

# Debt and Taxes: Fiscal Strain and U.S. City Budgets during the Great Depression

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## Abstract

While municipal budgets fared well on average during the Great Depression, many suffered greatly. In newspapers and trade publications, key observers blamed distress in real estate markets, the general rise in tax delinquency, and growth in real debt obligations. This paper uses a sample of large U.S. cities to estimate how these factors influenced municipal revenue and spending changes during the Depression. The results show that city finances were stable in the face of the housing market distress that plagued many urban areas in the 1930s. Instead, principal elements of fiscal strain were the rise in unpaid taxes, which was associated with diminished revenue and operating expenditures, and growth in real debt obligations, which was primarily associated with reduced capital outlays. Thus, the behavior of taxpayers and obligations to city creditors drove local budgets rather than the downturn in real estate markets. These results shed light on the policy responses of municipal governments to the fiscal strain wrought by the Depression.

*Keywords:* Great Depression, housing, municipal debt, municipal finances, tax delinquency

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## 1. Introduction

Municipal budgets during the Great Depression fared well on average compared to the national economy. As Figure 1 shows, across 94 large U.S. cities, real per capita revenue grew between 1929 and 1933 while spending went unchanged, at a time when real GDP declined by 30 percent. However, these trends hide the distress experienced in many local governments during the early 1930s. Real spending fell in nearly half of the largest cities between 1929 and 1933, eight of which saw it decline by more than 30 percent. Between 1931 and 1934, real spending fell by 15 percent on average, 80 percent of large cities cut spending, and 16 slashed their budgets by more than 30 percent. Addressing municipal leaders at a conference in 1932, Mayor Frank Murphy of Detroit bemoaned, “Perhaps never before in the history of the nation has the problem of the cities been as distressing as at present...” (Better, 1933b, p. 176). Murphy spoke from experience:

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real spending was cut nearly 30 percent in the Motor City between 1929 and 1933 and roughly 35 percent between 1931 and 1934. Why did budgets in places like Detroit suffer so much, while others fared better?

The variety of experiences suggests an important role for local changes rather than national trends as sources of fiscal strain in municipal budgets. This strain took many forms in the 1930s. Dependent on the property tax for most of their revenue, as well as special assessment fees attached to new construction, cities in the Depression faced rising tax delinquency and declining real estate markets. Adding to the stress were debt obligations incurred during the prosperous 1920s, which grew in real value as prices fell after 1929, and the rise of local relief demand as unemployment soared. If these ailments were the sources of financial sickness during the 1930s, Detroit was near death. Facing the problems of a downtrodden city, Murphy was elected in the fall of 1930 on the promise of providing relief. But the mayor soon found that the costs of such a program were too great in the face of strained budgets. Within a year of taking office, in addition to curtailing public works projects and relief expenditures, Murphy had cut health and recreational services, as well as police and fire budgets (Judd and Swanstrom, 2002, p. 124; Gelfand, 1975, p. 33).<sup>1</sup>

This paper estimates how housing distress, the rise in tax delinquency, and growth in real debt obligations influenced city revenue and spending during the Great Depression. Existing studies in this area are descriptive or otherwise limited in scope. Spengler (1937), for instance, describes budgetary trends in only the ten largest cities. In these cities, fluctuations in nominal revenue and spending were moderate between 1929 and 1933 and lagged general changes in the economy. However, analyzing a small sample leads to selection bias, yielding results at odds with the concerns voiced by many municipal leaders at the time. Another study focuses on a sample of 15 cities of various population sizes, but looks only at the period up to 1931, thus missing the worst years of the Depression for municipal budgets (Gilbert, 1940). And while city finances garnered much attention in trade publications and newspapers, these outlets provide only qualitative and anecdotal evidence of the plight of American cities in the 1930s. What then explains the variation in municipal budgetary distress during the Great Depression? Identifying which sources of fiscal strain were the most salient establishes whether the challenges to local governments arose from housing market distress, taxpayer behavior in the form of unpaid taxes, or city policy itself through the debt accumulation of the 1920s.

Falling house prices and residential construction activity led to housing market distress in the 1930s. Declines in house values could have led to reductions in the value of local tax bases. Without a countervailing hike in property tax rates, or other taxes and fees, municipal revenue would have suffered. Likewise, a falloff in the special assessment fees attached to new construction could have reduced revenue. Since 70 percent

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<sup>1</sup>Like Detroit, Boston spent a lot on relief in the early years of the Depression. To fund it, the mayor cut expenditures in other areas and forced many municipal employees to contribute to the city's welfare costs (Trout, 1977). Cincinnati also curtailed essential services in favor of providing more relief funds (Bane, 1935).

of total revenue came from property taxes and special assessment fees by 1930, spending would likely have declined too. Gilbert (1940) concludes that local booms and busts in real estate are the principal drivers of the municipal budget cycles seen between 1902 and 1931, showing that the peaks and troughs in city finances and building cycles seem to correspond. However, recent studies of the relationship between house prices and city revenue around the time of the Great Recession in 2008–09 find that, while city revenue increased with house prices up to 2006, it changed little (if at all) when house prices fell after 2006 (Alm et al., 2011; Doerner and Ihlanfeldt, 2011; Lutz et al., 2011; Ross et al., 2015).<sup>2</sup> This stability in revenue is often due to increases in property tax rates, lags in property re-assessment, general under-assessments, or even reliance on other taxes or counter-cyclical revenue flows. While Gilbert (1940) attributes a large role to local real estate cycles, recent research points to other factors as reasons for the municipal budgetary distress experienced during the Great Depression.

Many observers focused on the fiscal strain caused by the rise in tax delinquency, which eroded otherwise reliable and stable property tax collections (Bird, 1936a). Since cities could raise tax rates to help offset declines in property assessments, the rise in delinquency may have introduced more strain to budgets than the downturn in real estate markets (Upson, 1935). And although some cities may have relied on cash reserves to tide them over, or borrowed to shore up budgets, local leaders often responded by cutting spending, especially as cash and credit markets dried up. Indeed, recent work focusing on localized shocks—such as mass foreclosures that drive house prices downward and state-designated fiscal mismanagement labels—finds that they lead not only to revenue shortfalls for local governments (Alm et al., 2014; Alm and Leguizamon, 2018), but also to spending cuts (Cromwell and Ihlanfeldt, 2015; Ihlanfeldt and Mayock, 2015; Skidmore and Scorsone, 2011; Thompson, 2016, 2017). This paper adds to the literature on local fiscal shocks and city budgets by focusing on the role of tax delinquency during the Great Depression.

Debt accumulation by municipal governments during the building booms of the 1920s also introduced strain to city budgets. Debt obligations could not be easily trimmed from budgets in the midst of the Depression. City governments with substantial payments were thus forced into unattractive alternatives such as cutting spending, raising taxes, or defaulting (Bird, 1936b). Indeed, under the weight of debt payments, many cities struggled to fund regular services (Dykstra, 1934). First posited by Fisher (1933), this debt-deflation process was at work throughout the economy during the Depression (Fackler and Parker, 2005; Hausman et al., 2019; Mishkin, 1978; Olney, 1999). High pre-crisis debt among U.S. households also constrained spending during the Great Recession (Dynan, 2012; Mian et al., 2013; Mian and Sufi, 2010).<sup>3</sup>

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<sup>2</sup>These results are not specific to the recession. For local governments between 1985 and 2005, Lutz (2008) finds that the elasticity of property tax revenue with respect to house prices in local U.S. governments is positive for house price increases but nearly nonexistent for house price declines. On the other hand, Vlaicu and Whalley (2011) find a positive and symmetric relationship between house price changes and property tax revenue in California between 1993 and 2007, although this result may be driven by the special rules imposed by Proposition 13.

<sup>3</sup>Andersen et al. (2016) find similar results for Danish households, although their evidence suggests the decline in consumption

Much of this literature has focused on the roles of farmers and households. Thus, the influence of debt payments on municipal spending during large downturns is still unknown.

The Great Depression was not only one of the largest economic downturns in U.S. history, but also marks the beginning of a system dominated by state and federal expenditures rather than local government spending.<sup>4</sup> The provisions of the federal New Deal programs, beginning in 1933, influenced the decline of local government expenditures relative to state and federal spending (Wallis, 1984).<sup>5</sup> Cities began to receive more revenue from state and federal grants, thus diversifying their revenue streams. But before this institutional change, cities struggled to provide essential services for their communities in the worst years of the Depression, including providing unemployment and welfare relief (Monkkonen, 1988, p. 134). Indeed, the shift toward a new municipal–federal alignment may have roots in the urban financial crisis itself as tired and desperate mayors began to lobby for federal assistance (Gelfand, 1975). This paper’s results shed light on how city governments responded to the fiscal stress of the 1930s just as the federal government began to assume a larger role in local affairs.

This study combines annual financial data for 94 large U.S. cities between 1923 and 1936, as compiled from the *Financial Statistics of Cities* reports produced by the U.S. Census Bureau, with information from census building reports on housing construction and costs. I then merge these data with delinquency rates gathered from a report issued by Dan and Bradstreet, Inc. in 1938. This process results in a new 85-city longitudinal dataset for the years between 1930 through 1936, which is the primary period of focus. I exploit these data in a fixed-effects framework to help account for unobserved heterogeneity in budgetary practices and determinants across cities. The results show that, while city finances were sensitive to changes in house prices (as proxied by construction costs) and residential construction activity in the 1920s, budgets were stable in the face of the housing market distress that plagued many cities in the 1930s. Instead, principal elements of fiscal strain were the rise in unpaid property taxes, which was associated with diminished revenue and operating expenditures—particularly police and fire protection, sanitation, and health—and growth in real debt obligations (as measured by interest payments), which was associated with reduced spending on capital projects, road maintenance, and general administration. Thus, the behavior of taxpayers and obligations to city creditors had important implications for the many employees and residents who relied on local services and capital investment during the downturn.

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was driven by the growth in pre-crisis debt rather than the debt level just before the crisis.

<sup>4</sup>Municipal expenditures were a large source of government activity in this era. Legler et al. (1988) show that local government revenues in the U.S. exceeded state and federal revenues beginning in the 1890s. Before the New Deal, local spending made up more than half of total government spending in the U.S. (Wallis, 1984, Fig. 2).

<sup>5</sup>Tax delinquency itself spurred the rise of general sales taxes administered at the state level (Coen-Pirani and Wooley, 2018).

## 2. Historical Background

### 2.1. Regional Variation in City Finances

Table 1 shows the ratios of city revenue and spending across census regions in various years relative to 1929.<sup>6</sup> Growth in revenue in the 1920s was greatest among the old and established cities of the Northeast and the newer cities of the West. City revenue suffered in the West and grew in the Northeast during the Depression. While revenue was relatively stable across the United States during the 1930s, there was tremendous regional variation. For instance, total revenue reached Depression-era lows in the Midwest and Northeast in 1933, while it hit bottom in the South and West in 1935.

A similar story of regional variation holds for spending. The average Western and Southern city decreased spending by roughly 15 percent between 1929 and 1934, while Midwestern cities followed closely behind. Only cities in the South had recovered their 1929 spending levels by 1936. Local governments in the Northeast increased real spending over 1929 levels during the downturn. Peaks and troughs varied across regions as well; Western cities saw a peak in 1930 and a trough in 1934, thus experiencing four consecutive years of decline. A cycle of the same duration hit Midwestern cities between 1931 and 1935. A three-year decline was the average experience in Southern cities, where spending peaked in 1931 and bottomed out in 1934.

Aside from the differences across regions, there was also substantial variation within regions. Midwestern and Southern cities exhibited much variation in revenue changes during this period. Northeastern cities exhibited far less variation in both revenue and spending. Additionally, cities in regions that exhibited the most variation in spending changes during the 1920s did not always exhibit the most variation during the Depression (e.g., southern cities), which suggests some asymmetry in booms and busts. Overall, budgetary fluctuations during the 1920s and 1930s varied substantially across cities, regions, and time.

### 2.2. Origins and Sources of Fiscal Strain

Most cities experienced booms in house prices and construction activity during the 1920s, aided by financial innovations that helped provide ample credit to homebuyers (Snowden, 2010).<sup>7</sup> Swelling housing markets enabled growth in property taxes, which increased with more properties valued at ever-higher levels, as well as growth in special assessments, which were often one-time fees levied on new construction projects to help defray infrastructure costs. Together, property taxes and special assessments made up the bulk of city revenue during the 1920s (see Table A2 in the appendix), with housing itself accounting for the largest portion of city assessment rolls.<sup>8</sup>

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<sup>6</sup>The analysis focuses on real per capita financial variables. Throughout the remainder of the study, I often exclude the descriptor ‘real per capita’ in reference to all revenue and spending categories.

<sup>7</sup>These financial innovations included private mortgage insurance, high leverage, affordable mortgage loans, and early forms of securitization.

<sup>8</sup>While there is variation in the makeup of assessment rolls across cities and time, one example is Chicago, a city known for its commercial prowess. Real estate in Chicago covered two-thirds of the assessment roll in 1931, with the other third in personal

A slowdown in housing came late in the 1920s. Residential construction began to decline in 1925 and continued its fall through the early 1930s. Furthermore, cities that saw bigger construction booms in the 1920s experienced bigger busts in the 1930s (Brocker and Hanes, 2014).<sup>9</sup> House-building suffered more than other construction projects: across 257 surveyed cities, residential permits represented nearly 60 percent of total building permit value in 1925 but only 20 percent by 1934 (U.S. Bureau of Labor Statistics, 1938, Table A1). House prices took their largest tumble beginning in 1929, although in real terms they fell later in the Depression, peaking in the early 1930s (Fishback and Kollman, 2014).<sup>10</sup> Although the boom and bust in housing markets garnered attention at the time, observers were often focused on the more immediate challenges of rising tax delinquency and growing real debt obligations.

Cities planned budgets around stable property tax collections. Tax delinquencies, however, led to unplanned shortfalls in revenue. Using data collected from a report issued in 1938 (Bird, 1938), Table 2 shows average tax delinquency rates for large cities by region and year, as well as standard deviations that represent the variation within regions.<sup>11</sup> A city's delinquency rate is the proportion of taxes levied on all property—real and personal—within a city's jurisdiction that are unpaid in a given fiscal year. Delinquency rates differed across regions in any given year, being low in the West and high in the Northeast. Across the country, the delinquency rate doubled between 1930 and 1933, having escalated in 1932 and peaked in 1933 at more than 26 percent. This timing aligns with the dips in revenue and spending depicted in Figure 1. While the rise in tax delinquency was a national problem, peaking in the same year in each region, the size of the increase varied across regions and cities. For instance, the increase was greater in the Midwest than it was in the Northeast and West. To highlight the variation across cities, Figure 2 shows histograms of the changes in delinquency rates during the 1930–33 and 1930–36 periods. Nearly all cities saw rising rates between 1930 and 1933, but the changes varied considerably. Over the 1930–36 period, many cities had recovered, but there were still many more with higher delinquency rates in 1936 than in 1930. Much of this variation may be due to different experiences in real estate speculation or subdivision development during the 1920s (Bird, 1936a, pp. 345–346). Speculative and scattered development—as builders subdivided outlying land parcels hoping to sell them for profit—left many cities with thousands of vacant lots in the downturn (Field, 1992).

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property (Heer, 1936, p. 24). Dwellings made up one-third of the assessment roll, with owner-occupied housing accounting for 14 percent and rented housing for 19 percent. The next-largest category in real estate included commercial office buildings, hotels, department stores, and mercantile buildings, which covered 15 percent of the assessment roll. Compared to Chicago, commercial real estate likely comprised a larger portion of the assessment roll in cities like New York, and a smaller portion in cities with less commercial presence.

<sup>9</sup>This point is related to the credit-boom view of business cycles, which asserts that periods of excessive credit expansion can lead to large subsequent slumps. Although this view does not explain everything about the business cycle of the 1920s and 1930s, there is evidence credit expansion and contraction played an important role. See, for example, Eichengreen and Mitchener (2004) for a study of the Great Depression period and Schularick and Taylor (2012) for a long-run view.

<sup>10</sup>Other studies documenting the changes in house prices during this period include Brocker and Hanes (2014), Field (2014), and White (2014). Focusing on both commercial and residential real estate in Manhattan, Nicholas and Scherbina (2013, Tables A1 and A2, pp. 306–309) show that prices fell 36 percent in nominal terms and 15 percent in real terms between 1929 and 1933.

<sup>11</sup>See Section 3.1 for more information about the data.

Such was the case in Detroit. In a 1938 tax sale, the city's first since they were suspended in 1932, 65 percent of all subdivided lots were advertised (Michigan Planning Commission, 1939). Vacant lot owners had little incentive to pay taxes when house prices and construction activity were plummeting. Many experts even laid the blame for high rates of unpaid taxes on real estate subdividers and the bankers who facilitated their efforts (New York Times, 1933b).

The fallout from real estate speculation explains only some of the delinquency experiences across cities, however. The rise in unpaid taxes between 1930 and 1933 was nearly universal, even if land booms in the 1920s were not. For instance, many residents not involved in speculative land development were also delinquent in paying their taxes. In a survey of 57 large cities in 1933, the average delinquency rate for vacant lots was 31 percent, while the rate among residential properties was between 23 and 30 percent, depending on the building type (Putney, 1935).<sup>12</sup> Several factors may explain this finding, not least among which is the fall in income and employment during the Great Depression, which led to an inability to pay taxes.<sup>13</sup> A substantial portion of tax delinquency may also be attributed to different collection procedures or rules at the local level (Bird, 1936a, 1938). For instance, efficient tax collection often eluded cities prone to over-assessing properties, perhaps due partially to infrequent (state-imposed) assessment cycles (Fairchild et al., 1932). Popularly-elected tax collectors, by focusing on the desires of their electorate rather than the needs of their government, may have also contributed to inefficient tax collection (Fairchild, 1934; Fairchild et al., 1932). Municipal governments often sufficed with poor procedures in the 1920s; the Depression exposed and exacerbated these inefficiencies.<sup>14</sup>

Growth in real debt payments posed another significant challenge to many cities during the Depression. To highlight the variation in this growth, Table 3 shows average nominal and real per capita interest payments by region and year, relative to 1929; standard deviations show the variation within regions.<sup>15</sup> First, consider nominal interest payments. While there is regional and urban variation in the changes in nominal debt obligations over time, nominal interest payments increased much less during the Depression relative to the growth between 1923 and 1929. Thus, the debt obligations cities faced over the course of the Depression had largely been incurred in previous years. The real value of interest climbed during the 1920s due to debt-

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<sup>12</sup>Delinquency rates among commercial properties were about half compared to those of vacant lots and residential properties, ranging from 12 percent for industrial properties to 20 percent for garages and gas stations. Hotels and rooming houses exhibited an average delinquency rate of 27 percent. As Beito (1989, p. 125) notes, the high rate on vacant lots gives a misleading impression of the relative importance of these delinquencies, since vacant lots usually accounted for a small portion of tax collections.

<sup>13</sup>Lenders did not collect and pay taxes on behalf of borrowers during this time, which augmented the collection problem since homeowners were directly responsible for paying their tax bills (Fishback et al., 2013).

<sup>14</sup>Delinquency may have also been a politically-motivated response of tax resistance on the part of taxpayers (Beito, 1989; Mencken, 1933). According to Beito (1989, pp. 96-97), it is unclear the extent to which this is true, since some groups argued most tax delinquents could afford to pay their taxes while other groups argued they could not. Fairchild et al. (1932) and Fairchild (1934) suggest that delinquency may have been driven by taxpayer perceptions of inefficient government spending or excessive tax burdens, but these authors still see it as primarily a problem of tax collection rather than tax resistance.

<sup>15</sup>Since principal payments are not available in the financial surveys, I focus only on interest payments. See Section 3.1 for more information.

financed infrastructure investment. However, deflation during the Depression also resulted in the growth of real debt burdens: across all cities, real per capita interest payments grew by more than 40 percent between 1929 and 1933, with much variation both across and within regions. The Northeast saw the largest growth in real debt obligations (about 50 percent), while cities in the Midwest and South saw the smallest (about 35 percent). Overall, while cities varied in the growth of real interest payments during the Depression, much of the general increase was due to the fall in prices, which caused fixed debt payments incurred in earlier years to rise in real value. Cities also varied in how their debt-payment schedules were staggered across time, leading to spikes in some years relative to others.

What drove the debt growth of the 1920s? Like the home-buyers and home-builders of the period, municipal governments benefited from credit expansion (Bird, 1936b). Following Herbert Hoover's call after the 1920–21 recession to spend money on infrastructure projects to help stave off downturns, cities responded by issuing bonds in record numbers (Rothbard, 2000, p. 193). The federal income tax introduced in 1913 made these tax-exempt municipal bonds attractive as investment vehicles. Cities easily found willing buyers for their debt, sometimes using it to help finance speculative suburban projects made feasible by the automobile (Hillhouse, 1936b, p. 249). A study by the National Housing Agency in 1945 noted that hundreds of thousands of plots in cities across the nation were “already equipped with paved streets, curbs, sidewalks, water and other utility mains into which millions of dollars have been sunk—enough, indeed; to have bankrupted many townships and villages...” (National Housing Agency, 1945, p. 36).<sup>16</sup>

While easy credit was important, other factors contributed to the diversity in debt growth during the 1920s. Real estate speculation aside, urban areas varied in their demand for public goods and infrastructure, much of which depended on local population and income growth and the degree of suburbanization. For example, investment in roads and schools—often funded with debt—fueled more than half of the growth in local government spending during this time (Wallis, 2001). But aside from these fundamental determinants, institutions governing debt accumulation also varied across cities (Bird, 1936b). For instance, differences in local government structure and budget administration led to a variety of political incentives around debt accrual. Pay-as-you-go financing and a thrifty citizenry guided the budgetary processes of many Midwestern cities, while New York residents were more cavalier regarding debt accumulation (Bird, 1935, pp. 17-18). Cities also faced different constraints on their ability to finance spending through debt. While most states set local debt limits, these constraints varied in size and allowable debt exemptions (Hillhouse, 1936b, p. 257). Cities were also able to create overlapping government units to increase their debt even in the presence of these limits. Some states gave citizens more control over local borrowing: California required a two-thirds popular vote to approve debt, while local officials in New Jersey could borrow without voter approval Bird (1936b). Many of the factors governing debt accumulation were institutional in nature and fixed in earlier

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<sup>16</sup>As quoted in Field (2011, p. 282).



years, but nonetheless drove some of the variation in the growth of real debt obligations during the 1920s and 1930s.

### *2.3. Qualitative Evidence for the Impact of Fiscal Strain on City Budgets*

The impact of fiscal strain on municipal budgets was portrayed in various newspapers and trade publications. Mayors and city managers spoke out about the financial difficulties they faced, and experts in municipal finance often joined in the chorus of pessimism around urban governmental affairs. In 1933, local leaders convened a conference to discuss only three topics: municipal debt obligations, tax delinquency, and local government budgets (Chicago Tribune, 1933). Municipal financial problems even gained national interest: the National Broadcasting Company produced a 19-program radio series in late 1933 entitled *The Crisis in Municipal Finance* (National Municipal Review, 1933). The magnitude of the strain was perhaps best communicated by Chicago's mayor, who declared that the city faced its worst crisis since the fire of 1871 (Freeman, 1932, p. 267).

Although the fiscal strain centered around several factors, perhaps no other budgetary challenge was more publicly decried by city leaders than tax delinquency. It was often easy to blame taxpayers for the “creeping paralysis” of unpaid taxes that hampered the vital functions of political and economic life (Pasley, 1933d). Mayor Murphy of Detroit singled out tax delinquencies as a major source of strain and retrenchment in 1932: “The increasing tax delinquencies...have presented a perplexing problem, but one we have met thus far and will continue to meet by recourse to uncompromising economy” (New York Times, 1932). Citing similar tax-collection problems, city commissioners in Jersey City ordered 40-percent pay cuts for 3,500 employees in 1933 (New York Times, 1933a). A municipal official in St. Louis described rising tax delinquency as showing the “necessity for economy in municipal government” (St. Louis Globe-Democrat, 1933).<sup>17</sup> Cuts in specific areas were sometimes even mentioned: a prominent expert at the Institute of Public Administration bemoaned, “the city with no taxes paid completed the circle of misfortune by being unable to pay its employes [sic] and thus curtailing police, fire and sanitary service for all residents” (New York Times, 1933b). A less obvious, though no less salient, challenge to budgets were fixed debt obligations that grew in real value as prices fell. Officials in some cities—including Atlanta (The Atlanta Constitution, 1933), Baltimore (Baltimore Sun, 1932), and Detroit (New York Times, 1932)—publicly claimed that making bondholder payments was a primary duty of local governments to preserve good credit. Indeed, municipal debt obligations were often paid promptly during the Depression (Chatters, 1935). For cities in which tax collections were down and making debt payments was a priority, something had to give. An advisory board in Camden admitted that service, personnel, and salary reductions in the 1933 budget were due to “debt service resulting from

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<sup>17</sup>Between 1930 and 1933, delinquency rates increased by 16 percentage points in Jersey City and St. Louis, and by 36 percentage points in New Orleans. These increases were larger than the average increase during this time, which was 13 percentage points.

unwise...expenditures and accumulated deficits of former years and the fact that a very large percentage of present taxes are not being paid. To avoid forcing our...city deeper into the debt mire we must now give up something and we must all pay our taxes.” (The Morning Post, 1933). In 1932, Mayor Jackson of Baltimore cited unpaid taxes and burdensome debt payments as sources of strain that led to budget slashes in every department except charity (Baltimore Sun, 1932). In 1932, these same sources of strain forced Detroit to cut pay for all city workers by 10 percent and lay off 5,000 employees (Kelsey, 1932). In Boston, delinquency forced the city’s police to miss pay days in early 1933. Later that year, under a new mayor who decried the city’s debt load, Boston implemented more drastic cuts by trimming its workforce and cutting salaries across the board (Trout, 1977).

Not only did cities face the internal stress of making revenue and spending meet, they also faced external forces that sought to govern their spending decisions. As tax collections were eroded by rising delinquency, “financial dictators” demanded cities cut spending to borrow money in anticipation of tax collections. Bankers increasingly held the leverage, demanding economy in local governments (Beyer, 1933). According to Upson (1933, p. 129), bankers in Detroit compelled the city council to retrench in order to borrow. This was a best-case scenario, as borrowing was described by one Boston banker as “well-nigh an impossibility” for cities in early 1932 (Shanks, Jr., 1932). In May 1933, roughly 60 percent of large cities found no market for their securities. This lack of demand was difficult on local governments given the timing of tax collections, since nearly every city had to live on borrowed funds at various points in any given fiscal year (Better, 1933a).

Taxpayers also focused their efforts on city spending through collective voices at the polls and budget committees. In a special election in Milwaukee, taxpayers voted for expenditure cuts (Pasley, 1933c), while taxpayer groups in Boston and Chicago agitated for the same (Trout, 1977; Beito, 1989). Community professionals also voiced their concerns. In Chicago, business leaders formed the Committee on Public Expenditures, which forced the city to trim its budget by 20 percent in 1931, followed by further cuts in 1932 and 1933 (Pasley, 1933a). In light of reduced tax collections, a real estate group in Los Angeles demanded “every possible economy be put into effect” (Los Angeles Times, 1933). For taxpayers and lenders alike—not to mention bondholders and local officials themselves—retrenchment was the only acceptable recourse in response to the fiscal strain cities faced.

Even cities in relatively good financial positions did not escape the crisis. San Francisco’s fiscal prudence was attributed to “the small number of property tax delinquencies and the steadiness of real estate values in boom years. No crash occurred in the local real estate market, just as no boom had been staged” (The Pacific Coast Wall Street Journal, 1932). The city’s tax delinquency rate was remarkably low during the 1930s (never more than 5.4 percent) and increased by only 3.9 percentage points between 1930 and 1933 (Bird, 1938). Even so, the city cut its salaries between 3 and 20 percent (Ridley and Nolting, 1935, p. 204,

Table 3) as it made its debt payments.<sup>18</sup> Also considered exemplary was Cincinnati, which faced some of the nation’s lowest delinquency rates but still trimmed salaries in 1933 between 5 and 20 percent (Pasley, 1933b). Cities in Massachusetts received positive attention for approaching the downturn in good financial shape, but nevertheless resorted to salary cuts and expenditure reductions (Hinckley, 1936). While these cities fared better than places such as Detroit, it is clear the Great Depression left few (if any) municipal budgets untouched.

### 3. Data Description and Summary

#### 3.1. Data Description

In response to the urban reform movement in the early twentieth century, government agencies began to collect statistics on city finances through personal contact with municipal officers. Aiming to provide uniform data collection spanning all large cities, the U.S. Census Bureau compiled these data into annual reports called the *Financial Statistics of Cities*. Multiple tables in these reports provide the financial data for this study. Table 4 provides descriptions of the financial variables, which include nine revenue categories and twelve spending categories. I use interest payments as a city’s measure of debt obligations since the reports do not provide information about principal payments. Furthermore, interest was not easily curtailed: it was nearly always paid, even in defaulting cities (Shanks, Jr., 1935). Annual data exist for the 94 largest cities—each with a population of more than 100,000 people—between 1923 and 1936 except Miami, which has data starting in 1926. About 30 percent of the total U.S. population lived in these cities in 1930.<sup>19</sup>

The reports give information for the fiscal year (FY). Although beginning and end dates for FYs varied by city, most began in January and ended in December. The first part of the analysis focuses on the years between FY1923 and FY1936, which isolates the Great Depression (1929–33) between the severe 1920–21 recession and the recession beginning in 1937.<sup>20</sup> The second part of the analysis, which uses tax delinquency data, focuses on the years between FY1931 and FY1936. Cities also differed in the number and structure of independent districts within their jurisdictions. The data at the city level include the relevant services provided by all districts within each city’s jurisdiction, a feature that makes comparisons across cities feasible.

The available data on house prices in the 1920s and 1930s feature few cities. Building permit values, compiled from reports by the Bureau of Labor Statistics (e.g., U.S. Bureau of Labor Statistics, 1925), provide the most representative house price information.<sup>21</sup> For nearly all city-years, the reports show the number of housing units permitted for both single-family and multi-family housing, as well as their total construction

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<sup>18</sup>Combing information from the *Bond Buyer* and *Moody’s Government Securities Manual*, Holian and Joffe (2013) assert that the default crisis was confined to smaller cities in California during the Great Depression. Only special assessment districts in Los Angeles, San Diego, and Oakland defaulted during the 1930s.

<sup>19</sup>See Table A1 for a list of the sample cities.

<sup>20</sup>The NBER dates the Great Depression from August 1929 to March 1933 (see <http://www.nber.org/cycles>).

<sup>21</sup>Price Fishback provided these data.

costs. With this information, the average cost per family housing unit was calculated for each city and an index constructed for which 1930 is the base year. I refer to this measure as the permit value index (PVI) and use it as a proxy for house prices in a period for which such data are scarce.<sup>22</sup> I measure residential construction activity as the number of permitted housing units. Although permit issues do not reflect actual housing starts, they are the best available measure of residential construction activity at the city level.<sup>23</sup>

Annual data on tax delinquency rates between 1930 and 1936 were gathered from Bird (1938, Table 1). Cities sometimes did not report delinquency rates. Nevertheless, of the 94 cities featured in the financial reports, 85 have delinquency data in at least one year between 1930 and 1936 and 80 have rates in every year. Although variation across cities in how taxes were levied and collected can make cross-city comparisons of delinquency rates problematic, the data provide a good picture of the changes in delinquency within cities.<sup>24</sup>

Other data used in the study include city population, per capita state income, and census region indicators. City population sizes were gathered from Gibson (1998) and linearly interpolated between census dates to arrive at a population estimate for each city in each year.<sup>25</sup> These data are used as controls and also to express the financial variables in per capita terms. Annual per capita state income is based on the data provided in Martin (1939).<sup>26</sup> Indicators for four census regions—Midwest, Northeast, South, and West—are also used in the analysis.<sup>27</sup>

Several states passed blanket property-tax-rate limits during the Depression. These limits served to restrict the aggregate tax rate—imposed at the city, county, and state levels—that could be levied on any particular property. Of the states represented in the sample, Michigan, Washington, and Indiana introduced

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<sup>22</sup>The PVI is not a perfect measure of house prices since it excludes lot values. Furthermore, if permit fees were based on construction costs reported by builders, these costs might have been under-reported, thus leading to downward bias in the index. While the PVI is flawed in these ways, Fishback and Kollman (2014) show that the movements in the permit value series are similar to those in other (small-sample) house price series during the 1920s and 1930s. See the appendix for robustness checks using a different measures of house prices. Additionally, land values accounted for only 20 percent of U.S. house prices during this time, with the remainder in building values (Knoll et al., 2017). Thus, construction costs capture a substantial portion of house values.

<sup>23</sup>Price Fishback and Kenneth Snowden both provided the permit count data. Broucker and Hanes (2014) use these data (as provided by Kenneth Snowden) in their study showing the relationship between boom and bust in city housing markets in the 1920s and 1930s. Kimbrough and Snowden (2007) use these data at the city level to study the relationship between residential construction in the 1920s and construction in the 1930s.

<sup>24</sup>For various reasons, Bird (1938) suggests that three cities have “misleading” data in comparison to those given for other cities: New Orleans, Oklahoma City, and Richmond. In an effort to maintain sample size, I include these cities in the analysis. Similar (and often stronger) results are obtained when these cities are excluded from the sample.

<sup>25</sup>The financial reports also give the census population figures, but only for 1920 and 1930 since the last report used in this study is for 1936. The figures in the reports for 1920 and 1930 are exactly those reported in Gibson (1998). Also, the reports provide population estimates for most cities in non-census years, which were arrived at using at least two different methods, depending on the year. City populations in earlier years were estimated using interpolation methods, while in later years they were estimated based on birth, death, immigration, and emigration data given at the national level. To remain consistent, I use linear interpolation to estimate population figures in non-census years. While accounting for annexations is more problematic when using this method, the reports’ figures are not without error given the inconsistent methods used to estimate them. Furthermore, annexations are likely only a problem in the 1920s when they were more prevalent. The results for the 1930s are thus less subject to this error.

<sup>26</sup>These data were used in Thomasson and Fishback (2014) and provided by Price Fishback.

<sup>27</sup>Legler et al. (1988) show that U.S. city finances exhibited variation across these four regions between 1850 and 1902.

blanket tax-rate limits in 1932 and Oklahoma did so in 1933 (Suiter, 1936, Table XI, p. 338).<sup>28</sup> Since these laws may have impacted municipal revenue and spending, I account for them in the analysis with an indicator for every year after the legislation was passed.

The final dataset is a slightly unbalanced panel. One reason is that Miami is included in the financial surveys only after 1925.<sup>29</sup> Also, data on building permits and costs are missing for some city-year observations, as are delinquency data. Rather than drop cities that are missing data at some point in the study period, I aim to maintain statistical power by analyzing a larger, unbalanced sample. Because data are seldom missing in the sample, I do not suspect that the reliability of the results is impacted by using an unbalanced dataset.<sup>30</sup>

### 3.2. Data Summary

Table 5 shows summary statistics for the entire panel.<sup>31</sup> Financial values and state income are in real per capita terms, and the PVI is in real terms. Real values are in 1967 dollars and are calculated using the CPI (U.S. Census Bureau, 1975, pp. 210-211, Series E-135). While the data are pooled across years, they provide insight into municipal finances in this period. Cities relied mostly on property taxes to generate revenue, but other important revenue streams were public enterprise earnings, government grants, special assessments, and other taxes. Key areas of spending included capital outlays, education, protection, and interest payments.

The table also shows summary information on the changes in each variable during the Great Depression. Between 1929 and 1933, total revenue and property taxes grew by 16 and 22 percent. Any increase in the average city's levy was due to an increase in assessed valuation rather than the property tax rate.<sup>32</sup> Government grants grew the most on the revenue side. This area was impacted by relief problems that prompted state and county governments to distribute more grants to cities after 1930 (Spengler, 1937). The largest decline occurred in special assessments, a revenue stream that dried up with the fall in house-building and infrastructure projects. On the other side of the budget, total spending changed little, balanced by a 23 percent increase in operating expenditures and a 60 percent decrease in capital outlays. Capital investment was the first area to see budget cuts, and as the Depression wore on and money markets tightened, it became ever more difficult to borrow for municipal projects (Gelfand, 1975, p. 46). The largest spending increase

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<sup>28</sup>Ohio also passed limits in 1933 that reduced the allowable property tax rate, but the state had blanket limits in place since 1911 (Suiter, 1936, Table XI, footnote (k), p. 338). Oklahoma's original constitution had a blanket property-tax-rate limit, but it was too high to be effective Suiter (1936, Table XI, footnote (n), p. 338). Pennsylvania adopted a levy limit in 1933, but this measure was repealed in part before returning in 1943 (Paquin, 2015). Controlling for Pennsylvania's levy limit does not change the results.

<sup>29</sup>A tax strike occurred in Chicago in 1929 and 1930, which caused revenues to drop (Spengler, 1937). The results are similar whether Chicago is included in, or dropped from, the analysis. I elect to include it.

<sup>30</sup>Across all samples used in the paper, missing data exist in no more than 4 percent of possible city-year observations.

<sup>31</sup>See Table A2 for means of the financial variables by year.

<sup>32</sup>A city's levy is the product of its property tax rate and assessed valuation.

was in charities, which in turn often depended upon grant receipts (Spengler, 1937). Also note that real interest payments grew more than 40 percent during the Depression.

The revenue and spending changes between 1929 and 1933 do not suggest a crisis in city finances. However, as Figure 1 shows, the worst period came after 1931 when city budgets, which were planned before a given fiscal year, had caught up to the downturn. To highlight this period, Table 5 shows information for the average changes between 1931 and 1934. In these years, total revenue rose by only 2 percent and property taxes fell by roughly 1 percent. Tax rates were generally not used to offset declines in assessed valuations. On the other hand, total spending declined by 15 percent, operating expenditures fell by 1 percent, and capital outlays declined by nearly 60 percent. Spending in every category dropped between 1931 and 1934 except interest payments and areas that included relief and welfare expenditures (charities and miscellaneous spending).<sup>33</sup>

Real house prices, as proxied by the PVI, rose on average between 1929 and 1933. This rise is seen across many other indexes, as shown in Fishback and Kollman (2014). On the other hand, residential construction activity fell more than 85 percent during the Depression itself. Between 1931 and 1934, housing permits fell by 75 percent, and while the PVI grew on average, this result is skewed by outliers. For instance, Figure 3 depicts the trend in the median PVI value, which declined between 1931 and 1934. The figure also shows the trend in permitted housing units, which peaked in 1925. The average delinquency rate across cities and years was 20 percent, so that one out of every five property tax dollars levied was not collected in the year intended during this time. On average, cities saw delinquency rates rise more than 13 percentage points between 1930 and 1933 and 7 percentage points between 1931 and 1934. The magnitudes of these changes suggest that tax delinquency was perhaps a greater challenge to property tax revenue than changes to assessed valuations or tax rates.<sup>34</sup> On average, real per capita state income fell nearly 30 percent between 1929 and 1933—on par with the national decline in real GDP. State income thus provides a good measure of the downturn’s impact across states. The average city over the period was of considerable size at roughly 364,000 people, and each of the regions in the U.S. are well-represented in the sample. Blanket tax-rate limits encumbered only 4 percent of city-year observations.

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<sup>33</sup>Charitable and miscellaneous spending included spending on the poor, children, and special aid to mothers (see Table 4).

<sup>34</sup>A city’s property tax revenue depends on many factors, including the tax rate, the value of its tax base, the rate of tax payment, and the receipt of back taxes. How does the impact on property taxes of a rise in tax delinquency rates compare to the impact of changes in other factors? For a given year, let  $P$  be property tax revenue so that  $P = \tau B(1 - D) + T$ , where  $\tau$  is the property tax rate;  $B$  is the assessed value of the property tax base;  $D$  is the property tax delinquency rate; and  $T$  represents collections of taxes imposed in any previous period (i.e., back taxes). A decomposition was conducted using the following formula:  $P_t - P_{t-1} = (((1 - D)_t - (1 - D)_{t-1}) \times \tau_t B_t) + ((1 - D)_{t-1} \times (\tau_t B_t - \tau_{t-1} B_{t-1})) + (T_t - T_{t-1})$ . The first term captures the change in property tax collections due to changes in the delinquency rate, while the remaining terms account for changes in other factors. The role of delinquency is isolated by holding constant other factors such as changes in the tax levy and back taxes. For the average city, 81 percent of the property tax decline between 1932 and 1933—the worst year for property taxes in which collections fell by 5 percent—was due to rising delinquency, and the remaining 19 percent was due to changes in other factors. Although property taxes grew in real terms during the Great Depression, tax delinquency was a barrier to even higher gains and a substantial driver of the large decline in revenue that occurred in 1933.

As the standard deviations show, all relevant financial and fiscal strain variables exhibit substantial variation in the changes experienced between 1929 and 1933 and between 1931 and 1934. This variation provides fertile ground for studying municipal budgets during the Great Depression. Note also that the average change in operating expenditures in both periods mirrors the average change in property taxes, which suggests that factors that influence property taxes, such as housing distress and tax delinquency, may also be driving operating expenditures. It is also clear the changes in total spending differ from those for total revenue. This outcome suggests an important role for factors other than those that directly influence revenue, such as debt obligations. The following analysis is focused on estimating the relationships between different sources of fiscal strain and budgetary changes during the 1930s, while accounting for other sources of variation.

## 4. Model and Results

### 4.1. Empirical Model

To characterize the relationship between fiscal strain and municipal budgets, I use the following model:

$$\begin{aligned} \ln(y_{it}) = & \sum_{j=0}^1 \eta_j \text{Delinquency}_{i,t-j} + \sum_{j=0}^3 \lambda_j \ln(\text{Interest}_{i,t-j}) + \\ & \sum_{j=1}^3 \beta_j \ln(\text{PVI}_{i,t-j}) + \sum_{j=1}^3 \theta_j \ln(\text{Permits}_{i,t-j}) + \\ & \sum_{j=1}^3 \gamma_j \ln(X_{i,t-j}) + \tau \text{Limit}_{it} + \delta_t \text{Region}_i + \text{Year}_t + \text{City}_i + \epsilon_{it}, \end{aligned} \quad (1)$$

where  $y_{it}$  is real revenue or spending per capita for city  $i$  in year  $t$ ; *Delinquency* is the delinquency rate; *Interest* represents total interest payments; PVI is the permit value index (in real terms); *Permits* represents the number of permitted family housing units; X contains three lags of city population and real per capita state income; *Limit* is an indicator for state-level property-tax-rate limits imposed during the Depression; *Region* is a region indicator; *Year* <sub>$t$</sub>  is a set of year fixed effects; *City* <sub>$i$</sub>  is a city fixed effect.<sup>35</sup> State income and region-year dummies control for economic differences across regions and states as well as changes in

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<sup>35</sup>Equation (1) could include a national time trend and state-specific time trends to account for price (and other) trends that occurred over time at the national and state levels. Estimating such a model (both with and without region-year indicators) yields nearly identical coefficients and standard errors as those reported in the main tables. Also, recent studies, such as Cromwell and Ihlanfeldt (2015), include government grants and assessed values as independent variables in spending regressions. While I do not include these variables here due to concerns about endogeneity, the results are nonetheless similar across specifications with and without them.

these conditions that could drive both municipal finances and fiscal strain outcomes.<sup>36</sup> Population controls for changes in city sizes. Including an indicator for new tax-rate limits accounts for the impact of these regulations on city budgets. Fixed institutional and political factors that influence municipal finances are absorbed in the city fixed effects, while year dummies capture changes common to all cities.<sup>37</sup> All continuous variables other than the delinquency rate are expressed in natural logs; these coefficients are thus interpreted as elasticities.<sup>38</sup> Standard errors are clustered at the city level, which allows for any form of error correlation within cities. In the following tables, cumulative coefficients are reported for the delinquency rate, interest payments, the PVI, and housing permits.

Unpaid taxes were likely related to city budgets both contemporaneously and with a lag. For instance, many cities operated on a pay-as-you-go basis, so that current receipts determined at least some current spending (Buck, 1934). However, current spending was also based on a budget written up in the previous fiscal year, which reflects the expectations for total revenue received in that year based on past experiences.<sup>39</sup> Furthermore, property taxes may have declined in one year due to unpaid taxes, but rebounded in the following year from payment of back taxes. The lag structure for the delinquency rate in equation (1) accounts for these differences in budgetary impacts and procedures. Since the delinquency-rate data begin in 1930, including a one-year lag limits the sample period to 1931–36. Nonetheless, this period captures the worst years for city governments during the Depression.

Absent municipal policies of borrowing or raising revenue in response to fiscal strain, most revenue and spending categories should be negatively associated with tax delinquency (so that  $\eta < 0$ ). Identifying the true impact of delinquency requires unbiased estimation of its coefficient. Bias can arise in this context in several ways. As discussed in Section 2, cities varied in their speculative development, experiences in the downturn, tax collection procedures, and assessment practices, all of which may have influenced both delinquency rates and municipal finances. House prices and housing permits capture speculative activities, and state income and region-year effects account for broad economic trends, but local institutional factors such as tax collection procedures and assessment practices are difficult to measure. However, many of the factors argued to have contributed to delinquency—e.g., popularly elected tax collectors or infrequent assessment (Fairchild et al., 1932; Fairchild, 1934)—are time-invariant and thus absorbed in the city fixed effects. Bias might also arise if

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<sup>36</sup>House prices and housing permits may capture trends in nonresidential property markets. However, to the extent trends in nonresidential real estate followed general economic trends, these effects are captured in the state income and region-year coefficients.

<sup>37</sup>One important political factor is city government type. These were relatively fixed during the time period of analysis. Up to 1934 (for which centralized data are available), only five cities in the sample changed their government form, four of which did so in the 1920s. Thus, the city fixed effect largely captures the impact of government form. Note also that year dummies capture economy-wide changes in the price level over time. Thus, all of the model's coefficients except the year indicators remain the same whether the regressions are estimated in nominal or real terms.

<sup>38</sup>For the rare cases when cities did not spend money in particular financial categories, the natural logarithm cannot be taken. These observations are thus excluded from the analysis.

<sup>39</sup>The budget model in Dallas was singled out as exceptional due to planning for delinquency based on recent experiences (Buck, 1934, pp. 46-47).



cities that received or spent more money per capita experienced more delinquency as taxpayers resisted the largesse of local government or otherwise felt burdened by taxation (Beito, 1989; Fairchild, 1934; Fairchild et al., 1932; Mencken, 1933). Tax delinquency could thus reflect tax or government resistance, leading to upward bias in the delinquency coefficients.<sup>40</sup> To the extent this occurred, the negative effect of unpaid taxes is under-estimated.

The inclusion of both contemporaneous and lagged debt obligations in equation (1) is also due to the variety of budgetary impacts and procedures across cities. Consider the case of spending, for instance. City governments plan budgets knowing the value of debt obligations for a given fiscal year. The greater these obligations, the less flexibility in the budget that year. Contemporaneous debt payments account for this phenomenon. Furthermore, the time horizon over which cities may have adjusted spending likely differs across cities based on their budgetary procedures. For some cities, debt burdens may have had a longer-term impact if they were able to spread the suffering over several years due to reliance on cash reserves, for instance, while other cities might have needed to contract spending all at once. I account for these differences by including three interest-payment lags.

At least two circumstances suggest that rising real debt obligations during the 1930s were a fiscal shock. First, interest-payment schedules were likely determined before the economy soured. While cities had accrued debt in the early 1930s, most of their obligations at the time had come from investments in the 1920s.<sup>41</sup> Second, the deflation of the early 1930s was largely unanticipated (Hamilton, 1987, 1992). This idea is further supported by the accumulation of long-term debt among municipal governments in the 1920s. Insofar as interest payments in the 1930s were pre-determined, and price deflation was unexpected, growth in real debt obligations during the Depression were a fiscal shock to municipal budgets.

Changes in property tax revenue, and thus total revenue, lag house price changes due to cycles in property re-assessment. States set rules regarding the frequency of assessment for tax purposes. On real property, the vast majority of states required assessment every year, many required it every other year, and several had assessment cycles of four years or greater (Jensen, 1931, p. 332, Table 82).<sup>42</sup> Having legal obligations to maintain accurate assessments, many cities also made adjustments between cycles (Jensen, 1931, p. 337; Noonan, 1936, p. 26). To account for the variety of assessment practices across cities, I include three PVI

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<sup>40</sup>The politically charged delinquency theory is less emphasized in the literature than factors such as the economic downturn or tax collection procedures. Additionally, if the efficiency with which local governments raise and spend funds helps determine urban quality of life (Gyourko and Tracy, 1991), then people would have sorted across cities according to their preferences even prior to the crisis.

<sup>41</sup>Cities sometimes rescheduled interest payments during the downturn, but this often had only marginal benefits (Bird, 1936b).

<sup>42</sup>These state-level rules give plausible exogenous variation in assessment practices that could be exploited to understand the channels through which house prices impacted property tax revenue. Interacting an annual assessment indicator with the one-year lag on house prices shows no significant differences in the impact of house prices on property taxes between cities with one-year assessment cycles and other cities. These results are consistent with the hypothesis that cities adjusted property values independently of assessment cycles during this period.

lags. Using three lags is also consistent with current literature that finds the largest cumulative house-price response for property taxes at the third-year lag (Lutz, 2008).<sup>43</sup> Housing permits, state income, and city population also have three lags to allow for local adjustments to changes in these factors.<sup>44</sup>

#### 4.2. Empirical Results

I begin by establishing a baseline relationship between city finances and housing cycles. If housing cycles drove municipal finances in this period, then changes in revenue and spending should be associated with changes in house prices and residential construction activity. Column 1 of Table 6 presents estimates for revenue between 1923 and 1936. In these years, a 10 percent rise (fall) in house prices led to a 1 percent rise (fall) in total revenue. Additionally, cities that experienced larger increases (decreases) in residential building experienced larger increases (decreases) in revenue over this period. However, as columns 2 and 3 show, these results are largely driven by the building booms of the 1920s: the PVI and permit elasticities are smaller in the 1930s than they are in the 1920s. While we cannot reject that the PVI elasticity differs across decades, it is statistically significant at the 5 percent level for the 1920s and statistically insignificant for the 1930s. These results suggest total revenue was less sensitive to changes in real house prices in the 1930s compared to the 1920s. This outcome is similar to findings using modern data, which suggest that city revenue often grows with housing booms and remains stable in the face of falling house prices (Alm et al., 2011; Doerner and Ihlanfeldt, 2011; Lutz, 2008; Lutz et al., 2011; Ross et al., 2015).

The results for municipal spending are shown in columns 4 through 6 in Table 6. Between 1923 and 1936, a 10 percent rise (fall) in house prices led to a 0.8 percent rise (fall) in total spending. Additionally, changes in city spending were positively associated with changes in residential construction activity. However, as in the revenue case, these effects are driven by the activity of the 1920s: much smaller spending elasticities are obtained for the 1930s than for the 1920s, with statistically significant differences across decades.

The stability of city finances in the face of housing market distress during the Depression suggests a role for other factors in explaining budgetary declines. Table 7 shows the results of introducing other sources of fiscal strain shown in equation (1) for city revenue between 1931 and 1936. Column 1 shows a baseline specification of the impact of housing cycles in the smaller 85-city sample; the results are similar to those reported in column 3 of Table 6 for the larger sample. As before, there is no evidence that housing cycles played a large

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<sup>43</sup>Robustness checks using different lag structures (e.g., one, two, or four) are consistent with the results shown here. The three-lag model also gives lower Akaike Information Criterion (AIC) values than models with one, two, or four lags. One could also argue there are contemporaneous wealth effects due to a change in house prices. For example, consumption may fall contemporaneously with house prices and thus lead to a fall in sales tax revenue. Estimates from models with both contemporaneous and lagged variables show small contemporaneous effects in some financial categories, but the cumulative effects are essentially the same. To maintain consistency and simplicity in presenting the data, I show only the lagged-model results.

<sup>44</sup>Although permits have a contemporaneous effect on certain budget categories, such as revenue generated from permit fees, these areas are not important revenue sources for cities. Nonetheless, specifications with contemporaneous permit effects yield similar cumulative effects as reported here.

role in driving municipal finances during the 1930s. Rising delinquency, however, was a primary headwind for city governments. The increase in the delinquency rate for the average city between 1930 and 1933 (13.4 percentage points) was associated with a nearly 5 percent decline in total revenue, enough to finance a typical health department and more. This finding implies cities did not offset the declines in property taxes associated with delinquency through other means, such as increases in other taxes. However, revenue and debt obligations were positively related, with an elasticity of 0.17 in the full specification shown in column 4. For the average city, which experienced a 40 percent increase in real interest payments between 1929 and 1933, this elasticity equates to a roughly 7 percent increase in total revenue. This increase counteracts the decrease caused by tax delinquency, and helps explain the general rise in revenue seen during the Depression (shown in Figure 1). The coefficients are similar across columns 1 through 4, thus suggesting that housing cycles, delinquency rates, and debt obligations were largely uncorrelated and acted independently on total revenue during this period.

Column 5 of Table 7 shows that the fluctuations in total revenue were driven by changes in property taxes. As in the total revenue case, property taxes were not influenced by cycles in housing markets during the 1930s, but were reduced by tax delinquency and positively related to interest payments.<sup>45</sup> Debt obligations could have influenced property taxes through two channels: the tax rate and the property tax base, the product of which is the property tax levy. Columns 6 and 7 show the results of testing for relationships between debt obligations and per capita assessed valuation and property tax rates.<sup>46</sup> The key channel of influence was the tax base. At least two reasons are possible for this outcome. First, cities with burdensome debt obligations may have increased assessed valuations to make up for tight budgets. But this would be akin to playing with fire when delinquencies were mounting. Also, if tax bases could be manipulated in this way, cities in which delinquency was rising might have done the same. The results suggest otherwise. More likely is that the infrastructure spending of the 1920s was positively related to—and helped increase—the value of local tax bases. Cities with larger interest payments in the 1930s spent more on capital projects in the 1920s. In this way, previous debt spending bolstered property tax revenue during the Depression.

Did cities experiencing fiscal strain generate revenue from sources other than property taxes? The results shown in Table 7 address this question. First, consider the housing elasticities. Local changes in house prices led to changes in the opposite direction in other taxes (elasticity of  $-0.34$ ) and general department earnings (elasticity of  $-0.28$ ) during the Depression. Thus, governments in cities where real house prices fell raised more revenue in these ways. Revenue from other (non-property) taxes was positively associated with housing

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<sup>45</sup>One might expect the delinquency coefficient to equal one. There may be several reasons why it is less than one in this setting, including possible bias in the coefficient and the receipt of back taxes. It is also important to remember that the delinquency coefficient is cumulative, including both contemporaneous and lagged effects.

<sup>46</sup>The reports do not give assessed valuations at the city level. A city's assessed valuation is thus calculated by dividing the property tax levy by the levy rate and multiplying by 1,000 (since levy rates are given as the amount paid per \$1,000 of assessed valuation).

permits during the 1930s (elasticity of 0.11). Included in this category are building permit fees, which rise and fall with construction activity. Lastly, government grants rose as housing permits fell, which suggests cities with greater lapses in residential construction activity received more grants.

Aside from reducing total revenue and property taxes, delinquency was also negatively associated with public enterprise earnings (coefficient of  $-0.63$ ), property and asset revenue (coefficient of  $-1.19$ ), and fines (coefficient of  $-1.72$ ). These areas were linked to real estate markets. For instance, public enterprise earnings and property revenue acted as taxes on real estate. Cities received fees for providing public services (i.e., water, electricity, and gas), and also earned rent on city-owned property. These payments for public services fell as the economy suffered and tax delinquency rose. In the case of fines, tax-delinquent property sales often made up a substantial portion of the stream. Before the Depression, private companies often purchased tax titles from city governments, which entitled them to collect penalty payments from delinquent property owners. This market helped ensure cities received tax revenues for the year (Upson, 1933, p. 132). However, it broke down when real estate values fell and an excess supply of delinquent tax titles emerged (Beito, 1989, p. 8). In Detroit, for example, they were halted altogether between 1932 and 1938 (Michigan Planning Commission, 1939).

Rising real debt obligations influenced property and asset revenue and general earnings. These areas contained fees positively correlated with infrastructure investment and bolstered by debt spending in the 1920s. But aside from these relationships, growth in debt obligations was also associated with a reduction in special assessment fees during the 1930s (elasticity of  $-2.6$ ). Highly indebted cities likely received more funding from this source in the 1920s since these (one-time) special charges were earned through building debt-financed infrastructure. When building slowed down in the 1930s, so too did these fees (Gulick and Hoan, 1933, p. 364). Overall, indebted cities traded a reduction in these fees for higher assessed valuations, asset revenue, and general earnings.

How did city spending respond to fiscal strain? The results of estimating equation (1) for spending are shown in Table 9. As shown in column 1, there is no evidence that housing cycles played a large role in driving municipal spending during the 1930s: the coefficients in the 85-city sample are similar to those reported in Table 6 for the larger sample. The key factor at play in total spending was growth in real debt obligations. As columns 3 and 4 show, for the average city, the increase in real interest payments between 1929 and 1933 was associated with a roughly 8 percent decline in total spending, which worked primarily through capital outlays (see column 6).<sup>47</sup> The results thus suggest highly indebted cities cut spending on large projects.<sup>48</sup> The key challenge for operating expenditures was rising tax delinquency. Similar to the

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<sup>47</sup>Skidmore and Scorsone (2011) show that fiscal stress in Michigan's cities led to large cuts in capital expenditures between 2005 and 2009.

<sup>48</sup>One concern is that a reduction in capital spending associated with a rise in interest payments was simply due to spending normalization after a period of excessive spending in the 1920s. However, including an interaction term of the growth in interest

magnitude for total revenue, the increase in the delinquency rate for the average city between 1930 and 1933 was associated with a nearly 5 percent decline in operating expenditures. Thus, to the extent rising tax delinquency led to revenue shortfalls, cities also cut operating expenditures.<sup>49</sup> These results are consistent with Upson (1935), who suggests that unpaid taxes forced cities to reduce spending in response.

The results for broad spending categories hide some of the dynamics associated with crafting city budgets. As suggested by the qualitative evidence, fiscal strain forced city leaders to cut specific services. Table 10 shows the results of estimating equation (1) for separate operating expenditures. Consider first the role of the housing market. While total spending was not sensitive to changes in house prices during the Depression, spending on sanitation was (elasticity of 0.14). Sanitation spending was also positively correlated with residential construction activity, along with charitable spending and miscellaneous services. Overall, while expenditures in these areas were sensitive to the housing market slowdowns in the 1930s, the effects are relatively small.

The slowdown in housing construction meant cities could reduce spending on roads, schools, and other infrastructure supporting new development. While this trend would not force cities to roll back existing services, rising tax delinquency and growing real debt payments would. First, consider the role of unpaid taxes. The primary categories affected by tax delinquency include police and fire protection, sanitation, and health: in each area, the average rise in the delinquency rate between 1930 and 1933 was associated with a real spending cut of at least 6 percent.<sup>50</sup> According to the qualitative evidence in Section 2.3, these were common areas in which city leaders cut spending due to mounting delinquencies.<sup>51</sup>

The relationship between real debt obligations and operating expenditures was isolated to particular areas. Growth in real debt obligations, for instance, cramped spending on highway maintenance and general government. Much construction in the 1920s was for new roads; cities with rising real debt obligations in the 1930s cut back on maintaining these roads. In 1933, the Commissioner of Public Works in Troy, NY observed that budgetary pressures had caused many cities to shirk on the maintenance of streets, sewers, and other infrastructure (Roche et al., 1933). And while cities could easily blame cuts in areas such as police and fire protection on taxpayer behavior, the blame for rising real debt obligations in the 1930s was on city governments themselves. General government services was an inconspicuous area in which to make spending

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payments between 1923 and 1929, or between 1927 and 1931, with year gives similar results.

<sup>49</sup>Although cities may have had reserves to tide them over in difficult years or otherwise issued debt to meet operating expenditures, these were not sustainable courses of action over the downturn as reserves dried up and banks became less apt to lend to excessive borrowers (Fuchs, 1992, p. 40).

<sup>50</sup>Including a national time trend and state-specific time trends (both with and without region-year dummies) yields nearly identical delinquency coefficients and the same significance levels as those reported in Table 10. And although the results are not shown, a high current-year delinquency rate was related to less spending in police and fire protection and highway operation and maintenance. These areas appear to have been the most adaptable to contemporaneous fiscal strain in the form of tax delinquency. Charitable spending, on the other hand, rose with delinquency initially but fell after one year. Cities spent more on relief when current-year delinquency rose, but then adjusted this spending downward in subsequent years.

<sup>51</sup>Police departments bore the brunt of cuts to public safety departments (Smith, 1935). And while cities such as Pittsburgh, Detroit, and Seattle cut fire services, most fire departments fared well (Bugbee, 1935).

cuts, perhaps a convenient scapegoat for debt-burdened cities.<sup>52</sup>

Expenditure cuts had social costs, which some argued should be balanced against the costs of debt default. In one observer's words, defaulting on services was a price "measured in pounds of flesh" (Leland, 1933, p. 120). What were some of these social costs? Crime may have increased with less police protection, especially at a time with little available work and greater temptations to resort to criminal behavior.<sup>53</sup> City spending on sanitation reduced waterborne disease rates in the U.S. between 1902 and 1929 (Cain and Rotella, 2001), and spending on child health programs helped reduce fertility between 1923 and 1932, possibly through a decrease in child mortality (Fox and Myrskylä, 2015). Additionally, relief spending through New Deal grants, which replaced some local health spending, saved lives and reduced infant mortality (Fishback et al., 2007). Cuts in these areas, then, likely marred the health of urban residents. And insofar as public-improvement projects employed workers, capital spending helped stimulate local economies. Fishback et al. (2005), for instance, find that an additional dollar of public works and relief spending increased 1939 retail sales by 44 cents. Spending on employment, services, and capital projects had positive impacts on urban communities during the Great Depression.

## 5. Discussion

Cities in the Great Depression were forced to cut costs by reducing services, cutting wages and salaries, or reducing inefficiencies in operation, including laying off workers (Brower, 1932). Personnel costs often comprised the largest component of a city's operating expenditures. Thus, many of the spending cuts in the midst of the Depression were wage and employment reductions (Buck, 1933). According to Ridley and Nolting (1935, p. 203, Table 3), public sector workers' wages were flexible: nearly 95 percent of 252 surveyed cities had cut salaries by 1934, with a range between 3 and 50 percent.<sup>54</sup> Wage and salary cuts averaged 17 percent in another study of 210 cities (Public Management, 1934). Comparing these nominal cuts to the fall in the consumer price index—roughly 24 percent between 1929 and 1933—suggests that they were real salary reductions in many cases, although not necessarily on average. Furthermore, salary cuts lasted several years: more than half of the cities that reduced salaries during the Depression had still not restored any portion of the cuts by 1935 (Ridley and Nolting, 1935, p. 203, Table 3). Cities also "reduced the number of employees by leaving vacancies unfilled, by consolidating positions, by retiring superannuated employees, and by eliminating unnecessary positions" (Public Management, 1934, p. 103). Employees in many cities were also put on a part-time basis or had wages in arrears for months (Cline, 1934). Chicago, for instance,

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<sup>52</sup>This result squares with recent literature showing that greater fiscal stress in Michigan's cities led to spending cuts in general government between 2005 and 2009 (Skidmore and Scorsone, 2011).

<sup>53</sup>Fishback et al. (2010) show that welfare spending during the Great Depression reduced property crime, which suggests such a link is plausible. Indeed, Stone (1933) describes a rising trend in burglary rates in large cities between 1930 and 1932.

<sup>54</sup>According to one source, cities began cutting wages in 1932 (Public Management, 1934). Thus, all of the cuts were possibly made between 1932 and 1934.

struggled for months to pay its employees. In April 1934, the city was still two months behind in paying its police officers, firefighters, and other workers (The Washington Post, 1934). In addition to cutting personnel, Dallas put many employees on a “staggered-time” employment basis (Upson, 1933, p. 142). Employees in many cities were even issued scrip (Abbott, 2007). It is difficult to imagine that city services were not impacted by such large and sweeping actions regarding personnel.

Early on, many local welfare offices had partnered with private charities to provide jobs and relief to unemployed workers (Abbott, 2007). Cities initially felt it was the duty of local governments and organizations to provide unemployment relief.<sup>55</sup> One example is Philadelphia, which formed a bureau for unemployment relief within the city’s welfare department in 1931 and distributed \$3 million in city funds for food, fuel, and clothing. Millions more were raised by other sources, but the money had dried up by the summer of 1932. Private charities in many large cities also did their part to carry some of the relief load early in the downturn (Gelfand, 1975, p. 32). Ultimately, these efforts fell short in providing the help required in the depths of the Depression. Adding to the stress were the actions of state governments, which focused on balancing budgets rather than helping the unemployed and destitute (Judd and Swanstrom, 2002, p. 125). These pressures forced dozens of officials from large cities—led by Mayor Murphy of Detroit—to draft a formal plea for help from the federal government in 1932. President Hoover responded by providing \$300 million in loans to local governments through the Reconstruction Finance Corporation (RFC). Aimed at being supplemental to the relief funds provided out of state and local revenues, these loans marked a turning point at which cities and the federal government developed a closer relationship (Gelfand, 1975; Judd and Swanstrom, 2002). Without this aid, many cities would have found it impossible to meet local relief needs (Betters, 1933b). Also available were project loans from the Emergency Relief and Construction Act of 1932—an amendment to the act that created the RFC—although the loan provisions were often difficult for cities to satisfy, which led to little take-up of these funds by 1933 (Betters, 1933b; Herring, 1934). Better yet were the combination of grants and loans provided through the Public Works Administration (formed by the National Industrial Recovery Act of 1933), although the low grant-to-loan ratio and high interest rate attached to the funds dissuaded many cities from undertaking local projects (Gelfand, 1975, pp. 48-49). While these federal programs helped relieve some of the pressure on city finances and encouraged capital expenditures, they were not a cure-all.

The Great Depression was a time of major financial stress and disruption in the national economy, with many local governments defaulting on debt payments as they became a growing burden in city budgets (Bernanke, 1983; Lehmann, 1950). While these obligations contributed to the wave of municipal defaults during the Depression, the rise in tax delinquency also aided in the crisis. Two-thirds of cities with excessively high delinquency rates during the Depression had defaulted on debt (Bird, 1936a, p. 344). A regression

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<sup>55</sup>This feeling is apparent in city manager conference proceedings from 1931. Much attention was given to methods and strategies for addressing the unemployment problem at the local level. See Ridley and Nolting (1932, pp. 52–98).

analysis of 45 cities and towns in Michigan shows that those with higher tax delinquency rates were more likely to default (Hempel, 1973).<sup>56</sup> Local governments simply could not fulfill their obligations as taxes went unpaid. Another indication of delinquency's role in the default crisis is the passage of the 1934 Municipal Bankruptcy Act, approved the year after delinquency rates reached their peak. Prior to 1934, municipal debt adjustment required consent from all creditors. By instead requiring majority consent, the Act provided "...an orderly procedure of debt adjustment for defaulting municipalities and local government units" (Lehmann, 1950, p. 241).<sup>57</sup> Common requests included maturity-date extensions and interest-rate adjustments (Hillhouse, 1936a). Aside from cities' debt burdens, certainly some of the motivation for passing the Act stems from the epidemic of delinquency and the revenue struggles it caused.

While default was a setback for many cities, falling delinquency and the eventual payment of back taxes provided much-needed budgetary relief. While improvements in the economy were important, another factor aiding in this rebound were better tax collection procedures implemented by municipal governments (Bird, 1936a). Among other things, these procedures included quarterly tax payments, earlier billing in the fiscal year, and stiffer tax penalties (Bird, 1936a). State legislation passed in the early years of recovery, rather than improvements made by individual cities, was the source of most of these procedural changes. Nearly every state passed some form of tax-assistance legislation in the mid-1930s aimed at curbing delinquency (Leland, 1936).<sup>58</sup> National pay-your-taxes campaigns also helped, for which Michigan was a front-runner (Leland, 1936). The city of Newark also gained national attention for its guilt-laden propaganda encouraging tax payment (Beito, 1989, pp. 112-118).

Perhaps more than any other intervention, the actions of the Home Owners Loan Corporation (HOLC) contributed to property-tax recovery toward the end of the Depression. Supported by both real estate interests and local governments, the HOLC began in the summer of 1933 as part of President Roosevelt's New Deal. The agency aimed to stem foreclosures by purchasing loans from private lenders and reissuing them to borrowers with better terms and interest rates. In the process, any remaining property debts or back taxes were either expunged or wrapped into the new loan's principal. The HOLC thus protected itself from losing property claims through tax delinquency (Fishback et al., 2013). In this way, the agency helped resolve the delinquency crisis and provided an impetus for the payment of back taxes that helped boost collections. In a survey of 61 city officials conducted by Lehman Brothers in 1935, the majority cited the

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<sup>56</sup>Using a logit model, Joffe (2013) shows cities that experienced bigger revenue declines and carried more burdensome debt obligations were more likely to default during the Depression.

<sup>57</sup>The 1934 Act was deemed unconstitutional two years later as an infringement on state responsibilities. It conferred no real benefits to large cities, whose biggest problems were with financial giants and not bondowners (Gelfand, 1975, p. 51). Nevertheless, Congress passed a second Municipal Bankruptcy Act in 1937. See Lehmann (1950) for more details.

<sup>58</sup>In the delinquency sample, 75 out of 85 cities were in states that passed some form of legislation described here. Controlling for the impact of this legislation with an indicator variable equal to one for cities in these states does not change the results. Since these laws were passed in a short period of time, and nearly every city was impacted, the year indicators generally capture the legislation's effects.



HOLC's efforts as the most important factor leading to recovery in tax collections, followed by improvements in the economy and local tax collection procedures (New York Times, 1935).

In 1933, H.L. Mencken suggested that the "reign of terror" on local budgets and employees had subsided with greater federal involvement in local affairs (Mencken, 1933, pp. 259-260). While the New Deal may have provided relief, city governments struggled to meet obligations during the Depression, whether in the form of employee remunerations, community services, or debt payments to creditors. These predicaments manifested in a collective urban voice that resulted in the creation of the United States Conference of Mayors (Gelfand, 1975, p. 67). This organization placed the urban plight of the 1930s in the conscience of the American people. Cities lobbied for debt-adjustment legislation, and after 1933, received federal grants and loans to help fund local expenditures (Gelfand, 1975). This support, combined with better tax collection procedures and assistance from HOLC, helped city budgets rebound just as the national economy was doing the same.

## **6. Conclusion**

Municipal budgets suffered under immense fiscal strain during the Great Depression. But while they were sensitive to changes in house prices and residential construction activity during the 1920s, city finances were stable in the face of the housing distress that plagued many cities in the 1930s. Instead, principal elements of stress were the rise in tax delinquency and growth in real debt obligations. The rise in unpaid taxes was associated with diminished total revenue and operating expenditures, particularly in such critical areas as police and fire protection, sanitation, and health. Growth in real debt obligations was associated with reduced spending on capital projects, road maintenance, and general administration. While there is more to learn about the determinants of delinquency and debt growth during this time, as well as the behavior of property owners and local governments, it is clear that city governments would have been in better financial shape to weather the economic storm of the early 1930s had these elements of fiscal stress been less onerous.

Municipal actions during the Great Depression were complex and multi-faceted. Cities responded dynamically to the downturn by adjusting their level and composition of spending. Local budgetary policy may indeed have had larger implications for the severity and duration of the Depression experienced in urban areas, especially at a time when the share of local government expenditures exceeded that of federal or state governments. Furthermore, city budgets were influenced by policies and programs implemented during the New Deal beginning in 1933. Much changed for cities in the tumultuous years of the early 1930s, and it is likely that experiences in this decade had long-term implications for municipal budgets and fiscal practices, which is an area worthy of further study.

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## Appendix

### 6.1. Sample Cities and Regions

Table A1 gives the list of cities used in the analysis by census region.

Table A1: Sample cities by census region

Midwest	Northeast	South	West
Akron, OH <sup>†</sup>	Albany, NY	Atlanta, GA	Denver, CO
Canton, OH	Boston, MA	Baltimore, MD	Long Beach, CA
Chicago, IL <sup>†</sup>	Bridgeport, CT	Birmingham, AL	Los Angeles, CA
Cincinnati, OH	Buffalo, NY	Chattanooga, TN	Oakland, CA
Cleveland, OH <sup>†</sup>	Cambridge, MA	Dallas, TX	Portland, OR
Columbus, OH <sup>†</sup>	Camden, NJ	El Paso, TX	Salt Lake City, UT
Dayton, OH	Elizabeth, NJ	Fort Worth, TX	San Diego, CA
Des Moines, IA <sup>†</sup>	Erie, PA	Houston, TX	San Francisco, CA
Detroit, MI	Fall River, MA	Jacksonville, FL	Seattle, WA
Duluth, MN	Hartford, CT	Knoxville, TN	Spokane, WA
Evansville, IN <sup>†</sup>	Jersey City, NJ	Louisville, KY	Tacoma, WA
Flint, MI	Lowell, MA	Memphis, TN	
Fort Wayne, IN	Lynn, MA	Miami, FL	
Gary, IN	New Bedford, MA	Nashville, TN	
Grand Rapids, MI	New Haven, CT	New Orleans, LA	
Indianapolis, IN <sup>†</sup>	New York, NY	Norfolk, VA	
Kansas City, KS	Newark, NJ	Oklahoma City, OK	
Kansas City, MO	Paterson, NJ	Richmond, VA	
Milwaukee, WI <sup>†</sup>	Philadelphia, PA	San Antonio, TX	
Minneapolis, MN	Pittsburgh, PA	Tampa, FL	
Omaha, NE	Providence, RI	Tulsa, OK	
Peoria, IL	Reading, PA	Washington, DC <sup>†</sup>	
South Bend, IN	Rochester, NY	Wilmington, DE	
St. Louis, MO	Scranton, PA		
St. Paul, MN	Somerville, MA		
Toledo, OH	Springfield, MA		
Wichita, KS	Syracuse, NY		
Youngstown, OH	Trenton, NJ		
	Utica, NY		
	Waterbury, CT		
	Worcester, MA		
	Yonkers, NY		

<sup>†</sup> Delinquency data unavailable.

### 6.2. Real Per Capita Financial Data

Table A2 shows average real per capita revenue and spending data between 1923 and 1936. Real values are in 1967 dollars and calculated using the CPI (U.S. Census Bureau, 1975, pp. 210-211, Series E-135).

Table A2: Real per capita revenue and spending, 1923–1936

	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936
<i>Municipal revenue</i>														
Total revenue	95.86	103.28	105.02	110.28	118.49	122.98	122.43	128.51	136.77	141.17	138.05	140.47	141.39	144.75
Property taxes	61.38	65.42	65.89	69.56	75.34	77.64	77.36	82.86	89.43	93.18	88.72	89.34	89.05	89.84
Public enterprise earnings	10.81	11.40	11.88	12.41	12.92	13.08	13.60	14.08	15.24	15.61	15.81	16.13	16.05	17.44
Government grants	4.87	5.05	4.92	4.96	5.16	5.71	5.86	6.30	7.58	9.53	13.79	14.42	16.06	17.11
Special assessments	6.90	8.15	9.04	8.93	10.27	11.33	9.94	8.86	7.38	5.50	3.74	3.88	3.10	2.73
Other taxes	4.44	5.13	5.23	5.94	6.08	6.29	6.44	6.90	6.93	6.70	6.22	6.96	7.55	8.40
Property and asset revenue	3.37	3.70	3.62	3.65	3.88	3.93	4.06	4.15	4.24	4.09	3.99	3.77	3.50	3.48
General department earnings	2.72	2.81	2.85	3.04	3.02	3.16	3.31	3.59	3.87	4.22	3.97	4.10	4.19	3.61
Donations and contributions	0.54	0.70	0.73	0.73	0.88	0.96	1.01	1.01	1.43	1.80	1.43	1.35	1.33	1.43
Fines, forfeits, and escheats	0.83	0.91	0.87	1.05	0.95	0.89	0.86	0.75	0.66	0.55	0.40	0.51	0.55	0.70
<i>Municipal spending</i>														
Total spending	110.36	120.71	122.14	127.08	137.11	135.51	135.66	144.70	151.92	149.30	134.68	129.98	131.26	137.30
Operating expenditures	66.10	69.42	70.14	73.81	78.59	80.58	82.39	86.56	98.10	106.16	102.60	98.57	98.54	100.06
Education	24.95	26.31	26.37	27.42	29.29	30.25	30.96	32.43	36.46	38.58	35.60	33.64	33.65	34.97
Protection to person and property	12.40	12.87	13.16	13.70	14.64	15.01	15.27	15.87	17.51	18.15	17.00	16.39	16.30	16.64
Charities, hospitals, and corrections	2.86	3.01	3.14	3.42	3.83	3.99	4.16	4.93	7.45	11.88	14.60	13.68	13.40	12.90
Public enterprises	6.41	6.64	6.67	6.90	7.18	7.26	7.16	7.31	7.91	7.80	7.31	7.39	7.59	8.44
Highways	5.57	5.84	5.77	6.52	6.51	6.38	6.61	6.74	7.49	7.20	6.42	6.65	6.53	6.46
General government	4.29	4.40	4.48	4.63	4.95	5.17	5.24	5.58	6.19	6.42	6.20	6.02	5.98	6.24
Sanitation	4.17	4.34	4.38	4.64	5.01	4.95	5.07	5.21	5.57	5.59	4.97	4.71	4.63	4.83
Miscellaneous	1.94	2.26	2.28	2.42	2.77	2.99	3.12	3.39	3.94	4.90	5.34	5.19	5.44	4.42
Recreation	2.02	2.14	2.21	2.41	2.54	2.64	2.78	3.00	3.26	3.20	2.89	2.68	2.78	2.81
Conservation of health	1.50	1.61	1.68	1.75	1.88	1.95	2.01	2.10	2.34	2.43	2.28	2.23	2.25	2.34
Capital outlays	34.85	41.32	41.53	41.97	46.23	42.00	39.81	43.86	37.88	24.84	13.45	13.12	15.69	20.64
Interest payments	9.41	9.97	10.48	11.31	12.28	12.92	13.45	14.28	15.94	18.31	18.64	18.28	17.03	16.60

Note: Average per capita values are given for the period between 1923 and 1936 for all revenue and spending variables across the 94-city sample (except for Miami, which does not have data for the years between 1923 and 1925). All variables are in real terms (1967 dollars) and calculated using the CPI (U.S. Census Bureau, 1975, pp. 210-211, Series E-135). See Table 4 for variable descriptions.

### 6.3. Summary Statistics, 1931–1936

Table A3 shows summary statistics for the years between 1931 and 1936.

### 6.4. Analysis Using a Different Measure of House Prices

Perhaps the most widely used source of house price data for the early twentieth century is Wickens (1937), a report that gives enough information to build a picture of the behavior of single-family house prices for 22 cities. This report has been tapped by economists for an indication of house price behavior across a subset of cities (see, for example, Fishback and Kollman (2014) and Shiller (2005)). Fishback and Kollman (2014) were able to add cities to this group after finding more survey results used by Wickens. Overall, of the 94 cities in this paper’s sample, 23 have house price data from this expanded sample. These data were calculated using the method of Grebler et al. (1956). The survey used to generate the data in Wickens (1937) asked participants for their house’s value at the time of acquisition, as well as the estimated value in 1934. An index value was calculated for each city in each year by dividing the average purchase price by the average house value reported in January 1934, with a base year of 1930 and a correction for an annual compound depreciation rate of  $1\frac{3}{8}$  percent. In each year, this calculation was performed on the same group of homes, thus mimicking a repeat sales index (except without a sale in 1934). I use this depreciation-corrected index (called the House Price Index, or HPI) in the following robustness checks. Like the PVI used in the main analysis, the HPI is likely biased. For instance, it only measures the value of houses that escaped foreclosure in the worst years of the Depression (i.e., those for which homeowners were available for an interview in 1934). Insofar as foreclosures occurred, the index overstates house prices, as it does not measure the potentially depressed values of these houses.

Overall, the coefficients for the HPI are larger than those for the PVI, likely due to measurement biases (i.e., upward bias in the HPI and downward bias in the PVI). But results across the samples correspond. For example, using the HPI for the 1923–36 period, the cumulative elasticities for total revenue and total spending are 0.746 (standard error: 0.246) and 0.726 (standard error: 0.385); for the 1923–29 period, they are 0.558 (standard error: 0.243) and 0.626 (standard error: 0.260); for the 1930–36 period, they are 0.112 (0.245) and  $-0.424$  (standard error: 0.363). See Table 6 for comparison. Other coefficients are similar across the PVI and HPI models.

Table A3: Summary statistics, 1931–1936

	Mean	Std. dev.
<i>Municipal revenue (per capita)</i>		
Total revenue	140.43	47.06
Property taxes	89.93	32.59
Public enterprise earnings	16.05	14.03
Government grants	13.08	13.55
Special assessments	4.39	4.87
Other taxes	7.13	6.05
Property and asset revenue	3.85	4.36
General department earnings	3.99	2.48
Donations and contributions	1.46	1.57
Fines, forfeits, and escheats	0.56	0.43
<i>Municipal spending (per capita)</i>		
Total spending	139.07	50.82
Operating expenditures	100.67	37.46
Education	35.48	9.37
Protection to person and property	17.00	6.13
Charities, hospitals, and corrections	12.32	13.35
Public enterprises	7.74	7.20
Highways	6.79	3.30
General government	6.17	3.56
Sanitation	5.05	2.88
Miscellaneous	4.87	4.07
Recreation	2.94	1.76
Conservation of health	2.31	1.46
Capital outlays	20.94	17.49
Interest payments	16.16	8.09
<i>Tax base (per capita)</i>		
Assessed valuation	3299.18	1233.43
Property tax rate	29.39	10.19
<i>Housing and tax delinquency</i>		
Permit value index (PVI)	103.62	49.83
Housing permits	1144.38	5339.63
Delinquency rate	0.20	0.11
<i>Controls</i>		
State income per capita	1243.57	431.67
Population	388226.90	811213.60
Tax rate limit	0.09	0.28
Midwest	0.30	0.46
Northeast	0.34	0.47
South	0.24	0.43
West	0.12	0.32

*Note:* Summary data are given for the period between 1931 and 1936 for all revenue and spending variables. To match their periods of use in the analysis (which uses lags of most variables), the PVI, housing permits, population, and state income data encompass the years between 1928 and 1935. Delinquency data run from 1930 through 1936. Interest payment data run from 1928 through 1936. Financial variables and state income are given in per capita terms. Financial values, state income, and the PVI (1930=100) are deflated using the CPI (U.S. Census Bureau, 1975, pp. 210-211, Series E-135). See Table 4 for financial variable descriptions and text for description of other variables.

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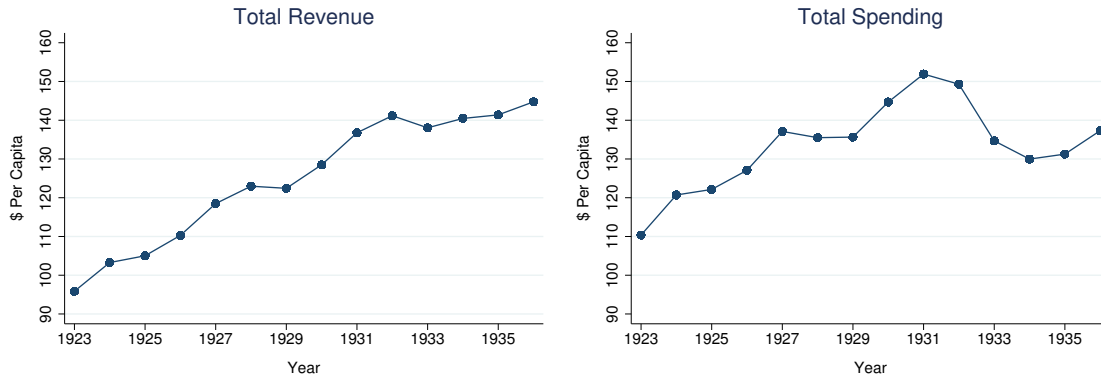


Figure 1: Real per capita revenue and spending, 1923–1936

*Note:* The figure shows average real per capita revenue and spending for 94 large U.S. cities. Due to lack of data, Miami is not included before 1926. All values are in 1967 dollars.

*Source:* Author's calculations based on data from the *Financial Statistics of Cities* reports. To calculate per capita values, census population data were linearly interpolated between census years. Nominal values are deflated using the CPI (U.S. Census Bureau, 1975, pp. 210-211, Series E-135). See text for details on data construction and Table 4 for descriptions of revenue and spending variables.

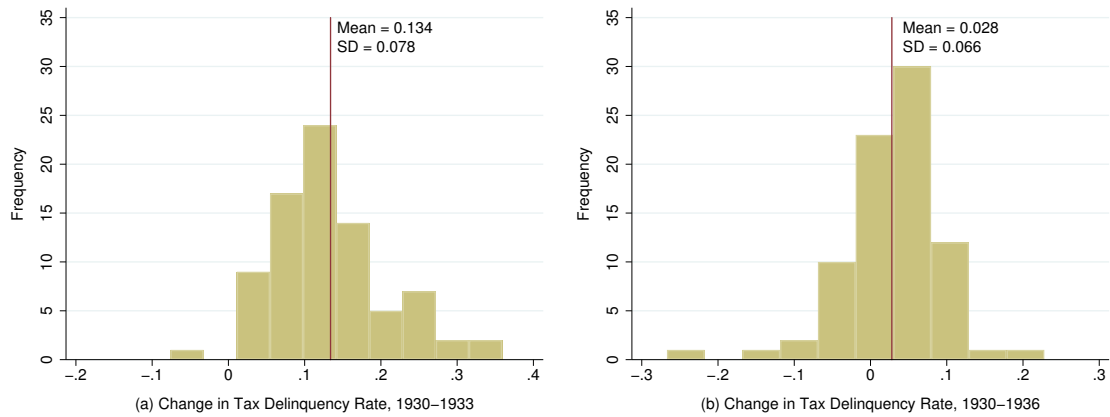


Figure 2: Distribution of the changes in the tax delinquency rate by city, 1930-1933 and 1930-1936

*Note:* The sample consists of 81 cities for which delinquency data are available in the years considered. The mean and standard deviation (SD) of the changes are as shown, with the solid vertical line representing the mean change.  
*Source:* Author's calculations from data given in Bird (1938).

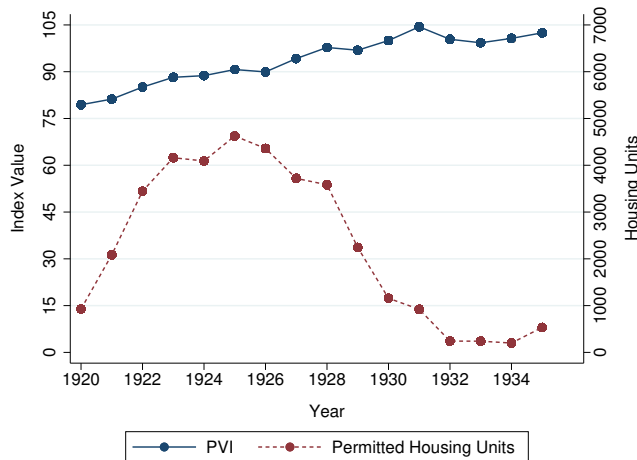


Figure 3: Permit value index (PVI) and permitted housing units, 1920-1935

*Note:* The figure shows median index values for the PVI (1930=100) and the average number of new family housing units permitted in 94 large U.S. cities between 1920 and 1935. The PVI is deflated by the CPI (U.S. Census Bureau, 1975, pp. 210-211, Series E-135).

*Source:* Author's calculations from reports compiled by the Bureau of Labor Statistics (see text).

Table 1: Average real per capita revenue and spending data by region and year, relative to 1929

	1923	1930	1931	1932	1933	1934	1935	1936
<i>Total revenue</i>								
Midwest	0.849 (0.236)	1.040 (0.179)	1.130 (0.361)	1.095 (0.297)	1.072 (0.380)	1.074 (0.374)	1.074 (0.448)	1.116 (0.392)
Northeast	0.763 (0.094)	1.062 (0.070)	1.144 (0.095)	1.274 (0.135)	1.258 (0.166)	1.289 (0.173)	1.348 (0.200)	1.315 (0.166)
South	0.847 (0.305)	1.106 (0.274)	1.177 (0.221)	1.188 (0.271)	1.193 (0.280)	1.181 (0.243)	1.150 (0.208)	1.246 (0.310)
West	0.788 (0.156)	1.053 (0.091)	1.076 (0.116)	1.046 (0.180)	0.998 (0.223)	1.011 (0.209)	0.973 (0.203)	1.084 (0.218)
United States	0.812 (0.212)	1.065 (0.174)	1.140 (0.234)	1.173 (0.244)	1.156 (0.290)	1.166 (0.283)	1.174 (0.323)	1.212 (0.300)
<i>Total spending</i>								
Midwest	0.915 (0.202)	1.053 (0.171)	1.094 (0.186)	1.049 (0.215)	0.962 (0.205)	0.910 (0.208)	0.879 (0.201)	0.981 (0.261)
Northeast	0.772 (0.121)	1.107 (0.205)	1.194 (0.185)	1.226 (0.166)	1.136 (0.152)	1.123 (0.153)	1.148 (0.186)	1.121 (0.172)
South	0.930 (0.338)	1.026 (0.179)	1.117 (0.220)	1.051 (0.240)	0.907 (0.210)	0.865 (0.181)	0.905 (0.186)	1.007 (0.219)
West	0.755 (0.163)	1.156 (0.311)	1.105 (0.242)	1.047 (0.255)	0.913 (0.258)	0.840 (0.221)	0.845 (0.190)	0.944 (0.259)
United States	0.850 (0.228)	1.077 (0.206)	1.135 (0.203)	1.110 (0.224)	1.002 (0.217)	0.963 (0.217)	0.973 (0.227)	1.031 (0.230)

*Note:* The mean for each region is given, with standard deviations in parentheses. The sample consists of 94 cities: 28 in the Midwest; 32 in the Northeast; 23 in the South; and 11 in the West. Due to lack of data, Miami is not included in the calculations for 1923. All values are in real terms (1967 dollars). To calculate per capita values, census population data were linearly interpolated between census years. *Source:* Author's calculations based on data from the *Financial Statistics of Cities* reports. Nominal values are deflated using the CPI (U.S. Census Bureau, 1975, pp. 210-211, Series E-135).

Table 2: Average property tax delinquency rates by region and year

	1930	1931	1932	1933	1934	1935	1936
Midwest	0.066 (0.030)	0.100 (0.051)	0.180 (0.079)	0.232 (0.101)	0.218 (0.090)	0.181 (0.074)	0.135 (0.055)
Northeast	0.175 (0.107)	0.201 (0.101)	0.258 (0.122)	0.292 (0.122)	0.267 (0.108)	0.218 (0.097)	0.184 (0.092)
South	0.141 (0.089)	0.176 (0.104)	0.241 (0.127)	0.286 (0.142)	0.244 (0.114)	0.199 (0.092)	0.164 (0.089)
West	0.079 (0.058)	0.108 (0.080)	0.157 (0.104)	0.195 (0.109)	0.168 (0.098)	0.140 (0.087)	0.106 (0.078)
United States	0.130 (0.095)	0.161 (0.099)	0.223 (0.118)	0.264 (0.125)	0.237 (0.108)	0.194 (0.092)	0.157 (0.085)

*Note:* The delinquency rate is the proportion of tax levies on all property—real and personal—within a city’s jurisdiction that are unpaid in a given fiscal year. The mean for each region is given, with standard deviations in parentheses. The sample is slightly unbalanced as not all cities have delinquency data for every year. In total, the sample consists of 85 cities: 20 in the Midwest; 32 in the Northeast; 22 in the South; and 11 in the West. See Section 3.1 for more information. *Source:* Author’s calculations from data given in Bird (1938).

Table 3: Average nominal and real per capita interest payments by region and year, relative to 1929

	Nominal				Real			
	1923	1931	1933	1936	1923	1931	1933	1936
Midwest	0.777 (0.215)	1.082 (0.236)	1.025 (0.237)	0.977 (0.297)	0.780 (0.216)	1.218 (0.266)	1.355 (0.313)	1.208 (0.367)
Northeast	0.684 (0.181)	1.051 (0.165)	1.163 (0.234)	1.045 (0.294)	0.687 (0.181)	1.182 (0.185)	1.537 (0.310)	1.292 (0.363)
South	0.712 (0.177)	1.059 (0.128)	1.024 (0.258)	0.961 (0.201)	0.715 (0.178)	1.191 (0.144)	1.354 (0.341)	1.188 (0.248)
West	0.768 (0.276)	1.132 (0.179)	1.136 (0.257)	1.040 (0.286)	0.771 (0.277)	1.274 (0.202)	1.502 (0.340)	1.286 (0.354)
United States	0.729 (0.204)	1.072 (0.183)	1.085 (0.248)	1.004 (0.273)	0.732 (0.205)	1.206 (0.206)	1.435 (0.328)	1.241 (0.337)

*Note:* The mean for each region is given, with standard deviations in parentheses. The sample consists of 93 cities: 28 in the Midwest; 32 in the Northeast; 22 in the South; and 11 in the West. Washington, D.C. is not included since it had no debt in these years. Due to lack of data, Miami is not included in the calculations for 1923. All values are in real terms (1967 dollars). To calculate per capita values, census population data were linearly interpolated between census years. *Source:* Author’s calculations based on data from the *Financial Statistics of Cities* reports. Nominal values are deflated using the CPI (U.S. Census Bureau, 1975, pp. 210-211, Series E-135).

Table 4: Financial variable descriptions

Variable	Description
<i>Municipal revenue</i>	
Property taxes	<i>Ad valorem</i> taxes on property
Public enterprise earnings	Fees and charges for public services such as water, electricity, and gas
Government grants	Grants from county, state, and federal governments
Special assessments	Charges levied on specific properties benefiting from capital projects; compulsory fees levied on specific properties for operation and maintenance of existing public improvements
Other taxes	Business license taxes; special taxes on corporations; inheritance taxes; taxes on animals; poll taxes; dog licenses; motor vehicle licenses; marriage licenses; building permits
Property and asset revenue	Interest on funds; fees received for privilege of using streets in provision of public services (e.g., subways) and extending private property onto public property (e.g., awnings); rent from city-owned real property (held for investment purposes)
General department earnings	Fees and charges for services performed by municipal administration
Donations and contributions	Private contributions; retirement dues received by or for government employees
Fines, forfeits, and escheats	Court fines and penalties; fees exacted from unfulfilled contracts; revenues received from sale of property seized by city governments
<i>Municipal spending</i>	
Operating expenditures	Short-term (non-capital) spending on education; protection to person and property; charities, hospitals, and corrections; public enterprises; highways; general government; sanitation; miscellaneous; recreation; conservation of health
Education	Schools; libraries
Protection to person and property	Police and fire departments; inspection services
Charities, hospitals, and corrections	Care of poor and children; operation and maintenance of hospitals; correctional services
Public enterprises	Water-supply systems; electric light and power systems; docks, wharves, and landings; cemeteries and crematories
Highways	Maintenance of roadways and waterways; snow and ice removal; street lighting
General government	Judicial courts and services; executive administration; legislative services; elections
Sanitation	Refuse collection; sewer maintenance and sewage disposal; street cleaning
Miscellaneous	Pensions; special aid; administration of public trust funds and investments; other general spending
Recreation	Parks and trees; educational; general recreation
Conservation of health	Prevention and treatment of communicable diseases; vital statistics; food regulation
Capital outlays	Costs of land, properties, and public improvements that are more or less permanent
Interest payments	Interest costs incurred on short-term and long-term debt

*Note:* Descriptions are based on those given in the *Financial Statistics of Cities* report for 1930 (U.S. Census Bureau, 1930); they are consistent across time. Categories are listed in order of their relative weight in the average city's budget across the years between 1923 and 1936 (see Table 5). The largest revenue and spending subcategories in 1930 are listed first in the descriptions.

Table 5: Summary statistics

	Cities	Periods	Mean	Std. dev.	% change: 1929-33		% change: 1931-34	
					Mean	Std. dev.	Mean	Std. dev.
<i>Municipal revenue (per capita)</i>								
Total revenue	94	14	125.02	43.34	15.62	28.98	2.10	14.08
Property taxes	94	14	79.68	28.75	21.96	71.51	-0.91	15.83
Public enterprise earnings	94	14	14.04	13.14	125.27	1012.71	10.38	30.96
Government grants	94	14	8.68	10.58	1513.70	5578.68	908.45	3763.90
Special assessments	94	14	7.12	8.68	-45.31	45.27	-40.64	48.22
Other taxes	94	14	6.38	6.03	25.60	73.08	37.50	101.45
Property and asset revenue	94	14	3.82	4.13	-2.90	45.46	-19.73	34.13
General department earnings	94	14	3.46	2.16	29.53	75.88	9.17	45.54
Donations and contributions	94	14	1.10	1.23	251.44	1113.52	7.19*	44.81
Fines, forfeits, and escheats	94	14	0.75	0.76	-37.62	72.31	-10.11	84.96
<i>Municipal spending (per capita)</i>								
Total spending	94	14	133.44	47.94	0.18	21.74	-14.52	16.23
Operating expenditures	94	14	86.59	32.68	23.32	19.74	-1.19	14.23
Education	94	14	31.50	8.97	14.92	15.03	-7.97	11.33
Protection to person and property	94	14	15.36	5.56	11.44	17.33	-6.61	10.84
Charities, hospitals, and corrections	94	14	7.39	10.11	474.13	992.45	96.52	223.45
Public enterprises	94	14	7.28	7.34	89.99	788.16	-2.33	29.62
Highways	94	14	6.48	3.09	1.61	33.66	-9.81	27.35
General government	94	14	5.42	3.16	20.27	36.08	-1.85	16.23
Sanitation	94	14	4.86	2.65	-2.20	28.73	-16.48	17.75
Miscellaneous	94	14	3.60	3.27	71.46	79.06	30.33	41.38
Recreation	94	14	2.67	1.54	8.66	58.72	-18.44	24.31
Conservation of health	94	14	2.03	1.28	14.31	30.85	-3.76	32.97
Capital outlays	94	14	32.64	25.44	-60.63	36.32	-57.16	37.91
Interest payments	94	14	14.22	7.67	43.48	32.83	14.15	17.05
<i>Tax base (per capita)</i>								
Assessed valuation	94	14	3072.10	1129.39	13.43	20.89	-6.69	16.98
Property tax rate	94	14	28.71	10.38	0.50	13.90	0.05	12.13
<i>Housing and tax delinquency</i>								
Permit value index (PVI)	94	16	96.94	41.88	6.86	39.05	15.45	97.31
Housing permits	94	16	2296.69	8601.90	-87.11	14.03	-75.03	24.16
Delinquency rate	85	7	0.20	0.11	0.13 <sup>†</sup>	0.08	0.07 <sup>‡</sup>	0.06
<i>Controls</i>								
State income per capita	94	16	1263.80	410.75	-29.13	6.96	-8.24	5.02
Population	94	16	364080.71	762263.02	3.41	4.32	1.36	2.86
Tax rate limit	94	14	0.04	0.19				
Midwest	94	14	0.30	0.46				
Northeast	94	14	0.34	0.47				
South	94	14	0.24	0.43				
West	94	14	0.12	0.32				

\* This calculation excludes Memphis, for which 1934 was an exceptionally good year for outside donations. With Memphis, the mean is 41,702.01 and the standard deviation is 397,743.2. <sup>†</sup> Percentage-point change: 1930-33. <sup>‡</sup> Percentage-point change.

*Note:* Summary data are given for the period between 1923 and 1936 for all revenue and spending variables. To match their periods of use in the analysis (which uses lags of most variables), the PVI, housing permits, population, and state income data encompass the years between 1920 and 1935. Delinquency data run from 1930 through 1936. Financial variables and state income are given in per capita terms. Financial values, state income, and the PVI (1930=100) are deflated using the CPI (U.S. Census Bureau, 1975, pp. 210-211, Series E-135). See Table 4 for financial variable descriptions and text for descriptions of other variables.

Table 6: Housing and municipal finances, 1923–1936

	Total revenue			Total spending		
	1923–36 (1)	1923–29 (2)	1930–36 (3)	1923–36 (4)	1923–29 (5)	1930–36 (6)
ln(PVI)	0.103*** (0.032)	0.109** (0.052)	0.045 (0.030)	0.081* (0.029)	0.178** (0.081)	−0.006 (0.049)
ln(Housing permits)	0.074*** (0.017)	0.096*** (0.021)	0.016 (0.017)	0.115*** (0.015)	0.167*** (0.032)	0.047** (0.018)
<i>p</i> -value for PVI			0.286			0.052
<i>p</i> -value for housing permits			0.003			0.001
Observations	1290	643	647	1290	643	647
Cities	94	94	94	94	94	94
$R^2$	0.674	0.540	0.379	0.493	0.362	0.471

\*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% levels.

*Note:* Total revenue and total spending are expressed in real per capita terms. Dependent variables are in natural logs. The coefficients for the PVI (an index based on the average cost to build a family housing unit) and housing permits are cumulative elasticities based on three lags. All regressions are based on equation (1) and include city fixed effects, year fixed effects, region-year interactions, a tax rate limit indicator, and three lags of city population and real per capita state income. *p*-values are given for two-tailed *z*-tests of the differences between the 1923–29 and 1930–36 coefficients. Standard errors are clustered at the city level.

Table 7: Fiscal strain and municipal revenue, 1931–1936

	Total revenue (1)	Total revenue (2)	Total revenue (3)	Total revenue (4)	Property taxes (5)	Assessed valuation (6)	Property tax rate (7)
Delinquency rate		−0.342** (0.148)		−0.353*** (0.130)	−0.419*** (0.140)	−0.050 (0.113)	0.063 (0.123)
ln(Interest payments)			0.142** (0.071)	0.167** (0.073)	0.258*** (0.072)	0.199*** (0.061)	0.026 (0.053)
ln(PVI)	0.000 (0.033)	0.004 (0.032)	−0.023 (0.034)	−0.022 (0.032)	0.005 (0.041)	−0.019 (0.026)	0.034 (0.034)
ln(Housing permits)	0.009 (0.014)	0.009 (0.014)	0.009 (0.015)	0.010 (0.014)	0.022 (0.017)	0.032 (0.020)	−0.008 (0.021)
Observations	488	488	488	488	488	488	488
Cities	85	85	85	85	85	85	85
$R^2$	0.300	0.327	0.323	0.352	0.413	0.636	0.222

\*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% levels.

*Note:* Column headings are dependent variables, which are expressed in real per capita terms (except the property tax rate). All dependent variables are in natural logs. Delinquency rate coefficients are cumulative effects based on contemporaneous and lagged delinquency (one year). The coefficients for interest payments are cumulative elasticities based on contemporaneous and lagged debt obligations (three years). The PVI (an index based on the average cost to build a family housing unit) and housing permits are cumulative elasticities based on three lags. All regressions are based on equation (1) and include city fixed effects, year fixed effects, region-year interactions, a tax rate limit indicator, and three lags of city population and real per capita state income. Standard errors are clustered at the city level.

Table 8: Fiscal strain and various categories of municipal revenue, 1931–1936

	Public fees (1)	Gov't. grants (2)	Special charges (3)	Other taxes (4)	Asset revenue (5)	General earnings (6)	Donations (7)	Fines (8)
Delinquency rate	-0.625** (0.298)	1.136 (1.250)	-0.275 (1.446)	0.449 (0.486)	-1.192* (0.665)	-0.041 (0.417)	0.541 (0.965)	-1.720* (0.892)
ln(Interest Payments)	0.206 (0.169)	-0.439 (0.738)	-2.581*** (0.643)	0.343 (0.314)	0.677** (0.306)	0.601** (0.232)	-0.120 (0.424)	-0.056 (0.430)
ln(PVI)	-0.005 (0.110)	0.075 (0.207)	-0.075 (0.368)	-0.340** (0.154)	-0.095 (0.168)	-0.280*** (0.095)	-0.142 (0.254)	-0.065 (0.169)
ln(Housing permits)	0.048 (0.040)	-0.249* (0.132)	0.018 (0.114)	0.105** (0.049)	0.114 (0.071)	0.051 (0.058)	-0.296 (0.221)	0.006 (0.068)
Observations	484	488	471	488	488	488	476	488
Cities	85	85	83	85	85	85	84	85
R <sup>2</sup>	0.238	0.333	0.514	0.515	0.420	0.303	0.093	0.276

\*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% levels.

*Note:* Column headings are dependent variables, which are expressed in real per capita terms. All dependent variables are in natural logs. Delinquency rate coefficients are cumulative effects based on contemporaneous and lagged delinquency (one year). The coefficients for interest payments are cumulative elasticities based on contemporaneous and lagged debt obligations (three years). The PVI (an index based on the average cost to build a family housing unit) and housing permits are cumulative elasticities based on three lags. All regressions are based on equation (1) and include city fixed effects, year fixed effects, region-year interactions, a tax rate limit indicator, and three lags of city population and real per capita state income. Standard errors are clustered at the city level.

Table 9: Fiscal strain and municipal spending, 1931–1936

	Total spending (1)	Total spending (2)	Total spending (3)	Total spending (4)	Operating expend's. (5)	Capital outlays (6)
Delinquency rate		-0.123 (0.217)		-0.119 (0.203)	-0.343** (0.172)	-0.512 (0.998)
ln(Interest payments)			-0.207** (0.090)	-0.221** (0.093)	-0.079 (0.074)	-1.664*** (0.599)
ln(PVI)	-0.011 (0.050)	-0.014 (0.051)	0.019 (0.047)	0.016 (0.047)	0.040 (0.040)	0.074 (0.241)
ln(Housing permits)	0.033* (0.020)	0.030 (0.020)	0.020 (0.019)	0.014 (0.019)	0.026 (0.018)	0.086 (0.100)
Observations	488	488	488	488	488	488
Cities	85	85	85	85	85	85
R <sup>2</sup>	0.499	0.501	0.560	0.564	0.378	0.542

\*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% levels.

*Note:* Column headings are dependent variables, which are expressed in real per capita terms. All dependent variables are in natural logs. Delinquency rate coefficients are cumulative effects based on contemporaneous and lagged delinquency (one year). The coefficients for interest payments are cumulative elasticities based on contemporaneous and lagged debt obligations (three years). The PVI (an index based on the average cost to build a family housing unit) and housing permits are cumulative elasticities based on three lags. All regressions are based on equation (1) and include city fixed effects, year fixed effects, region-year interactions, a tax rate limit indicator, and three lags of city population and real per capita state income. Standard errors are clustered at the city level.



Table 10: Fiscal strain and municipal operating expenditures, 1931–1936

	Educ. (1)	Prot. (2)	Charity (3)	Public enter's. (4)	Highways (5)	General gov't. (6)	Sanit. (7)	Misc. (8)	Rec. (9)	Health (10)
Delinquency rate	-0.229 (0.160)	-0.514*** (0.195)	-0.325 (1.010)	0.080 (0.370)	-0.498 (0.352)	-0.323 (0.266)	-0.555** (0.264)	0.014 (0.434)	-0.450 (0.439)	-0.453* (0.262)
ln(Interest payments)	-0.043 (0.067)	-0.018 (0.084)	-0.114 (0.363)	-0.218 (0.240)	-0.371** (0.175)	-0.222** (0.097)	-0.086 (0.145)	0.395* (0.234)	-0.263 (0.178)	-0.086 (0.146)
ln(PVI)	-0.016 (0.037)	-0.003 (0.033)	0.367 (0.259)	-0.015 (0.120)	-0.001 (0.075)	0.073 (0.060)	0.138* (0.081)	-0.087 (0.097)	0.027 (0.077)	0.005 (0.058)
ln(Housing permits)	0.022 (0.017)	0.009 (0.019)	0.267** (0.117)	0.048 (0.058)	-0.010 (0.034)	0.013 (0.025)	0.070** (0.031)	0.077** (0.034)	0.029 (0.041)	0.016 (0.033)
Observations	488	488	481	482	488	488	488	488	488	488
Cities	85	85	84	85	85	85	85	85	85	85
R <sup>2</sup>	0.452	0.353	0.265	0.147	0.236	0.224	0.404	0.284	0.289	0.218

\*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% levels.

Note: Column headings are dependent variables, which are expressed in real per capita terms. All dependent variables are in natural logs. Delinquency rate coefficients are cumulative effects based on contemporaneous and lagged delinquency (one year). The coefficients for interest payments are cumulative elasticities based on contemporaneous and lagged debt obligations (three years). The PVI (an index based on the average cost to build a family housing unit) and housing permits are cumulative elasticities based on three lags. All regressions are based on equation (1) and include city fixed effects, year fixed effects, region-year interactions, a tax rate limit indicator, and three lags of city population and real per capita state income. Standard errors are clustered at the city level.