal policy on inequality.

Little is known about the variation in wage inequality across industries and states during this period due to the scarcity of data on wages for different groups of the population. The Population Census was conducted only once per decade and did not include wage data until 1940.[2] The BLS conducted occasional surveys during the Depression that do not allow for systematic measures of wage inequality across industries and states. Data drawn from tax records allows for measures of inequality only between those at the very top (the 1 percent or at most the 10 percent) and the rest, since the large majority of the population did not pay income taxes. In contrast, wage differences between white-collar and blue-collar workers describe inequality within the vast majority. The importance of studying inequality within the "rest" of the population and the fact that it responds to different determinants than inequality between the 1 percent and the rest have been emphasized by recent studies.[3]

[2]An exceptional early source of data is the 1915 population census of the state of Iowa, which differently than the national population census at the time, did contain wage data. This census allows Goldin and Katz (1999, 2007) to study long run trends in wage inequality between 1915 and 1940, year in which the National census first includes wages.

[3]Autor (2014), for instance, argues that wage inequality between skilled and unskilled workers is much more relevant for the large majority of the population than the share of income of the 1 percent

Given the scarcity of data that could portrait wage inequality across states for those groups of the population outside the very top, the wage data for white-collar and blue-collar workers from the Census of Manufactures is a valuable resource. It is also a previously unexplored source. While some variables of the Census have been digitized, this is the first paper, to the best of my knowledge, to digitize systematic state by industry data on wages of white-collar and blue-collar workers for this period.

White-collar and blue-collar workers represent two very different groups of the population in terms of their educational attainment. To show this and provide some background on the meaning of these categories, I use the 1940 Population Census (the first Census to include wage and education data) and map occupations into white-collar and blue-collar groups. I find that the median educational attainment for white-collar workers in manufacturing is a high school degree while that of blue-collar workers corresponds to eighth grade. Sixty one percent of white-collar workers in U.S. manufacturing had attained at least a high school degree, while only 17 percent of blue-collar workers reached this level. The wage gap between white-collar and blue-collar workers has been widely used as a measure of wage inequality in studies of modern periods based on manufacturing data, with these categories often being described as skilled and unskilled workers.

As Autor and Katz (1999) note, before individual level datasets became available, work trying to understand the wage structure in the U.S. economy focused on occupational wage differences between white-collar and blue-collar workers (see for example Douglas (1930) and Ober (1948)).

The Census of Manufactures reports separately the wages of white-collar and blue-collar workers for every industry and state. A key feature of this Census is its frequency: it was conducted every two years during the 1920s and 1930s. I digitize data for every state in the 25 largest industries on employment and wages for white-collar and blue-collar workers for 1919, 1925, 1927, 1929, 1933, 1935, and 1937. During this period, manufacturing employed an important share of U.S. workers (33 percent of U.S. employment in non-agricultural activities

and 22 percent of the labor force in 1927) and represented 21 percent of national income on average during 1919-1938 (Kuznetz, 1946). The 25 industries considered represent roughly 50 percent of workers in the manufacturing sector. From meat packing to motor vehicles to cotton goods, these industries vary in terms of geographical location, skill composition, and their business cycle sensitivity.

I start by studying national and regional trends in wage inequality. The relative wage of white-collar to blue-collar workers increased monotonically during the 1920s and in the early phase of the Great Depression until around 1933 and started decreasing from that point onward. The increase in inequality of the 1920s had a relevant magnitude. The wage ratio increased from 1.7 to 1.9 times overall in U.S. manufacturing from 1919 to 1929. In the early 1930s, the further increase in inequality raised this ratio to slightly above 2. The decline after the turning point in 1933 was fairly sharp, and between 1933 and 1937, the relative wage fell to pre-Depression levels. This findings can be compared to other measures of inequality for this period. Goldin and Margo (1992) find a similar pattern during the 1920s and 1930s assembling two series: the ratio of wages for railroad clerks over wages for railroad laborers and the ratio between wages of clerks in New York factories and the wage series for unskilled workers from the National Industrial Conference Board. Piketty and Saez (2003) find a similar pattern using tax records that allow them to focus on the top decile and top one percent of the population. In a series of studies, Goldin and Katz (1995, 1999, 2001, 2007, 2009), Goldin and Margo (1992) and Margo (1999) have pioneered the study of the behavior of U.S. wage inequality and its long-run determinants. This paper contributes to the literature on inequality in U.S. history adding a new data source to explore a short period with scarce information. Differently than earlier work, I focus on short-run movements in wage inequality during a large crisis and completely ignore the role of education and other factors that shape long-term patterns of inequality.

I also study the trajectory of employment for white-collar and blue-collar workers. The decline in employment during 1929-1933 was dramatic. Employment in U.S. manufacturing

fell by 32 percent during 1929-1933. The differences across occupational groups seen for wages are not such for employment. I find that the decline in employment is equally sharp for white-collar and blue-collar workers.

At the core of the paper, I use this new data to study the determinants of wage inequality during the Depression. I measure the impact on labor markets of two key developments: the deteriorating financial conditions at the onset of the Depression and the large fiscal stimulus provided in the context of the New Deal. In both cases, I exploit the geographical variation across states and study the impact of these developments on regional labor markets. In this sense, the regional disaggregation of the manufacturing dataset is essential.

Credit declined abruptly after 1929 and stabilized at the trough (never recovering its original level) from 1933 until the end of the decade. To study the effect of the contraction in bank lending on labor markets I collect data on bank loans in each state throughout the Depression and study the relationship between changes in bank lending and changes in wages and employment for white-collar and blue-collar workers. Calomiris and Mason (2003) pioneered the study of the impact of bank lending on income during the Depression[4] Using the geographic variation in bank loans across states and counties and isolating the effect of loan supply on income with an instrumental variables approach, these authors find that bank distress explains a substantial share of the variation in income during the period. [5] Different states specialized in different industries, some of which are more sensible to financial conditions than others. For this reason I use disaggregated industry by state labor market

[4]A large literature has studied the effects of economic crises and credit conditions on labor markets outside this particular period. Bernanke and Lown (1991) focus on the recession of 1990 and use variation across states to estimate the relationship between credit and employment. Chodorow-Reich (2014) studies the 2008-2009 financial crisis observing the relationships between banks affected by the crisis and firms in the manufacturing sector borrowing from these banks. In a different vein, Calvo et al (2012) study the effect of financial crises on labor markets for a large set of countries in a long postwar panel. There is however not much work on the behavior of wage inequality during crises and its relation to credit conditions, topic on which there is much work to be done.

[5]Following this approach Mladjan (2011) and Lee and Mezzanoti (2014) use more disaggregated industry by state level data to control for the industrial composition across states. Ziebarth (2013) also studies the impact of bank distress on the real sector during the Depression. Ziebarth (2013) uses the fact that the state of Mississippi was divided into two Federal Reserve districts and compares manufacturing outcomes in these two areas, where different policies where enacted. The contribution of my paper to these literature is the focus on differences between white-collar and blue-collar workers.

data and control for the state's industrial composition. The key econometric challenge to study the relationship between credit and manufacturing outcomes is that bank lending might respond to the demand for credit. Weak firms will borrow less at the same time they reduce their employment and wages. To address this issue, I use an instrumental variables approach. Following Calomiris and Mason (2003), I use state level total assets per bank and capital-asset ratios before the start of the crisis as an instrument for bank lending during the Depression. I find a large impact of credit supply on employment, especially for blue-collar workers. The impact on wages on the other hand is not significant.

A second important development that contributes to explain the behavior of employment and wages is the federal stimulus consisting of a series of programs under the New Deal umbrella. A large literature has studied the determinants of federal spending during this period (see for instance Fishback, Kantor, and Wallace (2003)) and its consequences on employment (Wallis and Benjamin (1981), Fleck (1999), Neumann, Fishback, and Kantor (2010)), retail sales (Fishback, Horrace, and Kantor (2005)), demography (Fishback, Haines, and Kantor (2007)) and mobility (Fishback, Horrace, and Kantor (2006)). As this literature has established, there was substantial variation across states in federal spending. Using this variation and instrumenting for federal spending, I find a positive effect on employment growth rates for blue-collar workers, no statistically significant effect on employment for white-collar workers, and no effects on wages.

I organize the paper as follows. I introduce the new data in section 2. In sections 3, I discuss the general trends in wages and employment for white-collar and blue-collar workers. Section 4 and 5 study the determinants of wages and employment during the Depression. Section 4 focuses on the effect of the contraction in bank lending during 1929-1933. Section 5 studies the impact on labor markets of New Deal spending during 1933-1937.

2. Data Sources: New Evidence on Wage Inequality from the Census of Manufactures.

I measure wage inequality during the Depression collecting data for two distinct groups of workers in manufacturing industries: white-collar and blue-collar workers. This measure of wage inequality - the ratio of wages of white-collar to blue-collar workers - has been used widely in studies using data from modern census of manufactures. As I show below in section 3, these two groups held widely different levels of education. This suggests that wage inequality measured as the ratio of wages of white-collar to blue-collar workers is a reasonable approximation to a skill premium.

The data on white-collar and blue-collar wages is reported periodically during the Depression for all U.S. states, disaggregated by industry. The source of the data is the original reports published by the Census of Manufactures. To the best of my knowledge, while others have used parts of the Census of Manufactures of the period, this is the first paper to digitize and use the data on white-collar and blue-collar wages.

During the 1920s and 1930s, the Census of Manufactues was collected at a biannual frequency. I base my analysis on data for 1919, 1925, 1927, 1929, 1933, 1935, and 1937. Unfortunately the 1931 census did not include the distinction between white-collar and blue-collar workers. I digitized data for the twenty-five largest industries in terms of employment during the period[6]. These industries account for approximately half of total manufacturing employment during the period. White-collar workers in my sample account for 48 percent of all white-collar workers in U.S. manufacturing in 1927, and blue-collar workers in my sample account for 51 percent of the total. Manufacturing, in turn, represented 33 percent of U.S. employment in non-agricultural activities and 22 percent of the labor force in 1927. From

[6]I exclude industries for which changes in classifications across years made it impossible to have a consistent comparison

cotton goods to meat packing to motor vehicles, the list of industries is diverse in terms of geographical location, skill composition, and financial dependence. Descriptive statistics for each industry are provided in the appendix. In summary, the newly-digitized dataset includes industry by state level data on sales, employment of white-collar and blue-collar workers and wages of white-collar and blue-collar workers.

It is important to point out that the Census reports total wage bills and employment figures. The wages are then constructed as unit values and are not strictly the same as those in surveys that ask directly for wages.

White-collar workers in the Census classification were clerks, administrative officers and office workers in general. Blue-collar workers were production workers in the factory floor. These definitions did not vary much throughout Census editions in the 1920s and 1930s. While census questionnaires requested separate information on the number and wages of salaried officers (firm presidents, vice-presidents, etc.), the tabulations often group this data together with that for white-collar workers. This occurs especially for the disagreggate industry-state observations. As I discuss in the next subsection, series of strictly comparable wages for white-collar workers excluding salaried officers throughout the Depression can be constructed at the industry level (but not at the industry by state level).

The data from the Census of Manufactures allows an analysis of wage inequality during the Depression beyond what seems possible with other sources. Systematic nation-wide data on wages during the 1920s and 1930s in the U.S. is scarce. Wages were absent from the nation-wide Census of Population until 1940. The BLS conducted surveys only after the Depression had started. Data on wages for different groups of the population that allows to systematically capture some dimension of wage inequality at the state level is absent from the BLS surveys. Data on income from tax records, used by Piketty and Saez (2003) and Schmitz and Fishback (1983) is focused on the very top incomes, since most of the population did not pay income taxes. Further, data on any measure of inequality disaggregated across industries and states during this period in U.S. history has not been studied to the best of

my knowledge.

2.1. A Finer Breakdown of Worker Categories.

In several years during the 1920s and 1930s, the Census report a finer breakdown of worker categories than the white-collar vs. blue-collar distinction reported above. In particular, the group I have called white-collar workers above includes: i) salaried officers, ii) supervisors and managers, iii) clerks and other salaried employees. Data on both employment and wages of the workers disaggregated into these narrower groups is available in several of the Census years during the Depression.

Most often, information for these finer categories are not available at the industry by state level. For this reason, I use the more broad distinction between white-collar and blue-collar workers for most of the econometric analysis below. However, the finer categories are reported at the industry level and provide a useful source of information of the evolution of inequality during the Depression. The descriptive statistics in table 1 indicate, in fact, that the white-collar worker category masks substantial heterogeneity. The following subsection discusses in detail the comparability of these finer worker categories across time.

2.2. Comparability of Worker Categories across Years.

The definitions and availability of data on persons engaged in manufacturing and their wages and salaries varies somewhat across Census years. The data for 1935 and 1937 is especially detailed, breaking down white-collar workers into salaried officers, supervisors and managers, and clerks and other salaried employees. The Census of 1931 and 1933 on the other hand do not have this level of detail, perhaps to budgetary limitations at the Census Bureau during the Depression.

Carefully tracking the definition of the different worker categories on the questionnaires in each year and the tabulations in the reports, one can compare the evolution of three consistent categories throughout the Depression, with data at the industry level. These categories are i) wage earners (blue-collar workers), ii) superintendents, managers, clerks and other salaried employees, and iii) salaried officers. Comparable data on wages and number of individuals at the industry level for the first two categories is available for 1929, 1933, 1935, and 1937. Comparable data for the third category is available for 1929, 1935, and 1937. This data is further discussed in section 4 to discuss the evolution of wage inequality during the Depression.

Table 7 shows the availability of data for different worker categories available for each of the following Census of Manufactures: 1919, 1925, 1927, 1929, 1931, 1933, 1935, and 1937. In each case, the table indicates whether the data was part of the questionnaire or not, and whether it is available at the industry level in the tabulations published by the Census Bureau. In some cases, information on number of persons in each category is more disaggregate than information on wages and salaries. During the 1920s and 1930s, the Census does not consider employees working in central administrative offices. These were, however, included in the 1919 Census. Employees in central administrative offices were allocated proportionally to the different plants in a firm, even if the plant was in a different state than the central office.

2.3. Educational Attainment of White-Collar and Blue-Collar Workers.

This section provides further information on the educational attainment of white-collar and blue-collar workers manufacturing workers, validating the notion that these were two distinct groups with widely differing levels of schooling.

While the Census of Manufactures did not collect information on the educational attainment of workers, the occupational description and industrial affiliation of these white-collar and blue-collar worker categories can be matched to those in the Census of Population to obtain further data on these workers' characteristics. The 1940 Population Census was the first to collect data on both educational attainment (beyond literacy) and on wages. The Census reports workers' industrial affiliation by detailed industry categories and their occupation. This allows me to classify occupations into white-collar and blue-collar groups for workers in the manufacturing industries.

Overall, pooling together workers in all manufacturing industries and in all U.S. states, the data shows that in 1940 the 17.2 percent of blue-collar workers had an educational attainment corresponding to a high-school degree or more. On the other hand, 61.6 percent of white-collar workers had at least a high-school degree. The median white-collar worker has an educational attainment of 12 years of school (exactly a high-school degree) while the median blue-collar worker had 8 years of schooling. The distribution of educational attainment for these two categories is seen in figure 11. The histogram shows that the overlap in terms of educational attainment between these two categories is fairly small.

The data from the 1940 Census also shows that this gap in educational attainment between white-collar and blue-collar workers holds across each individual U.S. state. Table 6 shows the share of white-collar and blue-collar workers with an educational attainment corresponding to at least a high-school degree for each state. Finally, the significant difference in educational attainment between white and blue-collar workers also holds in each of the twenty-five industries considered.

Unfortunately there is no information in the 1920 and 1930 census that allows me to repeat this exercise for earlier years. The data from the 1940 Census points in the direction that white and blue-collar workers were two very distinct groups in terms of educational attainment and that the wage gap between these two groups is a reasonable approximation to the skill premium at the time.

3. Evolution of Labor Markets during the 1920s and 1930s.

In this section, I report trends in the evolution of wages (subsection 3.1) and employment (subsection 3.2) of white-collar and blue-collar workers in U.S. manufacturing during the 1920s and 1930s. In Subsection 3.3, I assess the relative importance of geography vs. industry in explaining the evolution of labor market for each class of worker.

3.1. Wage Inequality during the 1920s and 1930s.

The wages of blue-collar workers fell by 12 percent in real terms and 34 percent in nominal terms during 1929-1933, as shown in figures 3B (real wages) and 3C (nominal wages). The decline in the wages of salaried employees (supervisors, managers, and clerks) was less dramatic. During the same period, they fell 21 percent in nominal terms and increased by almost 5 percent in real terms. The recovery of blue-collar wages after 1933 was as strong as the fall, to the extent that the 1929-1937 growth in wages was higher for blue-collar workers. As a consequence, the relative wage of white-collar to blue-collar workers, which had been rising during the 1920s, increased as well in the early phase of the Great Depression until about 1933 and started decreasing from that point onward. By 1937, this ratio was lower than in 1929. This trend is shown in figure 4B.

Focusing on a longer time period, the increase in inequality of the 1920s was economically significant. Comparable data starting in 1919 groups firm's salaried officers (presidents, vice-presidents, etc.) to the white-collar employees mentioned earlier. This ratio is of course slightly higher than the series excluding corporate officers. The ratio of these employees' (officers and salaried employees) wages to blue-collar wages started the decade at about 1.7 in 1919 and reaching 1.95 by 1929, as figure 4A describes. This two-decade graph excludes the year 1933, for which comparable data for white-collar workers is unavailable.

The national trend in wage inequality masks different experiences across regions. As the map in figure 2 indicates, the largest increases in inequality were observed in the North East and the South Central states. Remarkably, on the other hand, California and the South Atlantic states saw the smallest increase (or largest decline) in inequality during the Depression. Some of the South Atlantic states had seen, however, increases in inequality in the previous decade. There is also important variation across industries. Wage inequality was systematically higher in some industries than others, especially in the textile sector. This is seen in figure 4. Panel B shows that changes in inequality were not as relevant at the industry level in comparison to the state level as discussed above. Important variation is seen, however, in cotton goods, knitted goods and silk manufactures, all of which saw a decline in inequality during the the 1920s and 1930s.

A possible explanation behind the fast recovery of blue-collar workers' wages after 1933 are the policies of the National Industrial Recovery Act (NIRA). The NIRA was enacted in June 1933 with the goal of regulating industry to soften competition and raise prices during the deflation. It introduced codes of fair competition that regulated labor markets establishing minimum wages and collective bargaining.

The NIRA did not last long: it was declared unconstitutional in 1935 by the Supreme Court. It is difficult to pin down the effect of the NIRA on wages since the adoption and end of these policies falls between the 1933 and 1935 manufacturing census. While one could think of using variation across industries in the adoption of NIRA codes, this decision was likely an endogenous response to industry developments.

While the recovery of blue-collar workers' wages during 1933-1935 overlaps the NIRA, the aggregate trend reported in figure 5 could be the result of compositional effects. In other words, industries with relatively higher blue-collar wages might have expanded during this period, leading to this result. Using industry level data on white-collar and blue-collar wages for 1929, 1933, 1935 and 1937, I examine whether the superposition of NIRA policies and the recovery of blue-collar wages holds also within industries. For this purpose, I estimate the

following regression, decomposing wages into year fixed effects, industry fixed effects, and occupational (white-collar and blue-collar) fixed effects. The interaction of year dummies and a white-collar dummy variable capture the within-industry relative wage.

$$\Delta Y_{oit} = \gamma_i + \gamma_t + \beta_1 \cdot \phi_{1929-1933} \cdot (white - collar)_o + \beta_2 \cdot \phi_{1933-1935} \cdot (white - collar)_o + \beta_3 \cdot \phi_{1935-1937} \cdot (white - collar)_o + \beta_4 \cdot (white - collar)_o + \epsilon_{oit} \quad (1)$$

The results, reported in table 2, indicate that the 1933-1935 recovery in blue-collar wages also occured within industries and was not the result of compositional effects. One limitation of this observation, however, is that while the NIRA policies formally were in place between 1933 and 1935, their effects on labor markets could have - and probably did - last longer.

3.2. Trends in Employment of White-Collar and Blue-Collar Workers.

Overall employment in U.S. manufacturing fell dramatically by 33 percent from 1929 to 1933 and increased rapidly by somewhat more than 40 percent from 1933 to 1937, according to figures from the twenty-five selected industries from the Census of Manufactures. While there was substantial heterogeneity in the evolution of wages for different occupational categories, the pattern in employment for white-collar and blue-collar workers is very similar. This is seen in Figure 5. This similarity also holds within each industry, as Figure 6 shows for a sample of major industries, although in some industries in the food sector and in textiles the 1933-1937 recovery in employment was faster for blue-collar workers. If one looks across regions, the dramatic decline and later recovery holds for each individual state with fairly consistent magnitudes. Based on a balanced panel of industries-state observations with data reported for each industry and state in both 1927 and 1937, the weakest growth

in manufacturing employment during the 1927-1937 decade, both for white-collar and for blue-collar workers was whitnessed in Mississippi. For blue-collar workers, Rhode Island, New Hampshire, Vermont, Massachussets and Louisiana were also at the bottom in terms of employment growth, while blue-collar employment grew the most in Michigan, Texas, Virginia, North Dakota, and Wyoming. The largest decline in white-collar employment was observed in Mississippi, New Hampshire, Colorado, Arkansas, and Vermont. The states with the largest 1927-1937 increase in white-collar employment were North Dakota, Virginia, New Mexico, Nevada, and Wyoming.

3.3. Regional vs Industry Determinants of Wage Inequality.

To study the determinants of wages and employment for white-collar and blue-collar workers described above, I begin by establishing the relative importance of the variation across regions versus variation across industries of these labor market outcomes.

While the regional disparity in outcomes during the Depression has been documented in the literature (Rosenbloom and Sundstrom 1999), there is no systematic evidence on the dynamics of labor markets for skilled and unskilled workers. This decomposition is relevant because much of the analysis in the literature or in this paper trying to understand the effect of financial conditions or fiscal stimulus on a variety of outcomes during the Depression relies on variation across states. The underlying assumption is that labor markets are segregated at a regional level. I start by looking at the variation in the levels of labor market outcomes. Table 3 reports the share of the variance in each labor market outcome explained by industry fixed effects and by state fixed effects in 1929 and 1937. Roughly forty percent of the explained variation in white-collar and blue-collar wages is captured by state fixed effects at the start of the Depression, with this share increasing to about 50 percent for white-collar workers in 1937. The regional dimension is more important for employment and output. State fixed effects explain 74 percent of variation in output in 1929 and 68 percent in 1937.

Panels C and D of table 3 extends the decomposition to the change in labor market

outcomes over time. I study two periods, 1929-1933 and 1933-1937. Variation across states is less relevant than variation across industries, especially for employment. The relative importance of variation across industries relative to variation across states is more important in the first period, 1929-1933 compared to 1933-1937. Overall, geography plays a larger role compared to industry for wages than for employment. This is similar for blue-collar and white-collar workers.

4. Effect of the Financial Crisis on White-Collar and Blue-Collar Workers.

Was wage inequality a consequence of the financial crisis? This section explores the differential effect on the employment and wages of white-collar and blue-collar workers of the dramatic deterioration of financial conditions during the crisis. To do so, I exploit the variation in bank lending across states and observe the response of these regional labor markets during 1929-1933. While some states historically specialized in more financially dependent industries, the disaggregated nature of the dataset allows me to control for states' industrial composition and compare the credit contraction within industries.

Bank lending started falling quickly and abruptly at the onset of the Depression. Nominal bank lending peaked in 1929, and fell by 46 percent between 1929 and 1933, and then by 8 percent from 1933 to 1935, when it reached its lowest level. Bank lending grew marginally from 1935 to 1937, stabilizing but never reaching the pre-crisis levels during the 1930s. Figure 8 shows the evolution of aggregate bank loans of all U.S. banks. The 1929-1933 variation in bank lending across states is described by figure 9. New York, Connecticut, Massachusetts, and California were among the states with the smallest contraction in bank lending. On the other extreme, Florida, Arkansas, Nebraska, South Carolina, and Illinois saw the largest decline.

Why could financial distress impact skilled and unskilled workers differently? A decline

in credit supply makes firms unable to finance investments. Depending on whether capital is complementary to skilled or unskilled labor, the effect of a credit crunch on wage inequality can go in either direction. Under capital-skill complementarity, lower levels of bank lending would reduce the wages of white-collar workers relatively more, reducing the wage gap. Establishing the relationship between the financial deterioration and wage inequality is then an empirical matter.

The literature on the financial crisis originating the Depression has studied the impact of bank lending on income (Calomiris and Mason 2003) and employment (Mladjan (2012), Lee and Mezzanotti (2014). Using, as here, the geographic variation in changes in bank lending during the period, these studies have found a positive correlation between credit and these outcomes. There is no earlier evidence however on the distributional consequences of the contraction in bank lending during the crisis.

To establish a causal relationship between financial conditions and labor markets, I take into account the fact that bank lending might respond to the conditions in each state's manufacturing industries. Weak manufacturing firms would reduce their demand for loans during the crisis. At the same time, wages can respond to this manufacturing weakness, creating a spurious relationship between bank lending and labor market outcomes. This issue has been addressed in the literature. A popular approach to overcome it consists in using pre-crisis measurements of bank health as instruments for bank lending during the crisis. Following Calomiris and Mason (2003) and Bernanke and Lown (1991), I use total assets per bank and capital-asset ratios in 1927 (before the financial crisis began) as an instrument for subsequent lending.

Following this empirical strategy, I estimate the following equation that relates the growth rate of state level bank loans to the growth rate of employment and wages of white-collar and blue-collar workers. I focus on the period 1929-1933. This period differs somewhat from Calomiris and Mason (2003), who restrict the analysis to 1930-1932. Each observation of the dependent variable consists of an industry (i) state (s) combination. In each case, I

control for the previous, 1925-1929 growth rate in these series.

$$\Delta Y_{si,1929-1933} = \beta_1 \cdot \Delta Loans_s + \beta_2 \cdot \Delta Y_{si,1925-1929} + \gamma_i + \epsilon_{si} \quad (2)$$

Controlling for state's industrial composition is essential, at least in theory. Industries - from motor vehicle manufacturing to meat packaging to silk manufactures - differ widely in their sensitivity to financial conditions. Labor markets of states with different industrial composition would then suffer differently from the credit crunch. I use disaggregated industry by state data on labor market outcomes and include industry fixed-effects to control for differences in industrial composition. Since the independent variable $\Delta Loans$ is defined at the state level, I cluster the standard errors at this level.

The independent variable, state-level data on bank loans is obtained from the Annual Report of the Comptroller of the Currency. State level total assets per bank and capital-asset ratios are also obtained from this source. Following Bernanke and Lown (1991), I compute bank loans and bank assets in nominal terms.

The results of the estimation of equation (2) are reported in table 4. The top panel shows the results for 1929-1933 employment growth rates. The OLS results show a positive and statistically significant effect of bank lending on employment growth, with a very similar elasticity for white-collar workers and blue-collar workers of about 0.09. The 2SLS results, using pre-Depression total assets per bank and capital-asset ratios show a much larger impact on blue-collar workers, more than twice as large as in the OLS estimation. The bottom panel in Table 4 shows the results for wages. In both the OLS and 2SLS estimation, these are not statistically significant. Under the 2SLS estimation, the magnitude of these coefficients reduces to a small magnitude.

In summary, the contraction in bank lending during 1929-1933 seems to have had a large impact on employment - especially for blue-collar workers - but no clear impact on wages for either group.

5. Did New Deal Policies Impact Wage Inequality?

Did the fiscal stimulus during the 1930s have an impact on labor market outcomes? Did it have a differential effect on white-collar and blue-collar workers? I study these questions relying on the geographic variation of federal spending across states.

The set of programs launched under the New Deal umbrella starting in mid 1933 sought to provide relief to the unemployed and to reactivacte the economy. These programs represented an unprecedented increase in federal spending. Federal government spending doubled between the mid 1920s to the late 1930s. Most of this increase began 1934. New Deal spending was divided into grants and loans. The vast majority of grants were allocated to hiring unemployed workers in public infrastructure projects. During the earliest period, from 1933 to 1935, the Federal Emergency Relief Administration (FERA) (1933-1935) and the Civil Works Administration (CWA) (1933-1934) where the primary programs aimed at providing relief employment. Later, the Works Progress Administration (WPA)(1935-1939) continued this effort. Since my labor market data from the manufacturing Census spans 1929-1937, I focus on the effect of FERA and CWA and exclude the WPA.

There is a myriad of channels through which the increase in federal fiscal spending could have influenced employment and wages in manufacturing. First, by directly reducing unemployment by hiring the unemployed under work relief programs, it could have increased spending and the demand for manufacturing industries. Second, launching public infrastructure projects would also have an impact on the demand for manufacturing industries, especially those related to investment goods. Third, by reducing the number of unemployed via the emergency work relief programs, it might have had a direct effect on labor markets. It is possible that any of these mechanisms could have had a differential effect on white-collar and blue-collar workers. The work relief programs typically offered lower wages than the private sector and hired workers for manual labor in public infrastructure projects, so the third channel might have had a larger impact on blue-collar workers.

This is not the first paper to study the effect of government spending under the New

Deal on employment. Neumann, Fishback and Kantor (2010) use a VAR model to estimate the impact of relief spending on private employment and earnings, finding a positive effect based on monthly data across 44 cities. Fleck (1999) finds a positive relationship between the number of workers hired under relief programs from 1937 and 1940 and a county's unemployment.Based on cross-sectional data, Wallis and Benjamin (1981) find that work relief programs did not reduce private employment. Previous work, however, does not distinguish between white-collar and blue-collar workers. Also differently than most of the earlier work, I study the impact not only on employment but also on wages. An important advantage of this earlier work is their use of more disaggregated county level data. Unfortunately the data on white-collar and blue-collar workers used in this paper is not available at the county level. There is, however, data at the city level (available for 33 large industrial areas) that could provide an alternative robustness check for my results. The city level data, however, is only available in 1929 and 1939, missing the important events in between.

The distribution of New Deal spending across states need not be random and in fact there are signs that it responded to the depth of the recession in each region. It is a possibility that more spending was targeted to areas with more strained labor markets, as the goal of these programs was to create emergency employments in public works. This would bias the results of a regression of federal spending on employment growth downwards. To address this econometric problem, I follow the literature that studies the impact of New Deal programs on different outcomes, discussed above, and adopt two instruments which have been found to be strongly correlated with federal spending yet are unrelated to labor market developments. First, Wallis (1998) and Fishback, Kantor, and Wallis (2003) among others have found that there was some role for political criteria in the allocation of federal spending across states or counties. Voter turnout in recent elections is positively correlated with the amount of spending in relief programs received. Following Fishback, Kantor, and Wallis (2003), I use voter turnout per capita in the 1932 election, normalized by population in 1930. While they use this variable at the county level, I find that in the first stage regression it is positively

correlated with federal spending received at the state level too. A second instrument used in this literature is the land area of each region since it was a criterion explicitely included in these programs to allocate funds. Fishback, Horrace, and Kantor (2005) for instance use this instrument for New Deal spending under work relief programs. On the other hand, this instrument would not be associated to labor market fluctuations during the Depression.

In sum, to capture the impact of federal spending under the New Deal on labor market outcomes, I estimate the following regression. The dependent variable is the for the growth rate of employment and wages of white-collar and blue-collar workers between 1933 and 1937. I measure these labor market outcomes at the industry (i) by state (s) level. This allows me to control for industry fixed effects, which is important given the extent of specialization across the U.S. at the time. I control for earlier trends in the growth rate of each series. Additional controls include regional fixed effects (grouping U.S. states into six major divisions).

$$\Delta Y_{is,1933-1937} = \beta_1 \cdot NewDealSpending_s + \beta_2 \cdot \Delta Y_{is,1929-1933} + \gamma_i + \epsilon_{is} \tag{3}$$

Federal government spending under the New Deal can be divided into different programs with different goals or in different time periods. I focus on two of them that account for a large majority of the grants aiming primarily at creating jobs for the unemployed. The first one is the Federal Emergency Relief Administration (FERA), which run from The second one is the Civil Works Administration (CWA). I exclude the Works Progress Administration (WPA). Federal spending under the different programs is computed in per capita terms, as the same amount of total spending would have vastly different implications in states of different populations. The data on federal spending during the New Deal comes from Fishback, Kantor, and Wallis (2003). They provide detailed county level information on different grant and loan programs associated to the New Deal, including the FERA and CWA grants I use. I aggregate these data to the state level to match the level of aggregation of my labor market data. I also obtain the instruments described earlier at the county level from their dataset and aggregate them to the state level.

The results of the estimation of equation (3) are shown in table 5. The results for employment growth rates during 1933-1937 are reported in the top panel.

The OLS results show very small and not statistically significant effects of federal spending on employment growth for both worker types. As I discussed earlier, as the funds would go to regions with higher unemployment, the OLS coefficients would be biased downwards. This is in fact the case, as seen from the 2SLS results. The 2SLS results show a much larger positive impact of spending on employment growth for blue-collar workers. The coefficient for white-collar workers' employment is also larger but not statistically significant. On the other hand, I find no impact of government grants on wages, for both white-collar and blue-collar workers.

6. Conclusions.

This paper introduces a new dataset on wages and employment of white-collar and blue-collar workers in manufacturing during the Great Depression with the purpose of understanding the behavior of wage inequality during large crises. The data shows that wage inequality increased during the 1920s and upto until 1933, making a sharp turn downwards in the second half of the 1930s. While employment fell dramatically for blue-collar and white-collar workers at the same speed, the pattern for wages differs across occupations, with a strong decline in nominal wages for blue-collar workers leading to an increase in wage inequality between 1929 and 1933.

I analyze two potential determinants of changes in labor market outcomes during the Depression. First, I focus on the financial crisis at the origin of the Depression. Using the variation across states in bank lending, I measure the impact of the sharp contraction in credit during 1929-1933 on labor markets. I find that the credit contraction had an important effect on employment growth, especially for blue-collar workers, and no significant impact on wages.

Second, I study the impact of federal spending under the New Deal on labor market outcomes. Once again using the variation in spending across regions and instrumenting for federal spending, I find a positive impact on blue-collar employment growth and no clear effect on wages for either group.

References

[1] David H. Autor. Skills, education, and the rise of earnings inequality among the "other 99 percent". *Science*, 344(6186):843–851, 2014.

[2] Ben S. Bernanke. Employment, Hours, and Earnings in the Depression: An Analysis of Eight Manufacturing Industries. *American Economic Review*, 76(1):82–109, 1986.

[3] Charles W. Calomiris and Joseph R. Mason. Consequences of bank distress during the Great Depression. *American Economic Review*, pages 937–947, 2003.

[4] Guillermo A. Calvo, Fabrizio Coricelli, and Pablo Ottonello. The Labor Market Consequences of Financial Crises With or Without Inflation: Jobless and Wageless Recoveries. 2012.

[5] Gabriel Chodorow-Reich. The employment effects of credit market disruptions: Firm-level evidence from the 2008–9 financial crisis. *The Quarterly Journal of Economics*, 129(1):1–59, 2014.

[6] Paul H. Douglas. Real wages in the United States, 1890-1926. 1930.

[7] Price V. Fishback, Michael R. Haines, and Shawn Kantor. Births, Deaths, and New Deal Relief during the Great Depression, 2007.

[8] Price V. Fishback, William C. Horrace, and Shawn Kantor. Did New Deal grant programs stimulate local economies? A study of Federal grants and retail sales during the Great Depression. *The Journal of Economic History*, 65(01):36–71, 2005.

[9] Price V. Fishback, William C. Horrace, and Shawn Kantor. The impact of New Deal expenditures on mobility during the Great Depression. *Explorations in Economic History*, 43(2):179–222, 2006.

[10] Price V. Fishback, Shawn Kantor, and John Joseph Wallis. Can the New Deals three Rs be rehabilitated? A program-by-program, county-by-county analysis. *Explorations in Economic History*, 40(3):278–307, 2003.

[11] Robert K. Fleck. The marginal effect of New Deal relief work on county-level unemployment statistics. *The Journal of Economic History*, 59(03):659–687, 1999.

[12] Claudia Goldin and Lawrence F. Katz. The decline of non-competing groups: Changes in the premium to education, 1890 to 1940. 1995.

[13] Claudia Goldin and Lawrence F. Katz. The Returns to Skill in the United States across the Twentieth Century. 1999.

[14] Claudia Goldin and Lawrence F. Katz. Decreasing (and then increasing) inequality in America: a tale of two half-centuries. *The Causes and Consequences of Increasing Inequality*, pages 37–82, 2001.

[15] Claudia Goldin and Lawrence F Katz. Long-Run Changes in the Wage Structure: Narrowing, Widening, Polarizing. *Brookings Papers on Economic Activity*, 2007(2):135–165, 2007.

[16] Claudia Goldin and Lawrence F. Katz. *The race between education and technology*. Harvard University Press, 2009.

[17] Claudia Goldin and Robert A. Margo. The Great Compression: The Wage Structure in the United States at Mid-Century. *The Quarterly Journal of Economics*, pages 1–34, 1992.

[18] Christopher Hanes. Nominal wage rigidity and industry characteristics in the downturns of 1893, 1929, and 1981. *American Economic Review*, pages 1432–1446, 2000.

[19] Timothy J. Hatton and Mark. Thomas. Labour Markets in the Interwar Period and Economic Recovery in the UK and the USA. *Oxford Review of Economic Policy*, 26(3):463–485, 2010.

[20] Lawrence F. Katz. Changes in the wage structure and earnings inequality. *Handbook of labor economics*, 3:1463–1555, 1999.

[21] Paul G. Keat. Long-Run Changes in Occupational Wage Structure, 1900-1956. *The Journal of Political Economy*, pages 584–600, 1960.

[22] Simon Kuznets. National income and its composition, 1919-1938. 1946.

[23] Mauricio Larrain. Capital Account Liberalization And Wage Inequality. (June), 2013.

[24] James Lee and Filippo Mezzanotti. Bank distress and manufacturing: Evidence from the great depression. 2014.

[25] Robert A. Margo. The microeconomics of depression unemployment. *The Journal of Economic History*, 51(02):333–341, 1991.

[26] Robert A. Margo. The History of Wage Inequality in America, 1920 to 1970. *Jerome Levy Econ. Institute Working Paper*, (286), 1999.

[27] Mrdjan M. Mladjan. Accelerating into the abyss: financial dependence and the great depression. *Working Paper*, 2011.

[28] Todd C. Neumann, Price V. Fishback, and Shawn Kantor. The Dynamics of Relief Spending and the Private Urban Labor Market During the New Deal. *The Journal of Economic History*, 70(March):195, 2010.

[29] Harry Ober. Occupational Wage Differentials, 1907-1947. *Monthly Labor Review*, 67:127, 1948.

[30] Thomas Piketty and Emmanuel Saez. Income inequality in the united states, 1913-1998. *The Quarterly Journal of Economics*, 118(1):1–39, 2003.

[31] Joshua L. Rosenbloom and William A. Sundstrom. The sources of regional variation in the severity of the great depression: Evidence from us manufacturing, 1919–1937. *The Journal of Economic History*, 59(03):714–747, 1999.

[32] Mark Schmitz and Price V. Fishback. The Distribution of the Income in the Great Depression: Preliminary State Estimates. *Journal of Economic History*, 43(01):217–230, 1983.

[33] John Joseph Wallis. Employment in the great depression: New data and hypotheses. *Explorations in Economic History*, 26(1):45–72, 1989.

[34] John Joseph Wallis. The political economy of New Deal spending revisited, again: With and without Nevada. *Explorations in Economic History*, 35(2):140–170, 1998.

[35] John Joseph Wallis and Daniel K. Benjamin. Public relief and private employment in the Great Depression. *The Journal of Economic History*, 41(01):97–102, 1981.

[36] Nicolas L. Ziebarth. Misallocation and Productivity during the Great Depression. *Working Paper*, pages 1–78, 2011.

[37] Nicolas L. Ziebarth. Identifying the effects of bank failures from a natural experiment in Mississippi during the great depression. *American Economic Journal: Macroeconomics*, 5:81–101, 2013.

Figure 1: Sample of the Newly-Digitized Data from the Census of Manufactures.

TABLE 2.—SUMMARY FOR THE INDUSTRY, BY STATES: 1937

[See secs. 11 and 25, pp. 7 and 13. See also footnotes 3 and 9, table 1]

	Number of establishments	Salaried officers and employees	Wage earners (average for the year)	Salaries	Wages	Cost of materials, etc., fuel, purchased energy, and contract work	Value of products	Value added by manufacture
United States	17,193	23,747	239,388	$45,460,779	$293,994,425	$727,021,811	$1,426,162,859	$699,141,048
Alabama	90	197	1,950	347,226	1,752,557	5,180,851	9,914,762	4,733,911
Arizona	49	50	514	152,600	567,047	1,794,556	3,260,667	1,466,111
Arkansas	60	105	1,084	175,196	943,899	2,750,314	5,384,284	2,633,970
California	1,152	1,115	13,519	2,302,149	19,232,168	45,552,119	89,389,654	43,837,535
Colorado	155	200	1,915	416,057	2,157,157	5,963,572	11,844,068	5,880,496
Connecticut	371	426	3,908	746,704	4,825,851	11,226,166	21,340,643	10,114,477
Delaware	28	43	394	89,535	442,214	1,153,095	2,501,769	1,348,674
District of Columbia	81	174	1,729	383,513	2,790,982	5,285,401	11,236,597	5,951,196
Florida	183	257	2,520	440,404	2,581,991	7,094,408	13,571,491	6,477,083
Georgia	93	227	2,657	461,460	2,477,045	7,301,805	14,821,991	7,520,186
Idaho	62	28	408	44,575	465,436	1,419,077	2,605,887	1,186,810
Illinois	1,512	1,992	20,013	3,510,142	25,346,136	65,814,799	126,437,147	60,622,348
Indiana	364	694	5,784	1,261,223	6,662,956	17,756,809	32,512,095	14,755,286
Iowa	284	411	4,257	879,402	4,495,322	12,937,463	24,052,036	11,114,573
Kansas	228	183	1,900	291,439	1,949,213	5,287,022	9,716,623	4,429,601
Kentucky	120	179	2,262	329,651	2,461,609	7,025,494	12,248,330	5,222,836
Louisiana	214	382	2,854	555,174	2,414,537	7,432,642	13,884,963	6,452,321

Notes: Example of the data on white-collar and blue-collar employment and wages in the 1937 Census of Manufactures.

Table 1: List of industries.

Panel A. Year 1929

Industry	White-Collar Empl.	Blue-Collar Empl.	White -Collar Wage	Blue-Collar Wage
Cotton goods	14.1	424.9	2910.5	763.2
Lumber and timber products	21.7	410.1	2783.4	1028.0
Steel works and rolling mills	36.9	394.6	2800.2	1746.2
Electrical machinery	75.9	328.7	2251.9	1388.3
Printing and publishing	190.5	280.5	2347.4	1804.8
Bread and bakery products	21.6	260.8	1889.2	1052.6
Motor vehicles	27.1	226.1	2949.7	1621.2
Motor vehicles bodies and parts	19.9	221.3	2891.7	1655.9
Knit goods	14.0	208.5	3054.2	1010.7
Boots and shoes	19.6	205.6	2260.0	1081.5

Panel B. Year 1937: Employment

Industry	Salaried Officers	Supervisors and Managers	Clerks and Others	Blue-Collar
Steel works and rolling mills	0.6	12.9	26.9	479.3
Cotton goods	1.6	4.8	6.3	435.4
Lumber and timber products	2.2	6.0	7.7	323.9
Electrical machinery	2.0	14.0	52.2	306.0
Motor vehicles bodies and parts	1.0	9.0	18.3	284.8
Printing and publishing	15.4	18.9	151.6	276.6
Bread and bakery products	3.1	6.9	13.8	239.4
Knit goods	2.0	4.2	7.4	231.1
Boots and shoes	1.3	5.1	8.5	215.4
Motor vehicles	0.2	6.0	16.3	194.5

Panel B. Year 1937: Wages

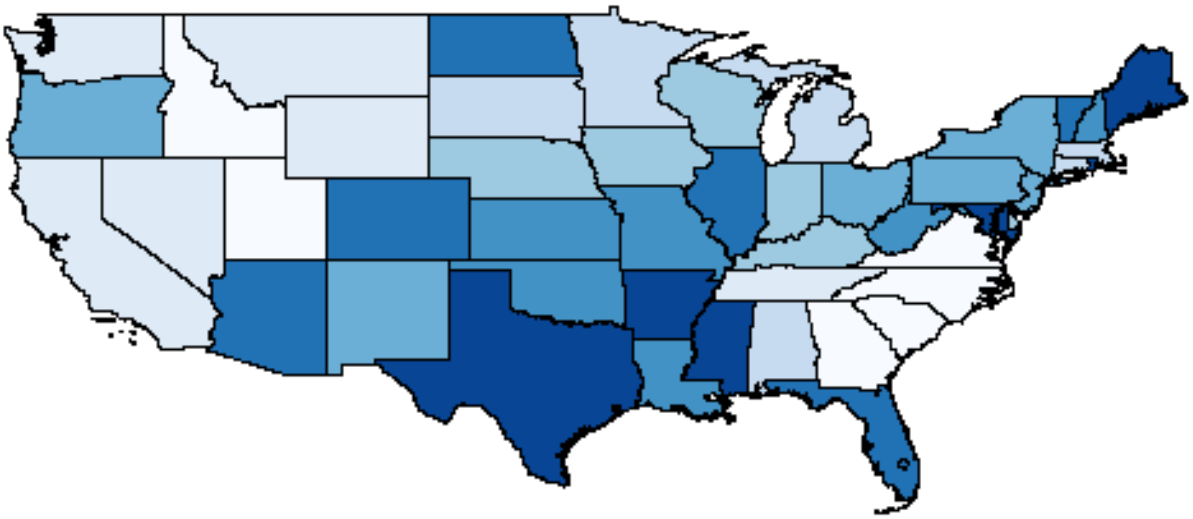
Industry	Salaried Officers	Supervisors and Managers	Clerks and Others	Blue-Collar
Steel works and rolling mills	11595.9	3838.4	1935.8	1626.8
Cotton goods	5942.0	2633.3	1272.2	744.3
Lumber and timber products	4678.3	2279.4	1349.1	849.1
Electrical machinery	7947.8	3439.5	1672.0	1333.2
Motor vehicles bodies and parts	6698.9	3194.3	1643.8	1544.7
Printing and publishing	5320.6	3688.5	1458.3	1507.4
Bread and bakery products	3954.3	2685.8	1071.2	1002.5
Knit goods	5663.0	2572.7	1155.0	861.5
Boots and shoes	6238.2	2384.1	1022.9	888.0
Motor vehicles	11150.2	3363.6	1627.1	1625.2

Notes: These tables report descriptive statistics on wages and employment for each of the largest ten industries of the 25 industries digitized. The 25 industries digitized were chosen as the largest industries in 1925 in terms of total employment, excluding a few

industries for which changes in classifications across years made a consistent comparison impossible. In panel A, the columns indicate the total employment (in thousands) and the average wage (in nominal USD) for white-collar and blue-collar workers for 1929. White-collar workers groups salaried officers, supervisors and managers and clerks and other salaried employees. Blue-collar workers are wage-earners (production workers). The average wage for each group is defined as the quotient of total wagebill over total employment. Panel B shows the employment and wages of narrower worker groups in 1937. It includes i) salaried officers, ii) supervisors and managers, iii) clerks and other salaried employees and iv) wage-earners (blue-collar workers).

Complete list of 25 industries: Boots and shoes, other than rubber; Bread and other bakery products; Canning and preserving: fruits and vegetables; etc. ; Cement ; Clay products (other than pottery) and nonclay refractories ; Confectionery ; Cotton goods ; Electrical machinery, apparatus, and supplies ; Engines and water wheels ; Furniture ; Glass ; Knit goods ; Leather, tanned, curried, and finished ; Lumber and timber products ; Marble, slate, and stone work ; Meat packing, wholesale ; Motor vehicles bodies and motor vehicle parts ; Motor vehicles, not including motor cycles ; Paper and wood pulp ; Planing-mill products ; Printing and publishing; Rubber tires and inner tubes ; Ship and boat building ; Silk manufactures ; Steel works and rolling mills.

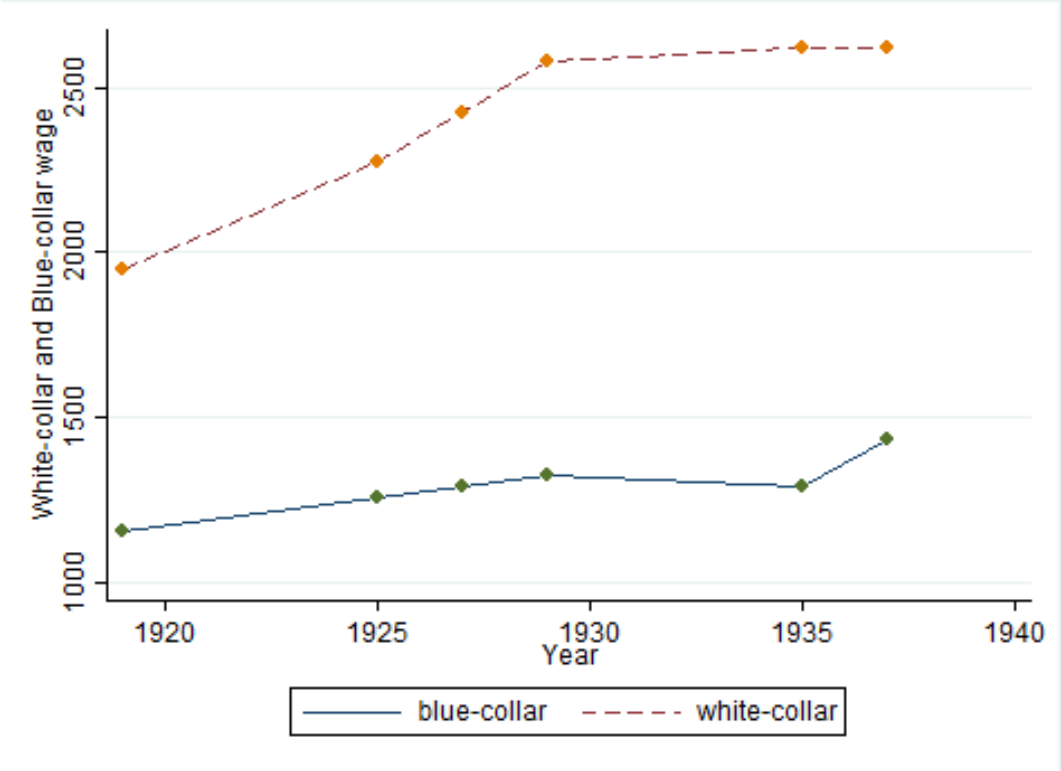
Figure 2: Variation in Wage Inequality by State, 1927-1937.



Notes: This map shows the variation in wage inequality (the ratio of white-collar to blue-collar wages) in manufacturing for each of the 48 continental states between 1927 and 1937. Darker shades of blue represent a larger increase (or a smaller decrease) in wage inequality. Wages in each state are the weighted average of the wages in each manufacturing industry, with weights corresponding to the employment of those industries in the state.

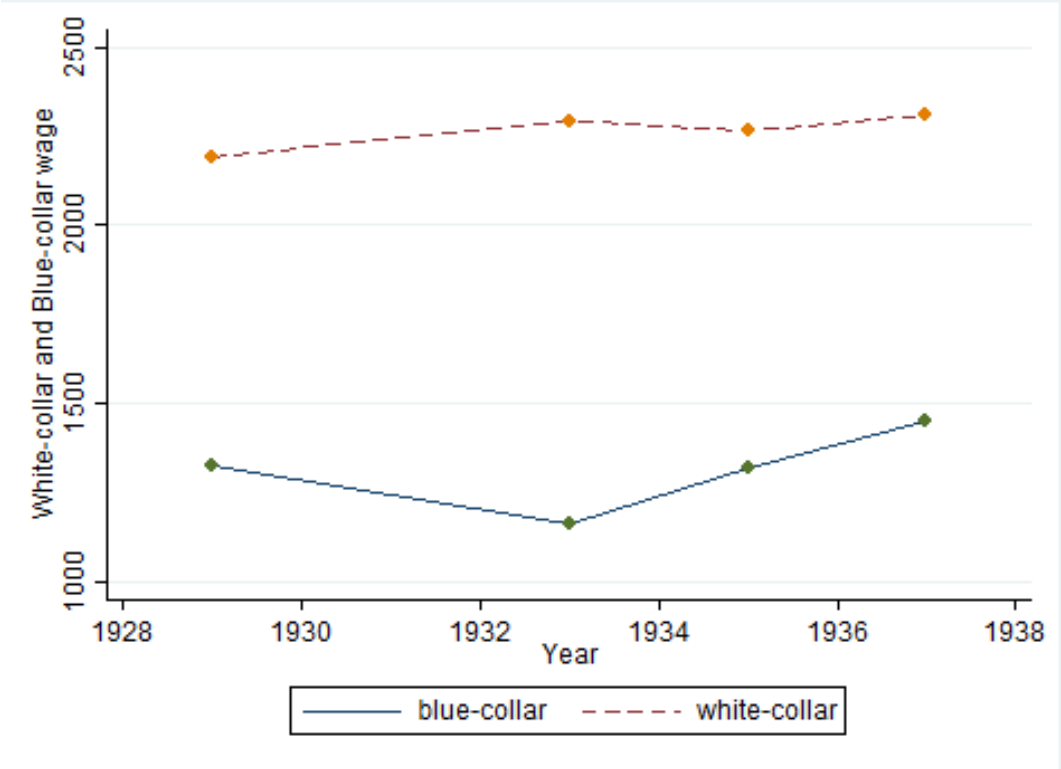
Figure 3: Evolution of White-Collar and Blue-Collar Wages in U.S. Manufacturing, 1919-1937.

Panel A: White-Collar and Blue-Collar Wages, 1919-1937 (Real Wages)



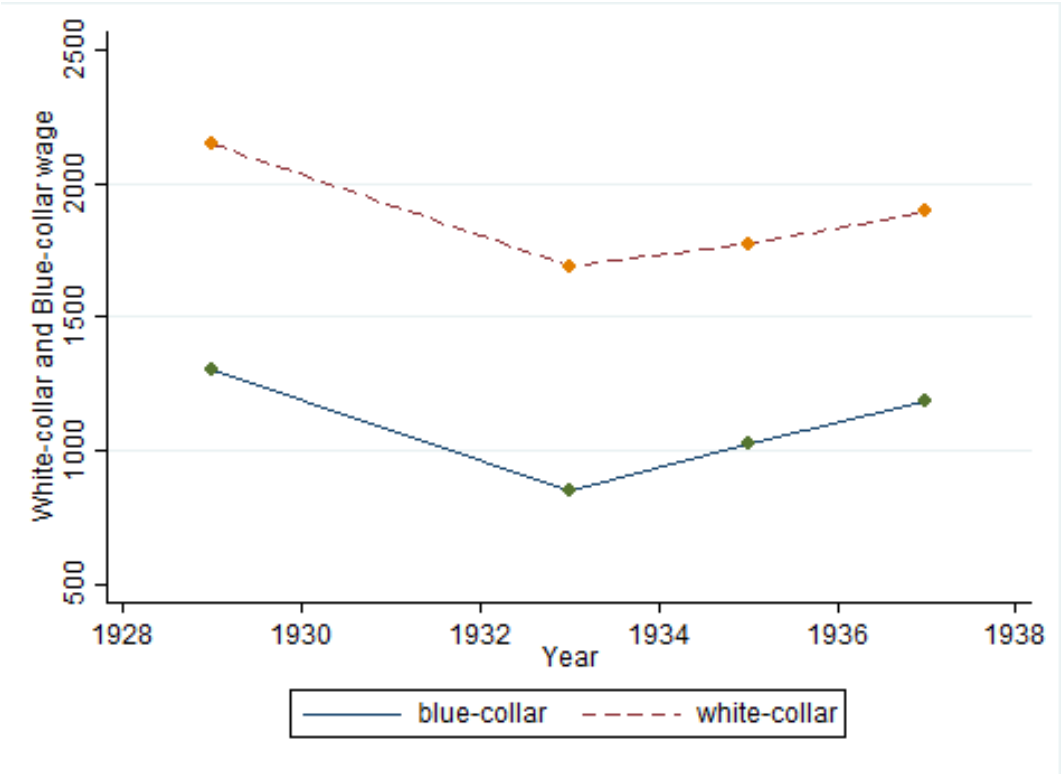
Notes: This graph describes the evolution of wages for white-collar and blue-collar workers in U.S. manufacturing during 1919-1937. The graph is based on data for the 25 largest manufacturing industries described in table 1. Wages for each worker category are computed as the sum across industries and states of the category's wagebill divided by the sum across industries and states of the category's employment. This method gives a larger weight to larger industries and to larger states. In this graph, white-collar workers include salaried officers of corporations, supervisors and managers and clerks and other salaried employees. Blue-collar workers are wage-earners (production workers). Wages are expressed in real terms (1925 USD).

Figure 3, Panel B: White-Collar and Blue-Collar Wages, 1929-1937 (Real Wages)



Notes: This graph shows the evolution of the wages of white-collar and blue-collar workers in U.S. manufacturing during 1929-1937. The graph is based on data for the 25 largest manufacturing industries described in table 1. Wages for each worker category are computed as the sum across industries and states of the category's wagebill divided by the sum across industries and states of the category's employment. This method gives a larger weight to larger industries and to larger states. In this graph, white-collar workers include supervisors and managers and clerks and other salaried employees. It does not include salaried officers of corporations. Blue-collar workers are wage-earners (production workers). Wages are expressed in real terms (1925 USD).

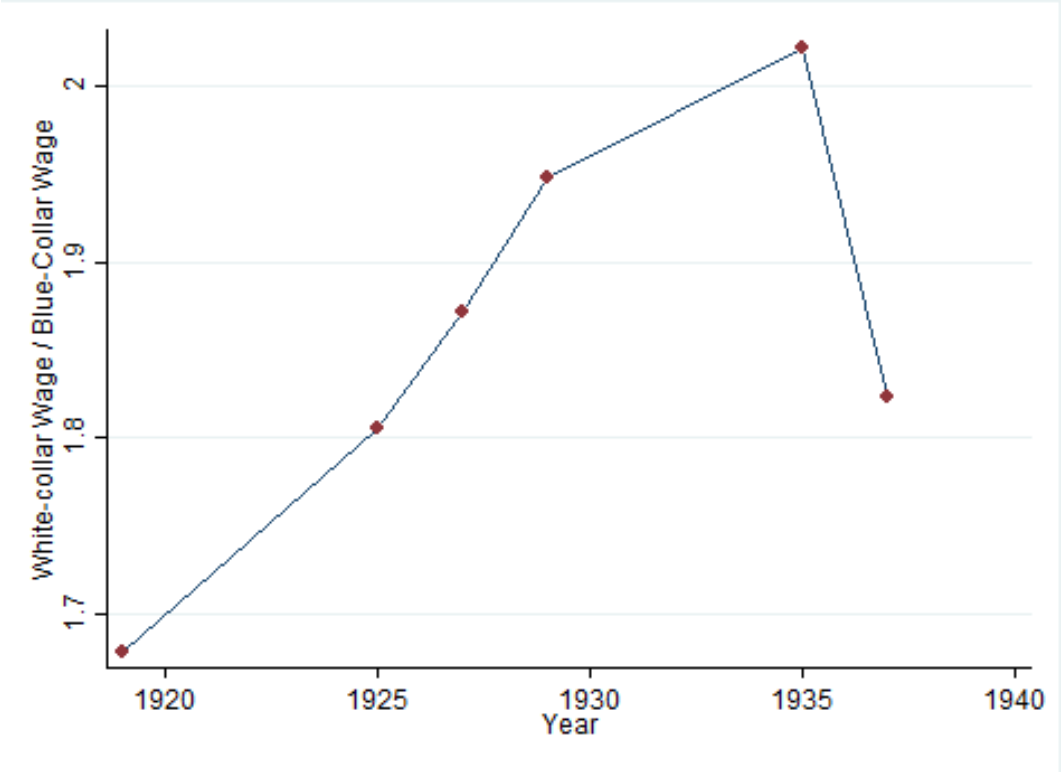
Figure 3, Panel C: White-Collar and Blue-Collar Wages, 1929-1937 (Nominal Wages)



Notes: This graph shows the evolution of the wages of white-collar and blue-collar workers in U.S. manufacturing during 1929-1937. The graph is based on data for the 25 largest manufacturing industries described in table 1. Wages for each worker category are computed as the sum across industries and states of the category's wagebill divided by the sum across industries and states of the category's employment. This method gives a larger weight to larger industries and to larger states. In this graph, white-collar workers include supervisors and managers and clerks and other salaried employees. It does not include salaried officers of corporations. Blue-collar workers are wage-earners (production workers). Wages are expressed in nominal terms.

Figure 4: Evolution of Wage Inequality in U.S. Manufacturing, 1919-1937.

Panel A: Wage Inequality, 1919-1937 (ratio of White-Collar to Blue-Collar Wage

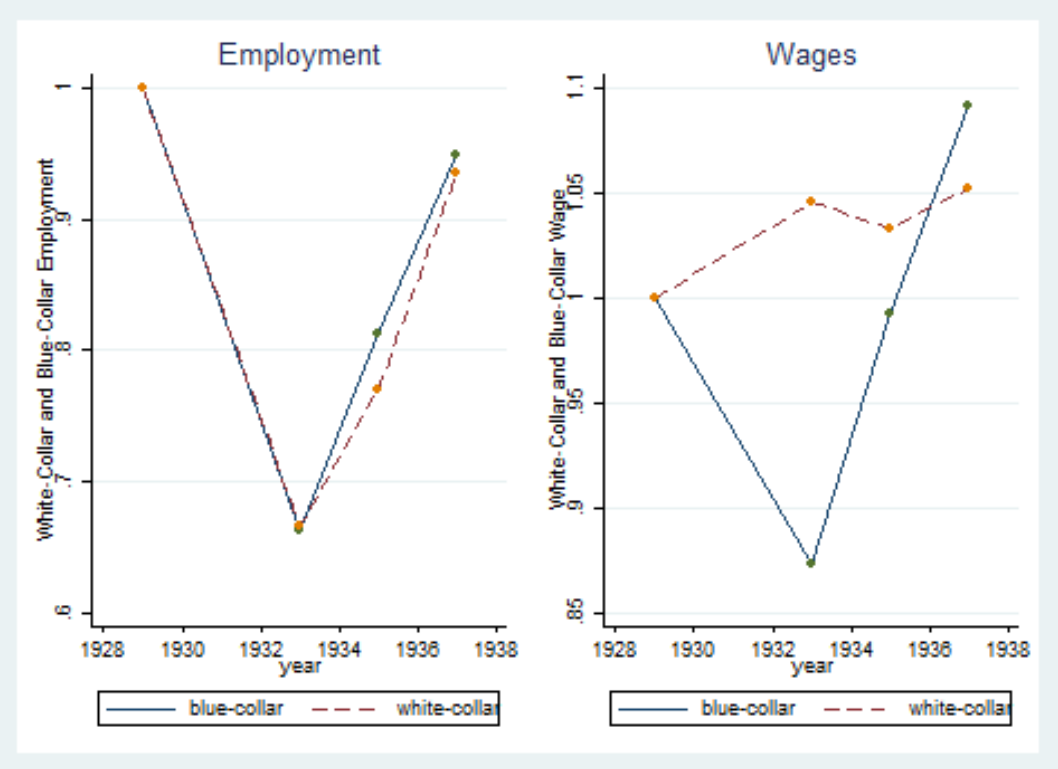


Notes: This graph shows the evolution of the relative wage of white-collar and blue-collar workers in U.S. manufacturing during 1919-1937. This is the ratio of the two series in figure 3, panel A. The graph is based on data for the 25 largest manufacturing industries described in table 1. Wages for each worker category are computed as the sum across industries and states of the category's wagebill divided by the sum industries and states of the category's employment. This method gives a larger weight to larger industries and to larger states. In this graph, white-collar workers include salaried officers of corporations, supervisors and managers and clerks and other salaried employees. Blue-collar workers are wage-earners (production workers).

Figure 4, Panel B: Wage Inequality, 1929-1937 (ratio of White-Collar to Blue-Collar Wage

Notes: This graph shows the evolution of the relative wage of white-collar and blue-collar workers in U.S. manufacturing during 1929-1937. This is the ratio of the two series in figure 3, panel B. The graph is based on data for the 25 largest manufacturing industries described in table 1. Wages for each worker category are computed as the sum across industries and states of the category's wagebill divided by the sum across industries and states of the category's employment. This method gives a larger weight to larger industries and to larger states. In this graph, white-collar workers include supervisors and managers and clerks and other salaried employees. It does not include salaried officers of corporations. Blue-collar workers are wage-earners (production workers).

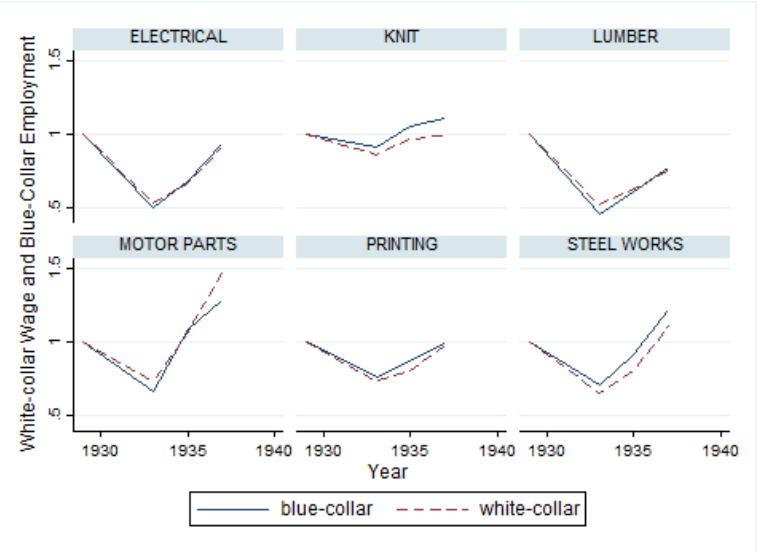
Figure 5: Evolution of White-Collar and Blue-Collar Employment and Wages in U.S. Manufacturing, 1929-1937.



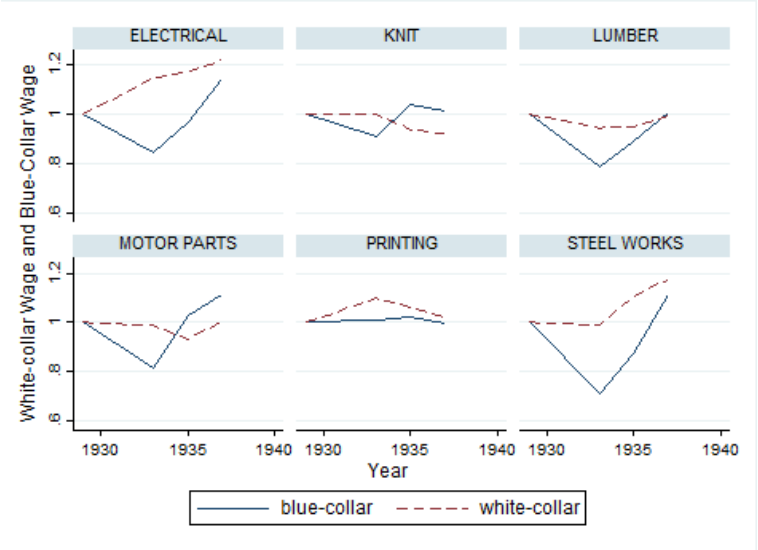
Notes: This graph represents the evolution of the employment and wages for white-collar and blue-collar workers in U.S. manufacturing during 1929-1937. The graph is based on data for the 25 largest manufacturing industries described in table 1. Employment and wages are normalized to 1 in 1929. Wages for each worker category are computed as the sum across industries and states of the category's wagebill divided by the sum across industries and states of the category's employment. This method gives a larger weight to larger industries and to larger states. In this graph, white-collar workers include supervisors and managers and clerks and other salaried employees. It does not include salaried officers of corporations. Blue-collar workers are wage-earners (production workers). Wages are expressed in real terms.

Figure 6: Evolution of White-Collar and Blue-Collar Employment and Wages in U.S. Manufacturing by Industry, 1929-1937.

Panel A: Employment



Panel B: Wages



Notes: This graph represents the evolution of the employment and wages for white-collar and blue-collar workers in U.S. manufacturing during 1929-1937 for six selected large industries out of the 25 industries used in this paper. Employment and wages are normalized to 1 in 1929. Wages for each worker category are computed as the sum across states of the category's wagebill divided by the sum across states of the category's employment. This method gives a larger weight to larger states. In this graph, white-collar workers include supervisors and managers and clerks and other salaried employees. It does not include salaried officers of corporations. Blue-collar workers are wage-earners (production workers). Wages are expressed in real terms.

Table 2: Decomposing the Variation in Wages and Employment.

Dependent Var.:	Wage	Employment
(1933-1935) x White Collar	-0.290***	-0.111
	0.038	0.162
(1935-1937) x White Collar	-0.206	-0.089
	0.038	0.162
White Collar	0.148***	0.058
	0.027	0.114
Industry F.E.	YES	YES
Year F.E.	YES	YES
Observations	144	144
R-squared	0.517	0.510

Notes: This table shows the results of the estimation of equation 1. Robust standard errors are clustered at the industry and state level. ***,**,* denote significance at the 1, 5, and 10 percent confidence levels.

Table 3: Regional versus Industry Determinants of Labor Market Outcomes.

Levels

Panel A: 1929

	Share of Variance Explained by	
	State	Industry
White-Collar Wage	0.41	0.59
Blue-Collar Wage	0.47	0.53
White-Collar / Blue-Collar Wage	0.30	0.70
White-Collar Employment	0.67	0.33
Blue-Collar Employment	0.74	0.26
White-Collar / Blue-Collar Employment	0.10	0.90
Output	0.74	0.26

Panel B: 1937

	Share of Variance Explained by	
	State	Industry
White-Collar Wage	0.53	0.47
Blue-Collar Wage	0.38	0.62
White-Collar / Blue-Collar Wage	0.35	0.65
White-Collar Employment	0.62	0.38
Blue-Collar Employment	0.75	0.25
White-Collar / Blue-Collar Employment	0.10	0.90
Output	0.68	0.32

Notes: This table shows the share of variance explained by state-level versus industry-level fixed effects in labor market outcomes for 1929 and 1937.

Table 3: Regional versus Industry Determinants of Labor Market Outcomes.

Differences

Panel C: 1929-1933

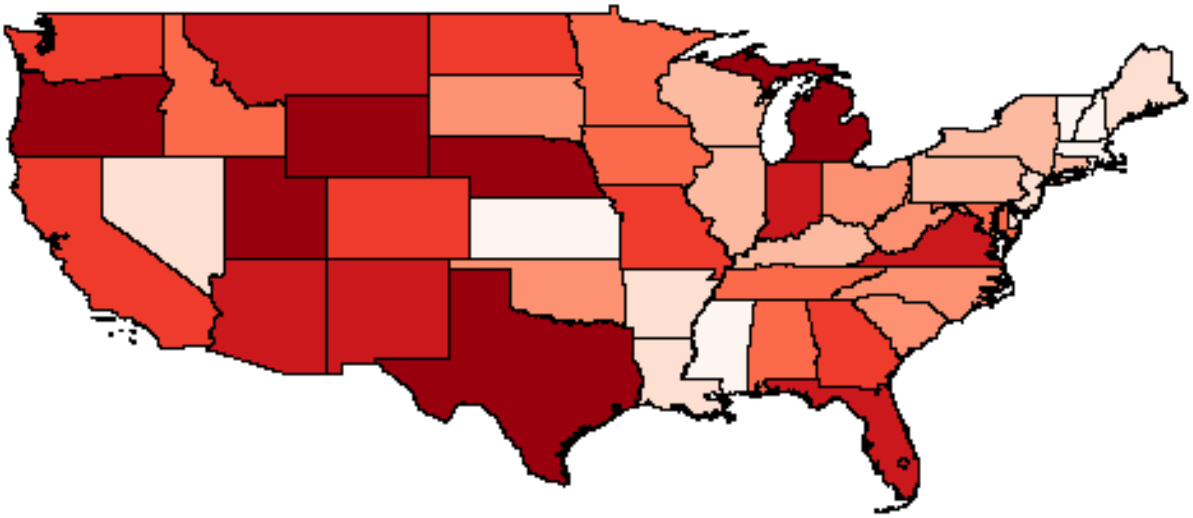
	Share of Variance Explained by	
	State	Industry
White-Collar Wage	0.27	0.73
Blue-Collar Wage	0.26	0.74
White-Collar / Blue-Collar Wage	0.41	0.59
White-Collar Employment	0.13	0.87
Blue-Collar Employment	0.10	0.90
White-Collar / Blue-Collar Employment	0.40	0.60
Output	0.12	0.88

Panel D: 1933-1937

	Share of Variance Explained by	
	State	Industry
White-Collar Wage	0.44	0.56
Blue-Collar Wage	0.38	0.62
White-Collar / Blue-Collar Wage	0.60	0.40
White-Collar Employment	0.31	0.69
Blue-Collar Employment	0.21	0.79
White-Collar / Blue-Collar Employment	0.41	0.59
Output	0.17	0.83

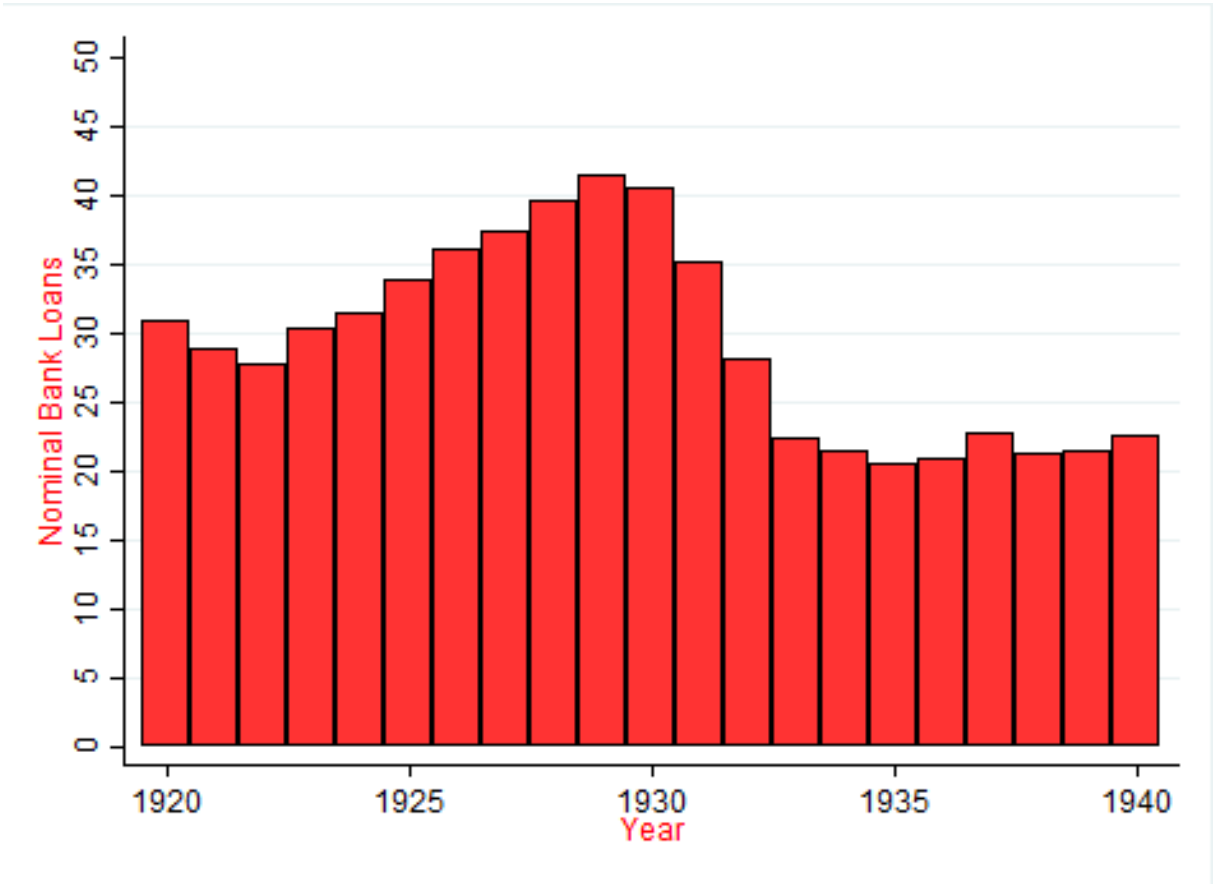
Notes: This table shows the share of variance explained by state-level versus industry-level fixed effects in changes in labor market outcomes between 1929-1933 (panel C) and 1933-1937 (panel D).

Figure 7: Variation in Manufacturing Output by State, 1927-1937.



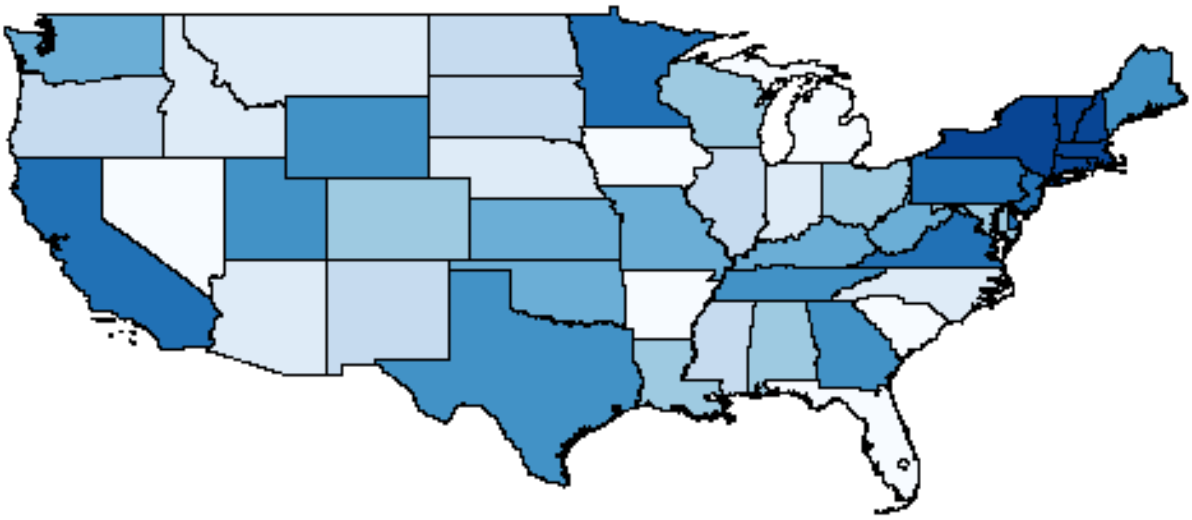
Notes: This map shows the variation in manufacturing output (revenue) for each of the 48 continental states between 1927 and 1937. Darker shades of red represent a larger increase (or a smaller decrease) in output. Manufacturing output in each state is measured as the sum across the 25 largest manufacturing industries described in table 1.

Figure 8: Bank Loans in the U.S., 1920-1940.



Notes: This figure shows the evolution of bank loans in the U.S. over 1920-1940. The data comes from the Annual Report of the Comptroller of the Currency for each year and corresponds to "loans and discounts by all active banks (national, state (commercial), savings and private banks." The series if for nominal bank loans and is measured in thousands of millions of U.S. dollars.

Figure 9: Variation in Bank Loans by State, 1929-1933.



Notes: This map shows the variation in total bank loans for each of the 48 continental states between 1929 and 1933. Darker shades of blue represent a larger increase (or a smaller decrease) in bank lending. Data on bank loans comes from the Annual Report of the Comptroller of the Currency and corresponds to "loans and discounts by all active banks (national, state (commercial), savings and private banks".

Table 4: Bank Lending and Labor Market Outcomes, 1929-1933.

Panel A: Employment

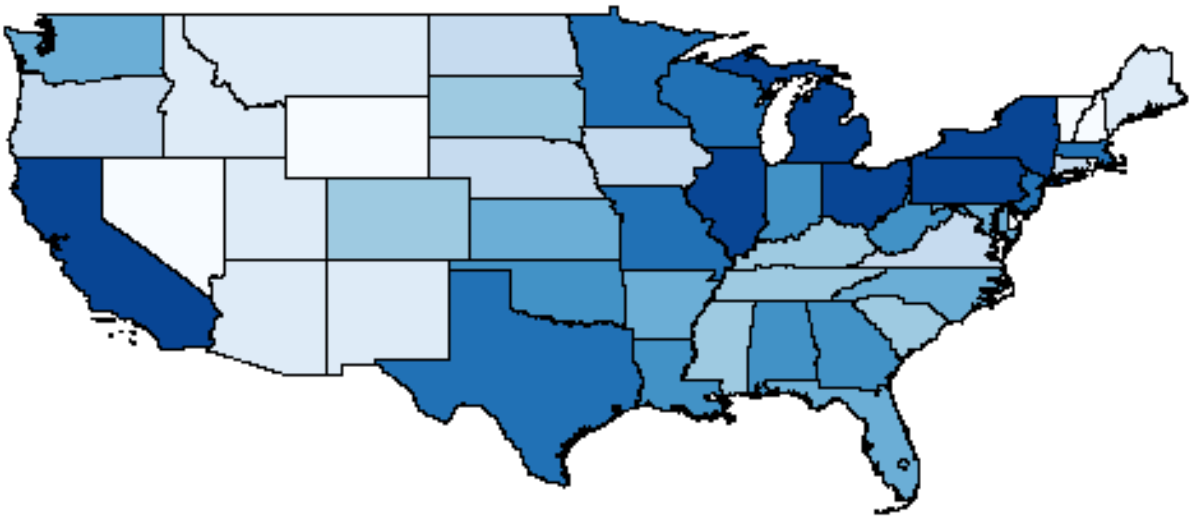
Dependent Var.:	White-Collar	White-Collar	Blue-Collar	Blue-Collar
	OLS	2SLS	OLS	2SLS
Δ Loans	0.0979 **	0.0939	0.0924 *	0.2418 *
	0.0459	0.1043	0.0502	0.1416
Industry F.E.	YES	YES	YES	YES
Observations	574	574	574	574

Panel B: Wages

Dependent Var.:	White-Collar	White-Collar	Blue-Collar	Blue-Collar
	OLS	2SLS	OLS	2SLS
Δ Loans	0.0446	0.1036	0.0232	-0.02618
	0.0415	0.0750	0.0270	0.0663
Industry F.E.	YES	YES	YES	YES
Observations	568	568	574	574

Notes: This table shows the results of the estimation of equation 2. The dependent variable is the for the growth rate of employment and wages of white-collar and blue-collar workers, between 1929 and 1933. Every regression includes lagged 1925-1929 growth rates on the right hand side. Robust standard errors are clustered at the industry and state level. ***,**,* denote significance at the 1, 5, and 10 percent confidence levels. The instruments for bank loans are total assets per bank in 1927 and capital-asset ratios in 1927.

Figure 10: New Deal Federal Spending by State.



Notes: This map shows the total amount of New Deal FERA and CWA grants for each state. Darker shades represent higher levels of fiscal spending.

Table 5: Federal Spending and Labor Market Outcomes, 1933-1937.

Panel A: Employment

Dependent Var.:	White-Collar	White-Collar	Blue-Collar	Blue-Collar
	OLS	2SLS	OLS	2SLS
Federal Gov. Spending	0.0152	0.1253	0.0325	0.3151*
	0.0493	0.2332	0.0360	0.1795
Industry F.E.	YES	YES	YES	YES
Observations	583	583	584	584

Panel B: Wages

Dependent Var.:	White-Collar	White-Collar	Blue-Collar	Blue-Collar
	OLS	2SLS	OLS	2SLS
Federal Gov. Spending	0.0068	-0.0357	-0.0113	0.0320
	0.0265	0.0840	0.0153	0.0620
Industry F.E.	YES	YES	YES	YES
Observations	579	579	584	584

Notes: This table shows the results of the estimation of equation 3. The dependent variable is the for the growth rate of employment and wages of white-collar and blue-collar workers, between 1933 and 1937. Every regression includes lagged 1929-1933 growth rates on the right hand side. Robust standard errors are clustered at the industry and state level. ***,**,* denote significance at the 1, 5, and 10 percent confidence levels. The independent variable Federal Gov. Spending represents federal government spending under the New Deal programs Federal Emergency Relief Administration (FERA) and Civil Works Administration (CWA). The instruments for this variable are voter turnout per capita in the 1932 election (normalized by the population in 1930) and land area, both defined at the state leve as discussed in the text.

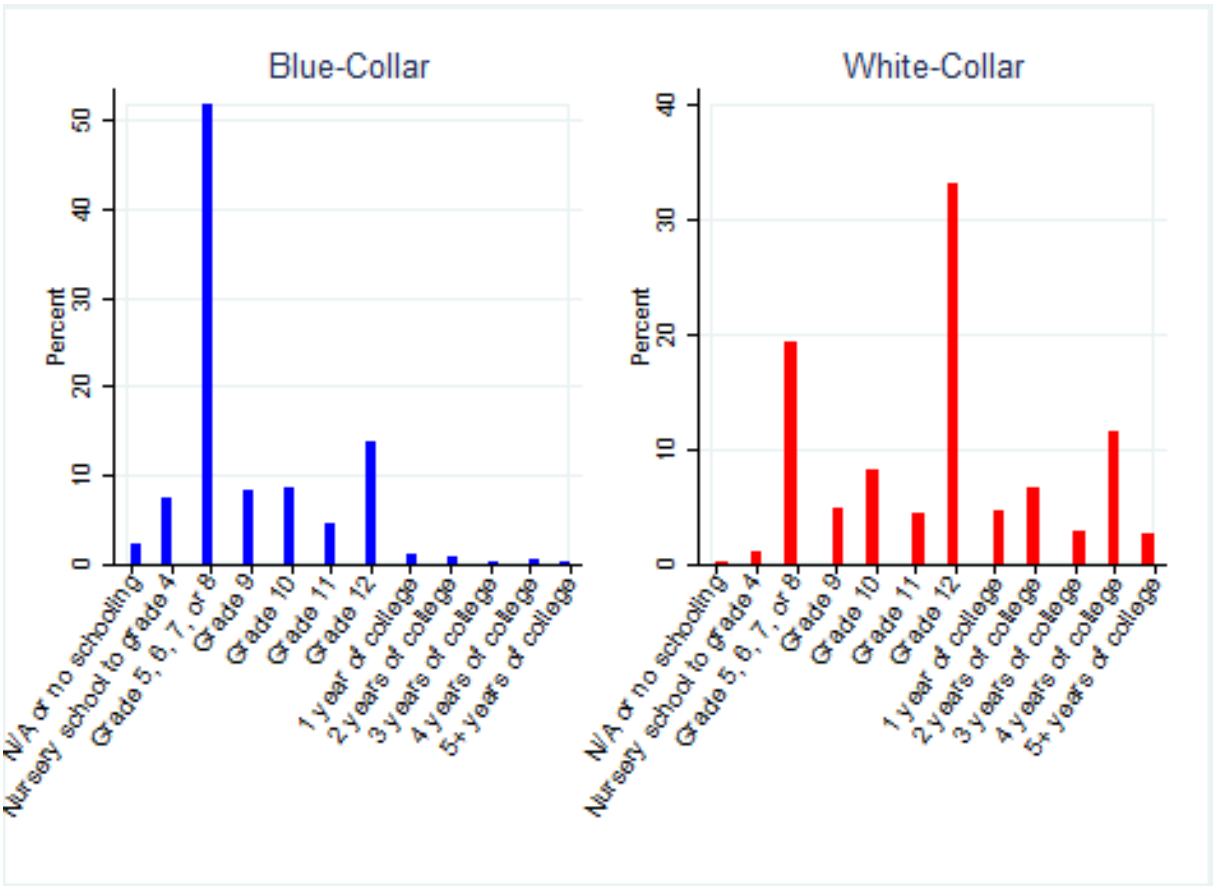
Table 6: Educational Attainment of White-Collar and Blue-Collar Workers in Manufacturing based on the 1940 Population Census

Share of workers with at least a high-school degree, by state

State	Blue-Collar	White-Collar	State	Blue-Collar	White-Collar
Alabama	0.13	0.61	Nebraska	0.40	0.67
Arizona	0.18	0.85	Nevada	0.00	0.75
Arkansas	0.10	0.45	New Hampshire	0.13	0.82
California	0.29	0.63	New Jersey	0.13	0.57
Colorado	0.19	0.69	New Mexico	0.15	0.50
Connecticut	0.13	0.60	New York	0.12	0.56
Delaware	0.17	0.67	North Carolina	0.15	0.68
District of Columbia	0.28	0.77	North Dakota	0.27	0.57
Florida	0.19	0.71	Ohio	0.20	0.66
Georgia	0.09	0.64	Oklahoma	0.24	0.64
Idaho	0.46	0.86	Oregon	0.23	0.69
Illinois	0.18	0.60	Pennsylvania	0.15	0.63
Indiana	0.25	0.63	Rhode Island	0.10	0.54
Iowa	0.25	0.59	South Carolina	0.13	0.71
Kansas	0.25	0.69	South Dakota	0.44	0.64
Kentucky	0.13	0.59	Tennessee	0.17	0.68
Louisiana	0.14	0.62	Texas	0.22	0.67
Maine	0.19	0.67	Utah	0.35	0.75
Maryland	0.12	0.49	Vermont	0.18	0.47
Massachusetts	0.16	0.68	Virginia	0.16	0.66
Michigan	0.18	0.60	Washington	0.25	0.66
Minnesota	0.22	0.69	West Virginia	0.29	0.63
Mississippi	0.26	0.70	Wisconsin	0.18	0.64
Missouri	0.17	0.59	Wyoming	0.20	1.00
Montana	0.21	0.33			

Notes: This table shows the share of white-collar and blue-collar workers in each state in the 1940 Population Census with an educational attainment corresponding to at least a high school degree (12th grade). Workers employed in manufacturing industries were assigned to the white-collar or blue-collar categories based on their occupation as described in Section 2.3.

Figure 11: Educational Attainment of White-Collar and Blue-Collar Workers based on the 1940 Population Census.



Notes: This figure shows the distribution of years of schooling for white-collar and blue-collar workers of ages 20 to 65 in the manufacturing sector. Section 2.3 describes the classification of workers into these categories.

Table 7: Data Availability in the Census of Manufactures.

Panel B. Year 1937: Wages

	Questionnaire			Tabulated - Industry Level		
	Officers	Employees	Wage Earners	Officers	Employees	Wage Earners
1929	Yes	Yes	Yes	Yes	Yes	Yes
1931	No	No	Yes	No	No	Yes
1933	Yes	Yes	Yes	No	Yes	Yes
1935	Yes	Yes	Yes	Yes	Yes	Yes
1937	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This figure shows the availability of different worker categories in each Census of Manufactures during the Depression. The first three columns indicate whether data was requested in the Census questionnaire. The next three columns indicate whether there is a tabulation in the Census report providing these data at the industry level. Much of the data is also available i) at the state level and/or ii) at the industry by state level. Worker categories show in this table are i) salaried officers of corporations, ii) salaried employees and iii) wage-earners (production workers). More detailed categories are available for some years, as described in the text.