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IN SEARCH OF THE MULTIPLIER FOR FEDERAL SPENDING IN THE STATES DURING THE GREAT DEPRESSION

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ABSTRACT

If there was any time to expect a large peace-time multiplier effect from federal spending in the states, it would have been during the period from 1930 through 1940. Interest rates were near the zero bound, and unemployment rates never fell below 10 percent and there was ample idle capacity. We develop an annual panel data set for the 48 states from 1930 through 1940 with evidence on federal government grants, loans, and tax collections and a variety of measures of economic activity. Using panel data methods we estimate a multiplier, defined as the change in per capita state economic activity in response to an additional dollar per capita of federal funds. The state per capita personal income multiplier with respect to per capita federal grants was around 1.1. Some point estimates for multipliers for nontransfer grants and nonfarm grants were higher but not statistically significantly different from one. There is some evidence that AAA farm grants had negative or no effect on personal income. Federal grants had stronger effects on consumption than on personal income, but they had no positive effect on various measures of private employment.

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In Search of the Multiplier for Federal Spending in the States During the Great Depression

The Great Recession of 2007 to 2009 has been described as the worst downturn since the Great Depression of the 1930s. In both periods the federal government sought to combat the downturns with sharp increases in federal spending. The recent federal stimulus package has led to a surge of interest in fiscal policy multipliers. The current environment for fiscal multipliers is similar to the Great Depression in two important ways. Short term interests are near the zero bound, and there is significant slack in the economy with unemployment rates over 9 percent.

The unemployment challenge was greater in the 1930s because real GDP dropped by 30 percent between 1929 and 1933 and unemployment rates exceeded 20 percent for four years and stayed above 14 percent for most of the decade. In contrast to the recent situation, in the 1930s the Hoover and Roosevelt administrations financed most of the increase in federal spending with taxes and thus ran relatively small fiscal deficits. However, as is the case today, there was substantial variation in the distribution of federal funds per capita across states that can be used to examine multipliers for federal spending in each state on state incomes.

In this paper, we construct measures of federal government spending in each state for the period 1930 through 1940 and then estimate the impact of federal government spending in the state on the state's per capita incomes, employment, and other measures of economic activity. In estimating the multipliers, we use several different measures of federal spending: grants, grants and loans, nontransfer grants, nonfarm grants, and

Agricultural Adjustment Administration (AAA) payments to farmers to take land out of production.

The multipliers are estimated using controls for time-varying weather patterns in the states, state fixed effects, year effects, and state-specific time trends, as well as instrumental variable techniques. Multipliers from most specifications with fixed effects and no instruments were well below one. We use two different instrumental variable (IV) strategies and multiple specifications and therefore report several estimates for each multiplier. The IV estimates of the state per capita personal income multiplier with respect to per capita federal grants were around 1.1. Some point estimates for multipliers for nontransfer grants and nonfarm grants were higher but not statistically significantly different from one. There is some evidence that AAA farm grants had negative or no effect on personal income. Federal grants had stronger effects on consumption than on personal income, but they had no positive effect on various measures of private employment.

The Recent Literature on Multipliers

Much of the focus of the recent literature on multipliers has been on macroeconomic multipliers for the national economy. The traditional Keynesian macroeconomic model predicts relatively high multipliers associated with high marginal propensities to consume, while neoclassical models predict low multipliers through crowding out of investment and consumption in part due to anticipation of future tax liabilities. Neo-Keynesian models that combine neoclassical modeling with frictions in the economy suggest multipliers somewhere in between.

Most of the empirical macroeconomic estimates for short run multipliers imply that a dollar increase in government spending is associated with an increase in income that ranges from about 50 cents to $1.30, or multipliers of 0.5 to 1.3. Some estimates range as high as 1.8. The variation comes in part from differences in strategies for resolving endogeneity problems that arise when policy makers use fiscal policy to try to counteract downturns. The methods range from use of Vector Autoregressive (VAR) models to identification of changes in military spending and tax policy that might be plausibly considered to be unrelated to the macroeconomy. Recent efforts examine the impact of unexpected changes in these plausibly exogenous factors. The results also may vary due to the period studied, as the multiplier is predicted to be larger in times of high unemployment and in periods when interest rates are fixed or near the zero bound.2

It is difficult to estimate a national multiplier during the 1930s because it is hard to argue that federal spending was not rising in response to the downturn, and finding an instrument for federal spending in a national regression is difficult. Any estimate is likely to be for a balanced-budget multiplier because the deficits were very small relative to the size of the problem. Scholars have repeatedly shown that the New Deal was not a

2 See Valerie Ramey's (2011) survey of multipliers for an upcoming issue of the *Journal of Economic Literature.* The third edition of Dornbusch and Fischer's *Macroeconomics* in 1984 (p. 148) reports multiplier estimates for an increase in net government spending of 1.8 from DRI and 0.7 from the Federal Reserve Bank of St. Louis. Key papers on the macroeconomic multiplier include Aiyagari, Christiano, and Eichenbaum (1992), Barro (1981); Barro and Redlick (forthcoming 2011), Blanchard and Perotti (2002) Blinder and Zandi (2010), Cogan, Cwik, Taylor, and Wieland (2009), Devereux, Head, and Lapham (1996), Hall (1980), Pereira and Flores de Frutos (1999) Ramey (forthcoming 2011), Ramey and Shapiro (1998), Romer 1992, Zandi (2009). Average tax multipliers tend to be somewhat higher (Romer and Romer 2010). In estimates of the impact of fiscal and monetary policy for the 1920s and 1930s from a panel of countries, Almunia, Benetrix, Eichengreen, O'Rourke, and Rua.find a multiplier for military spending above 2. Ethan Ilzetski, Enrique Mendoza, and Carlos Vegh (2010) find smaller multipliers for government consumption using panel SVAR methods on a modern panel of countries, although the multipliers vary across conditions.

Keynesian attempt to deal with the Depression.3 On the other hand, there was tremendous variation in the amount of per capita federal grants and loans distributed across the states during the New Deal and federal funds to each state fluctuated over the course of the decade. This variation can be used to identify the impact of distributing additional federal funds within a typical state on the income in the state.

The state-level multiplier is not the same as the federal multiplier. Nakamura and Steinsson (2011) suggest that state multipliers for federal spending are useful as estimates of the multiplier in a small open economy in a currency union with free movement across borders. However, there is likely to be cross-subsidization in the state multiplier for federal spending that is not present at the national level. A national multiplier for federal spending addresses a situation where all of the taxation and obligations to repay future debt are centered within the economy where the money is spent (Barro 1982). 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. They develop a model that shows that the relationship between state multipliers and the overall national multiplier can vary a great deal depending on a variety of assumptions, ranging from the extent of national unemployment to the variability of interest rates. In a political economy model, the state multiplier serves another purpose by determining the benefit that the state's residents anticipate receiving when seeking federal government funds.

Our estimates for the Depression therefore are most comparable to estimates from a series of recent working papers on the impact of federal spending on state and

3 Keynes chastised Roosevelt in letters to the editor for not running deficits to finance the rise in federal spending. E. Cary Brown (1956) and Larry Peppers (1973) both performed analysis to show that the deficits run were very small relative to the size that Keynesians would have recommended.

local economies between 1980 and the present.4 Juan Carlos Suarez Serrato and Phillipe Wingender develop local fiscal multiplier estimates for the modern era in the U.S. using changes in the distribution of federal spending across districts driven by updated local population estimates from the decennial Census. Using first-difference estimation on panels at the county, state, and MSA level after 1983, they report an income multiplier estimate of 1.88 and an estimated cost per job created of $30,000 per year.

Daniel Wilson (2011) estimates jobs multipliers for the federal distribution of funds under the American Recovery and Reinvestment Act (ARRA) of 2009. He relied on the exogenous formulas for allocation of spending as the source of identification and finds that the ARRA saved roughly one job per $100,000 spent and had its strongest impact on construction employment. Emi Nakamura and Jon Steinsson (2010) 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 construct an instrument based on regressing each state's military procurement spending on total U.S. military spending; therefore, the instrument for a state in year t is the coefficient from that state's regression times U.S. military spending in year t. Their results suggest a multiplier of 1.5, which is not sensitive to how strongly monetary policy leans against the wind.

4Another set of studies seek to estimate the impact of state government spending within the same state. Daniel Shoag (2010) estimates multipliers within states for state government spending using "windfalls" in returns on state pension assets as an instrument for state government spending. The estimates suggest an income multiplier of $2.12 and the generation of an additional job per $35,000 spent. Jeffrey Clemens and Stephen Miran (2011) examine the impact of state spending on state income using budget rules for state deficit finance and differences between forecasted state budgets and actual state budgets for identification. However, these sources of variation in state fiscal policy did not serve as strong instruments.

Cohen, Coval, and Malloy (2010) use changes in federal spending related to changes in key Congressional committee assignments to show that increases in federal spending are associated with reductions in private investment and employment in the states. In a study of low income countries Aart Kraay (2010) finds a multiplier of less than one for World bank lending using fluctuations in approval of projects as a source of variation in later spending that is uncorrelated with current output.

Regional scientists also have developed a broad range of theoretical models that lead to multipliers for net income coming into a state.5 The models range from the early Keynesian regional models to input-output models to economic base models to neo-classical models.6 The earlier empirical work on regional multipliers led to a broad range of estimates of multipliers of between 0.5 and 2 depending on the technique used. Some relied on simulations that derive multipliers using input-output models and surveys

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5 There is a large literature on the impact of public infrastructure spending at the state level. Hulten and Schwab (1991) conclude that the link between public infrastructure and states' economic growth is weak, as the states that expanded public infrastructure the most in the 1970s were not the ones that developed faster during that period. Munnell (1992 192) finds a significant effect of public capital on state-level output, investment and employment growth, although the effects of government spending at the state level are smaller than at the national level. Garcia-Mila and McGuire (1992) constructed a panel of 48 states from 1969 until 1983 to estimate input elasticity coefficients of regional Cobb-Douglas production functions and concluded that government provided goods, such as highways and education, have a significant and positive effect on state's output. Costa, Ellison, and Martin (1987) consider a translog production function and conclude that public capital and labor are complementary inputs. The estimated elasticities of output with respect to public are around one in all states. Meanwhile, Blanchard and Katz (1992) model the effects of negative one-percent employment shocks to a wide range of variables using data from U.S. states from 1947 to 1990 and find sizeable effects on per capita income over an extended number of years.

Duffy-Deno and Eberts (1991) study the effect of the public capital stock on the state's economic growth, first, without using capital expenditures as a proxy for capital stock, and second, considering public capital both exogenous to the firm and endogenous to the local community positing a simultaneous relationship of public capital and local economic growth. The authors find a positive and statistically significant effect of public capital on state's economic growth rate.

Assessing a link between public capital and economic growth, Fernald (1999) studies the direction of causation between public capital and productivity and unsurprisingly concludes that road construction (which is one of the biggest components of public spending) causes a surge in productivity in industries with high motor-vehicle use. David Aschauer (1989) also finds that road construction bears the most explanatory power of the change of local productivity, while military spending has almost none.

6 Richardson (1985) surveys all but the neoclassical models. Merrifeld (1987 and 1990) and McGregor, McVittie, Swales, and Yin (2000) for examples of neoclassical multipliers for the economic base.

that describe the degree to which different industries rely on local labor and external inputs and capital. Others rely on Ordinary Least Squares regression estimates (Mulligan (2005, 1987).

The coefficient on federal spending in a regional model will be determined by a series of factors.7 It will have positive effects to the extent that it puts to work unemployed resources; it is more productive than the private spending that is replaced by the anticipation of future obligations for taxpayers; it produces social overhead capital (like roads, sanitation, public health programs) that make the inputs in the state economy more productive; and/or it leads to multiplier effects. The Keynesian multiplier model arises as each income recipient purchases goods and services from others in the state who, in turn, spend their receipts on goods and services produced by others in the state. The regional neoclassical multiplier arises as labor demand is pushed out along an upward sloping labor supply curve.

The positive benefits of the multiplier are diminished through a variety of "leakages" when the money spent in the process is spent on goods and services outside the state economy. Much of the federal grant spending on work relief programs, like the FERA, WPA, or CWA, had small initial leakages because over 80 percent was spent on wages for people in the state. Grants from the Public Works Administration and Public Roads Administration had larger initial leakages because more than 50 percent of the monies were spent on materials and equipment imported from other states. More

7The intuitive discussion of the multiplier is based on a Keynesian discussion of consumption and imports. See Cullen and Fishback (2007) and Fishback, Horrace, and Kantor (2005b) for how this works in a simple model. Nakamura and Steinsson (2011) have a neo-Keynesian model that leads to the same implications.

leakages occurred to the extent that workers on federal projects spent their wages on goods and services produced outside the state.

Federal spending will have smaller positive effects on the economy to the extent that it leads people to save in anticipation that they will have to pay future taxes. The federal spending will have an even weaker effect to the extent that it replaces local production of goods and services. An influx of federal spending might bid up local wages in ways that raised the costs of hiring labor to private producers. It may have also bid up the prices for non-labor inputs with the same effect. The most obvious crowding out 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 projects that would have been built in the absence of federal spending. The impact of the reduction in state and local spending was likely to be small because states were generally required to run balanced budgets. Even when they ran deficits in the early 1930s, the deficits were relatively small as a share of state and local spending.

The Impact of Federal Spending in the 1930s.

There have been some estimates of the impact of New Deal spending on general economic activity. At the macroeconomic level, Christina Romer (1992) calculated a fiscal multiplier of only 0.23 in a difference-in-difference estimate that examined the change in federal funds distributed after the Veterans' Bonus was passed out in 1936. In simulations from a dynamic structural general equilibrium model Gauti Eggertsson (2008) finds that the combination of increased federal spending, the move off of the gold

standard, the zero interest bound, and government efforts to raise wages and prices through the National Recovery Administration led to a strong turnaround in the economy.

In microeconomic studies using variation across time and place, Fishback, Horrace, and Kantor (2005, 2006) showed a strong positive influence of public works and relief spending on county-level retail sales and net-migration. In studies of panel data for cities between 1929 and 1940 Fishback, Haines and Kantor (2007) and Johnson, Fishback and Kantor (2010) show that relief spending contributed to reductions in mortality and crime rates and increases in birth rates. On the other hand, Agricultural Adjustment Administration (AAA) grants had a slightly negative effect on retail sales growth and net migration. Garrett and Wheelock (2006) found similar positive effects of overall New Deal spending in a cross-sectional analysis of the growth rate in state personal income per capita for the entire period 1933 to 1939 and New Deal spending during that period. However, neither paper shows the effects of a multiplier on income in the same year.

Studies of labor markets using panel data from 1930s have focused on the impact of relief spending on labor markets. Neuman, Fishback, and Kantor (2010) examine monthly data from 1933 through 1940 for over 40 cities and find that relief spending raised private employment through 1935 but reduced it afterward. Benjamin and Mathews (1992) find small crowding out effects of private employment from relief jobs through 1935 and much larger crowding out effects in the second half of the New Deal.8

Federal Spending in the 1930s

8 We focus on the studies that use panel data here, see Neumann, Fishback, and Kantor (2010) for citations to studies relying on cross-sectional estimation.

In response to the hard times between the fiscal years 1929 and 1933, the Hoover administration and Congress increased nominal government spending by 52 percent, 88 percent after adjusting for the tremendous deflation.9 After a decade of no change in annual real federal spending, Hoover sought to increase spending through existing programs. As an example, the U.S. Department of Agriculture (1932, 49-50) described the increase in highway spending in 1932 as a relief and stimulus measure: "Emergency employment was directly provided for varying periods for nearly 200,000 men and indirectly for a much larger number in industries that supply necessary materials and services."10 By fiscal years 1932 and 1933 the federal government was running a deficit of -4.7 percent of a much reduced GDP as growth in tax revenues failed to keep pace with the rise in government spending.

After Franklin Roosevelt and the new Democratic Congress took office in March 1933, government spending roughly doubled over the next 6 years. The rise in spending did not lead to large budget deficits because tax revenues rose at roughly the same rate. E. Cary Brown (1956) and Claude Peppers (1973) have documented that the federal deficits as a share of GDP were small and fell well short of being Keynesian policies designed to stimulate the economy.11 On the other hand, the distribution of the federal spending varied enormously across states on a per capita basis. Figure 1 shows the large

9See series Ea584, Ea585, and Ea586 in Wallis (2006, 5-80 and 5-81). The federal fiscal year ran from July 1 in year t-1 to June 30 in year t. Nearly all of the decisions made about fiscal year 1933 were made by the Hoover administration and Congress. Roosevelt did not take office until early March 1933 and very little of the New Deal spending occurred before July 1, 1933.

10 In 1935 the U.S. Bureau of Agricultural Economics traced the path of $100 million of highway spending through the economy until it was paid out as wage or salary income and calculated highway spending multipliers of 2.7 for employment and 3 for economic activity.

11 After July 1931, it appears that monetary policy was relatively uniform across the 12 regional federal reserve banks. Richardson Van Troost (2009) document differences in attitudes toward providing reserves to banks in the St. Louis and Atlanta districts in 1930 and the first half of 1931, but St. Louis began following similar policies to Atlanta's in July of that year. Meltzer (2003) notes that there were differences of opinion about how to proceed with open market operations but that nearly all open market sales and purchases were made by the New York Federal Reserve Bank.

variation in the annual changes in per capita federal grants plotted against per capita personal income across states for the years 1930 through 1940, all measure in 1967. The changes over time within states after controlling for national shocks in each year is the source of variation used to identify the multipliers.

The Composition of Federal Spending

Understanding of the impact of federal spending and taxation during the New Deal era is complicated by the great diversity of programs. The New Deal funding programs were divided into two major classifications: nonrepayable grants and repayable loans.12 The Office of Government Reports (OGR) (1940) reported the total amount spent by each program in each state in each year from July 1, 1932 through June 30, 1939. The OGR mimeos do not document where they obtained the spending figures. To double check the OGR data and extend the series for programs back to 1930 and forward to 1940, we went through a large number of reports from various agencies and the Treasury department to double check the numbers. The data appendix describes the sources we used and some of the inconsistencies we found. In addition, we added information that the OGR did not report on the construction and maintenance spending on Hoover (Boulder) Dam and the Tennessee Valley Authority (TVA) and the loans and cash grants on the World War I adjusted service certificates that were associated with the Veterans' Bonus. The totals and the amounts per capita for the period 1933 through 1939 are reported in Table I to get a sense of the size of each program.

12The Office of Government Reports offered information on the value of housing loans insured by the Federal Housing Administration. Since these loans were private loans, we do not incorporate these into the analysis of net federal spending.

The main focus in the analysis is on nonrepayable grants from the federal government. About 62 percent of the grants were associated with relief programs. All of the Works Progress Administration (WPA), Civilian Conservation Corps (CCCG), and Civil Works Administration (CWA) grants and roughly half of the Federal Emergency Relief Administration (FERA) were spent on poverty relief projects with work requirements and could be considered federal expenditures because they produced a good or service. The Social Security Act Programs (SSA), and the rest of the FERA grants were New Deal programs that offered transfer payments to alleviate poverty. The Veterans' Administration (VA) and Soldiers' and Sailors' Homes (SOLD) were grant programs in place before the New Deal that provided pensions, disability payments, and living support to military veterans. Grants from the SSA programs provided matching grants to states that provided aid to dependent children (ADC), old-age assistance (OAA), and aid-to-the-blind (AB). If we performed the analysis for the U.S. as a whole, the transfer payments from the SSA, part of the FERA, the VA, and the SOLD, which account for roughly 20 percent of the grants, would not necessarily be treated as expenditures because they are net transfers within the system. However, at the state level these transfer grants become income that influenced purchasing power within each state, and therefore the Bureau of Economic Analysis included them in their personal income estimates; therefore, we incorporate them into the analysis.

The second major grant category is public works programs, which accounted for 19.4 percent of the grants. The Public Works Administration Federal (PWAF) and Nonfederal (PWANF) programs, Public Roads Administration, Public Buildings Administration (PBA), Rivers and Harbors Grant (RH) and other smaller programs listed

as public works in the table were not poverty programs. All but the PWA programs were long run federal programs established before the New Deal. Unlike the work relief poverty programs, the public works programs could hire from the labor market and faced fewer restrictions on hours worked. They also paid average hourly wages that were roughly double those on the work relief programs.

Approximately 12 percent of the grants were devoted to agriculture from programs run by the Agricultural Adjustment Administration (AAA), Soil and Conservation Service (SCS), Farm Security Administration (FSA), and Agriculturual Experiment Stations (AES). The AAA was the major New Deal program which was devoted to payments to farmers to take land out of production. The initial AAA program was funded with an agricultural processing tax until it was declared unconstitutional in January 1936.13 The AAA also administered the replacement program adopted under the Soil and Domestic Conservation Act of 1936, which continued to make payments to farmers to take land out of production without the processing tax. The FSA started within the FERA relief program and was more of a poverty relief program. The SCS began before the AAA was declared unconstitutional and provided grants for training farmers about soil conservation techniques.

It is not always clear how to treat the federal loans in terms of developing a multiplier. They are not government spending because at the time the loans were made they all required repayment. However, loan distributions are often listed in the budget deficit figures. As one example, the OGR treated the loans for construction of irrigation projects through the Bureau of Reclamation as grants. The loans were interest-free and

13AAA grants per capita were not very strongly correlated with processing tax receipts in cross-sectional correlations. The correlation for 1934 was only 0.034 and for 1935 was 0.1677.

the repayments were often delayed for a long time period, and in a number of cases the loans were forgiven. Following the OGR practice, we treated the Bureau of Reclamation funds as grants in this analysis.

Nearly all of the rest of the loans were repaid, and thus were treated separately as a loan category.14 There was a grant feature to the loans to the extent that they provided subsidies in the form of lower interest rates and better lending terms. The Home Owners' Loan Corporation (HOLC), for example, bought over 1 million mortgages that were on the verge of foreclosure at close to the full book values of the loans and then refinanced them for the original borrower at interest rates that were below market interest rates on good loans. The HOLC also extended the standard repayment period, and allowed much smaller down payments relative to the value of the home. The Farm Credit Administration (FCA) loans provided good terms for farm mortgages and short-term loans for crops, seed, and tools.15 The subsidies in Reconstruction Finance Corporation (RFC) loans likely varied by type of loan. Given the measurement issues with loans, we include multiplier estimates where we add 10 percent of the value of the loans as a measure of the interest subsidy to the grants. We also run estimates where we add the full value of the loans to the grants.

World War I service-adjusted certificates, associated with the Veterans' Bonus of 1936, are divided into two categories, loans and death benefit grants before January 1936

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14 There were some cases of loan forgiveness. In the case we know about, the RFC loans offered to cities for poverty relief under the Hoover administration in fiscal year 1933 were eventually forgiven by the Roosevelt administration. The HOLC likely experienced the highest loan default rate because it foreclosed on 20 percent of the mortgages that it supported. Our sense from reading the reports of the various agencies, is that they anticipated repayment and were active in seeking repayment or recovery of assets to be sold when there was a default.

15The Commodity Credit Corporation loan program provided nonrecourse loans that established a price floor for the commodities produced. The CCC loan information has been eliminated from the analysis because the loans were not reported across states in fiscal 1934 and major portions of the loans were not reported across states in other years.

and grants after that date. Since Cone and the BEA incorporated both the loans and grants in their measure of personal income, these deserve direct attention. In 1924 Congress enacted an adjusted-service certificate program for men and women who served in World War I. The program offered certificates that could be redeemed at face value twenty years after receipt. The amount to be paid was $1 for each day served in World War I inside the U.S. and $1.25 for each day overseas, and then the amount was multiplied by 1.25 to take into account the delay in payment. Certificates valued at less than $50 were paid in cash immediately and the cash value of the certificate was paid out to heirs at the time of the veterans' death. These payments are treated as grants throughout.

Living veterans could also borrow from the Veterans' Bureau against the certificates by accepting a lien on the value of the certificate. They could pay back the loan and receive the full certificate value in 1945 or not repay and accept the amount left after interest was deducted in 1945. After Congress lowered the maximum interest on the loans to 4.5 percent (and soon after to 3.5) and increased the amount that could be borrowed to half of the value of the adjusted service certificate on February 27, 1931, World War I veterans took out 2 million loans valued at $795 million within the next few months. In January 1936 the Veterans' Bonus Bill allowed veterans to convert the adjusted-service certificates to cash at the full face value. If veterans held them for more than one year they could receive the face value plus 3 percent interest per year until maturity on June 15, 1945. The VA received 3.3 million applications with a face value of $3.2 billion for settlement by June 30, 1936. After deducting outstanding liens from loans, the VA paid out $1.7 billion in cash. Since the payment of liens released veterans

from making future payments on loans, we treat the entire $3.2 billion as grants (Administrator of Veterans' Affairs 1931, pp. 10, 42-44; 1936, pp. 1, 22-24). In the analysis that combines loans and grants, however, the $3.2 million in grants was offset by the repayment of $1.5 billion in loans, so the combined value of grants and loans for the adjusted service certificates in 1936 is $1.7 billion.

Federal Tax Policy in the 1930s

Federal taxation in the 1930s was relatively simple in that all tax rates were the same across all states for each activity in each year. However, the tax structure during the 1930s was quite different from the post-War economy, in which the vast majority of internal tax revenues come from taxes on income in the form of corporate, personal, and employment (social security and unemployment insurance) taxes. Between 1930 and 1940 the sources of federal revenue shifted dramatically away from income taxes toward excise taxes. Less than 10 percent of households earned enough to pay personal income taxes throughout the 1930s.16 In 1930 personal income taxes accounted for 38% of total internal revenue and corporate income taxes composed 42%. The Tax Revenue Act of 1932 led to several major changes. Even though income tax rates were increased, the share of revenue from personal income taxes fell markedly to 16% in 1934 and 18% in 1940, while the share from corporate income taxes fell to 15% in 1934 before rising to 21% in 1940. The big revenue sources that arose from the 1932 tax changes was an expansion in excise taxes to cover manufactures of autos, tires, gasoline, lubricants and taxes on pipelines, telephones, telegraphs, and electricity. The share of internal revenue

16 Households did not begin paying income taxes before income hit $2,000 for individuals and $5,000 for a family of four at a time when most workers were earning $1,000 or less.

from excise taxes rose from 19% in 1930 to 28% in 1933. In 1933 the Roosevelt administration added in processing taxes on agricultural goods, a capital stock tax and eliminated Prohibition. The excise tax share jumped to 48% in 1934. Over the rest of the decade the excise tax share fell back to 35%, although the share of revenue from alcohol taxes remained steady around 12%.17

Aside from tax rate changes, the driving force behind changes in tax revenue within a state over time were changes in economic activity. Between 1930 and 1940 the correlations across time between real per capita personal income and real per capita taxes within the same state ranged from 0.95 in Georgia to 0.3624 in South Carolina. It was above 0.8 for 22 states, between 0.7 and 0.8 in 18 states, between 0.6 and 0.7 in 5 states, 0.4913 in Nebraska, 0.4423 in Kansas, and 0.3624 in South Carolina. The taxation is so strongly tied to income levels that it is difficult to find instruments for taxation that are not also strong correlates of income.

We deal with federal taxation empirically in two ways. Since national tax rates were the same across all states, the simplest way is to incorporate year fixed effects that control for tax rate changes in a model of state per capita income as a function of national government spending per capita in the state. Essentially, the model shows the multiplier of federal spending for state personal income after controlling for the fiscal drag created by the tax rate system. We also estimate the model with a dependent variable of per capita state income as a function of real per capita national government spending minus real per capita national taxes. This is the multiplier for income from federal government spending net of taxes.

17Shares calculated from Wallis (2006, 5-86).

Measures of Economic Activity

The impact of federal spending is estimated for several measures of economic activity. The broadest measure is state personal income per capita, which has been estimated and reported by the Bureau of Economic Analysis since the 1930s. Frederick Cone (1940, 3, 10, 13, 39), who helped develop the early estimates, described personal income as a measure of the "ability of consumers to purchase the new goods and services currently produced by business enterprises." With that in mind personal income was defined as national income after subtracting business savings, social security contributions from employer and employee, contributions to the Railroad Retirement Fund, and contributions to retirement systems for government employees on the grounds that these were not available for spending. To capture purchasing power, the BEA added back many transfer payments, including direct and work relief, federal pensions to veterans, adjusted service benefits (both loans in the early 1930s and the Veterans' Bonus), other government retirement allowances, unemployment compensation, railroad insurance benefits, old-age insurance benefits, and agriculture benefit payments.18 Direct relief accounted for about 1.4 percent, retirement payments for veterans and federal workers accounted for about 1 percent, and the World War I adjusted service certificates payouts reached peaks of 1.4 percent of income (in the form of loans) in 1931

18Cone (1940, p. 8) made the following argument for inclusion of the World War I veterans' loans and then 1936 cash payout on adjusted service certificates as personal income: "because these disbursements of the Federal Government were in the nature of original receipts to the veterans and because, owing to the large volume of the disbursements and their wide distribution among 3,000,000 veterans, they represented an important stimulus to consumption on two distinct occasions, they have been incorporated."

and 2.1 percent (in the form of cash) in 1936 with negligible amounts in between (Cone, 1940, 10, 24-5).19

We also estimate the model with measures of wage and salary income net of payroll taxes and several other measures of economic activity. The wage and salary income, which is net of pay-roll deductions for social insurance, accounted for about 62.5 percent of personal income in the 1930s (Martin and Creamer, 1942, p. 23). Measurement error is also an issue with the wage and salary income personal income data because the information on some components had to be interpolated between census years and from scattered components. The most accurately measured information is the wage component of wage and salary income because it relies heavily on the monthly establishment surveys collected by the Bureau of Labor Statistics during this period. The BLS suggested that about 48 percent of employment was covered by the survey in 1938 (Cone, 1940, 31).

To further reduce problems with measurement error and also examine in more depth where the stimulus occurred, we examine several other series: census reports on manufacturing payroll per capita in the odd years from 1929 through 1939, and the retail census estimates of per capita retail sales for the years 1929, 1933, 1935, and 1939. These two measures are particularly valuable because they are based on nationwide censuses of all establishments. There are several additional measures of income and spending that are not available in dollar terms, including per capita measures of John

19 We have been trying to develop a measure of income that does not include transfers and thus is a more production based measure. The new measure starts with the BEA measure of personal income. We have been collecting evidence by state that will allow us to subtract transfers without a work relief component and add back payroll taxes for social insurance and contributions to government pension plans. Work relief is treated as production income because it was related to production. Since we are not privy to the exact sources used to construct personal income, there is a risk of adding measurement when we make the adjustments.

Wallis's (1989) broad-based employment index built up from BLS employer surveys for 1929 through 1939,20 newly computerized payroll indices for 1932 to 1939 for the same group of industries, and per capita auto registrations, to capture the effect of government spending on a major consumer durable. The employment and payroll indices rely very little on interpolation but there may be sampling error in each state because the series are based on month-to-month comparisons of the same employers from surveys that rotate employers out of the sample (Wallis, 1989; Neumann, Fishback, and Kantor 2010). Wallis (1989) used benchmarks to resolve some of these problems for the broad-based employer index, but the payroll indices have not been benchmarked. The automobile registrations also are measured well, as the states collected license revenue from the automobiles.

Estimation Procedure

Despite the variety of different models that generate income multipliers of government spending, the empirical estimations of multipliers tend to be similar and use reduced form models with a sparse set of correlates. Both Barro and Redlick (2010) and Romer and Romer (2006) express worries about omitted variable bias that might arise from the absence of exogenous factors in the model. To estimate the multiplier, we use panel data methods with a measure of real per capita state income (y_{it}) in state i and year t in 1967 dollars as the dependent variable as a function of a measure of real per capita federal spending in state i and year t (g_{it}),

20 The broad-based index includes manufacturing wages only; mining wages only; street railways; telephone and telegraph; electric light, power, and gas; insurance; brokerage; wholesale and retail trade; year-round hotels; and laundry and dry-cleaning establishments.

$$y_{it} = \beta_0 + \beta_1 g_{it} + \beta_2 W + S + Y + S^* t + \varepsilon_{it}.$$

To control for omitted variables that might have influenced government policy and state income, we include several vectors. A vector of extreme weather (W) variables—days with temperatures over 90, days with temperatures below 0, months of extreme or severe drought, and months of extreme or severe wetness, and precipitation--controls for the influence of these factors on crop production and prices in the farm sector, construction activity, and other activities where weather was a factor. A vector of state fixed effects (S) controls for factors like geography, state constitutions, and the basic economic, cultural, and demographic structure of each state that did not change over time but varied across states. A vector of year fixed effects (Y) controls for national changes in the economy that affected all states in each year, including monetary policy changes, changes in federal tax rates, the introduction and elimination of the National Recovery Administration and other changes in national regulation. A vector of state specific time trends (S*t) control for differences in the trend paths of economic activity in each state, including the shift away from state budget deficits in the early 1930s to budget surpluses in the late 1930s. Under the complete model specification the identification of the multiplier β_1 for net New Deal spending comes from the deviation from trend across time within states after controlling for nation-wide shocks.21

The model can also be estimated in year-to-year first differences to control for time-invariant state effects. In the difference model state time trends are controlled with the addition of state fixed effects. Both methods lead to unbiased and consistent

21 We have also tried estimating the model while including squared terms. The estimates at the mean of the sample are very similar and there is very little gain from adding the squared terms. In addition, the instruments did not have adequate strength to separate the coefficients for the squared terms.

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, 491-2). Since the sample is relatively small with 48 states for 11 years each, we report both sets of estimates. Following Barro and Redlick (2011), Kraay (2010) and Nakamura and Steinsson (2010), we have also estimated the model as the growth rate in income from the previous year as a function of the change in government spending divided by lagged income. The use of the growth rate matches more common macroeconomic specifications, while the normalization of government spending by dividing by lagged income allows the coefficient to be interpreted as a dollar-for-dollar multiplier.

There are a variety of other factors that may have changed over time in non-trend ways that may have influenced both net fiscal federal spending and per capita income in the state. There are two problems that arise in trying to control for these other factors. First, many that might be included as controls in a productivity model, such as wages, employment, and interest rates, are themselves components of personal income. By controlling for them we would be restricting the measure of the impact of net federal expenditures to the parts of state income for which we have not controlled. Second, controls for age, race, ethnicity, population, and the structure of the economy are all available typically only during the census years and thus measures would have to be interpolated between census years to provide values. Essentially, the interpolated measures of the census-year structural variables between 1930 and 1940 would be linear combinations of the state-specific time trends and/or the state effects.

Third, state and local government spending and taxation are currently controlled for with the combination of the state fixed effects and state-specific time trends. Thus

deviations in trend state fiscal activity is not being controlled. The multiplier estimate therefore may incorporate influences on income that arise from correlations between deviations from trend in state and local fiscal activity and federal spending. Since federal spending drove some state decisions, this might not be a disadvantage. As it stands today, comparable annual estimates of revenues and governmental cost payments in the states are available only up through 1931 and after 1936 for all states; therefore, any estimate incorporating controls for net state spending would miss a very large portion of the New Deal period. Information is available on cities over 100,000 people throughout the 1930s, but data for the rest of the governments is available only for 1932.22

There still remains the possibility of biases from simultaneity and endogeneity. An ample literature on the geographic distribution of New Deal spending shows that the Roosevelt Administration tended to distribute more New Deal grants to areas where income was declining (see Wallis 1998, Fleck 2008, Fishback, Kantor, and Wallis, 2003; Neumann, Fishback, and Kantor 2010). This tendency imparts a negative bias to the multiplier coefficient. To eliminate the biases arising from the issues described above, we follow an instrumental variable strategy. To be effective, the instrument must vary annually both across time and across space and be strongly correlated with the measures of federal government funds but not with the error term in the final-stage equation.

22The federal government stopped collecting the annual information from states for the volume *Financial Statistics of the States* in 1933 after having collected information from 41 states for 1932. They restarted by collecting the data for 1937 (U.S. Bureau of the Census 1940, p. vi). John Wallis, Richard Sylla, and John Legler have posted information for 16 states for the period 1933 through 1937 with the ICPSR, but it is taking longer than we anticipated to make the data for these states comparable with the federal government's categories. Working with John Wallis we have been collecting, computerizing, and categorizing the information for the remaining states for 1933 through 1937 and for the seven states in 1932 that the Census Bureau had not worked with. We still have about two year's worth of work to do on the project.

We develop two instrument strategies each based on a similar logic about the distribution of federal spending across states. Each year the federal government decides to distribute a total number of grants while paying attention to the state of the economy but not the economy within each state. In any one year each state's share of the grants is determined by a variety of factors, including economic problems within the state but also long run differences across states unrelated to the economy. Our goal is to use these factors unrelated to state-specific economic problems as instrumental variables.

Some scholars in the modern studies have tried to use federal rules for distribution, but this will not work in the 1930s because the federal government routinely ignored the original rules written into the acts setting up the emergency programs. Nakamura and Steinsson (2010) follow a strategy of estimating a separate share coefficient for each state. This is equivalent to estimating a first stage in our panel with 47 state dummies interacted with federal spending. When we tried this, the Stock-Yogo tests for instrument strength suggested that we had weak instrument bias. We therefore, experimented with interactions of regional dummies with federal grant spending per capita based on 9 census regions and 4 census regions. The instrument tests suggested that weak instrument bias was less of a problem with the 4 census region interactions, and Hausman tests for over-identification in this case do not reject the hypothesis that the instruments do not belong in the final stage regression.

The second instrument strategy relies more heavily on the finding in the New Deal distribution literature that swing voting was the key factor influencing the cross-state distributions of funds (Wright 1974; Fishback, Kantor, and Wallis 2003; Fleck 2001, 2008, Wallis 1998, 2001). It also tries to eliminate potential correlations between

the state-specific portion of the total error for total federal spending and error term for the state in the final stage regression. The instrument is the interaction of two variables: a measure of swing voting in presidential elections up to the year *t-1* and aggregate per capita federal grant spending in year *t* in an area well outside the region where the state is located. The swing voting measure is the standard deviation of the percentage voting Democrat for president in the state between 1896 and the most recent presidential election prior to year *t*. The variable varies across time because each state's value changes between 1932 and 1933 and again between 1936 and 1937. By using the measure calculated up through the most recent presidential election before that year, we eliminate contemporaneous correlation with factors that influenced income in the state.23 Given the controls for state fixed effects and state time trends, it seems unlikely that swing voting in the presidential elections between 1896 and year *t-1* would have been correlated with the error for income in the state in year *t* except through the New Deal distribution mechanism.

The second variable in the interaction term is federal grant spending in the area *outside* an geographic "moat" around the state of interest. The moat includes the state's census region (of 9) and nearby census regions to avoid spatial correlation with the error term from potential spillovers. For New England, for example, the moat includes any states in New England, the Mid-Atlantic, the East North Central, or the states of Virginia, Maryland, Kentucky, or West Virginia; therefore, the component of federal spending for the instrument for that state is based on federal spending outside that moat.24 25

23 As an example, the instrument for the year 1932 would include the standard deviation of the percent voting for the Democratic presidential candidate from 1896 through 1928.

24For more detail on the moats for each region, see the data appendix.

Since AAA grant spending differed markedly from other grant spending in its purposes, we also estimate a model with AAA grants and nonAAA grants. In the first IV strategy the instruments using region dummies interacted with federal grant spending per capita are reasonably strong. In the second IV strategy we construct the instrument for nonAAA grant spending in a way similar to the manner described above but based on the AAA procedure for handing out grants. For each crop in each year the AAA considered past crop output and current market conditions and set a price per acre to offer farmers to take land out of production. Typically, the allotments of acreage for each state were based on the average number of acres harvested and the yield per acre in the state over the previous five years. We developed an instrument that partially mimics that process while not including state-level information from the sample period on acreage, yields, or prices in the area. We set the basic structure for AAA payments in 1928 before the sample starts and then update the instrument each year based on changes in AAA spending elsewhere in the country. AAA spending well outside the region where the state was located is multiplied by an agricultural activity measure in 1928 based all crops that received AAA subsidies by 1940.26 The 1928 activity measure is the share of U.S. crop activity in that state in 1928. The instrument is expected to have strength because it has similarity to the five-year averages that served as the basis of distribution in the actual program. By fixing the share of agricultural activity in 1928 and updating with information on AAA spending well outside the region, the instrument should not be

25 If the federal government had established a hard budget constraint nationwide, there might have been a negative relationship between spending in the rest of the regions and spending in the state in question. There did not appear to be a hard spending constraint at the national level because Roosevelt and the Congress often approved additional funds throughout the years and ran budget deficits in most years.
26 The AAA started providing grants for different crops in different years. By using the crops in the program as of 1940, we avoid any endogeneity related to the timing of when programs began for each crop.

correlated with the error in the final stage regression except through its impact on AAA spending.

Multipliers for Per Capita State Personal Income

The state personal incomes are reported on a calendar year basis, while the federal spending is reported on a fiscal year basis, covering the period from July 1 in year *t-1* to June 30 in year *t*. This automatically imparts a half-year lag into the model.27 Table II shows coefficients and standard errors from a series of estimations with per capita state personal income in $1967 as a function of per capita estimates of federal government fiscal activity in the state. The first column shows the coefficient and standard errors for per capita federal grants in the level specification as correlates are added cumulatively and then IV methods using the region interactions with federal spending as instruments. The raw Ordinary Least Squares (OLS) estimate of 1.04 with no correlates implies that a one dollar increase in per capita federal grants increased per capita state income by $1.04. Controlling for state fixed effects raises this multiplier estimate to 1.43, and adding weather correlates raises it further to 1.56. The addition of year effects to control for nationwide shocks reduces the multiplier to 0.45, and the addition of state-specific time trends lowers the estimate further to 0.16. This last estimate suggests that the federal spending crowded out a great deal of local economic activity and/or the impact is weakened greatly because the spending quickly leaked out of the local economy. The

27 We investigated interpolating the federal spending in each state to a calendar-year basis by using state level information on monthly employment in programs, but we could not do this for all programs. Without such state-specific information, interpolation runs the risk of incorporating information on government spending in the first half of year *t+1* into the year *t* estimate. We did not carry the process further because the interpolation might introduce biases to the extent that state income in year *t* influences the distribution of federal government spending in year *t+1*.

results for the other regression specifications show the same pattern of changes in coefficients as correlates are added to the analysis. This pattern typically appears when using other measures of government funding and other measures of economic activity.

Given that the Roosevelt administration distributed more grants to areas where the economy was in trouble, we instrument to try to eliminate negative bias in the coefficient. The transition to instrumental variables is consistent with negative endogeneity bias, as the instrumental variable (IV) coefficients are more positive than the non IV coefficients from equations with the same correlates. The IV estimates that both control for a great deal of omitted variable bias and also meet the strongest criteria for instrument strength are the ones with controls for weather, state effects, and year effects. If we are willing to accept up to 15 percent weak instrument bias in the size of the coefficient, the critical value for rejecting the hypothesis of weak instrument bias at the 10 percent level developed by Stock and Yogo (2002a, 2002b) for the Kleibergan-Paap (2006) (KP) version of the Donald F-statistic when using robust standard errors is 12.83 with three instruments instrument for one right-hand side variable. The values if one is willing to accept 20 and 25 percent bias are 9.54 and 7.80. The critical values are lower if weak instrument bias is measured relative to the bias of the OLS coefficient at 9.08 for 10 percent relative bias and 6.46 for 20-percent relative bias.

The IV estimates without year fixed effects generate very high F-statistics that reject the hypothesis of weak instrument bias, but the absence of year effects means that the effects of monetary policy, federal tax rate changes, the National Recovery Administration, and other changes, which were correlated with both income and federal grant spending, are incorporated into the coefficient of federal grant spending. The

addition of year fixed effects eliminates this potential problem and the KP statistics reject the hypothesis of 15 percent weak instrument bias when state and year fixed effects are included. The addition of state-specific time trends serves to eliminate potential omitted variable bias but at the cost of losing instrument strength, as the F-statistic of 5.03 is not high enough to reject 15 to 25 percent weak instrument bias. Therefore, we will focus the discussion on the IV estimates with state and year effects.

The per capita personal income multiplier estimates for per capita federal grants using the IV of region interactions with federal totals vary only slightly when using different estimating equations. The coefficient is 1.11 using level estimation, 1.10 in the first difference specification, and 1.13 in the growth rate specification. Under the moat/swing instrument strategy, the level specification leads to a multiplier estimate of 1.39. We do not report the difference specifications for the moat-swing instrument strategy because the instrument F-statistics are all less than 3, suggesting weak instrument bias. Although each of the estimates is greater than one, we cannot reject the hypothesis that the multiplier is equal to one. Thus, an additional dollar of federal grants may well have increased personal income by no more than the dollar of grant spending with no additional benefit in the private sector.

Personal Income Multipliers for Different Types of Federal Funding

The estimates of multipliers for different federal funding measures in Table III show variations in the point estimates for different types of spending. The multiplier for grants net of federal taxes paid from the state hovers around one. When a dollar in federal loans is treated like a dollar in grants and we estimate the effect of the combined

total of grants and loans, we might expect smaller multipliers for the combination of grants and loans. There was a huge surge of loans on World War I adjusted service certificates in 1931 when the economy was falling apart, and the size of the Veterans' Bonus was cut nearly in half in 1936 when the economy was growing the cash grants of over $3 billion was offset by the repayment of the earlier loans. The estimates under the level specifications in Table III are consistent with this expectation with values of .86 and .89. On the other hand, the difference and growth specifications lead to estimates of 1.54 and 1.93. When the loans are treated as providing a subsidy of 10 percent of the loan value, the multipliers for grants and 10 percent of loans are very close to the multiplier for grants alone reported in Table II and at the top of Table III.

There is some sign that specific types of grants may have had stronger effects. When direct transfers to the poor are removed from the grants and the focus is on government purchases, the multiplier estimate is as high as 2.18 in the level specification using the moat-swing instrument strategy and exceeds 1.4 in two other specifications. On the other hand, the estimate is also only 0.38 in the first-difference specification.

Given that the AAA farm grants were designed to take land out of production, we expected that the nonAAA grants would have stronger effects than all grants and that the AAA potentially had negative effects on personal income. Three of the four sets of estimates are consistent with this view. The multipliers for nonAAA grants vary from 0.94 to 1.79, while the AAA grant coefficients are negative in three specifications although very large and positive in the level specification using the region interaction instruments. The findings of the positive effect of nonAAA grants and negative effects of AAA grants are similar to Fishback, Horrace, and Kantor's (2005, 2006) findings

using county level data. Using a different instrument strategy, they find that public works and relief were associated with higher retail sales and net in-migration, and that AAA grants were associated with slightly lower retail sales and net out-migration. The payments would have benefitted farm owners and those tenants who received a share of the AAA payments. On the other hand, the likely reduction in the demand for farm labor would have reduced wages and employment for farm workers and share croppers (Fishback, Horrace, and Kantor (2005, 2006).28

Even though the results in Table III show variations in the multiplier for different forms of spending, it is important to note that the standard errors of the estimates are large enough that we cannot reject a multiplier of one for nearly every estimate. Further, the comparisons of multipliers for different types of government funding do not match for each estimation procedure. For example, in looking down the columns for the growth rate specification, the largest multiplier of 1.93 is the one for grants and the full value of loans. In contrast, the multiplier for grants and the full value of loans is lowest in the two level specifications.

The Impact of Federal Grants on Various Measures of Economic Activity

28The policy was designed to raise prices for farmers. The negative effect on real personal income from the price rise was likely to have been felt nationwide for crops with national markets. This change would have led to a rise in the CPI and a reduction in real income nationwide that would show up in the coefficients of the year dummies. In that sense, the multiplier estimate will be overstated. There may have been differential effects within states due to differences in the consumer prices based on distance between farmgate and final market. Much of this effect would be controlled for by the state fixed effects. For some crops that sold in local markets, like corn and hay, the local prices might have risen more than at the national level with the reduction in output as long as they stayed within a price range set by transportation costs to other markets (Fox, Fishback, Rhode, 2011). This localized rise would show up in the measure of state personal income but the effect of the rise in limiting purchasing power would not because we have not adjusted for localized differences in the cost of living. Here again the multiplier effect will be slightly overstated.

Federal grants had differential effects on various economic measures that are aggregated into per capita personal income. Table IV shows dollar-for-dollar IV estimates for retail sales per capita, wage and salary income per capita and manufacturing payrolls per capita. Data for retail sales per capita and manufacturing payrolls per capita data were reported for only some years; therefore, the table includes estimates for per capita personal income for the same years to make comparisons on the same set of observations. Dollar-for-dollar estimates cannot be developed when the dependent variables are employment and durable good consumption in the form of automobile registrations, so we report the effects as elasticities evaluated at the mean of the sample along with elasticities for per capita state income.

The estimates suggest that the distribution of government funds had strong effects on consumption but virtually no effect or even a negative effect on employment. The dollar-for-dollar coefficient in the retail sales per capita analysis for the four years in which it was available is in the 0.8 to 0.9 range. The coefficient is similar to the coefficient in the per capita personal income estimation for the same four years. Given that the ratio of retail sales to income during this period was roughly 0.5, it appears that the grants had a relatively much stronger effect on retail consumption than it did on income per capita.

The grants also contributed to increases in automobile purchases. The estimates of the elasticity of automobile registrations with respect to grants range from 0.047 to 0.081 while the elasticity estimates for personal income with respect to grants range from 0.086 to 0.108. To put this in dollar terms, value each car at the price of a new Ford in 1934, which was about $500 then and $1,247 when adjusted to the 1967 Consumer Price

Index values used to control for the price level. An additional dollar of federal spending raised the value of car registrations by between 10 and 22 cents.

The effect of grants on wage and salary income was small relative to the effect on all personal income. The dollar-for-dollar coefficients for wage and salary income are relatively low, ranging from 0.09 to 0.66. These are much smaller than the coefficients above 1 for personal income. Wage and salary income accounts for roughly 60 percent of all income during this period, and the wage and salary grant coefficients are less than 60 percent of the coefficients for personal income.

In contrast to their generally strong positive effects on personal income and consumption, the effects of grants on per capita employment and manufacturing payrolls are mostly negative and relatively small in size.29 30 These findings for *private* employment and payrolls are in the same range as the results for the impact of New Deal relief spending found by Neumann, Fishback, and Kantor (2010) for a city-level monthly panel from 1932 through 1939 and Benjamin and Mathews' (1992) findings for a state panel from 1932-1939. Both find that relief spending was associated with crowding out of private employment after 1935. Neumann, Fishback, and Kantor found some positive effects of relief spending on employment from 1932 to 1935, while Benjamin and Mathews find crowding out of about 20 percent. Wallis and Benjamin (1982) also

29We put all measures on a per capita basis for consistency. We have also estimated the models for the payrolls and employment without putting them on a per capita basis and the magnitudes of the results are only slightly larger.

30It is possible that the statistically insignificant effect of government spending on manufacturing payrolls might reflect the fact that most manufacturing was selling to national and international markets. If so, a rise in federal spending within a state would only stimulate the demand in that state, which might be a small share of the demand for the product. We checked this hypothesis by estimating the impact of spending on manufacturing payrolls in the bread industry for the years 1929, 1931, 1933, 1935, and 1937. The bread industry was found in every state and tended to sell locally. The bread industry results also show small and statistically insignificant effects of federal spending. The dollar-for-dollar effects 0.2 cents per dollar spent, while the elasticities are smaller than the elasticities reported for manufacturing payrolls per capita in Table IV. The findings for the bread industry are therefore inconsistent with the idea that the small effects on manufacturing are being driven by the dispersed nature of manufacturing consumption.

provide cross-sectional estimates that cast doubt on any positive effects of New Deal spending on private employment.

State by State Estimates

The identification in the state and year fixed effects IV model comes from changes over time within the same state in the part of federal spending correlated with the instrument after controlling for nation-wide shocks in each year. The coefficient is therefore an average across the states. We also estimate the relationship for each individual state over the period using a difference model to reduce problems with non-stationarity. The major issue with the state-by-state estimation is how well the model can control for national shocks common to all states. Our solution is to include the difference in the real per capita national money supply (M2) and a dummy variable for the National Recovery Administration (NRA) period from 1933 through 1935. Cole and Ohanian (2004) argue that the NRA's codes of competition held wages and prices high and contributed greatly to the underemployment of resources. On the other hand, Eggertsson (2008) argues that the NRA push for high prices and wage stimulated the economy as part of a program to reverse inflationary expectations. Changes in tax rates were important but there were multiple changes over the period and there are few degrees of freedom. To capture the impact of taxes we estimate the model with grants net of federal taxes in each state. Results are reported for estimates without the taxes for comparison purposes. In this analysis we use the moat/swing instrument, which has fewer problems with weak instrument bias than when total grants spending is used.

Table V shows the dollar-for-dollar effects on per capita state personal income of a one dollar increase in per capita grants net of federal taxes in each state. For comparison, when the model specification is estimated for the panel of all states, the multiplier coefficient is 0.605 with a t-statistic of 3.19 and the instrument strength tests suggest that it is strong. The instrument strength varies for each state. There were 33 states where the hypothesis of weak instrument bias of 10 percent was rejected, 7 more estimates that met the 15 percent or less criteria, and 8 with very weak instruments. The estimates were generally consistent with a view of negative endogeneity, as the IV multiplier estimates were more positive, by an average of about .25, than the OLS coefficients in 35 of the 40 states where weak instrument bias is not a problem. The average dollar-for-dollar coefficient for those states was 0.80. For the 40 states with no more than 15 percent weak instrument bias, the average coefficient was .79 and the values ranged from -1.27 in Kansas to 3.4 in Idaho. The multiplier estimates for states that where weak instrument bias could not be rejected included 5 of the 7 largest values in absolute value.

There was not much of a discernable pattern in the estimates across states. Among the states with less than 15 percent weak instrument bias, the extreme values over 2 were found in Pennsylvania, New Jersey, and Idaho. Pennsylvania was probably the most self-sufficient state but Idaho was one of the smallest states. States with values between one and two included states of all sizes from several regions. Some had large populations, like New York, Massachusetts, and California, but most were in the bottom half of the population distribution, including West Virginia, Oregon, Utah, Mississippi,

Washington, Maine, and Florida. Negative multipliers were found in Kentucky, Oklahoma, Minnesota, and Kansas.

Conclusions

If there was any time to expect a large peace-time multiplier from federal spending in the states, it would have been during the period from 1930 through 1940. Interest rates were at or near the zero bound for nearly the entire decade, a situation in which macroeconomic models predict stronger fiscal multiplier effects. Unemployment rates with work relief workers treated as unemployed were never below 14 percent during the decade. Even if people on work relief were treated as employed, the unemployment rate never fell below 9 percent (Darby 1976). There was idle capital in nearly every industry. As a result, there were clearly a large number of underemployed resources that could have been soaked up by federal spending without crowding out private activity.

Estimates controlling for weather shocks, state and year fixed effects, and in some cases state-specific time trend but without using instruments imply that state fiscal multipliers were in the 0.1 to 0.5 range. Given that New Deal funds were distributed in part in response to drops in economic activity, there is ample reason to believe that the non-IV multiplier estimates are biased downward even in models with state and year fixed effects and time trends. The estimates for the state multipliers that we think are most accurate are the IV estimates controlling for state and year fixed effects. The IV estimates without controls for state and year effects are likely too high because they do not control for nationwide monetary and tax rate shocks, nor do they control for

fundamental time-invariant features of the states. The addition of state-specific time trends leads to weak instrument bias.

The dollar-for-dollar multiplier estimates show the dollar change in the measure of economic activity in response to a one dollar increase in the measure of government spending. Nearly all of the state per capita personal income multiplier estimates are not statistically significantly different from one. In some estimating strategies, the point estimates of the multipliers for nonfarm grant spending and nontransfer grants are as high as 1.79 and 2.18, but other estimates are below one for the same measure, and the standard errors of the estimates in all of those cases are high enough that a multiplier of one cannot be rejected. Three of four point estimates for coefficients on AAA grants to farmers to take land out of production were negative but not statistically significant. As a general statement, the distribution of a dollar of federal funds to a state led to about a dollar increase in personal income in the state.

Federal grants had a stronger impact on consumption than on personal income. The per capita retail sales multiplier was roughly the same size as the personal income multiplier in the same sample even though retail sales are typically only about 50 percent of income. An additional dollar in federal grants contributed to an increase of about 10 to 20 cents in the value of automobiles registered in the state.

On the other hand, there were no signs that increased government grants raised nonfarm private employment or manufacturing employment. Most of the coefficient estimates were negative with small elasticities. The results are consistent with the findings by Neumann, Fishback, and Kantor (2010) and Benjamin and Mathews (1992) using alternative data sets.

If we apply the lessons of the New Deal to the federal fiscal stimulus today, it is important to realize that the estimates for the states are not for a national multiplier. Instead, they describe the impact within the state of additional federal funding in the state after all leakages are considered.31 In both periods interest rates are near the zero bound and unemployment rates are well above long run averages, although the problems of the Depression were far worse. The New Deal results suggest that federal fiscal stimulus during a modern recession would stimulate income in the states roughly dollar-for-dollar but have little impact on private nonfarm employment in the state.

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Table I
Total and Per Capita Federal Spending by Program in Millions of Contemporay Dollars for the period July 1, 1932 through June 30, 1939

	Acronym	Amounts From July 1, 1932 to June 30, 1939 (Millions $)	Per Capita	Category	First Fiscal Year with Significant Spending	Ended Before 1939
TOTAL TAXES COLLECTED FROM STATES		26,061	213.11			
NONREPAYABLE GRANTS						
Works Progress Administration	WPA	6,844	55.97	Work Relief	1936	
Veterans' Administration	VA	3,955	32.34	Relief	Pre 1933	
Federal Emergency Relief Administration	FERA	3,059	25.02	Relief and Work Relief	1934	Mar-37
Agricultural Adjustment Administration1	AAA	2,863	23.41	Agriculture	1934	
Civilian Conservation Corps	CCCG	2,130	17.42	Work Relief	1934	
Public Roads Administration	PRA	1,613	13.19	Public Works	Pre 1933	
Rivers and Harbors and Flood Control	RHFC	1,316	10.76	Public Works	Pre 1933	
Public Works Administration--Nonfederal Projects	PWANF	1,032	8.44	Public Works	1934	
Civil Works Administration	CWA	807	6.60	Relief/Public Works	1934	Mar-34
Social Security Act	SSA	759	6.21	Relief	1936	
Public Works Administration--Federal Projects	PWAF	632	5.16	Public Works	1934	
Balance from Relief Acts	BRA	376	3.08	Relief	1936	
Public Buildings Administration	PBA	324	2.65	Public Works	Pre 1933	
Bureau of Reclamation	BR	290	2.37	Public Works	1934	
Farm Security Administration	FSA	273	2.24	Agriculture	1936	
National Guard	NG	219	1.79	Military	Pre 1933	
Public Works Administration--Housing Projects	PWAH	129	1.05	Public Works	1935	
Soil Conservation Service	SCS	100	0.82	Agriculture	1934	
Agricultural Extension Work	AE	94	0.77	Agriculture	Pre 1933	
Vocational Education	VE	90	0.74	Education	Pre 1933	
U.S. Employment Service	USES	80	0.65	Relief	1934	
Indian Service - Civilian Conservation Corps	CCCIS	51	0.42	Relief	1934	

Agricultural Experiment Stations	AEX		36	0.29	Agriculture	Pre 1933	
Forest Service (Roads)	FSR		34	0.28	Public Works	1937	
Colleges of Agriculture and Mechanical Arts	CAM		24	0.19	Education	Pre 1933	
Forest Funds	FF		17	0.14	Public Works	Pre 1933	
Mineral Lease Act Payments	ML		11	0.09	Public Works	Pre 1933	
Land Utilization Program	LUP		11	0.09	Public Works	1939	
State Soldiers' and Sailors' Homes	SSS		4	0.03	Relief	Pre 1933	
Special Funds	SF		2	0.02	Miscellaneous	Pre 1933	
Office of Education--Emergency Relief Act Funds	OE		2	0.02	Education	1936	
State Marine Schools	SMS		1	0.01	Education	Pre 1933	
Books for the Blind	BFB	a)		0.00	Education	Pre 1933	
Federal Water Project Payments	FWP	a)		0.00	Public Works	Pre 1933	
Nonrepayable Grants Total			27,180	222.26			
REPAYABLE LOANS CLOSED							
Reconstruction Finance Corporation	RFC		4,782	39.11	All	1932	
Farm Credit Administration	FCA		3,957	32.35	Agriculture	Pre 1933	
Home Owners' Loan Corporation	HOLC		3,158	25.83	Home Finance	1934	1936
Commodity Credit Corporation	CCCL		1,186	9.70	Agriculture	1934	
Public Works Administration	PWAL		508	4.15	Public Works	1934	
Farm Security Administration	FSAL		337	2.76	Agriculture	1934	
Home Owners' Loan Corporation and Treasury Investments in Bldg. and Savings and Loans Associations	HOLCT		266	2.17	Home Finance	1934	
Federal Reserve Banks.	FRB		125	1.02	Finance	1935	
Rural Electrification Administration	REA		123	1.01	Agriculture	1936	
U.S. Housing Authority	USHA		56	0.45	Public Works	1939	
Farm Tenant Purchases	FTP		33	0.27	Agriculture	1938	
Disaster Loan Corporation	DLC		17	0.14	Relief	1937	
Total Repayable			14,549	118.97			
Value of Loans Insured by Federal Housing Administration			0	0.00			
Title I --Refurbishing and Maintanence Loans			834	6.82	Home Finance	1936	
Title II--Home Mortgages.			1,855	15.17	Home Finance	1936	
Total Housing Loans Insured			2,689	21.99			

[a]Under 500,000 dollars.

Table II
Estimates of Dollar-for-Dollar Effect of Per Capita Grants on State Per Capita Personal Income, 1930-1940
t-statistics Listed Below Coefficients

		Estimation Specification			
Level/Difference		Level	Difference	Growth Rate	Level
LEAST SQUARES					
No controls	Coeff.	**1.04**			**1.04**
	t-stat.	*2.70*			*2.70*
Controls state effects	Coeff.	**1.43**	**1.00**	**1.21**	**1.43**
	t-stat.	*7.24*	*7.22*	*9.17*	*7.24*
Controls state effects and weather	Coeff.	**1.56**	**1.09**	**1.33**	**1.56**
	t-stat.	*7.10*	*6.95*	*9.56*	*7.10*
Controls year effects, state effects, and weather	Coeff.	**0.45**	**0.73**	**1.18**	**0.45**
	t-stat.	*2.29*	*3.40*	*5.61*	*2.29*
Controls state time trends, year effects, state effects, and weather	Coeff.	**0.16**	**0.75**	**1.23**	**0.16**
	t-stat.	*0.69*	*3.07*	*5.18*	*0.69*
TWO-STAGE LEAST SQUARES					
		Instrument Choice			
Instruments		Interaction of National with 3 Region Dummies			Moat times Swing
Controls Weather and state Effects	Coeff.	**1.94**	**1.28**	**1.29**	**2.16**
	t-stat.	*15.28*	*7.23*	*11.10*	*15.41*
	Instrument F-stat.	198.67	189.66	71.86	192.72
Controls year effects, state effects and weather	Coeff.	**1.11**	**1.10**	**1.13**	**1.39**
	t-stat.	*6.14*	*2.30*	*3.16*	*3.44*
	Instrument F-stat.	13.07	8.15	8.59	7.09
Controls state time trends, year effects, state effects, and weather	Coeff.	**0.50**	**1.12**	**1.14**	**0.97**
	t-stat.	*2.41*	*2.33*	*3.38*	*1.80*
	Instrument F-stat.	5.03	6.94	7.49	4.14

Sources: See Data Appendix.

Notes: This is a balanced panel with information for 48 states for each year from 1930 through 1940. Estimation used the STATA 10 reg and ivreg2 programs. 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. When compared with the Stock-Yogo critical values, the Kleibergen-Paap rank Wald (KP) F statistic can be used to test for weak-instrument bias based on the maximum weak-instrument bias that one is willing to accept. In the analyses with one instrument for one government activity measure, the critical value is 16.38 at the 10 percent confidence level if someone is unwilling to accept more than 10-percent weak instrument bias, 8.96 for unwillingness to accept more than 15 percent bias and 6.66 for 20 percent bias. When using three instruments the critical values for maximal size of weak instrument bias are 22.30 at the 10 percent level if someone is unwilling to accept more than 10-percent weak instrument bias, 12.83 for unwillingness to accept more than 15 percent bias, 9.54 for 20 percent bias, and 7.80 for 25-percent bias. The critical values for willingness to accept 10-percent weak instrument bias relative to the bias from OLS estimation is 9.08 and for willingness to accept 20% bias is 6.46.

Table III
Estimates of Dollar-for-Dollar Effect of Per Capita Measures of Government Funding on State Per Capita Personal Income, 1930-1940
t-statistics Listed Below Coefficients

		Level	First Difference	Growth Rate	Level
		Interaction of National with 3 Region Dummies			Moat times Swing
		Controls Weather, State and Year Effects			
Grants only	Coeff.	**1.11**	**1.10**	**1.13**	**1.39**
	t-stat.	*6.14*	*2.30*	*3.16*	*3.44*
	Instrument F-stat.	13.07	8.15	8.59	7.09
Grants plus all loans	Coeff.	**0.89**	**1.54**	**1.93**	**0.86**
	t-stat.	*5.54*	*2.20*	*2.78*	*1.98*
	Instrument F-stat.	16.38	6.46	4.48	9.41
Grants Plus 10 % of Loans	Coeff.	**1.05**	**1.14**	**1.20**	**1.08**
	t-stat.	*5.19*	*1.91*	*3.13*	*1.94*
	Instrument F-stat.	12.74	7.97	8.58	7.85
Grants Minus Taxes	Coeff.	**0.93**	**1.06**	**1.14**	**1.08**
	t-stat.	*3.59*	*1.99*	*3.04*	*1.49*
	Instrument F-stat.	12.01	7.52	8.46	5.55
Grants Minus Transfers	Coeff.	**1.67**	**0.38**	**1.46**	**2.18**
	t-stat.	*4.14*	*0.52*	*3.64*	*1.97*
	Instrument F-stat.	12.45	9.86	12.56	6.86
Grants minus AAA	Coeff.	**0.94**	**1.26**	**1.42**	**1.79**
	t-stat.	*3.00*	*2.13*	*2.08*	*2.70*
	Instrument F-stat.	11.88	7.36	7.42	4.44
AAA	Coeff.	**3.68**	**-2.17**	**-0.84**	**-0.41**
	t-stat.	*2.19*	*-0.74*	*-0.32*	*-0.62*
	Instrument F-stat.	17.58	12.07	11.91	10.28
	combined F-stat.	15.68	7.34	3.06	4.27

		Controls Weather, State and Year Fixed Effects, and State-Specific Time Trends			
Grants only	Coeff.	**0.50**	**1.12**	**1.14**	**0.97**
	t-stat.	*2.41*	*2.33*	*3.38*	*1.80*
	Instrument F-stat.	5.03	6.94	7.49	4.14
Grants plus all loans	Coeff.	**0.77**	**1.72**	**2.20**	**0.86**
	t-stat.	*2.94*	*2.16*	*2.72*	*1.26*
	Instrument F-stat.	11.72	4.04	3.44	7.73
Grants Plus 10 % of Loans	Coeff.	**0.65**	**1.19**	**1.22**	**1.08**
	t-stat.	*2.30*	*1.83*	*2.86*	*1.23*
	Instrument F-stat.	6.28	6.40	7.38	4.04
grants minus taxes	Coeff.	**0.47**	**1.08**	**1.13**	**1.21**
	t-stat.	*2.17*	*1.95*	*2.99*	*1.37*
	Instrument F-stat.	4.76	6.42	7.98	2.06
Grants minus AAA	Coeff.	**0.51**	**1.30**	**1.54**	**1.73**
	t-stat.	*2.32*	*2.01*	*1.73*	*1.98*
	Instrument F-stat.	4.49	6.11	6.60	1.87
AAA	Coeff.	**2.95**	**-2.08**	**-1.47**	**-3.52**
	t-stat.	*1.44*	*-0.63*	*-0.39*	*-1.39*
	Instrument F-stat.	10.39	9.17	8.86	4.29
	combined F-stat.	7.71	5.24	1.85	2.06
Grants minus AAA	Coeff.	**0.52**	**1.35**	**1.34**	**1.73**
	t-stat.	*2.20*	*2.21*	*2.42*	*1.98*
	Instrument F-stat.				
AAA	Coeff.	**-0.73**	**-3.89**	**-2.93**	**-3.52**
	t-stat.	*-0.75*	*-2.75*	*-1.76*	*-1.39*
	Instrument F-stat.				
	combined F-stat.	6.62	20.45	8.45	2.06

All analyses are from individual regressions except for the nonAAA and AAA results, which are estimated in the same regression. The instrument F-statistic is the Kleibergen-Paap rank Wald (KP) F statistic. See notes to Table II for instrument strength critical values with one variable that requires instruments. In the analysis with nonAAA and AAA grants the critical values with 10 percent confidence are 7.03 for 10 percent bias, 4.58 for 15 percent bias, and 3.95 for 20 percent bias. When loans are included the panel drops 1940 due to problems in obtaining data for loans in 1930. The measures of economic activity are on a calendar year basis

while the measures of government activity are on the July t-1 to June t fiscal year basis. Commodity Credit Corporation loans were dropped from the loan figures due to inaccurate measurement of the distribution of loans across states.

Table IV
Estimates of Impact of Government Grants on Measures of Economic Activity
t-statistics Listed Below Coefficients

		Level	First Difference	Level
		Interaction of National with 3 Region Dummies		Moat times Swing
Per Capita State Income	Coeff.	**1.11**	**1.10**	**1.39**
	t-stat.	*6.14*	*2.30*	*3.44*
	Instrument F-stat.	13.07	8.15	7.09
Per Capita Wage and Salary Income	Coeff.	**0.27**	**0.09**	**0.66**
	t-stat.	*2.01*	*0.56*	*1.59*
	Instrument F-stat.	13.07	8.15	7.09
retail sales per capita, 1929, 1933, 1935, 1939	Coeff.	**0.822**		**0.884**
	t-stat.	*1.62*		*2.05*
	Instrument F-stat.	6.13		4.36
Income per capita, 1929, 1933, 1935, 1939	Coeff.	**0.853**		**0.941**
	t-stat.	*3.73*		*1.83*
	Instrument F-stat.	6.13		4.36
Manufacturing payroll per capita 29,31,33,35,37,39	Coeff.	**-0.21**		**-0.01**
	t-stat.	*-3.09*		*-0.03*
	Instrument F-stat.	9.91		6.84
Income per capita 29,31,33,35,37,39	Coeff.	**0.89**		**1.05**
	t-stat.	*4.39*		*2.37*
	Instrument F-stat.	9.91		6.84
ELASTICITIES				
Per Capita State Income	Coeff.	**0.086**	**0.086**	**0.108**
	t-stat.	*6.14*	*2.3*	*3.44*
	Instrument F-stat.	13.07	8.15	7.09
Nonfarm Employment per Capita	Coeff.	**-0.019**	**0.001**	**-0.013**
	t-stat.	*-1.41*	*0.06*	*-0.47*
	Instrument F-stat.	13.07	8.15	7.09
Manufacturing employment per	Coeff.	**-0.082**	**-0.003**	**-0.066**
	t-stat.	*-3.51*	*-0.03*	*-2.38*

capita 29,31,33,35,37,39	Instrument F-stat.	13.07	7.09	7.09
Auto Registrations Per Capita	Coeff.	**0.075**	**0.047**	**0.081**
	t-stat.	*3.81*	*2.08*	*2.38*
	Instrument F-stat.	13.07	8.15	7.09

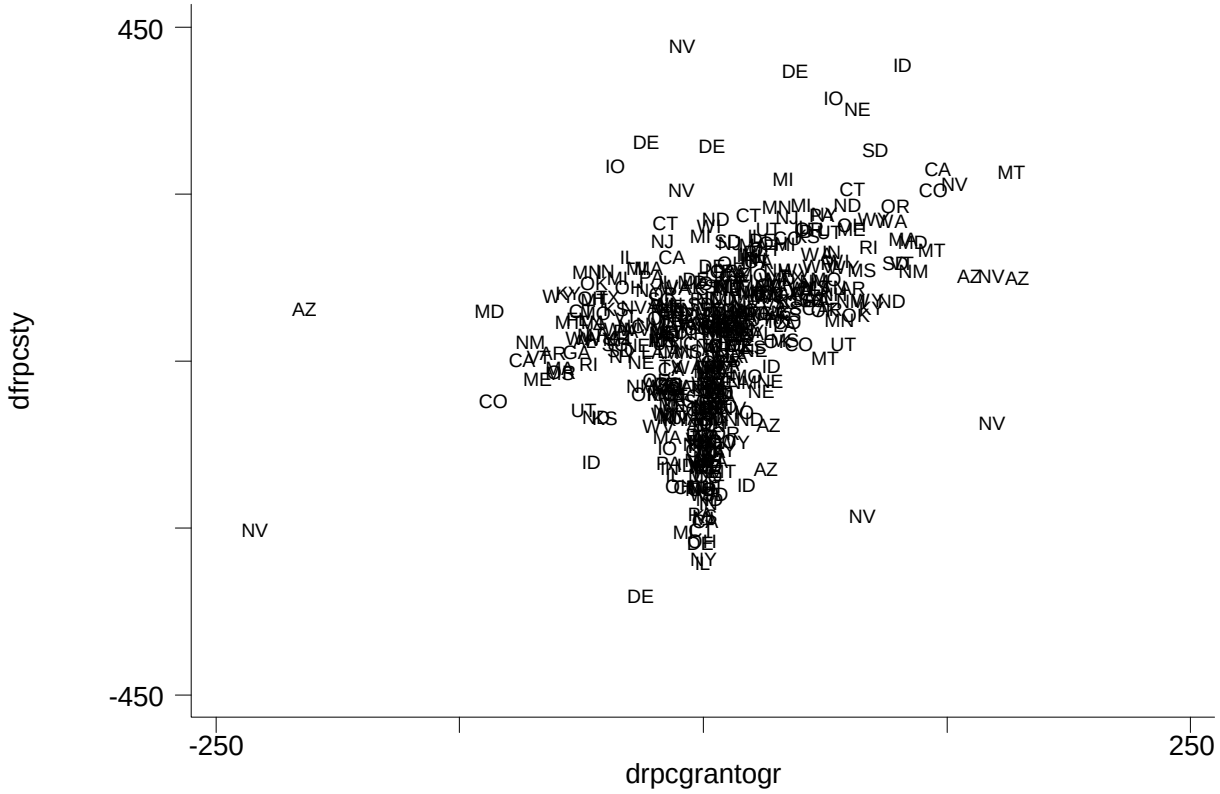
Table V
Dollar-for-Dollar Estimates by State from Differenced Regressions Using OLS and IV

State	Dollar-for-Dollar Coefficient	t-statistic	Dollar-for-Dollar Coefficient	t-statistic	KPF
Rejects 10-percent Weak Instrument Bias at the 10-percent Level					
New Jersey	0.95	0.83	2.21	2.85	19.32
Pennsylvania	0.78	0.62	2.06	2.62	41.24
West Virginia	1.26	1.66	1.80	6.13	28.82
Oregon	1.40	2.48	1.59	4.58	26.02
Utah	0.96	1.10	1.26	2.20	79.67
Massachusetts	0.54	1.48	1.22	1.88	30.50
Mississippi	0.97	2.11	1.07	2.98	37.68
Washington	0.84	1.15	1.06	2.28	68.63
California	0.85	1.04	1.03	1.76	21.15
North Carolina	0.62	0.85	0.86	1.93	22.05
Vermont	0.66	1.62	0.78	2.91	83.26
Colorado	0.79	1.61	0.76	1.98	81.61
Tennessee	0.47	0.57	0.73	1.69	41.54
New Hampshire	0.63	1	0.70	2.1	61.47
Arkansas	0.59	1.39	0.70	2.2	25.75
Ohio	0.47	0.45	0.66	0.77	25.94
New Mexico	0.51	1.10	0.64	2.27	44.83
Rhode Island	1.29	1.94	0.61	1.18	259.36
Alabama	0.56	1	0.61	1.55	44.83
Connecticut	0.57	0.5	0.61	3.19	144.60
Louisiana	0.47	0.97	0.58	1.36	31.52
Indiana	0.33	0.24	0.57	0.61	68.43
Wyoming	0.23	0.28	0.52	0.75	19.37
Georgia	0.48	1.33	0.51	1.98	67.28
Illinois	0.16	0.12	0.49	0.44	23.97
Wisconsin	0.26	0.27	0.37	0.5	118.42
South Carolina	0.55	1.84	0.37	1.67	70.08
Missouri	-0.06	-0.07	0.32	0.52	36.11
Virginia	0.00	0	0.12	0.26	62.49
Kentucky	-0.82	-0.12	-0.03	-0.06	35.22
Oklahoma	-0.14	-0.19	-0.09	-0.15	58.38
Minnesota	-0.82	-0.81	-0.50	-0.65	28.48
Kansas	-0.92	-1.03	-1.27	-1.32	25.50
Rejects 20-percent Weak-Instrument Bias at 10 percent Level					
Idaho	4.02	4.26	3.46	4.26	10.20
New York	0.34	0.47	1.50	1.51	9.33
Maine	0.84	1.08	1.29	1.69	15.30

Florida	0.83	0.92	1.19	1.24	11.06
Texas	0.10	0.13	0.67	0.79	10.49
Maryland	0.08	0.14	0.50	1.20	10.53
Arizona	0.01	0.00	0.28	1.07	14.81
Cannot Reject 20-percent Weak-Instrument Bias at 10 percent level.					
South Dakota	3.42	3.24	17.54	0.82	0.26
Nevada	0.54	1.35	3.51	1.15	0.73
Delaware	0.63	1.05	1.29	1.18	1.58
Michigan	-1.11	-1.68	1.09	0.62	3.30
Montana	1.14	1.65	-0.52	-0.68	5.97
Nebraska	0.40	0.26	-6.32	-1.53	2.94
Iowa	-3.76	-1.15	-8.30	-2.85	3.94
North Dakota	2.81	2.08	-24.79	-0.34	0.08

Notes. The estimates come from difference regressions of the change in real per capita personal income on the change in real per capita federal grants minus taxes, the change in the real money supply, a dummy for the NRA period, and a year trend. The estimates cover the period 1930 through 1940 for each state.

Figure I
Annual Changes in Per Capita New Deal Grants and Changes in Per Capita Personal Income for the years 1930 through 1940 by State in 1967 Dollars



DATA APPENDIX
IN SEARCH OF THE MULTIPLIER FOR FEDERAL SPENDING IN THE STATES DURING THE GREAT DEPRESSION

State Personal Income

There are different concepts of government spending used in the literature and in national income accounting. Many macroeconomic models refer to government purchases of goods and services when examining real GDP estimates. They exclude transfer payments.

In the analysis in this paper the state personal income and state populations are from the current BEA website. Bureau of Economic Analysis, U.S. Department of Commerce, Regional Economic Information System, http://www.bea.gov/regional/spi/SA1-3fn.cfm. The definitions reported there are very similar to the original BEA estimates from the late 1930s and early 1940s from Creamer and Merwin (1941). Their definition of personal income is based on the definitions used for monthly personal income described in Cone, 1940. The focus was on consumer purchasing power "Consumer purchasing power" signifies the ability of consumers to purchase the new goods and services currently produced by business enterprises.

The definition of income payments is National Income after subtracting business savings, social security contributions from employer and employee, contributions to the Railroad Retirement Fund and contributions to retirement systems for government employees and then adding direct relief, federal pensions to veterans, World War I Adjusted Service Compensation (ASC) benefits in the form of loans or cash payouts, other government retirement allowances, unemployment compensation, railroad insurance benefits and old-age insurance benefits. Agriculture benefit payments are included in income (Cone 1940, pp. 3, 4, 8, 10, 13, 39).

In addition, the following items were excluded from state personal income: capital gains; earnings from odd jobs due to lack of data; Illegal earnings because they have "no economic value within the legal framework of the producing economy;" and imputed income from ownership of durable consumers' goods is excluded.

Cone (1940, p. 8) explained the logic for incorporating the World War I ASC loans and payouts in the following way:

> "Prior to June 1936 payments to World War veterans took the form of cash loans on the security of their adjusted service certificates; in that month the Federal Government, in discharge of its obligations on amount of adjusted service legislation, remitted to the veterans more than $2,000,000,000 worth of adjusted service bonds and some cash. The larger portion of these bonds were liquidated during the year 1936, but the Treasury has been redeeming them in smaller amounts during the past 3 years; the present rate is about $2,000,000 a month. More properly , then, the payments to veterans represent in the first instance loans on existing assets and in the second the gradual liquidation of these assets rather than the actual payment of income as here defined. Nevertheless, because these disbursements of the Federal Government were in the nature of original receipts to the veterans and because, owing to the large volume of

the disbursements and their wide distribution among 3,000,000 veterans, they represented an important stimuls to consumption on two distinct occasions, they have been incorporated into the monthly series.

Since the personal income payments include transfers, transfers have been incorporated in the federal government distribution of grants (Cone 1940, p. 8, 39).

Other Measures of Economic Activity

State wage and salary income is from Creamer and Merwin (1942). Cone (1940) provides an overview of the series used to construct the data. Manufacturing Payrolls for 1929, 1931, 1933, 1935, 1937, and 1939 are from the Biennial U.S. Manufacturing Censuses of 1931, 1933, 1935, 1937, and from the Manufacturing Volumes in the Fifteenth and Sixteenth Censuses of the United States and Haines (ICPSR 2896). Retail Sales data are from retail censuses conducted by the Bureau of the Census and reported in U.S. Department of Commerce, Bureau of Foreign and Domestic Commerce, 1936 and 1939. The 1929 and 1939 retail sales are from Haines (ICPSR 2896).

Wallis (1989) constructed the index for the broad measure of employment, which covers establishments in manufacturing, mining, retail, wholesale, laundries, and street railroads, and does not include railroads, construction, or government workers. The index is built up from the U.S. Bureau of Labor Statistics monthly establishment surveys collected by various agencies around the country. Wallis then benchmarked the series to census employment figures. The index of payrolls for the broad measure of employment is constructed from the same information and is built up from the Monthly Labor Review and a series of monthly reports *Employment and Payrolls*. We have not benchmarked the payroll indices. In the payroll index we substituted information from Milwaukee from the Neumann, Fishback, and Kantor (2010) dataset for information for Wisconsin because the Wisconsin series led to extremely unusual figures. Wallis (1989) also mentions this issue). We have also created the unbenchmarked employment index from this data and have used it to create an estimate of average monthly earnings.

Automobile registrations for each state were collected from U.S. Public Roads Administration (1947).

Measuring Government Spending

We have compiled a data set of the key components of federal spending and loans identified by the U.S. Office of Government Reports (OGR) between 1933 and 1939. Starting with the OGR data we then checked the spending in each category from 1933 and 1939 and then extended the data forward to 1940 and backward to 1930 using reports of the U.S. Treasury and many federal agencies.

The Path of Federal Spending in the States through 1932

Prior to the New Deal there were relatively few federal programs that distributed grants and loans to the states, local governments, or individuals within states. By the early 1920s the grants came in the form of federal highway grants to the states through the Department of Agriculture, public health grants for children under the Shephard-Townsend legislation; grants for state and city soldier and sailors homes; education grants

to state agricultural and mechanical universities, for books for the blind, marine schools, and vocational education; grants under the Department of Agriculture to Experiment Stations and Extension Services. The Army Corps of Engineers was building, improving, and maintaining rivers and harbors and flood control works. The Veterans' Bureau was paying out pension and death payments to veterans or their dependents. There were also payments to replace lost property taxes to counties in Oregon associated with the Coos Bay wagon trail and to the state of Oregon for the loss of property taxes on land that the federal government had taken back over from the original Oregon and California Railroad land grant. Finally, there were payments to Oklahoma for gas and oil royalties. The Shephard-Townsend grants wound down after 1930.

The Veterans' Bureau provided extensive vocational rehabilitation training for disabled veterans from World War I with expenditures peaking $166 million in 1922 before slowly declining over the decade to $20 thousand in 1930. The Bureau also provided pensions to veterans, payments to widows of veterans, various forms of insurance, and hospital and medical services.

The Bureau of Reclamation was providing no interest loans for building dams and irrigation works and Boulder Dam had begun construction. In the paper we treated these as grant expenditures because the payments on the loans were often delayed for long periods of time and in a number of cases were forgiven.

The loans came in the form of Federal Land Bank mortgage loans to farmers and a series of special appropriations for emergency crop and feed loans. After 1926 loans were available to veterans based on collateral in the form of World War I Adjusted Service Certificates (ASCs) that would mature after 20 years from the date of receipt of the ASC.

Between the fiscal years 1929 and 1933 Congress and the Hoover Administration raised federal government outlays by 52 percent in nominal terms and 88 percent after adjusting for inflation. Mostly this came in the form of expansions of existing programs. In February 1932 the Reconstruction Finance Corporation was established and made a broad range of loans to financial institutions, industry, and lower levels of government. Franklin Roosevelt and the Democratic Congress took office in early March, 1933 and introduced the broad range of programs seen in Table 1 of the paper. The Public Roads Administration took over the highway grants formerly distributed by the USDA and the Federal Credit Administration

Veterans' Bonus.

The World War I Veterans' Bonus that was associated with the Bonus Army March of 1931 and the cash payout in 1936 was based on an insurance certificate that would mature in the mid 1940s. Through 1936 World War I veterans could obtain loans against the certificates, which they did quite actively. In 1936 over Roosevelt's veto Congress passed a law that allowed cash payments on the certificates and thus a very large cash payout.

On May 19th, 1924, Congress enacted a law providing for adjusted service compensation for veterans of World War I. The act provided for a basic service credit of $1 per day served and a $1.25 for each day served overseas with a maximum credit of $625 for overseas service and $500 for home service. For veterans with credits less than $50 the payments would be made in cash. Otherwise, the veteran would receive an

insurance certificate of the amount multiplied by 1.25 that would pay out the amount on the certificate at the end of 20 years. Apparently, the 25 percent increase was added to take into account the delayed nature of the payment. If the beneficiary died before 20 years, his beneficiary would receive the amount on the certificate (Veterans Bureau, 1924, p. 688). In the original act, the veteran could borrow from banks or trust companies using the certificate as collateral an amount up to 90 percent of the present value of the certificate at the end of the year in which the loan was made using a discount rate of 4 percent and adjusting for likely mortality. This turned out to be about 40 percent of the value of a certificate maturing in 20 years. If the veteran failed to pay interest and the face value, the bank could receive payment from the Veterans' Bureau to cover the loan, and the certificate was passed to the Veterans' Bureau (Administrator of Veterans' Affairs, 1924, pp. 688-672; 1932, p. 36). The interest rate on loans was established as 2 percent about the Federal rediscount rate for 60 days' paper in the Federal Reserve District where the loan was made. Many people ignore the life insurance value of the certificates that were issued. The Veteran's Administration suggested in 1932 that in 80 percent of the cases of veterans dying, the insurance payout from the ASC was the only material asset left to the dependents (Administrator of Veterans' Affairs, 1932, p. 36-37).

Between 1925 and 1936 the Veterans' Bureau issued roughly 3.7 million adjusted-service certificates (ASCs) with maturity value of $3.69 billion. About $3.1 billion had been issued in certificates by June 30, 1926, while the rest trickled in over time as the deadline for application was consistently extended.

On March 3, 1927, Congress authorized the Veterans' Bureau to loan directly on the ASCs. By 1928, as seen in Table A-1, nearly 700,000 veterans borrowed against their ascs. By 1930 the Veterans' Bureau had made about 2.4 million loans with a value of $215 million against the ASCs.

On Feb. 27, 1931 Congress passed Public No. 743 over Hoover's veto. It provided that the loan basis of the asc shall at no time be less than 50 percent of the face value of the asc after the certificate has been in effect for 2 years. The law also capped the maximum interest rate at 4.5 percent. The new law led to an explosion of new loans as the cumulative dollar value of loans on certificates rose from $215 million to nearly $1.1 billion (Administrator of the Veterans' Bureau, 1931, pp. 10, 42-43). The loans had a nice feature that the veteran could forgo repayment and just allow the repayment plus accumulated interest to be taken out of the payment made when the certificate matured. The Veterans' Bureau estimated this would lead to a payout of about $188 for a a typical certificate (the average was roughly $1,000) on which 50 percent had been borrowed and no principal and interest repaid. Of course, the veteran received the intial $500 up front. A law of July 21, 1932 eliminated the two-year waiting period between issuance of the certificate and the loan and cut the maximum interest rate to 3.5 percent (Administrator of the Veterans' Bureau (1932, pp. 10, 36-38). After the burst in 1931, the value of loans on the certificates rose by roughly $300-350 million in fiscal 1932 and 1933, declined some during as the recovery began and rose again until 1935.

Table A.1
Loans on World War I Adjusted-Service Certicates through June 30 of Fiscal Year

Fiscal Year Ending June 30	Cumulative Number of Loans on Certificates	Cumulative Dollar Value of Loans on Certificates	Change in Number of Loans on Certificates	Change in Value of Loans on Certificates	Cone's Estimate of Loans in Personal Income included in Personal Income
1927	689,805	64,433,625	689,805	64,433,625	
1928	757,706	73,884,775	67,901	9,451,150	
1929	1,429,946	133,653,488	672,240	59,768,713	
1930	2,357,697	215,435,144	927,751	81,781,656	
1931	2,265,345	1,087,195,525	-92,352	871,760,381	795,000,000
1932	2,584,582	1,396,042,679	319,237	308,847,154	181,000,000
1933	2,836,922	1,750,000,000	252,340	353,957,321	181,000,000
1934	2,884,504	1,614,220,289	47,582	-135,779,711	34,000,000
1935	2,904,525	1,679,669,884	20,021	65,449,595	24,000,000

Sources: Administrator of Veterans' Affairs. 1927, p. 44; 1928, 26-27; 1929, pp. 5, 30; 1930, pp. 30; 1931, pp. 10, ; 1932, pp. 11, 36-68; 1933, pp. 24-25; 1934, pp. 28-29; 1935, pp. 22-23. Cone, 1940, p. 44.

Frederick Cone (1940, 44) provided monthly estimates of loans on ASCs that he included as part of his estimates of personal income. Table A-1 lists the fiscal year totals of loans from 1931 through 1935. His amounts differ from the ones in the veterans' bureau reports, as he has no loans listed in fiscal year 1930. When the transition is made to grants and the loans paid off in 1936, his totals don't match the veterans' bureau totals. We used Cone's estimates for the ASCs to subtract out the ASCs from the personal income measures to obtain production income numbers. His calendar year totals after paying off loans in millions for 1936 are 1,427, for 1937 are $120, for 1938 are $58, and for 1939 are $34. He does not report a value for 1940. In measuring grants and loans, we used the information from the Administrator of Veterans' Affairs Reports.

We have been unable to find descriptions of the amount of the loans on ASCS or the value of the veterans' bonus on the ASCs in 1936 through 1941 by state for each year. However, there are several sources for specific years that give good descriptions of the share of World War I veterans in the states in several years. The 1926 report of the Veterans' Bureau Administrator reported the distribution of the ASCs across states distributed to that time, but no reports were made after that. By June 30, 1926 approximately 84 percent of the certificates had been issued. The 1930 Census reported the number of World War I veterans, and we used the Integrated Public Use Microdata Sample for 1930 to get an estimate of the number of World War I veterans in each state. We also have information on the number of living World War I veterans receiving pensions in 1934 through 1941 Administrator of Veterans' Affairs, 1926, pp. 312-313; 1934, pp. 78-79; 1935, pp. 80-81; 1936, pp. 90-91; 1937; pp. 80-81; 1938, pp. 93-94 ; 1939, pp. 93-94; 1940, pp. 101-102; 1941, pp. 89-90). The correlations between the

1934 through 1941 numbers were all above .99. The correlations between the 1926 numbers and these numbers were in the 0.93 to 0.94 range, the correlations between the 1930 number and the 1934-1941 numbers were in the .92 range, which might be expected if people were moving around the country. We calculated the share of veterans in each state (taking into account veterans living elsewhere and in Washington, D.C in the total) in each year where we had information. For the years 1927 through 1929 and 1931 through 1933 we used straight-line interpolations of the shares between the values in 1926 , 1930, and 1934. We then multiplied the values by the national totals to get loan values for the ASCs in each state in 1927 through 1935 and by the cash payouts in 1936 through 1941.

In response to pressure from veterans' groups, Congress overrode a Roosevelt veto on January 27, 1936 to create a new payment structure for the ASCs. The World War I veterans could turn in the ASCs for payment of the face value in cash (the famed Veterans' Bonus) after their outstanding loans and accumulated interest to that date had been deducted. The veteran could also choose a bond dated June 15, 1936 to mature June 15, 1945 with interest at the rate of 3 percent per annum but no interest to be paid on any bond redeemed before June 15, 1937. As of June 30, 1936, during the life of the program, the veterans' bureau had issued a total 3,757,259 ASCs with a maturity value of $3.692 billion. Of these 231,109 had matured on account of death and $229.5 million had been awarded to the designated beneficiaries. This left 3.52 million certificates in force with maturity values of $3.462 billion. Payments of less than $50 had been made in 165,184 cases to the value of $5.206 million. Cash settlements were made to the beneficiaries of 135,615 veterans who died in service for an amount of $44.669 million. After the passage of the 1936 act, the VA received 3.264 million applications for settlements of which 98.9 percent had been certified and the rest were in the process. The face value of the certificates was $3.206 billion. After deducting outstanding liens for loans the net value was $1.764 billion.

In constructing the data, we used the change in the cumulative value of the Veterans' Bureau's loans on the ASCs as the value of loans in each fiscal year through the end of fiscal year 1935. Hardly anybody held on to their loans after the passage of the cash opportunity in 1936. The issue arises as to how to treat the cash out of the veterans' bureau. We treated the full $3.206 billion in cash and bond payouts in fiscal year 1936 as a grant, while the value of loans was treated as a repayment with a value of minus $1,679,699,884 for that year. Additional cash disbursements were made of $282.6 million in fiscal 1937, $13.8 million in 1938, $7.4 million in 1939, $9.2 million in 1940, and $2.657 million in 1941 (Administrator of Veterans' Affairs 1941, p. 87).

Tennessee Valley Authority Spending

From examining the OGR figures for spending on rivers and harbors and the Bureau of Reclamation in Tennessee and Alabama, it is clear that the Tennessee Valley Authority expenditures on the construction of a series of Dams and Canals along the Tennessee River are not included. The TVA was a quasi-government corporation that was supposed to repay construction expenditures eventually with electric power revenues but these were very slow to repay the full bill. The expenditures were included in the

Federal Budget expenditure figures listed in the Statistical Abstract of the United States in various years, so they likely belong as expenditures. Another reason to include them is that the Office of Government Reports included the Bureau of Reclamation expenditures on Dams and irrigation projects in their estimates. We constructed estimates of the expenditures on the TVA project, which started in fiscal year 1934 using information from the Federal budget line item for the TVA (U.S. Bureau of the Census, Statistical Abstract of the United States, 1935, p. 169, 1936, p. 170, 1937, p. 168, 1938, p. 174, 1939, p. 172, 1940 p. 198, 1941, p. 184, and 1942, p. 198) and from the TVA annual reports.

We divided up the line item for each year by projects using the TVA Annual Reports for the years 1935 through 1942. The TVA reported a net investment figure for each Dam project for the fiscal years 1934, 1935, 1936, and 1937 (Reports of 1935, pp. 63-68; 1936 123-129; 1937, 103-109). National defense and fertilizer net investments were all assigned to the Muscle Shoals, Alabama area. Mapping and future project expenditures were split evenly between Alabama and Tennessee. In 1938, the TVA began reporting the cumulative cost over the years for each of the following dams: Wilson, Norris, and Wheeler Dams. In 1939, Pickwick was added. (Reports of 1938, pp. 20-26; 1939, 15-22). In 1940 an evaluation of the fixed assets for Wilson, Norris, Wheeler, Pickwick, Hiwassee, Guntersville, and Chickamauga was reported (Report of 1940, 61-63). The 1941 Report (pp. 41-43) then reported the cumulative cost again. Prior to 1939 the construction costs for Hiwassee, Guntersville, and Chickamauga were reported together. Using information on the amount of construction completed (Reports of 1938, pp. 20-26, 1939, 15-22, and 1940, p. 16-18) we could divide up the expenditures across the years. In late 1939 the TVA began reporting aggregate values of constructions o the Watts Bar and Kentucky Dam projects. We split the total expenditures evenly between the two projects through 1940 and then used information on the construction costs of the projects in 1941 (pp. 41-43) to calculate the differences. The annual estimates of expenditures from these various cumulative measures appear consistent with the narrative descriptions of the progress of construction on each project. In the process of developing the figures, a large estimate for Wilson dam in Muscle Shoals, Alabama appears for the first time in 1937. Wilson Dam was built before the 1930s and transferred to the TVA when it was started. A transfer value was not developed until 1937, and that is when it appears in the records. To get the final value for each state we added up the total annual expenditures for all projects and then calculated the ratio of the expenditures from the line item for the TVA in the federal expenditures to the total value we calculated. We then multiplied that ratio by the annual values we estimated in each state.

Table A.2
Estimates of TVA Annual Spending by Project and State

Year	Project	TVA Annual Spending	State
1934	General maps and map work	85,641	Alabama
1935	General maps and map work	332,773	Alabama
1936	General maps and map work	383,611	Alabama
1937	General maps and map work	239,268	Alabama

1938	General maps and map work	0	Alabama
1939	General maps and map work	0	Alabama
1940	General maps and map work	0	Alabama
1934	General Program	94,521	Alabama
1935	General Program	227,930	Alabama
1936	General Program	387,443	Alabama
1937	General Program	302,004	Alabama
1938	General Program	0	Alabama
1939	General Program	0	Alabama
1940	General Program	0	Alabama
1935	Guntersville Dam and Reservoir	23,927	Alabama
1936	Guntersville Dam and Reservoir	2,659,358	Alabama
1937	Guntersville Dam and Reservoir	8,976,602	Alabama
1938	Guntersville Dam and Reservoir	20,293,793	Alabama
1939	Guntersville Dam and Reservoir	9,738,410	Alabama
1940	Guntersville Dam and Reservoir	1,967,208	Alabama
1934	Other dam projects	0	Alabama
1935	Other dam projects	34,035	Alabama
1936	Other Dam projects	350,431	Alabama
1937	Other Dam projects	325,355	Alabama
1938	Other Dam projects	0	Alabama
1939	Other Dam projects	0	Alabama
1934	Wheeler Dam and Reservoir	2,090,454	Alabama
1935	Wheeler Dam and Reservoir	13,165,198	Alabama
1936	Wheeler Dam and Reservoir	12,890,593	Alabama
1937	Wheeler Dam and Reservoir	3,285,043	Alabama
1938	Wheeler Dam and Reservoir	626,956	Alabama
1939	Wheeler Dam and Reservoir	395,905	Alabama
1940	Wheeler Dam and Reservoir	0	Alabama
1934	Wilson Dam and Reservoir	2,396,583	Alabama
1935	Wilson Dam and Reservoir	4,866,477	Alabama
1936	Wilson Dam and Reservoir	8,237,822	Alabama
1937	Wilson Dam and Reservoir	3,843,698	Alabama
1938	Wilson Dam and Reservoir	1,671,786	Alabama
1939	Wilson Dam and Reservoir	1,055,686	Alabama
1940	Wilson Dam and Reservoir	1,353,059	Alabama
1941	Wilson Dam and Reservoir	1,018,167	Alabama
1941	Wilson fertilizer plant	882,948	Alabama
1935	Hiwassee Dam and Reservoir	138,856	North Carolina
1936	Hiwassee Dam and Reservoir	254,474	North Carolina
1937	Hiwassee Dam and Reservoir	2,554,688	North Carolina
1938	Hiwassee Dam and Reservoir	2,560,249	North Carolina
1939	Hiwassee Dam and Reservoir	4,824,822	North Carolina
1940	Hiwassee Dam and Reservoir	5,925,531	North Carolina
1939	Kentucky Gilbertsville Project	7,469,486	Kentucky
1940	Kentucky Gilbertsville Project	9,573,543	Kentucky

1941	Kentucky Gilbertsville Project	18,097,817	Kentucky
1941	Cherokee Dam	11,142,725	Tennessee
1935	Chickamauga Dam and Reservoir	35,831	Tennessee
1936	Chickamauga Dam and Reservoir	2,250,697	Tennessee
1937	Chickamauga Dam and Reservoir	7,403,995	Tennessee
1938	Chickamauga Dam and Reservoir	4,618,291	Tennessee
1939	Chickamauga Dam and Reservoir	9,853,205	Tennessee
1940	Chickamauga Dam and Reservoir	7,803,115	Tennessee
1941	Ft. Loudon	2,531,536	Tennessee
1934	General maps and map work	85,641	Tennessee
1935	General maps and map work	332,773	Tennessee
1936	General maps and map work	383,611	Tennessee
1937	General maps and map work	239,268	Tennessee
1938	General maps and map work	0	Tennessee
1939	General maps and map work	0	Tennessee
1940	General maps and map work	0	Tennessee
1934	General Program	94,521	Tennessee
1935	General Program	227,930	Tennessee
1936	General Program	387,443	Tennessee
1937	General Program	302,004	Tennessee
1938	General Program	0	Tennessee
1939	General Program	0	Tennessee
1940	General Program	0	Tennessee
1941	Hales Bar	549,962	Tennessee
1934	Norris Dam and Reservoir	6,619,639	Tennessee
1935	Norris Dam and Reservoir	14,579,302	Tennessee
1936	Norris Dam and Reservoir	12,349,029	Tennessee
1937	Norris Dam and Reservoir	3,285,274	Tennessee
1938	Norris Dam and Reservoir	0	Tennessee
1939	Norris Dam and Reservoir	0	Tennessee
1940	Norris Dam and Reservoir	0	Tennessee
1934	Other dam projects	0	Tennessee
1935	Other dam projects	34,035	Tennessee
1936	Other Dam projects	350,431	Tennessee
1937	Other Dam projects	325,355	Tennessee
1938	Other Dam projects	0	Tennessee
1939	Other Dam projects	0	Tennessee
1934	Pickwick Landing Dam and Reservoir	0	Tennessee
1935	Pickwick Landing Dam and Reservoir	2,542,933	Tennessee
1936	Pickwick Landing Dam and Reservoir	7,845,057	Tennessee
1937	Pickwick Landing Dam and Reservoir	11,251,447	Tennessee
1938	Pickwick Landing Dam and Reservoir	12,021,925	Tennessee

1939	Pickwick Landing Dam and Reservoir	0	Tennessee
1940	Pickwick Landing Dam and Reservoir	0	Tennessee
1941	Pickwick Landing Dam and Reservoir	2,721,983	Tennessee
1939	Watts Bar Project	7,469,486	Tennessee
1940	Watts Bar Project	9,573,543	Tennessee
1941	Watts Bar Project	14,229,862	Tennessee

Extending the OGR Expenditures back to Fiscal Year 1930 and forward to Fiscal Year 1941.

We were able to extend the federal grant spending by state back to fiscal year 1930 and forward to fiscal year 1941 using information from the Annual Reports of the Treasury Department, which reported direct payments made to states under cooperative arrangements and grants to and expenditures within states providing direct relief, work relief, and other aid, exclusive of loans (U.S. Department of Treasury, Annual Report,1930, 623-626; 1931, 566-569; 1932,443-446; 1933, 382-385 ; 1934, 397-401; 1935, 432-4351936, 474-477; 1937, 474-479; 1938, 520-531; 1939, pp. 519-525, 1940, 821-829, 1941, 651-659). In the fiscal years 1934-1939 when both the OGR and Department of Treasury of estimates were both reported, the data by program matched up perfectly for the following programs for all years: Agricultural Experiment Stations, Agricultural Extensions works, Colleges of Agricultural and Mechanical Arts, Forest Funds, Forest Service Grants, Public Roads Administration (after summing across roads programs in Treasury reports), Mineral Lease Payments, Special Funds grants, Vocational Education and Rehabilitation Grants, Office of Education Grants, State Marine School Grants, Books for Blind Grants, Federal Water Power Grants, Soldier and Sailor Homes Grants, and National Guard Grants. All of these programs were programs that existed before, during, and after the New Deal.

Veterans' Bureau Spending

The Office of Government Reports reported Veterans' Administration expenditures for the years 1933 through 1939 by state. The loans to living veterans on the World War I Adjusted Service Certificates prior to 1936 and the Veterans' Bonus payouts on the ASCs in 1936 and after were not included in the Veterans' Administration expenditures. The expenditures included pension payouts for Navy and Army veterans, VA homes, Maintenance, military and naval insurance payouts for adjusted service certificates of less than $50 in cash and payments to dependents from ASCs where the veteran has died, We found that these matched the information reported by the Administrator of Veterans' Affairs in Annual Reports for 1934, pp. 78-83; 1935, pp. 80-85; 1936, pp. 90-95; 1937; pp. 80-85; 1938, pp. 93-98 ; 1939, pp. 93-98. We therefore used information from the 1940 and 1941 Reports to add the data for those years (1940, pp. 101-106; 1941, pp. 89-94). The distributions across states in each year were pretty stable with pair-wise

correlations between one year and the next of .98 or higher throughout the period from 1933 through 1941.

For the period prior to 1933 the Veterans' Administration (VA) reported national expenditures but did not report the total spending by state. However, the VA did report "the number of pensioners on the roll and the annual value of said roll" for war pensions in 1931 and 1932 in the *Annual Report* of the Administrator of Veterans' Affairs (1931, p. 127; 1932, p. 95). Prior to 1931 the information was reported in the annual reports of the U.S. Commissioner of Pensions (1920, p. 16; 1921, p. 21; 1922, p. 18; 1923, p. 12; 1924, p. 19; 1925, p. 14; 1926, p. 15; 1927, p. 14; 1928, p. ???; 1929, p. 15; 1930, p. 14) and in the *Statistical Abstract of the United States* (1919, p. 380). In 1928 the information was reported in the Secretary of Interior, *Annual Report, 1928* (p. 292).

For the years through 1932 the veterans' administration reports the number of pensioners on the rolls and the value of the pensions to be paid by state. This does not represent all of the types of funds for the VA grants used in the data set from 1933 to 1939. We also have the number of veterans reported by state in the Census in 1930 from the Integrated Public Use Microdata Sample (IPUMS). The correlations across states between these measures and the 1933 veterans' bureau spending were .952 for the IPUMS distribution for 1930, .943 for the distribution of pension amounts in 1932 and .945 for the distribution of pension amounts in 1931.

In the measure we used in the analysis we used the shares of the national totals from the IPUMS data in 1930 and the shares for the VA spending in 1933 and developed estimates of the shares in 1932, 1931, 1929, and 1928 using straight-line interpolations. We then multiplied the national totals after subtracting out spending that is covered in other categories (spending on state and territorial homes, vocational training, government life insurance, seamen's insurance, allotments and allowances, loans to vets for transportation, medical and hospital services, and miscellaneous factors). The national totals were $546,255,828 in 1932, $695,951676 in 1931, $626,485,964 in 1930, $620,504,069 in 1929, and $611,396,308 in 1928 (calculated from Veterans Administrator, 1934, p. 76, Table 40) We made the adjustments to the national totals after comparing totals for 1934 with the OGR reports.

The U.S. Employment Service grants reported by the OGR were much bigger than those reported by the Treasury. For example, the OGR reported a total for the U.S. of $24.556 million, while the Treasury reported $4 million. However, the Treasury figures for 1940 look more like the OGR figures. In fact, they were substantially larger than the 1939 OGR figures at a total around $60 million. They then fall off markedly to $3.1 million in 1940. We looked at the Monthly Labor Review reports on public employment agencies and we cannot explain this sudden rise and fall. Relative to the total spending in those years, the fluctuations would be in the neighborhood of 1.5 percent of total spending in 1939. No grants were listed prior to fiscal year 1934, but we know that the U.S. Employment Service operated in the early 1930s with a few offices and a small staff in several states. Based on the descriptions of the size of the offices and their tasks, we do not believe the expenditures were larger than $30,000 in those states prior to 1934. U.S. Department of Labor, "Public Employment Services," Monthly Labor Review (January 1931): 10-32. We chose to leave a value of zero for the U.S. employment service prior to 1934.

Among major New Deal programs, the Agricultural Adjustment Administration OGR and Treasury values matched in 1939 and there were small differences in 1938, and 1937, and no listings in 1934-1936 in the Treasury Reports. The Civilian Conservation Corps matched perfectly in 1937 and 1938, the treasury reports were 1.18 times the OGR reported amount in each state in 1939.

The Public Works Administration total for non-federal and for federal grants matched up with the total in the Treasury in 1939. However, comparisons of the Treasury information with information from the First and Second Annual Reports of the Federal Works Administrator shows that the Treasury only reported the grants for non-federal projects in 1940 and 1941. We filled in the grants for federal projects from PWA expenditures form Federal Works Agency. *First Annual Report, 1940*, pp. 328-329 and the *Second Annual Report*, 1941, pp. 318-19.

For the Works Progress Administration, the sum of the Treasury's National Youth Administration and the WPA matched in 1939 and the sums were off a little in 1936, 1937, and 1938. The WPA figures from the OGR matched exactly the WPA annual reports of federal expenditures from WPA, *Report on the Progress of the Works Progress Administration*, various years. In 1940 and 1941 the Treasury expenditures were slightly larger than the WPA expenditures reported in the Federal Works Agency, *Second Annual Report, 1941*, pp. 452-453, and *First Annual Report, 1940*, pp. 436-437. The Federal Emergency Administration Grants in the OGR and Treasury Reports matched in 1935, 1937, 1938, and 1939 and differed slightly in 1936. The FERA expenditures were not listed in the Treasury Reports of 1934, so no comparisons could be made between the OGR and Treasury Reports that year.

The Social Security Administration Expenditures reported by the OGR matched the Treasury Reports and the grants listed for fiscal 1936 and 1937 in the Social Security Board's *Second Annual Report of the Social Security Board, 1937,* pp. 99-100. These included grants for old-age assistance (74 percent of total in 1937) , aid to the blind (2.8%), aid to dependent children (14.8%), unemployment compensation administration (5.5%), as well as Department of Labor grants for maternal and child health services (1.8%), services for crippled children (1.2%), and child welfare services (0.6%), and Treasury department grants for public health work (4.6%). The OGR reports had lower totals in 1938 and 1939 than those listed in the Treasury reports, while the Treasury reports listed in 1938 and 1939 matched exactly the reported amounts in the Social Security Board's *Fourth Annual Report of the Social Security Board, 1939,* pp. 195-196. We therefore used the Treasury and Social Security grant estimates for 1938 and 1939 instead of the OGR estimates.

The Treasury Department figures for the Farm Security Administration were similar to the OGR figures for 1938, but were much larger in 1937 and 1939. It appears that the Treasury was including the value of FSA loans in the grant figures. For 1940 and 1941 we adjusted the Treasury figures downward based on the ratio of the OGR grant in 1939 to the Treasury listing in 1939.

The Public Building Administration spending is not reported in the Treasury Reports until 1940 but is reported in the OGR Reports. The data for the OGR matches up exactly for 1934 with the data reported for the Public Buildings Administration in Federal Works Agency, *Annual Report, 1940*, pp. 264-265, and are similar in most other years. The Treasury data for 1940 are similar to and strongly correlated with the data reported in

the Federal Works Agency *Annual Report, 1940* , pp. 264-265. There are some substantial differences between the Treasury and the Federal Works Agency report in 1941 (Federal Works Agency, *Annual Report, 1941* pp. 247).

The sources for Public Works Administration loans in fiscal years 1940 and 1941 are Federal Works Agency, *First Annual Report, 1940*. Washington, D.C.: Government Printing Office, 1940, pp. 328-329 and Federal Works Agency, *Second Annual Report, 1941*. Washington, D.C.: Government Printing Office, 1941, pp. 318-319. These were loans on non-federal projects. Negative numbers means that bonds were cancelled in lieu of payments.

Bureau of Reclamation

One of the main questions to address is how to deal with the Spending on construction of dams and irrigation projects by the Bureau of Reclamation. Technically, all Bureau of Reclamation projects were interest-free loans to the users of the irrigation works or the electric works associated with dams. However, the repayments on the loans were generally delayed and in a number of cases the scheduled payments were pushed back even further. This was particularly true during the 1930s. On some projects the loans were forgiven. Thus, a case could be made that the Bureau of Reclamation spending could be treated as similar to grants. Certainly, in terms of net flow of funds they lie somewhere in between the non-repayable grants of the WPA and the loans with repayment schedules. The OGR reports Bureau of Reclamation grant spending. These estimates in most cases are pretty similar to estimates of construction costs reported separately in the annual reports of the Bureau of Reclamation after the construction spending for the Boulder Dam project (begun in fiscal year 1931), the All-American Canal (begun in fiscal year 1935), and the Marshall Ford Dam (Mansfield after 1941 and begun in fiscal year 1938) are added to the construction statistics listed in the Bureau of Reclamation Annual Reports (see Bureau of Reclamation, Annual Reports for Fiscal Year for the period 1921 through 1932) and Secretary of Interior Annual Reports for Fiscal Year for the period 1933 through 1941.

We constructed two different versions of the Bureau of Reclamation spending. In one we used the OGR estimates of Bureau of Reclamation grant spending for fiscal years 1934 through 1939 and then added in estimates using the Bureau of Reclamation Construction Spending for fiscal years 1930 through 1933 and 1940 and 1941 plus construction spending for the Boulder Canyon Project, the All-American Canal and the Marshall Ford Dam. These were added because it was clear from comparisons during 1934 through 1939 of the spending by state listed by the OGR and Reclamation Bureau that those three projects were included in the OGR estimates but not the Reclamation Bureau estimates. The Reclamation Bureau reported separate accounting for the Boulder Canyon projects and the All-American Canal in their reports (Secretary of Interior 1933; pp. 40-1; 1934, pp. 50-51; 1935, pp. 80-81; 1936, pp. 84-85; 1937, pp. 28-29; 1938, pp. 77-79; 1939, pp. 225-227; 1940, pp. 120-122; 1941, pp. 45-47).

In a second set of estimates we used the Bureau of Reclamation Report estimates of spending plus the spending on the Boulder Canyon Project, the All-American Canal and the Marshal Ford Dam. We constructed estimates of Boulder Canyon spending from the following material. For the fiscal years 1934 through 1940 the Reclamation Bureau reported accounting summaries for the Boulder Canyon Project that showed an estimate

of fixed capital under construction and also total cumulative disbursements by the fiscal agents of the project. For Boulder Canyon the difference between the two cumulative numbers was roughly $8 million out of around $60 million total in 1934 and 1935 and $3 million thereafter, for percentage differences of 13.6 in 1934, 9.3 in 1935, 5.6 in 1936, 3.3 in 1937, 2.7 in 1937, 2.3 in 1938, and 1.7 in 1939. The same figures were provided for the All-American Canal from 1935 through 1940. The differences were 142,000 in 1935 and less than 850,000 thereafter with percentage differences of 6.3 in 1935, 12.3 in 1936, 5 in 1937, 2.6 in 1938, 2.3 in 1939 and 3 in 1940 (Secretary of the Interior 1934, pp. 54-56; 1935, 84-87; 1936, 88-92; 1937, pp. 30-33; 1938, pp. 80-83; 1939, pp. 228-231; 1940, pp. 123-126). For fiscal year 1941 we used the appropriations estimates reported in Secretary of Interior 1941, pp. 32-33 for Boulder Canyon and listed on p. 557 in the U.S. Department of Treasury, Budget of the United States, 1942, printed in 1943). For the Boulder Canyon Project, the Bureau of Reclamation (1932, p. 88 provided an estimate of cumulative construction costs by the end of fiscal year 1932 of $21,745,004. And information on expenditures in fiscal year 1931 suggests that roughly $5.5 million was spent on constructing railroads, highways, Boulder City, and electric transmission lines that year (about $3.1 million on railways, $300,000 on highways, $1.5 million on transmission lines, and $600,000 on the initial parts of Boulder City (U.S. Bureau of Reclamation. *Boulder Canyon Project Final Reports: Part I: Introductory. Bulletin I. General History and Project Description*. Washington, D.C.: Government Printing Office, 1948, pp. 84-85). To get an estimate of cumulative construction costs in 1933, we subtracted the line item amount of $19,526,000 for the Boulder Canyon Project in the Treasury report on expenditures of (Stat. Abstract, 1935, p. 170) from the 1934 estimate. The spending for the All American Canal was allocated to California and the Boulder Canyon project was split evenly between Arizona and Nevada because it sits astride their border. The split seems to be the way the OGR also allocated the Boulder Canyon funds.

For the Marshall Ford Dam for the years 1935 through 1939, we used the estimates for the Bureau of Reclamation provided by the Office of Government Reports for Texas. The Bureau of Reclamation reported no construction estimates for Texas during the period and we had no separate information on the Marshall Ford dam prior to 1941. For 1941 we used a figure of $3 million that came from an appropriations request by Roosevelt for Marshall Ford Dam in 1941. For 1940 we assumed a figure of $ 4 million based on the decline in annual spending between 1939 and 1941. Marshall Ford Dam was allocated to Texas.

Table A.3

Estimated Annual Spending on Major Dam Projects for Fiscal Years, 1930-1940

	Estimated Annual Spending for Fiscal Years				
	Boulder Canyon Dam		All American Canal		Marshall Ford Dam
	Based on		Based on		Based on OGR and appropriations
Fiscal Year	Disbursements	Capital Under Construction	Disbursements	Capital Under Construction	

1930	0	0	0	0	
1931	5,500,000	5,500,000	0	0	
1932	14,640,028	14,640,028	0	0	
1933	13,682,429	22,106,181	0	0	
1934	19,526,000	19,526,000	0	0	
1935	21,965,333	21,313,868	2,248,138	2,105,904	0
1936	18,896,056	16,719,814	4,332,560	5,287,203	555,731
1937	7,792,162	5,630,729	8,580,700	8,549,162	796,291
1938	6,076,856	5,608,865	7,769,657	7,576,826	5,569,261
1939	5,407,545	5,082,650	3,018,729	3,035,664	5,255,993
1940	4,693,698	4,050,808	1,910,080	2,152,418	4,000,000
1941	6,500,000	6,500,000	1,500,000	1,500,000	3,000,000

Rivers, Harbors, and Flood Control

The Office of Government Reports offered estimates of spending on rivers and harbors and flood control by the Army Corps of Engineers for the fiscal years 1933 through 1939. To push these estimates back to 1928 and forward to 1941 we examined the reports of the Chief of Engineers, U.S. Army, *Annual Report of the Chief of Engineers* for the years 1919 through 1941. The reports listed the net expenditures by project from the Chief of Engineers budgets as well as separate estimates of net spending from budgets provided under the National Industrial Recovery Act through the Public Works Administration and from budgets provided by the Federal Emergency Relief Acts. We found that a number of the state expenditures did not match up well for 1933; therefore, we also created an alternative estimate for the rivers and harbors spending based on the annual reports. Some projects were associated with multiple states, like the various sub-districts of the Mississippi River and sub-districts of the Ohio River. In the cases where we could identify specific locations within the sub-districts we used the amounts spent in those locations to divide the spending between states. In situations where specific information was not available we divided the expenditures based on rough estimates of the mileage of the rivers measured with maps and rulers. In most of the districts the spending was not divided by project for the following types of spending: preliminary examinations and reports, plant allotments, preliminary examinations and reports for flood control and plant allotments for flood control. For the first two we distributed the spending on those categories across states based on the spending in the district on the projects in the states in that year. For the third and fourth categories we distributed the spending based on the state distribution of flood control projects. The expenditures we use are net expenditures after net receipts from sales are subtracted. We treated negative values as zeroes in this situation on the grounds that when the area had negative net expenditures, they were not pulling money out of the area.

The Mississippi River Commission covered the Mississippi River from the Head of Passes at the end of the river as it flowed into the Gulf of Mexico to northern parts of the river. For 1922 through 1940, the Mississippi River Commission information for Rivers and Harbors spending by the Army Corps of Engineers was reported by district and for specific spots where money was spent. We used a variety of maps, Wikipedia,

and other sources on the internet to locate the specific spots reported and assigned the expenditures to the states. These are the numbers that we used in the basic statistics with and without negative numbers for the period 1922 through 1930. All funds contributed by local levee districts and governments were excluded.

Splitting the Reconstruction Finance Corporation Loans between fiscal 1932 and fiscal 1933.

We used information from Reconstruction Finance Corporation (1932x, pp. 3-4 and 1933x, pp. 8-9, 14-15). The RFC did not report the total loans by state for fiscal year 1932 or for fiscal year 1933 in their monthly and quarterly reports of 1932 and 1933. They did report the number of borrowers by state for fiscal year 1932 for each category: banks and trust companies, credit unions, building and loan association, insurance companies, mortgage-loan companies, joint-stock land banks, livestock credit corporations, agricultural credit corporations and railroads (including receivers). In the 1933 report they reported the cumulative number of borrowers in the categories above plus the additional categories under the expanded range for the RFC after June 1932. The added categories included Federal Land Banks, Federal Intermediate Credit Banks, Regional Agricultural Credit Corporations, Self-liquidating projects, Financing of Agricultural Commodities and Livestock, Relief and Work Relief, Loans on Preferred Stock of Banks, and Purchases of Capital Notes and Debentures of Bonds. Using this information we determined the number of borrowers (B_{32js}) in each category (j) in each state (s) as of June 30, 1932 (32) and the additional borrowers added in fiscal year 1933 (B_{33js}). The two reports also reported the total loans in each category as of June 30, 1932 and June 30, 1933. From that information we determined the value of loans of loans in each fiscal year for loans. We calculated the average loan size for each category of loan (l_{32j})

$$l_{32j} = L_{32j}/\Sigma_s B_{32js}.$$

Σ_s is the summation sign over all states s.

To get an estimate of the amount of loans in state s in 1932 (EL_{32s}) we multiplied the number of borrowers in the state in each category (B_{32js}) by the national average loan size (l_{32j}) and then summed across all categories.

$$EL_{32s} = \Sigma_j l_{32j} * B_{32js}$$

We followed the same procedure for each state in 1933.

$$EL_{33s} = \Sigma_j l_{33j} * B_{33js}$$

The proportion of loans in state s from February 2, 1932 to June 30, 1933 that was in fiscal year 1932 (P_{32s}) is then

$$P_{32s} = EL_{32s}/ (EL_{32s} + EL_{33s}).$$

This was then multiplied by the reported amount of loans from the Office of Government Reports to get the 1932 figure. The RFC reported Loans allotted, the amount disbursed, the amount repaid, and the amount outstanding. The Office of Government Reports appears to have used loans outstanding in their reports, so we used that definition here.

Agricultural Loans through Federal Land Banks 1917 through 1932, Emergency Crop Loans, 1921-1932 and Farm Credit Administration (Federal Land Banks, Land Bank Commissioner, Production Credit Associations, and Emergency Crop and Feed Loans) from 1933 forward.

Federal Land Bank Mortgage Loans through 1932. In 1917 12 Federal Land Banks were organized and authorized to "extend long-term mortgage credit to farmers on security of first mortgages on farm lands." The loans could be made for a period from 5 to 40 years. The loans almost entirely were made through national farm loan association, corporations charted under the 1917 act and organized by farmers on a cooperative basis. The membership of the cooperatives was made up exclusively of borrowers from the Federal land banks. The banks were organized on a cooperative bases because nearly all of the stock was owned by the borrower-owned national farm loan associations. Each bank was liable for its own bond issues and the bond issues of the 11 other Federal land banks. As of 1930 the Federal Land Banks held about 12 percent of the farm mortgage indebtedness in the U.S. The administration oversight of these banks was taken over by the Farm Credit Administration in 1933 (Federal Farm Loan Board. *Annual Report,* 1930, pp. 2, 12). Interest rates on bank loans were limited to a maximum of 1 percent over the interest rate at which the federal land bank sold its most recent issuance of bonds. For example, in 1925 Federal Land Banks were marketing their bonds at 4.5 percent, which implied a maximum interest rate on the mortgages to farmers of 5.5 percent. Some of the larger banks charged on 5.25 percent (1925, p. 5).

In May 1921 the Federal Land Banks resumed operation after a cessation of lending that lasted roughly 15 months, which seemed to occur between the beginning of December 1919 and the end of April 1921. The stoppage was a result of litigation over the constitutionality of the Federal Farm Loan Board lending system established in 1917. (pp. 2-3, Federal Farm Board. *Fifth Annual Report of the Federal Farm Board, 1921.* Washington, D.C.: Government Printing Office, 1922).

We collected information on the value of loans closed by the federal land banks in each year from the Federal Farm Loan Board *Annual Reports* for the years 1918, pp. 25-27; 1919, pp. 25-27; 1920, p. 5; 1921, p. 12; 1922, p. 20; 1923, p. 21-22; 1924, p. 21-22; 1925, pp. 27-28; 1926, p. 32; 1927, p. 71; 1928, p. 122; 1929, pp. 162, 163; 1930, pp. 121, 124, 1931, p. 124, 1932, p. 106-7. The reports reported the amounts loaned through December 31, of the year of the report back through 1922. Between 1922 and 1928 only the cumulative totals to December 31 were reported, so the annual amounts were based on the change in the cumulative totals. From 1918 through 1921, the cumulative totals through November 30 of the year was reported. In checking the data we discovered some discrepancies in 1929 between the value of loans reported for that calendar year and the

value determined by subtracting the 1928 cumulative total from the 1929 cumulative total. Most were less than 5 percent but Georgia and Florida had sizeable discrepancies. We used the 1929 calendar year reported values. (Fdldbk.xls). In the analysis we converted the calendar year data to a fiscal year basis for year *t* by taking half of the calendar amount in year *t* and half of the calendar year amount in year *t-1*.

Farm Loan Board (1931, p. 121; 1929, p. 158; 1928, p. 116;) showed that roughly 60 to 66 percent of the amount of federal land bank loans closed in the calendar years 1929 and 1931 were closed in the first half of the year. 53 percent in 1930,

Joint Stock Land Bank Loans. The Annual Reports of the Federal Farm Loan Board first reported loans granted by joint-stock land banks in 1923. The joint-stock land bank loans were privately organized corporations chartered by the federal government to provide farm loans. Interest rates on bank loans were limited to a maximum of 1 percent over the interest rate at which the federal land bank sold its most recent issuance of bonds. For example, in 1925 joint stock land banks were marketing their bonds at 4.5 to 5 percent, which implied a maximum interest rate on the mortgages to farmers of 5.5 to 6 percent (1925, p. 5).

"Based on the results of actual experience, the board deems it wise not to charter additional joint-stock land banks, except and unless it shall be shown by a careful survey that there is a need for the bank and reasonable assurance of a profitable volume of business and evidence that the financial responsibility and competency of the personnel of the proposed organization will afford satisfactory and efficient operation. Such a bank must function so as to insure conservatism in its lending activities and at the same time accumulate legitimate profits to absorb necessary charges for expenses and still afford reasonable dividends to stock holders.(1925, p. 8)." Between 1923 and 1926 the amounts of loans granted from time of organization to October 31st of the year in question were reported (1923, p. 29; 1924, pp. 29-30; 1925, p. 40; 1926, p. 45. From 1928 onward the amounts closed from date of organization through December 31st of the year were reported (1928, p. 122; 1929, p. 163; 1930, p. 125; 1931, pp. 125-127; and 1932, pp. 107-109). In 1927 only the loans submitted for approval as collateral for bond issues were reported (1927, p. 78). The same values were also reported for 1928 through 1931 (1928, p. 141; 1929, p. 182 ; 1930, p.145 ; 1931, p. 146). To get a figure for the 1927 loans closed, we multiplied the cumulative number of loans submitted for approval for collateral in 1927 by the ratio in 1928 of the cumulative loans closed to the cumulative loans submitted for approval as collateral in that year for each state. This estimate is likely to be a good estimate because in 1928 the ratio of loans closed to loans submitted for approval as collateral ranged from .978 in Tennessee to 1.115 in California with an average of 1.043 and a standard deviation of 0.047. The ratios in 1929 for each state were close to the same, as the ratio of the ratio in 1928 to the ratio in 1929 was within one percent of one in all but two states. In 1929 the change in cumulative loans was negative for Missouri, and we inserted the annual amount reported on p. 162 in the volume. In 1931 the change in the cumulative total of loans was negative for Ohio and Pennsylvania. We inserted the annual amount reported on p. 124 in the 1931 volume instead. In general, we used the change in the cumulative amounts rather than the

reported annual amounts because only the cumulative amounts were reported in the earlier years.

Emergency Crop and Feed Loans through 1932. Congress made funds available for emergency crop production and seed loans in several different years between 1921-1932 under special appropriations. We also had precise information on the distribution across states of the funds in 1922 (Agriculture Yearbook, 1922, p. 51; 1923, p. 120) and in 1924 (Yearbook of Agriculture, 1924, p. 91). We had information on the states that received the emergency loans in 1921, 1929, and 1930. Using the information from the total distribution of loans over the period 1921 through 1930 (FCA, 1933, pp. 115-117), we could do a reasonable job of figuring out the distribution of loans across states within those years (see fca3337.xls and fca3841.xls). There were loans in 1921 of $1,935,125 and in 1922 of 1,481,988. An Act of March 3, 1921 allowed for $1,954,929 in seed-grain loans to Montana, North Dakota, Idaho, and Washington. An Act of March 20, 1922 authorized lending of $1,481,988 seed-grain loans in crop-failure areas for the crop of 1922. The loans were for $24,685 in Idaho, $756,213 in Montana, $661,548 in North Dakota, $37,812 in South Dakota, and $1,730 in Washington (Agriculture Yearbook, 1922, p. 51; 1923, p. 120). USDA financial statements from 1924 report appropriations of $1 million for seed and farm loans to farmers in New Mexico (Yearbook of Agriculture, 1924, p. 91). The total loans reported for 1921-1930 to New Mexico in FCA, 1933, pp. 115-117 were $433,849, so we believe that was the amount spent in 1924. The USDA financial statement in 1926 included $22,560 in seed grain loans (Yearbook of Agriculture,1926, p. 121). At some point between 1921 and 1930 there was another distribution of loans in the range of $1.6 million, but we have not found the description of that loan distribution. It likely occurred in 1927. In 1929 Congress made available $6 million for the USDA to make emergency loans to farmers for seed, feed, and fertilizer. About $5.5 million was loaned in Virginia, North Carolina, South Carolina, Alabama, Georgia and Florida for staple crops. About $200,000 was loaned in southern Florida on vegetables. By June 30, 1930 about $4.6 million had been repaid. In spring 1930 under the first deficiency act of March 26, 1930, loans were made to other farmers in Virginia, North Carolina, South Carolina, Alabama, Georgia and Florida and crop financing was aided in Indiana, Illinois, Missouri, Oklahoma, New Mexico, Minnesota, North Dakota and Montana. Except in the Southeastern states and in North Dakota and Montana, however, the amounts loaned were negligible. The total spring loans amounted to $4,612,136. In August and September roughly $500,000 was loaned in Florida on winter vegetables and another $170,000 was loaned on fall pasture crops in Alabama, Missouri, Oklahoma, and Virginia (Yearbook of Agriculture, 1931, pp. 5, 6).

We had precise information on the distribution of the emergency crop and feed loans made during the calendar year for 1931 and 1932 from the annual reports of the Federal Credit Administration (First, 1933, pp. 115-117). The 1932 loans were made from funds provided by the Reconstruction Finance Corporation but were administered by the Federal Farm Bureau of Loans and were reported there and not in the RFC reports. Roughly $120 million was advanced in 1931 and 1932. Although reported on a calendar year basis, nearly all of the loans, with the exception of late loans were made prior to July 1 of each year. In nearly all cases the fiscal year value and the calendar year value were

similar. Where they were not, we subtracted the loan values in fall year *t* from the year *t* calendar value and added it to the year *t+1* value.

Farm Credit Administration from 1933 onward. The Farm Credit Administration was created in 1933 and the duties of various farm loan activities were merged into its administrative realm. The FCA continued the Federal Land Banks. A new program under the Land Bank Commissioner was authorized under the Emergency Farm Mortgage Act of 1933 with a fund of $200 million. The funds were used to refinance indebtedness, for providing working capital for farm operations, and for enabling farmers to redeem or repurchase property which has been foreclosed since July 1, 1931. The loans were granted on security of first or second mortgages on land and permanent improvements. The maximum amount of loans per farmer was to be $5,000 with no indebtedness to exceed 75 percent of the appraised normal value of the property. These loans were focused on farmers who could not obtain Federal land bank financing (Farm Credit Administration, First Annual Report, 1933, p. 10).

FCA Federal Land Bank and Land Bank Commissioner Loans. Federal Land Bank and Land Bank Commissioner Loans made during the calendar year were reported in the Farm Credit Administration Reports (First, 1933, pp. 78-79; Second, 1934, pp. 91-92; Third, 1935, pp. 119-120; Fourth, 1936, pp. 115-116; Fifth, 1937, pp. 113-114; Sixth, 1938, pp. 187-9; Seventh, 1939, pp. 138-139; Eighth, 1940, pp. 155-156; Ninth, 1941, pp. 145-146). The FCA annual report provided information on the number of loans closed by the Federal Land Banks and Land Bank Commissioner during the 11 months through November 1933. However, 59.5 percent of the loans closed in the full calendar year of 1933 were closed in December of 1933(Farm Credit Administration First Annual Report, 1933, p. 7). Therefore, we multiplied each figure by 1.6809 to determine the total loans for the calendar year. Thus, we are assuming that the percentage of loans in each state was the same in December as it had been in the first 11 months of the year.

FCA Production Credit Division. The crop production loans made during the calendar year were reported in the Farm Credit Administration Reports, (First, 1933, pp. 118-119; Second, 1934, pp. 152-154; Third, 1935, pp. 133-134; Fourth, 1936, pp. 136-137; Fifth, 1937, pp. 136-137; Sixth, 1938, pp. 187-9; Seventh, 1939, pp. 165-166; Eighth, 1940, pp. 201-202; Ninth, 1941, 189-191). The Farm Credit Act of 1933 also created the Production Credit Division, a system of cooperative credit institutions chartered by the Farm Credit Administration and operating under rules set up by 12 Production Credit Corporations (PCC), one in each Federal land bank city. The local associations made loans directly and were capitalized partly by the production credit corporations and partly by the borrowers. They could borrow and rediscount with the Federal intermediate credit banks. The PCCs provided part of the capital for the loans and set the regulations. Their initial capital stock of $7.5 million each was subscribed by the Governor of the FCA, and the Governor could raise and lower the capital stock. The funds of the PCCs were not loaned directly to farmers but provided paid-in capital for the creation of the PCCs. Production Credit Associations (PCAs) could be organized by 10 or more farmer-borrowers after a meeting of interested farmers living in the territory to be served. As of December 31, 1933 there were 322 PCAs, each with a specified

territory. Class A stock in the PCAs was nonvoting but preferred upon liquidation and was purchased primarily by PCCs but could be bought by private investors. The Farm Credit Act called for the value of Class A stock to be roughly 20 percent of the volume of loans. Class B stock was purchased primarily by farmer-borrowers and was paid in as loans were made. Each borrower was required through the local PCA to own class B stock equal to 5 percent of the value of his loan. Each Class B stock holder had one vote. The PCAs could rediscount loans in an amount equal to about 5 times their paid-in capital. When the rediscounts were equal to 5 times paid-in capital, the PCCs could provide added capital by purchasing more Class A stock. The plan was to have one-fourth of the capital stock be owned by borrowers as Class B stock, and the rest as class A stock owned by the PCCS (FCA, First Annual Report, 1933, pub. 1934, pp. 33-36). In 1933 the state distribution for loans by the PCAs was reported only through November 31st of the year. However, the total for the entire period from January 1 through Dec. 31 was very close to the amount reported through November 1933 (see FCA, First Annual Report, p. 2 and pp. 119-120). Therefore, we used the total through November for each state.

FCA Emergency Crop and Feed Loans. The administration of the original emergency crop and feed loans made by Congressional appropriation was transferred to the FCA. In 1933 $90 million was authorized for loans to purchase feed, finance crop production, and cover the costs of administering the loans. Security on the loans was a first lien on the crop to be harvested and/or livestock fed. The 1933 maximum for each feed loan was $250, the individual maximum for crop production purposes was $300 and the maximum that could be advanced to all tenants of any one landlord was $2,000 (FCA, First Annual Report, 1933, pub. 1934, pp. 51-52). We had precise information on the distribution of the emergency crop and feed loans made during the calendar year for each year from 1931 through 1941 from the annual reports of the Federal Credit Administration (First, 1933, pp. 115-117; Second, 1934, pp. 168-170; Third, 1935, pp. 155-157; Fourth, 1936, pp. 165-167; Fifth, 1937, pp. 174-6; Sixth, 1938, pp. 187-9; Seventh, 1939, pp. 205-207; Eighth, 1940, pp. 232-234; Ninth, 1941, 221-223).

FCA Drought Relief Loans. In 1934 and 1935 the Farm Credit Administration passed out Drought Relief Loans authorized by a Congressional Act approved June 19l, 1934. Congress appropriated $525 million for relief in agricultural areas seriously affected by drought. Of that amount the FCA was allocated $96,785,000 to make loans to farmers of purchase of seed and feed, summer fallowing, and similar purposes. The Emergency Crop and Feed Loan Section administered the loans. The first loans were disbursed on July 3, 1934 and were made continuously until June 30, 1935 when the appropriation expired. The loans were made principally to care for cattle and other livestock in the drought areas. They were made on “extremely liberal” terms, based on a borrower’s unsecured not and on a nondisturbance agreement to expire at the end of 1935, executed by all holders of liens and other livestock to be fed. The borrower could not increase the lien without permission of the FCA Governor. Most were made at 5.5 percent interst. Loans were also made for orchard rehabilitation in Washington, citrus rehabilitation and truck loans related to a freeze in Florida, and strawberry loans. (FCA Third Annual Report, 1935, pp. 75-76). The drought relief loans made during the fiscal

year 1934-1935 are reported in (FCA Third Annual Report, 1935, pp. 158). We can separate them into calendar year loans using information on the loans made during the fiscal year 1934 in FCA, Second Annual Report, 1934, p. 168).

The Commodity Credit Corporation (CCC) loans from the Office of Government Reports do not match up well at all with CCC loan information reported for 1939, 1940, and 1941. One problem in the OGR reports is there is missing information for 1934. On many state sheets they say that the state by state loans are not available, but then the OGR reports CCC loans for Illinois, Indiana, Ohio, Iowa, Kansas, Minnesota, Missouri, Nebraska, and South Dakota. In the 1939 state by state report from Department of Agriculture (Agriculture Statistics, 1940, p. 632), the cumulative numbers for 1933 through 1939 don't match the cumulative numbers from the OGR, in part because of the missing 1934 data in many states. However, the numbers are substantially different for the states where the OGR did report the 1934 numbers. Also in the Agricultural statistics for 1939, they state that approximately $159 million in loans were not included because they went to cooperative associations. ***The CCC numbers are so problematic that we removed them from the analysis.***

Moat Areas for Instrument Using Spending Outside Region

When constructing one of the instrumental variables, we used a measure of federal grant spending in the area *outside* an geographic "moat" around the state of interest. The moat includes the state's census region (of 9) and nearby census regions to avoid spatial correlation with the error term from potential spillovers. For New England, for example, the moat includes any states in New England, the Mid-Atlantic, the East North Central, or the states of Virginia, Maryland, Kentucky, or West Virginia; therefore, the component of federal spending for the instrument for that state is based on federal spending outside that moat.For the Mid-Atlantic states the area used for the instrument does not include any states from New England, the Mid-Atlantic, the East North Central, the South Atlantic, or the states of Alabama, Georgia, Kentucky, Maryland, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia. The area used for the instrument for the East North Central states does not include any states from the Mid-Atlantic, the East North Central, the West North Central, or the states of Alabama, Arkansas, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, South Carolina, Tennessee, Texas, Virginia, or West Virginia. The area used for the instrument for the West North Central states does not include any states from the East North Central, the West North Central, the East South Central, the West South Central, and the Mountain States. The area used for the instrument for the South Atlantic states does not include any states from the Mid-Atlantic, the South Atlantic, the East North Central, the East South Central, or the West South Central. The area used for the instrument for the East South Central does not include any states from the Mid-Atlantic, the South Atlantic, the East North Central, the East South Central, the West South Central, or the states of Iowa, Kansas, Missouri, or Nebraska. The area used for the instrument for the West South Central states does not include any states from the East North Central, the West North Central, the East South Central, the West South Central, or Mountain regions. The area used for the instrument for the Mountain states does not include any states from the West

North Central, the West South Central, the Mountain, or the Pacific regions. The area used for the instrument for the Pacific states does not include any states from the Mountain and Pacific regions or the states of Oklahoma, Texas, Kansas, North and South Dakota, and Nebraska.

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