Effects of New Deal Spending and the Downturns of the 1930s on Private Labor Markets in 1939/1940

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Abstract

We examine the medium-term effects on private labor markets for males in 1939-40 of the earlier Great Contraction of 1929-1933, and the Second-Dip Recession of 1937-38, as well as the concurrent and medium run effects of New Deal grants between 1933 and 1939. The analysis combines county level data on New Deal spending on the relief, public works, and Agricultural Adjustment Administration farm programs from 1933 to 1939 with IPUMS information on individuals from the U.S. Census in 1940. The results show that workers in counties hit harder by the earlier contractions still had fewer work opportunities and lower earnings in 1939/40 and were less likely to move to more skilled jobs between 1930 and 1940. Workers in counties with more public works grants per capita had higher weekly and annual earnings and worked more hours in private jobs and were more likely to move to higher skilled jobs during the 1930s, but there was no difference in their hourly earnings or in their probability of private employment. In counties with more relief grants and AAA grants, workers had less access to private jobs and were paid lower annual, weekly, and hourly earnings. The probability of moving into more skilled jobs was also lower.

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In the short span of the 1930s decade the United States experienced the Great Contraction and then the largest peace-time expansion in government spending in its economic history. The depth of the Great Contraction and the size of the New Deal expenditures varied substantially across counties throughout the United States. Such dramatic changes were likely to have effects both in the short and the medium run. There is an extensive literature on the local effects of the New Deal summarized by Price Fishback (forthcoming). A substantial majority of the studies focus on averages from cities, counties, and states because the availability of individual data through most of the 1930s has been limited.[1] Among studies of the impact of New Deal spending on labor markets, all but one have shown that relief and public works spending had no positive effect and sometimes a negative effect on private employment.[2] Todd Neumann, Fishback, and Shawn Kantor (2010) found that private earnings were higher during periods when relief funding increased.[3]

Yet, the Depression and the New Deal were such large shocks that it seems reasonable to expect that they would have had impact on labor markets for at least several years before World War II delivered another set of major shocks to the economy. In fact, they might have lasted longer. Recent studies show that men who were born in the worst years of the Depression

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1 The exceptions have been Joshua Hausmann's (2015) study of the impact of the Veteran's Bonus on consumption in 1935 and Robert Margo's (1991, 1992) descriptions of the access to emergency work in 1940. Leah Boustan, Fishback, and Shawn Kantor (2010) examined the impact of migration on labor markets, but did not focus on the impact of the Depression and the New Deal programs.

2 Cross sectional analysis conducted by Wallis and Benjamin (1981) using data from 52 cities and Fleck (1999) using county level data nationwide found no effects of relief spending on private employment or private monthly wages. Benjamin and Matthews (1992) use a state level panel data and find employment crowd-out effects during both the First and Second New Deal. Neumann, Fishback, and Kantor (2010) investigate the short-run dynamics between relief spending and private employment using a panel of 44 major cities. They find a demand stimulus effect during the First New Deal and an employment crowd-out effect during the Second New Deal. Fishback and Kachanovskaya (2015) examine the multiplier effects of New Deal programs using a panel of 48 states and shows that these programs had no positive effects on private employment.

3 Some other studies have examined the impact of President's Reemployment Agreements and National Recovery Administration Codes on wages and hours. These regulations were typically national in scope by industry and were short-lived. For examples, see Cole and Ohanian (2004), Eggertsson (2012); Taylor (2011), Taylor and Neumann (2013), Taylor, Neumann and, Fishbck (2013), and Neumann and Taylor (2016). .

in low-income states earned less and had more disability later in life (Thomasson and Fishback 2014); males who were teenagers in the hardest hit states became more conservative investors and savers (McGuire, 2016), and the Dust Bowl had impact on economic activity for decades (Hornbeck 2012).

Understanding the size and nature of the longer-run private labor market effects of both contractions and government spending expansion is of increasing importance, as it enables us to track the welfare changes for individuals who experienced severe economic downturns early in their life.[4] Such analysis further sheds light on the changes in workers' income distribution, occupational/skill distribution, as well as labor supply later in life. However, certain difficulties exist when analyzing such medium run and longer run effects because in years after the downturns the impacts of many other factors might have had different influences for different cohorts and need to be taken into account to avoid problems with omitted variable bias in the measures of the impact of the downturns.

We investigate the medium run effects of the Great Contraction of 1929-1933, the Second-Dip Recession of 1937-38, and concurrent and medium run effects of New Deal grants per capita at the county level on the employment status of male household heads, their earnings, and time worked in 1939/1940. We also examine changes in occupational status between 1930 and 1940 using a longitudinal sample that matches information for men from the 5-percent 1930 Census sample with their information from the 1940 Census Universal Sample.[5] The new analysis adds to the literature in multiple ways. First, for the first time we are able to evaluate differential effects on the labor market between public works program paying full wages in

[4] There is an expanding literature on the effect of recessions later in life. See McGuire (2016) on the Depression and its effects on investment in the 1980s and 1990s, Moulton (2016) on the effect of entering the workforce after 1930 on labor market success in 1940, and Stuart (2016) for the effect of the 1980s recessions on later success. Each contains a summary of the modern literature and references.

[5] Chris Boone generously shared his matched sample, and we describe the features of the matching in Appendix 1.

regular employment and work relief programs paying lower earnings with limitations on work. Second, we can see the effects of the New Deal's intent to treat the population, while controlling for a rich set of individual characteristics. Third, we can look at the impact of the New Deal on changes in individual workers' occupational status and thus measure the extent to which there was depreciation or appreciation of skills associated with the programs.

The thought experiment considers workers in 1930. Over the next three years, there was a tremendous contraction in the economy followed by a major surge in federal government spending on poverty relief, the building of public works, and payments to farmers to take land out of production. The recovery after 1933 was then temporarily reversed by a second short recession in 1937-38. Were these major shocks still influencing private labor market outcomes as late as 1939 and 1940? In the analysis of earnings and working time of males in 1940, we do not have individual information on earnings and working time in 1930, but we can control for the situation in 1930 by including county averages of earnings and the structure of the economy to create a quasi-first difference. When examining the occupational situation we look at the actual change in the occupations of individuals between 1930 and 1940.

One issue that arises is potential endogeneity of the New Deal programs in the form of correlations between unmeasured factors in each county in 1940 and these variables. We work to reduce the potential for this kind of omitted variable bias in two ways. First, we start with Ordinary Least Square (OLS) estimation in which we control for a broad range of correlates that describe the economy in 1930. The major form of endogeneity of New Deal variables that most scholars worry about relates to the delivery of more New Deal funds to areas where the Great Contraction and the recession of 1937-38 were worse. The OLS analysis addresses these issues directly because measures of the size of the Great Contraction and unemployment in 1937 are

controlled in the analysis. The impact of the New Deal we measure is therefore the effect of New Deal spending on the situation in 1940, holding constant the size of the Great Contraction and unemployment rates in 1937 in each county. The correlations between the downturn and New Deal measures might lead to multi-collinearity in the coefficient estimates, but this is likely not a serious problem because the studies of the political economy of the geographic distribution of New Deal funds find that the downturn accounts for only part of the variation of New Deal spending across areas (See Fleck 2008 and surveys by Fishback, Kantor, and Wallis 2003 and Fishback forthcoming).

Second, endogeneity might still arise if the unemployment rate in 1937 does not fully capture the problems in the economy that would have drawn more New Deal funds in the late 1930s. To address this issue, we use instruments that commonly have been used in the New Deal literature: pre-1930s presidential voting activity and Congressional committee assignments at the beginning of 1933 before Roosevelt was inaugurated in March. The validity of these instruments has been vetted in numerous papers (For example, Fleck 1999; Fishback and Kachnaovskaya (2015), Fishback, Horrace, and Kantor 2005 and 2006; Fishback forthcoming).

There are several potential channels through which New Deal spending might have affected the private labor market: demand stimulus, crowding-out of private sector labor demand, an increase in labor productivity abetted by more and better public works, depreciation of the skills of workers, crowding-out of private sector workers' labor supply, and a large scale dismissal of relief workers from the WPA in 1939. Some previous studies have provided narrative evidence of these channels but they have rarely been tested empirically.

The results show a stark difference in the impact of relief and public works grants. In communities where there were more grants per capita in the public works programs, which hired

all types of workers at market wages, annual earnings and weekly earnings in the private sector were higher, largely due to more hours worked per week. In those counties men working in 1930 had more opportunities to move up to or remain in skilled jobs over the course of the decade, but overall private employment opportunities and hourly earnings were unchanged. In contrast, the work relief programs were associated with worse outcomes, as men in counties where relief spending was higher were less likely to be employed in private jobs or self-employed. Men who had jobs in 1939/40 in those counties earned about one percent less annually, weekly, and hourly. The relief spending was also associated with men moving to lower skilled jobs over the course of the decade.

The narrative and quantitative literature on AAA farm grants to date suggests that the grants led to drops in demand for agricultural labor that pushed tenants, croppers, and farm workers down the agricultural tenure ladder and out of farming altogether. The results here complement those findings as the results show that communities with more AAA farm grants associated with lower annual, weekly, and hourly earnings in the private sector while the percentage employed in private jobs dropped. The effects of the AAA on opportunities to move up or down the skill ladder were mixed, likely because the AAA pushed tenants, croppers, and laborers with such a wide range of skills out of farming.

1. The Great Contraction and the Second-Dip Recession

The Great Depression is considered the longest and the most widespread Depression in the 20th century. By 1932, the unemployment rate had risen to more than 20 percent and U.S. manufacturing output had fallen to 54 percent of its 1929 level. Roosevelt's New Deal distributed large amount of federal government funds. Work relief grants and public works

grants were distributed to the unemployed and required recipients to work on various infrastructure construction projects. The Agricultural Adjustment Administration (AAA) provided funds to farmers and landowners to take land out of production of key crops, which contributed to a drop in the demand for farm labor. Between 1933 and 1939, the Roosevelt administration had continuously modified New Deal programs and regulations. By the early 1940s, some programs had phased out due to the end of recession while others, including the Social Security System and farm programs, were established permanently.

2. New Deal Grants

In response to a variety of economic stresses associated with the Great Depression, a series of New Deal program were enacted between 1933 and 1938 under the Roosevelt administration. The lion's share of federal spending went into three major types of non-payable grants: relief grants, public works grants, and farm grants (Fishback forthcoming).

Established between the summer of 1933 and June 1935 during the First Hundred Days, the Federal Emergency Relief Administration (FERA) provided both direct relief and work relief. These federal grants were given to states. The amount of relief given each household was determined by the budget deficit principle, which evaluated the gap between households' actual income and the estimated minimum budget for a certain household size. Given the large number of households and limited grants, relief benefits distributed to each household provided only income maintenance and often did not cover the full household deficit. As work relief was initiated to allow the unemployed to "work with dignity," the average hourly earnings on FERA projects were about half to two thirds of the earnings paid by the Public Works Administration (PWA) and Public Roads Administration (PRA) jobs.

In November 1933, Roosevelt administration created a short-lived program, the Civil Works Administration (CWA) due to the harsh winter and continuing high unemployment. During the implementation of the CWA, the program provided jobs to four million people, both skilled and unskilled, with half of the workers taken from the relief rolls. The CWA employed workers to work on a wide range of public construction and maintenance projects while paying the wage rates prevailing on PWA and PRA projects. Weekly earnings on CWA projects were lower, however, because the CWA imposed limits on hours worked per week. The CWA program ended in March 1934. After that, most workers were transferred back to the FERA.

In 1935, Congress passed the Emergency Relief Appropriation Act of 1935 and created the Works Program Administration (WPA) to replace the FERA. Unlike the FERA, the federal government took over the responsibility of running the WPA directly, while hiring from pools of unemployed workers identified by state and local governments. The WPA funded traditional infrastructure such as roads, schools, hospitals, and water works. Similar to the FERA, as the primary goal of this program was income maintenance, hourly earnings were roughly about one half to two thirds of the earnings on PWA and PRA projects. One goal of the WPA was to make sure that these projects would not compete with private industry activities. To that end, the WPA encouraged workers to take private sector jobs and assured workers that they could come back on work relief if they lose their private jobs. Even so, large amount of workers still continued to stay on the relief roll to avoid the high risk of job loss in private sectors (Margo 1993, Neumann, Fishback, and Kantor 2010; Howard 1943). The WPA phased out by the end of 1942. In this study, our measure of relief spending, which is aggregated to the county level from 1933 to 1939,

contains the FERA grants, CWA grants, WPA grants, and the Social Security Administration's Aid to the Blind, Aid to Dependent Children, and Old Age Assistance grants.[6]

The public works grants of the New Deal aimed to provide federal support to the building of federal, state, and local public works projects, including highway construction and flood control. They included expenditures by the Public Works Administration (PWA), Public Buildings Administration (PBA), and the Public Roads Administration (PRA). In contrast to the relief programs, the public works program had the freedom to hire workers who were not on the relief rolls. Projects funded by the public works grants mostly focused on larger and longer-term projects. These projects hired workers at full market wage that were comparable to the wage rates paid in private industry.

During the Great Depression, farmers faced the most severe economic conditions and lowest agricultural prices since the 1890s (Hurt, 2002). The Agricultural Adjustment Act (AAA) of May 1933 sought to raise farm prices by paying farmers to take land out of production. The original program was largely financed through a tax on the processors and was declared unconstitutional in 1935. A new version of the AAA was passed without the tax and based on funding for general revenues through a new Soil and Domestic Allotment Act of 1936. Based on narratives and earlier work by Depew, Fishback, and Rhode (2013), we expect that the reduction of land usage in producing farm commodities resulted in a reduction in the demand for tenants and sharecroppers, forcing them to participate in less skilled farm jobs and other non-farm jobs and migrate to urban regions. In this study, our measure of AAA farm grants comprises the AAA

[6] The Social Security Act was created by the Roosevelt administration during the Second New Deal and became the permanent component that is still in use today. The Social Security Administration aid grants for blind, dependent children, and old age were financed through close end matching grants.

Rental and Benefit payments from 1933 to 1935 and the soil conservation payments in 1936 and 1937.[7]

3. Predictions of the Effects of the Contractions and New Deal Grants

Predictions for the concurrent and medium run effects of the New Deal on private labor markets are more complicated than the predicted medium run effects of the Great Contraction of 1929-1933 and the Second-Dip Recession of 1937/1938. We anticipate that the dominant effect of the two downturns would have been a drop in the demand for labor that reduced time worked and earnings. These drops were large enough that they might have reverberated over several years and kept hours, earnings, and employment prospects depressed even as late as 1939 and 1940.

The predicted impacts of the New Deal grants are more complex for multiple reasons. First, the New Deal data for public works and relief grants are reported as aggregates for a six year period from July 1933 to June 1939 and thus overlap the information on annual earnings and weeks worked in 1939 for a six month period. This means that we are measuring the combined impact of concurrent and past grants. Second, the New Deal grants likely affected labor markets through multiple channels that influenced both labor demand and labor supply. Our estimates are reduced-form coefficients that summarize the net effects. Finally, the high levels of unemployment during the period raise a great deal of uncertainty about what type of model to use to determine the impact of the grants.

[7]The county level AAA spending was obtained from mimeographed unpublished documents found in various archives. We have not been able to find county level AAA spending after 1937. We believe that the 1937 figures give a reasonable picture of the 1938 and 1939 figures because the cross-state correlations between the values in 1937 and 1938 and 1937 and 1939 are 0.96 and 0.86, respectively.

The predictions from the various channels and models are summarized in Table 1. The top part of the Table describes predictions based on short run changes from a standard supply and demand model with the expectation that the longer run effects would be in the same directions. The extraordinary unemployment in the 1930s raises doubts that an equilibrium model describes what was happening; therefore, the bottom part of Table 1 discusses predictions when there is an implicit wage floor. Some channels predict positive effects on individual earnings and number of labor hours while others predict negative effects. Thus, the net impact of the New Deal spending variables is an empirical issue that requires estimation.

Work relief and public works spending might have stimulated the derived demand for labor by increasing the incomes of consumers. The demand increase is expected to have led to an increase in hourly earnings and total hours. There might have been differences in this demand stimulus for public works and relief spending. Relief spending potentially had more powerful positive effects because it went to people in poverty who were likely to spend a higher share of their earnings. Given the drops in income for most workers, the difference in the marginal propensity to consume between low and high income workers might have been small. If true, public works spending might have had more powerful derived demand effects through the composition of spending because their earnings were high enough to purchase more consumer durables and high end goods that the relief workers would not have been able to purchase.

The demand stimulus effect might have been offset by crowding out of private sector and local government labor demand to the extent that the New Deal projects replaced their activities. As an example, the WPA funds were used to build infrastructure such as roads, bridges, golf courses, and schools, which had been built before by local governments and/or private construction contractors. Similarly, the distribution of federal highway funds no longer required

state matching funds after 1934 and the rest of the programs either did not have explicit state matches or were lax in enforcing them (Kachanovskaya 2016). Thus, the federal funds potentially were replacing state funds and construction activity that might have happened otherwise with consequent negative effects on time worked and earnings.

Increases in worker productivity associated with the New Deal public works and relief spending would have raised labor demand and thus hourly earnings and time worked. National estimates of both labor productivity and total productivity rose relatively rapidly between 1929 and 1939, and part of the rise in productivity has been attributed to the public works built by the public works and relief projects. These projects had spillover benefits to the private sector because new roads and bridges enhanced local distribution networks; expanded sanitation works led to healthier workers, and better school buildings enhanced the quality of schooling (Cole and Ohanian 1929 and Field 2011). In addition, employment on public works provided on-the-job training for skilled positions and allowed a significant percentage of workers to maintain employment skills.

The impact of relief spending on worker productivity and thus labor demand were more mixed because a large share of relief workers were employed in unskilled laborer positions for limited numbers of hours. The positive effects on productivity and labor demand came from young people who had not had jobs before learning the basic general skills associated with work. A relatively small share of relief workers would have gained skills from positions as skilled or white collar workers. On the downside, there was potential for skill depreciation to the extent that workers who originally were skilled, semi-skilled, bosses, or farm operators (owners or tenants or croppers) were placed in unskilled positions on relief projects. Table 2 shows the

distribution of workers' usual occupations[8] in 1935 and relief occupations in 1939.[9] It is clear that almost 60 percent of jobs provided by work relief spending were unskilled laborer positions and relatively few white-collar and skilled relief positions were created. In a study conducted in 13 cities Shepherd and Bancroft (1937) found that a certain amount of occupational "degrading" occurred. Professional workers and office workers were given work of their usual kind in about half of their assignments. Most skilled and semiskilled workers were assigned to laboring jobs. Some employment was better than no employment for these groups, so their skills would not have depreciated as much as those who remained unemployed for long periods. Thus, we expect that relief spending per capita in the counties would have been associated with less skill depreciation than the contraction measures.

On the supply side of the market, relief and public works spending may have led to higher wages and less time worked to the extent that they provided workers with a relevant alternative that led them to say no to private employment opportunities. Margo (1991, 1993) and Howard (1943) found that workers stayed on relief jobs for extended periods. They valued the certainty of a relief job despite lower pay over private sector jobs that paid higher wages but with more uncertainty that the job might not last. To overcome this, private employers had to pay higher wage rates in order to attract people to participate in regular jobs (Neuman, Fishback, and Kantor, 2010). Studies of short run labor market responses consistent with this type of labor supply effect include Wallis and Benjamin (1989), Matthews and Benjamin (1992), Fleck (1999a), and Neumann, Fishback, and Kantor (2010).

Finally, there was a powerful short run change in WPA policy in the middle of 1939 that led to the release of large number of WPA workers who had been on relief for 18 or more

[8] In this context, usual occupation is the kind of occupation a worker did before they received relief jobs. The distribution of workers' usual occupation is obtained from Workers on Relief in the United States in March 1935 (Hauser, 1938).
[9] This is obtained by tabulation occupational distribution using 1940 Census 100 percent sample.

months and prohibited their reinstatement for 60 days. The policy was a response to the Byrnes Committee investigation that found that of 2.7 million WPA workers found eligible for continuing WPA employment in early 1939, 51.6 percent had been continuously employed for one year or more; 25.8 percent had been employed continuously for two years or more; and 16.7 percent had been continuously employed three years or more (Howard, 1943). When this new policy took effect, 171,000 workers were dismissed in July 1939. The dismissed number rose to 611,733 in August and was down to 86,000 in September 1939. Since the dismissals were nationwide, it is likely that the numbers dismissed in each area were highly correlated with relief spending per capita between June 1933 and June 1939. The discharge of so many relief workers would have increased the labor supply substantially and led to lower hourly earnings and total hours worked, although the mix between hours per week, weeks worked, and employment might have been more complex.

The AAA farm grants are expected to have different effects in the agricultural and nonagricultural sectors. Much of the evidence to date suggests that the AAA grants led to a reduction in demand for wage workers, croppers, and tenants in agriculture and released them into the nonfarm labor force (Depew, Fishback, and Rhode 2013; survey by Fishback forthcoming). The demand reduction would have led to lower hourly wages and time worked in agriculture. The supply increase outside agriculture would have led to lower hourly wages and more time worked in ways similar to the WPA discharge.

Total hours worked in the year are calculated as the product of the number employed times average weeks worked times time average hours per week. A rise in total hours worked did not always mean that each component of total hours rose. Even in the best of times, contracts, inertia in the internal market, and the relative productivity of incumbent and new

workers would have influenced the impact on the three components. Given the high unemployment of the 1930s, employers seeking to raise total hours worked likely raised hours per week and weeks per year before increasing employment because employed workers typically had higher productivity than new workers, and they were often working "short time," less than a full work year or less than the normal workweek. A number of employers had followed such policies to ensure that they could keep an adequate force of productive workers in case of recovery. Such policies were reinforced by Hoover's jawboning and Roosevelt's President's Reemployment Agreements and the codes established under the National Recovery Administration. The policies had all the hallmarks of labor sharing policies designed to maintain employment by reducing weekly hours, while also keeping hourly earnings from falling because weekly wages were already being cut sharply by the drop in weekly hours (Neumann, Taylor, and Fishback 2013).

Predictions with Implicit Wage Minimums

Given these policies and the unemployment rates that ranged from 10 to 25 percent in the 1930s, the equilibrium supply and demand model described above may not adequately capture the situation. In the context of a labor supply and demand model, such high unemployment implied that some factors were holding the hourly wage paid by employers well above the market-clearing equilibrium. The candidates for the causes of this floor include the Presidential policies in the prior paragraph, although these ended when the National Recovery Administration was declared unconstitutional in 1935. The National Labor Relations Act might have put similar pressures on higher wages, shorter hours, and maintaining employment by requiring employers to collective bargain when a majority of their workers demanded it. Its impact strengthened after

it was found constitutional in April 1937. Even then, the employment covered by unions was largely found in industrial, construction, and transportation employment and only indirectly influenced other sectors. The Fair Labor Standards Act of 1938 also established a minimum wage at 25 cents per hour, although Seltzer (1997) finds that it was only binding in the south, where it appears to have been routinely circumvented. As discussed above, the introduction of the federal work relief and direct relief programs also influenced the labor markets to the extent that workers reduced their quantity of labor supplied at each wage.

In Figure 1 such an implicit "floor" of 50 prevented the wage from falling to a market equilibrating value of 45 and a quantity of 500. Instead, the floor led to an unemployment level of 80 between the potential quantity supplied of 530 and actual hours worked of 450. In this implicit wage floor model if the wage floor remains fixed at 50, many of the supply and demand shift predictions in the top part of Table 1 are muted. For example, demand increases from Demand 1 to Demand 2 in Figure 1 would lead to a rise in hours from 450 to 475 but the hourly wage would stay at 50. For a reduction in labor supply to influence employment, the labor supply would have to shift left far enough to reduce hours worked below 450 and even then it would not affect the wage.

The major problem here is that we do not understand much about how the implicit wage floor was determined. Wage minimums were set by the Fair Labor Standards Act and the voluntary PRA, but the Hoover jawbones and the NRA codes did not set minimums explicitly, nor were they universal, and the problems of unemployment were rampant throughout all sectors. Changes in the factors we have described might have moved not only labor demand and/or supply but also changed the implicit wage floor itself. For example, productivity improvements associated with public works and relief might have increased labor demand from Demand 1 to

Demand 2 while also pushing the wage floor up from 50 to 52. The net results in Figure 1 would have been a wage rise from 50 to 52 but no change in hours, which remain at 450. If demand shifts out faster than the wage floor rose, the hourly wage would rise to 52 and hours would rise; if the wage floor rose more than demand rose, the hourly wage would rise to 52 but hours would fall. Similarly, the labor supply reduction associated with access to relief might also have led to a rise in the implicit wage floor. In this case, the wage would rise to 52 and total hours would fall from 450 to 430 (or lower if there was an extreme leftward shift supply).

The implicit wage floor analysis implies that an expansion of labor supply would have had no impact on wages or time worked because the wage and hours were determined by the combination of the wage floor and labor demand. There would have been an exception if the factors that led to the shift in labor supply also lowered the wage floor. In Figure 1, this can be shown by a reduction in the implicit wage floor from 52 to 50, which would have led to a reduction in the wage from 52 to 50 and an increase in total hours along the demand curve from 430 to 450. We do not show the labor supply shift because it still would have had no effect on the wage or time worked.

4. Data and Summary Statistics

To perform the analysis we combined information from several sources. Individual information on hours, earnings, and the other factors in Table 3 came from the 1940 Census 1 percent sample from the Integrated Public Use Microdata Samples (IPUMS). We combined the individual data with county-level information compiled by Fishback, Horrace, and Kantor (2005, 2006) from the Office of Government Reports (1939), age information from Gardner and Cohen (1992, ICPSR study 0020), and various census and city and county databooks compiled in

Michael Haines' ICPSR 2896 compilation. For the study of changes in occupational status, we used Chris Boone's (2014, 2015) matches of individuals from the 5 percent IPUMS Census sample of 1930 with the 1940 Complete Census data located at the National Bureau of Economic Research.

In this study we focus on male household heads whose age ranged from 16 to 64. The summary statistics for the Census information are reported in Table 3 for men working in the private sector and for men working on public emergency relief jobs conducted by the WPA, NYA, CCC, or state or local work relief agencies who had non-zero earnings in 1939. In early April 1940, the men reported the information on occupation, employment status, and hours worked during the week of March 24-30, as well as weeks worked and annual earnings in 1939. Thus annual earnings and weekly earnings cover 1939. Annual hours worked and hourly earnings are estimated by combining the hours worked information from that March week with the earnings and weeks worked information from 1939. Thus, there will be measurement error in the hourly earnings that arises from any differences in the individual's situation in March and April 1940 and during the year 1939. When estimating the earnings and hours worked regressions for workers, the sample is limited to men who earned more than $100 over the year, $2 per week, and 10 cents per hour to avoid problems with misreporting.[10] The qualitative results when the sample sets an annual minimum of $1, weekly earnings of 2 cents and hourly earnings close to zero are similar.

The demographic profiles of regular workers and relief workers in Table 3 were quite different. Relief workers, on average, received lower earnings, worked fewer weeks, were older,

[10] About 5-6 percent of people reported that they were working and earned less than $100 in annual earnings. The number reported working with less than $2 in weekly earnings was about 2 percent and the number with less than 10 cents per hour was around 4 percent. We considered setting the minimums based on the minimum wage of 25 cents per hour from the Fair Labor Standards Act of 1938, but agricultural workers were not covered by the minimum wage law and Seltzer (1997) documents that manufacturing firms in the South found ways around the minimum. Further, we wanted to include information on people working only partial years and partial weeks.

had less schooling, rented rather than owned, had larger families with more children, and were more likely to be black, American Indian, have other family members on relief, and live in rural areas. Over 60 percent of emergency workers were working as non-farm laborers that required less skill and education. Regular workers, on the contrary, were more likely to work as operatives and craftsman, which required more skills.

Table 4 provides state level comparisons of the New Deal spending per capita as well as instruments that we use for New Deal spending, including the standard deviation in the percent Democratic votes for president between 1896 and 1932, the mean percent Democrat votes for the period, and the representation of the Congressional districts on the House Agriculture committee in 1933. The variation across counties within states is in general greater than the variation across states. The relief and public works spending distributed to the western counties and states were higher than other counties mainly because these counties had lower populations and were more likely to be federal land. Average relief and public works spending per capita was particularly low in many of the southern states. AAA farm grants were largely distributed to mid-continent states that heavily depended on farming. Table 4 and prior studies show that states with higher volatility of Democratic support tended to receive more relief and public works grants. States with higher loyalty to Democratic Party were likely to receive higher relief spending and AAA farm grants, while states with more House agricultural committee members tended to receive more AAA.

5. Empirical Model

Our goal is to measure the extent to which the labor market experiences of working age male household heads in 1939 and 1940 were influenced by several major economic events in

the counties where they lived: the Great Contraction of 1929-1933, the spike in unemployment in the Second-Dip Recession of 1937-38, and the introduction of large amounts of New Deal spending through the public works, relief, and AAA farm programs.

There are three basic types of analyses that we perform. When estimating earnings, weeks worked, and hours per week, we estimate Ordinary Least Squares (OLS) and Two-Stage Least Squares (2SLS) equations. When examining the probability of employment in various sectors, unemployment, or on emergency work relief, we estimate a multinomial analysis. A multinomial procedure is also used to estimate the transitions between 1930 and 1940 for workers at different skill levels. The estimating equations include the following variables.

$$\ln(E_{ic40}) = f(-\Delta RSC_{c29-33}), U_{c30}, U_{c37}, Relief_{c33-39}, Public\ Works_{c33-39}, AAA_{c33-39}, X_{ic40}, EconCon_{c30}, State, \varepsilon_{ic40} \quad (1)$$

E_{ic40} represents annual earnings received by individual i in county c during the calendar year 1939. We also estimate OLS and 2SLS equations for weekly earnings, hourly earnings, weeks worked, and weekly hours to see how workers and employers adjusted various parts of the employment package. In the first multinomial analysis, household heads can end up in private employment, on work relief, unemployed, self-employed, out of the workforce or in regular government employment. We included the self-employed to capture the effects of the AAA on tenants, who were considered self-employed. The regular government employment was included separately because workers on public works projects like the PWA, PRA, and PBA were considered regular government employees. In the multinomial analysis of transitions in activity between 1930 and 1940, household heads can end up in one of five options in 1940, unskilled

private employment, semi-skilled private employment, skilled private employment, on emergency work relief, or unemployed.

The measures of the Great Contraction of 1929 to 1933 are the unemployed as a share of the population in 1930 (U_{c30}), and the magnitude of the drop in county retail sales per capita between 1929 and 1933, which is measured as minus the percentage change (-ΔRSC_{c29-33}). This construction causes a deeper contraction to lead to a rise in the retail sales drop measure, just as deeper contractions lead to higher unemployment, which makes it easier to see if the coefficients of all three contraction measures have the same sign. The measure of the Second-Dip Recession is the number unemployed in 1937 as a share of population in the county in 1930 (U_{c37}).

$Relief_{c33-39}$, $Public\ Works_{c33-39}$, and AAA_{c33-39} are per capita annual average measures of New Deal county level relief spending, public works spending, and AAA funds. When we estimate 2SLS equations to control for endogeneity of the New Deal programs, predictions from first-stage equations that we describe below replace the actual values. X_{ic40} is a vector representing individual characteristics that are likely to affect earnings and working time, including age, race, schooling, farm status, home ownership, occupation, and industry categories. In the multinomial analysis of placement in unemployment, work relief, or private employment, we add information on marital status, number of children under 5, and variables that describe the economic contributions of other family members in the household X_{ic40} vector.[11]

[11] These variables include total wage from other family members, number of other family members who received more than $50 non-wage income, number of other family members who were non-paid family workers, number of other family members who were regular workers (not in public emergency projects), number of other family members who were on public emergency projects. In estimating Heckman-style wage equations that control for selection into employment, these household measures are commonly left out of the earnings regressions, so we followed that practice. A case can be made that these variables could be included in the wage and working time OLS regressions. The inclusion or exclusion of these variables had little impact on the coefficients of the New Deal and earlier contraction variables in the earnings, weeks, worked, and weekly hour regressions. We have also estimated

In estimating the equations for earnings and working time, we restrict the sample to workers in private employment to measure how the various government expenditures spilled over into the private sector. The mechanisms for how government programs influenced earnings and employment differed across private employment, work relief, regular government work, and public works spending; therefore, the restriction to private employment keeps the coefficients from conflating mechanisms in the private and public sectors. In our baseline estimates for earnings, weeks worked, and hours per week, we estimate the model while controlling for individual occupation and industry categories to determine the effects of the contractions and New Deal programs within occupations and industries.[12] We also provide estimates of the coefficients for specific groups, including rural versus urban estimates, and workers in different skill and industry categories.

$EconCon_{c30}$ is a vector of county level economic conditions in 1929-1930, including population, land area, race and age profiles, unemployment rate, retail sales per capita in 1929, and average annual earnings in retailing in 1929. The 1930 Census did not ask individuals about their earnings, so we included average annual earnings for retail workers in 1929 to control for typical earnings in the labor market before the Depression started.[13] $State$ represents a vector of state dummy variables to control for differences in state governments' contributions to welfare and public works, living costs, state tax policies, state labor laws, and other factors that were

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Heckman-style two-stage models with selection into private employment in the first stage and a wage equation like in Table 6 with inverse mills ratios. The coefficients from that model are similar to the coefficients in Table 6.

[12] We have also estimated the earnings and time worked equations without the occupation and industry dummies to measure adjustments that across occupation and industry. Comparisons of Table 6 with Appendix Table 3-1 shows that the qualitative results do not differ much between the two specifications. Most of the impact of the contractions and the New Deal programs took place within industry and occupation.

[13] We use retail annual earnings rather than manufacturing annual earnings because retail earnings were available for all counties, the Census did not report manufacturing earnings separately for roughly 600 counties to preserve confidentiality. The correlation between the two is 0.69.

common to all counties within the same state but varied across states. ε_{ic40} is a zero-mean disturbance term, containing unmeasured factors that influence earnings.

The impacts of the economic contractions and the New Deal spending programs are identified by the variation across counties, while holding constant the average earnings and unemployment in 1929/30, structural features of the county and state economy in 1929/1930 before the Depression, and the characteristics of the state that did not vary across counties. To the extent that the county averages in 1930 match up with the individual's situations in 1930, the estimation is similar to a difference in difference estimation. Had we focused on average retail earnings for the counties in 1929 and 1939 we would have been looking at the difference in earnings. Given that we are matching up individual information on earnings in the county in 1939-40 while controlling for county averages for retail annual earnings in 1929, this is like a quasi-first difference on that dimension.

The coefficient estimates for the contractions and the New Deal programs can be given a causal interpretation if we have fully controlled for endogeneity, essentially correlation between these measures and the error term. The primary form of endogeneity that scholars have worried about with the New Deal programs relates to the interaction between the contractions in the local economies and the distribution of New Deal funds. The New Deal political economy literature shows cross-sectional evidence that more New Deal spending was delivered to areas where the initial contraction was worse (Fishback, Kantor and Wallis 2003, Wallis 1998, Fleck 2008). When estimating the New Deal coefficients, we are controlling for the size of the Great Contraction and the Second-Dip, as well as nearly all of the other factors identified in the political economy literature. The challenge to causal identification arises if there is some aspect of the economy not captured by all of those measures that is correlated with both the New Deal

and the error term. We believe that the collection of correlates in the analysis makes this unlikely. For those who believe otherwise, we show the results of IV estimation using instruments from the New Deal political economy literature, which is describe in more depth in the IV section.

When examining the effects of the Great Contraction and the Second-Dip Recession, we are measuring the combined effects of the direct influence of the slumps on the private labor market in 1939/40 and the indirect influence of the slumps through their impact on economic conditions in 1939/40, while holding constant the New Deal spending activity. The correlations between New Deal spending and the contraction measures might lead to some multi-collinearity in the estimates for both, but the correlations are not high enough for the multi-collinearity to be severe.

6. Results

The effects of the earlier contractions and the New Deal programs on earnings and work opportunities in the 1939/1940 labor market are captured by the coefficients in Tables 5 and 6. Table 5 shows the marginal effects from the multinomial analysis of private employment, unemployment, and work relief. The marginal effects are determined by calculating the marginal effect for each individual in the sample and then calculating the mean of the marginal for the entire sample. On any row the marginal effects sum to zero. Table 6 shows the OLS baseline regression results for earnings and working time. Given the multiplicative nature of the natural logs of the dependent variable and the OLS estimation, in any row the coefficient in the annual earnings column is equal to the sum of the coefficients in the columns for weekly earnings and weeks worked, as well as the sum of the coefficients in the columns for hourly

earnings, weeks worked, and hours per week. Similarly, the coefficient in the weekly earnings column is equal to the sum of the coefficients in the hourly earnings and weekly hours columns. In the cases where they do not sum to zero, it is because of rounding error. The standard errors in both tables are robust and clustered at the county level in order to capture potential correlation across individuals within each county.[14] The coefficients on many of the individual characteristics are consistent with findings in other studies. For example, average annual earnings of blacks, American Indians, and other races were roughly 30 percent, 28 percent, and 15 percent lower than for whites. Annual earnings rose with more schooling and age. Men who were located in the same place in 1935 and 1940 earned 1.6 percent less and urban dwellers earned about 5.3 percent more. Migrants between 1935 and 1940 tended to earn higher earnings[15] and farm workers lower earnings. The earnings rankings in occupations matched typical patterns.

6.1 Contraction Effects

The effects of the Great Contraction and the Second-Dip Recession were still reverberating in 1939 and 1940.[16] In the multinomial analysis in Table 5 the statistically significant and negative coefficients in the private employment column and the positive and statistically significant coefficients in the emergency workers column show that the earlier contractions were associated with reductions in employment and increases in the likelihood of being unemployed or on emergency work relief in 1940 for two of the three contraction

[14] We eliminate extreme values for weekly earning and hourly earning measures. We keep individuals whose weekly earnings were less than or equal to $200 and individuals whose hourly earnings were less or equal to $10.
[15] It is possible that individual might have migrated to counties or states that received more relief and public works spending. Ideally, we want to know the community each individual had lived in during the 1930s. However, this information is not available in the 1940 Census. By controlling for whether an individual was staying in the same community during the past 5 years, we eliminate much of the endogeneity induced by across county migration.
[16] We have estimated an alternative model where we control for selection into employment by employing a Generalized Selectivity Model (GSM) introduced by Lee (1983). The coefficients for the contraction variables and the New Deal variables were very close to those in Table 5..

measures. In the earnings and time worked estimations in Table 6, all but one of the earlier contraction coefficients are negative, and all three were associated with statistically significant reductions in annual earnings.

The negative and statistically significant coefficients in Table 6 for the drop in retail sales per capita of -0.00127 for annual earnings, -0.0009 for weekly earnings, and -0.000714 for weekly earnings imply that a drop in retail sales per capita of one dollar was associated with a 0.127 percent reduction in 1939 annual earnings, a 0.09 percent reduction in 1939 weekly earnings, and a 0.07 percent drop in hourly earnings estimated with 1939 and 1940 data. A common difference for the retail sales drop across counties was one standard deviation (OSD) of 8.1 percentage points, while the mean was 51 percent. In a county where retail sales had dropped by an additional 8.1 percentage points between 1929 and 1933, annual earnings in 1939 were lower by one percent, weekly earnings were lower by 0.7 percent and hourly earnings were lower by 0.6 percent. The coefficients are also negative for weeks worked and hourly earnings, but the OSD effects are -0.3 and 0.1 percent and not statistically significant. Similarly, the multinomial coefficients in Table 5 imply that in counties where the drop in retail sales per capita was OSD lower, men were only 0.1 percent less likely to be privately employed and 0.1 percent more likely to be on work relief.

The effect of the retail sales drop was compounded by negative effects of higher unemployment in 1930 and in 1937. In Table 5 the statistically significant multinomial coefficients imply that in counties where the 1930 unemployment rate was one standard deviation of 1.1 percentage points higher, the probability of being in private employment was 0.7 percent lower, which matched the 0.7 percent higher probability of being unemployed in 1940. The statistically significant coefficients in Table 6 imply that in those same counties, annual

earnings in 1939 were lower by 1.1 percent, primarily because average weeks worked were lower by 0.65 percent.

The impact of the 1937 recession on the situation in 1939-40 was more negative. The multinomial analysis in Table 5 implies that in counties with a 1937 unemployment rate that was an OSD of 2.3 percent higher, men were 1 percent less likely to be in private employment in 1940, while the probability of being in emergency work was 0.2 percent higher and the probability of unemployment was 0.6 percent higher. The coefficients in Table 6 imply that in those counties, annual earnings were typically lower by 1.7 percent because weeks worked were lower by 1.6 percent and weekly hours were lower by 1.6 percent. The drops in working time more than offset a 1.5 percent increase in hourly earnings.

A man in a county hit by the triple whammy of an economy that was one standard deviation worse on all three dimensions was 1.8 percent less likely to be employed, 1.4 percent more likely to be unemployed and 0.3 percent more likely to be on work relief in 1940. An employed worker in that county would have earned 3.8 percent less annually and 1.3 percent less weekly while working 2.5 percent fewer weeks and 1.9 percent fewer hours per week. He could take some solace that he earned 0.5 percent more per hour. The slightly higher hourly earnings may seem contradictory, but it may have been the result of higher productivity among the workers who had retained their jobs or a sign that the county labor market was bumping into an implicit minimum.

6.2 New Deal Effects

Nearly all of the prior studies have studied the combined effects of public works and relief spending. A variety of studies have shown positive effects of relief spending on death

rates, crime, and economic activity alone and in combination with the public works, but the labor market studies have found negative or no positive effects on private employment (Fishback forthcoming). This is the first study that uses information on both types of programs to measure differences in their effects. The results in Tables 5 and 6 show that the public works programs had positive effects on earnings and work opportunities, while the relief programs generally had negative impact.

The public works programs were associated with higher earnings in the private sector largely due to more working time when employed. They had little effect on private employment while essentially substituting regular government employment for work relief that paid less and had more limited hours. The statistically significant multinomial marginal effects in Table 5 imply that men in counties with an OSD greater per capita public works spending of $54 throughout the 1930s were 0.26 more likely to be regular government employees and 0.26 percent less likely to be emergency work relief workers. The statistically significant coefficients in Table 6 imply that a worker in a county with one standard deviation of $54 more in public works spending per capita would have earned 0.5 percent more annually and 0.4 percent more weekly, largely because he worked 0.4 percent more hours per week. The results are consistent with the public works programs stimulating the demand for private goods and services while having little impact on private hourly earnings.

In contrast, relief spending had a more negative impact on the labor market. In the multinomial analysis in Table 5 workers in a county with an OSD of $44 more in relief spending per capita were 0.6 percent less likely to be in private employment, 0.2 percent less likely to be self-employed and 0.6 percent more likely to be on emergency work relief. The statistically significant coefficients in Table 6 imply that private workers in counties with OSD more in relief

spending per capita earned 1.2 percent less annually, 0.8 percent less weekly, and 1 percent less per hour while working 0.5 percent fewer weeks per year. These findings are consistent with relief spending contributing to a drop in private sector labor demand (along with a decreased implicit wage floor if there was one), skill depreciation, and/or the dismissal of relief workers in the second half of 1939.

The AAA payments had similar effects on private work opportunities and on earnings. The AAA payments to farmers to take land out of production pushed tenants, croppers, and farm workers out of agriculture (Depew, Fishback, and Rhode 2013). The statistically significant multinomial results in Table 5 show that the drop in private employment among hired workers in the agricultural sector associated with the AAA was largely offset by a rise in work relief recipients, government workers and the self-employed. Individuals in counties with OSD higher AAA per capita spending by $23.62 were 0.53 percent less likely to have private jobs, 0.1 percent more likely to be on work relief, 0.3 percent more likely to be self-employed, and 0.1 percent more likely to be in regular government work. Some of the self-employment rise may have come from a rise in farm owners chasing AAA grants. In those same counties the privately employed workers earned 1.2 percent less per year, 1.1 percent less per week, and 1.9 percent less per hour, as the drop in hourly earnings was partially offset by a rise of 0.8 percent in weekly hours. Even though the AAA was associated with the release of tenants, croppers, and workers into the work force, the dominant longer range effect of the AAA appears to have been a drop in private employment and earnings associated with a drop in the demand for private workers. If there had been an implicit wage floor, it would have had to have fallen along with the drop in demand.

6.3 Differences in Effects on Earnings and Working Time in Urban and Rural Areas

Contemporary narratives suggested that the impact of the contractions and the New Deal differed for residents in urban and rural areas. The coefficients for men who resided in urban and rural locations in Table 7 show substantial differences for the effects of New Deal programs.[17] It is clear that relief programs had more negative effects on annual, weekly, and hourly earnings and higher weekly hours for urban residents. The release of workers into the labor force by the AAA programs had much larger negative effects on earnings and larger positive effect on weekly hours for urban residents. In contrast, the effects of public works grants, which tended to be spent on large projects like dams and highways outside urban areas, had more positive effects on annual and weekly earnings for rural than for urban residents.

The effects of the contraction measures in Table 7 show that the negative effects of the Second Dip Recession in 1937 and the drop in retail sales per capita during the Great Contraction were stronger in rural than in urban areas for annual earnings and weekly earnings in 1939. The retail sales drop contributed to stronger negative effects on hourly earnings in 1939 in rural areas, while the positive effect of the 1937 unemployment rate on hourly earnings was larger in rural than in urban areas. The impact of the 1930 unemployment rate in rural areas contrasted sharply in rural and urban areas, with negative effects on all of the earnings measures in urban areas and positive effects on earnings in rural areas.

6.4 Earnings Results by Occupation

A significant share of the impact of the downturns and New Deal programs occurred within the same occupation and industry. Yet, the effects were likely to vary for occupations at

[17]The urban sample was composed of workers who reported residence in a city of more than 2,500 people, and the rest were considered rural.

different skill levels and in different sectors. Many narratives suggest that more skilled workers were more likely to keep their jobs during the downturns. Most of the opportunities in relief work were in unskilled positions, making it difficult for skilled workers who ended up on relief to maintain their skill levels. Meanwhile, the AAA program likely had different effects on the jobs of farm and non-farm laborers. To measure these effects, we report earnings coefficients for workers in specific occupations in 1940 in Tables 8 through 10. The discussion emphasizes the statistically significant coefficients.[18]

The AAA's negative effects on earnings in Table 6 carry over to nearly all occupations, as the AAA earnings coefficients were negative for all occupations and statistically significant for most in Tables 8 through 10. Relief spending primarily put statistically significant downward pressure on annual and weekly earnings for semi-skilled operatives and hourly earnings for unskilled farm laborers. The negative effects on operatives' earnings are consistent with a situation where they experienced some skill depreciation when employed as relief workers doing unskilled work rather than semi-skilled work that they likely were performing at the start of the Depression.

Public works grants helped maintain and enhance productivity of workers in blue-collar jobs. The positive effects of public works on annual earnings were concentrated among semi-skilled operatives and farm laborers, while contributing to increases in weekly and hourly earnings for craftsmen and semi-skilled operatives. There were no positive effects for professionals, managers, and sales people.

There have long been questions about the impact of the Great Contraction and the Second-Dip Recession on workers of different skill levels. Nearly all of the annual earnings

[18] We report the coefficients for weeks worked and weekly hours in Appendix Tables 3-2 and 3-3. The weeks worked coefficient can be calculated by subtracting the coefficient for weekly earnings from the coefficient for annual earnings. Similarly, the coefficient for weekly hours is the difference between the coefficients of weekly earnings and weekly hours.

coefficients in Table 8 for the downturn measures are negative. The workers hurt most by 1930 unemployment were managers, salesmen, and craftsmen, for whom a one percent increase in 1930 unemployment lowered annual earnings in 1939 by more than 2.1 percent, while managers and salesmen experienced drops in hourly earnings and weekly earnings of between 2.2 and 3.3 percent. One percent higher unemployment in 1937 in a county was associated with 0.7 percent to 1.5 percent lower annual earnings for salesmen, operatives, and both farm and nonfarm laborers. For craftsmen, sales people, and farm laborers the drop came mostly through working time because they earned more per hour where 1937 unemployment was greater.

7. Instrumenting for the New Deal

Despite simultaneously controlling for the New Deal programs, the Great Contraction and the Second Dip Recession, it might still be possible that the distribution of New Deal grants was influenced by unobserved factors in the error terms in the earnings and time worked equations. To correct for the potential endogeneity bias of the New Deal spending variables, we adopt an instrumental variable strategy using instruments from the literature on the impact of New Deal spending at the county level (Fleck 1999; Boustan, Fishback, and Kantor 2010, Fishback, Haines, and Kantor 2007, and Fishback, Horrace, and Kantor 2005 and 2006). We chose three instruments that just identify the three New Deal programs: Democratic Loyalty in presidential elections, swing voting in presidential elections, and representation on the House Agriculture Committee in January 1933 before the New Deal began. Wright (1974) found that a combination of swing voting and long run Democratic loyalty in presidential elections influenced the cross-sectional distribution of New Deal funds across states and counties, respectively. Anderson and Tollison (1991) found that representation on key Congressional committees had

strong influence at the state level, while Fishback, Kantor, and Wallis (2003) found that more representation of the county on the House Agricultural committee at the beginning of 1933 before Roosevelt entered office had powerful influence on AAA spending. Democratic loyalty is measured as the average percent voting Democrat for president between 1896 and 1932 and the swing measure is the standard deviation of the percent Democratic presidential vote over the same period. These instruments are unlikely to be correlated with the error term in the 1939-1940 outcome regressions because they are measured at least 6 or more years earlier and the economic and demographic controls and state fixed effects in the equation block any additional avenues of correlation that might arise from serial correlation. Thus, their influence likely comes only through New Deal spending.

The strengths of the instruments in the first stage are shown in Table 11 by the series of t-statistics and F-statistics in the first three columns and the variety of statistics at the bottom of the table in columns 4 through 8. The first-stage F-statistics for each individual equation all exceed 11. However, there are some worries about instrument strength with respect to identifying differential effects for different programs that arises from the statistics that capture the joint strength across all three equations. For example, the Kleibergen-Paap statistic is around 4.3, which is lower than the rule of thumb of 10 used by many scholars.[19] That low statistic implies that the instruments are somewhat weak at separating out the specific effects of each program.

[19] Baum, Schaffer, and Stillman (2007) suggests that when using the Kleibergen-Paap rk Wald statistics for testing weak identifications, one can refer to the "rule of thumb" proposed by Staiger and Stock (1997), which says that F-statistic should be at least 10 for weak identification not to be considered a weak instrumental variable.

The 2SLS New Deal coefficients in Table 16 in nearly all cases magnify the size of the OLS coefficients in Table 5. The 2SLS relief coefficients in Table 11 imply that private workers in counties with OSD more in relief spending per capita ($44) had 7 percent lower annual earnings (compared with -1.2 percent in Table 5), 3 percent lower weekly earnings (compared with -0.8 percent), and 2.8 percent lower hourly earnings (compared with -1 percent). Most of the reduction in annual earnings associated with an additional standard deviation in relief came through 4 percent fewer weeks worked in 1939 (compared with -0.5 percent). Only the coefficients for annual earning and weeks worked are statistically significant. Thus, both the OLS and 2SLS relief coefficients suggest that the dominant ways in which relief spending influenced the labor market would have come through demand crowding out, skill depreciation, or the dismissal of relief workers in the later part of 1939. Had there been a binding implicit wage floor, the wage floor would have had to have fallen as well.

AAA spending had similar damaging effects on earnings. Counties with OSD more AAA in grants per capita of $23.62 had 5.3 percent lower annual earnings (compared with -1.2 percent for OLS), 6.8 percent lower weekly earnings (-1.1 percent for OLS), and 10 percent lower hourly earnings (-1.9 percent for OLS). The reduction in annual earnings in those counties was smaller than for weekly and hourly earnings because weeks worked were 1.5 percent higher and weekly hours were 3.3 percent higher (compared with OLS percentages of -0.1 and 0.8, respectively).

A similar magnification of effects in the other direction occurs for public works per capita, but the 2SLS coefficients are not precisely estimated. In counties where there was OSD higher per capita public works spending of $54, the 2SLS coefficients imply that annual earnings were 4.5 percent higher (compared with OLS effect of 0.5 percent), weekly earnings were 5.9

percent higher (compared with 0.4 percent), and hourly earnings were 4.5 percent higher (compared with 0.04 percent). Weeks worked were 1.5 percent higher (compared with 0.06 percent), but this was offset by hours per week that were 1.5 percent higher (compared with 0.4 percent). The point estimates are consistent with demand stimulus from the public works spending.

8. Occupational Change

One of the avenues through which the contractions and the New Deal programs influenced the labor market was through their impact on skill depreciation and appreciation. Job loss during the contractions likely led to skill depreciation. The labor practices of the public works programs, which paid market wages and hired for the normal distribution of construction jobs, likely promoted skill appreciation. The relief programs combatted the skill depreciation associated with job loss but were less likely to be as effective as the public works programs because the majority of relief jobs were for unskilled work; therefore, a number of formerly skilled workers had less opportunity to maintain or enhance their prior job skills. The release of tenants, croppers, and farm workers associated with the AAA program likely also was associated with skill depreciation.

One way to capture skill appreciation or depreciation is to examine changes in occupation over time for the same workers. Christopher Boone gave us access to his linking of individuals from the 1930 5-percent Census sample with the 1940 100-percent Census sample.[20] We use the sample to estimate a multinomial logit analysis of the transition for employed workers in 1930 of three types-unskilled, semiskilled, and skilled to five categories in 1940: unskilled, semi-skilled,

[20] Boone (2014, 2015) kindly provided this linked sample to us. For more information about how the sample was constructed and what criteria were used for the linkages, readers may refer to the appendix.

skilled, emergency relief, or unemployment. We use the same covariates as in Table 5 except for the occupation and industry dummies as they are used to identify skill levels.

Table 12 is a contingency table that shows the actual transition from the three skill categories in 1930 to the five categories in 1940. The row percentages show the share of people in a specific skill category in 1930 that ended up in one of the five categories in 1940. For example, 34.24 percent of the unskilled workers in 1930 remained in unskilled jobs in 1940, 13.38 percent ended up on emergency work relief, and 10.53 percent ended up unemployed. For both semiskilled and skilled workers in 1930, over 50 percent of them remained in the same skill category in 1940 while about 7 percent of them ended up unemployed and 5 to 6 percent ended up on emergency work relief.

8.1 Effects of the Earlier Contractions

In general, the effects of the earlier contractions increased the probabilities that the employed workers in 1930 would end up unemployed or on work relief, while reducing the likelihood of rising to a higher occupation and increasing the likelihood of ending up in a lesser occupation. The marginal effects in Tables 13 through 15 are calculated in the same way as the marginal effects for the multinomial analysis in Table 5, and the coefficients in each row sum to zero. In discussing the magnitudes of the results, we focus on statistically significant coefficients.

Workers who were unskilled in 1930 in Table 13 were 1.6 percent more likely to end up unemployed in 1940 in counties with an OSD higher unemployment rate in 1930. When the 1929-1933 drop in retail sales was an OSD larger they were 0.5 percent more likely to end up on work relief, 0.6 percent more likely to remain in unskilled jobs in 1940, and 1 percent less likely to move into semi-skilled or skilled jobs. Finally, in counties where the 1937 unemployment

rate was an OSD higher, they were 0.8 percent less likely to rise to skilled jobs, 0.6 percent more likely to be on work relief, and 1 percent more likely to end up on unemployment in 1940.

Workers who were semi-skilled in 1930 in Table 14 were 1.3 percent less likely to rise to skilled positions and 1.1 percent more likely to end up unemployed in 1940 in counties where the unemployment rate was OSD higher in 1930. In counties where the unemployment rate in 1937 was an OSD higher, they were one percent less likely to end up in semi-skilled or unskilled jobs but unfortunately 1.1 percent more likely to end up unemployed in 1940.

The 1930 skilled workers in Table 15 in counties where the 1937 unemployment rate was one standard deviation higher were 1.3 percent less likely to remain in skilled employment in 1940, 0.6 percent more likely to be in unskilled work, and 0.8 percent more likely to be unemployed. Where the drop in retail sales per capita was greater by OSD, the skilled workers were 0.4 percent more likely to end up on work relief but 0.8 percent less likely to drop to semi-skilled employment. Where 1930 unemployment was an OSD higher, the 1930 skilled were 0.9 percent more likely to drop to semi-skilled employment.

8.2 New Deal Impact

Our estimates of the relationship between the New Deal and occupation reported in 1940 is less troubled by simultaneity than the estimates of the impact on earnings and weeks worked because the New Deal information ends in June 1939 and the information on occupation is from April 1, 1940. Per capita relief programs were associated most with shifting employed workers in 1930 on to work relief in 1940 and were not associated with advances upward to more skilled positions. In counties with OSD more relief per capita 1930 unskilled workers were 1.6 percent more likely to be on work relief in 1940, while semi-skilled and skilled workers from 1930 were both 1 percent more likely to end up on work relief in 1940. In those same counties 1930

unskilled workers were 1.6 percent less likely to move up to semi-skilled or skilled positions in 1940, 1930 semi-skilled workers were 1.3 percent less likely to move up to skilled positions in 1940, and 1940 skilled workers were 0.7 percent less likely to still be in a skilled position in 1940.

The relationship of occupational mobility with public works spending was more positive than relief spending with respect to opportunities to move up but more negative in terms of workers ending up unemployed in 1940. On the positive side, in areas with OSD more in public works spending per capita, the 1930 unskilled and 1930 semiskilled were both 0.5 percent more likely to rise to a skilled occupation and the 1930 skilled were 0.4 percent more likely to remain in skilled positions. In those same counties, however, the probability of being unemployed in 1940 was 0.4 percent higher for the 1930 unskilled, and 0.3 percent higher for the 1930 semi-skilled.

The AAA program also had mixed effects. In areas with OSD more in AAA spending, the semi-skilled of 1930 were 1.7 percent less likely to stay in semi-skilled jobs. Some did better, as their probability of obtaining a skilled job was higher by 0.5 percent, but others fared poorly as the probability of taking an unskilled job was higher by 0.4 percent and the probability of unemployment was higher by 0.5 percent. Similarly, in those same counties, some 1930 unskilled fared better with a 0.36 percent higher probability of being in skilled jobs, but they were 0.35 percent more likely to end up on emergency relief. None of the AAA coefficients were statistically significant for the 1930 skilled workers in Table 15, but they imply that one standard deviation more in AAA spending raised the probability of staying in a skilled position in 1940 by 0.7 percent.

9. Conclusions

The Great Depression and the New Deal were extraordinary events in U.S. economic history. We estimate reduced form coefficients that show the medium-run effects of the Great Contraction and the Second-Dip Recession of the 1930s, as well as the concurrent and medium run effects of New Deal programs on earnings, time worked, employment status, and transition between skill levels for individuals in 1939-1940. The coefficients show the net effects of a variety of factors, including demand stimulus, crowding out, productivity effects, skill transition effects, and a major layoff from WPA projects. When examining earnings and working time, we estimated OLS regressions and 2SLS regressions with instruments for the New Deal variables. The 2SLS results for the New Deal variables suggest that the OLS effects likely understate the absolute value of the magnitudes of the coefficients.

The results show that the contractions in 1929-1933 and in 1937-1938 continued to have powerful negative effects in 1939-1940. Men in counties where the contractions were worse had fewer work opportunities and lower annual and weekly earnings. A man in a county hit by the triple whammy of an economy that was one standard deviation worse on all three dimensions was 1.8 percent less likely to be employed, 1.4 percent more likely to be unemployed and 0.3 percent more likely to be on work relief in 1940. If he was employed, he would have earned 3.8 percent less annually and 1.3 percent less weekly while working 2.5 percent fewer weeks and 1.9 percent fewer hours per week. The one solace was that his hourly earnings would have been 0.5 percent higher.

There have long been questions about the impact of the Great Contraction on workers of different skill levels. We performed a multinomial logit analysis of transitions by individuals from employment at three skill levels in 1930 to skill levels, unemployment, and work relief in

1940. The results show that unskilled, semiskilled, and skilled workers in counties hit harder by the earlier contractions all faced substantially higher probabilities of being unemployed in 1940. Further, the contractions stifled their opportunities to move to more skilled jobs. Among the workers who were employed in 1940, the strongest long term negative effects of the Great Contraction on annual earnings were felt by workers in the upper part of the occupational distribution, including professionals, managers, craftsmen, and sales people. In contrast, in counties where the 1937-1938 recession was worse, annual earnings declined more for workers in jobs in the lower part of the skill distribution.

To combat the contractions, President Roosevelt and Congress distributed large amounts of grants in three major categories, public works, relief, and AAA farm payments to take land out of production. The public works programs, which hired workers of all kinds at full wages, generally had positive effects on private labor markets. In counties with more public works spending per capita, annual and weekly earnings and weeks worked were higher but the probability of private employment in 1940 was largely unchanged. The public works appear to have replaced the relief jobs that had limited hours and lower earnings with regular government employment at higher earnings. In areas with more public works spending, workers had higher probabilities of moving into more skilled positions over the course of the decade, but this was offset to some degree by a higher probability of becoming unemployed.

In contrast, the relief programs were associated with lower probabilities of employment in the private sector and lower probabilities of moving up to or staying in skilled occupations jobs between 1930 and 1940. For those who were employed, the relief programs were associated with lower earnings and no statistically significant changes in time worked in ways consistent

with reductions in private sector labor demand, depreciation of skills, and a rise in labor supply associated with the WPA layoffs in 1939.

Similarly, the AAA spending in the 1930s was associated with lower probabilities of private employment and lower annual, weekly, and hourly earnings. The effects on the probability of transitioning to higher skill levels between 1930 and 1940 were mixed, probably because the range of skills among the farm workers pushed out of agriculture by the AAA was so varied.

The persistently high unemployment rates in the 1930s make it difficult to identify which of many changes were the dominant factors that lead to the results found here for private labor markets. In an equilibrium supply and demand model with few frictions, the negative effects on work opportunities and earnings associated with the earlier contractions and the relief and AAA would imply that a reduction in labor demand was their dominant impact. Meanwhile, the impacts of the public works programs are somewhat puzzling because annual and weekly earnings in private employment rose due to more working time, but hourly earnings and the probability of private employment was largely unchanged.

The persistently high unemployment throughout the 1930s raises questions about an equilibrium model. We discussed a model with an implicit wage floor. Given the drops in earnings associated with the contractions, relief, and AAA, it is clear that any binding implicit floor would have had to have fallen along with demand in areas where the contractions were deeper and relief and AAA grants per capita were larger. Meanwhile, the results for public works seem consistent with a setting in which public works spending did not change the hourly earnings implicit floor. The public works programs had the unusual effect of increasing hours worked in private markets but had no impact on overall private employment. The results suggest

that the public works jobs replaced the work relief jobs and thus raised the pay and work hours for workers who were able to make the transition from work relief to regular government employment on the public works projects.

References:

Acemoglu, Daron, and David Autor. 2011. "Skills, Tasks and Technologies: Implications for Employ- ment and Earnings." In *Handbook of Labor Economics*, Vol. 4, Part B, edited by Orley Ashenfelter and David Card, 1043–1171. Amsterdam: Elsevier.

Anderson, G. M., and Tollison, R. D. 1991. 'Congressional Influence and Patterns of New Deal Spending, 1933-1939', *Journal of Law and Economics*, 34 (April): 161-75.

Angrist, Joshua D., and Jörn-Steffen Pischke. *Mostly harmless econometrics: An empiricist's companion*. Princeton university press, 2009.

Barro, Robert J. "Human capital and growth." *American Economic Review* (2001): 12-17.

Becker, Gary S., Kevin M. Murphy, and Robert Tamura. "Human capital, fertility, and economic growth." *Human Capital: A Theoretical and Empirical Analysis with Special Reference to Education (3rd Edition)*. The University of Chicago Press, 1994. 323-350.

Benjamin, Daniel and Mathews, Kent. 1992 *U.S. and U.K. Unemployment Between the Wars: A Doleful Story*. Institute for Economic Affairs, London.

Baum, Christopher F., Mark E. Schaffer, and Stephen Stillman. "rEnhanced routines for instrumental variables." *GMM estimation and testings, Stata Journal* 7.4 (2007): 465.

Boone, Christopher. 2015. "The Agricultural Sector in Crisis: Farm Out-Migration in the Great Depression." Working Paper. Columbia University.

Boone, Christopher and Laurence Wilse-Samson. 2014. "Modernization, Rural Migration, and Market Withdrawal: Evidence from the Great Depression." Working Paper, Columbia University.

Boustan, Leah, Fishback, Price, and Kantor, Shawn. 2010. "The Effect of Internal Migration on Local Labor Markets: American Cities During the Great Depression." *Journal of Labor Economics 28* (October): 719-746

Cole, H., and L. Ohanian. "The Great Depression in the United States from a neoclassical perspective." *Handbook of Monetary and Fiscal Policy* 159 (2001).

Denison, Edward Fulton. *Trends in American economic growth, 1929-1982*. Brookings Institution Press, 1985.

Depew, Briggs, Price V. Fishback, and Paul W. Rhode. "New deal or no deal in the Cotton South: The effect of the AAA on the agricultural labor structure." *Explorations in Economic History* 50.4 (2013): 466-486.

Eggertsson, Gauti. 2012. "Was the New Deal Contractionary." *American Economic Review* 102 (February): 524-555.

Field, Alexander J. *A great leap forward: 1930s depression and US economic growth*. Yale University Press, 2011.

Fleck, Robert K. "The marginal effect of New Deal relief work on county-level unemployment statistics." *The Journal of Economic History* 59.03 (1999): 659-687.

Fishback, Price. "How Successful Was the New Deal? The Microeconomic Impact of New Deal Spending and Lending Policies" *Journal of Economic Literature.* Forthcoming.

Fishback, Price. "US Monetary and Fiscal Policy in the 1930s." *Oxford Review of Economic Policy* 26.3 (2010): 385-413.

Fishback, Price. "What Was New About the New Deal?" The Great Depression of the 1930s: Lessons for Today, edited by Nicolas Crafts and Peter Fearon. Oxford, England: Oxford University Press, 2013, with John Joseph Wallis, pp. 290-327.

Fishback, Price V., Michael R. Haines, and Shawn Kantor. "Births, deaths, and New Deal relief during the Great Depression." *The Review of Economics and Statistics* 89.1 (2007): 1-14.

Fishback, Price, Michael Haines, Paul Rhode. 2012. "The Impact of the AAA on Farm Wages." Unpublished Working Paper presented at the NBER Summer Institute, July.

Fishback, Price V., 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 (2005): 36-71.

Fishback, Price V.; Horrace, William C.; and Kantor, Shawn, "The Impact of New Deal Expenditures on Mobility During the Great Depression" (2006). Economics Faculty Scholarship.

Fishback, Price V., Shawn Kantor, and John Joseph Wallis. "Can the New Deal's three Rs be rehabilitated? A program-by-program, county-by-county analysis." *Explorations in Economic History* 40.3 (2003): 278-307.

Fishback, Price V., et al. "Information and the impact of climate and weather on mortality rates during the Great Depression." *The Economics of Climate Change: Adaptations Past and Present*. University of Chicago Press, 2011. 131-167.

Fishback, Price, and Valentina Kachanovskaya. "The multiplier for federal spending in the states during the great depression." *The Journal of Economic History* 75.01 (2015): 125-162.

Fleck, Robert K. "The marginal effect of New Deal relief work on county-level unemployment statistics." *The Journal of Economic History* 59.03 (1999): 659-687.

_____. 2008. "Voter Influence and Big Policy Change: The Positive Political Economy of the New Deal." *Journal of Political Economy* : 1-37.

Gardner, J., Cohen, W., 1992. Demographic Characteristics of the Population of the United States, 1930–1950: County-Level. ICPSR file 0020.

Goldin, Claudia. "America's graduation from high school: The evolution and spread of secondary schooling in the twentieth century." *The Journal of Economic History* 58.02 (1998): 345-374.

Haines, Michael R., and Inter-university Consortium for Political and Social Research. Historical, Demographic, Economic, and Social Data: The United States, 1790-2002. ICPSR02896-v3. Ann

Arbor, MI: Inter-university Consortium for Political and Social Research [distributor], 2010-05-21.

Hauser, Philip Morris, and Bruce LeRoy Jenkinson. "Workers on relief in the United States in March 1935." (1938).

Hausman, Joshua. 2015. “Fiscal Policy and Economic Recovery: The Case of the 1936 Veterans’ Bonus.” Working Paper University of Michigan.

Hawkins, Jennifer. 2014. “Preliminary Work on Antitrust Enforcement

Heckman, James J. "Sample selection bias as a specification error." *Econometrica: Journal of the econometric society* (1979): 153-161.

Hornbeck, Richard. 2012. “The Enduring Impact of the American Dust Bowl: Short- and Long-Run Adjustments to Environmental Catastrophe.” *American Economic Review* 102 (June): 1477-1507.

Howard, Donald S. *The WPA and federal relief policy*. New York: Russell Sage Foundation (1943).

Hurt, R. Douglas, *Problems of Plenty: The American Farmer in the Twentieth Century*, (Chicago: Ivan R. Dee, 2002), 67.

Kachanovskaya, Valentina. “New Deal: Distribution and Impact of Funds in the States.” Unpublished Ph.D. Dissertation. University of Arizona, 2016.

Keane, M. (2011), “Labor Supply and Taxes: A Survey”, *Journal of Economic Literature*, 49, 961-1075.

Kline, Patrick and Moretti, Enrico. 2014. “Local Economic Development, Agglomeration Economies and the Big Push: 100 Years of Evidence from the Tennessee Valley Authority.” *Quarterly Journal of Economics* 129(1), 275-331.

Lee, Lung-Fei. "Generalized econometric models with selectivity." *Econometrica: Journal of the Econometric Society* (1983): 507-512.

Levine, Linda. "The labor market during the Great Depression and the current recession." Congressional Research Service, Library of Congress, 2009.

Margo, Robert, “Employment and Unemployment in the 1930s.” *Journal of Economic Perspectives* 7 (Spring 1993), 41-59.

Margo, Robert A. "The microeconomics of depression unemployment." *The Journal of Economic History* 51.02 (1991): 333-341.

McGuire, Erin. “Teenage Wasteland: The Great Depression’s Impact on Asset Preferences Later in Life.” Working Paper, University of Arizona, 2015.

Meghir, C and D Phillips (2010), “Labour Supply and Taxes”, in T Besley, R Blundell, M Gammie, and J Poterba (eds.), *Dimensions of Tax Design: the Mirrlees Review*. Oxford University Press, 202-274.

Moretti, Enrico. 2012. *The new geography of jobs*. Houghton Mifflin Harcourt.

Moulton, Jeremy. 2016. “The Great Depression Of Income: Historical Estimates of the Long-Term Effect of Entering the Labor Market During a Recession.” Working Paper at University of North Carolina Department of Public Policy.

Neumann, Todd C., 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* 70.01 (2010): 195-220.

Neumann, Todd, Jason Taylor, and Price Fishback. 2013. **"**Comparisons of Weekly Hours Over the Past Century and the Importance of Work Sharing Policies in the 1930s," *American Economic Review Papers and Proceedings* 102 (May): 105-110.

Schultz, Theodore W. "Investment in human capital." *The American economic review* (1961): 1-17.

Seltzer, Andrew. 1997. "The Effects of the Fair Labor Standards Act of 1938 on the Southern Seamless Hosiery and Lumber Industries." *Journal of Economic History* 57 (June): 396-415.

Shepherd, Susan M., and Bancroft, Gertrude, Survey of Cases Certified for Works Program Employment in 13 Cities. WPA, Series IV, no. 2, Government Printing Office, Washington, 1937, p. 5.

Sorensen, Todd, Fishback, Price, Kantor, Shawn, and Rhode, Paul. 2011. "The New Deal and the Diffusion of Tractors in the 1930s." Working paper, University of Arizona.

Staiger, D., and J. H. Stock. 1997. Instrumental variables regression with weak instruments. Econometrica 65: 557–86.

Stuart, Bryan. 2016. "The Long-Run Effects of Recessions on Education and Income." University of Michigan Working Paper.

Taylor, Jason. 2011. "Work-Sharing During the Great Depression: Did the 'President's Reemployment Agreement' Promote Reemployment?" *Economica* 78: 133-158.

Taylor and Neumann. "Recovery Spring, Faltering Fall: March to November 1933." *Explorations in Economic History*. Forthcoming.

Thomasson, Melissa and Price Fishback. "Hard Times in the Land of Plenty: The Effect on Income and Disability Later in Life for People Born During the Great Depression." *Explorations in Economic History* 54 (October 2014): 64-78.

US Office of Government Reports, Statistical Section, 1940. Report No. 10, volume 1, County reports of estimated federal expenditures, March 4, 1933–June 30, 1939. Mimeo.

Wallis, John J. 1998. "The Political Economy of New Deal Spending Revisited, Again: With and Without Nevada." *Explorations in Economic History* 35 (April), 140-70.

Wallis, John Joseph, and Daniel K. Benjamin. "Private employment and public relief during the Great Depression." *Department of Economics, University of Maryland working paper* (1989).

Wright, Gavin. 1974. "The Political Economy of New Deal Spending: An Econometric Analysis," *Review of Economics and Statistics* 56 (February):

Figure 1

Changes in Wage Rates and Employment with Shifts in Demand or Changes in Implicit Wage Floor in a Wage Floor Model

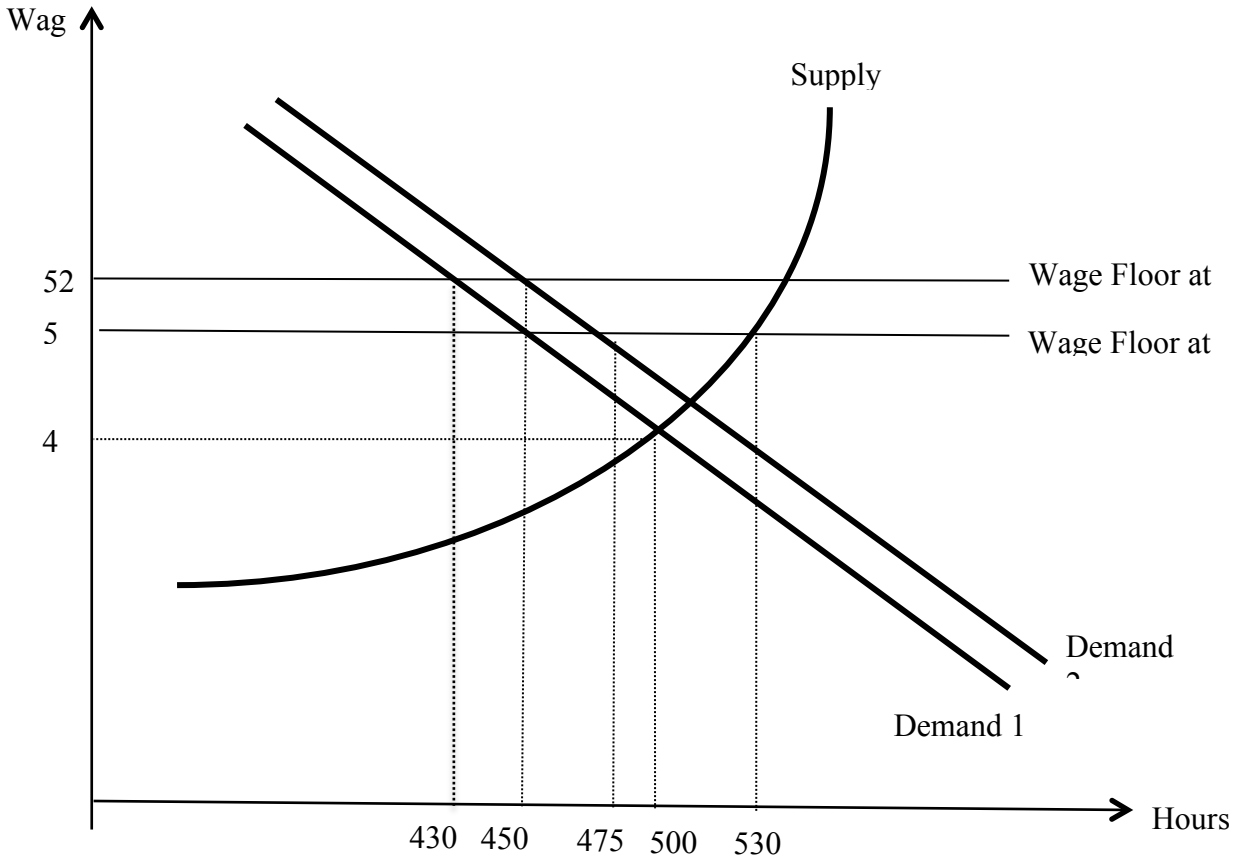


Table 1: Predictions for Hourly Earnings and Total Hours Worked in Private Employment Associated with Changes in New Deal Grants Under Different Models of the Labor Market

	Hourly Earnings	Total Hours
Equilibrium Supply and Demand:		
Demand Stimulus	Rise	Rise
Demand Crowding Out	Fall	Fall
Productivity Increase	Rise	Rise
Skill Depreciation	Fall	Fall
Labor Supply Crowd Out	Rise	Fall
Dismissal of Relief Workers in 1939	Fall	Rise
Fixed Implicit Wage Minimum:		
Demand Stimulus	Same	Rise
Demand Crowding Out	Same	Fall
Productivity Increase	Same	Rise
Skill Depreciation	Same	Fall
Labor Supply Crowd Out	Same	Same
Dismissal of Relief Workers in 1939	Same	Same
Implicit Wage Minimum Changes in the Same Direction as Wages Change from Change in Demand or Supply:		
Demand Stimulus	Rise	Uncertain
Demand Crowding Out	Fall	Uncertain
Productivity Increase	Rise	Uncertain
Skill Depreciation	Fall	Uncertain
Labor Supply Crowd Out	Rise	Fall
Dismissal of Relief Workers in 1939	Fall	Rise

Table 2: Distribution of Male Emergency Workers' Usual Occupations from 1935 Relief Survey and Their Occupations Listed in the 1940 Census

	Relief Survey 1935			1940 Census 100 Percent Sample	
Usual Occupation	Number	Percent	Occupation	Male	Male Percent
White-collar workers			***White-collar workers***		
Professional and technical workers	48,799	1.21	Professional, Technical	46,904	2.53
Proprietors, managers, and officials	75,289	1.86	Managers, Officials, and Proprietors	30,383	1.64
Office workers	127,729	3.16	Clerks	98,562	5.31
Sales and kindred workers	124,295	3.07	Sales Workers	43,260	2.33
Manual workers			***Manual workers***		
Skilled workers and foremen	733,686	18.14	Craftsman	212,132	11.43
Semiskilled and unskilled workers	1,828,861	45.21	Operatives	162,501	8.76
			Non-Farm Laborers	1,078,512	58.12
Domestic and personal service workers	169,301	4.19	Service Workers (Private HH)	3,488	0.19
			Service Workers (Non-HH)	81,055	4.37
Agricultural workers			***Agricultural workers***		
Farm operators	453,849	11.22	Farmers	38,653	2.08
Farm laborers	483,524	11.95	Farm Laborers	17,134	0.92
			Farm Laborers, Wage Workers	43,212	2.33
Total	4,045,333	100	**Total**	1,855,796	100.01

Sources: Hauser (1938) and IPUMS 100-Percent 1940 Census.

Table 3: Summary Statistics for Individual Characteristics in the 1940 Census Sample for Regular Workers and Emergency Relief Workers

	Regular Workers				Emergency Workers				
	Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Min	Max	Difference in Means
Dependent Variables:									
Annual Earnings ($)	1,430.774	975.431	100	5001	527.938	379.576	100	5001	-902.837***
Weekly Earnings ($)	30.433	19.172	2	200	15.001	10.868	2	184	-15.432***
Estimated Hourly Earnings ($)	0.770	0.608	0.1	10					
# of Weeks Worked (1939-1940)	46.086	11.568	0	52	34.322	14.741	0	52	-11.763***
# of Hours Worked (Mar 24-30 1940)	46.635	13.351	1	98					
Demographic Profile:									
# of Fam Members in HH	3.877	2.031	1	29	4.440	2.374	1	18	0.564***
Age	41.932	11.286	16	65	41.723	11.841	16	65	-0.210**
White	0.915	0.279	0	1	0.872	0.334	0	1	-0.043***
Black	0.082	0.274	0	1	0.121	0.327	0	1	0.040***
American Indian	0.001	0.038	0	1	0.006	0.076	0	1	0.004***
Other Race	0.002	0.042	0	1	0.000	0.021	0	1	-0.001***
Urban	0.546	0.498	0	1	0.506	0.500	0	1	-0.039***
Rural	0.454	0.498	0	1	0.494	0.500	0	1	0.039***
No School	0.029	0.168	0	1	0.038	0.191	0	1	0.009***
Below Grade 6	0.208	0.406	0	1	0.360	0.480	0	1	0.152***
6 < Grade <= 12	0.647	0.478	0	1	0.569	0.495	0	1	-0.078***
Some College	0.116	0.320	0	1	0.032	0.176	0	1	-0.084***
Live at the Same Community	0.820	0.384	0	1	0.847	0.360	0	1	0.027***
Farm Status	0.238	0.426	0	1	0.165	0.371	0	1	-0.073***
Rent Dwelling	0.584	0.493	0	1	0.737	0.441	0	1	0.153***
Marital Status	0.938	0.240	0	1	0.935	0.247	0	1	-0.004*
# of Children under 5	0.346	0.663	0	5	0.573	0.854	0	6	0.227***
Other Fam Member: Total Wage ($)	300.459	642.231	0	11300	133.620	376.709	0	5892	-166.839***
Other Fam Member: # who Recieved > $50 Non-Wage Income	0.194	0.503	0	10	0.132	0.407	0	5	-0.062***
Other Fam Member: # of Non-Paid Family Worker	0.058	0.311	0	11	0.013	0.133	0	4	-0.045***
Other Fam Member: # who At Work	0.491	0.799	0	12	0.239	0.569	0	5	-0.252***
Other Fam Member: # who on Emergency Relief	0.016	0.133	0	4	0.070	0.286	0	3	0.055***
Occupation Categories:									
Professional/Technical	0.058	0.234	0	1	0.021	0.144	0	1	-0.037***

Farmers	0.181	0.385	0	1	0.009	0.092	0	1	-0.173***
Managers/Officials/Proprietors	0.117	0.321	0	1	0.010	0.099	0	1	-0.107***
Clerical	0.061	0.238	0	1	0.055	0.229	0	1	-0.005**
Sales workers	0.059	0.235	0	1	0.002	0.048	0	1	-0.056***
Craftman	0.170	0.376	0	1	0.129	0.335	0	1	-0.041***
Operative	0.179	0.384	0	1	0.073	0.260	0	1	-0.106***
Service Workers (private household)	0.003	0.055	0	1	0.001	0.029	0	1	-0.002***
Service Workers (non HH)	0.052	0.222	0	1	0.032	0.176	0	1	-0.020***
Farm laborers	0.035	0.184	0	1	0.012	0.111	0	1	-0.023***
Non-farm laborers	0.082	0.274	0	1	0.649	0.477	0	1	0.567***
Industry Categories:									
Agriculture/Forestry/Fishing	0.223	0.417	0	1	0.045	0.208	0	1	-0.178***
Mining	0.031	0.172	0	1	0.027	0.162	0	1	-0.003**
Construction	0.065	0.246	0	1	0.762	0.426	0	1	0.697***
Manufacturing	0.248	0.432	0	1	0.029	0.168	0	1	-0.219***
Transportation/Communication/Other utilities	0.092	0.289	0	1	0.013	0.114	0	1	-0.079***
Wholesale	0.031	0.173	0	1	0.001	0.036	0	1	-0.030***
Retail Trade	0.126	0.331	0	1	0.009	0.092	0	1	-0.117***
Finance/Insurance/Real Estate	0.031	0.175	0	1	0.002	0.046	0	1	-0.029***
Business & Repair Services	0.023	0.151	0	1	0.004	0.060	0	1	-0.020***
Personal Services	0.032	0.176	0	1	0.004	0.067	0	1	-0.027***
Entertainment	0.009	0.093	0	1	0.011	0.103	0	1	0.002**
Prefessional and Related	0.043	0.203	0	1	0.020	0.140	0	1	-0.023***
Public Administration	0.037	0.189	0	1	0.050	0.218	0	1	0.013***

Note: There were 134,943 nonemergency workers and 12,236 emergency workers in the sample. Asterisks mark whether mean difference is statistically significant at different levels. * p<0.10, ** p<0.05, *** p<0.00.

Table 4: Means for Counties in Each State of New Deal Grants Per Capita and Instruments

	Relief Per Capita (1933-1939)	Public Works Per Capita (1933-1939)	AAA Per Capita (1933-1939)	Std.Dev. Of % Democratic Vote for President, 1896-1932	Mean % Democratic Vote for President, 1896-1932	Membership in House Agriculture Committee, Jan. 1933
New England:						
Connecticut	56	46	2	7.3	37.7	0.000
Maine	52	66	1	14.2	37.8	0.313
Massachusetts	108	44	1	10.6	31.9	0.000
New Hamshire	47	32	1	7.4	38.2	0.600
Rhode Island	59	87	0	9.4	35.4	0.000
Vermont	38	42	3	8.9	26.0	0.000
Mid-Atlantic:						
Delaware	41	60	9	5.1	45.5	0.000
New Jersey	89	36	1	8.3	37.2	0.000
New York	55	45	3	6.8	35.3	0.069
Pennsylvania	102	28	2	8.8	35.9	0.031
East North Central:						
Illinois	79	34	37	8.9	40.8	0.010
Indiana	70	27	31	5.5	46.1	0.000
Michigan	107	42	10	12.1	31.5	0.072
Ohio	85	29	18	8.7	43.1	0.172
Wisconsin	85	41	17	16.7	34.4	0.143
West North Central:						
Iowa	33	33	81	12.9	37.6	0.263
Kansas	60	38	174	11.9	40.6	0.305
Minnesota	75	41	48	17.0	34.2	2.000
Missouri	59	28	38	7.4	50.1	0.000
Nebraska	46	39	109	13.1	44.5	0.000
North Dakota	89	47	143	19.6	35.8	0.000
South Dakota	118	51	122	17.1	40.0	0.000
South:						
Virginia	23	41	8	10.0	62.3	1.000
Alabama	33	21	25	13.5	70.2	0.000
Arkansas	55	22	31	11.6	65.3	0.160
Florida	83	35	8	13.2	65.0	0.000
Georgia	28	27	22	15.5	72.3	0.000
Louisiana	44	27	29	11.7	80.9	0.000
Mississippi	40	22	26	7.4	88.2	0.122
North Carolina	32	26	17	9.7	58.9	0.000

South Carolina	52	29	22	5.0	94.1	0.174
Texas	44	44	72	16.5	69.8	0.252
Kentucky	55	20	27	6.3	50.0	1.000
Maryland	40	50	11	7.1	47.5	0.000
Oklahoma	78	35	63	13.2	50.8	0.000
Tennessee	36	20	19	7.4	53.2	0.179
West Virgina	97	21	3	5.2	46.4	0.000
Mountain:						
Arizona	91	398	10	12.7	50.0	0.000
Colorado	105	85	37	17.5	49.8	0.302
Idaho	87	71	57	18.6	44.6	0.000
Montana	109	107	93	16.0	42.5	0.000
Nevada	89	494	9	19.2	51.6	0.000
New Mexico	95	120	29	10.0	49.5	0.000
Utah	92	105	18	16.7	47.0	0.000
Wyoming	96	126	38	12.9	39.9	0.000
Pacific:						
California	72	91	17	15.7	41.0	0.086
Oregon	52	79	51	11.6	39.5	0.500
Washington	77	66	54	15.6	37.0	0.000

Table 5: Marginal Effects from Multinomial Logit of Employment Status in 1940

	(1)	(2)	(3)	(4)	(5)	(6)
	Regular, Private Workers	Emergency Workers	Unemployed	Self-Employed	Not in the Labor Force	Regular, Government Workers
New Deal Grants in County						
Relief Per Capita 1933-1939	-0.000130*	0.000136***	0.0000158	-0.0000566**	0.000000402	0.0000352
	(0.0000512)	(0.0000160)	(0.0000278)	(0.0000221)	(0.00000249)	(0.0000310)
Public Works Per Capita 1933-1939	-0.0000179	-0.0000484***	0.00000171	0.0000159	0.000000767	0.0000478**
	(0.0000202)	(0.0000126)	(0.00000793)	(0.000012)	(0.00000241)	(0.0000160)
AAA Per Capita 1933-1939	-0.000224***	0.0000329*	0.000000742	0.000136***	0.00000147	0.0000532*
	(0.0000465)	(0.0000155)	(0.0000255)	(0.0000261)	(0.00000328)	(0.0000218)
Contraction Measures for County						
% Pop Unemployed in 1930	-0.00618*	0.0000223	0.00663***	0.0001599	-0.0000346	-0.000600
	(0.00264)	(0.000921)	(0.00167)	(0.0011435)	(0.000163)	(0.00122)
% Drop in Retail Sales per Cap from 1929 to 1933	-0.000120	0.000129*	-0.0000423	0.0000739	0.00000499	-0.0000453
	(0.000118)	(0.0000583)	(0.0000801)	(0.0000784)	(0.0000103)	(0.0000936)
% Pop Unemployed in 1937	-0.00441***	0.000984***	0.00290***	-0.00000287	0.00000992	0.000522
	(0.000622)	(0.000256)	(0.000389)	(0.0003868)	(0.0000405)	(0.000418)
Exclusion Restrictions						
Marital Status	0.0248***	-0.000854	-0.0236***	-0.011358***	-0.000332	0.0113***
	(0.00321)	(0.00166)	(0.00185)	(0.0026637)	(0.000283)	(0.00166)
# of Children under 5	-0.00854***	0.00314***	0.00561***	0.0034458***	0.000226	-0.00390***
	(0.00118)	(0.000509)	(0.00107)	(0.001058)	(0.000136)	(0.000676)

Other Fam Member: Total Wage ($)	0.00000684***	-0.0000114***	0.00000815***	-0.00000867***	0.000000312	0.00000474***
	(0.00000148)	(0.00000128)	(0.000000880)	(0.00000128)	(0.000000182)	(0.000000944)
Other Fam Member: # who Received > $50 Non-Wage Income	-0.0152***	-0.00173*	0.00614***	0.0125606***	0.000155	-0.00193*
	(0.00151)	(0.000801)	(0.00106)	(0.0010172)	(0.000140)	(0.000879)
Other Fam Member: # of Non-Paid Family Worker	-0.0950***	0.0130***	-0.0213***	0.0972643***	0.000608	0.00548
	(0.00777)	(0.00299)	(0.00608)	(0.0046473)	(0.000599)	(0.00426)
Other Fam Member: # who At Work	0.00385**	-0.00799***	-0.00226*	0.0087766***	-0.000000965	-0.00237**
	(0.00131)	(0.000902)	(0.000970)	(0.0008865)	(0.000127)	(0.000866)
Other Fam Member: # who on Emergency Relief	-0.0341***	0.0211***	0.0310***	-0.0063066	0.000661*	-0.0124***
	(0.00496)	(0.00170)	(0.00217)	(0.004881)	(0.000331)	(0.00285)
Individual Characteristics	Y	Y	Y	Y	Y	Y
Occupation and Industry Categories	Y	Y	Y	Y	Y	Y
Economic Conditions (1929-1930)	Y	Y	Y	Y	Y	Y
State Dummies	Y	Y	Y	Y	Y	Y
Observations	266120	266120	266120	266120	266120	266120

Note: Standard errors in parentheses. Standard Errors are clustered at the county level. * p<0.10, ** p<0.05, *** p<0.01.

Table 6: OLS Estimation of Effects of Contractions and New Deal Grants on Logged Individual Earnings and Time Worked

		(1)	(2)	(3)	(4)	(5)
		Coefficients (Standard Errors				
	Mean (SD)	Log Annual Earnings	Log Weekly Earnings	Log Weeks Worked	Log Weekly Hours	Log Est. Hourly Earnings
New Deal Grants in County						
Relief Per Capita 1933-1939	90.50	-0.000280***	-0.000174**	-0.000106*	0.0000490	-0.000223**
	(44.06)	(0.0000871	(0.0000800	(0.0000548	(0.0000566	(0.000103
Public Works Per Capita 1933-1939	31.82	0.0000906*	0.0000801**	0.0000105	0.0000731***	0.00000699
	(54.09)	(0.0000540	(0.0000381	(0.0000239	(0.0000227	(0.0000328
AAA Per Capita 1933-1939	9.102	-0.000512***	-0.000475***	-0.0000367	0.000345***	-0.000820***
	(23.62)	(0.000128	(0.000108	(0.0000555	(0.0000629	(0.000130
Contraction Measures for County						
% Pop Unemployed in 1930	2.306	-0.00998*	-0.00419	-0.00580*	-0.00114	-0.00304
	(1.120)	(0.00515	(0.00446	(0.00326	(0.00316	(0.00554
% Drop in Retail Sales per Cap from 1929 to 1933	50.53	-0.00127***	-0.000889***	-0.000382	-0.000157	-0.000732**
	(8.112)	(0.000483	(0.000313	(0.000299	(0.000261	(0.000335
% Pop Unemployed in 1937	7.565	-0.00759***	-0.000714	-0.00688***	-0.00725***	0.00654***
	(2.228)	(0.00170	(0.00162	(0.000918	(0.00104	(0.00210
Individual Characteristics						
# of Fam Members in HH	3.879	0.00984***	0.00727***	0.00257***	0.000309	0.00696***
	(2.026)	(0.001000	(0.000819	(0.000537	(0.000544	(0.000967
Age	41.81	0.00351***	0.00428***	-0.000768***	-0.000668***	0.00495***

	(11.26)	(0.000228	(0.000160	(0.000115	(0.0000879	(0.000169
Black	0.0829	-0.296***	-0.298***	0.00146	-0.0219***	-0.276***
	(0.276)	(0.0115	(0.0113	(0.00522	(0.00614	(0.0133
American Indian	0.00145	-0.282***	-0.155***	-0.126**	0.00485	-0.160**
	(0.0381)	(0.0746	(0.0516	(0.0513	(0.0466	(0.0651
Other Race	0.00179	-0.145**	-0.189***	0.0442**	0.0650***	-0.254***
	(0.0422)	(0.0636	(0.0604	(0.0205	(0.0202	(0.0659
Urban	0.549	0.0526***	0.0454***	0.00722***	0.00715***	0.0383***
	(0.498)	(0.00717	(0.00597	(0.00258	(0.00247	(0.00607
Below Grade 6	0.207	0.116***	0.0781***	0.0375***	0.0254***	0.0528***
	(0.405)	(0.00864	(0.0114	(0.0102	(0.00682	(0.0127
6 < Grade <= 12	0.648	0.296***	0.214***	0.0812***	0.0717***	0.143***
	(0.478)	(0.00868	(0.0123	(0.0116	(0.00697	(0.0133
Some College	0.116	0.489***	0.391***	0.0977***	0.0745***	0.317***
	(0.321)	(0.0114	(0.0125	(0.0111	(0.00834	(0.0127
Live at the Same Community	0.820	-0.0164***	-0.0299***	0.0135***	-0.0152***	-0.0146***
	(0.384)	(0.00611	(0.00474	(0.00250	(0.00217	(0.00503
Farm Status	0.236	-0.0826***	-0.0695***	-0.0131***	0.0210***	-0.0904***
	(0.425)	(0.00809	(0.00653	(0.00482	(0.00501	(0.00778
Rent Dwelling	0.586	-0.132***	-0.111***	-0.0211***	0.00659***	-0.118***
	(0.493)	(0.00432	(0.00354	(0.00212	(0.00196	(0.00388
Professional/Technical	0.0579	0.297***	0.267***	0.0298**	0.0166	0.250***
	(0.234)	(0.0224	(0.0211	(0.0127	(0.0119	(0.0231
Farmers	0.179	-0.0162	-0.0938*	0.0776***	0.162***	-0.255***

	(0.384)	(0.0539	(0.0480	(0.0228	(0.0272	(0.0531
Managers/Officials/Proprietors	0.114	0.466***	0.413***	0.0532***	0.0912***	0.322***
	(0.318)	(0.0272	(0.0249	(0.0122	(0.0113	(0.0271
Clerical	0.0622	0.0538**	0.0240	0.0298**	0.0136	0.0103
	(0.242)	(0.0216	(0.0194	(0.0123	(0.0112	(0.0217
Sales workers	0.0593	0.142***	0.126***	0.0159	0.0686***	0.0573**
	(0.236)	(0.0220	(0.0208	(0.0123	(0.0114	(0.0229
Craftsman	0.170	0.0244	0.0489**	-0.0245**	0.00103	0.0478**
	(0.376)	(0.0207	(0.0197	(0.0123	(0.0106	(0.0214
Operative	0.181	-0.177***	-0.111***	-0.0655***	-0.0204*	-0.0910***
	(0.385)	(0.0217	(0.0201	(0.0126	(0.0108	(0.0212
Service Workers (private household	0.00303	-0.514***	-0.418***	-0.0959***	-0.0624**	-0.356***
	(0.0549)	(0.0407	(0.0329	(0.0196	(0.0245	(0.0318
Service Workers (non HH	0.0530	-0.292***	-0.273***	-0.0182	0.0796***	-0.353***
	(0.224)	(0.0236	(0.0210	(0.0132	(0.0124	(0.0227
Farm laborers	0.0355	-0.555***	-0.450***	-0.105***	0.00418	-0.454***
	(0.185)	(0.0330	(0.0282	(0.0193	(0.0197	(0.0320
Non-farm laborers	0.0811	-0.372***	-0.259***	-0.113***	-0.0409***	-0.219***
	(0.273)	(0.0226	(0.0211	(0.0129	(0.0111	(0.0221
Agriculture/Forestry/Fishing	0.222	-0.104***	-0.106***	0.00204	0.0906***	-0.196***
	(0.415)	(0.0287	(0.0233	(0.0168	(0.0178	(0.0279
Mining	0.0303	0.156***	0.255***	-0.0992***	-0.156***	0.411***
	(0.171)	(0.0256	(0.0166	(0.0156	(0.0174	(0.0209
Construction	0.0618	-0.0787***	0.0894***	-0.168***	-0.0591***	0.148***

	(0.241)	(0.0199	(0.0151	(0.0131	(0.0115	(0.0181
Manufacturing	0.252	0.140***	0.113***	0.0271**	0.00504	0.108***
	(0.434)	(0.0211	(0.0137	(0.0124	(0.0107	(0.0143
Transportation/Communication/Other utilities	0.0935	0.287***	0.214***	0.0728***	0.0846***	0.130***
	(0.291)	(0.0232	(0.0160	(0.0106	(0.0112	(0.0141
Wholesale	0.0313	0.160***	0.0914***	0.0690***	0.0891***	0.00230
	(0.174)	(0.0209	(0.0140	(0.0119	(0.0119	(0.0154
Retail Trade	0.125	-0.00744	-0.0502***	0.0428***	0.149***	-0.199***
	(0.330)	(0.0187	(0.0128	(0.0121	(0.0133	(0.0166
Finance/Insurance/Real Estate	0.0317	0.172***	0.109***	0.0630***	0.0720***	0.0368
	(0.175)	(0.0384	(0.0326	(0.00969	(0.0107	(0.0361
Business & Repair Services	0.0232	0.0204	-0.0184	0.0388***	0.120***	-0.138***
	(0.151)	(0.0181	(0.0145	(0.0104	(0.0126	(0.0187
Personal Services	0.0318	0.0150	-0.0482***	0.0633***	0.146***	-0.194***
	(0.176)	(0.0236	(0.0153	(0.0128	(0.0125	(0.0147
Entertainment	0.00848	0.104***	0.109***	-0.00526	0.0187	0.0901*
	(0.0917)	(0.0286	(0.0316	(0.0169	(0.0230	(0.0497
Prefessional and Related	0.0425	-0.0101	-0.0502***	0.0401***	0.0787***	-0.129***
	(0.202)	(0.0187	(0.0152	(0.0108	(0.0132	(0.0196
County Characteristics						
Total Population in 1930	998116.1	-1.24e-08***	-1.08e-08***	-1.61e-09	4.72e-09***	-1.55e-08***
	(1847281.1)	(2.38e-09)	(2.26e-09	(9.94e-10	(1.31e-09	(2.59e-09
Land Area (Sq Mile in 1930	886.1	0.00000193	-0.000000194	0.00000212*	0.00000661***	-0.00000680**

	(1307.1)	(0.00000187	(0.00000163	(0.00000125	(0.00000209	(0.00000295
% Black in 1930	8.244	0.00167***	0.000965***	0.000709***	0.000464*	0.000501
	(12.17)	(0.000405	(0.000368	(0.000192	(0.000260	(0.000443
% Urban in 1930	66.57	0.000507*	0.000390*	0.000117	-0.000404***	0.000794***
	(30.64)	(0.000259	(0.000230	(0.000130	(0.000152	(0.000287
% Married in 1930	61.06	0.00211*	0.00268**	-0.000577	-0.00106	0.00375***
	(4.326)	(0.00124	(0.00106	(0.000641	(0.000767	(0.00127
% Illiterate in 1930	3.907	-0.00296**	-0.00238**	-0.000580	-0.00175**	-0.000631
	(3.606)	(0.00128	(0.00120	(0.000630	(0.000815	(0.00146
% Pop Aged 20-29	17.30	0.0129***	0.00756**	0.00534***	0.00290	0.00466
	(2.157)	(0.00378	(0.00337	(0.00180	(0.00208	(0.00382
% Pop Aged 30-34	7.815	0.00382	0.00843	-0.00461	-0.00169	0.0101
	(1.207)	(0.0110	(0.00976	(0.00577	(0.00641	(0.0110
% Pop Aged 35-44	14.65	0.0292***	0.0234***	0.00582	0.00433	0.0191***
	(1.991)	(0.00670	(0.00584	(0.00360	(0.00401	(0.00676
% Pop Aged 45-54	10.81	0.0141*	0.0135**	0.000672	-0.00792*	0.0214***
	(1.356)	(0.00796	(0.00665	(0.00441	(0.00470	(0.00772
% Pop Aged 55-64	6.835	-0.0229***	-0.0269***	0.00397	0.0171***	-0.0439***
	(1.503)	(0.00584	(0.00529	(0.00324	(0.00368	(0.00654
Retail Sales per Cap in 1929	449.7	-0.0000203	-0.0000135	-0.00000682	0.0000348	-0.0000483
	(150.6)	(0.0000459	(0.0000384	(0.0000207	(0.0000212	(0.0000413
Retail Wage per Employee in 1929	1341.6	0.000330***	0.000335***	-0.00000418	-0.0000106	0.000345***
	(197.2)	(0.0000321	(0.0000290	(0.0000158	(0.0000165	(0.0000323
Constant		5.643***	1.915***	3.728***	3.664***	-1.749***

	(0.121	(0.104	(0.0655	(0.0777	(0.126
State Dummies	Y	Y	Y	Y	Y
Observations	126243	126243	126243	126243	126243
R-squared	0.454	0.490	0.106	0.145	0.427
Mean of Dependent Variable	7.063	3.266	3.797	3.740	-0.473
SD of Dependent Variable	(0.686	(0.579	(0.310	(0.304	(0.643

Note: Standard errors are in parentheses. Standard errors are clustered at the county level. * p< 10, ** p< 05, *** p< 0.0

Table 7: OLS Estimation of Effects of Contractions and New Deal Grants on Logged Earnings in Urban and Rural Areas

	Log Annual Earnings		Log Weekly Earnings		Log Hourly Earnings	
	Urban	Rural	Urban	Rural	Urban	Rural
New Deal Grants in County						
Relief Per Capita 1933-1939	-0.000382***	-0.000179	-0.000231***	-0.000133	-0.000311***	-0.000232*
	(0.000102)	(0.000114)	(0.0000891)	(0.000100)	(0.000114)	(0.000130)
Public Works Per Capita 1933-1939	0.0000400	0.0000898	0.0000311	0.0000841*	-0.0000401	0.0000212
	(0.0000556)	(0.0000681)	(0.0000449)	(0.0000430)	(0.0000451)	(0.0000335)
AAA Per Capita 1933-1939	-0.000656***	-0.000362**	-0.000569***	-0.000323***	-0.00113***	-0.000495***
	(0.000208)	(0.000145)	(0.000182)	(0.000118)	(0.000228)	(0.000124)
Contraction Measures for County						
% Pop Unemployed in 1930	-0.00871	0.00527	-0.00560	0.0112*	-0.00964	0.0175**
	(0.00610)	(0.00789)	(0.00494)	(0.00659)	(0.00612)	(0.00737)
% Drop in Retail Sales per Cap from 1929 to 1933	-0.000978**	-0.00135*	-0.000357	-0.00111***	-0.000377	-0.000735**
	(0.000484)	(0.000747)	(0.000429)	(0.000415)	(0.000560)	(0.000357)
% Pop Unemployed in 1937	-0.00621***	-0.00863***	-0.000352	-0.000841	0.00656**	0.00778***
	(0.00221)	(0.00227)	(0.00199)	(0.00187)	(0.00263)	(0.00225)
R-squared	0.364	0.520	0.401	0.558	0.349	0.495

Note: Standard errors are in parentheses. Standard errors are clustered at the county level. * p< 10, ** p< 05, *** p< 0.01. There were 86,012 observations in the urban equations and 40,231 in the rural equations. All equations include state dummies and the variables from Table 6 for individual characteristics, occupation and industry dummies, and economic conditions.

Table 8: OLS Estimation of Effects of Contraction and New Deal Grants on Logged Annual Earnings by Occupation

	Skilled			Semi-Skilled		Unskilled	
	Professional	Manager	Craftsman	Sales	Operative	Farm Laborer	Non-Farm Laborer
New Deal Grants in County							
Relief Per Capita 1933-1939	-0.000242	-0.000234	-0.000166	-0.000288	-0.000436***	-0.000137	-0.000189
	(0.000307)	(0.000218)	(0.000120)	(0.000196)	(0.000139)	(0.000268)	(0.000220)
Public Works Per Capita 1933-1939	-0.000226	-0.0000511	0.000154	-0.0000691	0.000231***	0.000357*	0.0000274
	(0.000150)	(0.0000773)	(0.000106)	(0.0000964)	(0.0000772)	(0.000184)	(0.0000653)
AAA Per Capita 1933-1939	-0.000824*	-0.000481*	-0.000496***	-0.000815**	-0.000444*	-0.000165	-0.000431
	(0.000480)	(0.000280)	(0.000178)	(0.000391)	(0.000260)	(0.000201)	(0.000270)
Contraction Measures for County							
% Pop Unemployed in 1930	-0.0272*	0.00754	-0.0213***	-0.0325***	0.00776	0.00295	-0.0118
	(0.0143)	(0.0122)	(0.00774)	(0.0120)	(0.00826)	(0.0231)	(0.0110)
% Drop in Retail Sales per Cap from 1929 to 1933	-0.00176	-0.00181*	-0.00138**	-0.00113	-0.000979	-0.000606	-0.000189
	(0.00145)	(0.00103)	(0.000591)	(0.000813)	(0.000998)	(0.00119)	(0.000640)
% Pop Unemployed in 1937	-0.00745	-0.00375	-0.00232	-0.00743**	-0.0105***	-0.0149***	-0.0128***
	(0.00603)	(0.00437)	(0.00249)	(0.00375)	(0.00258)	(0.00466)	(0.00355)
Observations	5506	9415	29182	10674	34528	5290	13909
R-squared	0.309	0.267	0.221	0.244	0.206	0.349	0.304

Notes: The regressions include the individual characteristics and economic conditions variables in Table 6, as well as state dummies. Standard errors are in parentheses. Standard errors are clustered at the county level. * p< 10, ** p< 05, *** p< 0.01.

Table 9: OLS Estimation of Effects of Contraction and New Deal Grants on Logged Weekly Earnings by Occupation

	Skilled			Semi-Skilled		Unskilled	
	Professional	Manager	Craftsman	Sales	Operative	Farm Laborer	Non-Farm Laborer
New Deal Grants in County							
Relief Per Capita 1933-1939	-0.000339	-0.000213	-0.0000787	-0.000168	-0.000216*	-0.000297	-0.0000678
	(0.000264)	(0.000205)	(0.000101)	(0.000173)	(0.000116)	(0.000201)	(0.000191)
Public Works Per Capita 1933-1939	0.0000189	-0.0000843	0.000162*	-0.0000389	0.000170***	0.0000490	0.0000567
	(0.0000524)	(0.0000750)	(0.0000842)	(0.0000678)	(0.0000597)	(0.000120)	(0.0000618)
AAA Per Capita 1933-1939	-0.000934**	-0.000547**	-0.000446***	-0.000741**	-0.000285	-0.000216	-0.000351
	(0.000437)	(0.000277)	(0.000168)	(0.000313)	(0.000200)	(0.000170)	(0.000214)
Contraction Measures for County							
% Pop Unemployed in 1930	-0.0222*	0.00924	-0.00998	-0.0333***	0.00387	0.0220	0.00598
	(0.0127)	(0.0113)	(0.00645)	(0.0108)	(0.00670)	(0.0163)	(0.00906)
% Drop in Retail Sales per Cap from 1929 to 1933	-0.00107	-0.00163	-0.000518	-0.00107	-0.000545	-0.00156*	-0.000408
	(0.00141)	(0.00104)	(0.000452)	(0.000741)	(0.000588)	(0.000816)	(0.000603)
% Pop Unemployed in 1937	-0.00296	-0.00219	0.00286	-0.00610*	-0.00131	-0.000206	-0.00422
	(0.00516)	(0.00416)	(0.00208)	(0.00336)	(0.00251)	(0.00463)	(0.00286)
Observations	5506	9415	29182	10674	34528	5290	13909
R-squared	0.318	0.280	0.240	0.279	0.279	0.376	0.429

Notes: The regressions include the individual characteristics and economic conditions variables in Table 6, as well as state dummies. Standard errors are in parentheses. Standard errors are clustered at the county level. * p< 10, ** p< 05, *** p< 0.01.

Table 10: OLS Estimation of Effects of Contraction and New Deal Grants on Logged Hourly Earnings by Occupation

	Skilled			Semi-Skilled		Unskilled	
	Professional	Manager	Craftsman	Sales	Operative	Farm Laborer	Non-Farm Laborer
New Deal Grants in County							
Relief Per Capita 1933-1939	-0.000320	-0.000123	-0.000113	-0.000280	-0.000232	-0.000664***	-0.000197
	(0.000317)	(0.000222)	(0.000124)	(0.000188)	(0.000166)	(0.000238)	(0.000225)
Public Works Per Capita 1933-1939	-0.0000531	-0.000148**	0.000156*	-0.000175**	0.000115**	-0.000174	0.0000156
	(0.0000691)	(0.0000626)	(0.0000842)	(0.0000729)	(0.0000551)	(0.000151)	(0.0000717)
AAA Per Capita 1933-1939	-0.00137***	-0.000696**	-0.000850***	-0.00103***	-0.000865***	-0.0000783	-0.000770***
	(0.000509)	(0.000300)	(0.000214)	(0.000355)	(0.000272)	(0.000193)	(0.000251)
Contraction Measures for County							
% Pop Unemployed in 1930	-0.0316**	-0.000280	-0.0116	-0.0321***	0.000195	0.0484***	0.0217*
	(0.0152)	(0.0120)	(0.00808)	(0.0110)	(0.00916)	(0.0151)	(0.0122)
% Drop in Retail Sales per Cap from 1929 to 1933	-0.0000172	-0.000569	-0.000597	-0.00183**	-0.000396	-0.00148*	0.0000846
	(0.00165)	(0.00113)	(0.000558)	(0.000846)	(0.000640)	(0.000800)	(0.000775)
% Pop Unemployed in 1937	-0.00107	-0.00139	0.00828***	-0.00163	0.00697**	0.0286***	0.00515
	(0.00630)	(0.00460)	(0.00262)	(0.00370)	(0.00326)	(0.00657)	(0.00358)
Observations	5506	9415	29182	10674	34528	5290	13909
R-squared	0.289	0.312	0.236	0.302	0.283	0.216	0.364

Notes: The regressions include the individual characteristics and economic conditions variables in Table 6, as well as state dummies. Standard errors are in parentheses. Standard errors are clustered at the county level. * p< 10, ** p< 05, *** p< 0.01.

Table 11: 2SLS Estimates of Impact of Contractions and New Deal Grants on Logged Earnings and Time Worked

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Stage 1			Stage 2				
	Relief Grants per Cap	Public Works Grants per Cap	AAA Grants per Cap	Log Annual Earning	Log Weekly Earning	Log Weeks Worked	Log Weekly Hours	Log Est. Hourly Earning
New Deal Grants in County								
Relief Per Capita (1933-1939)				-0.00161*	-0.000696	-0.000912*	-0.0000511	-0.000645
				(0.000929)	(0.000897)	(0.000489)	(0.000528)	(0.00106)
Public Works Per Capita (1933-1939)				0.000823	0.00110	-0.000279	0.000270	0.000831
				(0.000858)	(0.000779)	(0.000407)	(0.000484)	(0.000851)
AAA Per Capita (1933-1939)				-0.00224*	-0.00287***	0.000637	0.00141**	-0.00428***
				(0.00123)	(0.00111)	(0.000621)	(0.000689)	(0.00132)
Contraction Measures for County								
% Pop Unemployed in 1930				-0.00530	-0.00559	0.000283	0.00128	-0.00686
				(0.00886)	(0.00863)	(0.00416)	(0.00428)	(0.00995)
% Drop in Retail Sales per Cap from 1929 to 1933				-0.000325	0.000365	-0.000690	-0.000224	0.000589
				(0.000940)	(0.000822)	(0.000514)	(0.000536)	(0.000906)
% Pop Unemployed in 1937				-0.00399	-0.00310	-0.000896	-0.00562	0.00252
				(0.00642)	(0.00609)	(0.00329)	(0.00355)	(0.00721)
Instrumental Variables								
Std of the % Voting for the Democratic Presidential Candidate (1896-1932)	0.830*	2.179***	0.896***					
	(0.467)	(0.701)	(0.183)					
Mean of the % Voting for the Democratic Presidential Candidate (1896-1932)	0.277	-0.195	0.222***					
	(0.172)	(0.137)	(0.0631)					

Representation on House Agriculture Committee	-8.097**	4.548	8.145***					
	(3.549)	(3.922)	(2.655)					
First-Stage A-P F stats	13.67	16.26	22.50					
K-P LM Stat				12.41***	12.41***	12.41***	12.41***	12.41***
Kleibergen-Paap Wald F-stat				4.255	4.255	4.255	4.255	4.255
Anderson-Rubin F-stat				3.545**	3.991***	2.531*	3.249**	5.791***
Anderson-Rubin Chi-stat				10.65**	11.99***	7.601*	9.758**	17.39***
Stock-Wright LM S stat				13.62***	16.53***	9.737**	14.56***	26.43***
R-squared				0.447	0.478	0.097	0.140	0.414

Note: Standard errors are in parentheses. Standard errors are clustered at the county level. * p<0.10, ** p<0.05, *** p<0.01. The specification for the final stage equation includes state effects and all of the correlates from Table 6. There are 126,243 observations.

Table 12: Number and Percentage of Workers by Skill Level in 1930 Who Were in Jobs by Skill, Unemployed or Emergency Relief Workers in 1940

	Occ Categories and Employment Status in 1940					
Occ Categories in 1930	Regular, Unskilled Occ in 1940	Regular, Semi-Skilled Occ in 1940	Regular, Skilled Occ in 1940	Emergency	Unemployed	Total
Unskilled Occ in 1930	**9144**	**7078**	**4096**	**3574**	**2812**	**26704**
(Row Pct)	34.24	26.51	15.34	13.38	10.53	100
SemiSkilled Occ in 1930	**3834**	**20764**	**8077**	**2397**	**2814**	**37886**
(Row Pct)	10.12	54.81	21.32	6.33	7.43	100
Skilled in 1930	**2975**	**8905**	**22156**	**2095**	**2868**	**38999**
(Row Pct)	7.63	22.83	56.81	5.37	7.35	100
Total	**15953**	**36747**	**34329**	**8066**	**8494**	**103589**
(Row Pct)	15.40	35.47	33.14	7.79	8.20	100
（Column Pct)	100	100	100	100	100	100

Source: Sample developed by Christopher Boone to match workers from the 1930 Census to the 1940 Census.

Table 13: Marginal Effects from Multinomial Logit of Skill Levels, Emergency Work Unemployed in 1940 for Workers Who Were in Unskilled Jobs in 1930

	(1)	(2)	(3)	(4)	(5
	Regular, Unskilled Occ in 1940	Regular, Semi-Skilled Occ in 1940	Regular, Skilled Occ in 1940	Emergency	Unemp
New Deal Grants in County					
Relief Per Capita (1933-1939)	0.0000286	-0.000316**	-0.0000507	0.000370***	-0.000
	(0.000107)	(0.000105)	(0.0000849)	(0.0000638)	(0.000
Public Works Per Capita (1933-1939)	0.0000486	-0.0000785	0.0000900***	-0.000135*	0.0000
	(0.0000346)	(0.0000520)	(0.0000260)	(0.0000630)	(0.000
AAA Per Capita (1933-1939)	-0.0000147	-0.000232	0.000147	0.000151*	-0.000
	(0.000138)	(0.000168)	(0.000111)	(0.0000668)	(0.000
Contraction Measures for County					
% Pop Unemployed in 1930	-0.00680	0.00227	-0.00701	-0.00299	0.014
	(0.00621)	(0.00543)	(0.00442)	(0.00374)	(0.00
% Drop in Retail Sales per Cap from 1929 to 1933	0.000785*	-0.000620	-0.000589	0.000647*	-0.000
	(0.000355)	(0.000329)	(0.000305)	(0.000255)	(0.000
% Pop Unemployed in 1937	-0.00316	-0.000581	-0.00371*	0.00258*	0.0048
	(0.00183)	(0.00178)	(0.00156)	(0.00108)	(0.00
Individual Characteristics	Y	Y	Y	Y	Y
Industry Categories	Y	Y	Y	Y	Y
Economic Conditions (1929-1930)	Y	Y	Y	Y	Y
State Dummies	Y	Y	Y	Y	Y
Observations	23472	23472	23472	23472	234

Note: Standard errors are in parentheses. Standard errors are clustered at the county level. * p<0.10, ** p<0.0 p<0.01.

Table 14: Marginal Effects from Multinomial Logit of Skill Levels, Emergency Work, and Unemployed in 1940 for Workers Who Were in Semi-Skilled Jobs in 1930

	(1)	(2)	(3)	(4)	(5)
	Regular, Unskilled Occ in 1940	Regular, Semi-Skilled Occ in 1940	Regular, Skilled Occ in 1940	Emergency	Unemployed
New Deal Grants in County					
Relief Per Capita (1933-1939)	-0.0000787	0.0000885	-0.000295***	0.000221***	0.0000648
	(0.0000698)	(0.000108)	(0.0000811)	(0.0000326)	(0.0000563)
Public Works Per Capita (1933-1939)	0.0000716**	-0.000168*	0.0000849	-0.0000458	0.0000571*
	(0.0000262)	(0.0000672)	(0.0000434)	(0.0000322)	(0.0000228)
AAA Per Capita (1933-1939)	-0.000212	-0.000708**	0.000698***	-0.000000282	0.000222*
	(0.000137)	(0.000226)	(0.000170)	(0.0000793)	(0.000103)
Contraction Measures for County					
% Pop Unemployed in 1930	0.00113	-0.00161	-0.0113*	0.00154	0.0102**
	(0.00325)	(0.00599)	(0.00488)	(0.00205)	(0.00314)
% Drop in Retail Sales per Cap from 1929 to 1933	0.0000636	-0.000621	0.000141	0.000168	0.000248
	(0.000315)	(0.000512)	(0.000386)	(0.000186)	(0.000296)
% Pop Unemployed in 1937	-0.00112	-0.00378	-0.000171	0.000117	0.00495***
	(0.00119)	(0.00202)	(0.00153)	(0.000659)	(0.000950)
Individual Characteristics	Y	Y	Y	Y	Y
Industry Categories	Y	Y	Y	Y	Y
Economic Conditions (1929-1930)	Y	Y	Y	Y	Y
State Dummies	Y	Y	Y	Y	Y
Observations	31861	31861	31861	31861	31861

Note: Standard errors are in parentheses. Standard errors are clustered at the county level. * p<0.10, ** p<0.05, *** p<0.01.

Table 15: Marginal Effects from Multinomial Logit of Skill Levels, Emergency Work, and Unemployed in 1940 for Workers Who Were in Skilled Jobs in 1930

	(1)	(2)	(3)	(4)	(5)
	Regular, Unskilled Occ in 1940	Regular, Semi-Skilled Occ in 1940	Regular, Skilled Occ in 1940	Emergency	Unemployed
New Deal Grants in County					
Relief Per Capita (1933-1939)	0.0000225	-0.0000496	-0.000170	0.000225***	-0.0000280
	(0.0000568)	(0.0000819)	(0.0000930)	(0.0000432)	(0.0000570)
Public Works Per Capita (1933-1939)	0.0000328*	-0.000126	0.0000785	0.000000243	0.0000144
	(0.0000163)	(0.0000949)	(0.0000871)	(0.0000153)	(0.0000139)
AAA Per Capita (1933-1939)	-0.000103	-0.0000823	0.000277	-0.0000731	-0.0000190
	(0.0000949)	(0.000158)	(0.000176)	(0.0000610)	(0.000115)
Contraction Measures for County					
% Pop Unemployed in 1930	-0.00323	0.00761	-0.00695	-0.000366	0.00294
	(0.00312)	(0.00438)	(0.00499)	(0.00244)	(0.00314)
% Drop in Retail Sales per Cap from 1929 to 1933	0.000394	-0.00100**	0.000417	0.000485*	-0.000293
	(0.000327)	(0.000351)	(0.000445)	(0.000204)	(0.000263)
% Pop Unemployed in 1937	0.00280**	-0.000679	-0.00587**	0.000185	0.00356***
	(0.00101)	(0.00157)	(0.00192)	(0.000787)	(0.000995)
Individual Characteristics	Y	Y	Y	Y	Y
Industry Categories	Y	Y	Y	Y	Y
Economic Conditions (1929-1930)	Y	Y	Y	Y	Y
State Dummies	Y	Y	Y	Y	Y
Observations	32479	32479	32479	32479	32479

Note: Standard errors are in parentheses. Standard errors are clustered at the county level. * p<0.10, ** p<0.05, *** p<0.01.

Appendices

Appendix 1 Matched Sample for Occupation Mobility

Boone and Wilse-Samson (2015) constructed a panel data that included individuals who were both in the 1930 Census 5 percent sample and 1940 Census 100 percent sample. The 1930 Census 5 percent sample is available from IPUMS while the 1940 Census 100 percent sample was digitized by Ancestry.com and is available to researchers at the NBER. Both Census data contains similar type of information, including names, age, location, birthplace, farm status, employment status, and occupations etc. However, the individual earnings were only available in the 1940 Census data. Due to the fact that both data sources lack unique identifier such as social security number for each individual, Boone and Wilse-Samson (2015) matched individuals based on exact place of birth, exact first and last names, and year of birth within a +/- 3 year band. The matching process was only conducted on males as females might change their last names due to marriage. As it was acknowledged in Boone and Wilse-Samson (2005), their matching strategy is conservative in order to minimize false positives. As a cost, a majority of individuals in the 1930 Census data were not matched. The final linked data represents 18 percent of the males in the 1930 IPUMS data and contains over 550,000 individuals.

This study focuses on male household heads within certain age range. Other sample selection criteria are applied. Therefore, this matched sample is subjected to further sample elimination. The final matched sample used for evaluating the skill transition during the 1930s in this study has over 100,000 observations. To make sure that this linked sample is representative and consistent with the individual characteristics distribution in the 1940 Census sample that we use for our main results, we report the descriptive statistics for the match sample in Table A2. The means of most individual characteristics in the matched sample are very similar to the means shown in Table 3, although there are some differences in earnings and working time variables. For instance, individual earnings and working time in the matched sample are higher in means and standard deviation than the 1940 Census sample. Individuals in the matched sample tend to have slightly more number of family members and be older. We also run the baseline

regression using the matched sample and include the same covariates as in Table 5. Regression coefficients using the matched sample are very close to those in Table 5.

Appendix Table 1-1: Summary Statistics for Individual Characteristics in the Matched Sample for Regular Workers

	# Obs	Mean	Std.Dev	Min	Max
Earnings and Work Hours:					
Annual Earnings ($)	118018	1,534.592	1,046.501	100	5001
Weekly Earnings ($)	117993	32.380	20.498	2	200
Estimated Hourly Earnings ($)	115549	0.798	0.610	0.1	10
# of Weeks Worked (1939-1940)	121129	46.118	10.679	0	52
# of Hours Worked (Mar 24-30 1940)	120783	45.688	14.478	1	98
Demographic Profile:					
# of Fam Members in HH	158154	3.873	1.893	1	28
Age	121129	40.965	11.217	16	65
White	121129	0.935	0.247	0	1
Black	121129	0.063	0.243	0	1
American Indian	121129	0.000	0.021	0	1
Other Race	121129	0.001	0.035	0	1
Urban	121129	0.640	0.298	0	1
No School	119462	0.020	0.141	0	1
Below Grade 6	119462	0.172	0.378	0	1
6 < Grade <= 12	119462	0.700	0.458	0	1
Some College	119462	0.107	0.309	0	1
Live at the Same Community	120181	0.771	0.420	0	1
Farm Status	105431	0.094	0.292	0	1
Rent Dwelling	119816	0.609	0.488	0	1
Professional/Technical	121129	0.041	0.198	0	1
Farmers	121129	0.008	0.088	0	1
Managers/Officials/Proprietors	121129	0.073	0.260	0	1
Clerical	121129	0.072	0.259	0	1
Sales workers	121129	0.073	0.260	0	1
Craftsman	121129	0.202	0.402	0	1
Operative	121129	0.226	0.418	0	1
Service Workers (private household)	121129	0.004	0.060	0	1
Service Workers (non HH)	121129	0.041	0.199	0	1

Farm laborers	121129	0.042	0.201	0	1
Non-farm laborers	121129	0.088	0.284	0	1

Note: This sample developed by Christopher Boone to match workers from the 1930 Census to the 1940 Census.

Appendix 2
Results from Quantile Regressions for Earnings within Occupation and Industry

As an alternative to estimating the OLS model for earnings and working time, we have also estimated quantile regressions to see if the effects of the New Deal programs and the contractions vary for workers at different earnings level within occupations and industry. Appendix Figures 1 through 3 are graphs of the quantile coefficients for the New Deal and contraction variables and their 95-percent confidence intervals for annual, weekly, and hourly earnings. The correlates in the models include the state fixed effects, the individual characteristics, the county economic variables, and the occupation and industry dummies included in Table 6. So that we can compare the results for contractions and New Deal variables on the same scale, the Figures plot the impact of OSD changes in these variables on the earnings and time worked variables.

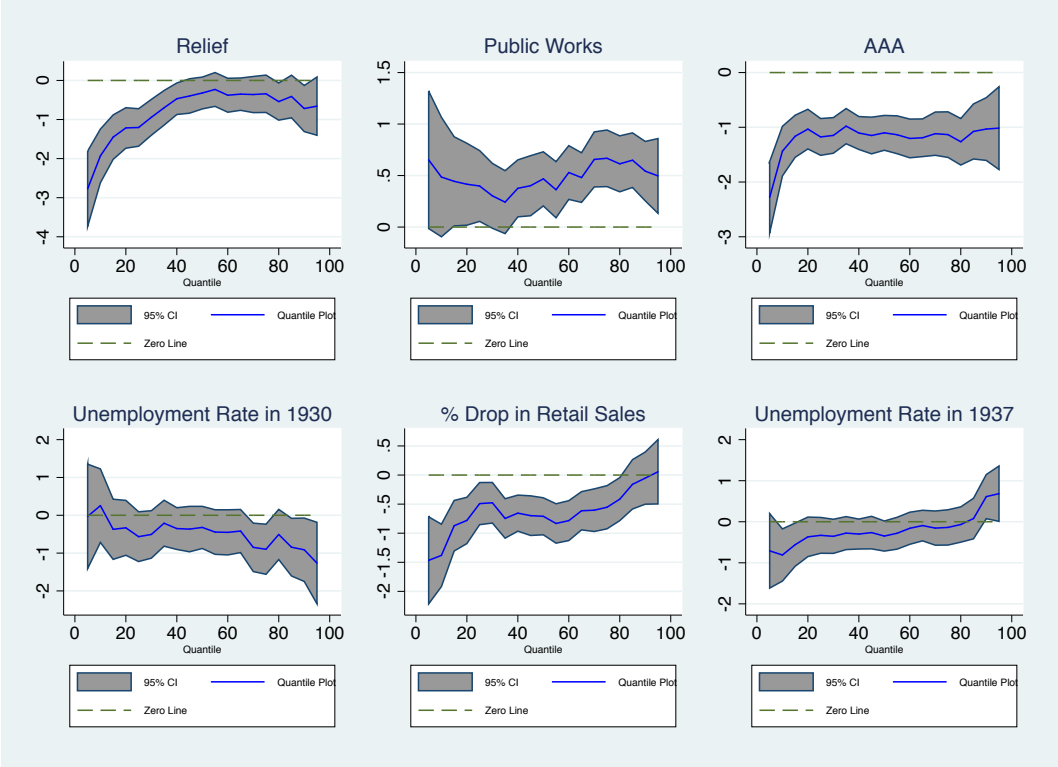
As was the case with the OLS and IV coefficients, the contraction variables have negative effects on annual earnings. The negative effect of an OSD higher 1937 unemployment is much more negative at -3.5 percent at the lower end of the earnings scale than the -0.5 percent at the upper end of the scale. The other two contractions also have more negative effects at the bottom than the top of the scale but the slopes of the relationships are less steep. The three contraction variables also had negative effects on weekly earnings through most of the range but only the confidence intervals do not include zero over most of the range only for the drop in retail sales measure. The effects of the contraction variables on hourly earnings are only statistically significant for the 1937 unemployment rate, which has positive effects above the 30th percentile.

The New Deal quantile results are also similar to the baseline OLS results in Table 6. Public works spending raised annual and weekly earnings for a majority of the workers, and the positive effect strengthened for higher wage workers. Relief spending and AAA spending were both associated with negative annual earnings throughout the range. The negative effects for relief are stronger on the lower end of the earnings scale for both weekly and annual earnings.

Appendix Figure 2-1:
Quantile Regression Estimates of Impact of Contractions and New Deal on Individual Annual Earnings

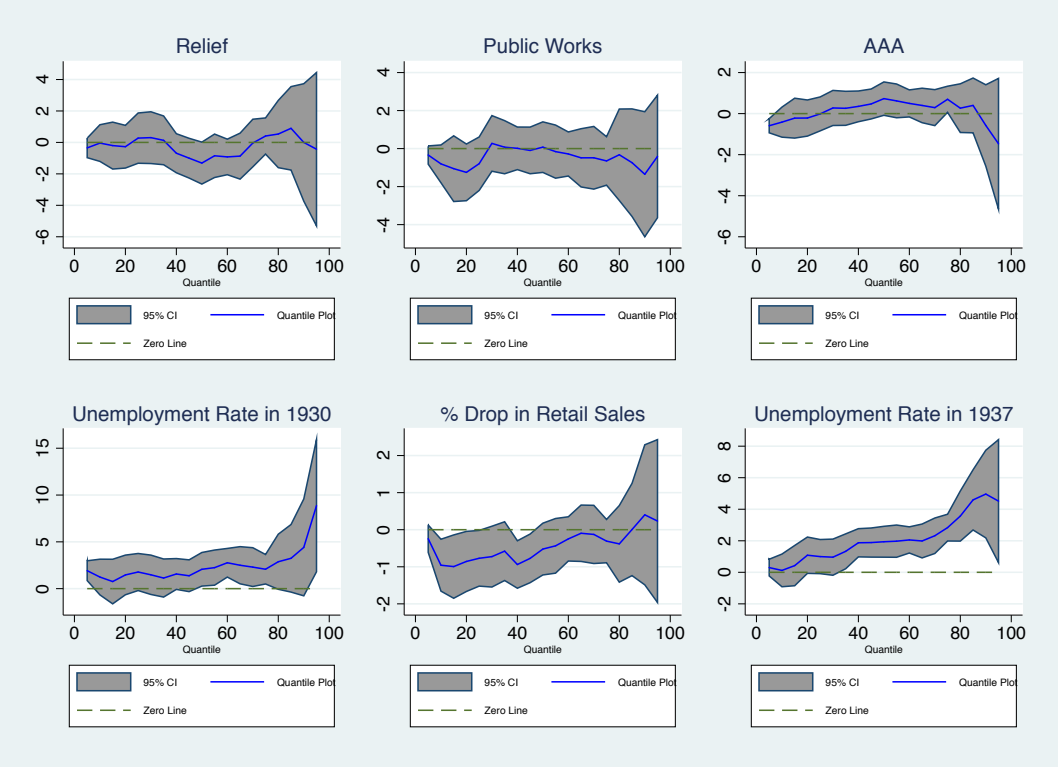
Note: Quantile regression results, associated 95 percent confidence intervals, and zero effect line are plotted. Reported effects are translated into percentage change in annual earnings associated with a one standard deviation increase in contractions and New Deal grants.

Appendix Figure 2-2:
Quantile Regression Estimates of Impact of Contractions and New Deal on Individual Weekly Earnings



Note: Quantile regression results, associated 95 percent confidence intervals, and zero effect line are plotted. Reported effects are translated into percentage change in annual earnings associated with a one standard deviation increase in contractions and New Deal grants.

Appendix Figure 2-3:
Quantile Regression Estimates of Impact of Contractions and New Deal on Individual Hourly Earnings



Note: Quantile regression results, associated 95 percent confidence intervals, and zero effect line are plotted. Reported effects are translated into percentage change in annual earnings associated with a one standard deviation increase in contractions and New Deal grants.

Appendix Table 3-1: OLS Estimation of Effects of Contractions and New Deal Grants on Logged Individual Earnings and Time Worked Excluding Occupation and Industry Dummies)

	(1)	(2)	(3)	(4)	(5)
	Coefficients (Standard Errors)				
	Log Annual Earnings	Log Weekly Earnings	Log Weeks Worked	Log Weekly Hours	Log Est. Hourly Earnings
New Deal Grants in County					
Relief Per Capita 1933-1939	-0.000204**	-0.0000507	-0.000153**	0.0000199	-0.0000706
	(0.0000993)	(0.0000940)	(0.0000665)	(0.0000767)	(0.000138)
Public Works Per Capita 1933-1939	0.0000867*	0.0000787**	0.00000808	0.0000868**	-0.00000811
	(0.0000465)	(0.0000400)	(0.0000271)	(0.0000338)	(0.0000510)
AAA Per Capita 1933-1939	-0.000860***	-0.000937***	0.0000767	0.000702***	-0.00164***
	(0.000153)	(0.000141)	(0.0000588)	(0.0000820)	(0.000191)
Contraction Measures for County					
% Pop Unemployed in 1930	-0.0140**	-0.00575	-0.00828**	-0.00561	-0.000149
	(0.00591)	(0.00531)	(0.00385)	(0.00398)	(0.00713)
% Drop in Retail Sales per Cap from 1929 to 1933	-0.00122**	-0.000906**	-0.000317	-0.000131	-0.000774*
	(0.000485)	(0.000353)	(0.000301)	(0.000274)	(0.000436)
% Pop Unemployed in 1937	-0.00799***	-0.000778	-0.00721***	-0.00788***	0.00710***
	(0.00189)	(0.00190)	(0.00103)	(0.00119)	(0.00250)
R-squared	0.332	0.368	0.048	0.059	0.304

Notes: Standard errors are in parentheses. Standard errors are clustered at the county level. * p< 10, ** p< 05, *** p< 0.01. There were 126,243 observations. The specification is the same as in Table 6 except the occupation and industry dummies are excluded.

Appendix Table 3-2: OLS Estimation of Effects of Contraction and New Deal Grants on Logged Weeks Worked by Occupation

	Skilled			Semi-Skilled		Unskilled	
	Professional	Manager	Craftsman	Sales	Operative	Farm Laborer	Non-Farm Laborer
New Deal Grants in County							
Relief Per Capita 1933-1939	0.0000969	-0.0000210	-0.0000873	-0.000120	-0.000220**	0.000160	-0.000121
	(0.000139)	(0.0000609)	(0.0000762)	(0.0000944)	(0.000102)	(0.000200)	(0.000149)
Public Works Per Capita 1933-1939	-0.000245*	0.0000332**	-0.00000771	-0.0000302	0.0000607	0.000308**	-0.0000293
	(0.000136)	(0.0000138)	(0.0000391)	(0.0000492)	(0.0000399)	(0.000137)	(0.0000255)
AAA Per Capita 1933-1939	0.000110	0.0000660	-0.0000504	-0.0000744	-0.000159	0.0000508	-0.0000795
	(0.000158)	(0.0000597)	(0.0000971)	(0.000191)	(0.000125)	(0.000142)	(0.000190)
Contraction Measures for County							
% Pop Unemployed in 1930	-0.00500	-0.00170	-0.0113**	0.000741	0.00389	-0.0191	-0.0178**
	(0.00660)	(0.00335)	(0.00467)	(0.00457)	(0.00566)	(0.0123)	(0.00803)
% Drop in Retail Sales per Cap from 1929 to 1933	-0.000682	-0.000174	-0.000867**	-0.0000607	-0.000433	0.000958	0.000219
	(0.000542)	(0.000294)	(0.000349)	(0.000372)	(0.000653)	(0.000646)	(0.000474)
% Pop Unemployed in 1937	-0.00449	-0.00156	-0.00518***	-0.00133	-0.00915***	-0.0146***	-0.00857***
	(0.00286)	(0.00121)	(0.00158)	(0.00160)	(0.00169)	(0.00352)	(0.00211)
Observations	5506	9415	29182	10674	34528	5290	13909
R-squared	0.064	0.027	0.114	0.027	0.089	0.078	0.052

Notes: The regressions include the individual characteristics and economic conditions variables in Table 6, as well as state dummies. Standard errors are in parentheses. Standard errors are clustered at the county level. * p< 10, ** p< 05, *** p< 0.01.

Appendix Table 3-3: OLS Estimation of Effects of Contraction and New Deal Grants on Logged Weekly Hours by Occupation

	Skilled			Semi-Skilled		Unskilled	
	Professional	Manager	Craftsman	Sales	Operative	Farm Laborer	Non-Farm Laborer
New Deal Grants in County							
Relief Per Capita 1933-1939	-0.0000187	-0.0000897	0.0000345	0.000112	0.0000153	0.000367**	0.000129
	(0.000204)	(0.0000926)	(0.0000632)	(0.0000830)	(0.000109)	(0.000181)	(0.000115)
Public Works Per Capita 1933-1939	0.0000720*	0.0000638**	0.00000589	0.000136***	0.0000548	0.000223*	0.0000411*
	(0.0000410)	(0.0000293)	(0.0000224)	(0.0000350)	(0.0000437)	(0.000129)	(0.0000216)
AAA Per Capita 1933-1939	0.000435*	0.000149	0.000405***	0.000291*	0.000580***	-0.000138	0.000419***
	(0.000252)	(0.000101)	(0.000106)	(0.000167)	(0.000144)	(0.000150)	(0.000139)
Contraction Measures for County							
% Pop Unemployed in 1930	0.00938	0.00952*	0.00167	-0.00119	0.00368	-0.0264*	-0.0157**
	(0.0104)	(0.00491)	(0.00377)	(0.00470)	(0.00602)	(0.0157)	(0.00688)
% Drop in Retail Sales per Cap from 1929 to 1933	-0.00106	-0.00106**	0.0000794	0.000754*	-0.000149	-0.0000808	-0.000493
	(0.000889)	(0.000421)	(0.000309)	(0.000429)	(0.000487)	(0.000609)	(0.000430)
% Pop Unemployed in 1937	-0.00189	-0.000802	-0.00542***	-0.00447***	-0.00828***	-0.0288***	-0.00938***
	(0.00380)	(0.00186)	(0.00125)	(0.00165)	(0.00164)	(0.00456)	(0.00201)
Observations	5506	9415	29182	10674	34528	5290	13909
R-squared	0.093	0.110	0.092	0.068	0.197	0.129	0.061

Notes: The regressions include the individual characteristics and economic conditions variables in Table 6, as well as state dummies. Standard errors are in parentheses. Standard errors are clustered at the county level. * p< 10, ** p< 05, *** p< 0.01.