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HOW SUCCESSFUL WAS THE NEW DEAL? THE MICROECONOMIC IMPACT  
OF NEW DEAL SPENDING AND LENDING POLICIES IN THE 1930S

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How Successful Was the New Deal? The Microeconomic Impact of New Deal Spending  
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**ABSTRACT**

The New Deal during the 1930s was arguably the largest peace-time expansion in federal government activity in American history. Until recently there had been very little quantitative testing of the microeconomic impact of the wide variety of New Deal programs. Over the past decade scholars have developed new panel databases for counties, cities, and states and then used panel data methods on them to examine the impact of New Deal spending and lending policies for the major New Deal programs. In most cases the identification of the effect comes from changes across time within the same geographic location after controlling for national shocks to the economy. Many of the studies also use instrumental variable methods to control for endogeneity. The studies find that public works and relief spending had state income multipliers of around one, increased consumption activity, attracted internal migration, reduced crime rates, and lowered several types of mortality. The farm programs typically aided large farm owners but eliminated opportunities for share croppers, tenants, and farm workers. The Home Owners' Loan Corporation's purchases and refinancing of troubled mortgages staved off drops in housing prices and home ownership rates at relatively low ex post cost to taxpayers. The Reconstruction Finance Corporation's loans to banks and railroads appear to have had little positive impact, although the banks were aided when the RFC took ownership stakes.

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## 1. *Introduction*

In response to the worst Depression in American history Franklin Roosevelt and a largely Democratic Congress established a broad range of spending and lending programs and new regulations that became known collectively as the New Deal. Many of these programs are either still in place today or have been cited as precedents for federal government action during the Great Recession. Dozens of New Deal spending and lending policies were put in place and the amounts spent per capita varied widely across the country. Each policy was designed to address a specific set of problems in the economy and could impact a wide range of socioeconomic variables. Much of the focus of the expanded spending was on building public works proposed by state and local governments and providing funds to temporarily sustain the unemployed. A significant share of spending also went to creating the farm subsidies that remain a permanent policy today.

The Depression also led to the creation of a series of government corporations that made loans and injected capital into industry. For example, the Reconstruction Finance Corporation took ownership stakes in banks and made a wide range of loans to banks, industry, and to railroads. The mortgage and housing problems of the Great Depression led to the creation of The Home Owners' Loan Corporation (HOLC), which bought and refinanced troubled mortgages and had substantial impact on housing prices and home ownership rates (Fishback and Wallis 2013). These programs not only had the potential to stimulate incomes or retard incomes, but also had impact on other factors, including migration, mortality rates, employment, crime rates, housing values, home ownership rates, and productivity.

Over the past two decades scholars have developed new panel databases for counties, cities, and states and used the substantial variation in New Deal spending and loans in each program across place and time to examine the impact of the programs. Using microeconomic panel data methods, in most cases the identification of the effect comes from changes across time within the same geographic location

after controlling for national shocks to the economy. Many of the studies also use instrumental variable methods to control for endogeneity. I summarize that literature here.

To establish the context of the New Deal programs, the article starts by comparing and contrasting the extent of the federal government entering the Great Depression and Great Recession and the changes in federal outlays, revenues, and deficits relative to the prior peak GDP that followed. Following a brief discussion of the macroeconomic literature on spending in the 1930s, I then describe the general empirical methods used for the recent studies and use descriptions of the estimation of the state income multiplier for federal spending to illustrate the process and several findings that often recur. The New Deal should not be seen as one program because the goals of the spending and loan programs were diverse and often had specific targets; therefore, I then summarize the results for particular spending programs and outcomes while providing a series of tables that summarize the methods of identification and means for dealing with endogeneity for each study. The last part of the paper deals with the lending programs in the farm sector and the lending by government corporations, like the RFC's loans to banks and railroads, the RFC's ownership stakes in banks, and the HOLC's purchase and refinance of troubled mortgages. The final summary shows that there was substantial variation in the successes, failures, and unintended consequences of the New Deal policies.

The studies find that there is no one story that be told about the New Deal programs. The extent to which the programs met their goals varied across programs, and there were a number of additional consequences stemming from each program, some positive and some negative. Public works and relief spending had state income multipliers of around one, led to increased consumption activity, attracted internal migration, reduced crime rates, and lowered several types of mortality. However, they had little positive impact on private employment. The farm programs typically aided large farm owners but eliminated opportunities for share croppers, tenants, and farm workers. The Home Owners' Loan

Corporation's purchases and refinancing of troubled mortgages bailed out lenders as much or more than they did borrowers. The program helped stave off drops in housing prices and home ownership rates at relatively low ex post cost to taxpayers. The Reconstruction Finance Corporation's loans to banks and railroads appear to have had little positive impact, although the banks were aided when the RFC took ownership stakes in the banks.

## 2. *The Relative Size of the Great Depression and the New Deal Response*

The Great Depression is usually considered to be the worst downturn in American history and the New Deal is described as the largest peacetime expansion of the federal government. One way to give a sense of the magnitudes of the changes in economic and government activity in the 1930s is to compare them to the changes during the Great Recession and its aftermath in the 2000s. The Great Recession received its nickname because many considered it to be the worst recession since the 1930s. Federal government outlays as a share of pre-downturn GDP rose by more than 4 percent in both periods, but the scale of the economic downturn in the 1930s was much larger.

To contemporaries in the 1930s the rise in federal government spending seemed extremely large because the size and scope of federal government activity when the Great Depression began in 1929 was much smaller (at around 3-4 percent of GDP) than when the economy entered the Great Recession in 2008 (around 19 percent). Most of the New Deal spending and loan policies broke new ground in the federal government's role in the economy, particularly in the areas of seeking to stimulate economic growth through spending, providing aid to the poor, building state and local public works, subsidizing farmers, influencing housing markets, and taking ownership stakes in banks. By 2008 the federal government's role in these areas had expanded markedly. This difference in context helps determine differences in the types of policies chosen in the two periods, as well as differences in the impact of those policies.

To make comparisons of the aggregate figures between the two periods in Figures 1 and 2, I calculate the differences in real GDP and real federal outlays, receipts, and deficits between year  $t$  and the pre-downturn peak year, 1929 for the Great Depression and 2007 for the Great Recession and then normalize the differences to become percentages of real GDP in the peak year by dividing by peak year real GDP in 1929 and 2007, respectively. Treating the pre-downturn peak as a baseline, the percentages in the two figures show how government activity changed in response to changes in real GDP within each time period, while also providing a common basis for comparisons between the 1930s and the 2000s. An alternative would have been to calculate the government activity each year as a percentage of GDP in that year. The alternative is problematic because it combines both changes in government activity and GDP in the same measure and therefore cannot show the distinct differences in the evolution of real GDP and federal activity.

### *2.1 The Great Depression*

Before the Great Depression the federal government had little capacity to offset economic downturns with spending and taxation. The only times the government revenue or spending shares exceeded 3 percent of GDP were during war or the periods when war debts were repaid afterward. On the eve of the Great Depression, the federal government had been running surpluses for a decade to repay its World War I debts. The federal government collected revenue equal to 3.7 percent relative to GDP in 1929.<sup>1</sup> In 1929 federal outlays were 3 percent relative to GDP. The outlays were largely devoted to national defense (22%), help for veterans (25%), and interest on debt (22%). The remaining outlays (28%) included national

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<sup>1</sup> It collected personal income taxes from fewer than 10 percent of households, and the revenues accounted for 28 percent of the total. The remaining revenue came largely from corporate taxes (31%), excise taxes (14%), and customs (16%).

highway grants to the states, projects to prevent flooding and improve navigation of waterways, the post office, and the administration of the government (Wallis 2006). Poverty relief, temporary and long term, was the responsibility of local governments with alms houses and some payments for “outdoor” relief to allow the poor to remain in their own homes. The states provided some aid for widows with children, compensation of families of injured workers, and aid to the blind.

The Great Depression led to a dramatic change in attitudes toward federal government spending and tax policies. Between 1929 and 1932 Real GDP in Figure 1 lurched downward to a level 25.6 percent below its 1929 peak level and then hit a trough 26.7 percent below in 1933. The Hoover administration and Republican Congress took the unusual step of increasing federal outlays by 88 percent in real terms between 1929 and 1932. Nearly all of these outlays occurred within existing programs. This increase from 1929 was 2.9 percent relative to 1929 peak GDP. By 1932 federal tax revenues had fallen below the 1929 level by -1.3 percent of 1929 GDP, so that the change in the deficit was -4.2 percent of 1929 GDP. Few people focus on the original expansion from 1929 to 1932 because Hoover and Congress constantly argued for balanced budgets, and they then raised tax rates in June 1932 and held spending constant in real terms in fiscal year 1933. That year was largely a Hoover year because the fiscal year began July 1 and ended on June 30, 1933, and Roosevelt was not sworn in as President until early March of 1933.

The rise in personal income tax rates in June 1932 was followed by a sharp decline in revenues from that source. As a result, the key tax rate increases that kept total tax revenues from falling were excise taxes imposed on oil transfers in pipelines, electricity, bank checks, communications and the manufacturing of gasoline, oil, tires, and automobiles. By 1934 excise taxes accounted for 48 percent of federal tax revenues, up from 14 percent in 1929.

Macroeconomists have assigned a sizeable share of the blame for the drop in output, ranging from 30 to 70 percent, to the Federal Reserve's monetary policy between 1929 and 1933.<sup>2</sup> The money supply declined sharply, contributing to the output decline and a 30 percent decline in the price level. Following a "real bills" doctrine and seeking to maintain the gold standard, the Fed responded tepidly to the waves of bank failures with ineffectual discount rate policy until purchasing 1 billion in bonds in the first half of 1932. Another wave of bank failures in the first quarter of 1933 led the states and eventually the federal government to declare bank holidays. The Roosevelt administration led the U.S. off of the Gold Standard and the Fed maintained a looser monetary policy that drove short term interest rates near the zero bound for the rest of the decade with one exception, a three-step increase in reserve requirements between August 1936 and May 1937 ((Eichengreen 1992; Temin 1989; Meltzer 2003).

During their First Hundred Days in office, Roosevelt and the Democratic Congress set in motion a set of spending policies that raised real federal outlays by an additional 2 percent of peak GDP between 1933 and 1934. The Veterans' Bonus, passed over Roosevelt's veto in 1936, raised outlays by an additional 1.8 percent of peak GDP. By 1937 real GDP had risen 5.3 percent above its 1929 level. The rise led Roosevelt and Congress to believe that they had leeway to balance the budget. They reduced federal outlays, while tax revenues increased as a result of tax rate increases and increases in the flow of revenues from the new alcohol taxes that followed Prohibition. The reduction in the deficit combined with the Federal Reserve's doubling of reserve requirements helped cause real GDP to fall back to within 2 percent of its 1929 level. Roosevelt and Congress then raised federal outlays again. By 1939 the increase in federal outlays relative to 1929 was roughly 8 percent of peak GDP.

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<sup>2</sup> The 30 to 70 percent figure is a rough guess based on a survey of the large literature on monetary policy during the 1930s in Fishback (2010), Smiley (2002), and Atask and Passell (1994, 583-624).



## 2.2 *The Great Recession*

The federal government played a much larger role in the economy when the Great Recession hit in 2008. In the peak year of 2007, federal outlays were 18.8 percent of GDP and revenues were 17.7 with a slight deficit of approximately -1.1 percent of GDP. Approximately 60 percent of American households were paying personal income taxes and all workers and self-employed were required to pay federal payroll taxes. Between October 2007 and December 2008, a major financial crisis developed, as the S&P 500 more than halved in value, the major investment banks failed or converted to commercial banks, and the federal government took ownership stakes in insurance giant AIG and Freddie Mac and Fannie Mae.<sup>3</sup> By the end of fiscal year 2008 on September 30<sup>th</sup>, the federal government had raised real outlays between 2007 and 2008 by 1.36 percent of 2007 peak GDP, as seen in Figure 2.

The decline in real GDP in Figure 2 was much smaller and the recovery much sooner than in the Great Depression. Real GDP fell slightly in 2008 and then declined to -3 percent below the 2007 peak in 2009 before recovering to 5.6 percent above the prior peak in 2013. In response, real federal outlays were increased by 4.8 percent of peak GDP relative to 2007 (1.6 percent from TARP payouts during 2008) and a series of tax credits and the bad economy contributed to a decline in revenue between 2007 and 2009 of -3.6 percent of peak 2007 GDP.<sup>4</sup> The combination led to an increase in the size of the deficit from 1.1 percent of peak GDP in

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<sup>3</sup> Former Federal Reserve Chairman Benjamin Bernanke recently described the financial crisis in 2008 as the most severe financial crisis in American economic history. He says this because in a very short span of one to two months the entire financial structure was rocked by problems at several financial institutions that were considered too big to fail. In contrast the financial crises during the Great Depression were much more slow moving and did not involve nearly as many large banks.

<sup>4</sup> The TARP was created in October and the use of the funds included posting collateral for AIG's credit default swaps, taking ownership stakes in major banks, and providing capital and loans to auto manufacturers Chrysler and General Motors.

2007 to 9.5 percent of peak GDP in 2009. Federal outlays remained over 4 percent of peak GDP higher than in 2007 in both 2010 and 2011 before tailing off. Federal revenues were around 3 percent of peak GDP lower than in 2007 in both 2010 and 2011 as the workers' share of Social Security tax payments was cut by 2 percentage points and the Bush era tax rules were continued.

Meanwhile, the Federal Reserve led by Depression scholar Benjamin Bernanke (2000) responded rapidly to the financial crisis with accommodative monetary policy. During 2008 the Fed drove the federal funds rate down near the zero interest bound with open market operations. Over the next few years the Fed embarked on a series of "quantitative easing" measures, including large-scale purchases of mortgage-backed securities, with a goal of keeping short-term and long-term interest rates close to the zero bound.

In comparing the two eras, modern fiscal policy makers responded much sooner and more aggressively relative to the size of the downturn than did the policy makers of the 1930s. Between 1930 and 1935 the federal government responded to annual shortfalls in real GDP that ranged from -9 to -27 percent of peak GDP with an increase in federal outlays of 2 to 6 percent of peak GDP and sharp tax rate increases, particularly for excise taxes. After a severe second dip recession in 1937-1938 while cutting outlays and raising receipts to achieve a balanced budget, they returned to a level of outlays that was 8 percent higher than it had been in 1929. In contrast, the during the Great Recession, the federal government responded to a 3 percent shortfall in real GDP with an increase in real outlays of 4.8 percent of peak GDP, roughly 1.6 times the size of the shortfall. Real outlays remained around four percent higher than 2007 peak GDP and tax revenues more than 2 percent below peak GDP through 2012, well after the economy passed the 2007 real GDP level in 2010.

*Macroeconomic Studies of National Aggregates of Federal Spending* The aggregate changes in federal spending during the New Deal were dramatic. After the Hoover era nearly doubled federal outlays, the New Deal nearly doubled them again. Even though aggregate federal government outlays rose sharply during both the Hoover and Roosevelt years, the macroeconomic literature, which has been the subject of several surveys, has focused mostly on the role of monetary policy during the 1930s in a series of studies that responded to the seminal work of Milton Friedman and Anna Schwartz (1963).<sup>5</sup>

The spending and lending policies likely have received less attention in the macroeconomics literature because tax collections rose at a similar rate to spending, leading to small deficits. In open letters to newspapers in 1933 John Maynard Keynes lauded the Roosevelt administration's spending increases, but argued that the tax increases that led to small deficits were negating the positive effects of the spending (*Los Angeles Times*, December 31, 1933). E. Cary Brown (1956) and Larry Peppers (1973) documented the small deficits and used Keynesian models to show that the New Deal programs should not be considered an example of a Keynesian stimulus. Christina Romer (1992) made some comparative calculations from 1921 and 1938 and found a weak effect of fiscal policy, although that conclusion has recently been challenged by Nathan Perry and Matthis Vernango (2013).

Using structural models, Eggertsson (2008) and Eggertsson and Pugsley (2006) examined the impact of federal spending as one piece of a package of policies including monetary policy, the National Recovery Administration, the retreat from the gold standard and jawboning for higher prices that influenced deflationary expectations when interest rates were near the zero bound.

Eggertsson (2008) built his model based on the insights of Peter Temin and Barry Wigmore

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<sup>5</sup>A survey of the macroeconomic literature on monetary policy easily filled a book by Smiley (2002). Other useful surveys of the large literature include Atack and Passell (1994, 583-624), Fishback (2010), and two books of interviews conducted by Randall Parker (2002, 2007) with economists who studied the Great Depression.

(1990). They found substantial impact of the policy package, but it is difficult to sort out how much each was contributed by monetary policy and fiscal policy separately.<sup>6</sup>

### 3. *Empirical Methods for the Microeconomic Studies*

Microeconomists have taken a different tack by emphasizing the different types of spending and lending and focusing on more disaggregated panel data at the state, county, city, and individual level. Some programs offered pure grants, while others offered loans to be repaid. The Agricultural Adjustment Act farm grants required farmers to take land out of production. This section provides an intuitive discussion of the panel data methods that have been commonly used to examine the New Deal programs in the past decade. The panel data methods are designed to reduce problems with endogeneity bias, which is a significant issue because it is clear that the New Deal spending policies were generally designed to offset problems in the economy. Studies of the geographic distribution of New Deal spending show that many of the New Deal programs paid attention to those issues when distributing the monies.

The studies have used specifications that involve some subset of the following equation. The dependent variable in the equation is the outcome measure ( $y_{it}$ ) in location  $i$  and year  $t$  and the New Deal funds are measured as  $g_{it}$ , and the coefficient  $\beta_1$  shows the relationship between the two. The outcome measures include per capita income, birth rates, death rates, crime rates, migration, employment, wages, home ownership rates, housing values, and rents. Depending on the study, the locations include states, cities, counties, and individuals, and the New Deal funds sometimes are split into multiple categories.

$$y_{it} = \beta_0 + \beta_1 g_{it} + \beta_2 x_{it} + S + Y + S^* t + \varepsilon_{it}. \quad 1)$$

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<sup>6</sup> There is substantial disagreement between Eggertsson (2012) and Harold Cole and Lee Ohanian (2004) about the impact of the National Recovery Administration based on conflicting structural models that are discussed later in the article.

The equation includes several vectors to control for exogenous variables that might have influenced both the New Deal funds and the outcomes in the locations. The  $x_{it}$  vector includes variables like weather shocks and the socioeconomic features of the economy that vary across time and place. A vector of location fixed effects (S) controls for factors like geography, local laws, and the basic economic, cultural, and demographic structure of each location that did not change over time but varied across states. When the location fixed effects are added to the model, the variation that identifies the impact of the New Deal ( $\beta_l$ ) is changes across time within the same location. A vector of year fixed effects (Y) controls for national changes in the economy that affected all locations in each year, including monetary policy changes, changes in federal tax rates, and changes in national regulation. The addition of the year fixed effects to the location fixed effects specifications causes the effect of the New Deal to be identified by variations within the same state over time after controlling for national shocks to the economy. The addition of a vector of location-specific time trends (S\*t) controls for differences in the trend paths of economic activity in each location. Under the complete model specification the identification of the New Deal effect comes from deviations from trend across time within the locations after controlling for nation-wide shocks.

As an alternative way to control for location fixed effects, the model can also be estimated in year-to-year first differences. The year effects in the first difference model still serve the same purpose of controlling for nationwide shocks in each year. In the difference model location time trends are controlled with the addition of state fixed effects. Both the methods, levels with fixed effects and first-differences lead to unbiased and consistent estimates

of the multiplier in large samples, but the standard errors are more efficiently estimated by the difference estimation if there is serial correlation (Wooldridge 2006, pp. 491-492).

Even after incorporating all of the controls, endogeneity bias might still remain if policy makers were explicitly taking into account the year to year fluctuations in that location's economy when deciding how much funding to provide to that area. The New Deal studies have sought to deal with that issue in a variety of ways. One has been to tap the ample literature on the political economy of the distribution of New Deal funds across locations. <sup>7</sup>

The range of New Deal spending per person across the states was striking, ranging from highs for the decade of nearly \$900 per person in the mountain west to lows of roughly \$100 per person in some southern regions (Arrington 1970; Reading 1973). The U.S. is an economically diverse country and there was substantial variation in the extent of the downturn across areas, so it seems natural that the amounts would vary. Among the patterns that have drawn the most attention were the relatively small amounts received by southern states, even though southern per capita incomes were the lowest in the nation and some southern states experienced among the worst of the downturns. Although many modern programs have explicit formulas that determine the distribution of spending through matching grants and specific counts, the inner workings of the emergency New Deal programs are more difficult to fathom. Explicit formulas for matching funds written into legislation for the Federal Emergency Relief Administration and

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<sup>7</sup>Arrington (1970) and Reading (1973) first identified the large variation in distributions. Wright (1974) developed a median voter model and found that swing voting had a very strong impact. Wallis (1987, 1991, 1998, 2001) emphasized the role of the states in determining the distribution because state governments often had to make proposals to get the funds. Anderson and Tollison (1991) emphasized the role of Congress. Fleck (1999a, 1999c, 2001a, 2001b, 2008, and 2013) developed new models that showed the impact of voter turnout, emphasized the importance of federal lands, discussed more complex interactions between political variables. He was the first to use the political variables as instruments. Couch and Shughart (1998) wrote a book-length survey with additional material. Stromberg (2004) emphasized the importance of the radio to electioneering. Fishback, Kantor, and Wallace (2003), Kantor, Fishback, and Wallis (2013), and Fishback, and Kantor (2006) examined the distribution across counties, showed that the factors influencing the distribution varied substantially by program, and describe the extent to which the Roosevelt administration sought to control corruption by local governments.

the Works Progress Administration were abandoned as unworkable, and Senate testimony by relief administrators offered long lists of factors considered but with no weights attached (Fishback, Kantor, and Wallis 2003). Scholars have attached weights to these factors using econometric analysis.

Studies spread across forty years suggest that the funds were distributed in response to a complex mix of factors, although there is not full agreement on how much weight to give to each factor. In a famous Fireside Chat in 1933 Franklin Roosevelt suggested that the New Deal funds would be used to promote “Recovery, Relief, and Reform.” Many studies, but not all, find evidence that the Roosevelt administration promoted recovery and relief by spending more in areas with higher unemployment and in areas where the economic downturn from 1929 to 1933 was more pronounced. This was particularly true for specific programs targeted at poverty relief. Most programs required that state and local governments develop and help fund projects to obtain federal grants (Wallis 1987, 1998; Fishback, Kantor, and Wallis 2003). Some areas received substantially less funding where leaders were leery of possible strings attached to New Deal largesse or because they did not press as aggressively for funding. Areas with more federally-owned land tended to receive more funds, as the administration sought to enhance the value of the federal lands (Reading 1973, Fleck 2001a, 2008).

Nearly every study finds that political considerations were important to the Roosevelt administration. More funds per capita were distributed in areas that were more likely to swing toward voting for Roosevelt and areas where high voter turnout suggested strong political interest.<sup>8</sup> Some studies find that the administration might also have been rewarding districts that

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<sup>8</sup> Wright (1973) developed a political model based on the median voter and developed a political productivity index that he found influenced the distribution of the funds. He also decomposed it into the mean share voting Democrat for president and a swing voting measure, the standard deviation of past voting for Democrats for president. That swing voting measure is the one that most scholars have found to be a strong determinant of the distribution of

had long voted for the Democratic presidential candidate. Since Congress holds the purse strings, the distribution of New Deal funds was influenced by the congressional power structure, and there is evidence that members of important committees and Congressional leaders were effective at helping their constituents obtain more New Deal funds (Anderson and Tollison 1991).

The studies of the impact of the New Deal have used a variety of the noneconomic factors from the political economy literature as instruments. Successful instruments have two features: 1) a strong relationships with the New Deal spending measure in equations that incorporate all of the controls in the final equations and 2) they are “valid” in that they are not correlated with the error ( $\varepsilon_{it}$ ) in the outcome equation. The first requirement is testable but the validity is not because the error term is unobservable; therefore, the validity is determined by the logic of the argument for why it would not be correlated with the error. One thing to remember in the logical discussion is that the instrument can be correlated with the outcome in raw correlations and still not be correlated with the error in the outcome equation after all other factors are controlled. In that case the raw correlation arises because the correlation from the instrument comes through the New Deal spending itself or through some other control that is included in the equation. For example, in studying death rates, the instrument might have a raw correlation with the death rate. If the raw correlation arises purely because the death rate is correlated with income and the New Deal variable, the instrument is not correlated with the error if both income and the New Deal variable are included in the equation.

Some examples help illustrate the logic of the instruments. As seen in Table 3, a common variable used has been a past measure of swing voting in presidential elections,

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funds. Fleck (1999a, 2001a, 1999c, 2001b, 2008) expanded the modelling and was the first to use swing voting and mean presidential voting measures as an instrument (Fleck 1999b).



typically the standard deviation of the percent voting for Democrats for President over a past time period. Nearly all of the political economy studies of New Deal spending find that the swing voting measure is strongly related to the geographic distribution of funds, and the instrument is typically found to be strong in tests on the first-stage equations. The argument for the validity of the past swing measure rests on several factors. In studies of death rates and migration, the swing voting would be uncorrelated with the error when income and other economic factors are included as a correlate and the swing voting has no separate relationship with the outcome measure. Further, the area fixed effects control for long run leanings of the location toward one party or the other. Finally, the swing voting measure is typically a lagged measure, so there is no question of simultaneity, and the lag length is long enough that there is unlikely to be serial correlation in the error term that would lead the swing measure to be correlated with a lagged error term.

Both studies of the New Deal and modern political economy studies have used representation on key committees in Congress as an instrument.<sup>9</sup> The argument for the lack of correlation between key committee memberships and the error rests on the argument that Congress is a national body. Even though congressmen from districts in trouble may seek spots on the key committees, more members seek the memberships than there are slots available and the tenure of congressmen and a wide range of rules determine who gets assigned to the committees. This process therefore leads to a weak relationship between the committee assignments in any year and the error term in the outcome equation.

Finding instruments can be difficult for annual panels because the instruments need to vary across both time and space. One instrument used in New Deal and modern papers is a

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<sup>9</sup> For New Deal examples, see Haines, Fishback, and Kantor 2007 and Hungerman and Gruber 2007. In the modern period see Feyderer and Sacerdote 2011.

“shift-share” instrument that has been used by Wallis and Benjamin (1981), Bartik (1991), and Nakamura and Steinsson (2014). In the New Deal context Fishback and Kachanovskaya (2015), for example, developed an instrument based on the idea that the federal government over the 1930s provided the same proportion ( $p_{ij25-28}$ ) of federal spending to state  $i$  in category  $j$  as it did for the period 1925 to 1928. For each of eight spending categories  $j$  they multiplied the 1925-1928 state proportions ( $p_{ij25-28}$ ) by the national total in each category ( $S_{usjt}$ ) for each year  $t$  in the 1930s to get a prediction of each state  $I$ 's spending in category  $j$  in year  $t$  and then summed across the categories to predict total state  $i$  spending in year  $t$ .

$$\text{Inst}_{it} = \sum_{j=1-8} p_{ij25-28} S_{usjt}.$$

The instrument is valid when the shares of federal spending in the 1920s are not correlated with the error in state  $i$  and year  $t$  in the outcome equation for years in the 1930s and each state's spending is a small enough share of the national total that the national total is not correlated with the error in the outcome equation. To avoid the problem that the state is part of the national total, Fishback and Kachanovskaya took an additional step and replaced the national total  $S_{usj}$  with a total spending measure from states that were well outside the region where the state was located. For Massachusetts, for example, the total used *excluded* all states in New England, the Mid-Atlantic, the East North Central, and Virginia, Maryland, Kentucky, or West Virginia. The goal was to develop a spending total for states that were least likely to be consistently trading with state  $i$ .

As in all studies using instruments, there are some additional issues to consider. For example, since no one can know the true error in the outcome equation, no one can know that the instrument is completely uncorrelated with the error. A complete lack of correlation may be difficult to achieve, so the logical discussion about this validity issue is often about where the

correlation lies on a continuum in which the instrument is more effective as the probability of correlation declines. Further, the instrumental variable method is focused only on the part of the New Deal spending that is correlated with that instrument (or set of instruments). There may be other components of the policy that are uncorrelated with the error term that have a different relationship with the outcome measures. Thus, the results may differ with different sets of instruments.

In some settings scholars have found it difficult to develop effective instruments for the New Deal programs. The problem arises most commonly when there were multiple New Deal programs that would have influenced the outcome of interest. For example, in farm settings there were several types of farm programs plus public works and relief programs that were likely to have differential effects on farmers' decision making. Even when scholars find several instruments, the same instruments typically are strongly correlated with more than one of the programs studied, which means that they cannot effectively be used to sort out the separate effects of those programs. One alternative has been to turn to placebo analysis in which the results of an analysis during the 1930s are compared to the results from a placebo regression for the 1920s in which the program values are inserted as if they occurred in that decade. In many cases the 1920s placebo regressions show that the 1930s program has no relationship with the changes that occurred in the 1920s, which makes it more likely that the 1930s results provide reasonable estimates of the effects in the 1930s (Kitchens and Fishback, 2015).

#### *4. The Multiplier for Federal Spending in the States*

To illustrate several common findings, I discuss estimates of the state income multiplier for overall federal spending in some depth and then provide shorter surveys and a summary table of the results and methods used for specific types of spending. The federal stimulus package of

2009 has generated renewed interest in the fiscal multiplier. The multiplier is valued at one when a dollar increase in government spending leads to a dollar increase in income. It is valued at two when the dollar of government spending leads to enough activity to raise income by two dollars, the original dollar plus additional effects that add another dollar to income. It is valued at one-half when the government spending of a dollar crowds out 50 cents in economic activity. In macroeconomics John Maynard Keynes (1935, republished 1964) is the economist most associated with the multiplier, but there were other economists at the time also writing about stimulus associated with injections of public works spending. The U.S Department of Agriculture under the Hoover administration, for example, saw increased highway spending as a way to stimulate the economy above and beyond the initial spending. The Bureau of Agricultural Economics inside the U.S. Department of Agriculture (1935) developed a formal input-output model visualized as a wheel of economic activity that implied multipliers above 2.5.10

In a recent *Journal of Economic Literature* survey, Valerie Ramey (2011) surveyed the modern multiplier literature, and many of the working papers she cites have now been published. The majority of studies focus on national macroeconomic multipliers in which the spending and taxation are generated within the same economy. These multipliers are difficult to estimate because of the endogeneity problems that arise because policy makers often set their spending and taxation policies in response to what they see in the economy around them. To reduce the endogeneity problem, scholars have tried a variety of methods, including using lagged values, identifying periods of warfare and focusing on military spending that might not have been driven by the ups and downs of the economy, using narratives to identify periods when policy makers are not mentioning the economy in setting policy, and seeking out “surprises” when spending

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10See Barber (1996, 83-89), U.S. Department of Agriculture (1932, 49-50), and Bureau of Public Roads (1935).

deviates from prior announcements. No consensus estimate has developed. After surveying the literature, Ramey (2011) suggests that the multiplier lies between 0.8 and 1.5, although she cites some studies with larger and smaller multiplier estimates.<sup>11</sup> None of the methods lend themselves to studies of the national multiplier for the New Deal because very little of the spending in the 1930s was on the military and the spending was clearly designed to offset the disastrous economy.<sup>12</sup>

Using the model structure described in the methods section above, Fishback and Kachanovskaya (2015) estimated the multiplier for federal injections of loans or spending into state economies in the 1930s. The state multipliers cannot be easily translated into a national multiplier because of spillover effects outside each state's boundaries and because the same state multiplier can lead to a broad range of estimates of the national multiplier under a reasonable range of assumptions in a macroeconomic model that pays attention to regional variation in spending.<sup>13</sup> The state multiplier measures the impact of federal monies that were delivered to a state after leakages in the spending from that state are taken into account. A state multiplier of

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<sup>11</sup> The lagged values require careful consideration of serial correlation. World War II was the only period of all-out war when problems in the economy would plausibly have had no influence on spending. However, it looked very little like a peace-time economy because there were few consumer durables produced, the military made a major share of the resource allocation decisions, and there were extensive price controls. Military spending in nearly all other periods has been subject to the same political economic wrangling as other spending.

<sup>12</sup> Romer (1992) estimated a multiplier of 0.23 using a difference-in-difference estimate during and after the Veterans' Bonus, arguing that the Bonus was not designed as a countercyclical measure.

<sup>13</sup> Nakamura and Steinsson (2014) suggest that state multipliers for federal spending might be useful as estimates of the multiplier in a small open economy in a currency union with free movement across borders. However, a national multiplier for federal spending addresses a situation where all of the taxation and debt obligations are centered within the economy where the money is spent (Barro 1981). In contrast, a state can receive federal funds but might bear less than (or more than) its full share of the tax and debt obligation associated with funds. Further, distribution of federal funds to one state will likely lead to spillovers for other states when the funds purchase inputs from other states and workers consume goods and services from outside their state. Nakamura and Steinsson (2014, 777-787) find that the relationship between state multipliers and the overall national multiplier can vary a great deal depending on a variety of assumptions about monetary policy. They cannot fully address the spillover issue because they do not estimate spatial spillovers. Suarez-Serrato and Wingender (2014) estimate spillover effects using county data and find small spillovers and not much change in their multiplier estimates, but the instruments for their spillover estimations are much weaker than for the direct estimation. This problem bedevils all analysts. It is already a challenge to come up with valid and strong instruments for the spending within the state and the problem is compounded when seeking multiple instruments that will allow the estimation to parse out the differential effects of the spending in the state of interest and the spending in its spatial neighbors.

one implies that a state like Arizona could expect that an additional dollar of per capita federal spending in Arizona would raise per capita income in Arizona by a dollar. Thus, it provides an indication of the benefits that the Arizona governments could anticipate obtaining for its residents by lobbying for an additional per capita dollar of federal spending. From the New Deal onward, the decision about how much federal funding to seek has been a significant decision for every state and local government. During the 1930s some governors and state legislatures aggressively sought federal grants, while others were passive and some were even hostile. Even with no lobbying the state was likely to gain from federal largesse. The President and Congress had incentives to provide some grants to every jurisdiction to avoid charges of favoritism, while states that did not actively lobby for grants still benefitted from any spillovers from federal spending in other states (Wallis 1998; Fishback and Kachanovskaya 2015).

There are a variety of theoretical models designed to capture the impact of federal spending in the states. The models range from the early Keynesian regional models to input-output models to economic base models to neo-classical models.<sup>14</sup> Generally, in a reduced-form model with state income as the dependent variable, the coefficient on federal spending will be determined by a series of factors. Spending has positive effects if it puts to work unemployed resources; if it is more productive than the private spending it replaces; and if it produces social overhead capital (like roads, sanitation, public health programs) that make the inputs in the state economy more productive. The logic of the Keynesian multiplier argues that income recipients will purchase goods and services within the state from others, who, in turn,

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<sup>14</sup>Nakamura and Steinsson (2014) develop a neo-Keynesian model for small open economies integrated into a currency union. Among regional economists Richardson (1985) surveys all but the neoclassical models. See Merrifield (1987 and 1990) and McGregor, McVittie, Swales, and Yin (2000) for examples of neoclassical multipliers for the economic base. For a static model that lays out the groundwork of the intuition see the online appendix by Cullen and Fishback (2013). Kline and Moretti (2013) survey the work on modern periods based on place-based regional models.

spend their receipts on goods and services produced by others in the state. Alternatively, the regional neoclassical multiplier arises because the spending increases labor demand along an upward sloping labor supply curve and thus increases earnings. .

The positive benefits of the multiplier are reduced by “leakages” when the money spent in the process is spent on goods and services outside the state economy. During the New Deal much of the federal spending on relief programs had small initial leakages because over 80 percent was spent on wages for people in the state. Public works grants had larger initial leakages because more than 50 percent of the monies were spent on materials and equipment imported from other states. After the first round of payments more leakages arose because workers on federal projects spent some of their wages on goods and services produced outside the state.

The boost of federal spending locally was smaller to the extent that it crowded out local production of goods and services. New federal spending could bid up local wages and other input prices and thus raise the costs of production for private producers. This effect will be attenuated in the longer run to the extent that the federal spending attracts new workers and/or sellers. The most obvious crowding out effect came from the AAA payments to farmers to take land out of production. The stated purpose of the act was to reduce output in hopes of raising prices enough to see an increase in income. In other cases, the federal spending may have replaced state and local resources in projects that would have been built without Washington’s support. The impact of the reduction in state and local spending was likely to be small because states were generally required to run balanced budgets.

Fishback and Kachanovskaya (2015) estimated state income multipliers for total federal grants using all the various subsets of panel model specifications described in the model section

above, and the results are shown in Table 1.15. They also estimated effects for subsets of spending and other outcomes that will be discussed in other sections of the paper. In the process, they learned quite a bit about how much results can differ using these different specifications. First, adding controls clearly led to changes in the multiplier estimate. The OLS estimates with no controls led to multipliers of 1.25 and 1.52. Controls for time-invariant features of the states led to multipliers ranging from 0.98 to 2.06. Adding year fixed effects to the other controls cut the multiplier to 0.26 to 0.45 and adding state time trends cut the estimates to 0.16 to 0.27.

Second, after adding the many controls, they anticipated negative endogeneity bias to the extent that the Roosevelt administration sought to provide more funds to areas where the economy was hit harder by negative shocks. Consistent with this expectation, performing IV estimation with the same controls typically led to larger multipliers. Using the shift-share instrument with national totals outside the state's large region described in the model section, the switch to IV estimation with state and year fixed effects increased the point estimates of the multipliers from a range of 0.26 to 0.45 to a range of 0.67 to 0.96. Third, when the state-specific time trends were added to the IV estimation, the instruments were much weaker as F-statistics were cut dramatically. The multipliers ranged from -0.18 to 0.87 and the hypothesis of zero could not be rejected.

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15 The New Deal involved a wide variety of grants and loans. The range of estimates described in the text refers to estimates of per capita income on grants in combinations where both income and grants include pure transfers and where both income and grants exclude pure transfers to see the effect of grants that led to production of a good or service. The grants required no repayment and were a pure subsidy, while the subsidy for the loans depended on the difference between the interest rate charged by the federal government and the interest rate that would have been charged privately. This private counterfactual interest rate varied a great deal across programs. For example, when the HOLC refinanced loans for troubled home borrowers at 5 percent interest, private lenders were charging 6 to 8 percent for good loans, but it is not clear that the HOLC borrowers would have been able to get a private loan at any interest rate. Therefore, Fishback and Kachanovskaya (2015) estimated multipliers with grants and no loans, grants and 10 percent of loans, and grants plus all loans. They also estimated the impact of grants net of federal taxes paid by state taxpayers. The estimates for these various measures using year fixed effects and controls for time-invariant features of the states ranged from 0.43 to 1.26.



Fourth, Fishback and Kachanovskaya had *a priori* expectations that the results would not change much when they switched from controlling for time-invariant features of the states in a model of levels with state fixed effects to a model of first-differences. In an OLS model with just controls for time-invariant features of the states, the coefficients differed by roughly 50 percent (1.54 versus 0.98 when transfers were included and 2.06 and 1.37 when transfers were excluded). The differences in coefficients were typically smaller in the IV model with state and year fixed effects. However, the same instruments were much weaker in the first-differenced model than in the level model with fixed-effects model with F-statistics that were roughly one-fourth to one-sixth as large. Consequently, the standard errors for the multiplier estimates were substantially larger.<sup>16</sup>

The differences in the estimates of the standard errors were not that surprising given that the assumptions about the error term in the levels with fixed effects and the first-differenced model are different. However, there were also substantial differences in the OLS coefficients using the two methods. Small sample size was likely the reason with only 48 states and 11 years in the panel. The panel is likely not large enough for us to expect the various multiplier estimates to converge to the same consistent value using the different methods.

#### *4.1 Comparisons with Modern State Multipliers*

The economic context for the New Deal state multiplier is similar to the context to the Great Recession in two major ways. In both periods Federal Reserve policies drove short term

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<sup>16</sup>To get an idea of how much leakages influenced the estimates of the state multiplier, Fishback and Kachanovskaya (2010) estimated multipliers for grants net of federal taxes in each state using first differences and adding a measure of the difference in the national money supply and a dummy for the NRA period. They expected larger states and more diverse economies to have larger multipliers due to smaller leakages. They found no discernible pattern in the estimates, as both large and small state economies were among the states with the largest multipliers.

nominal interest rates near zero and there was significant slack in the economy.<sup>17</sup> During the Great Recession the unemployment rate rose above 9 percent for nearly two years, while the slack was much greater in the Depression when real GDP dropped by 30 percent between 1929 and 1933 and unemployment rates ranged from 14 to 25 percent for most of the decade. There are also significant differences in context. The federal government played a substantially smaller role in the economy in 1929 than in 2007 and had not been running deficits for several decades.

Several studies of the modern economy measure the impact of federal spending on state economies. Nakamura and Steinsson (2014) estimate state level multipliers based on variations in military procurement spending during periods of military buildups between 1966 and 2006. To control for endogeneity, they estimate state shares of military spending in a baseline period and construct their instrument as the product of the baseline shares and national military spending in each year. Their results suggest multipliers of 1.5 to 1.9, which are much larger than the ones Fishback and Kachanovskaya (2015) find for the New Deal. The New Deal estimates are somewhat larger than multiplier estimates of around 0.5 found by Art Kraay (2010) who used earlier project approvals of World Bank loans as his instrument for public works spending in low income countries.

One potential reason for the difference in results might be that Nakamura and Steinsson focus on military spending, which tends to go to large military contractors who are hiring a large share of highly skilled workers on a relatively permanent basis. On the other hand a large share of the New Deal spending went toward relief payments of half to two-thirds of normal wages that were designed to increase the recipients' income to a minimum standard of living. As a result, the New Deal relief workers likely spent a higher share of their earnings than did modern

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<sup>17</sup>Although it seems reasonable that the multiplier would be larger during periods of higher unemployment, Owyang, Ramey, and Zubairy (2013) and Barro and Redlick (2011) do not find variation in the size of national multipliers during periods of high unemployment.

workers but they only had enough funds to pay for the basic necessities for food, clothing, and shelter. Unlike the modern full-wage workers, the relief workers were not purchasing the types of durable goods and non-necessities that would have stimulated a broad range of industries and services that were hit hard by the Depression. My sense is that the impact on the multiplier of differences in the composition of spending more than outweighed potential differences in the marginal propensity to consume.<sup>18</sup>

### *5. Effects of Different Types of Grants*

The New Deal enacted a broad range of grant and loan programs, which are described with thumbnail sketches and acronyms in Table 2, along with their shares of total grant and loan funds distributed between fiscal years 1934 and 1940. The relief grants, the farm grants, and the public works grants focused on local projects, and many of the loan programs introduced new roles for the federal government. Grants for veterans, highways, Bureau of Reclamation dams, and Army Corps of Engineers' (ACE) river and harbor projects continued existing programs. Some of the new public works and relief grant were used to fund parts of the ACE projects without flowing through the ACE.

It is likely that the different types of grants and loans had differential effects on economic activity because they were targeted for different purposes. Roughly half of the New Deal grants went to relief programs for the poor and unemployed. This was a major change in federal policy. Except for benefits for federal employees, including military veterans, poverty relief had been the responsibility of local governments from the colonial period onward. In the 1910s, many state governments began supplementing these activities with new laws for workers'

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<sup>18</sup>One sign of the differential effects comes from Xing Liu's (2015) finding that private hourly, weekly, and annual earnings for individuals in 1939 were positively and statistically significantly related to New Deal Public Works spending in the 1930s, which paid full wages, and not with New Deal relief programs.

compensation, aid to mothers without spouses, and aid to the blind. In the late 1920s and early 1930s roughly half started providing means-tested old age assistance. Most of the federal relief funds were distributed as work relief payments with a goal of helping households reach an emergency budget level with hopes of moving up to a basic maintenance level (Stecker 1937). Faced with large numbers of unemployed and limited funds, the FERA and WPA limited work hours and paid out earnings per hour that were roughly half to two-thirds of earnings on the public works and highway projects that were not focused on relief workers. The ratios varied across states and time (Federal Works Agency 1940, 1941; Wallis and Benjamin 1981). Work relief stints were meant to be short, but a significant percentage of emergency workers in the 1939 census reported continuous time on relief that carried well beyond 6 months and often to multiple years. Even though WPA officials in many areas encouraged relief workers to accept private employment with promises to allow them to return if the job did not work out, employers in a number of areas found it difficult to offer high enough wages to attract people off of work relief because private employment was considered more unstable (Margo 1991; Howard, 1943; Neumann, Fishback, and Kantor 2010). Darby (1976) raised the issue as to whether relief workers should be treated as employed or unemployed. In my view in comparisons with current people on Unemployment Insurance (UI), the 1930s relief workers should be treated as unemployed. In the modern era, UI provides benefits of up to two-thirds of the normal wage without a work requirement to people who are unemployed and seeking work. People on New Deal work relief received similar shares of earnings as benefit payments but were actually worse off than modern UI recipients because they had to work for their benefits.

Some of the federal relief money came in the form of direct transfers with no work requirement. When the FERA was the primarily federal relief agency from July 1933 through

July 1935, about one-third of the funds went to direct relief payments with no work requirement. In the 1935 negotiations between Congress and the Roosevelt Administration over short term emergency relief and the long run features of the Social Security Act, the federal government increased its control over emergency relief for “employables” and returned responsibility for direct relief to the nonworking poor to state and local governments. The federal government still provided some aid to unemployables in the form of matching grants to the states for largely state-run Public Assistance Programs created by the Social Security Act to aid women with dependent children, the poor elderly, and the blind (Wallis 1981; Wallis, Fishback, and Kantor 2006).

Roughly 20 percent of the grants went to veterans. Half of those went to long standing Veterans’ Administration programs for pensions, disability, life insurance, housing, and medical care (Administrator of Veterans’ Affairs, various years). The other half was paid out as a Veterans’ Bonus in the summer of 1936 when Congress overrode President Roosevelt’s veto. The bonus called for roughly \$3 billion dollars in early cash payments on World War I adjusted service certificates, which originally were meant to be cashed in the 1940s. Roughly half the bonus was paid in cash, while the rest was used to repay loans on the certificates that a large number of veterans had taken out with the Veterans’ Administration in the early 1930s (Hausman 2014).

Another 18 percent of the grants went to large-scale public works projects. The labor requirements on these projects differed from the relief projects because they were not required to hire from the relief rolls and paid regular wages. The Public Works Administration (PWA) built federal projects and for the first time helped build local and state government projects with a mixture of grants and loans. The Public Roads Administration took over the federal/state highway building program from the U.S. Department of Agriculture, while increased funding

was given to the Bureau of Reclamation and the Army Corps of Engineers. To build a system of dams along the Tennessee River, the federal government created the TVA corporation, which spent about 1 percent of the total grant funds on the projects. Farmers received about 11 percent of the grants in return for taking land out of production through the AAA program.

### *6.1 The Impact of Public Works and Relief Spending*

A substantial majority of New Deal grant spending went to public works and relief spending. Over the past decade there have been a number of studies that use panel and cross-sectional methods to examine the impact of New Deal public works and relief spending on a variety of measures of activity in local economies. The studies are summarized in Tables 3 and 4 with information on the outcome variable, the nature of the data used, the types of panel methods used, and the types of instruments used.

Counties with more public works and relief spending between 1933 and 1939 had increased growth in retail sales per capita. An additional dollar per capita over that period was associated with roughly a 40 to 50 cent increase in retail sales per capita in 1939, which was consistent with a rise in income per capita of about 80 cents. Even though many local areas limited access to relief for new in-migrants, increased public works and relief spending was associated with net inflows of migrants from other parts of the country (Fishback, Hoxby, and Kantor 2005, 2006). The inflows of new migrants had mixed effects on the welfare of the existing population because the inflow was associated with shorter workweeks, more difficulties in obtaining relief when unemployed, and some out-migration (Boustan, Fishback, and Kantor 2010).

Relief spending had a number of positive effects on other socio-economic variables in a series of panel studies with annual data for 80 to 114 large cities for the years 1929 to 1940. Hausmann (2014) finds that the Veterans' Bonus stimulated automobile sales and increased home building activity. A 10 percent increase in work relief spending per capita was associated with a 1.5 percent reduction in property crime. In a number of specifications work relief spending did more to reduce crime than direct relief spending because the time spent working reduced the time available for crime for the relief recipients. An increase in private employment was even better because a 10 percent rise in private employment was associated with a 10 percent reduction in property crime (Johnson, Fishback, and Kantor 2010). During the early 1930s birth rates declined below trend, in part because marriage rates declined sharply with the Depression. The distribution of New Deal relief spending helped stabilize incomes in poor households and contributed to a rise in marriage rates and a return of the birth rate to its long term trend (Fishback, Haines, and Kantor 2007).<sup>19</sup>

Relief spending had its most positive effects in reducing mortality. Estimation using a panel of 114 cities found that an additional \$2 million of relief spending, measured in year 2000 prices was associated with one fewer infant death, one less suicide, 2.4 fewer deaths from infectious disease, and one less death from diarrhea in that city. On this basis alone the relief spending would pass cost-benefit tests because the dollars spent per life saved were much lower than estimates of the statistical value of life. General relief spending had little effect on a variety of other death rates (Fishback, Haines, and Kantor 2007). The relief measure in these city panel studies incorporates all types of relief from all levels of government and private aid. For people who lived in Dust Bowl areas during the 1930s the New Deal relief spending and several types

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<sup>19</sup> Hill (2015) finds a negative relationship between WPA work relief spending per capita in the late 1930s and the probability of marriage in 1940 but he did not try to control for endogeneity and suggests that this may not be a causal effect

of loans helped to reduce the negative effects of the Dust Bowl on the health and education later in life (Vellore 2014).<sup>20</sup>

During the early 1930s state governments were involved in specific public assistance programs for mothers, the elderly, and the blind, which were expanded on and replaced by new programs under the Social Security Act of 1935 that added federal matching grants to the mix. The lion's share of the public assistance spending went to old-age assistance (OAA) for the elderly poor, which was designed to allow the elderly to live independently and not in almshouses. This independence can be seen in studies using individual census data from 1940, and 1950. Higher OAA benefits allowed a higher share of women to live on their own (Costa 1999) and more elderly to exit the labor force (Friedberg 1999). A panel study with state data for 1930 through 1950 found that increased OAA benefits explained roughly half of the drop in the number of elderly in the labor force during that period (Parsons 1991).

On the other hand, panel studies by Balan-Cohen (2009) and Stoian and Fishback (2010) found that old-age assistance had little impact on the death rates of the elderly in the 1930s. One reason might have been that the move from the general relief program to the specific old-age assistance program did not change the access to poverty relief much. Another reason might have been changing access to health care. The alms houses and living with relatives may not have been pleasant but these situations did involve day to day access to some palliative care for the elderly, while living alone may have led to more isolation from other people, which itself can have deleterious effects. Balaan-Cohen (2009) found positive effects of old-age assistance after the middle of World War II when penicillin became more widely available.

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<sup>20</sup>Thomasson and Fishback (2014) find that the sharp drops in state income, including relief payments, during the Depression had negative effects later in life for people born during the early 1930s in the low income birth states but not the high income ones.



Throughout the 1930s, total relief payments at all levels of government divided by the population rose, even though the ratio of employment (excluding relief workers) to population rose from 30 to 34 percent after 1932. This rise suggests that the government safety net was expanding over the decade. Hungerman and Gruber (2007) use a panel of data from church charities and find that increased New Deal spending reduced church charitable spending by roughly one-third of the maximum possible. In general, the loss in private charitable spending was overwhelmed by a flood of government spending that was several times larger than the per capita level of charitable spending in 1933 before the federal program began (Baird 1942, 12-13).

Nearly all of the studies of New Deal relief and public works spending find at best small positive effects and sometimes negative effects on *private employment*. Wallis and Benjamin (1981) found little effect of relief spending on employment when they used Two-Stage Least Squares (2SLS) to estimate a three-equation model to examine the impact of higher relief benefits on private employment for a cross-section of cities in 1935. Using a similar procedure on panel data for the states, Benjamin and Mathews (1992) estimated the New Deal spending reduced private employment by one-third of a job prior to 1935 and by 0.9 jobs after 1935, although they did not control for state and year fixed effects. Fleck (1999b) used IV estimation on county cross-sections from 1937 and 1940 and found that the creation of an additional relief job was associated with an additional person listed as unemployed. He argued that an additional relief job pulled a discouraged worker back into the labor force and into the relief job, which counted as another unemployed worker at the time.

Neumann, Fishback, and Kantor (2010) estimated a panel VAR model on a panel of monthly data from 1932 through 1939 using first differences, city-specific time trends, and

adjustments for serial correlation. The measured impact can be seen as causal if there is a one-month delay in *all* of the reactions of relief spending, private wages, private employment to each other. They found that an additional eight relief jobs were associated with one additional private job prior to 1935. After 1935 an additional relief job was associated with the loss of two-thirds of a private job. When estimating multipliers with their state panel from 1930 to 1940, Fishback and Kachanovskaya (2015) found no evidence of a positive impact on private employment and some specifications yielded statistically significant negative elasticities of around -0.04. That elasticity is about two-thirds as large in absolute value as the elasticity of per capita income with respect to public works and relief spending that generated a dollar-for-dollar multiplier of one.

These results seem more pessimistic about the impact of federal spending on employment than a recent set of modern studies. Most of the recent studies find positive effects of federal spending on overall employment. The range in point estimates of dollars spent per job created is quite large from a low of \$25,000 in Medicaid reimbursement to a high around \$400,000 for general ARRA funds with a number of estimates in between. <sup>21</sup>

Why are we seeing this difference? Most of the modern studies look at total employment, while the New Deal results above are focusing on private employment. The two modern studies that focus on private job creation find small positive or even negative effects on private employment.<sup>22</sup> The lack of the effect of the New Deal public works and relief spending

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<sup>21</sup> Chodorow-Reich, et. al. (2011) estimated the 1 job for \$25,000 effect for Medicaid spending under the 2009 ARRA in a state cross-section using prior Medicaid spending as an instrument. Feyderer and Sacerdote estimated about \$100,000 per job for overall ARRA aid in a state cross-section using the rank of the seniority of congressmen on the appropriations committee, while their time series estimates suggested an effect of \$400,000 per job. Wilson (2012) found a similar figure of about \$125,000 per job in his cross-section state study of ARRA spending using various mechanical rules for federal fund distribution as an instrument. Nakamura and Steinsson find strong positive effects of military spending in their state panel studies using the methods described in the text for their multipliers. Suarez Serrato and Wingender (2014) in their study of a county panel of federal spending using the changes in allocation influenced by new Census population estimates find spending of \$30,000 per job created.

<sup>22</sup> Conley and Duper (2013) found positive effects on state and local government employment in their cross-sectional state study of ARRA aid using highway fund distribution rules, the portion of state revenues that tend to be

on private jobs helps explain why the state income multiplier was no larger than one because the result suggests that there was little or possibly negative spillover into the private sector.

A significant part of the ARRA stimulus in 2009 was targeted at state governments to help them maintain key programs and served to maintain jobs that already existed. The New Deal was also creating government jobs with their emergency programs. The best jobs were the ones with full pay under the PWA, PRA, and PBA public works programs. The number of workers on these projects reached a high around 1 million in June 1934 but had roughly halved by the next year and fell to around 300 thousand between 1938 and 1940. After a short burst when the Civil Works Administration hired up to 4 million relief workers between December 1933 through early March 1934, the numbers of relief workers fell off. The FERA and later the WPA had between 1.5 and 3.3 million people working on projects for roughly half to two-thirds the hourly earnings on the public works programs (Federal Works Agency 1941, pp. 244, 259, 302, 427; Works Progress Administration 1943, 154). All knew that the jobs were designed to provide an emergency standard of living for the relief workers' households. Despite the temporary nature of the work relief jobs, workers' remained on work relief for extended periods of time, some for up to multiple years (Margo 1991).

What was most troubling for the economy was that many workers considered the work relief jobs to be more stable than private employment. Federal government relief was a new phenomenon in the 1930s. It was substituting for much more ad hoc and temporary forms of relief offered by local governments in earlier times of stress, and the federal work relief project lasted much longer than the past local projects did. WPA officials urged many workers to accept

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relatively rigid, and Democratic governors as instruments. They find weaker and sometimes negative effects on private employment. Meanwhile, Cohen, Coval, and Malloy (2011) use changes in federal spending related to changes in key Congressional committee assignments as an instrument and find that increases in federal spending are associated with reductions in private investment and employment in the states.

private employment and made promises to accept the workers back on work relief if the job ended. Meanwhile, private employers in many areas were complaining that they could not hire enough workers. This disconnect was driven partly by the instability of the economy during the 1930s and partly by the impact of the public works and relief programs on private wages. The economy was unstable enough that workers felt there was a high probability that private jobs would end and did not trust the officials' promises that they could return to work relief (Margo 1991; Howard 1943; Neumann, Fishback, and Kantor 2010).

### *5.2 Wages and Hours Policies*

Meanwhile, a variety of factors, many still not well understood, were holding wages above the market clearing equilibrium. Scholars have examined several policies that may have contributed to high wages, including work relief policies, jawboning for high wages, the push to maintain hourly wages by the President's Reemployment Agreements and National Recovery Administration, the National Labor Relations Act and the minimum wage.

One possible contributor was the widespread presence of work relief forced employers to offer higher wages to attract workers, and the higher wages limited the number of people they were willing to hire. Increases in relief spending were associated with increases in private hourly earnings in the 43 cities studied by Neumann, Fishback, and Kantor (2010) and were also associated with higher hourly earnings for farm wage workers (Fishback, Haines, and Rhode 2012). More work needs to be done, however, to study the mechanism that contributed to the finding that relief and public works spending contributed to high wages with little or even negative stimulus for private employment. The economy continued to have record high levels of unemployment throughout the 1930s and as yet we still do not have good descriptions of the mechanisms that led to such high unemployment.

One possible mechanism that macroeconomists have been exploring is attempts by public policy makers to “jawbone” industry leaders into maintaining high wages. Ohanian (2009) argues that Herbert Hoover’s jawboning of industry leaders to maintain high wages contributed greatly to the rising unemployment rates between 1929 and 1933. He argues that industry leaders followed along because they feared a rise in unionism. Cole and Ohanian (2004) argue that the recovery from the trough of the Great Depression was slowed by the creation of the National Recovery Administration (NRA) and the accompanying agreement not to enforce antitrust laws. The NRA allowed firms, workers, and consumers to set up industry codes that would set prices, quality levels, wages, hours, and employment. The codes appeared to have been written largely by trade associations and the Roosevelt administration largely left them alone as long as the firms agreed to maintain wages up and work to increase the number employed (Bellush 1975). The Supreme Court declared the NRA unconstitutional in 1935. Only the protections for union workers in the NRA were reinstated and strengthened in the National Labor Relations Act of 1935.

Cole and Ohanian (2004) build a Dynamic Structural General Equilibrium (DSGE) model of the macro-economy with no uncertainty in which the NRA and later pro-union policies allowed firms with 25 percent of workers to become cartelized and pay higher wages. They find the high wage policies help explain about half of the slow growth in the economy between 1935 and 1939. In contrast, Eggertsson (2008, 2012) offers an alternative new-Keynesian DSGE model with sticky prices that emphasizes the fact that interest rates were bumping against the zero-interest bound and that deflationary expectations had been driving the downturn. Eggertsson’s model shows that the NRA in conjunction with the move off of the gold standard and fiscal stimulus (Eggertsson 2008) and then the NRA combined with a monetary policy that

keeps interest rates at the zero bound (Eggertsson 2012) contributed to higher growth rates during the emergency.

The different conclusions stem from wildly different counterfactual outcomes in the absence of the NRA that are developed in the models. Cole and Ohanian's model implies that the economy would have returned very close to its long term trend GDP by 1936 without the NRA, which would have been a very rapid recovery. Including the NRA in the model causes real GDP to fall short of the long term trend GDP by 13 to 14 percent between 1936 and 1939, while the actual economy remained 25 to 30 percent below long run trend GDP over the period. Thus, their analysis shows that the NRA was half of the reason why the economy failed to recover quickly.

In the Eggertsson (2012) model the counterfactual with no NRA is for real GDP to fall further from 30 percent below 1929 GDP in 1933 to 40 percent below in 1937. When added to the model, the NRA has powerful effects in reversing deflationary expectations and the modal estimate of real GDP rises to a point 18 percent below 1929 GDP by 1937. Thus, the NRA explains 55 percent of the difference between the actual GDP and a very low counterfactual GDP.

Rather than go into a long discourse about conflicting assumptions in the models, I want to refocus the question on whether they have fully captured the features of the NRA policies. The NRA labor policies involved more than just a focus on maintaining or raising earnings. They explicitly included provisions for maximums for weekly hours in an attempt to promote increases in the numbers employed. They might better be treated as job-sharing programs where hourly earnings were not allowed to fall because workers were already losing large amounts of

weekly pay from the decline in weekly hours. None of the DSGE models take into account these hours maximums or the pressures from the government to increase the number employed.<sup>23</sup>

While the NRA codes were being negotiated, a process that took several months, the Roosevelt administration created an alternative arrangement, the President's Reemployment Agreements, in August 1933. In return for the use of the NRA's Blue Eagle symbol, the large number of firms who signed these agreements agreed to a job sharing plan that capped the workweek at 35 hours, paid hourly wage rates of at least 40 cents per hour and allow collective bargaining. There was also strong pressure on the firms to increase employment. The firms were given strong incentives to sign because the Roosevelt administration embarked on a huge Blue Eagle advertising campaign in July and August 1933 that involved large parades in most cities, door-to-door campaigning by 1.5 million people who received the pledges of 20 million households to support the Blue Eagle, and listings of the firms on Honor Rolls at the post office and in newspapers (Taylor 2011).

The PRAs appear to have had sizeable effects on hours worked and hourly earnings in the studies summarized in Table 5. In panel VAR estimation for 11 major industries from 1923 to 1939, while controlling for macroeconomic policy changes, Taylor and Neumann (2013) find that relative to the period 1923 through February 1933 weekly hours were 15 percent lower and real hourly earnings 12 percent higher in low wage industries. In high wage industries weekly hours were 4 percent lower and hourly earnings 3 percent higher. The NRA codes that followed were associated with a 2 percent drop in employment. In low wage industries weekly hours were 6.6 percent higher and real hourly earnings were -8.4 percent lower, while in high wage

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<sup>23</sup>This same issue arises in discussions of Herbert Hoover's jawboning for high wages. In his memoirs Herbert Hoover describes the policies as job-sharing arrangements in which employers agreed to cut weekly hours sharply to maintain employment and then did not cut hourly wages much because workers' weekly wages had already been cut almost 20 percent. A number of large firms in 1932 actively publicized that they had maintained employment by cutting weekly hours (Taylor, Neumann, and Fishback 2013).

industries weekly hours were -1.6 percent lower and real hourly earnings were -0.8 percent higher (see also Taylor 2011; Neumann, Taylor, and Fishback 2013). A great deal more work needs to be done in examining the PRAs and the NRA codes to determine precisely what was negotiated and what happened after the NRA was declared unconstitutional in 1935. There has been discussion that the passage of the National Labor Relations Act in 1935 reestablished a high wage policy by protecting collective bargaining. But any enforcement of the NLRA provisions was weakened greatly because there was enormous uncertainty as to whether the Act was constitutional, and this was not eliminated until the spring of 1937. Taylor and Neumann (2013) find that wages and earnings in high and low wage industries in the period after the NRA was declared unconstitutional and before the NLRA was found constitutional were roughly similar to the pre-New Deal period, as they were after the NLRA was declared constitutional.

There are other claims that there were implicit bargains between antitrust authorities and firms that they would be left alone as long as they continued to keep wages high. Checks of the sources of the claims are thinly documented. Hawkins (2014) is in the process of compiling information on the extent of antitrust enforcement by the Department of Justice (DOJ) and the Federal Trade Commission (FTC) from 1925 through 1940. The preliminary findings suggest that the DOJ was less active between 1935 and 1938 than in the 1920s, but the FTC was more active after 1935 than in the late 1920s (see also Bittlingmayer 1995). A fruitful area for additional research would be deeper analysis of the specific features of labor market and antitrust institutions across industries and sectors.

### *5.3 The Tennessee Valley Authority (TVA)*



Among the largest public works projects built during the Depression were the dams of the Tennessee Valley Authority (TVA), which were designed to control floods and improve navigation along the Tennessee River, as well as produce electricity. In response to the severe flooding in the late 1920s, the Army Corps of Engineers (ACE) had designed the dams and the order in which they should be built to supplement the Wilson Dam built in the 1920s. To build the dams, the Roosevelt administration followed a new path by setting up the TVA as a government-sponsored corporation. The TVA's first chairman Arthur Morgan placed the emphasis on flood control and improved navigation. The TVA was also charged with distributing surplus electric power from the Wilson Dam, which had been transferred from the ACE. As was the case with other federal dams before and since, electric power from the Wilson Dam was sold wholesale to private utilities who then distributed it to final users. After a power struggle within the TVA, the corporation sought to become a full-scale wholesale public utility that marketed its power directly to municipalities, cooperatives, and final consumers. Between 1933 and 1940 the TVA expanded its public power service area to cover most of Tennessee and large swaths of Alabama, Mississippi, and Georgia through a combination of increased power production with the newly built dams and the takeover of the transmission and distribution of assets of several large private utilities. Even as the New Deal wound down, the TVA continued to expand until the federal government established a fixed boundary in 1959. Federal subsidies gave the TVA the capacity to build more dams, roads, canals, and coal-fired electric plants, as well as to purchase additional transmission and distribution facilities from private utilities.

The key change wrought by the TVA was the creation of a wholesale public electric utility that directly contracted with local distributors. Much of the TVA activities resembled prior programs that involved the building of dams, roads, and canals. In the absence of the TVA,

the tasks would have been performed by the Army Corps of Engineers, and federal/state highway programs. Had the ACE built and operated the dams, it likely would have disposed of electricity that was incidental to flood control and navigation improvements, in the same way it did at Wilson Dam throughout the 1920s, or as the Bureau of Reclamation did at Hoover Dam.

Most discussions of the TVA suggest that the major benefit of having the TVA act as a public utility was to offer lower electric rates and to expand access to electricity for new consumers. In its annual reports the TVA emphasized that it charged lower marginal rates on each unit of electricity. The situation was actually more complex than this. Kitchens (2014) examined the records of the Federal Power Commission and archives for local power producers and shows that for a large number of household consumers of electricity the *monthly* bill for TVA power was similar to the *monthly* bills for consumers in nearby districts served by private utilities. The TVA marginal rates were lower than at the nearby private utilities but the fixed charges for cooperative membership fees and amortization of capital associated with buyouts of private utilities raised the total monthly bills to the same level as for private utilities over a large range of electricity usage. It might be argued that the private utilities lowered their rates as a way to prevent the TVA from being created, but many of the private utilities had aggressively lowered their rates throughout the 1920s and early 1930s and many of the rate schedules had been set in 1930 and 1931 before the TVA was actively being considered. If they were trying to lower rates as a way to delay the ACE's plans, that was likely a "fool's errands" because the ACE already had strong reasons to build the dams for navigation and flood control. Further, the private companies would have likely benefitted from buying and selling the excess power disposed of by the ACE. Finally, it should be noted that the TVA also expanded its service area

by taking over the assets of private utilities in many areas, often through hostile negotiations that leveraged other New Deal agencies, such as the PWA to weaken private bargaining positions.<sup>24</sup>

The small differences in electric rates help explain why Kitchens (2014) finds little effect of the expansion of TVA electrification on retail sales per capita, farm production, and manufacturing activity between 1933 and 1960 in a panel of southeastern counties. In the analysis the identification comes from variation across time within the same county as the area serviced by TVA hydro-electric power expands from a few counties to multiple states. The instrument is driven by a schedule of dam locations created for flood control and navigation purposes by the ACE in the late 1920s and does not pick up expansions in service areas when the TVA purchased assets in private utilities.

When the view of the TVA is expanded from just electricity to focus on the long range impact of the federal subsidies distributed after 1940 to the TVA for road, dam, and canal building, the answer is somewhat different. Kline and Moretti (2014) compare growth rates in economic activity in counties in the final TVA service area circa 1959 to different groups of control counties selected because their pre-TVA characteristics were similar to the TVA counties in 1930.<sup>25</sup> They find that the overall federal subsidies in the TVA counties between 1940 and 1960 led to substantially faster growth rates in agricultural and manufacturing employment between 1940 and 1960. From 1960 to 2000 the higher growth in manufacturing employment continued at slower pace, while agricultural employment growth dropped sharply. Using

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<sup>24</sup>For instance, in Chattanooga, TN the city had voted for a private municipal utility when the TVA suggested that they apply for PWA grants to build a duplicate system to devalue the private company's assets. A series of similar TVA and PWA interactions led to the *Ashwander vs. TVA* Supreme Court case in which the Court ultimately chose to uphold the TVA (McCraw 1971).

<sup>25</sup> They also perform placebo testing for the period prior to 1940. There may be a problem with the placebo test because it includes the decade of the 1930s when several major TVA dams were being built.

manufacturing employment growth lagged two decades as an instrument, they find that the TVA subsidies were associated with increases in manufacturing productivity.

In addition to positive effects, large dams can also have unintended negative consequences by flooding environmentally sensitive areas, moving large numbers of people, and in creating more problematic environments. One of the negative features of the creation of large reservoirs when the TVA dams were built was that the large reservoirs created an environment that aided the breeding of mosquitoes and consequent problems with malaria. Kitchens (2013a) performed an analysis of the impact of the TVA on malaria death and morbidity rates using a panel data set that he compiled for Tennessee and Alabama from 1926 to 1951. Because the dams had to be located in precise locations for their many purposes they were not located in response to previous malaria problems. The dams had to be located in areas with substantial rushing waters, which were the exact locations where mosquitoes found it difficult to breed. During the period prior to the introduction of the TVA, the areas where the TVA was eventually located had lower rates of malaria than other areas in the region. After the TVA reservoirs were built, the malaria mortality rates jumped by 30 percent, while malaria morbidity rates increased 70 percent. In their annual reports the TVA officials do not mention problems with malaria until they were in the middle of constructing Wheeler Dam. Once they recognized the issue, they developed an extensive eradication program that took multiple forms: fluctuating water levels in the dams and the reservoirs to make it more difficult for mosquitoes to breed, oiling the waters of the reservoirs, public education about malaria, ditching and cleanups on the borders, etc. They were joined by the Works Progress Administration in several southern states and their efforts met with success and were widely praised (Kitchens 2013b). The true eradication then occurred when DDT was distributed.

#### 5.4 Farm Grants

Among the New Deal grant programs, the Agricultural Adjustment Administration (AAA) grants were unusual because they were designed to crowd out production. The AAA offered rental and benefit payments to farmers to take land out of production for specific crops and accounted for roughly 10 percent of all grants awarded (Table 2). The original program was originally financed mostly through a tax on the processing of the agricultural product supported. In 1935 the program, particularly the processing tax, was declared unconstitutional. Strong support from the agricultural lobby led to the passage of a new Soil and Domestic Allotment Act that continued the AAA payments out of the general fund while the rhetoric emphasized soil conservation and improvements to the land (Alexander and Libecap 2000).

The studies summarized in Table 6 show that the AAA tended to benefit large farmers at the expense of farm workers. The two factors that had the most explanatory power in determining the distribution of AAA grants and farm loans were the average size of farms and representation on the House Agricultural Committee (Fishback, Kantor, and Wallis 2003). In the Fishback and Kachanovskaya (2015) study of state multipliers, an additional dollar of AAA payments was associated with an increase in personal income of at most 15 cents in one specification, and the effect was negative in other specifications. In county level studies AAA grants had slight negative effects on retail sales per capita and on net migration (Fishback, Horrace, and Kantor 2005, 2006).

One sign of the losses to farm workers was a sharp decline in the overall farm population, and the number of white and black share croppers and black tenants in the cotton-producing counties when the AAA was introduced (Fishback, Haines, and Rhode 2012; Depew, Fishback, and Rhode 2013; Whatley 1983). This push of the croppers and tenants down the tenure ladder

and out of farming had a variety of effects, some positive and some mixed. A number migrated out of areas where malaria was a problem with a consequent reduction in the overall malaria rate in the South (Barreca, Fishback, and Kantor 2012). The average wages of hired workers rose about 9 percent with the introduction of the AAA, but this may have been because the average quality of the hired workers increased as the tenants and croppers were pushed down the tenure ladder into wage jobs (Fishback, Haines and Rhode 2012). Even though the former tenants and croppers may have been paid more as a wage laborer than the former wage workers pushed out of farming, the former tenants and croppers were earning less than what they had in their former positions.

Both the AAA grants and loan programs (described below) had strong effects on the structure of farming. They contributed to an increase in the use of farm machinery, particularly tractors, by providing both additional income to farm owners and also providing cash in a rural economy where it was difficult to come by.<sup>26</sup> When the AAA shifted its emphasis toward soil conservation after 1935, it also contributed to an increase in farm size and the use of anti-erosion methods that helped eliminate another Dust Bowl problem in the 1970s. The 1970s and 1930s shared the same weather patterns that had created the Dust Bowl in the 1930s but the use of the anti-erosion methods prevented large dust storms from forming (Hansen and Libecap 2004).

#### *6. The Impact of Loan Programs*

Roughly one-fourth of all funds distributed across the country by the New Deal came in the form of loans. The size of the subsidy from the federal loans is more difficult to determine than for grants because the size is determined by the difference between the interest rate on the government loan and an interest rate on an alternative loan. In many cases it is hard to determine

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<sup>26</sup> See Sorensen, Fishback, Kantor, and Rhode (2008), Clarke (1994), and Whatley (1983, 1985).

the alternative interest rate, which can then be used to calculate a dollar equivalent of the grant then using the present value of the anticipated stream of loan payments at the alternative interest rate.<sup>27</sup> For example, the HOLC offered mortgage refinances for borrowers in troubled loans at 5 percent when market rates on low risk loans ranged from 6 to 8 percent. Yet, nearly all the HOLC loans had been near foreclosure and private firms might not have offered refinances at all. For a \$1000 loan at 5 percent the grant equivalent of the subsidy would have been \$131 with a counterfactual interest rate of 8 percent, but if there was no possibility of an alternative loan the grant equivalent would have been \$1000. Fishback and Kachanovskaya (2015) use a variety of assumptions about the grant equivalent when they measured the state income multiplier for combined loans and grants. Most studies to date, however, have used the loan principal as a measure of the loan because they were treating loans separately. The results of the lending studies are summarized in Table 7.

Nearly 45 percent of all New Deal loans were distributed to farmers, as the Farm Credit Administration expanded earlier programs to provide funds for long-term farm mortgages at low interest rates and created new permanent programs for production loans and emergency loans. The Rural Electrification Administration was created to make loans, mostly to farm cooperatives, to expand access to electricity. The remaining loans were distributed by the Reconstruction Finance Corporation (RFC) and the Home Owners' Loan Corporation (HOLC). The RFC started in February 1932 under the Hoover Administration but was in operation through World War II. The Hoover loans included loans to banks to stave off closure and to local governments for poverty relief under the Hoover Administration. It later took ownership stakes in a number of

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<sup>27</sup>The grant equivalent measure is designed to get a measure of the loan subsidy in dollars by measuring the difference between the principal of the loan and the present value of the stream of loan payments at the counterfactual interest rate. It is essentially the difference in the market price of the loan when the market interest rate moves away from the loan interest rate.

banks and made a series of industrial loans, as well as startup loans to other federal agencies. Meanwhile, the Home Owners' Loan Corporation accounted for roughly a fourth of the loan funds when they purchased troubled nonfarm mortgages from lenders and then refinanced the mortgages for the borrowers.

### *6.1 Farm Loans*

The New Deal reorganized earlier lending programs and expanded into new areas. The Federal Farm Loan Board had been created in 1916 to provide seed money for 12 regional farm land banks. The banks made loans to associations of farmers who set up the equivalent of a mutual society in which the farmers financed mortgages at time horizons of up to 40 years with interest rates at 5 percent. The government also provided seed money for federal joint-stock banks that followed a profit-making process of making loans. By 1930 approximately one-seventh of farm mortgages were financed under these programs. At various times, on an ad hoc basis, Congress also authorized emergency crop and feed loans in the 1920s (Federal Farm Loan Board, various years; Halcrow 1953; Glock).

As the Depression worsened in the 1930s a sharp rise in farm foreclosure rates contributed to the demise of the joint-stock banks (Glock 2014). The foreclosures were slowed by the adoption by more than half of the states of mortgage moratoria laws that made it more difficult to foreclose on delinquent borrowers. This came at a future cost, however, as private lenders anticipated the risk of future moratoria and increased mortgage interest rates and made fewer loans in the years that followed (Alston 1984 and Rucker and Alston 1987).

The New Deal reorganized and expanded the farm loan programs. The Farm Credit Administration was created to take over the land bank loans and to expand mortgage lending. The expansion in New Deal mortgage lending helped reduce the foreclosure rate with an



elasticity of -0.49 (Rucker and Alston 1987). It also created new programs for production loans and emergency crop and feed loans and ultimately accounted for about 30 percent of all New Deal era loans (Table 2). The Commodity Credit Corporation distributed 12 percent of the loans in a price support program in which the farmer took out a nonrecourse loan with a base output price. If the market price fell below the base price, the farmer repaid the loan with the crop in kind; otherwise, he sold the crop and repaid the loan in cash. The Farm Security Administration targeted a relatively small share of the New Deal loans at low income farmers.

The Rural Electrification Administration handed out about one percent of the New Deal loans to rural electricity cooperatives to provide access to electricity for rural farms and households that previously had not had access to the grid. Fishback and Kitchens (2015) developed a panel from 1920 through 1940 for Midwestern and southeastern rural counties estimated fixed effects regressions and then performed placebo tests to see if the effects could be considered causal. Rural Electrification Administration (REA) loans to rural cooperatives had much stronger impacts on the farm sector than TVA electrification did. The REA loans were associated with increases in farm output per acre, increases in the use of machinery, reductions in the amount of time the farmer worked off of his farm, and decreases in infant mortality rates.

## *6.2 Reconstruction Finance Corporation Loans and Ownership Stakes in Banks*

During the Great Recession two of the most controversial policies set up in November and December of 2008 were the moves by the Treasury to take ownership stakes in banks and to provide loans to and restructure the ownership of General Motors and Chrysler. Both were based on precedents set during the New Deal. As the Federal Reserve System allowed the money supply to decline in the early 1930s, the Hoover Administration sought other ways to inject

liquidity into the economy by forming the Reconstruction Finance Corporation (RFC) in February 1932. Modeled after the War Finance Corporation of World War I, the RFC's first moves included making loans to 4,000 banks, railroads, credit unions and mortgage loan companies to provide assets that would jumpstart commercial lending. Among the most important programs was the provision of loans to troubled banks to seek to provide them with enough liquidity to survive bank runs. Recent studies suggest that these initial loans were not successful because the RFC loans were given first priority over depositors and other lenders in situations where the bank failed. As a result, banks had to hold the assets that they could sell most easily to insure repayment of the RFC loans. These assets could not then be used to repay depositors when the bank failed. When the RFC began to accept more risk by purchasing preferred stock in the troubled banks, it was more successful at staving off bank failures (Mason 2001a).<sup>28</sup> At the height of its activity the RFC owned one-third of the capital of U.S. Banks (Mason 2001b). In a panel study of Michigan banks, Calomiris, et. al. (2013) suggest that the preferred stock program was successful because

“(1) It did not burden the bank with increased debt, increased liquidity risk, or collateral requirements that subordinated the claims of depositors (2) the RFC was selective, and apparently chose viable cases, not basket cases, when granting assistance, and (3) the RFC implemented effective measures to ensure that government assistance was not abused by banks receiving assistance.”

The RFC gave the Roosevelt administration enormous flexibility. It retained control of a large supply of funds that could be loaned out and had the authority to borrow still more funds without having to constantly return to Congress for new appropriations. As the loans were

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<sup>28</sup> Vossmeier (2014) finds positive effects of the RFC program in a multivariate selection model but does not try to isolate the separate effects of the loan and capital injection programs.

repaid, the RFC continually had new funds to loan out again. “By the mid-1930s, the RFC was making loans to banks, savings banks, building and loan associations, credit unions, railroads, industrial banks, farmers, commercial businesses, federal land banks, production credit associations, farm cooperative, mortgage loan companies, insurance companies, school districts, and livestock credit corporations.” Perhaps even more importantly, the RFC became the banker to many of the New Deal programs, providing loans and/or startup working capital to the FERA, PWA, Home Owners’ Loan Corporation (HOLC), FCA, the Federal Housing Administration (FHA), REA, and the WPA.<sup>29</sup>

The RFC also contributed to precedents for making substantial loans for major transport entities considered too big to fail. Large railroads were the GM and Chrysler of the 1930s. For example, RFC loans to railroads and industries helped delay bankruptcies for businesses and railroads with conflicting effects. The delays gave financial institutions more time to dump their railroad bonds. However, the railroads that went through bankruptcy proceedings, which had evolved over time to handle the specific features of the railroads, hired 2-3 percent more employees, and spent 8 to 10 percent more on maintenance of way and equipment maintenance than the railroads receiving RFC loans (Mason and Schiffman 2003). The RFC provided loans in a large number of settings and the existing studies have just begun to scratch the surface.

### *6.3 Housing Policy*

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<sup>29</sup>The descriptions in this section on the RFC are based on Olson (1988) and Jones (1939, 1951), who was the director of the RFC. The quote is from Olson (1988, 43-4).

The Great Depression is similar to the Great Recession in the sense that both followed housing and mortgage booms that eventually became housing busts. The consensus cause of the Great Recession appears to have been the housing and mortgage crisis that began in 2006.<sup>30</sup> Even though there was a similar boom and bust in nonfarm residential homes and mortgages in the 1920s and 1930s, most economists over the past half century have not assigned much of the blame for the Great Depression to the bust in residential housing. This was a shift in emphasis from the period before the Great Depression when the housing cycle was seen as a key driver of the business cycle by many of the leading economists at the National Bureau of Economic Research (Snowden 2014). Re-examinations of the Depression by Gjerstad and Smith (2014a, 2014b), Field (1992, 2014), and White (2014) are beginning to bring housing back into the picture.

The argument for housing not being a prime cause of the Depression comes from the data that has been used to describe the timing of the bust. The traditional data used showed that the peaks in building permits and nominal housing prices occurred in the mid-1920s, and real housing prices did not show much of a decline. The peak in building permit units was 937

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<sup>30</sup> Housing values and mortgage lending had boomed through the early 2000s as the number of sub-prime loans expanded rapidly. The government-sponsored enterprises Fannie Mae and Freddie Mac with the support of their regulator purchased a significant share of the sub-primes along with their usual purchases of conventional loans. A large majority of mortgages were packaged up and sold in mortgage-backed securities (MBSs), bundled again into collateralized debt obligations (CDOs), and then insured with credit default swaps (CDSs). All of the indexes of nominal housing prices roughly doubled with real prices rising 25 to 67 percent; (Fishback and Kollmann 2014, Tables 8 and 9).

As housing prices began to fall after the peak, there were sharp increases in the numbers of foreclosures and delinquencies that put many of the investments in jeopardy. Asymmetric information problems contributed to fears of severe adverse selection by potential buyers of the CDOs and holders of the CDSs. Mark-to-market accounting showed that several major financial institutions held a large number of toxic assets on their balance sheets, and several holders of CDOs demanded that the CDS insurers post collateral to show that they could cover their losses. As the stock values of several troubled financial giants fell, credit markets seized up throughout the economy, and the Federal Reserve and Treasury Department in September 2008 took control of insurance giant AIG, and Fannie and Freddie, while letting Lehman Brothers go bankrupt. They then demanded that the leading commercial banks allow the government to take ownership stakes in the banks. The federal government loaned new funds and restructured the ownership of auto giants GM and Chrysler in last 2008 and then embarked on a large-scale stimulus package that raised the deficit to roughly 10 percent of GDP, roughly double the highest deficit share without major warfare in American history (Gorton 2010; Blinder 2013).

thousand in 1925 before declining to 503 thousand in 1929 and bottoming out at 93 thousand in 1933. If the boom years of the 1920s were the new norm, this timing of the peak is correct. However, the rise in new housing units in the 1920s was an unusual boom that partly offset the lack of production of housing units during World War I and was matched by a rise in urban population of only 15 million in the 1920s after urban populations had risen by roughly 12 million in both the 1900s and 1910s decades. The 1929 figure of 503,000 was higher than all but one year between 1900 and 1922 and the annual units permitted in 1931 through 1935 were below the lowest peace-time figures back to 1903 (Snowden 2006, 4-481).

The traditional housing price data are based on estimates developed by Grebler, Blank, and Winnick (GBW) (1956) from Civil Works Administration surveys in which home owners were asked the value of their homes in 1934 and at the time of purchase in 22 cities. The GBW housing price index that most scholars have used assumes that the quality of the homes had not changed between the purchase date and 1934. However, GBW expressed reservations about this assumption and created an alternative adjusted index that they thought better took into account the depreciation in housing quality over time. Fishback and Kollmann (2014) have updated the GBW indices to include information on 31 more cities from the CWA survey that GBW did not have and then created alternative home value indices that appear to fit better other potential measures of home values.

The updated GBW home value index shows that nominal housing values rose by 8.1 percent from 1920 to a peak in 1925 and then declined back to the same level in 1929 before falling by nearly 23 percent by 1933. The alternative index developed by Fishback and Kollmann based on Census and CWA information rises by 21 percent from 1920 to a peak in

1928. Since it is based on roughly the same data as the updated GBW index between 1929 and 1934, the index falls by roughly 23 percent to 1934.

The nominal housing values declined rapidly after 1929 but so did other prices. As a result, real housing values barely moved, which makes it look like home owners did not suffer a loss in real housing value wealth. This overall deflation cut two ways. The equity in the house stayed constant in real terms, which was good news for full owners but only partially good news for borrowers who typically had 40-60 percent equity in the home. Those with mortgages faced a 25 percent increase in the real value of the amounts owed on their mortgages between 1929 and 1933. This situation was worse for the borrowers who had reduced their equity by taking out second mortgages at penalty interest rates that were more than double the interest rates on the first mortgage.

The sharp rise in the real amount owed was a problem for every type of borrower. Those with the “standard” loan from commercial banks and insurers at the time were making monthly payments of interest only until the end of the loan when they had to repay the full principal. Thus, someone who had taken out the loan in 1928 saw their real principal owed rise by 25 percent when it was due in 1933. Most mortgages from financial institutions were made by Building and Loans, which created Share Accumulation Contracts (SACs) that combined the standard interest-only loan with a contract to purchase shares in the building and loans, which were held in a sinking fund that paid dividends on the B&L shares. The loan contract did not end until the sinking fund amount reached the principal owed, and not before. Thus, the deflation meant that the B&L borrowers had a larger real target to hit before they could end the loan. The length of time until the end of the loan often rose when the B&L ran into trouble and reduced the dividends paid or the value of the shares in the sinking fund.

This increased difficulty in paying off the loan led to a sharp rise in delinquencies on payments and a near doubling in the foreclosure rate from 7.1 in 1929 to 13.3 homes per 1000 mortgages in 1933 (Snowden 2006, 4-569). But the rise in foreclosures disguises a much more serious set of problems in the 1930s than in the 2000s. The Depression borrowers had dramatically higher equity rates than their modern counterparts and so lost a great deal more in real assets when they lost their home. The economy was much worse in the 1930s and few houses were selling, and borrowers succeeded in pressuring more than half of the states to enact mortgage moratoria laws that slowed foreclosures (Ghent 2012). When the Home Owners' Loan Corporation ended up refinancing roughly 20 percent of all nonfarm mortgages in 1934 and 1935, the typical HOLC borrower refinanced was more than 2 years behind on principal and interest on the loan and real estate taxes on the property. Even as their loan assets deteriorated in value, lenders also experienced a sharp drop of 25 percent or more in new funds available to lend. To survive the downturn, large numbers of people withdrew savings from commercial banks, cashed in insurance policies, and cashed out their shares in B&Ls (Fishback, Rose, and Snowden 2013, 30).

The mortgage crisis moved glacially compared to the crises in commercial banks (Rose 2014). Most of the Depression literature focuses on the three waves of failures of the commercial banks between 1930 and 1932. The banks failed more quickly because they were deposit institutions and bank regulators would shut down bank operations to protect the deposits. The dominant commercial lenders in real estate were the Building and Loans, which were mutual societies that did not hold deposits. Except in cases of fraud or the demise of the board of directors, the B&Ls would not close until two-thirds of the shareholders voted to close the institution. Fleitas, Fishback, and Snowden (2015) find that the probability that a B&L would

liquidate in New Jersey rose 38 percent when the borrowers' ownership share fell below one-third in a hazard model that controls for the contemporaneous changes in the firm's balance sheet, the structure of the firm before the crisis, economic conditions in the counties, and HOLC activity. As a result, a substantial majority of all B&L closures took place after 1935, which likely contributed to the extended time frame for the Great Depression.

In response to the developing mortgage crisis, the Hoover administration and Republican Congress in 1932 established the Federal Home Loan Bank Board (FHLBB) to provide liquidity to mortgage lenders to stave off short run balance sheet problems. The FHLBB did not have much impact because it did not provide much in the way of advances relative to the size of the problem. The FHLBB focused almost exclusively on B&Ls and tended to only provide funds when the advances could be supported by loans in good standing.

The Roosevelt administration and Democratic Congress offered an emergency solution to the mortgage crisis in 1933 by creating the Home Owners' Loan Corporation (HOLC), a government-sponsored entity that could issue its own bonds. Within a year the full value of the bonds were guaranteed by the federal government, allowing the HOLC to issue debt at a risk-free interest rate. The corporation used the bonds to purchase from lenders over a million nonfarm mortgages in which the borrowers were in trouble through "no fault of their own." They then refinanced the mortgages for the borrowers. At its peak, the HOLC held mortgages on roughly 10 percent of all nonfarm homes in America (Hairris 1951). The HOLC came close to fully replacing toxic mortgages on lenders' books because it often paid prices for loans that covered the principal owed, interest owed, and taxes paid by the lender (Rose 2011). When the loan was refinanced, the HOLC used the amount paid to the lender as the basis of the refinanced loan; therefore, the borrowers did not get a break on the amount owed. Borrowers benefitted because



the HOLC refinanced at a low interest rate, lengthened the period of the loan, and used a modern, direct-reduction loan contract where each loan payment immediately retired part of the principal owed. Borrowers also benefitted because the HOLC was very slow to foreclose, often waiting through more than 1.5 to 2 years of delinquency to allow borrowers more time to get back on their feet in the terrible economy of the 1930s. Even so, the agency ended up foreclosing on 20 percent of its loans (Fishback, Rose, and Snowden 2013).

The key to the HOLC's success was the federal guarantee on its bonds, which allowed it to issue bonds at low interest rates and to practice its patient foreclosure policy. The *ex ante* risk for the HOLC was considered very high. Such an intervention had never been tried before and the quality of the loans was terrible. Fishback, Rose and Snowden (2013) offer a rough estimate of the *ex ante* risk that implied a federal subsidy of 20 to 30 percent of the value of the loans. In the first seven years of its existence, the predictions of high risk seemed to have been borne out, as the HOLC foreclosed on roughly 20 percent of the loans and over 20 percent of borrowers were still delinquent on the loans in 1940. After the HOLC closed down its operations in 1951, however, its losses added up to only about 2 percent of the value of the loans because it was often able to sell foreclosed homes when housing prices recovered during World War II.

The HOLC also had positive effects on housing markets. To estimate the impact of the HOLC's lending on housing markets, Courtemanche and Snowden (2011) and Fishback, et. al. (2011) independently and simultaneously compiled panel data for county housing markets across the country for 1930 and 1940. Both performed analyses of the impact of the HOLC that combined a rich set of correlates with controls for time-invariant features of the counties and instrumental variables. Courtemanche and Snowden also devoted substantial effort to analyzing the political economy of the distribution of funds. For instruments, both groups focused on the

distance from the county to the nearest HOLC office established. Both argued that greater distance from HOLC offices raised the administrative and negotiations costs of purchasing and refinancing the loan. Refinances involved in-person evaluation of property values and the borrower's ability to repay that were made more difficult to administer when the property was more distant from the HOLC office. Courtemanche and Snowden used the inverse distance to the actual office locations as their instrument. Although Courtemanche and Snowden performed a variety of robustness checks of the validity of the instruments, Fishback, et. al. worried that the office locations chosen might have been correlated with unobserved features of the housing markets in the counties. They took an additional step by creating a simulated set of locations for offices for any federal administrator trying to reach the most people in the state by placing an office in the state capital and in the four most populous counties in the state. They then used the distance from these simulated offices as the instrument for the office locations.

Both groups found that the HOLC had substantial impact on the number of home owners and on home values in the more the nearly 2500 counties with fewer than 50,000 people. The full scale of the effects were not understood until Fishback, Rose, and Snowden (2013, 107-111, 133-145) re-examined the econometric results. With no HOLC, they found that real median housing values would have fallen by 22.9 percent between 1934 and 1940, while a county with the mean per capita HOLC lending would have seen housing values fall by only 7.6 percent; therefore, the HOLC staved off two-thirds of the decline in housing values that likely would have occurred by the end of the decade. Without the HOLC the number of nonfarm home owners would have likely risen by 5.1 percent between 1934 and 1940, while counties where the typical HOLC loans per capita were handed out would have experienced an 18.4 percent rise in the number of home owners. Neither group found statistically significant effects of the HOLC in

larger counties. This may have been because the instruments had more strength in the smaller counties where offices were in counties some distance away. Many of the more populous counties had offices and so the distance from the office was essentially zero and could not adequately parse out differences in office access across those counties. Another possibility was economic in nature. Larger counties had better developed lending markets with larger and more diversified lenders and thus the HOLC was not as effective in those markets.

The New Deal created two housing institutions, the Federal Housing Administration and Fannie Mae, that have had significant long run effects on housing markets but had relatively small effects in the 1930s. The FHA started insuring home repair and rehabilitation mortgages in 1934 and new full-scale mortgage loans in 1935. They started and have continued to be relatively conservative in their mortgage lending with low foreclosure rates. Their largest share of new loan value in the 1930s was 9.3 percent in 1936. Fannie Mae was a government backed corporation created in 1938 to create a secondary market for mortgages and add liquidity to the system. Their annual purchases did not exceed 3.3 percent of new loan value in 1938 through 1940 (Snowden 2006, 4-540, 4-550, 4-556).

By the 2000s the federal government's involvement in housing markets had risen sharply. The Veterans' Administration joined the FHA in insuring mortgages in the wake of World War II. Fannie Mae was officially removed from government sponsorship in the late 1960s and Freddie Mac was created as a competitor in the secondary market in 1971. Although officially not backed by the federal government, private investors and markets have treated Fannie and Freddie as if they had government guarantees and their bonds have had interest rates at close to T-bill rates for decades. Many households have also benefitted from reduced taxes associated with the deduction of mortgage interest on tax returns. The FHA and Freddie and Fannie have

come under constant pressure for the past 30 years to expand their aid to low income and minority households with more subsidies offered for expansion by both the Clinton and Bush administrations. As a result, the federal government has moved from playing virtually no role in housing markets prior to the Great Depression to playing a large role in the 2000s.

When the housing/mortgage crisis hit, the federal government experimented with a variety of programs. The largest and one most similar to the HOLC is the Homes Affordable Modification Program (HAMP), which eventually became involved in about 3 percent of mortgages, compared with 10 percent for the HOLC. The HAMP and HOLC are similar in that most of the gains they offered in refinancing came from lowering the interest rate and extending the length of the loan. The HAMP differs in three ways. They have offered principal reductions on about 30 percent of their modifications. They do not purchase the mortgages and instead offer subsidies to help offset the haircut the lender was taking on the refinancing. Finally, the HAMP also contracted out the servicing of the loan and disqualifies borrowers from the program if they fall behind by more than three payments. Approximately, 28 percent of the 1.4 million HAMP modifications have been disqualified and referred to additional programs to try to help lenders move out of delinquency. Of that group 24 percent have gone into foreclosure and 13 percent have had short sales (U.S. Department of Housing and Urban Development 2014).

One possible reason why the HAMP has not purchased mortgages is that other federal agencies were making purchases. When the crisis hit its peak in the fall of 2008, there was substantial discussion of using monies from the TARP to develop auctions to purchase the toxic assets from the lenders. Instead, the government took ownership stakes in the large banks, as the RFC did in 1933, and has performed multiple stress tests on various banks, as the New Dealers did with the National Bank Holiday of 1933. The Federal Reserve in 2009 began purchasing

substantial amounts of mortgage-backed securities and as part of its various quantitative easing programs continues to hold large amounts of MBSs. Reports from bankers suggest that the Fed and other bank regulators have also required banks to be careful in making new loans. This might be read as a *de facto* way of replacing the toxic assets on the bank balance sheets and insuring that another crisis does not develop. Finally, the government continues to control Fannie Mae and Freddie Mac, which were in terrible shape in 2008 2009, but have been involved in a large share of all new mortgage lending since that time. According to the Congressional Budget Office (2010, viii and ix), the two owned or guaranteed roughly half of all outstanding mortgages in 2009 and they financed three-fourths of new mortgages originated that year. As housing markets have recovered, the two have begun earning profits that now are revenues in the federal government budget.

## 7. *Summary*

The New Deal led to a dramatic increase in the federal government's role in the economy on a wide range of dimensions. Many of these policies created programs that are still in place today and set precedents that policy makers have cited in suggesting their own solutions to the Great Recession in the 2000s. During the 1930s the federal government for the first time took responsibility for solving general problems with unemployment and poverty, established the modern farm grant and loan programs, subsidized the housing market, banks, railroads, and other industries with low-interest and/or guaranteed loans, and took ownership stakes in banks. The government developed the policies while running relatively small deficits.

The federal government responded to the Great Recession with much larger deficits and a range of programs in the same policy areas. The modern policies look somewhat different

because the federal government influences a much larger share of the economy than it did when the Great Depression began at the end of 1929. Their impact might also differ because the Great Depression was several magnitudes worse and often of a different kind than in the Great Recession. Even so, careful study of the impact of the federal spending and lending policies in the 1930s remains valuable because so many people invoke what they consider to be the successes and failures of the New Deal when considering modern policies. Until recently, they have been making such claims with a limited information base.

Over the past two decades scholars have compiled a wide range of data bases and used the rich variation in the distribution of New Deal funds across place and time to examine their impact on a wide variety of outcomes. Seeking a pithy statement about the New Deal, people commonly ask: Was the New Deal a Success? The answer depends on a variety of factors: what policies are included, which outcomes are being measured, how large must the effect be to be considered a success. It is a treacherous effort to try to define a unified theme for the New Deal because there were so many objectives, often conflicting, that were being addressed. The New Deal is best seen as a bundle of policies designed to tackle a broad range of specific problems that arose in a severely depressed economy.

Scholars have only been using the microeconomic methods described here to study the New Deal for about a decade, and there is plenty of opportunity for new research. Thus far, we can say that the distribution of New Deal public works and relief funding stimulated income in the states with a multiplier of around one, and stimulated durable good consumption in the form of car sales. Public works and relief helped lower a variety of mortality and crime rates and stimulated birth rates. However, they were generally not associated with stimulating private employment, which might account for why the income multiplier was not larger. The relief

funds are associated with higher wage rates, but a great deal more work needs to be done to understand fully the changing implicit and explicit labor market institutions during the period and how the spending and loan programs interacted with them.

The AAA payments to farmers to take land out of production likely aided the farmers receiving the payments but contributed to significant losses in the number of tenants and share croppers. The net effects on per capita incomes at the county and state level appear to have been small or even negative. The TVA electrification had small effects in the 1930s on economic activity, likely because monthly electric bills did not drop much for most electricity users in the area, while the REA electrification loans had larger impact on agricultural productivity.

The HOLC mortgage purchase and refinance program appears to have kept a large share of people in their homes while also bailing out many mortgage lenders. The ex ante uncertainties surrounding the program suggest a relatively sizeable subsidy to the housing sector, but the ex post costs of the program were generally small. Meanwhile, the HOLC appears to have kept housing values and home ownership rates from declining further after 1934. The early work on the RFC suggests that it helped stimulate banking activity when it took ownership stakes in banks, but the loans in the railroad industry may have retarded the maintenance and rebuilding of capital in that industry.

While the focus here has been on the spending and loan programs, the New Deal also expanded government activity and authority in other ways not addressed here.<sup>31</sup> Many of these have affected the economy ever since. A broad range of new financial regulations were established, some of which were eliminated in financial deregulation after 1978. Social Security

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<sup>31</sup> For surveys by economic historians that capture the full breadth of the New Deal see the conference volumes edited by Bordo, Goldin, and White (1998) and Crafts and Fearon (2013).

old-age pensions were introduced along with Unemployment Insurance and the matching grant public assistance programs in 1935, but they were not fully implemented until near the end of the decade. The government allowed firms within industries to bargain with each other on prices, wages, output, hours, and employment under the NRA without antitrust interference between 1933 and 1935, and a literature has developed to examine how effectively the firms were able to cartelize.<sup>32</sup> When the NRA was struck down by the Supreme Court, the National Labor Relations Act of 1935 was introduced to enhance the strength of unions, and the Fair Labor Standards Act of 1938 established a national minimum wage and maximum hours law.<sup>33</sup> The modern farm policies got their start under the New Deal and continue on after revisions driven by a Supreme Court decision to strike down the first version. I anticipate that scholars will be able to use the data already compiled and uncover additional information that can be used to continue the trend toward rigorous quantitative examinations of the New Deal programs.

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<sup>32</sup> For examples, see Alexander (1997), Alexander and Libecap (2000), Klein and Taylor (2008), Taylor (2007, 2010), Vickers and Ziebarth (2014), and Chicu, Vickers, and Ziebarth (2013).

<sup>33</sup> See Seltzer (1995, 1997) and Fleck (2002) for studies of the political economy and impact of the laws.



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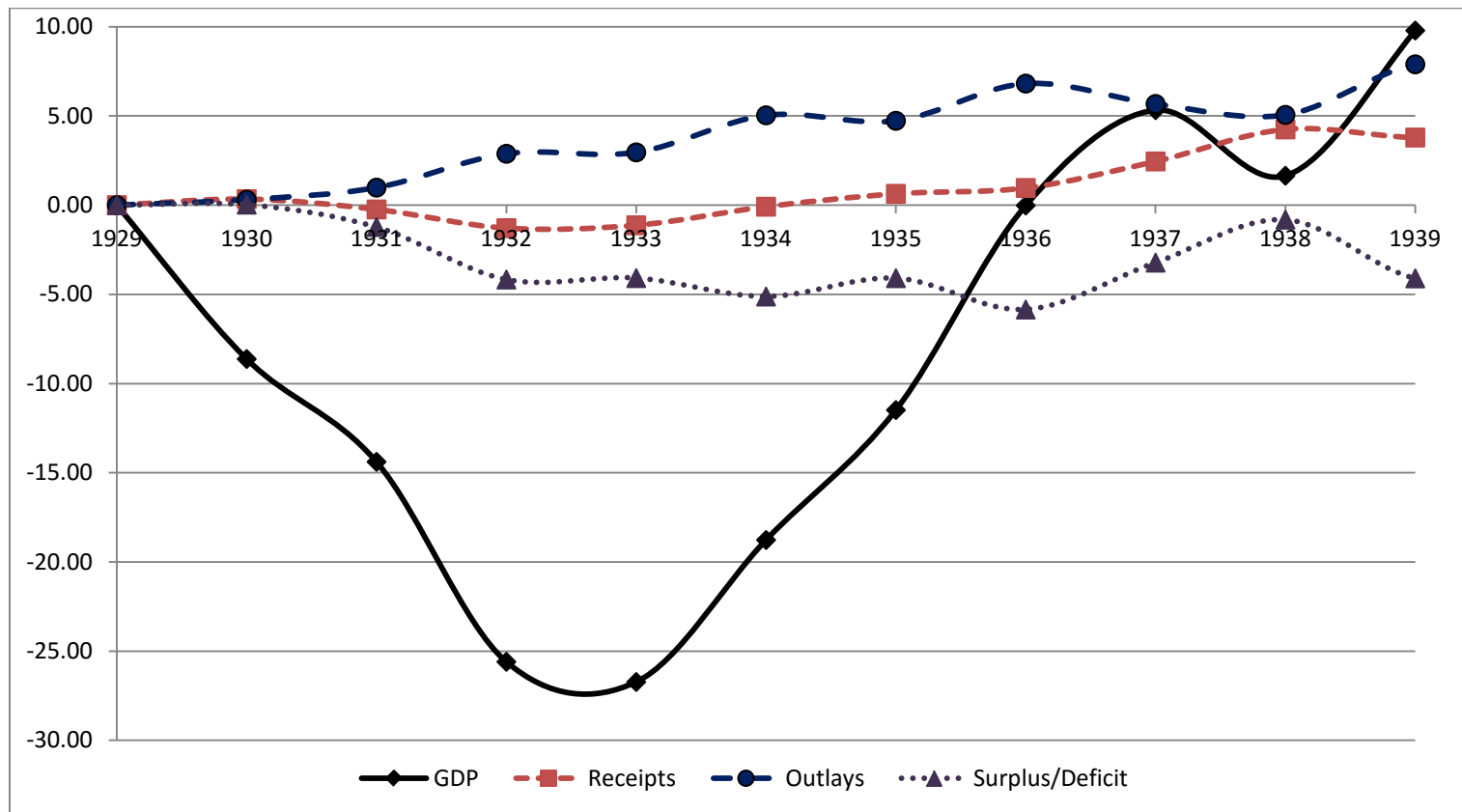
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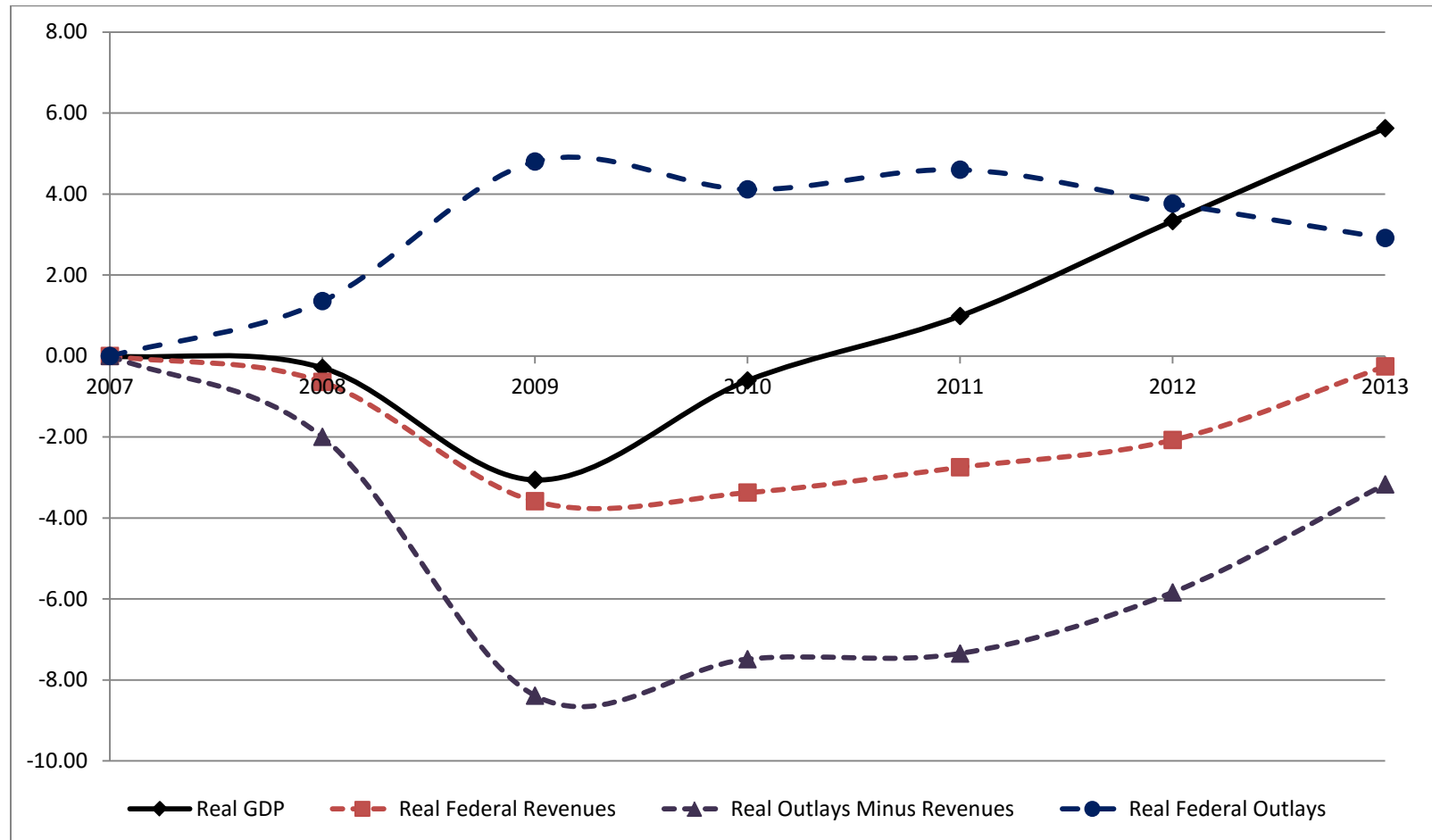
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**Figure 1**  
**Difference from 1929 in Real GDP, Federal Government Outlays, Revenues, and Surplus/Deficit As Percentage of 1929 Real GDP, 1929-1939**



*Sources:* All dollar values were converted to real values using a GDP deflator (1996=100) and then divided by 1929 real GDP to get a percentage. Calculated from information on Gross Domestic Product and the GDP deflator in Sutch (2006 3-25) and on federal government revenues and outlays are from the Office of Management and Budget and downloaded from <http://www.whitehouse.gov/omb/budget/Historicals> on August 26, 2014.

**Figure 2**  
**Differences from 2007 in Real GDP, Federal Government Outlays, Revenues, and Surplus/Deficit As Percentage of 2007 Real GDP, 2007-2013**



*Sources:* All dollar values were converted to 2009 dollars and then calculated as a percentage of 2007 real GDP. GDP and GDP deflator were determined by the Bureau of Economic Analysis and downloaded from the St. Louis Federal Reserve online database at <http://research.stlouisfed.org/fred2/> on August 26, 2014. Federal government outlays and receipts were downloaded from <http://www.whitehouse.gov/omb/budget/historicals> on August 26, 2014.

TABLE 1

## ESTIMATES OF DOLLAR-FOR-DOLLAR EFFECT OF PER CAPITA GRANTS ON STATE PER CAPITA INCOME, 1930–1940

		Level		Difference	
		Including Transfers	Excluding Transfers	Including Transfers	Excluding Transfers
<b>LEAST SQUARES</b>					
No controls	Coeff.	1.25	1.52	—	—
	<i>t-stat.</i>	(3.77)	(3.95)	—	—
Controls state effects	Coeff.	1.54	2.06	0.98	1.37
	<i>t-stat.</i>	(7.54)	(5.43)	(5.96)	(3.20)
Controls state effects and weather	Coeff.	1.63	2.15	0.94	1.39
	<i>t-stat.</i>	(7.17)	(5.35)	(5.25)	(3.12)
Controls year effects, state effects, and weather	Coeff.	0.43	0.45	0.26	0.26
	<i>t-stat.</i>	(2.28)	(1.95)	(2.20)	(1.6)
Controls state time trends, year effects, state effects, and weather	Coeff.	0.21	0.16	0.26	0.27
	<i>t-stat.</i>	(1.15)	(0.88)	(1.82)	(1.42)
<b>TWO-STAGE LEAST SQUARES</b>					
Controls year effects, state effects, and weather	Coeff.	0.83	0.96	0.81	0.67
	<i>t-stat.</i>	(3.10)	(2.43)	(1.58)	(0.39)
	Instrument F-stat.	[47.18]	[63.89]	[12.25]	[10.92]
Controls state time trends, year effects, state effects, and	Coeff.	0.26	-0.18	0.87	0.84
	<i>t-stat.</i>	(1.19)	(-0.25)	(1.63)	(0.35)



weather	Instrument F-stat.	[8.19]	[4.59]	[9.33]	[4.58]
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*Notes:* Including transfers means that both income and grants included transfers, excluding transfers means that neither included transfers. This is a balanced panel with information for 48 states for each year from 1930 through 1940. For the calculations of t-statistics, standard errors are based on White corrections using the robust command with standard errors clustered at the state level. The instrument F-statistic is the Kleibergen-Paap rank Wald (KP) F statistic.

*Source:* Fishback and Kachanovskaya (2015).

TABLE 2  
THUMBNAIL SKETCHES OF MAJOR NEW DEAL PROGRAMS DISTRIBUTING LOANS AND GRANTS TO THE STATES  
AND THEIR CITIZENS

Program	Description	Percentage of Total Grants, Fiscal Years 1934-1940
TOTAL GRANTS	\$34.5 billion in nominal dollars; roughly \$586.5 billion in 2013 dollars	
RELIEF GRANTS		47.9
Federal Emergency Relief Administration (FERA)	Provided direct and work relief payments based on gaps between household income and an income maintenance budget. Hourly work relief payments about half of payments under PWA. July 1933 through June 1935 with a phase out period to March 1937.	8.9
Civil Works Administration (CWA)	Work relief that paid similar wages to Public Works Administration from November 1933 through March 1934.	2.3
Works Progress Administration (WPA)	Provided work relief with limits on monthly hours and hourly wage payments of roughly half of Public Works Administration payments. Started in July 1935.	24.3
Social Security Administration Public Assistance (SSAPA)	Matching grants to states to help fund public assistance payments for aid to dependent children, old age assistance, and aid to the blind. Timing of first payments based on when states passed enabling legislation after national law passed in 1935.	3.3

Civilian Conservation Corps (CCC)	Work relief for young men, who were often moved to other states to work on various projects. Paid \$1 per day with most of pay sent to parents. July 1933 through the 1930s. About 1 percent went to small to CCC for native-americans.	6.8
<b>VETERANS' GRANTS</b>		
Veterans' Administration (VA)	Provided a wide array of pensions, disability payments, provision of housing and medical care, and life insurance payments. Preceded New Deal.	20.9
Veterans' Bonus Payments for Adjusted Service Certificates (ASCG)	Payments in cash or repayments of loans based on World War I Adjusted Service Certificates beginning in June 1936.	10.8
<b>PUBLIC WORKS GRANTS</b>		
Public Roads Administration (PRA)	Provided grants for highway building and took over control of prior highway matching grant programs. Started in June 1933.	17.8
Public Works Administration, Nonfederal (PWANF)	Provided grants to build public works to subnational governments for projects specific to their area. Started in June 1933.	4.7
Public Works Administration, Federal (PWA)	Built national public works projects. Started in June 1933.	3.8
Housing, Public Works Administration (PWAH)	Grants to build low-income housing projects, June 1933 through 1938 with phaseout afterward.	2.1
Public Buildings Administration (PBA)	Grants for building federal buildings. Formal agency created in 1933.	0.4
Bureau of Reclamation (BR)	Provided long term no interest loans for irrigation works. Repayments delayed enough many treat them as grants rather than loans. Preceded New Deal.	0.8
Rivers and Harbors under Army Corps of Engineers (ACE)	Built and maintained projects to control floods and to aid navigation and use of rivers and harbors. Preceded New Deal.	1.1
		4.0

Tennessee Valley Authority (TVA)	Corporation created to build and then operate dams for flood control and electricity. By late 1930s became a retailer of electricity to homes and businesses. Created in 1933 but given control of Wilson Dam, which had been built in 1920s.	0.7
Miscellaneous	Includes maintenance of forest, building forest roads, aid to hydroelectric power, and wildlife restoration	0.3
FARM GRANTS		12.4
Agricultural Adjustment Act (AAA)	Payments to farmers to remove acreage from production and raise prices in 1933. Started in July 1933. After declared unconstitutional in 1935 was reenacted as means to conserve on soil and prevent erosion.	10.7
Farm Security Administration (FSA)	Payments to help low income farmers and tenants. Took over some of responsibilities of FERA. Began in fiscal 1935.	0.9
LOANS TOTAL	\$13.1 Billion in Nominal Dollars, Roughly 222.7 billion in year 2013 dollars	Percentage of Total Loans, Fiscal Years 1934-1939
Farm Credit Administration (FCA)	Programs for loans for mortgages, production credit, emergency crop and seed loans, and farm disaster relief. Started in July 1933 and took over administration of earlier programs. The earlier programs included seed money for Federal Land Banks to offer mortgages through associations of farmers, emergency crop and feed loans provided on an ad hoc basis by Congress	29.5

Home Owners' Loan Corporation (HOLC)	Purchase of nonfarm mortgages from lenders that were in trouble through no fault of the borrower. The loans were then refinanced at better terms. Loans made from late 1933 through early 1935. The HOLC also made loans and investments to Savings and Loans, which accounted for 7.8 percent of its activity.	26.1
Reconstruction Finance Corporation (RFC)	Made loans to banks, industry, local governments for relief, and to help many New Deal and later War Programs in their early stages. Started in February 1932.	21.4
Commodity Credit Corporation (CCC)	Nonrecourse loans for farmers in which farmer repaid the loan in cash when price exceeded a reserve level or repaid the loan with the crop when the market price was below. Started in 1933.	12.6
Public Works Administration (PWA)	Loans to held subnational governments build local public works. Usually tied to PWA Nonfederal grants as part of a package. Started in fiscal 1933.	3.9
Farm Security Administration (FSAL)	Loan programs for low-income farmers, started in fiscal 1936.	2.6
Rural Electrification Administration (REA)	Loans to cooperatives to bring electric power lines to farms, started in 1935.	0.9

*Source and Notes.* Fishback (2015). The Bureau of Reclamation funds were interest-free loans with long time horizons with repayment. In most cases the repayments were delayed over extended periods and some were forgiven. As a result, the Office of Government Reports treated them as grants rather than loans, and I follow their definition. Miscellaneous relief grants accounted for 2.1 percent of grants and included payments to state and local governments for soldier/sailor homes, grants to distribute surplus food and commodities, the U.S. Employment Service, and Miscellaneous relief funds. Miscellaneous farm grants accounted for 0.8 percent of grants and included grants for Soil Conservation Service, Land Utilization Programs, Agricultural Extension, Experiment Stations, Agricultural and Mechanical Colleges, and purchases of submarginal land. Grants for vocational education and rehabilitation and other small education grants accounted for 0.3 percent of total grant. Miscellaneous grants for the national guard, public health, and

other items accounted for 0.8 percent. Nearly all of these programs were continuations of programs created before the New Deal. Miscellaneous Loans accounting for 1.8 percent of loans included Federal Reserve Bank loans starting in 1935, U.S. Housing Authority Loans beginning in 1939, farm tenant purchase loans starting in 1938 and Disaster Loan Corporation Loans starting in 1937.

Table 3  
Summary of Studies of the Impact of New Deal Relief Spending

Program	Reference	Effect	Data	Method	Instrument
New Deal Emergency Relief Employment, 1937, 1940	Fleck (1999)	<b>Private Employment:</b> Increase of one emergency relief job associated with an increase in measured unemployed but little effect on private employment	Separate Cross Sections of County Averages in 1937 and again in 1940	Large number of correlates and instrument for relief jobs.	Voter turnout, and series of measures of loyalty to Democratic Presidential Candidates based on vote shares from 1896 to 1928
New Deal Federal Emergency Relief Administration Employment, 1935	Wallis and Benjamin (1981)	<b>Private Employment:</b> Little or no effect of FERA cases per capita spending on private monthly wages. Little effect of FERA average benefits on FERA caseloads.	Cross Section of 52 cities in fiscal year, 1934-1935	In wage equation correlates for aggregated demand and prior wages. In case equation correlates and instruments for FERA benefit levels.	Exclusion restrictions from system of equations. Key instruments are shift-share instruments for manufacturing production and fluctuations in employment plus specified benefit ratios
New Deal Relief Spending	Hungerman and Gruber (2008)	<b>Private Charitable Spending:</b> An additional dollar of New Deal spending reduced church charitable spending by about 29 percent of the maximum it could have reduced it.	Panel of annual state averages, 1933 through 1939.	State and year fixed effects, region-specific time trends, instruments	Tenure of states' Congressional representative on Appropriations committee and state constitutional restrictions on the issuance of debt.

New Deal Relief Spending	Fishback, Haines, and Kantor (2007)	<b>Death and Birth Rates:</b> About \$2 million (in 2000\$) in additional relief spending associated with reduction of one infant death, half a homicide, one suicide, 2.4 deaths from infectious disease, one death from diarrhea. A one-standard deviation increase in relief spending associated with 0.82 standard deviation rise in general fertility rate	Panel: Annual averages for 114 cities, 1929-1940	Controls for city characteristics, city and year fixed effects, instruments.	Standard Deviation of Vote for President in past presidential elections, representation on key House Committee in Congress, and Democratic Governor
New Deal Relief Spending	Johnson, Fishback, and Kantor (2010)	<b>Crime Rates:</b> Ten percent rise in work relief spending associated with 1.5 percent reduction in property crime rate. Smaller effect of direct relief spending.	Panel: Annual averages for 81 large cities, 1930-1940	Controls for city characteristics, city and year fixed effects, city-specific time trends, and instruments.	Extreme wetness from rainfall and average percent vote for Democratic President in county interacted with total federal relief spending outside region where city is located and extreme wetness
New Deal Relief spending,	Neumann, Fishback, and Kantor (2010)	<b>Private Employment:</b> Prior to 1936 an additional private job-month was created when relief case-months rose by 8.9. After 1935 an additional WPA job-month associated with 0.66 fewer private job-months.	Panel of monthly averages from January 1933 through December 1939 for 44 major cities.	Panel VAR with differencing and controls for serial correlation. No endogeneity if there is a one-month or more lag in effects of each variable on other variables.	N.A.



New Deal Relief Spending: Works Progress Administration	Kitchens (2013b)	<b>Malaria Rates:</b> WPA programs reduced malaria death rate by 9.1 deaths per 100,000, 44% of observed decline.	Annual panel of Georgia counties, 1932-1947.	Dynamic first-differenced panel with state and year fixed effects, lagged malaria rate, rainfall, temperature, socioeconomic correlates. Pre-trend tests suggest no endogeneity bias.	Lagged value of correlates in manor of Blundell and Bond (1998)
New Deal Relief Spending: Works Progress Administration	Sundstrom (2001)	<b>Labor Force Participation for Black and White Women:</b> Played a secondary role in reducing women's labor force participation. Discouraged worker effect far more important.	Cross section of individual observations from 1940 Census.	Probit estimation of probability of being in labor force as function of whether husband on public relief (relief effect), the area unemployment rate (discourage worker) and other correlates.	N.A.
Old Age Assistance, 1930-1938	Stoian and Fishback (2010)	<b>Death Rates of Elderly:</b> Old Age Assistance did not reduce elderly death rates	Panel: Annual averages for 75 cities, 1930-1940	Difference between eligible and non-eligible age groups with city and year fixed effects and instrument for Old Age Assistance variable	Workers' compensation benefit ratio from 20 years earlier
Old Age Assistance, 1930-1950	Parsons (1991)	<b>Labor Force Participation:</b> OAA benefits account for about half of the decline in the elderly work force between 1930 and 1950	Panel of State Averages, 1930, 1940, and 1950	Pooled regressions with controls and with random effects.	Not used

Old Age Assistance, 1934-1955	Balaan Cohen (2009)	<b>Death Rates of Elderly:</b> Old Age Assistance reduced several types of mortality after 1940 but not before.	Panel: Annual Averages for 48 states, 1934-1955; 1937-1955; 1940-1955	State and year fixed effects and state specific time trends with instrument for Old-Age Assistance variable, plus regression to show no effects for people not eligible for program	Instrument based on state rules and simulated income for the elderly.
Old Age Assistance, 1940 and 1950	Costa (1999)	<b>Family Structure:</b> Elderly women more likely to live on own.	Pooled Cross-Sections of Different Individuals from Census, 1940 and 1950	Controls for individual characteristics, state and region fixed or random effects, differencing between eligible and noneligible populations.	Not used
Old Age Assistance, 1940 and 1950	Friedberg (1999)	<b>Labor Force Participation:</b> Higher Old Age Assistance Benefits lowered Labor Force Participation Among the Elderly	Pooled Cross-Sections of Different Individuals from Census, 1940 and 1950	Probit with controls for individual characteristics and state economic conditions with state and year fixed effects. Additional regressions to show no effect for people not eligible for program	Not used
Relief Spending	Hill (2015)	<b>Marriage rates</b> lower in areas with more WPA spending per capita	Individuals in 1940 Census Sample with WPA spending by 460 State Economic Areas	Cross-sectional	Not used

Relief Spending, 1930s	Benjamin and Matthews (1992)	<b>Private Employment:</b> An additional New Deal relief job crowded out about one-third of a private job in the First New Deal through 1935 and about nine-tenths of a private job in the second new deal.	Panel of annual state averages, 1932 through 1939	Pooled regressions with controls and instruments	Exclusion restrictions from system of equations. Key instruments are shift-share output instrument, federal tax revenue.
Unemployment Insurance, 1930s	Balkan (1998)	<b>Wages:</b> Introduction of Unemployment Insurance in late 1930s had little impact on wages	Unbalanced panel of hourly earnings for 72 industries in 48 states for years 1933, 1935, 1937, and 1939	Correlates and state and year fixed effects. Lagged measure of UI maximum paid for maximum duration.	Not used
Veterans' Bonus	Hausman (2015)	<b>Purchases:</b> Veterans' Bonus increased probability of car purchase by 22 percentage points for individuals, an extra veteran associated with 0.3 more car sales in 1936 and increase in \$100 of the value of building permits.	Cross-Section of Households from 1935-1936 Consumer Survey; cross-section of cities and states.	Difference-in-Difference with multiple correlates.	Not used.

Table 4  
Summary of Studies of the Impact of New Deal Public Works and Relief Spending

Program	Reference	Effect	Data	Method	Instrument
Public Works and Relief Grants	Fishback and Kachanovskaya (2015)	<b>Per Capita Income and Automobiles:</b> Grant dollar raises income by 0.25 to 1.1 dollars, value of car registrations by 14 cents.	Panel for 48 States from 1930 through 1940	State and Year Fixed Effects and Extreme Weather Correlates and instrumental variables; some estimates with state time trends	Shift-Share instrument using state shares from 1920s for 8 programs and national totals well outside region
Public Works and Relief Grants	Fishback and Kachanovskaya (2015)	<b>Nonfarm Private Employment:</b> Elasticities ranging from -0.046 to 0.016.	Panel for 48 States from 1930 through 1940	State and Year Fixed Effects and Extreme Weather Correlates and instrumental variables; some estimates with state time trends	Shift-Share instrument using state shares from 1920s for 8 programs and national totals well outside region
Public Works and Relief Spending	Fishback, Horrowice, and Kantor (2005)	<b>Retail Sales:</b> Dollar increase of public works and relief spending per capita associated with rise in retail sales per capita of roughly 40 cents.	Cross-section of Growth rates for U.S. Counties, 1929-1939, 1929-1935, 1933-1939	Large number of correlates and instrument for public works and relief.	Standard Deviation of Democratic Voting, 1896-1928; voter turnout 1928, county land area; latitude; longitude; church membership 1926

Public Works and Relief Spending	Fishback, Horrace, and Kantor (2006)	<b>Net Migration:</b> A one-standard deviation Increase in public works and relief spending leads to a 0.54 increase in net migration.	Cross-section of county averages during 1930s.	Large number of correlates and instrument for public works and relief and AAA farm grants.	Key Instruments for Public Works and Relief were Standard Deviation of Vote for President in past presidential elections; presence of large rivers; also instruments for AAA grants
Public Works and Relief Spending	Vellore (2014)	<b>Outcomes Later in Life.</b> Ameliorated negative effects of Dust Bowl later in life, including reducing the probability that people born in Dust Bowl states had disabilities and raising likelihood of education completion.	Panel: Individual census data for 1980, 1990, and 2000 for people who were children in the 1930s.	State of birth and current state fixed effects, and census year fixed effects.	Not used
Public Housing Projects	Kollman (2013)	<b>Property Values</b> rose within a mile radius of new public housing projects between 1934 and 1940. Impact on median rents is mixed.	Real property inventories in 1934 and census tract information in 1930 and 1940 from Chicago, Washington, Philadelphia, New York, Boston and Louisville.	Hedonic pricing model with spatial interactions with controls for numerous correlates.	Not used.

TVA Dams	Kitchens (2012)	<b>Malaria:</b> TVA reservoirs are associated with increase in malaria rates of 40 to 50 percent relative to the mean. TVA anti-malaria programs had some success reducing rate.	County panel from Alabama and Tennessee with annual data for the 1914 through 1950	Count and Year fixed effects, controls for anti-malaria efforts by WPA and county health boards. Placebo testing with measles rates.	Not used
TVA Electric Power	Kitchens (2014)	<b>Economic Activity:</b> No positive and statistically significant effects of TVA Electrification on retail sales per capita, farm output, farm value, productivity, manufacturing value added, or number of manufacturing employees.	Panel of Southeastern Counties from 1929 to 1955	County and Year fixed effects, state-year fixed effects, variety of correlates, pre-treatment controls interacted with year fixed effects; and instrumental variables; also matching estimator as in Kline and Moretti	Distance from Dam Locations and Timing based on Army Corps of Engineers' Plans in 1920s
TVA Subsidies Between 1940 and 1960	Kline and Moretti (2013)	<b>Manufacturing and agricultural employment, manufacturing productivity:</b> During subsidy period 1940-1960 employment in manufacturing and agricultural rose 10 percent more in TVA service region. After 1960 agricultural employment down 16 percent, manufacturing employment up 3.6 percent. No effects on wages, small effects on land and housing value. Substantial increase in manufacturing productivity.	Panel of TVA counties and similar counties from 1940 to 2000.	Matching estimators based on pre-TVA county characteristics and potential inclusion in other TVA-like projects. Also IV when measuring productivity effects.	For productivity study, two decade lags in manufacturing employment.

Table 5  
Summary of Studies of the Impact of President's Reemployment Agreements and NRA Codes

Program	Reference	Effect	Data	Method	Instrument
President's Reemployment Agreements	Taylor (2011)	<b>Labor Market.</b> PRA associated with no change in total hours, 3.3 percent higher employment, offsetting drop in weekly hours, 18 percent higher hourly earnings and -2 percent fewer hours in low wage industries, 5 percent higher hourly earnings and -6 percent fewer hours in medium wage industries, 2 percent higher hourly earnings in high wage industries and -6.5 percent fewer weekly hours.	Monthly panel for up to 66 industry, 1927 to 1937.	Industry fixed effects, controls for aggregate fiscal policy and monetary policy.	Not used
National Recovery Administration Codes	Taylor (2011)	<b>Labor Market.</b> NRA codes associated with -0.4 percent less employment, -1.2 percent less total hours, -1.4 percent less output, 1.5 percent higher hourly earnings and -2 percent fewer weekly hours in low wage industries; no change in weekly earnings and -2 percent fewer weekly hours in both mid- and high-wage industries.	Monthly panel for up to 66 industry, 1927 to 1937.	Industry fixed effects, controls for aggregate fiscal policy and monetary policy.	Not used

President's Reemployment Agreements	Taylor and Neumann (2013)	<b>Labor Market.</b> PRA codes associated with 7 percent lower output; -15 percent lower weekly hours and 12 percent higher real hourly earnings in low wage industries; -4 percent lower weekly hours and 3 percent higher hourly earnings in high wage industries.	Monthly panel for 11 industries, 1923-1939	Panel Vector autoregressive model using differences or levels with fixed effects.	Not used
National Recovery Administration Codes	Taylor and Neumann (2013)	<b>Labor Market.</b> NRA codes associated with 2 percent drop in employment; 6.6 percent rise in weekly hours and -8.4 percent drop in real hourly earnings in low wage industries; -1.6 percent drop in weekly hours and 0.08% rise in real hourly earnings in high wage industries.	Monthly panel for 11 industries, 1923-1939	Panel Vector autoregressive model using differences or levels with fixed effects.	Not used



Table 6  
Summary of Studies of the Impact of Farm Grants

Program	Reference	Effect	Data	Method	Instrument
AAA Farm Grants	Sorensen, Fishback, Kantor (2008)	<b>Tractors:</b> Elasticity of tractor usage with respect to AAA grants of statistically insignificant 0.19 to statistically significant 0.77.	County panel 1929 to 1939 throughout the U.S.	First-difference with state fixed effects, multiple correlates, prior growth rate, and instrumental variables.	House Representation on Agriculture Committee in 1933, longitude as measure of frontier; and the presence of major rivers.
AAA Farm Grants	Barreca, Fishback, and Kantor (2012)	<b>Malaria:</b> \$20 increase in AAA grants per capita associated with 10 percent of decline in malaria rates in the period. Part of the drop association with out-migration	Quasi-first difference of malaria rates for 1930 and 1940 counties in the South	State fixed effects and placebo tests.	Not used
AAA Farm Grants	Depew, Fishback, and Rhode (2013)	<b>Number of tenants and croppers:</b> Each 10 percent increase in AAA grants per capita displaced 1.4 to 1.9% of black tenants and share croppers and white share croppers	Change between 1930 and 1935 for cotton counties in South	Difference and state fixed effects, multiple correlates, instrument	Instrument based on AAA rules on output, using lagged values from 1924
AAA Farm Grants	Whatley (1983)	<b>Number of tenants and croppers.</b> Predicted to displace 33 percent of tenants.	Totals for Cotton South	Predictions from Simulation	N.A.

AAA Farm Grants	Fishback and Kachanovskaya (2015)	<b>Per Capita Income and Automobiles:</b> Grant dollar raises income by at most 14 cents, some negative effects and reduces car registrations.	Panel for 48 States from 1930 through 1940	State and Year Fixed Effects and Extreme Weather Correlates and instrumental variables; some estimates with state time trends	Instrument based on AAA rules on output combined with shift-share estimates of output lagged multiple years
AAA Farm Grants	Fishback and Kachanovskaya (2015)	<b>Nonfarm Private Employment:</b> Positive elasticity of 0.004 to 0.01	Panel for 48 States from 1930 through 1940	State and Year Fixed Effects and Extreme Weather Correlates and instrumental variables; some estimates with state time trends	Instrument based on AAA rules on output combined with shift-share estimates of output lagged multiple years
AAA Farm Grants	Fishback, Horrace, and Kantor (2005)	<b>Retail Sales:</b> Dollar increase of AAA spending associated with a statistically insignificant fall in retail sales per capita of 4 cents.	Cross-section of Growth rates for U.S. Counties, 1929-1939, 1929-1935, 1933-1939	Large number of correlates and instrument for public works and relief.	Standard Deviation of Democratic Voting, 1896-1928; voter turnout 1928, county land area; latitude; longitude; church membership 1926
AAA Farm Grants	Fishback, Horrace, and Kantor (2006)	<b>Net Migration:</b> A one-standard deviation increase in AAA farm payments to take land out of production led to a 0.14 standard deviation reduction in net migration.	Cross-section of county averages during 1930s.	Large number of correlates and instrument for public works and relief and AAA farm grants.	Key Instruments for AAA grants were average farm size; quality of soil (average water capacity); also instruments for public works and relief

AAA Farm Grants	Fishback, Haines, and Rhode (2012)	<b>Farm Wages and Farm Workers:</b> Typical AAA payments associated with decline in farm population of 14 percent and a rise in farm wage of 9 percent.	Panel of State averages, 1923 to 1939	Multiple correlates, state and year fixed effects and instrumental variables	Based on AAA distribution rules, used weighted average of output from two to six years earlier for all crops that eventually became AAA crops. Weights based on national prices in 1910-1914.
Farm Conservation Policies	Hansen and Libecap (2004)	<b>Future Dust Bowl:</b> Conservation programs helped stop drought, high temperatures, and high winds from created a 1970s version of the Dust Bowl.	County level information in Plains States in 1930s and 1970s	A variety of correlates	Not used

Table 7  
Summary of Studies of the Impact of Lending Programs

Program	Reference	Effect	Data	Method	Instrument
Farm Loan Programs	Sorensen, Fishback, and Kantor (2008)	<b>Tractors:</b> Elasticity of tractor usage with respect to Farm Loans of 0.34 to 0.49.	County panel 1929 to 1939 throughout the U.S.	First-difference with state fixed effects, multiple correlates, prior growth rate, and instrumental variables.	House Representation on Agriculture Committee in 1933, longitude as measure of frontier; and the presence of major rivers.

Rural Electrification Administration Loans	Kitchens and Fishback (2015)	<b>Rural Outcomes:</b> More REA loan funds associated with rise in farm output per acre and per farm, increases in machinery per farm, less work off the farm by farmers, and lower infant mortality	First-differences for 1930 and 1940 for rural counties in nonwestern areas;	First differences and large number of correlates. Placebo tests show no relationship of REA to changes in variables in the 1920s.	Not used
Farm Credit Administration Loans	Alston and Rucker (1987)	<b>Farm Failures:</b> Elasticity of farm failures with respect of federal lending was -0.488. State mortgage moratoria reduced farm failure rates. AAA indirectly reduced farm failure rates.	Panel of States, 1929-1939	Pooled regression with variety of correlates. Two-stage least squares.	Exclusion restrictions in system of equations. Key instruments Dummy for Roosevelt in Office and interaction of dummy with failure rate
State Mortgage Moratoria	Alston and Rucker (1987)	<b>Farm Failures:</b> State Moratoria reduced farm failures.C26	Panel of States, 1929-1939	Pooled regression with variety of correlates. Two-stage least squares.	Exclusion restrictions in system of equations. Key instruments Dummy for Roosevelt in Office and interaction of dummy with failure rate
State Mortgage Moratoria	Alston (1984)	<b>Loans and Interest Rates:</b> Moratoria contributed to higher interest rates and reduction in number of private loans made.	Panel of States, 1932 and 1934	First differences with range of corelates	Not used
RFC Bank Loans and Purchases of Preferred Stock	Mason (2001a)	<b>Bank Failure Rate and Growth of Loans:</b> Preferred Stock Assistance improved survival rate of banks, RFC loans did not.	Panel of 357 Chicago area banks.	Survival model with numerous controls for features of balance sheet, measures of local economy.	Not used

RFC Bank Loans and Purchases of Preferred Stock	Calomiris, e.t al. (2013)	<b>Bank Failure Rate and Growth of Loans:</b> One percent earlier use of Preferred Stock Assistance increased time to failure by 2 percent. One percent rise in assistance increased loan activity by 1 percent.	Data on Michigan Banks, 1930-1936	Numerous controls for features of balance sheet, measures of local economy with instrumental variables.	Instruments based on bank correspondence networks
RFC Bank Loans and Purchases of Preferred Stock	Vossmeier (2014)	<b>Bank Loan Activity in 1935:</b> Combined effect of \$100 in RFC loans and stock purchases increases loan activity in 1935 by \$57.	Cross-section of all banks from Alabama, Arkansas, Michigan, Mississippi, and Tennessee present in 1932.	Numerous controls for features of balance sheet, measures of local economy.	Uses Bayesian Methods to determine exclusion restrictions in selection model.
RFC Loans to Railroads	Mason and Schiffman (2004)	<b>Railroad Maintenance and Investment:</b> Railroads going through bankruptcy increased spending on maintenance-of-way 8% more than railroads receiving RFC loans, 10% more on equipment maintenances, and raised employment by 2 percent more.	Panel of annual railroads, 1932-1937	Controls and firm and year fixed effects.	Not used
Home Owners' Loan Corporation	Courtemanche and Snowden (2011)	<b>Home Ownership and Housing Values:</b> One standard deviation increase in HOLC loans raised home value 19-22 percent and home ownership rate by 3.6-3.9 percent.	County panel from 1930 and 1940 with many correlates, state effects, and instrument	Controls and county first differences with state fixed effects and instrumental variables.	Distance from actual locations of HOLC Offices with robustness tests for different combinations

Home Owners' Loan Corporation	Fishback, et. al. (2011) and Fishback, Rose, and Snowden (2013)	<b>Home Ownership, Housing Values, Rents:</b> In counties with fewer than 50,000 people, prevented 67 percent of decline in home values that would have occurred without HOLC by end of decade; helped raise home ownership rate by 13 percent.	County panel from 1930 and 1940.	First Difference with controls for large numbers of correlates, state fixed effects, and instrumental variables.	Distance from simulated locations for HOLC offices.
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