

# Fiscal Centralization: Theory and Evidence from the Great Depression\*

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## Abstract

The Great Depression produced a profound and lasting influence on the structure of U.S. government. This paper studies theoretically and empirically the increased centralization of revenues and expenditures by the states relative to local governments during this period. A model of property and sales taxation and tax delinquency is introduced. In the model, the income decline of the Depression causes a rise in property tax delinquency and leads to a shift towards sales taxation and fiscal centralization by the states. Empirical evidence based on cross-state variation in the severity of the Depression is consistent with the model's key predictions.

*Keywords:* Centralization, Fiscal Federalism, Great Depression, Property Tax, Sales Tax

*JEL Classification:* H77, H71, N42

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# 1 Introduction

The Great Depression produced a profound and lasting influence on the size and structure of U.S. government. The size of the government grew as programs in areas like social insurance were expanded. Its structure also changed, as the federal government grew in importance relative to its state and local counterparts. For example, the federal government's share of non-defense expenditures went from about 27 percent on the eve of the Great Depression to almost 45 percent on the eve of World War II in 1940. The big losers in this period were local governments—cities, counties, school districts—whose share of expenditures fell dramatically from about 54 percent in 1927 to 31 percent in 1940.<sup>1</sup>

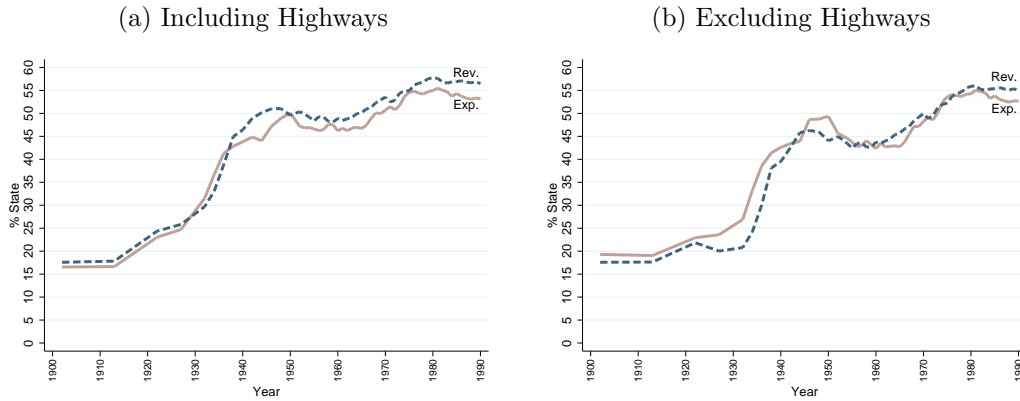
While the New Deal and associated policies are usually credited with the rise of the federal government in this period (Rockoff, 1998), a less well-known but important development of the 1930s was the rise of state governments relative to local governments (for an earlier paper on this topic see Wallis, 1984, discussed below). Between 1927 and 1940, state governments' share of combined state and local expenditures and revenues increased, on average, by 19 and 21 percentage points, respectively. Figure 1 shows the evolution of state governments' share of combined state and local own revenue and expenditure. Figure 1(a) shows that the states' share of both variables had been increasing starting in 1913. However, panel (b) of Figure 1 makes it clear that much of this early increase is attributable to rising expenditures and revenue collections for new roads and highways associated with the advent of the automobile (Wallis, 2001). The Great Depression clearly stands out as a period of rapid centralization of revenue and expenditures by state governments.

The process of fiscal centralization by state governments is important be-

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<sup>1</sup>Here and in the rest of the paper we define expenditures to include both direct and indirect expenditures of a given level of government. Indirect expenditures include intergovernmental grants to other levels of government. Expenditures exclude grants received from other levels of government. The numbers cited in this paragraph and the next are based on our computations using data from the *Historical Statistics of the U.S.* (Wallis 2006, Tables Ea171-219, Ea396-456, Ea530-583). We use 1927 as reference point because it is the last pre-Depression year for which data on government finances is available.

Figure 1: States' Share of Total State and Local Revenue and Expenditures



Highway revenues are defined as motor fuel taxes and fees from motor vehicle and operators' licenses. Own revenue refers to total revenue less revenue from intergovernmental grants. Expenditures are defined in footnote 1. *Source: Historical Statistics of the U.S.* (Tables Ea348-384, Ea396-456, Ea489-518, Ea530-583) in Wallis (2006).

yond its historical interest because the new fiscal arrangements that emerged from the Great Depression were long-lasting and still exert a powerful influence on today's world. Two of these long-lasting developments are worth mentioning at the outset. First, general sales taxes, which now represent the single most important source of revenues for state governments (Census of Governments (2012)), were first introduced in the U.S. by 28 states during the Depression. Second, the current involvement of state governments in elementary and secondary education funding has its origins in the Great Depression. As of 1929, local governments accounted for 83 percent of education revenue, with the states providing the rest. The share of funding coming from the states increased dramatically during the 1930s, reaching 30 percent in 1939 and 40 percent in 1949. The further expansion of states' funding share after the mid-1970s is dwarfed by the increase that occurred during the 1930s (National Center for Education Statistics, 1993, Figure 12).

In this paper we seek to explain the rise of state governments during the 1930s. In doing so, the paper makes two contributions to the topic of fiscal centralization. First, it presents a novel *positive* theory of centralization,

which is used to interpret the events of the Depression. As such, our paper complements the mostly *normative* literature on fiscal federalism (see, e.g., Oates, 1972; Besley and Coate, 2003). The second contribution of the paper is to test empirically some of the key implications of the theory using data on U.S. states.

Our explanation of fiscal centralization is based on the observation that, at the onset of the Great Depression, the property tax was the primary tax used by local governments to fund their expenditures, providing about two-thirds of their own tax revenue.<sup>2</sup> Local governments' heavy reliance on the property tax made them particularly sensitive to the sharp and sudden income decline at the onset of the Great Depression. When the Depression hit, incomes fell further and faster than property tax levies, leading to a large increase in property tax delinquency rates. In 1933 more than a quarter of property taxes levied in cities with a population greater than 50,000 were delinquent (Beito, 1988). This crisis in the ability of local governments to collect taxes provided the impetus towards the introduction of general sales taxes. The latter—which “originated as an emergency source of revenue” (Shoup, 1936, 110)—provided some practical advantages to policymakers scrambling for new sources of revenue in the worst months of the Great Depression. An important advantage was that “the great bulk of dollar volume of sales is concentrated in relatively few establishments” so “it is possible to collect a very large percentage of the potential revenue with costs of administration between 2 and 4 per cent of the tax receipts” (Shoup, 1936, 108). Thus, tax delinquency was much less of a problem with sales taxes but it was only cost-effective for state or national governments to collect these levies (Nechyba, 1997). Sales and gross receipts taxes accounted for about 6 percent of all state and local revenues in 1927 and 18 percent in 1940. This growth corresponds to about 60 percent of the

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<sup>2</sup>By contrast, at the onset of the Depression the property tax accounted for only 17 percent of states' revenue (Wallis, 2001, Table 4). The states relied, instead, on excises, fees, and—to a much lesser extent—on income taxation. Individual and corporate income taxes accounted for only 2.1 percent of state and local revenue in 1927 and 3.5 percent in 1940. Only 7 percent of the growth in revenue centralization in the period 1927–1940 is attributable to them (Wallis 2006, Table Ea247–275).

increase in revenue centralization from 1927 to 1940.

We embed these ideas in a simple model of public good provision financed by property and indirect taxation. The tax mix selected by the benevolent government reflects the trade-offs associated with these two tax instruments. Property taxes are transformed more efficiently into public goods than indirect taxes, reflecting the prevalence of local provision in the pre-Depression era. However, property tax delinquency is an option available to the agents in the model, limiting the feasibility of property taxation as their income declines.

Our theory produces three main empirical predictions that are tested by exploiting the variation in the extent of the decline in income across states at the onset of the Great Depression. First, the theory predicts that states with larger income declines are more likely to introduce general sales taxes. Consistent with this prediction, we find that states that experienced a larger decline in income between 1929 and 1932 were more likely to introduce a sales tax during the 1930s. Moreover, we find evidence that the introduction of sales taxes was associated with rising discontent over property taxation: states with larger income declines in 1929-32 were also more likely to pass blanket property tax limitation referenda.<sup>3</sup> Second, our model predicts that states with larger income declines experience an increase in the share of combined local and state revenues collected by state governments. Empirically, we find that states with a larger income decline in 1929-32 centralized revenue and expenditures relatively more between 1932 and 1942. This channel accounts for between one-third and one-half of the observed increase in the states' share of combined state and local revenue and expenditures in this decade. Finally, the model predicts that federal aid produces a different effect on state centralization depending on whether it takes the form of matching or lump-sum grants. The former lead to an increase in states' revenue share (as argued by Wallis (1984) and Wallis and Oates (1998)) while the latter have the opposite effect. In our empirical analysis, we instrument federal aid received by a state using Wright (1974)'s political variables, summarizing the state's importance for Franklin

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<sup>3</sup>Blanket property tax limits set a cap on the combined millage that all jurisdictions within a state could levy on a single piece of property (Mott and Suiter, 1934).

Delano Roosevelt’s re-election in 1936. Using this approach, we find that states that received exogenously more federal aid experienced a relative decline in the revenue share accounted for by state governments.

Our emphasis on the importance of income decline for institutional change is consistent with a number of accounts of the events of the Depression. Teaford (2002) ascribes the process of fiscal centralization by the states to taxpayer discontent towards the property tax and the fiscal crisis faced by local governments. Rueben (1994) finds support for “economic stress” theories of the introduction of sales taxes, according to which the economic downturn of the 1930s induced state governments to seek out new sources of revenue to finance expenditures. Hartley et al. (1996) attribute the passage of the 1933 Riley-Stewart Amendment – a major fiscal reform in California inclusive of a sales tax – to “growing voter discontent over the property tax during the Great Depression” (666). In a related paper, Gillitzer (2017) argues that states that were most hit by the Great Depression found it optimal to broaden their tax base in order to raise revenue at lower tax rates and reduce the deadweight loss of taxation. Consistent with this view, he also finds that states that experienced larger drops in income during the Great Depression were more likely to adopt a retail sales tax. Finally, our paper is related to the empirical literature on the determinants of fiscal centralization. An incomplete list of papers includes Baicker, Clemens, and Singhal (2012) and Matsusaka (1995, 2000), who focus on the experience of U.S. states; and Panizza (1999) and Arzaghi and Henderson (2005) who study cross-country variation in fiscal centralization.

The rest of the paper is organized as follows. Section 2 presents a model to illustrate the mechanism linking income decline to tax delinquency and state centralization. In Section 3 we test the model’s key predictions using state-level data. Section 4 concludes. The appendix contains details on the data used in the empirical part of the paper.

## 2 The Model Economy

In this section we introduce a simple model that links income decline to tax delinquency, federal aid, and fiscal centralization through the introduction of sales taxes. From the model we derive a number of empirical predictions that are then tested in Section 3. In the model, provision of a public good may be financed by a property tax and by an indirect tax. The trade-off between these taxes is based on two assumptions. The first assumption is that locally raised property taxes are transformed more efficiently into public good provision than indirect taxes raised by the state. This assumption is consistent with the fact that at the eve of the Great Depression local governments accounted for about three-quarters of combined local and state taxes. In practice, local provision might allow for better voter monitoring of how politicians use tax revenue, for more flexibility in the use of funds, and for better tailoring of expenditures to local needs. On this point, Husted and Kenny (2000) show empirically that, as the state share of education revenue increases, measures of school efficiency such as test scores decline. Besley and Coate (2003) emphasize other costs of centralized provision of public goods such as political uncertainty and misallocation across localities associated with the formation of coalitions and bargaining in legislatures.

The second assumption concerns the scope for tax delinquency: unlike property taxes, sales taxes cannot be avoided. This feature of indirect taxes induces the policymaker to expand their use, following the sharp income decline and the rise in property tax delinquency at the onset of the Great Depression. The reason why tax delinquency was likely to be less of an issue for indirect rather than property taxes is twofold. First, yearly property tax payments by the owner of property to the local government were large relative to the day-to-day transactions, such as purchasing food, that were subject to sales taxation. Therefore, a cost-benefit analysis would have discouraged sales tax evasion because of the relatively small size of the transactions involved. Second, while property tax payments consisted of direct transfers by the owner of property to the local government, the sales tax was, instead, collected by a retailer who

acted as a tax collector on behalf of the state government. Tax delinquency, in this case, would have required the willing participation of buyers and sellers, instead of the unilateral decision of the property owner.

## 2.1 Theoretical Framework

The model economy, which is meant to represent a U.S. state, is populated by a representative agent and a benevolent policymaker. The representative agent cares about private consumption  $c$  and consumption of a public good  $g$ . Public good provision is financed by two distinct sources of revenue. The first one is a head tax  $t_l$ , a proxy for the locally controlled property tax (Hamilton, 1975, 1976). For our purposes the key aspect of the property tax that is conveniently captured by a head tax is that when an individual's income falls her tax bill does not fall automatically, leading to an increase in tax delinquency. The second source of revenue is a consumption tax with rate  $t_s$ , representing the sales tax introduced by many states during the Depression.

Formally, the agent's preferences are represented by the following logarithmic utility function:

$$U = \ln c + \lambda \ln g - \kappa d t_l, \quad (1)$$

where the parameter  $\lambda > 0$  indexes the relative weight of the public good. While the agent may choose to be delinquent on a portion  $d$  of her property taxes  $t_l$ , she bears a utility cost  $\kappa$  per unit of delinquent taxes. The latter reflects the consequences of social stigma and of the threat of losing the title to one's home on an individual.<sup>4</sup> The agent spends her income  $y$  on consumption and state and local taxes, according to the budget constraint:

$$y = (1 + t_s) c + (1 - d) t_l. \quad (2)$$

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<sup>4</sup>See Luttmer and Singhal (2014) for a discussion of non-pecuniary factors such as social stigma in tax compliance decisions. Notice that the cost of tax delinquency is a utility cost that does not represent revenue for a local government. Property tax delinquency usually involved local governments selling the title to one's house after some time. As explained by Beito (1988, 8), the tax title market effectively ceased to function during the Depression. Hence, an individual's failure to pay the property tax did result in a loss of revenue for local governments.



The policymaker's budget constraint is:

$$g = \rho(1 - d)t_l + t_s c(1 + f) + F. \quad (3)$$

The first term on the right-hand side of this equation represents the contribution of property tax collection,  $(1 - d)t_l$ , to the provision of the public good. A unit of locally raised taxes is transformed into  $\rho$  units of the public good, with  $\rho > 1 + f$  in order to capture the advantage of local over state provision discussed above. The second term on the right-hand side of equation (3) represents consumption tax revenue  $t_s c$  plus any matching-grants  $ft_s c$  from the Federal government. Last,  $F$  represents a lump-sum transfer of revenue from the Federal government to state and local governments. We distinguish between matching grants and lump-sum transfers because they have different implications for the mix of state and local tax revenue. Notice that both  $F$  and  $f$  are parameters outside of the policymaker's control.<sup>5</sup>

The representative agent chooses property tax delinquency  $d$  in order to maximize utility (1) subject to the budget constraint (2), taking taxes and government expenditures  $(t_l, t_s, g)$  as given.<sup>6</sup> The policymaker chooses  $(t_l, t_s, g)$  in order to maximize utility (1) subject to the government budget constraint (3), taking the agent's delinquency  $d$  as given. The assumption that the government takes  $d$  as given when choosing taxes is equivalent to postulating that the policymaker chooses policy after or simultaneously with the representative agent. It can be shown that, with this timing of events, equilibrium property and sales taxes may realistically coexist for intermediate levels of income (see the discussion surrounding equation (10)).<sup>7</sup>

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<sup>5</sup>For simplicity, we abstract from discussing the financing of federal transfers to the states. In practice, the Federal government relied heavily on borrowing in order to finance New Deal spending programs (Oates and Wallis, 1998).

<sup>6</sup>While we use the representative agent setup to avoid unnecessary analytical complications, we emphasize that the model's delinquency rate should be interpreted as representing the share of homeowners who are fully delinquent on their taxes rather than literally as a decision by all households to only pay some share of their taxes.

<sup>7</sup>The alternative timing assumption in which the government selects taxes first, taking into account the representative agent's response in terms of  $d$ , also generates a transition from property to sales taxation as income drops. However, in this case there is no coexistence

## 2.2 Politico-Economic Equilibrium

In this section we solve for the model's equilibrium. Consider first the representative agent's choice. Formally, use the budget constraint (2) to replace  $c$  in the utility function and maximize the latter with respect to  $d$ . The interior first-order condition of this problem is:

$$\frac{1}{y - (1 - d)t_l} = \kappa. \quad (4)$$

Equation (4) states that the marginal benefit of not paying an extra dollar of property taxes must be equal to its marginal cost,  $\kappa$ . Notice that the marginal benefit of property tax delinquency increases as income declines due to the rising marginal utility of consumption.

Consider now the problem of the policymaker. The latter maximizes the agent's utility function with respect to  $(t_l, t_s)$ , taking into account the effect of taxes on  $g$  through the government budget constraint (3). The interior first-order conditions of this problem can be written as:

$$t_l : \frac{\lambda c}{g} [(1 + t_s)\rho - t_s(1 + f)] = 1 + \kappa c \frac{1 + t_s}{1 - d} d, \quad (5)$$

$$t_s : \frac{\lambda c}{g} (1 + f) = 1. \quad (6)$$

These two equations equalize at the margin the benefit and cost of increasing property and indirect taxes by an amount such that private consumption falls by one unit. The right-hand side of equation (6) represents the marginal cost, in terms of lost consumption, of higher sales taxes. In addition, the property tax has an additional cost, represented by the second term on the right-hand side of equation (5), associated with the utility loss of property tax delinquency.

The marginal benefit of higher taxes appears on the left-hand side of equations (5) and (6). It is given by the marginal increase in the consumption of  $g$  afforded by higher taxes, shown in parenthesis, multiplied by the marginal rate of substitution of private and public consumption,  $\lambda c/g$ . Notice that the

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of these two types of taxes in equilibrium.

impact of a higher property tax on  $g$  in equation (5) is increasing in the productive advantage of locally-raised taxes,  $\rho$ . Moreover, the impact of a higher consumption tax on  $g$  in equation (6) is increasing in the matching subsidy rate  $f$  that states receive from the federal government.

The equilibrium of the model described above consists of private and public good consumption,  $c$  and  $g$ , taxes  $t_l$  and  $t_s$ , and a delinquency rate  $d$ , such that the budget constraints (2) and (3), and the optimality conditions (4), (5), and (6) hold. Solving this system of equations yields the following expressions for property and sales tax revenues:

$$T_l \equiv (1 - d)t_l = y - \kappa^{-1}, \quad (7)$$

$$T_s \equiv t_s c = \frac{\lambda(1 + f) + \rho - \kappa(\rho y + F)}{(1 + \lambda)(1 + f)\kappa}, \quad (8)$$

while the property tax delinquency rate is:

$$d = \frac{(1 + \lambda)(\rho - 1 - f)}{\kappa(\rho y + F) + \lambda(\rho - 1 - f)}. \quad (9)$$

Notice, from equations (7) and (8), that the solution is interior and property and sales taxes coexist ( $T_l > 0$ ,  $T_s > 0$ ) as long as income is in the range:

$$\frac{1}{\kappa} < y < \frac{\rho + \lambda(1 + f)}{\kappa\rho} - \frac{F}{\rho}. \quad (10)$$

Outside of this range, the tax system is fully specialized. In particular, in the relevant case in which income is larger than the upper bound in (10), only property taxes are used.<sup>8</sup> In this situation, equation (6) holds as an inequality ( $t_s = 0$ ), while the property tax and the delinquency rate are still determined by equations (4) and (5). Solving for property tax delinquency in this case

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<sup>8</sup>We mention for completeness that when income falls below the lower bound in (10), delinquency becomes pervasive, and the equilibrium features only sales taxes. No state experienced a complete elimination of property taxation during the Great Depression, so we ignore this extreme scenario in our discussion.

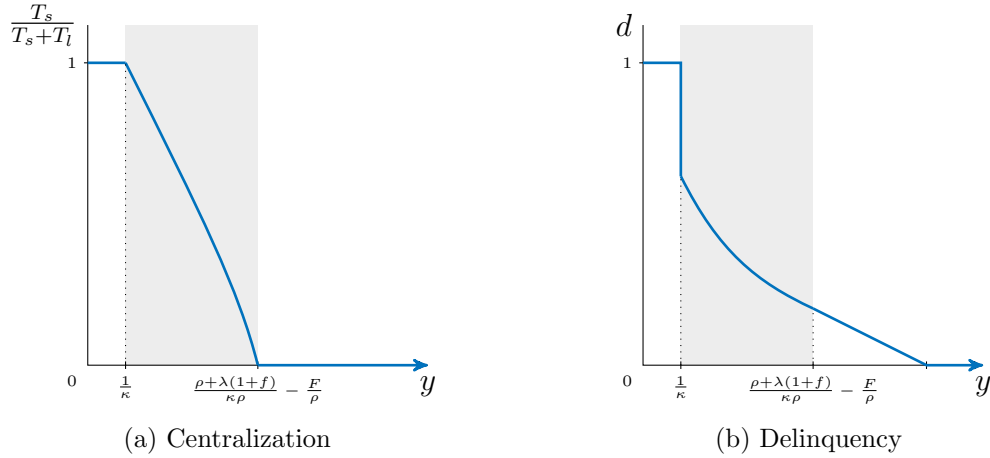


Figure 2: Effect of Income Decline on Centralization and Delinquency  
The shaded areas represent the region in which the two taxes coexist.

yields:

$$d = \frac{(1 + \lambda) \rho - \kappa (\rho y + F)}{\lambda \rho}, \quad (11)$$

which declines with income until it eventually becomes zero.

Figure 2 illustrates graphically how the state's share of state and local taxes  $T_s / (T_s + T_l)$  and the delinquency rate  $d$  vary with income  $y$ . The shaded area in the figure indicates the range of  $y$  such that property and sales taxes coexist. Notice that, as income exceeds the upper bound in (10), the share of state taxes goes to zero, while the delinquency rate, given by (11), remains positive until it eventually becomes zero as well.

### 2.3 Interpreting Institutional Changes During the Depression

We use the model's equilibrium and the visual representation in Figure 2 in order to interpret the institutional changes related to fiscal centralization that occurred during the Great Depression. We interpret the pre-Depression period as corresponding to a level of income exceeding the upper bound in equation (10). In this case, the efficiency advantage associated with locally raised taxes

and encoded in the assumption  $\rho > 1 + f$  induces the policymaker to rely exclusively on property taxes. As income declines, the marginal utility of consumption increases, and so do incentives for tax delinquency. Eventually, as income falls below the upper bound in equation (10), the rise of property tax delinquency is sufficiently detrimental to property tax collection,  $T_l$ , to induce the policymaker to introduce sales taxes. Differently from property taxes, sales taxes cannot be avoided, allowing the policymaker to offset some of the decline in public good provision associated with tax delinquency. Further declines in income within the range in equation (10) exacerbate this trend, leading to an increase in sales tax revenue  $T_s$  (see equation (8)). As a result, the share of revenue collected by state governments increases as income declines. This discussion leads to two empirical predictions of the model.

**Prediction 1** *States characterized by a larger income decline are more likely to introduce sales taxes, (i.e. cross the income cut-off for the introduction of sales taxes in Figure 2).*

**Prediction 2** *States characterized by a larger income decline are more likely to experience an increase in the share of taxes  $T_s / (T_s + T_l)$  collected by states relative to local governments.*

In addition, as argued by Wallis (1984) and Oates and Wallis (1998), during this period, the federal government might have affected revenue centralization through its aid policies. The parameters  $(f, F)$  play different roles in the context of our model. The matching rate  $f$  has a positive effect on  $T_s$  because it increases the marginal benefit of raising sales taxes. The lump-sum transfer  $F$  instead tends to substitute for sales taxes and leads to a decline in  $T_s$ . The federal aid data we use in our empirical analysis corresponds to

$$\text{total federal aid} = fT_s + F, \tag{12}$$

and so it does not distinguish between matching grants  $fT_s$  and lump-sum grants  $F$ . For this reason, while the instrumental variables approach we follow exploits exogenous variation in federal aid induced by political and geographic

considerations (see Section 3 for details), the predicted association between exogenous variation in federal aid and fiscal centralization is ambiguous.

**Prediction 3** *Exogenous increases in the magnitude of federal aid to the states may be either positively or negatively associated with the share of taxes  $T_s/(T_s + T_l)$  collected by the states. The former situation emerges if exogenous variation in federal aid is mainly due to differences in the generosity of the matching-grant ratio ( $f$  in the model). The latter situation emerges if exogenous variation in federal aid is mainly due to differences in the generosity of lump-sum transfers ( $F$  in the model).*

We conclude our discussion of the impact of federal aid on fiscal centralization by pointing out that we don't *necessarily* expect the latter variable to display a systematic association with the introduction of sales taxes, because about half of the states that introduced sales taxes did so in 1932-33, while the New Deal policies were ushered in starting in mid-1933. We proceed to test the model's prediction in the next section of the paper.

## 3 Empirical Analysis

### 3.1 Data and Descriptive Statistics

Throughout our analysis, the basic unit of observation is a U.S. state. The sample includes 48 states because Alaska and Hawaii became states only in 1959. Table 1 provides summary statistics for the outcome variables and the main regressors of interest. We postpone the discussion of additional controls and instruments to Section 3.2. The data are described in full in Appendix A.

We consider five outcome variables. The first is a dummy variable for the adoption of a general sales tax during the 1930s. Almost 60 percent of the states adopted a sales tax in this period (Jacoby, 1938; Rueben, 1994). The second policy variable is a dummy for the adoption of blanket tax limit during the 1930s. We interpret the latter as an indicator of popular discontent over property taxation. As shown in Table 1, one in six states adopted a blanket

property tax limitation during the Depression (Mott and Suiter, 1934, Tables 1–3; *The New York Times*, 1939). The list of states adopting one or both of these policies, together with the adoption date, is contained in Table 2.

Third, we seek to explain the increase in revenue and expenditure centralization—measured by a state’s share of combined state and local revenues and expenditures—between 1932 and 1942. The choice of the years 1932 and 1942 reflects constraints on data availability. The state-level fiscal data—provided by Sylla, Legler, and Wallis (1995)—is drawn from censuses of government finances, which were only conducted in two years during the period of interest. The earliest year of data available before 1932 is 1913 and after 1942 is 1962. Revenue refers to *own* revenues—revenues raised directly by the government and not derived from intergovernmental grants—and expenditures include grants made to another level of government but subtract out total grants received from other levels of government (Wallis and Oates, 1988). Notice that the state’s share of own revenues might differ from its share of expenditures to the extent that states and local governments financed a portion of their expenditures by borrowing rather than raising taxes. While in the model of Section 2 all expenditures are financed by current taxes, in our empirical analysis we consider both measures of state centralization. Based on these definitions, it is important to point out that, while the expression “revenue centralization” refers to the increase in the share of tax revenues collected by the states, the expression “expenditure centralization” encompasses two distinct trends. The first one is the direct funding and administration by the states of governmental functions that, before the Great Depression, were the prerogative of local governments.<sup>9</sup> The second manifestation of expenditure centralization is the rise in intergovernmental transfers from the states to localities meant to fund programs, such as K-12 education, over which local governments retain control.<sup>10</sup> The fifth and last outcome measure we consider is the logarithm of

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<sup>9</sup>According to the *Historical Statistics of the U.S.* (Wallis 2006, Tables Ea182, Ea408, Ea542), in 1927, 69% of all spending on “public welfare” was undertaken directly (i.e. financed by own revenue) by local governments, against spending shares of 25% and 6% by the states and the federal governments, respectively. By 1940, the local share had fallen to 48% and the state share risen to 40%.

<sup>10</sup>In 1927, local governments accounted for 69% of all direct education spending, against

local expenditures, a level, rather than a share, variable.

There are three main regressors of interest. Following Predictions 1 and 2 derived in Section 2.3, the main driving force of our model is the income decline experienced by a state between 1929 and 1932. We measure the latter as the logarithmic difference between its personal income per capita in 1932 and in 1929 using the Bureau of Economic Analysis' Regional Data (Table SA1). We consider the decline from 1929 to 1932 because the National Bureau of Economic Research dates the peak of the business cycle in the third quarter of 1929 and the trough in the first quarter of 1933. Since we only have yearly income data at the state-level, we consider 1929-32 to be the contraction phase of the cycle (Garrett and Wheelock, 2006). Notice that the policies we focus on—tax limitations and sales tax adoptions—were all enacted during or after 1932. The income variable is converted in real terms by dividing it by the national Consumer Price Index. As a robustness check we employ the growth rate of state-level manufacturing employment (instead of personal income per capita growth between 1929 and 1932). We use manufacturing, rather than aggregate, employment because, it is less subject to the measurement error issues described by Wallis (1989), who constructed the state-level employment indices based on Bureau of Labor Statistics data.

Finally, as discussed in Prediction 3 in Section 2.3, we are also interested in evaluating the impact that New Deal grants had on fiscal centralization. We measure federal aid as the (logarithm of) the total real aid per capita received by a state from the federal government in the period 1933–1939. To construct this measure of federal aid we use data from the *Annual Report of the Secretary of the Treasury* (1933-1939).<sup>11</sup>

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7% of state governments. By 1940 these shares had not changed much; the local share was 66% and the state share 11% (*Historical Statistics of the U.S.* (Wallis 2006, Tables Ea180, Ea403, Ea537)). The increased role of the states in education funding during the 1930s (see Section 1) took the form of intergovernmental grants. Notice that even this type of fiscal centralization might have hurt the autonomy of local governments in the long-run as states began attaching mandates to education grants.

<sup>11</sup>We have also employed a second measure of federal aid reported by Reading (1973), who drew on a different government document, with nearly identical results. The correlation between the two variables is 0.93. A more detailed comparison of our aid variable and Reading's one is provided in Section A.2.3 of the Appendix.



Table 1: Summary Statistics

	Mean	Std. Dev.	Min	Max
<i>Outcome Variables</i>				
Blanket Tax Limit <sup>a</sup>	0.167	0.377	0.000	1.000
Sales Tax <sup>a</sup>	0.583	0.498	0.000	1.000
Permanent Sales Tax <sup>a</sup>	0.479	0.505	0.000	1.000
Temporary Sales Tax <sup>a</sup>	0.104	0.309	0.000	1.000
Difference State Rev. Share, '32-42 <sup>b</sup>	0.230	0.080	0.084	0.402
Difference State Exp. Share, '32-42 <sup>b</sup>	0.224	0.088	0.078	0.464
Difference Log Local Expenditures, '32-42	-0.503	0.211	-0.926	-0.050
<i>Regressors of Interest</i>				
% Growth in Per Capita Income, '29-'32	-0.364	0.101	-0.595	-0.166
% Manuf. Employment Growth, '29-'32	-0.445	0.120	-0.675	-0.221
Log Federal Aid to State	4.974	0.428	3.995	6.175

<sup>a</sup>Dummy variable. The unit of observation is a U.S. state. Summary statistics for all variables used in this section may be found in Section A.1 of the Data Appendix. <sup>b</sup>Shares are in percentage points / 100.

Table 2: State Blanket Property Tax Limitations and Sales Tax Adoptions

Blanket Property Tax Limit		Sales Tax Adoption
MI, WA, IN, WV	1932	MS, PA*
OH, OK, NM	1933	AZ, IL, IN, UT, MI, NC, OK, CA, WA, NY*, SD
	1934	MO, IA, WV, KY*
	1935	OH, CO, ID*, WY, AR, ND, MD*, NM
	1936	LA
	1937	AL, KS

*Blanket Property Tax Limitation:* North Dakota instituted a blanket property tax limitation in 1919. *Sales*

*Tax Adoption:* \* denotes states that allowed the sales tax to expire or repealed it by 1942.

*Source:* Tax limits: Mott and Suiter (1934). Sales Taxes: Jacoby (1938, Table 14) and U.S. Advisory Commission on Intergovernmental Relations (1993, Table 14).

### 3.2 Sales Tax Adoption and Blanket Property Tax Limitations

We start by evaluating Prediction 1 of our theoretical analysis, concerning the increased likelihood that states hit by larger income declines introduced general sales taxes. In addition, as our model makes clear, the rise in property tax delinquency was costly, not only from the perspective of local governments whose tax base shrank, but also from the perspective of individuals. In a number of states, the introduction of sales taxes was often preceded by state-level voter initiatives that either adopted or strengthened state-wide property tax limitations. In this section, we interpret such *blanket* property tax limitations as strong and direct indicators of voter discontent with the property tax and empirically investigate the link between their adoption and state-level income decline.

We start by running state-level probit regressions for the probability of introducing a sales tax during the 1930s on measured income decline, federal aid, and a number of control variables. Table 3 displays the marginal effects of these probit regressions. In all regression specifications the income growth variable displays a statistically and economically significant association with the probability of adopting a sales tax. States that experienced larger declines in per capita income in 1929–1932 were more likely to adopt sales taxes. In column 1 of Table 3 the only explanatory variables are the percent growth in income and federal aid. Reducing a state’s income growth by one standard deviation, or about 10 percentage points (Table 1), is associated with an increase in the probability of adopting a sales tax of about 26 percentage points.

In column 2 of Table 3 we include as controls the variables proposed by Rueben (1994) in her study of sales tax adoption. These variables include a dummy (debt restriction) for whether the state government was legally prohibited from raising debt; a dummy (same party control) indicates states where a majority of both houses of the state legislature and the governor were in the same political party; a dummy (Republican control) set equal to one if Republicans controlled both houses of the legislature and the governor’s office;

Table 3: Sales Tax Adoption: Marginal Effects

	(1)	(2)	(3)	(4)	(5)	(6)
	Probit	Probit	Probit	Probit	IV Probit	IV Probit
% Growth in Per Capita Income, '29-'32	-2.558 (0.439)	-1.709 (0.606)	-2.202 (0.587)		-2.646 (0.611)	-2.201 (0.611)
% Growth Manuf. Employment, '29-'32				-1.377 (0.691)		
Log Federal Aid to State	0.034 (0.149)	0.056 (0.161)	-0.049 (0.213)	0.373 (0.247)	-0.703 (0.304)	-0.047 (0.305)
Observations	48	48	48	48	48	48
Covariates	No	Yes	Yes	Yes	Yes	Yes
Census Region Dummies	No	No	Yes	Yes	Yes	Yes
<i>Instruments</i>						
Political					Yes	No
Land					No	Yes
F-Stat (First-Stage)					34.13	81.29

Covariates: debt restriction, same party control, Republican control, Southern state, log income per capita 1929. Instruments for federal aid: electoral votes per capita, standard deviation Democratic vote share, 1896-1932, federal land per capita, non-federal land per capita. Standard errors reported in parentheses. The first-stage regressions for the IV Probit specifications in columns 5 and 6 can be found in Appendix Table A.5. The F-Statistic in the last row tests the null hypothesis that the coefficients on the excluded instruments in the first stage are jointly equal to zero. *Variable definitions*: see text and data appendix.

a dummy variable for southern states (Southern state); the logarithm of 1929 state income per capita. The estimated effects of these control variables on sales tax adoption are consistent with Rueben’s. While the inclusion of these controls lowers the marginal effect of the income growth variable, the latter remains statistically and economically significant. According to the specification in column 2, a one standard deviation decrease in income from 1929 to 1932 is associated with an increase in the probability of adopting a sales tax by about 17 percentage points. In column 3 of Table 3 we also include dummies for Census regions in the probit regression in order to control for unobserved regional shocks that might be correlated with income decline and with the introduction of sales taxes. Adding region dummies increases the marginal effect of income decline on the likelihood of sales tax adoption relative to the specification in column 2.

In column 4 of Table 3 we use 1929-32 *manufacturing employment* growth, instead of *income* growth, as our “economic shock” variable, and obtain quantitatively analogous results. A one standard deviation (12 percentage points) decline in manufacturing employment growth increases the probability of adopting a sales tax by about 16 percentage points, a magnitude similar to Rueben (1994)’s.

The marginal effects of the federal aid variable is statistically insignificant in all probit specifications (1)-(4). The discussion of the model’s predictions in Section 2.3 makes it clear that federal aid may be endogenous in the regressions of Table 3, leading to inconsistent estimates. The ideal instrument exploits variation in federal aid received by a state that is uncorrelated with the unobserved determinants of sales tax adoption. Following the literature, we consider two sets of instruments. The first is based on Wright (1974), who argues that federal grants were allocated across states so as to increase Franklin Delano Roosevelt’s probability of reelection in 1936. Wright shows that the number of electoral votes per capita and the within-state (time-series) standard deviation of the Democratic vote share in presidential elections from 1896 to 1932 were powerful predictors of New Deal spending in a state.<sup>12</sup> The

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<sup>12</sup>The premise of Wright’s (1974) argument is that the Roosevelt administration sought

second set of instruments is based on the land area of a state. Reading (1973) hypothesizes that more grants flowed to states with larger amounts of federal land because relief projects on federal land both improved the land and minimized the amount of bureaucratic machinery necessary to get them underway. More recently, Fleck (2008) points out that the amount of non-federal land in a state was an important determinant of the amount of federal highway grants received by a state. We therefore consider both federal and non-federal land per capita as instruments for federal aid. Columns (5)-(6) of Table 3 present instrumental variable probit (IV probit) regressions for the probability of sales tax adoption. The estimated impact of the income growth variable remains negative and quantitatively similar to the one reported in columns (1)-(3). The impact of federal aid on sales tax adoption, instead, becomes negative and statistically significant when using Wright’s political instruments (column 5). It is also negative when using Fleck’s land instruments, although in this case the effect is not statistically different from zero. Thus, there is some evidence that higher exogenous levels of federal aid reduced the probability of sales tax adoption by the states.

We conclude this section by considering the effect of income decline on the likelihood of passage of referenda imposing blanket property tax limitations on the combined millage that could be levied on a single piece of property. Specifically, we run state-level probit regressions for the probability of passing tax limitations during the 1930s on measured income decline from 1929 to 1932 and a number of control variables.<sup>13</sup> Table 4 reports marginal effects of

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to distribute discretionary aid dollars among states so as to maximize electoral votes while minimizing costs. Assuming that a given amount of federal aid could buy a vote and that the distribution of this cost is equal across states, states with more electoral votes per capita could be “bought” relatively more cheaply since each voter has more influence over which candidate the state’s electoral votes goes. States in which the standard deviation of the Democratic vote share was low were either solidly Democratic or Republican; an aid dollar spent there would do little to change the outcome of the election. High standard deviation states, however, could potentially be swung into the Democratic camp with more aid dollars. Notice that we would obtain similar results using Wright’s “political productivity index” (which is itself based on the electoral votes measure) as an instrument, rather than the electoral votes variable.

<sup>13</sup>We exclude from the latter the federal aid variable because blanket tax limitations were passed relatively early in the Depression, in 1932 and 1933, so it is highly unlikely that

these regressions. In all the specifications we consider the growth in per capita income from 1929 to 1932 is significantly and negatively correlated with the probability of adopting a blanket tax limitation. According to the estimate in column 1, a one (cross-state) standard deviation decrease in 1929 to 1932 income growth—corresponding to about 10 percentage points—increases the probability that a blanket tax limitation will be adopted by 14.7 percentage points. The estimated marginal effect is robust to the inclusion of a number of control variables (column 2 of Table 4) that account for voters’ preferences over public good spending and tax limitations (e.g. Vigdor, 2004) and to the inclusion of dummies for the four Census regions (column 3 of Table 4). Overall, the results of Table 4 are consistent with the hypothesis that the income decline at the onset of the Great Depression led to increased discontent with the property tax.

Table 4: Property Tax Limitation Adoption: Marginal Effects (Probit)

	(1)	(2)	(3)
% Growth in Per Capita Income, '29-'32	-1.471 (0.522)	-1.356 (0.439)	-1.301 (0.601)
Observations	48	48	48
Covariates	No	Yes	No
Census region dummies	No	No	Yes

Covariates: % renters in 1930, % 10-19 years old enrolled in school in 1927-28, % urban in 1930, log income in 1929, % democratic vote in 1929, % non-white in 1930, state initiative dummy. Standard errors reported in parentheses. *Variable definitions:* see text and data appendix.

### 3.3 Fiscal Centralization

In this section we investigate empirically Predictions 2 and 3 discussed in Section 2.3. Specifically, we consider two direct indicators of state fiscal cen-

they are explained by New Deal policies enacted in 1933 and implemented over a number of subsequent years. Including federal aid in the regressions does not affect our results and the aid variable is not statistically significant.

tralization—the state government’s share of combined state and local revenue and expenditure—and assess their association with the decline in state per capita income at the onset of the Depression and with federal aid. State-level fiscal data are available in 1932 and 1942, allowing us to estimate a difference-in-difference regression of the following form:

$$z_{st} = \delta_s + d_{1942} \cdot (\alpha_0 + \alpha_1 \cdot \Delta y_s + \alpha_2 \cdot aid_s) + \varepsilon_{st}, \quad (13)$$

where  $z_{st}$  is the share of revenue or expenditures in state  $s$  at time  $t = 1932, 1942$ ;  $\delta_s$  is a state fixed effect;  $d_{1942}$  is a dummy for  $t = 1942$ . The parameters of interest are  $\alpha_1$  and  $\alpha_2$ , which correspond to the effect of 1929-32 income (or employment) growth—denoted by  $\Delta y_s$ —and federal aid—denoted by  $aid_s$ —on the change in the dependent variable between 1932 and 1942.

Columns (1)-(2) of Table 5 present ordinary least squares (OLS) estimates of  $\alpha_1$  and  $\alpha_2$  for our revenue and expenditures centralization measures, respectively. The estimates of  $\alpha_1$  reveal that states that experienced a larger decline in per capita income at the onset of the Great Depression centralized revenues and expenditures relatively more between 1932 and 1942. The estimated effects are statistically significant at conventional levels. A one standard deviation decrease in 1929–32 income growth is associated with an additional increase in centralization of about 2.2 percentage points for revenues and 2.3 percentage points for expenditures. Applying these effects to the average income decline experienced in the 1929-32 period of the Great Depression (see Table 1), we estimate that the latter accounts for 34 percent of the observed increase in revenue centralization and 37 percent of the observed increase in expenditures centralization. These results are supportive of our empirical Prediction 2.

The estimates of the parameter  $\alpha_2$ —the effect of federal aid on centralization—in columns (1)-(2) of Table 5, instead, reveal a negative partial correlation between federal aid and the increase in states’ revenue and expenditure shares. In other words, states that received more generous federal aid experienced relatively less centralization. This finding can be rationalized if increases

in federal aid were mostly associated with lump-sum transfers of revenue from the federal government to the states, as proposed in our empirical Prediction 3.

The rest of Table 5 considers a number of robustness checks and extensions of the main results of columns (1)-(2). In columns (3)-(4) we augment the OLS regressions with Census region dummies interacted with a time dummy for the year 1942. These additional regressors allow us to control for any region-specific shock to revenue or expenditure centralization that is correlated with state-level income growth. The results are qualitatively similar to those in columns (1)-(2). In columns (5)-(6) of Table 5 we correlate the changes in states' shares of revenue and expenditures with a measure of employment, rather than income, growth in 1929-32. We find that states that experienced larger declines in manufacturing employment in 1929-32 experienced larger increases in fiscal centralization. Last, we also consider a version of the regression specifications in equation (13) where the dependent variable is the (log) of local revenues and expenditures, instead of the states' shares of combined state and local revenues and expenditures. While the latter are our preferred measures of fiscal centralization, our theory also predicts that the sharp income decline at the onset of the Depression impaired local governments' ability to raise revenue and fund expenditures autonomously from the states. The estimates in columns (7)-(8) of Table 5 suggest that states with larger income declines at the onset of the Great Depression experienced a smaller growth in the levels of local revenue and expenditures in the following decade, 1932-42.

### **3.3.1 Instrumental Variables Estimates**

As discussed in Section 2.3, variation in federal aid reflects both lump-sum and matching-grant transfers of revenue from the federal government to the states. The latter are likely to induce an endogeneity issue in the OLS regression for centralization (equation 13) because any independent increase in state revenue would have led to higher transfers to the states through the matching grants mechanism. This channel would, therefore, induce a spurious positive correlation between federal aid and the state's revenue and expenditures share.



Table 5: Fiscal Centralization (OLS)

	State Share of:						Log Local	
	Rev. (1)	Exp. (2)	Rev. (3)	Exp. (4)	Rev. (5)	Exp. (6)	Rev. (7)	Exp. (8)
% Growth in Per Capita Income, '29-'32 $\times$ 1942	-0.214 (0.080)	-0.226 (0.109)	-0.231 (0.093)	-0.300 (0.128)			0.662 (0.209)	0.933 (0.269)
% Growth in Manuf. Employment, '29-'32 $\times$ 1942					-0.551 (0.127)	-0.491 (0.155)		
Log Federal Aid to State $\times$ 1942	-0.063 (0.023)	-0.046 (0.024)	-0.139 (0.032)	-0.149 (0.035)	-0.046 (0.020)	-0.028 (0.022)	0.077 (0.053)	0.117 (0.063)
Observations	96	96	96	96	96	96	96	96
R-squared	0.937	0.925	0.947	0.939	0.954	0.935	0.996	0.994
Census Region Dummies $\times$ 1942	No	No	Yes	Yes	No	No	No	No

OLS Regressions. Robust standard errors reported in parentheses. State and time fixed effects included in all regressions. *Variable definitions:* see text and data appendix.

In addition, state governments that were particularly hard hit by the Great Depression—in ways not fully reflected in the 1929-32 income decline variable—might have received more aid from the federal government, biasing the OLS estimate of federal aid downward instead. For both reasons, the OLS estimates of the effect of income decline and federal aid on our centralization measures might be inconsistent.

In order to address these concerns, in Table 6 we report the two-stage least squares (2SLS) estimates of the parameters  $\alpha_1$  and  $\alpha_2$  using Wright (1974)'s political instruments and Fleck (2008)'s land instruments to generate seemingly exogenous variation in federal aid across states. The first-stage estimates reveal that both sets of instruments have the expected sign and are highly statistically significant in accounting for variation in federal aid across states.

The 2SLS estimates are qualitatively and quantitatively consistent with the OLS findings discussed in the previous section. Comparing Table 6 with Table 5, it may be noticed that the estimated effect of 1929-32 income decline on centralization is a bit larger, in absolute value, in the 2SLS regressions than in the OLS ones. Using the former, the income decline channel now accounts for 38 percent of revenue centralization and 40 percent of expenditure centralization. The effect of federal aid on centralization remains negative and statistically significant.

### 3.3.2 Relationship with Wallis (1984)

Taken together, neither the OLS nor the IV results are supportive of the view that the policies of the federal government played a role in fostering the rise of state governments during the Great Depression. How does this finding relate to Wallis (1984) and Wallis and Oates (1998) view to the contrary? Wallis (1984)'s regression that is most comparable to ours pertains the link between federal transfers and local expenditures financed through own revenue.<sup>14</sup> In

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<sup>14</sup>Wallis and Oates (1998) is a descriptive paper, so we focus on the evidence in Wallis (1984). In another set of regressions Wallis (1984, Table 3, page 154) links the *level* of state expenditures in a given year to the *level* of federal aid received by that state in that

Table 6: Fiscal Centralization (IV)

	State Share of:			
	Rev. (1)	Rev. (2)	Exp. (3)	Exp. (4)
% Growth in Per Capita Income, '29-'32 $\times$ 1942	-0.239 (0.057)	-0.238 (0.058)	-0.244 (0.074)	-0.257 (0.074)
Log Federal Aid to State $\times$ 1942	-0.084 (0.016)	-0.084 (0.019)	-0.061 (0.019)	-0.072 (0.019)
	First-Stage Coefficients			
Electoral Votes Per Capita $\times$ 1942	42.646 (8.219)		42.646 (8.219)	
SD Dem. Vote, '96-'32 $\times$ 1942	0.054 (0.008)		0.054 (0.008)	
Federal Land Per Capita $\times$ 1942		0.531 (0.207)		0.531 (0.207)
Non-Federal Land Per Capita $\times$ 1942		5.114 (0.939)		5.114 (0.939)
Observations	96	96	96	96
F-Stat (First-Stage)	52.54	163.01	52.54	163.01

Robust standard errors reported in parentheses. All columns include state and time fixed effects. The F-Statistic in the last row tests the null hypothesis that the coefficients on the excluded instruments in the first stage are jointly equal to zero. *Variable definitions:* see text and data appendix.

the latter, Wallis (1984, page 157) relates the 1932–1942 change in aggregate local expenditures in a state to the change in intergovernmental transfers received by local governments in that state. Wallis instruments the 1932–42 change in intergovernmental transfers using Wright (1974)’s political productivity measure and the standard deviation of the Democratic vote share. The underlying logic here is that politically motivated (and therefore plausibly exogenous) transfers from the federal government to the states induced the latter to increase aid to local governments. He finds that local spending declined in relative terms between 1932 and 1942 in states characterized by larger exogenous transfers from state to local governments. This result appears consistent with Wallis’ view. In order to better understand this result, we replicated it, at least qualitatively, by running a version of his regression. The version we considered relates the change in local spending to the change in intergovernmental transfers per capita received by local governments in a state, using the state’s electoral votes per capita and the standard deviation of the Democratic vote share as instruments for the variation in intergovernmental transfers. The top panel of Table 7 contains our estimates.

The table shows that an exogenous increase in intergovernmental transfers to local governments is associated with a decline in local government’s expenditures. The estimated elasticity of local expenditures to intergovernmental transfers to local governments is in the range of negative 0.2–0.3 and is highly statistically significant. This result is, at least qualitatively, consistent with Wallis’ second-stage regression (1984, page 157).

In interpreting the evidence for Wallis’ hypothesis, however, it is necessary to consider the first-stage regression alongside the second-stage one. The first-stage estimates in Table 7 reveal that states with *more* electoral

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year, for the years 1937–1940. The federal aid variables are instrumented using Wright’s political productivity measure and the standard deviation of the Democratic vote share. Since these instruments change only across states, and not over time, the only variation that identifies the effect of federal aid on state spending is cross-sectional (i.e. Wallis is not using a difference-in-difference estimator). While in our analysis we have also used multiple observations for the same state (for 1932 and 1942), we are interested in the effect of federal aid on the *change* in, rather than the level of, the state’s expenditure shares. It follows that Wallis’ first set of results cannot be compared directly with ours.

Table 7: Effect of Transfers on Local Expenditures (IV)

	(1)	(2)
Log Transfers to Local $\times$ 1942	-0.287 (0.064)	-0.215 (0.059)
% Growth in Per Capita Income, '29-'32 $\times$ 1942		0.731 (0.168)
	First-Stage Coefficients	
Electoral Votes Per Capita	-65.225 (14.949)	-68.307 (16.827)
SD Dem. Vote, 1896-1932	0.018 (0.021)	0.022 (0.022)
Observations	96	96
F-Stat (First Stage)	9.57	8.40

Regressions include state and time fixed effects. Instrumented variable is Log Transfers to Local $\times$ 1942. When it is included in the second-stage, first-stage regressions also include % Growth in Per Capita Income. Robust standard errors reported in parentheses. The F-Statistic in the last row tests the null hypothesis that the coefficients on the excluded instruments in the first stage are jointly equal to zero.

votes per capita—and, therefore, more generous politically-motivated federal aid—experienced a *smaller* increase in intergovernmental transfers over the decade 1932-42.<sup>15</sup> Therefore, although the second-stage relationship between intergovernmental transfers and local expenditures is consistent with Wallis’ hypothesis (i.e., larger exogenous transfers from the states to local governments reduces local governments’ own-financed expenditures), the first-stage one is not consistent with the view that federal policies led to a diminished size of local governments during the 1930s. This evidence is instead consistent with the argument that more generous federal aid in the form of lump-sum transfers to the states released the latter from the need to expand state revenue collection in order to aid local governments. In these states, local governments experienced a larger increase (or a smaller decline) in own-financed expenditures between 1932 and 1942 than in states that received less federal aid.

### 3.4 Expiration of Sales Taxes and Centralization

During the 1930s 28 states adopted a sales tax. Of these, 23 states kept the sales tax beyond 1942 (the end of our sample period), while the five states marked by a star in Table 2 let the tax expire or repealed it by the end of the decade. In our empirical analysis thus far we have not distinguished between these two groups of states, which we label for convenience “permanent” and “temporary” adopters. The historical experience of temporary adopters allows us to refine empirical Predictions 1–2 and further test some of the model’s implications. We focus on two. First, the logic of the model suggests that temporary adopters might have experienced a smaller income decline at the onset of the Great Depression than permanent adopters (a refined version of Prediction 1). In fact, the 1929-32 income decline in temporary adopters states was only 0.02 log points larger than (and not statistically different from) the corresponding decline in states that never adopted a sales tax. By contrast, average income decline was 0.11 log points larger in permanent adopters states than in temporary adopters ones; moreover, this difference is statistically significant.

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<sup>15</sup>Notice that this first-stage relationship is statistically significant with a t-statistic above 4.

Second, if the adoption of a sales tax is the mechanism through which states centralized revenues and expenditures, a temporary adopter state should have experienced a smaller increase in centralization between 1932 and 1942 (a refined version of Prediction 2). To test this prediction we regress our measures of centralization on dummies for sales tax adoption, distinguishing between temporary and permanent adopters. The results are reported in Table 8. First, columns (1) and (3) show that, as a group (i.e. pooling together temporary and permanent adopters), states that adopted a sales tax during the Great Depression experienced a relative increase in measures of centralization by about 9 percentage points between 1932 and 1942. Columns (2) and (4) report analogous results for the case in which we distinguish between temporary and permanent adopters. The permanent introduction of a sales tax is associated with an additional increase in centralization measures by about 10 percentage points relative to states that did not adopt a sales tax. By contrast, a temporary adoption of a sales tax increases centralization measures by 3-5 percentage points only. Moreover, we can strongly reject the null hypothesis that the impact of sales tax adoption on centralization is the same for temporary and permanent adopters when centralization is measured as a revenue share. We conclude that the experience of states that let their sales tax expire is consistent with our main hypothesis.

## 4 Conclusion

In this paper we have analyzed one of the most striking changes in intergovernmental fiscal relationships in U.S. history. During the Great Depression the states' share of combined state and local revenue and expenditures increased greatly. Our main hypothesis is that this shift was brought about by the severe contraction of the early years of the Depression. We have used a model to illustrate a mechanism through which income decline leads to increased support for sales taxation and fiscal centralization. Finally, we have shown empirically that states that experienced larger declines in income in 1929-32 were more likely to pass blanket limitations on property taxation, introduce a general

Table 8: Centralization Measures and Sales Tax Adoption (OLS)

	State Share of:					
	Rev. (1)	Rev. (2)	Rev. (3)	Exp. (4)	Exp. (5)	Exp. (6)
Sales Tax×1942	0.087 (0.017)			0.089 (0.020)		
Sales Tax Permanent×1942		0.101 (0.018)	0.097 (0.020)		0.099 (0.022)	0.095 (0.023)
Sales Tax Temporary×1942		0.029 (0.021)	0.028 (0.022)		0.045 (0.026)	0.047 (0.026)
Log Federal Aid×1942	-0.067 (0.024)	-0.074 (0.024)	-0.118 (0.030)	-0.050 (0.023)	-0.054 (0.023)	-0.122 (0.034)
Observations	96	96	96	96	96	96
R-squared	0.953	0.958	0.962	0.940	0.943	0.950
Census Region Dummies× 1942	No	No	Yes	No	No	Yes
p-value of test: Permanent=Temporary		0.00	0.01		0.07	0.12

Robust standard errors reported in parentheses. All columns include state and time fixed effects. *Variable definitions:* see text and data appendix.



retail sales tax, and, more generally, to centralize revenue and expenditures in the hands of state governments during the 1930s.

It is interesting to note that while the income shock of the Great Depression was only *temporary*—although very severe—it led to a seemingly *permanent* change in state and local government relations. Sales taxation and state centralization have in fact persisted for many decades after the end of the Great Depression. This point applies more generally to many New Deal policies of the 1930s, such as social security, the minimum wage, unemployment insurance, and collective bargaining, among others. While a complete account of this “hysteresis” is outside the scope of the paper, one hypothesis is that the severity of the Depression enabled the type of institutional reform that requires a very broad political consensus. After the economic crisis passed, support for centralization might have declined, but the politico-economic coalition favoring a return to the pre-Depression status-quo was not sufficiently large. We leave further exploration of this important question to future research.

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*(Appendices not meant for publication.)*

## A Data Appendix and Definitions

### A.1 Summary Statistics and Source Summary

Table A.1 contains summary statistics for all variables used in the regressions of Section 3. Table A.2 summarizes the data sources for these variables.

### A.2 Additional Details on Selected Variables

In this section we provide additional detail on a selected number of variables mentioned in the main text of the paper.

#### A.2.1 State Budget Shares

State revenue and expenditure shares were both derived from the 1932 and 1942 Census of Governments, which were collected by Sylla, Legler, and Wallis (1995). State revenue shares in our analysis are defined *own* revenue shares, i.e. they only include revenue raised by the government directly and do not include intergovernmental grants. The data that we used, instead, includes intergovernmental grants in the total revenue figure. Thus, some adjustments were necessary. Suppose  $R_L$  and  $R_S$  represent total revenues for local and state governments, respectively. Denote intergovernmental grants to local governments (by state governments) and to state governments (by the federal government) by  $I_L$  and  $I_S$ . Then, the state's share of combined state and local own revenues,  $R_S^O$ , is given by

$$R_S^O \equiv \frac{R_S - I_S}{(R_S - I_S) + (R_L - I_L)}.$$

In constructing the state expenditure shares we attribute intergovernmental grants to the *granting* government. The data that we used counts grants to other governments as a part of total expenditures but we still need to

Table A.1: Summary Statistics for All Variables

	Mean	Std. Dev.	Min	Max
<i>Outcome Variables</i>				
Blanket Tax Limit	0.167	0.377	0.000	1.000
Sales Tax (Jacoby)	0.583	0.498	0.000	1.000
Permanent Sales Tax	0.479	0.505	0.000	1.000
Temporary Sales Tax	0.104	0.309	0.000	1.000
Difference State Rev. Share, 1932-42	0.230	0.080	0.084	0.402
Difference State Exp. Share, 1932-42	0.224	0.088	0.078	0.464
Difference Log Local Expenditures, 1932-42	-0.503	0.211	-0.926	-0.050
<i>Regressors of Interest</i>				
% Growth in Per Capita Income, 1929-32	-0.364	0.101	-0.595	-0.166
% Manuf. Employment Growth, 1929-32	-0.445	0.120	-0.675	-0.221
Log Federal Aid to State	4.974	0.428	3.995	6.175
Difference Log Transfers to Local, 1932-42	0.838	0.729	-0.864	2.705
<i>Covariates</i>				
% Families Renters, 1930	0.494	0.085	0.361	0.679
Share of White Popn. Ages 10-19 in High School, 1927-28	0.193	0.063	0.102	0.335
% Pop. Urban, 1930	0.460	0.199	0.166	0.924
Log Per Capita Real Income, 1929	6.347	0.377	5.583	7.048
% Democrat Votes, 1928	0.434	0.125	0.271	0.914
Non-White Population, 1930	0.106	0.132	0.002	0.503
Initiative State	0.438	0.501	0.000	1.000
State Debt limit (Heins)	0.833	0.377	0.000	1.000
Unified Gov't	0.729	0.449	0.000	1.000
Unified Republican Gov't	0.125	0.334	0.000	1.000
Log Income Per Capita, 1929	6.347	0.377	5.583	7.048
<i>Instruments</i>				
Federal Land Per Capita	0.039	0.148	0.000	0.998
Non-Federal Land Per Capita	0.043	0.056	0.002	0.246
Electoral Votes Per Capita	0.006	0.004	0.004	0.033
SD Dem. Vote, 1896-1932	10.175	4.326	2.500	18.100

Table A.2: Source Summary

Variable	Source
Blanket Tax Limit	Mott and Suiter (1934)
Sales Tax	Jacoby (1938), SFFF (1993)
Temporary Sales Tax	Jacoby (1938), SFFF (1993)
Difference State Rev. Share, 1932-'42	Sylla, Legler, and Wallis (1995) [ICPSR 6304]
Difference State Exp. Share, 1932-'42	Sylla, Legler, and Wallis (1995) [ICPSR 6304]
Difference Log Local Expenditures, 1932-42	Sylla, Legler, and Wallis (1995) [ICPSR 6304]
% Growth in Per Capita Income, 1929-32	Bureau of Economic Analysis, Regional Data Table SA1
% Manuf. Employment Growth, 1929-32	Wallis (1989)
Log Federal Aid to State (Treasury)	U.S. Treasury (various years)
Log Federal Aid to State (Reading)	Reading (1973)
% Renters, 1930	Haines (2010) [ICPSR 2896, part 29]
% School, 1927-'28	U.S. Office of Education (1930, pp. 984ff.)
% Pop. Urban, 1930	Haines (2010) [ICPSR 2896, part 26]
% Democrat Votes, 1928	Leip (2014)
Non-White Population, 1930	Haines (2010) [ICPSR 2896, part 28]
Initiative State	Matusaka (2000)
Debt Restriction	Heins (1963), Shawe (1936)
Unified Gov't	Burnham (1985) [ICPSR 00016, DS4]
Unified Republican Gov't	Burnham (1985) [ICPSR 00016, DS4]
Log Income Per Capita, 1929	Bureau of Economic Analysis, Regional Data Table SA1
Federal Land Per Capita	Fleck (2008) from Rand McNally (1992) and United States Committee on Appropriations (1939)
Non-Federal Land Per Capita	Fleck (2008) from Rand McNally (1992) and United States Committee on Appropriations (1939)
Electoral Votes Per Capita	Fleck (2008) from Wallis (1998)
SD Dem. Vote, 1896-1932	Fleck (2008) from Wright (1974)

subtract out expenditures paid for by grants from other levels of government to avoid double counting. Let  $E_L$  and  $E_S$  denote expenditures by state and local governments, respectively, and use the same notation for intergovernmental grants as above. Then the state expenditure share,  $E_S^O$  is given by

$$E_S^O \equiv \frac{E_S - I_S}{(E_S - I_S) + (E_L - I_L)}.$$

The 1932 Census of Government reports expenditure and revenue figures for states, counties, cities and towns, school localities, other civil divisions, and townships. We sum expenditures, revenues, and grants across counties, cities and towns, school districts, other civil divisions, and townships to generate  $E_L$ ,  $R_L$ , and  $I_L$ , respectively. State expenditures, revenues, and grants only include the state government figures. The ISO codes used by Sylla, Legler, and Wallis (1995) for each of these variables for 1932 is given in appendix Table A.3.

The 1942 Census of Government only reports total local government and state government figures. The total expenditure figure includes “Provision for Debt Repayments”, an item not included in other years. Sylla, Legler, and Wallis (1995) advise that this item be removed from expenditure totals for 1942 in order to make them comparable across years. We follow this advice in computing expenditures for 1942. The 1942 Census also provided more detail on intergovernmental grants received. In particular, it includes total grants and grants from state governments. This is reported in Sylla, Legler, and Wallis (1995) as aid “From Federal Government” (ISO = 2350) and “Aid From State Government Only” (ISO = 2361). The data providers assume that the states only received aid from the federal government, which - in their words - is “an inaccurate assumption, but not too far wrong” (Sylla, Legler, and Wallis, 1995, page 26). For our purposes this does not present a problem since aid “From Federal Government” is the same as total aid for states and it is total aid that we are after. These details are documented in appendix Table A.3.



Table A.3: ISO Codes for Computing Variables From Legler, Sylla, Wallis (1995)

Variable	Year	ISO Code
$E$	1932	0003
	1942	0003
$R$	1932	0001
	1942	0001 – 4100
$I$	1932	2300
	1942	2350 + 2361

For state governments ISO = 2361 (“Aid From State Government Only”) is always equal to zero in 1942.

### A.2.2 Debt Limitations and Single Party Control Variables

We count only constitutional debt limitations. There are two conflicting sources for this data. Shawe (1936) reports that all states except Delaware, Mississippi, Vermont, Massachusetts, Tennessee, Maryland, New Hampshire, Connecticut, North Carolina, and North Dakota had a tax limitation. Heins (1963) presented a list equivalent to Shawe but also counted North Carolina and North Dakota as having a tax limitation. This discrepancy might be attributed to differing opinions of what constitutes a debt limit.<sup>16</sup> North Carolina was limited to borrowing 7.5% of its assessed valuation but borrowing below that limit could be authorized by the legislature, a far less stringent process than the constitutional amendment required by other states. The North Dakota legislature was also allowed to issue debt but “Not in excess of \$2,000,000 unless secured by a first mortgage” (Shawe 1936, 125). Rueben (1994) uses the list provided by Heins (1963). Our results are similar using either list.

Single party control variables are computed from data provided by Burnham (1985). Following Rueben (1994), we say that a state exhibits single party control if a majority of both houses of the legislature and the governorship are occupied by politicians from the same party in 1932. The majority of states

<sup>16</sup>Heins (1963) also reports the year of adoption of tax limitation so the discrepancy is not attributable to a change in the law between the thirties and the sixties.

hold elections on even years and, therefore, report the relevant figures in 1932. Three states - Mississippi, Kentucky, and Virginia - held elections in odd years and only report the relevant figures in those years. When this is the case we use the figures from 1931. One state - Maryland - only reported the relevant figures for 1930; the unified variable for Maryland is constructed from this data. Finally, Nebraska and Minnesota had non-partisan legislatures during this period. These states are counted as not having single party control.

### **A.2.3 Alternative Measure of Federal Aid to the States**

Our variable for federal aid to states is taken from the *Report of the Secretary of the Treasury* for the years 1933 to 1939.<sup>17</sup> For all years and for each state we collect the grand total of all federal aid to the state. We then correct the figure for inflation (using 1932 as a base year). We sum the annual aid figures over all years. Finally, to put the variable in per capita terms, we divide total aid by the total population of the state over the same period.

The decision to count *all* federal aid rather than only those that were explicitly for New Deal programs was prompted by this observation from Reading (1973, 793):

Some New Deal Programs were established to meet a specific emergency; others were directed toward aiding depressed areas for the duration of the depression; still others were permanent and lasting. Some programs were the creation of New Deal planners; others were holdovers from the previous administrations. The Roosevelt Administration viewed many well-established programs (the Bureau of Public Roads, the Veterans' Administration, the Bureau of Reclamation) as vehicles for and methods of increasing employment.

Reading followed this reasoning in constructing his own set of federal aid figures from a report by the Statistical Section of the Office of Government Reports

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<sup>17</sup>The exact name and table number differs by year. We provide the table numbers here: 1933: 49, 1934: 47, 1935: 48, 1936: 52, 1937: 54, 1938: 59, 1939: 61.

Table A.4: Federal Aid Variables

Source	Construction	Mean	SD	Min	Max
Office of Government Reports	Sum of federal aid to state (1933-39, nominal) divided by 1930 population.	293.44	178.14	147.31	1130.76
U.S. Treasury	Sum federal aid to state (1933-39, real 1932 dollars) divided by weighted average 1930/1940 population.	159.7	82.73	54.33	480.8

entitled *Federal Loans and Expenditures* (1940). Subsequent work on New Deal Aid has used Reading's data, generally dividing the total aid figure by each state's 1930 population to get a per capita figure. This work includes Wright (1974), Wallis (1984, 1987, 1998), Anderson and Tollison (1991), and Fleck (2001, 2008). Wallis (1998) provides an insightful and entertaining overview of the history of this data.

Our decision to use a slightly different aid variable was prompted by a few concerns. First, by collecting yearly data we are able to account for the wide swings in prices that occurred during the Depression. The Reading data are in nominal terms. Yearly data also allows us to correct for population growth. Finally, we were unable to locate the original document used by Reading (only aggregate figures are reported in the 1973 paper). Thus, a key advantage of the Treasury data is that we can see the breakdown of federal aid by program. Wallis (1984) used the same Treasury data used here to supplement Reading's data.

It should be noted that our federal aid data are not merely a transformed version of Reading's. It was not possible to replicate the Reading figures by varying the process we used to generate total per capita federal aid. Each variable is summarized in Table A.4.

The correlation between these two variables is strong (0.9333) but the Treasury data has consistently smaller means. If we exclude Nevada - a consistent outlier - the estimated fitted line between these two variables is

$$Aid_{Reading} = 17.36 + 1.34 \cdot Aid_{Treasury}.$$

The robust 95% confidence interval on the slope coefficient is [1.04, 1.65]; the difference in the aid variables is larger for states that received large amounts of aid.<sup>18</sup>

Although these differences in federal aid variables are important they do not affect our results. The general finding that the amount of federal aid provided by the government was not significantly correlated with the change in centralization in a state holds whether we use our preferred variable, Reading's variable, or New Deal spending only.

### A.3 Maps and Figures

In this section we present maps displaying the decline in income from 1929 to 1932 (Figure A.1), the adoption of sales taxes by states (Figure A.2), and the growth in the states' revenue share from 1929 to 1932 (Figure A.3 ). We also present state-level scatterplots of the change in centralization measures against our measure of income decline.

Figure A.1 reinforces the point that there was a large amount of variation in income growth across states from 1929-1932. While—under ordinary circumstances—the 16.57% income decline in Massachusetts would be rightly viewed as a calamity, Massachusetts was actually the most fortunate state in terms of income growth. Mississippi's 59.46% income decline was the greatest. The figure also suggests that income growth was correlated within regions. The Northeast, in particular, stands out as an area where income declines were relatively modest. In the regressions reported in the main text we included region dummies in certain specifications and found that our results were robust to their inclusion.

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<sup>18</sup>The coefficient is larger if Nevada is included.

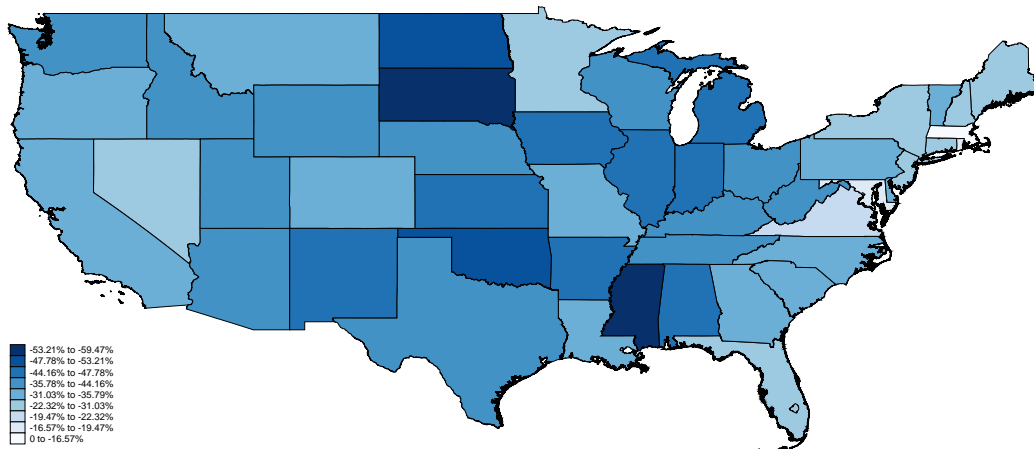


Figure A.1: Income Growth by State, 1929-1932

Table A.2 is a graphical representation of sales tax adoption by state. We previously noted that northeastern states tended to experience smaller income declines. From this figure we can see that few of these states adopted a sales tax and those that did adopted them only temporarily. This, of course, is consistent with our predictions.

Our revenue centralization measure is mapped in Figure A.3. One important feature that sticks out in this map is that centralization in South Dakota was rather modest even though it adopted a sales tax and experienced a severe income decline. In fact, centralization in most of the plains states was quite modest. One possible explanation for this finding is that retail sales were not nearly as important in these sparsely-populated states; people either made their own goods or traded informally among themselves. If the governments of these states could not raise revenue through the sales tax as efficiently as governments in other states then we would expect that centralization would be lower than expected.

Below we report scatterplots of the change in states' shares of revenue (Figure A.4) and expenditure (Figure A.5) against the percent growth in income from 1929 to 1932. The unit of observation is a state. A bivariate regression of the revenue and expenditures shares variables on income growth yields estimates of  $-0.14$  and  $-0.17$  respectively. These are somewhat smaller, in



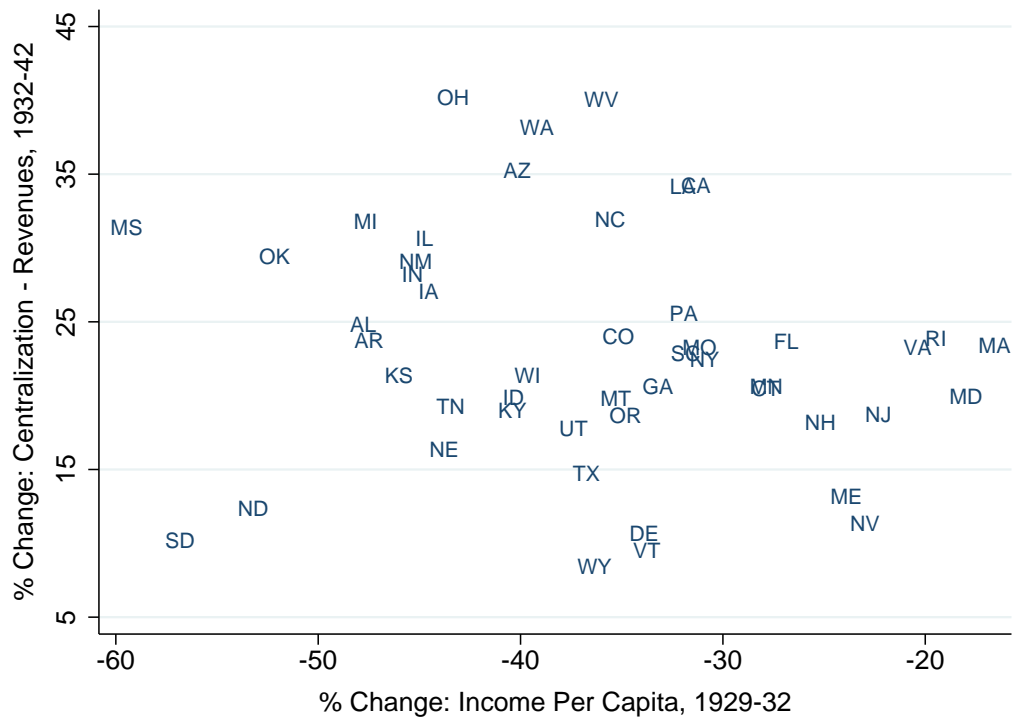


Figure A.4: Scatterplot of State Revenue Share against % Growth in Income, 1929-32

absolute value, than those reported in Table 5. The latter results are obtained from regressions that control for federal aid, a variable which both the literature and our model suggest is critical for understanding the determinants of centralization.

#### A.4 First-Stage of Sales Tax IV Probit Regressions

Table A.5 displays the first-stage regression results associated with columns (5) and (6) (respectively) of Table 3.

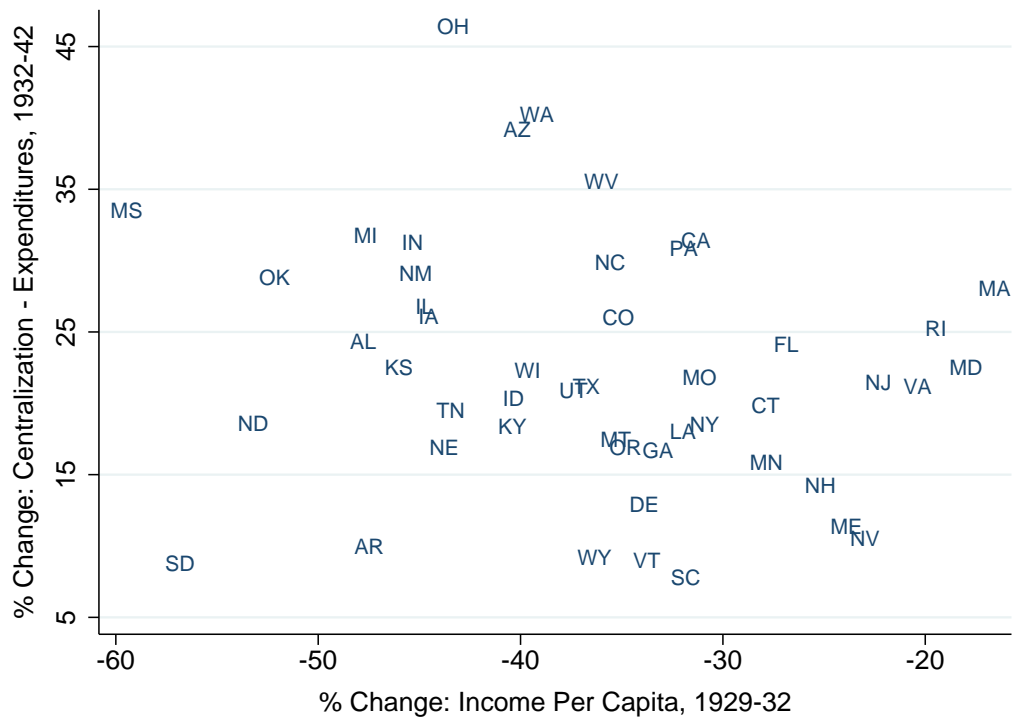


Figure A.5: Scatterplot of State Expenditures Share against % Growth in Income, 1929-32



Table A.5: Sales Tax IV Probit Regressions, First-Stage

	(1)	(2)
Electoral Votes Per Capita	35.802 (5.084)	
SD Dem. Vote, '96-'32	0.024 (0.010)	
Federal Land Per Capita		0.629 (0.174)
Non-Federal Land Per Capita		3.191 (1.036)
% Growth in Per Capita Income, '29-'32	-1.057 (0.461)	-1.016 (0.428)
Observations	48	48
Covariates	Yes	Yes
Census Region Dummies	Yes	Yes
F-Stat (First-Stage)	34.13	81.29

Covariates: debt restriction, same party control, Republican control, Southern state, log income per capita 1929. Instruments for federal aid: electoral votes per capita, standard deviation Democratic vote share, 1896-1932, federal land per capita, non-federal land per capita. Standard errors reported in parentheses. The F-Statistic in the last row tests the null hypothesis that the coefficients on the excluded instruments in the first stage are jointly equal to zero. *Variable definitions*: see text and data appendix.

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