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On December 19, 2010, municipal analyst Meredith Whitney predicted in an interview broadcast on CBS' 60 Minutes that "between 50 and 100 counties, cities, and towns in the United States would have "significant" municipal bond defaults starting in 2011..." Since that time, three California cities have declared bankruptcy—Stockton, San Bernardino, and Mammoth Lakes. The Mammoth Lakes bankruptcy has since been dismissed after the city settled with its one principle creditor. Nonetheless, the effects of the Great Recession continue to challenge public agencies in California and throughout the U.S. Public revenues lag in an economic recovery by as many as five years and many communities have applied all the cost-cutting measures available short of default.

To address the prospect that public agencies, particularly cities and counties, will have to continue to make hard choices between providing services and meeting their outstanding obligations, CDIAC commissioned a study to assess the probability of bond default by public agencies in California. The study, funded through a contract with the Center for California Studies at Sacramento State University, takes a big step forward in identifying some of the determinants of fiscal stress in California.

The study applies two approaches to modeling default. The first is based upon the relationships found in municipal defaults that took place during the Great Depression. The second draws from case studies of California municipal defaults from 1979 to the present. Combined, these two approaches identify five factors that appear to be linked to defaults: population, income, the ratio of interest cost to total revenues, the ratio of change in revenues to total revenues, and general fund balances.

Because of the methodological and data limits of this study, CDIAC does not interpret the result of the probability model to be indicative of potential default and we do not encourage readers to do so either. Instead, we suggest that readers understand from the model that certain key factors are significantly related to bond defaults that occurred during the Great Depression and to the extent that some or all of those conditions exist today, these factors

may be indicative of the potential for bond defaults today. For this reason, any assessment of a city's fiscal condition may be well advised to begin here.

The authors of the study represent that this is the first effort to model municipal bond defaults. As such it contributes to the discussion of this topic and more broadly to the discussion of municipal fiscal stress. But this is just the first step. Future research must address the limitations in this study, including modeling current period defaults on conditions that existed in the early 1930s. CDIAC is encouraged to present the results of this study as a way to engender follow-on efforts that will contribute to an understanding of key determinants of municipal fiscal stress that may lead to default.

CDIAC believes that this report begins the discourse that needs to take place in the state with regard to evaluating the fiscal conditions of public agencies. As a part of this discussion, data analysts, including the public agencies themselves, must decide what to do with the results of any evaluation. We look forward to playing a part in this discussion.

Respectfully,

Mark B. Campbell
Executive Director

Assessing Municipal Bond Default Probabilities

by Matthew J. Holian, Ph.D
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Assessing Municipal Bond Default Probabilities

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Abstract

In response to a request from the California Debt and Investment Advisory Commission, we propose several approaches to explaining municipal default, and to estimating default likelihood for bonds issued by cities. The first approach relies on logistic regression analysis of major city financial statistics and socioeconomic variables from the Great Depression – the last time a large number of cities defaulted – to develop a statistical model. The model is used with contemporary figures, including data available in Comprehensive Annual Financial Reports (CAFRs) that cities are required to publish, to estimate default probabilities. For this study, we gathered data from CAFRs for 260 California cities with population over 25,000. Using CAFR data from the year 2011, and our Depression-era model, we estimate the default probability for California cities, and consider how well these estimates would have predicted the two defaults that actually occurred in California in 2012. Despite the fact that the model is based on historical events from over 80 years ago, it does a fairly impressive job of predicting the two 2012 defaults. The second approach relies on detailed case study evidence for recent historical defaults in California and other states. These case studies reveal that general fund exhaustion was associated with the most recent California municipal bond defaults. Thus our second approach for predicting default relies on a simple ranking of cities based on a standardized measure of general fund balance. This second approach, though highly simplistic, does an even better job of predicting the 2012 defaults than our Great Depression-era model. We continue this line of analysis by examining the determinants of general fund balance, and identify several variables that may provide a worthwhile departure for future research into the causes of municipal stress. Finally, we discuss the possibility of a hybrid model, which is informed by both the logistic regression analysis and case study evidence, as a third approach. Overall, this study sheds new light on the determinants and predictors of municipal default. By making both our findings and the data we gathered for this study available to scholars and the general public, this research will pave the way for better understanding this important topic.

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Executive Summary

California local agencies have faced substantial fiscal stress in the aftermath of the financial crisis. Several cities have filed for bankruptcy, defaulted on bond payments or declared fiscal emergencies. However, the vast majority of California local bond issuers continue to perform on their obligations.

The fiscal troubles faced by individual governments typically receive substantial publicity. Such news reports reinforce dire predictions from high profile analysts that a municipal market crisis is imminent. As a result, bondholders may be dissuaded from investing in the obligations of all municipal bond issuers – even those that are relatively healthy. This phenomenon threatens to exacerbate municipal bond market illiquidity, which, according to Ang and Green (2011), already costs issuers an extra 1.1% in annual interest.

With the collapse of the municipal bond insurance business and questions concerning the credibility of bond ratings, new methods of credit risk assessment are required. In response to a request by the California Debt and Investment Advisory Commission, we propose various empirically-based methodologies for assigning credit scores to municipalities, using quantitative techniques that are resistant to bias.

In bond market terms, a default is usually defined as *the failure on the part of an issuer to pay principal and/or interest in full and on a timely basis*. It is this definition of default that we use in this study. This means we do not consider the concept of a technical default which often relates to the failure of an issuer to carry out other obligations under the bond agreement, such as the prompt filing of continuing disclosures. Further, we do

not consider failure to pay contractors, employees, retirees or beneficiaries promised sums as defaults for the current purpose – the concept narrowly applies to bondholders.

Since our model applies to cities themselves, it does not consider the specific attributes of their individual bond issues. Thus, general obligation bonds issued by a city should be expected to have less risk than our estimates suggest, while certificates of participation and other securities not explicitly backed by a diverse stream of tax revenues may be more risky.

In this report, we develop and consider three main approaches for explaining municipal default, and to estimating default likelihood for bonds issued by cities. Our first approach analyzes data from the Great Depression era in the United States to develop a statistical model of municipal default risk based on four fiscal indicators. These are: (1) the ratio of interest and pension expenses to total governmental fund revenue, (2) the annual change in total governmental fund revenue, (3) city population, and (4) average household income.

We next conduct case study evaluation of more recent defaults. This analysis finds that the ratio of the city's end of year general fund balance to its general fund expenditures appears to be an important variable. In fact, a simple ranking of California cities in 2011 puts San Bernardino and Stockton, the two California cities that did default in 2012, closer to the top of the "risk of default" list than the Depression-era model.

As a third approach, we suggest combining insights from the first two approaches and discuss a hybrid model of municipal default. All three approaches will help municipal bond investors and other stakeholders in city government solvency better comprehend the risks faced by investors. This project also paves the way for future study by building and

distributing a new database, and by relating these new data to other sources. Specifically, we examine the determinants of general fund balance in order to further efforts to anticipate conditions that increase the risk of default.

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Matthew Holian and Marc Joffe

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Introduction

The issue of municipal solvency has frequently made the headlines in recent years. Financial analyst Meredith Whitney's 2010 appearance on *60 Minutes* was but one of a number of dire predictions for municipal bondholders. In 2012, the bankruptcies of Stockton and San Bernardino (both in California) attracted significant media attention, as has the July 2013 filing by Detroit, Michigan.

Unfortunately for bondholders and the many other stakeholders in city solvency, the debate about municipal credit has often generated more heat than light. Whitney's analysis fed into a narrative about skyrocketing public employee pension costs triggering a tsunami of municipal bankruptcies.

These politically charged predictions have yet to be borne out by the facts on the ground. In the *60 Minutes* interview, Whitney predicted 50-100 sizable defaults (CBS News, 2010). She later stated that this would be "something to worry about" within 12 months of her appearance (in December 2010). When it became apparent that this dire forecast was failing to materialize, Michael Lewis (2011) wrote an influential piece in *Vanity Fair* quoting Whitney as saying "who cares about the stinking muni-bond market?" and attempting to rehabilitate her by turning the reader's attention to fiscal problems in California cities, public employee pensions and the risk of "cultural" as opposed to financial bankruptcy.

For those who do care about the "stinking" municipal bond market, the discussion left much to be desired. Investors are still wondering how much risk they actually shoulder when purchasing municipal bonds issued by California cities and how much extra interest they should expect to receive in compensation for taking on this risk. The question of the

appropriate interest rate resonates far beyond the municipal bond market, since it directly affects municipal debt service costs, which in turn impact tax rates, service levels and cities' abilities to add infrastructure by borrowing.

As we discuss in this study, defaults by cities have been quite rare since the Great Depression. Doty (2012) estimates that annual default rates on general obligation bonds have been consistently below 0.1% in recent decades. Indeed, a researcher is compelled to unearth 80-year-old data just to obtain a statistically meaningful sample of general obligation bond defaults on the part of U.S. cities. Even when this dark period in the history of municipal finance is investigated, we find the defaults were often the result of idiosyncratic factors that do not portend ill for modern investors. Finally, pension underfunding is not a new phenomenon: as Munell (2012) documents, it was also a serious concern in the 1970s – a period that witnessed some highly publicized city financial emergencies, but no spate of municipal bond defaults.

All that said, defaults have occurred and will continue to occur, perhaps with somewhat greater frequency than they have in recent decades. Clearly, some cities are more at risk than others, and so stakeholders would benefit from objective, widely available measures of municipal credit risk.

While credit rating agencies have the potential to better inform the public's understanding of municipal credit risk, they face several barriers in doing so. First, since they rely primarily on bond issuers for their revenue, they have limited incentive to evaluate cities they are not paid to rate. Second, much of their investor-oriented research is sold as premium content and thus cannot be freely distributed. Third, rating agencies have lost credibility in the aftermath of the 2008 financial crisis. And, finally, the three major

rating agencies were sued by the Connecticut attorney general – also in 2008 – for assigning overly harsh ratings to municipal bond issuers relative to corporate and structured finance issuers. Two of the three agencies recalibrated their municipal ratings in response to the suit, which was settled in 2011 with no admission of responsibility but the extension of credits to the state of Connecticut for future ratings services.

We believe that the informational vacuum created by the rating agency problem can be filled by academic research. This study represents our initial contribution to this academic project, and we hope that it will motivate others to add their insights. Our approach involves the use of statistical and case study analysis to propose a municipal bond default probability model targeted at California cities with populations greater than 25,000.

The discussion proceeds as follows. First, we provide a literature review that discusses previous efforts to model municipal credit quality. We find that most of the literature uses ratings or bond yields as a proxy for credit risk, and offer objections to these approaches.

Next, we review the Great Depression-era municipal bond default experience and propose a logit model based on a set of data collected from this period. This analysis identifies two significant fiscal variables intuitively related to default risk: the ratio of interest to revenue and the change in annual revenue. We also find that larger populations had a greater default risk as did cities with lower average incomes.

After this, we provide a comprehensive review of California city bond defaults and bankruptcies with case studies of the most recent payment difficulties. The case study evidence suggests that exhaustion of the general fund – an element that is not available in

the Great Depression data set – has been a major driver in recent bankruptcy filings and attendant defaults. We extend this analysis by developing a regression model identifying several determinants of general fund balance.

Finally, we explore the possibility of statistically modeling more recent defaults and potentially creating a hybrid model that embeds insights from both the Depression and current periods. We stop short of proposing such a hybrid model in this paper, but we describe what such a model would look like.

Appendix 1 presents models of Depression-era default with alternative specifications, and discusses our method of model selection.

Appendix 2 investigates the possibility of using data from the California State Controller's Office *Cities Annual Report* as a basis for municipal bond default probability estimation. We also evaluate the accuracy of these data against the Comprehensive Annual Financial Report (CAFR) data we have gathered for this study.

In Appendix 3, we survey post-Depression defaults in U.S. cities outside California. As part of this discussion, we see how New York and Cleveland – both of which defaulted in the 1970s – rank against peer cities with respect to variables of interest. We also provide information that supplies much needed context to popular media reporting about municipal bond distress. Specifically, we find that bankruptcy does not necessarily involve default (and vice versa) and that most bankruptcies have occurred in small towns, many of which did not have significant volumes of outstanding municipal bonds (if any).

The data supporting this study is available at the California City Credit Scoring website (http://www.publicsectorcredit.org/ca).

Chapter 1: Literature Review

Previous Great Depression-Era Municipal Default Research

Dr. George Hempel's contribution to our understanding of Depression-era municipal defaults is widely regarded in the municipal bond industry. Aside from his most commonly cited study, *The Postwar Quality of State and Local Debt* (1971), some of Hempel's other work is relevant. Particularly noteworthy is his contribution to a 1973 study published by the now-defunct U.S. Advisory Commission on Intergovernmental Relations (ACIR). This work contains a wealth of statistics as well as detailed case studies of eight high-profile defaults from the Great Depression era.

In addition to default counts and descriptive material, Hempel also presented an econometric default model in his 1971 National Bureau of Economic Research (NBER) study. Unfortunately, the model was based on data from only 24 municipal issuers in the State of Michigan, 17 of which defaulted. This sample has three shortcomings: small overall size, geographic distribution not representative of the nation as a whole, and an in-sample default rate inconsistent with population default rates. Contemporaneous estimates published in *The Bond Buyer* (1938) indicate that there were about 30,000 municipal issuers in the 1930s. The approximate default count of 4,800 issuers in that decade implies a population default rate of 16%. This contrasts to a rate of 71% in Hempel's sample.

Hempel collected 11 independent variables for the sample issuers. These are:

- Population
- Dollar Amount of Notes Outstanding
- Dollar Amount of Debt Outstanding
- Per Capita Debt
- Total Assessed Property Values

- Dollar Amount of Taxes Levied
- Tax Levy per $1,000 Assessed Value
- Debt/Assessed Property Values
- Percentage of Current Taxes Delinquent
- Tax Levy per Capita
- Assessed Property Values per Capita

This set of variables captures many of the factors theorized to cause municipal bond defaults including size of the issuer and debt burden, as well as the willingness and ability of local government and the citizenry to generate required tax revenue. No variables capture other costs that municipal leaders might choose to pay instead of debt service – such as municipal employee salaries or pensions. Also, some of Hempel's variables are derived from others, introducing a risk of multicollinearity. For example, Per Capita Debt is the quotient of Dollar Amount of Debt Outstanding and Population.

After collecting the data, Hempel subjected it to factor analysis, multiple discriminant analysis and multiple regression analysis. He reports a multiple regression equation that contains eight of the 11 variables, which are significant at $p < 0.1$. While the overall regression has an r^2 of 0.64, a number of the variables have signs inconsistent with theory, perhaps due to multicollinearity. Hempel addressed multicollinearity by further reducing the set of independent variables to the following four (shown here with their coefficients and standard errors):

Table 1: Hempel's (1971) Municipal Default Model

Variable	Coefficient	Standard Error
Tax Levy per $1,000 Assessed Value	-0.00310	0.00247
Tax Levy per Capita	-0.00115	0.00108
Debt/Assessed Property Values	+0.3521	0.17000
Percentage of Current Taxes Delinquent	+0.07209	0.07277

Hempel's work does not report any goodness of fit measures for the overall equation, but notes that it had a higher r^2 than other alternatives he evaluated, and that all variables have the expected sign. On the other hand, two of the four variables are not significant at $p < 0.05$, while the two best predictors are theoretically related.

In the interest of using Depression-era data to predict future defaults, it is fortunate that certain variables fell out of Hempel's specification. Given the substantial change in prices and wealth since the 1930s, it would be difficult to use the Dollar Value of Notes Outstanding, the Dollar Value of Debt Outstanding or Per Capita Debt to model current issuers. Tax Levy per Capita, which remained in Hempel's specification, has a similar challenge. Variables that take the form of ratios, such as Debt/Assessed Property Values or Tax Levy per $1,000 Assessed Value are more appropriate for analysis and forecasting, independent of time period.

Hempel (1973) later expanded the sample to 45 Michigan cities – 28 of which defaulted – and 23 independent variables. Many of the added variables were 1922 values most likely obtained from that year's Census of State and Local Governments. He identified a regression equation with nine exogenous variables significant at $p < .05$.

Table 2: Hempel's (1973) Municipal Default Model

Variable	Coefficient	Standard Error
Log of 1932 Population	-0.07678	0.0321
Assessed Property Value per Capita in 1932	+0.0001585	0.0000523
Growth of Population from 1922 to 1932	-0.02146	0.0113
Growth of Debt Relative to Population Growth	-0.007912	0.00213
Debt/Assessed Property Values in 1932	+0.4885	0.258
Tax Levy per $1,000 Assessed Value in 1932	+0.00919	0.00242
Tax Levy per Capita in 1932	-0.007197	0.00322
Percentage of Current Taxes Delinquent in 1932	+0.2095	0.0962
Notes Outstanding per Capita in 1932	+0.009159	0.00246

Hempel noted the presence of multicollinearity but did not present an alternative equation that addressed it. Two of the nine variables presented above – Growth of Debt Relative to Population Growth and Tax Levy per Capita in 1932 – have coefficient signs that are inconsistent with intuition. Hempel reported that the nine-variable regression had an adjusted r^2 of 0.51, while alternatives that remedied multicollinearity had adjusted r^2 of between 0.39 and 0.45.

In his discussion of Hempel's findings, Forbes (1973) questioned the use of Depression-era data for modeling purposes, while admitting that the paucity of more recent defaults forced this choice. In particular he noted that local governments received more state aid – at the time of his writing – than they did in the 1930s. This institutional change could reduce the relevance of the historic default data.

Predicting Credit Ratings as a Proxy for Estimating Default Risk

Rubinfeld (1973) proposed a multiple regression model for predicting credit ratings. Since credit ratings are intended to convey information about the likelihood of default, exogenous variables that explain credit ratings could also be used as predictors of default. Using a sample of 128 New England municipal bond issuers, he found that the following independent variables were predictive of the credit rating at the 10% significance level:

- Percentage of Taxes Uncollected in the Previous Year
- Ratio of Direct Net Debt to Assessed Valuation
- Median Family Income
- Full Valuation of the Property Tax Base
- Overlapping Debt

The first two of these exogenous variables are consistent with those in Hempel's 1973 study. Overlapping Debt refers to the indebtedness of other issuers who rely on the same tax

base. For example, if property owners pay taxes to both their city and county, and if both governmental entities carry debt, then the county's debt would be considered overlapping debt vis-à-vis the city and vice versa. This variable, along with Median Family Income and Full Valuation of the Property Tax Base, would have to be restated as a ratio to be useful in a default prediction model.

Carelton and Lerner (1969) attempted to use statistical techniques to match Moody's bond ratings using a random sampling of issuers extracted from Moody's 1967 *Municipal and Government Bond* manual. They tested six variables – all of which they found to be significant. These were:

- Whether the Issuer Was a School District
- Ratio of Debt to Assessed Valuation
- Ratio of Debt to Population
- Log of Population
- Log of Debt
- Average Collection Rate

Using a large sample of 976 cities, Farnham and Cluff (1984) tested 23 variables to determine whether they were predictive of Moody's bond ratings. They found 12 of the variables to be significant at $\alpha = 0.05$. The method used was an "N-chotomous" probit analysis. The authors chose this method because the four possible ratings in the dependent variable were thought to be of unequal lengths. That is, many more cities fell into the A rating category than into the Aaa category. Their analysis included several variables not considered by other authors – including housing stock attributes, form of government and geographical location. Four of the housing stock attributes proved to be significant. Farnham and Cluff's variables are listed in the following table.

Table 3: Farnham and Cluff's (1984) Independent Variables

Variable	Significant at 5% Level?
Gross Debt / 1,000 Population	*
Total General Revenue	*
Percent Change in Total Revenue	*
Assessed Valuation	*
Population	
Percent Change in Population	
Percent Nonwhite	*
Percent Eighteen Years and Under	
Population Density	*
Income per Capita	
Ratio of Non-Workers to Workers	*
Number of Manufacturing Establishments	
Percent One-Unit Housing Structures	*
Percent Housing Units Occupied	
Percent Housing Units Owner Occupied	*
Percent Housing Units Built Before 1940 (as of 1970)	*
Median Value of Owner Occupied Housing Units	*
Median Years of Education	*
Local Documents Available	
Council-Manager Form of Government	
City Located in Northeast Region	
City Located in Northcentral Region	
City Located in South	

The papers reviewed above are part of a large literature that attempts to estimate municipal bond ratings. Loviscek and Crowley (1990) compared the studies described here with 11 others that had the same objective.

Since Loviscek and Crowley published their review, at least two additional papers modeling municipal bond ratings have appeared. Moon and Stotsky (1993) analyzed data for 892 U.S. cities with populations over 25,000, of which 727 were rated. They first modeled the decision by city officials to seek a rating and then factors determining the ratings actually

assigned. This methodology highlights the fact that by choosing to be rated, cities self-select into the samples used in previous studies. This suggests that studies that use ratings as a proxy for default probability suffer from selection bias.

Moon and Stotsky (1993) found that cities choosing to remain unrated were likely to receive a low rating. They tested 20 variables potentially affecting rating levels, and found 15 to be significant. The variables they evaluated are as follows:

Table 4: Moon and Stotsky's (1993) Independent Variables

Variable	**Significant at 5% Level?**
Median Housing Value	*
Proportion of Housing Units that Were Built Before 1940	*
Proportion of Housing Units that Were Built After 1970	
Proportion of Housing Units that Are Owner-Occupied	*
Per Capita Income	*
Percentage Change in Population from 1970 to 1980	*
Proportion of the Population that Is Non-White	*
Population Density	*
Total Debt	
Per Capita Debt	*
Ratio of Debt to Income	*
Ratio of Surplus Revenues to General Revenues	
Ratio of Intergovernmental Revenues to General Revenues	
Council-Manager Form of Government	*
Commission Form of Government	
City Located in Midwest	*
City Located in South	*
City Located in West	*
Population Between 100,000 and 500,000	*
Population Greater than 500,000	*

Most recently, Palumbo and Zaporowski (2012) analyzed ratings for 965 county and city governments rated by Moody's in 2002. This population encompassed all such units that issued rated full faith and credit debt and that could be matched against Census Bureau,

Bureau of Economic Analysis (BEA), and Bureau of Labor Statistics (BLS) data sets. Of the 15 variables they examined, 13 proved to be significant at the 5% level, as shown below.

Table 5: Palumbo and Zaporowski's (2012) Variables

Variable	Significant at 5% Level?
Per Capita Income	*
Percentage Change in Population, 1990-2000	*
Unemployment Rate	*
Percentage Change in Earnings per Worker, 1986-2001	*
Economic Diversity Index from BEA	*
State Aid per Capita	*
State General Obligation Bond Rating	*
Debt to Market Value (Ratio of Full Faith and Credit Debt to Population-Weighted Median Value of Housing)	*
Non-Guaranteed Debt per Capita	
Per Capita Interest Payments for Nonutility Debt	
Per Capita General Revenues	*
State Imposed Taxation Limit	*
State Imposed Expenditure Limit	*

Objections to Rating-Based Analysis

Researchers who model ratings rather than defaults, implicitly assume that the former predict the latter.[1] However, if ratings do not change in response to underlying credit conditions experienced by municipal bond issuers, they may not be an effective proxy for default risk. Under SEC rules, rating agencies are required to publish transition matrices showing the distribution of rating changes over a given period. A review of the transition matrices published by Moody's Corporation (2012), Standard & Poor's Corporation (S&P

[1] In fairness to the authors of these studies, it is worth pointing out that most do not make the claim that ratings proxy default probability. When modeling credit ratings, researchers may have goals other than estimating default probability. For example, they may be interested in modeling rating agency behavior.

2012a) and Fitch, Inc. (2012) suggests that about 90% of municipal bond ratings remain unchanged within a given year.

For example, an S&P (2012a) transition matrix (for non-housing municipal issuers) shows that 89.11% of AA-rated issuers remained AA the following year, while 0.18% were upgraded to AAA, another 1.62% were upgraded to AA+, and a total of 9.09% were downgraded to various rating categories ranging from AA- down to BB+.

The S&P matrix represents all rating change activity that occurred between 1986 and 2011. During most of this period, a substantial proportion of municipal bond ratings reflected insurance "enhancements." So-called monoline insurers, such as Ambac, FGIC and MBIA (which were rated AAA), sold bond insurance policies to municipalities guaranteeing that any missed bond payments would be covered by the insurer. Consequently, the ratings assigned to these insured issuers were AAA, reflecting the estimated credit quality of the insurer. During the 2007-2008 financial crisis, all monoline bond insurers went out of business or suffered ratings downgrades (Palumbo and Zaporowski, 2012).

While the insurance was in place, ratings might have appeared to remain stable despite changes in municipal credit conditions, simply due to the stability of the insurer's credit rating. However, Fitch's Form NRSRO ratings transition exhibit states that the ratings analyzed are "unenhanced," which means they reflect the underlying credit quality of the issuer excluding any insurance benefit. We expect that this is also the case for the S&P and Moody's tables.

Insurance coverage aside, municipal ratings stability could be explained by some combination of three factors. First, underlying credit conditions for most issuers do not materially change from year to year. Second, ratings grades are too coarse to capture many

credit quality changes. And, third, rating agencies do not perform sufficient surveillance activities to detect and respond to many changes in issuer credit quality. To the extent that the second and third causes are explanatory, they pose challenges to the use of ratings as a proxy for default probability.

Little evidence is available to determine the relative weight of each of these three factors. One item that may be relevant is the criticism rating agencies received for their inadequate monitoring of Residential Mortgage Backed Securities (RMBS) and Collateralized Debt Obligations (CDO) prior to the financial crisis of 2007 and 2008. The United States Senate Permanent Subcommittee on Investigations (2011) found that:

> *Resource shortages impacted the ability of the credit rating agencies to conduct surveillance on outstanding rated RMBS and CDO securities to evaluate their credit risk. The credit rating agencies were contractually obligated to monitor the accuracy of the ratings they issued over the life of the rated transactions. CRA* [Credit Rating Agency] *surveillance analysts were supposed to evaluate each rating on an ongoing basis to determine whether the rating should be affirmed, upgraded, or downgraded. To support this analysis, both companies collected substantial annual surveillance fees from the issuers of the financial instruments they rated, and set up surveillance groups to review the ratings. In the case of RMBS and CDO securities, the Subcommittee investigation found evidence that these surveillance groups may have lacked the resources to properly monitor the thousands of rated products. At Moody's, for example, a 2007 email message disclosed that about 26 surveillance analysts were responsible for tracking over 13,000 rated CDO securities. (p. 314).*

Since these findings relate to structured securities rather than municipal bonds, it is possible that they are not relevant. On the other hand, it is reasonable to think that if rating companies under-invested in surveillance for their most profitable asset class – structured finance - (Cornaggia, Cornaggia and Hund, 2011), they probably made similar under-

investments in the surveillance of other asset classes. It is Joffe's contention (based on his experiences at a major rating agency) that surveillance procedures for structured assets were actually superior to those undertaken for municipal bonds.

Estimating Default Probability from Market Prices

A number of researchers have attempted to derive default probabilities from bond yields or Credit Default Swap (CDS) spreads (Longstaff, Mithal and Neis, 2004). In theory, bond yields should be a function of their credit risk. More specifically, yields should compensate investors for the expected loss arising from a potential default. In the literature, expected loss is defined as the product of default probability and loss given default (LGD). LGD is simply the complement of a bond's rate of recovery, and is also called "loss severity."

Theoretical bond yields contain a number of components aside from expected loss. Bohn, Arora and Agrawal (2004) propose an equation for corporate bond yields that includes the risk free rate of interest, the level of investor aversion to risk, the bond's maturity date, issuer size (as a proxy for liquidity) and the correlation of the bond's default risk with that of other instruments. Yields may also be affected by call provisions that give issuers the option to redeem their bonds prior to maturity.

With respect to municipal bonds, a further complexity arises as a result of their tax status. Since interest on most municipal bonds is exempt from federal, state and local income taxation, their yields are not comparable to those on taxable securities. Some adjustment to the municipal bond yield must be made in order to make it "taxable equivalent." One approach is to convert the tax free yield to a taxable yield based on the highest prevailing marginal tax rate, on the assumption that municipal investors are predominantly high

income individuals. However, given the complexities of the tax code, the heterogeneity of individual investors and the participation of institutional investors (with different tax considerations), the use of the top marginal rate is a relatively strong assumption. Chalmers (1998) found that interest rate differentials between long-term U.S. Treasuries and federally insured municipals (which are assumed to have no default risk) were not consistent with the tax benefits available to individuals in the top tax bracket.

The literature includes a number of efforts to decompose municipal bond yields into default risk and other components. Wu (1991) found that the risk aversion factor was not significant, but his functional form excluded recovery rates. Wu, Wang and Zhang (2006) offered a more comprehensive model that included a static recovery rate assumption. The authors attributed a substantial portion of municipal bond yields to liquidity factors.

In corporate credit markets, analysts often derive default probabilities from Credit default swap (CDS) spreads rather than bond yields. CDSs are insurance contracts against default. If the issuer defaults, the CDS seller (or insurer) pays the protection buyer the face value of the bond and takes the bond in exchange. Deriving default probabilities from CDS spreads is easier than using bond yields because CDS have fewer complexities, such as call provisions. The applicability of CDS-implied default probabilities to the municipal market is greatly limited, however, by the fact that CDS trades against a relatively small number of municipal issuers, and trading volume is low even for those issuers for which CDSs are available.

A final concern regarding market-implied default probabilities pertains to how efficiently markets price credit risk. Decomposing yields into default probabilities and other components implicitly assumes that bond prices are efficient, that is, that they accurately

reflect all available information. This assumption is consistent with the strong form of the Efficient Markets Hypothesis (EMH) markets advanced by Fama (1970). More recently, EMH generally, and the strong form of the hypothesis in particular, have come under attack (Summers, 1986; Crotty, 2011). Most tests of EMH have involved equities rather than bonds. In a 2003 survey of EMH literature, Malkiel (2003) identified only one study addressing bond market efficiency, and that paper found inefficiency in the pricing of corporate bonds (Keim and Stambaugh, 1986). Since large capitalization stocks experience much higher trading volumes than municipal bonds, it is not clear that EMH applies at all to the latter asset class. Indeed, there is a substantial literature documenting the lack of liquidity and transparency in the municipal bond market – suggesting the existence of substantial inefficiencies (Ang and Greene, 2011).

In summary, the task of deriving default probabilities from municipal bond yields is impeded by both the complexities of decomposing yields into their components and the likelihood that observed yields do not efficiently incorporate credit risk insight.

Default Probability Modeling Using Logit and Probit Techniques

More recent efforts to model bond default probabilities have used logit and probit techniques. An obvious advantage of logit and probit over ordinary least squares (OLS) for default probability modeling is that the dependent variable is restricted to a range of 0 to 1. In addition, the use of a binary endogenous variable, such as default/non-default, violates a number of assumptions of the OLS model (Menard, 2002).

Because corporate bankruptcy has been much more common than municipal default, the academic literature contains many more efforts to model the former. Ohlson (1980) was first to apply a logit model to corporate bankruptcy modeling.

Shumway (2001) built upon previous logit models by using panel rather than cross-sectional data. This approach addresses the fact that most bankrupt firms were solvent for many years before going into distress, and that it is thus useful to analyze a time series of data for each firm.

The literature also contains applications of probit models to corporate bankruptcy starting with Zmijewski (1984). Moody's RiskCalc is a commercially available, private firm default probability model that uses probit. The RiskCalc methodology document written by Falkenstein, Boral and Carty (2000) suggests that the choice of probit over logit was not a significant one, as the two models usually produce similar results. On the other hand, Altman and Sabato (2007) asserted that logit models have outperformed probit models in the corporate bankruptcy field.

Probit and logit models are functionally similar, with the key difference being the fact that probit is based on a cumulative normal probability density function, whereas logit uses a logarithmic distribution. This latter distribution has more observations in its left and right tails and fewer observations at its center. Ameniya (1980), in his extensive survey of binary choice and other discrete choice models concluded that "it does not matter much whether one uses a probit model or a logit model, except in cases where data are heavily concentrated in the tails due to the characteristics of the problem being studied (p. 1487)."

Although the published literature does not appear to include general obligation municipal bond default probability models that employ logit and probit techniques,

Bialaszewski (1985) applied a logit model to a set of municipal revenue bonds – issues which are supported by user fees and other operating revenues collected by the issuing agency rather than with tax revenues. Bialaszewski collected financial, economic and demographic data for 36 defaulted revenue bonds and for 36 comparable bonds that did not default. She then created models using data at issuance, two years prior to default, one year prior to default and at the time of default. Different variables were significant in each model. She reported that her one year prior to default model accurately classified 87% of the observations into defaulting and non-defaulting categories, where these categories were defined in terms of a "cut point" in the calculated probabilities. Her cut point of 65.8% was set to produce the highest degree of accurate classification. It may be more appropriate to use a fixed cut point of 50%, since probability estimates over that level could be reasonably characterized as default predictions, while probabilities under this level could be seen as predictions of non-default. The significant variables in Bialaszewski's regression were:

- Total Population
- Percentage of Population that is Non-White
- Debt Service as a Percentage of Total Revenue
- Welfare Payments as a Percentage of Total Revenue
- Short Term Debt as a Percentage of Cash and Security Holdings

Since the observations involved revenue bonds, the theoretical case for some of the variables in this specification is not immediately apparent. For example, welfare payments are financed by a municipality's general fund, and should thus not be expected to compete with revenue bondholders for priority. On the other hand, non-white population and welfare dependency levels may be indicators of poverty. Impoverished residents may be less able to pay fees required to service debt incurred by the facilities that default.

Finally, the use of race-based criteria for evaluating municipal bonds has been subject to criticism. Yinger (2010) found that general obligation municipal bond ratings penalize communities with relatively high non-white populations despite the lack of evidence that these communities are more likely to default. He characterized this result as a form of redlining and argued for municipal bond rating regulation to curtail this practice.

Review of Budget Forecasting Literature

Independent fiscal variables supplied to the models developed later in this paper include actual revenues, expenditures and fund balances. The use of these variables in a predictive model is challenged by the fact that municipalities report actual results less frequently and with longer delays than corporations. The Governmental Accounting Standards Board (2011) reported that larger governments took an average of 171 days from the end of the fiscal year to issue annual financial reports, while smaller governments took an average of 200 days. Consequently, modeled municipal default probability estimates that rely solely on actual data can be expected to produce much less timely results than modeled corporate default probability estimates.

One way to address this timeliness issue is to supplement or replace actuals with official budget forecasts or independent projections. Numerous techniques are available for predicting future revenues and expenditures. Wang (2010) listed four basic approaches that rely solely on past data. These are simple moving averages (forecasting the next period's realization by averaging results from a number of prior periods), exponential smoothing (using a weighted average that favors more recent periods), trend moving averages (projecting based on the average change over recent periods) and extrapolation based on regression against time (in which the year is the independent variable and the set of prior results provide the dependent series). Granger and Jeon

(2007) listed four types of regression analyses that can be used for extrapolating trends: linear, exponential, parabolic and modified exponential. Granger and Jeon (2007) tested these four methods using U.S. personal consumption data from 1947 to 1964 to forecast the same series from 1965 to 2003. They found that the modified exponential extrapolation to be the best of the four. Foss (2010) argued that the modified exponential technique is effective when there is a foreseeable limit to growth and noted that similar results can be achieved with Gompertz and logistic curves.

An alternative to extrapolation is quasi-causal forecast modeling (Wang, 2010). This technique involves forecasting both a predictor variable and a relationship between that variable and a revenue or expense item. For example, property tax revenues can be forecasted by estimating assessed valuations in future years and then making assumptions about ad valorem tax rates and collection ratios.

Mikesell (2010) listed four types of quasi-causal forecasting approaches: (1) deterministic models, (2) multiple regression equations, (3) econometric equation systems and (4) microsimulation from taxpayer data files. The most basic of these techniques, deterministic models, are essentially rules of thumb that describe a relationship between an independent variable and a dependent fiscal variable. For example, revenue forecasters may assume (based on prior experience) that a 1% change in Personal Income causes a 0.5% increase in Sales Tax revenues. Multiple regression equations include two or more independent variables and are fitted against historical series of the independent and dependent variables for the jurisdiction in question. Econometric models build upon multiple regression techniques by using simultaneous equations, and can provide insight into how multiple taxes interact with one another. Finally, microsimulation approaches forecast how a sample of individual tax returns will be impacted by expected economic conditions or by a policy change, and then estimates total tax revenue from the sample. This last

approach is most relevant to personal and corporate income taxes, so it is less relevant to California cities.

More recently, Hajek and Olej (2010) suggested the use of neural networks and support vector machines for revenue forecasting. They believe that these more advanced modeling techniques are needed because of the complex interrelationships between exogenous variables and revenue realizations. On the other hand, Mikesell (2010) concluded that simpler techniques are more appropriate for long term forecasts, and that "more attention has to be given to estimating the longer-term economic, demographic, and structural trends that themselves will drive the revenue flows" (p. 581).

The accuracy of revenue projections is subject to debate. A number of researchers have evaluated the accuracy of forecasts at higher levels of government. Auerbach (1999) found large standard errors in a comparison of federal budget results to Congressional Budget Office and Office of Management and Budget forecasts, but did not find evidence of bias. Boylan (2008) found that state general fund revenue forecasts for the period fiscal years 1982-2005 understated actuals by 3% on average. He also found that revenue forecasts were significantly more optimistic relative to actuals in election years. This election year bias at the state level may be attributed to balanced budget requirements. A more aggressive forecast during an election year enables targeted spending increases (or the avoidance of cuts) at politically crucial times.

To the extent that the magnitude and direction of budget forecast errors can be estimated, adjustments may be made to budget forecast data before loading them into a default probability model. A precedent for budget adjustments exists in the stock market. Public companies publish revenue and earnings forecasts, but these forecasts are adjusted by equity analysts who maintain their own projection models. Crippen (2003) argued that medium-term budget forecasts (those with

3-10 year time horizons) should be presented in the form of confidence intervals rather than point estimates. Generating confidence intervals of this sort typically requires the use of simulation techniques.

Simulation and other advanced techniques may not be practical when forecasting revenues for a large set of local governments – especially smaller units for which limited exogenous variables are available. In a survey of Texas cities, Reddick (2008) found that expert judgment and simple trend extrapolation were the most common methods used to forecast municipal revenues. Less than one third of the cities surveyed used exogenous variables in their analysis.

Chapter 2: Great Depression Review and Analysis[2]

Since 1940, interest or principal payment defaults on U.S. municipal bonds have been rare. This is especially true of general obligations bonds – those backed by the full faith and credit of a state, county, city or other governmental unit with taxing authority. By contrast, there were about 4800 reported municipal bond defaults during the 1930s (U.S. Advisory Commission on Intergovernmental Relations ([ACIR], 1973; Fons, Randazzo and Joffe, 2011).

With the assistance of colleagues and a data entry vendor, Joffe (2012) collected information on approximately 5,000 defaults from the period 1920 to 1939. The primary sources were contemporary *Moody's Manual of Investments* (Moody, 1920-55, vol. 1[now published by Mergent Corporation as *Mergent's Municipal & Government Manual*]), and back issues of *Daily Bond Buyer* and weekly *Bond Buyer*. Joffe (2012) also found and catalogued defaults from state-level bond listings and other documents housed in state archives, Reconstruction Finance Corporation records, local newspaper accounts and other sources.

In their book, *This Time Is Different*, Carmen Reinhart and Kenneth Rogoff (2009) marshaled older data in their analysis of banking and sovereign debt crises. Due to the paucity of recent defaults, a similar approach may be applicable to U.S. municipal bonds. In contrast to some areas of fixed income - such as mortgage-backed securities - institutional change in the municipal sphere over the last century has been incremental rather than revolutionary. Political and budgetary processes at the state and local level have evolved relatively slowly in the context of a stable national political framework. Older municipal

[2] This section contains previously published research that originally appeared in Fons, Randazzo and Joffe (2011) and Joffe (2012). However, the statistical analysis presented below has been updated for this report.

defaults are thus more relevant to modern experience than older defaults in other asset classes.

The goal of this chapter is to mine the Depression-era municipal bond default record to learn whatever insights it can offer for present day credit research. This is done by providing a brief description of the 1930s municipal credit crisis and by developing a quantitative default probability model.

The Great Depression-Era Municipal Default Wave

According to U.S. Treasury statistics reported by the *Bond Buyer*, the dollar volume of municipal bonds outstanding more than quadrupled between 1913 and 1931 – a period during which the CPI rose 54%. The boom in municipal issuance during this period is largely attributable to the inception of the federal income tax and the popularization of automobile travel. Municipal bond interest was exempt from income taxes since the levy's 1913 inception, creating demand for these securities among high income investors. On the supply side, automobiles created a need for paved roads – which states, counties and cities often financed with bonds. Communities also used bonds to finance drainage, irrigation and levee projects to support agricultural developments and to fund school construction.

Those concerned about today's municipal credit quality correctly point to the rapid growth in municipal bonds outstanding in recent years. But the growth in municipal bonds outstanding between 1913 and 1931 far exceeded the rate of increase over the 18 years up to 2010 – and both of these booms were outpaced by growth following World War II, during the years 1946 to 1964. While the pre-Depression municipal bond boom ended with a spike in defaults, the post-War expansion was not followed by a similar circumstance.

Bank Closings, Bank Holidays and Municipal Bond Defaults

It is also worth considering that the peak in estimated municipal default rates coincided with a nationwide outbreak of bank failures and bank holidays. In a 1933 survey of 1,241 state, city and county financial officials, Martin Faust (1934, 1936) found that slightly more than half of their governmental units had funds in closed banks. The municipalities surveyed had a total of over $98 million tied up in these failed institutions. Faust estimated that the aggregate balance in failed banks for all state and local governments would have been $450 million – more than 2% of the principal outstanding on municipal bonds at the time. Contemporary accounts attributed many of the defaults to the closure of banks in which funds intended for bondholders had been deposited.

A major source of distress for municipalities in North Carolina, Louisiana, Arkansas, Tennessee and other southern states was the November 1930 collapse of Caldwell & Company and its affiliates. Founder Rogers Caldwell, dubbed the "J.P. Morgan of the South" had built a large business marketing municipal bonds issued by southern states. Bond proceeds were typically held at Caldwell's Bank of Tennessee until they were required by the issuer. According to John McFerrin's (1939) history of Caldwell and Company, most issuers required that their deposits be supported by high quality collateral – typically other municipal bonds. Caldwell often pledged such bonds as collateral initially, and then substituted illiquid, high-risk real estate bonds without notifying the issuer. In addition to following deceptive practices, Caldwell looted bank assets to finance an extravagant lifestyle.

On November 7, 1930, a Tennessee state audit declared Caldwell & Company insolvent. News of this declaration triggered runs on Caldwell and numerous affiliated banks

throughout the South. In Tennessee alone, $9 million in county and municipal deposits were lost. Caldwell's failure triggered a run on affiliates, including Central Bank and Trust Company in Asheville, North Carolina, which was followed by runs on other area banks.

Property Tax Delinquencies

While the vast majority of the enumerated defaults occurred in special districts, school districts and small towns, the Great Depression era did witness several spectacular defaults by large issuers including Cleveland and Detroit. New York City, the nation's largest municipality back then, also experienced a brief default in December 1933. Chicago, then the nation's second largest city, narrowly avoided default by refinancing its bonds at lower interest rates. Cook County – which encompasses the city – failed to make scheduled interest and principal payments, as did a number of independent taxing districts within the city's limits.

As statistics collected at the time by Dun & Bradstreet (Bird, 1936) suggest, major city defaults during the Great Depression were preceded by substantial spikes in tax delinquency rates. For example, the tax delinquency rate in Detroit rose from 10.8% in fiscal year 1930 to 17.2% in 1931, 25.0% in 1932 and 34.8% in 1933 – the year in which it defaulted. In New York and Chicago, delinquency rates peaked at 26.5% and 42.4% respectively.

Although many of the property tax delinquencies were undoubtedly the result of economic distress, the early 1930s was also a period of organized tax revolts. This long-forgotten tax resistance movement is described in David Beito's 1989 book *Taxpayers in Revolt*. Beito argued that the resistance was in large measure a reaction to substantial increases in property taxes during the preceding decade. This increased burden was often

accompanied by stable or falling property values, since the 1920s was a time of weak real estate prices.

Beito traced the history of the property tax resistance movement in Chicago where anti-tax activism was most potent. The Chicago resistance was led by the Association of Real Estate Taxpayers (ARET), an organization originally formed by relatively affluent investors, but which later attracted broad support among the city's skilled blue-collar workers worried about maintaining their foothold in the middle class. At its peak, ARET leaders hosted a thrice-weekly radio program and the organization had 30,000 members.

As the following table indicates, large cities were especially vulnerable to property tax delinquencies due to their heavy reliance on real estate taxes. According to 1931 Census data on which this table is based, the average city received about two-thirds of its revenue from this one source.

Table 6: Share of Total Revenues from Property Taxes, Cities Over 300,000, in 1931

City	Property Tax Revenue Share
Baltimore, MD	66.8%
Boston, MA	69.3%
Buffalo, NY	69.6%
Chicago, IL	67.2%
Cincinnati, OH	58.9%
Cleveland, OH	67.4%
Detroit, MI	61.2%
Houston, TX	74.6%
Indianapolis, IN	86.8%
Jersey City, NJ	70.9%
Kansas City, MO	64.2%
Los Angeles, CA	52.5%
Louisville, KY	69.3%
Milwaukee, WI	67.1%

Table 6 (Cont.)

City	Property Tax Revenue Share
Minneapolis, MN	72.3%
New Orleans, LA	61.8%
New York, NY	70.8%
Newark, NJ	69.1%
Philadelphia, PA	71.8%
Pittsburgh, PA	81.2%
Portland, OR	65.7%
Rochester, NY	66.5%
San Francisco, CA	59.5%
Seattle, WA	47.5%
St. Louis, MO	62.5%
Washington, DC	56.1%

Source: Calculations from *Financial Statistics of Cities having a Population of over 30,000*, 1931.

While over-reliance on one revenue source can be attributed to the relative lack of municipal finance sophistication at the time, part of the problem was beyond the control of city governments. According to Census statistics reported by C. E. Rightor (1938) in *Municipal Finance*, roughly 4.5% of major city revenue was derived from alcohol taxation in 1916. This revenue source disappeared with Prohibition, and did not return until the 18th Amendment was repealed in 1933. Additional policing costs associated with Prohibition-related organized crime must have further contributed to the cities' fiscal distress.

Public Employee Pensions

Contemporary concerns about municipal bond defaults are often linked to public pensions, but underfunding is not unique to our era. During the Great Depression, many retired government workers were eligible for pensions. Buck (1936) noted that before the establishment of pensions, older municipal employees would continue to report for work

even though they could no longer perform their jobs (at least not to the satisfaction of contemporary management). Supervisors, guided by a humanitarian impulse rather than a concern for the bottom line, were reluctant to fire these older employees. Administrators thus reached the conclusion that it would be less expensive to pension off the older workers at a percentage of their former salary.

Many cities had not yet created pension funds, and those that did often failed to make actuarially appropriate contributions. A 1937 National Municipal League Consulting Service (NML) survey of Atlanta's finances reported serious underfunding in the city's three pension funds:

> *It is obvious from these figures that the firemen's fund with a cash balance of $491.38 is no fund at all. Nor are the reserves of either the general or police funds even a faint approximation of what they should be to guarantee the payment from the fund of its probable obligations. ... Firemen this year who paid money into their pension fund saw it go out again immediately to pay other firemen's pensions. Their sacrifice in no way built up for them any protection. They have in fact nothing to rely on but the naked promise of the city as their security for old age. We would recommend therefore that in all the pension funds the employee's contribution be treated as a trust fund and invested for him in securities or in the purchase of an annuity. (p. 158)*

That said, the NML consultants were not advocates of full funding:

> *We believe on the other hand that it is not necessary for a public body deriving its income from taxes to accumulate a fund as if it were a private insurance company. Unless there are some predictable sharp upturns in the curve of natural retirement there is no reason why the City should not pay pensions out of income. The integrity and solvency of the city should be a sufficient guarantee to the employee that the city will fulfill its pension contract. In fact if the city went bankrupt any fund it might have accumulated would probably disappear in the crash. (p. 160)*

Atlanta public employee pensions at the time were generous – at least by the standards of today's private sector. Employees could retire on 50% of their salary after 25 years of service, regardless of age. Survivor benefits were also provided. Atlanta avoided default during the Depression and evidence reviewed thus far does not attribute any case of municipal default during the 1920-1939 timeframe to employee pensions. Although pensions were available to Depression-era public employees, legal protections for these benefits have increased in recent decades.

Since that time, California courts have repeatedly ruled that public employees and their beneficiaries have a right to receive pension benefits according to the rules that prevailed at the time of their employment. For example, in Kern v. City of Long Beach (29 Cal.2d 848, 1947), the California Supreme Court ruled that a fireman could not be deprived of his pension benefits by a change to the city charter. In Betts v. Board of Administration (21 Cal.3d 859, 1978), the Court ruled that a public agency could not apply a new benefit formula lowering benefits to a vested employee unless it also provided a comparable, offsetting advantage.

It may be appropriate to conclude that pension benefits were junior to debt service in a government's priority of payments during the 1930s, while today these two types of obligation appear to be almost *pari passu*, that is, on equal footing.

Data Sources and Statistical Methodology

Today, the municipal bond market covers a broad range of issuers. This diversity was also present – albeit to a lesser extent – in the years prior to World War II. The municipal bond default list compiled in Joffe (2012) includes 5,079 issuers who failed to make timely

and complete principal or interest payments (or who obliged investors to accept refunding bonds in lieu of cash at maturity) at some time between 1920 and 1939. Most of the defaulting issuers were school districts, small towns and special tax districts – created to build roads and other infrastructure.

Financial data for special assessment districts and for school districts is more limited than for other issuer categories. Moody's bond manuals provide some data, but it is incomplete and not in a consistent format. The best data are available for states and large cities because they reported their financial statistics to annual censuses at the time. Comprehensive financial data for smaller cities and counties was collected by censuses in 1922 and 1932.

Since annual census data are available for a substantial number of larger cities, and since these cities experienced a significant number of defaults, statistical analysis is most readily applicable to this subset of issuers.

For fiscal years 1930 and 1931, the U.S. Census Bureau reported financial statistics for 311 U.S. cities with populations over 30,000 (as of April 1, 1930). After 1931, the collection effort was scaled back, perhaps due to budgetary pressures at the federal level.[3] Data reported for each entity include revenues by category, expenditures by category, as well as various classifications of assets and debt.

Of the 311 cities included in the 1930 and 1931 Census reports, 46 had defaults on general obligation bonds between 1930 and 1936, implying a cumulative default rate of 15%

[3] In FY 1932 and FY 1933, the Bureau reported similar statistics for 94 cities with populations over 100,000 (also as of April 1, 1930). In FY 1934, Honolulu was added to the annual data set. The analysis presented in this report utilizes data from 1930 and 1931, as this contains the largest cross-section of cities. See Joffe (2012) for an analysis of the panel of 94 cities during the Great Depression, and for an analysis of an unbalanced panel consisting of a total of 1,000 city/year observations for the period FY 1930-1935.

for this population. The overall municipal default rate during this period was about 16%. Among the non-defaulting cities, some had "forced refunding," in which investors were obliged to exchange maturing bonds for new ones with later maturities. Many others had defaults on special assessment bonds which were not general obligations of the cities. In the following analysis, none of these instances are classified as a default – but adjusting the default classifications in light of these circumstances is a reasonable task for future research.

Some defaults were attributed at the time to bank closures or bank holidays. Since FDIC insurance is now available, it would be reasonable to exclude defaults that really were the result of banking issues. However, reclassifying such defaults should only be done after an intensive reading of contemporary newspapers to confirm that they were fully attributable to banking problems. In certain cases, city officials may have used bank closures or holidays as a pretext to obscure fiscal problems that rendered the city unable or unwilling to pay, even if funds had not been temporarily frozen. Thus, these classification adjustments are also left to future research.

Although several hundred series are available in the census data, most of them relate to small components of revenue and expenditure. This still leaves a number of aggregate revenue, expenditure, debt and asset series that may yield useful explanatory variables. Below, variables are evaluated in ratio form to maximize their modern relevance despite the substantial increase in population, price levels and per capita economic output that have occurred over the last 80 years.

The current study applies a binary response technique to a larger number of geographically representative issuers than Hempel (1971, 1973) could access. Since

municipal bankruptcy is a rare event, it is preferable to use a model that differentiates between observations in the tail – suggesting a choice of logit over probit.

Equation (1) below describes the model mathematically:

$$Prob(DEFAULT_{it}) = F(X_{it}\beta) \qquad (1)$$

where $DEFAULT_i$ is an indicator variable equal to one if city i defaulted between 1932 and 1935,[4] $F(\cdot)$ is the cumulative standard logistic distribution function, X_{it} is a matrix that contains fiscal-ratio, socioeconomic and demographic variables; as discussed below; these are primarily from 1931. Finally, β is a vector of coefficients to be estimated by maximum likelihood.

We have identified several independent variables that have theoretical justification for inclusion in the matrix X_i. After considering various specifications, we settled on the model specification that is presented here, which includes two socioeconomic variables, and two fiscal ratios. We discuss these four variables in detail in this section.[5] This model is *parsimonious*; that is, it explains default using only a few variables. Parsimonious models offer greater transparency and accessibility; accessibility is an important characteristic of a model like the one we aim to develop; that is, one that is intended for practical use. For example, the more data points that need to be collected, the harder the model is to

[4] Three cities defaulted in 1930, two in 1931. Once a city defaults, its data may become idiosyncratic as it suspends interest payments and possibly writes down principal. For example, Miami's interest costs fell from $2.2 million in 1929 to $0.3 million in 1933. News sources indicate that the city first defaulted in 1930. Since the purpose of the analysis is to predict default, post-default observations are dropped from the data set. Honolulu satisfied the size criteria, but the Census did not report data on it, and it was also dropped. Thus the econometric analysis we present later includes 305 of the 311 cities.

[5] We provide details on specification selection, i.e., the other variables that we considered but that were ultimately not included in this model, in the Appendices.

implement and maintain. Moreover although we use only four variables here, we present further discussion of specifications that include additional variables in Appendix 1.[6]

The table below describes the variables used in the model presented in this section, as well as the source of the data.

Table 7: Variable Descriptions, Great Depression-Era Data

Variable	Description	Source
DEFAULT	*An indicator of whether city defaulted in 1931, 1932 or 1933*	Authors' research
lnPOP	*The natural logarithm of city population in 1930*	Integrated Public Use Microdata Series (IPUMS)
SEI	*A proxy for average income; this is the average level of Duncan's socioeconomic index among city residents, 1930*	Authors' calculations using data from IPUMS
INT_BY_REV	$\frac{total\ interest\ costs\ in\ 1931}{total\ receipts\ in\ 1931}$	US CENSUS, *Financial Statistics of Cities having a Population of over 30,000.*
REV_CHANGE	$\frac{total\ receipts\ in\ 1931 - total\ receipts\ in\ 1930}{total\ receipts\ in\ 1930}$	US CENSUS, *Financial Statistics of Cities having a Population of over 30,000.*

Sources: U.S. Census Bureau (1930-31), Integrated Public Use Microdata Series [IPUMS] (various).

As mentioned above, the variable DEFAULT is the dependent variable and it is an indicator equal to one if the city defaulted; extensive review of media reports was used to determine whether or not each of the largest 311 cities in the United States (as per the 1930 Census) defaulted over the subsequent six years. The variables lnPOP and SEI are the

[6] As we discuss there, the models we estimated with additional explanatory variables did not result in a better fit. However, we recognize some researchers will be interested in the impact of these other variables (which include, for example, city-level homeownership rates, budget surplus and deficit measures, and so on.)

socioeconomic variables we selected based on theoretical appeal, their use in previous research, and data availability. The source for each of these is the 1930s Integrated Public Use Microdata Series (IPUMS) available from the University of Minnesota (see Ruggles et al., 2010). This data set includes 1930 population and the individual responses to Census interviewers from the 1930 Census. We use these individual-level data to construct aggregate city-level measures for SEI.

The first socioeconomic variable is lnPOP. This is the natural logarithm of city population based on the 1930 Census. Rather than including this variable in levels, we take the log transformation, primarily so extreme values (e.g., New York City) do not overly-influence the resulting estimates. Literature we reviewed included suggestions that large cities were less likely to default than smaller ones, as larger cities would generally be expected to have more diverse economies rendering them less vulnerable to the collapse of any given industry. Also, larger cities may be more able to attract state or federal bailouts, due to their greater importance and political power. However, a reasonable counter-hypothesis is that large cities are more likely to default, perhaps due to greater demands for service delivery, or less accountability for those making financial decisions within a larger governmental structure. Thus, we expect the sign of the coefficient on lnPOP may be positive or negative.

The second socioeconomic variable is SEI, which stands for socioeconomic index. This particular index is the Duncan SEI and is contained in the IPUMS data.[7] The 1930

[7] The Duncan SEI is a composite variable whose derivation "…involves scaling occupations according to some external criterion in order to turn occupation into a measure of … socioeconomic standing. Such measures are a staple of modern social scientific research." (Chapter 4: Integrated Occupation and Industry Codes and Occupational Standing Variables in the IPUMS, https://usa.ipums.org/usa/chapter4/chapter4.shtml, Accessed June

Census did not ask questions about income, and so we treat SEI as a proxy for average income at the city level. We expect that richer cities will be less likely to default, as governments will be able to more easily raise revenue from richer citizens.

Rating agencies use a number of purely fiscal metrics that can be estimated directly from the municipal Census data set. One commonly used metric is the ratio of interest costs to revenue. The rationale for including this ratio is that a default becomes likely when interest costs become so onerous that they threaten to crowd out other spending priorities. When the interest burden is low, it is not rational for a political leader to default, because he or she then loses access to capital markets and is thus compelled to reduce spending or raise taxes. As interest expenses rise, this disincentive is increasingly likely to be outweighed by the near term political costs of cutting spending on popular programs.

This theoretical underpinning does have a couple of limitations that should be noted. First, defaults often occur when a principal payment – rather than an interest payment – becomes due. During the Great Depression era, cities were more vulnerable to principal repayment defaults because the concept of serialized maturities had yet to become popular. Large bond issues were typically scheduled to mature all at once. Many obligors accumulated revenues in "sinking funds" to meet these large debt repayments, while others expected to pay off the maturing bonds by issuing new ones. When sinking fund assets declined in value and the new issue market dried up, many governments were unable to redeem or roll over maturing issues. In the aftermath of the Depression experience, public finance specialists began to advocate serialized maturities, under which a large bond issue is broken down into

30, 2013). For a list of occupations on which the SEI is based and the corresponding SEI ranking, see Occupational Income and SEI Scores, http://www.hist.umn.edu/~rmccaa/ipums-europe/usa/volii/incsei.html.

a number of smaller tranches whose principal becomes due at varying dates – often one year apart.

Second, revenue may not be an ideal denominator, since political leaders may have the option of running surpluses or deficits. While many state and local governments are and have been subject to balanced budget requirements, these are typically prospective rather than retrospective and are often subject to evasion. On the other hand, using expenditures rather than revenues as a denominator is also an imperfect measure. Local governments cannot sustain large annual deficits indefinitely, so revenues appear to be a better indicator of their long term fiscal capacity.

Aside from the absolute burden of debt services, changes in available resources may be expected to enter into the default decision. For example, if revenues are declining, officials may face the choice of reducing public services below baseline levels or defaulting. Thus, year-on-year revenue changes should be predictive of default. Earlier we cited the spike in property tax delinquencies as a cause of Depression-era defaults in major cities. Annual revenue changes provide a way to capture this phenomenon. Revenue change is not directly observable from census data of any one year. For any given annual census, it must be calculated by comparing revenues from the current census to the prior one. As indicated in the table above, the variable REV_CHANGE is the difference in 1930 and 1931 revenue, which

is then normalized by dividing this difference by 1930 revenue.[8] Table 8 below presents summary statistics[9] for the variables described above.

Table 8: Summary Statistics, Great Depression-Era Data

Variable	Obs.	Mean	Std. Dev.	Min.	Max.
DEFAULT	305	0.13	0.34	0	1
lnPOP	305	11.27	0.88	10.32	15.77
SEI	305	33.83	4.16	21.94	51.13
INT_BY_REV	305	0.11	0.05	0	0.33
REV_CHANGE	305	-0.01	0.10	-0.25	0.52

Sources: U.S. Census Bureau (1930-31), Integrated Public Use Microdata Series [IPUMS] (various).

This table documents a large amount of variation in the fiscal health of city governments during the start of the Great Depression. The average city in our sample had interest expenses equal to 11% of revenue, however, some cities had interest to revenue ratios three times this value. Moving to REV_CHANGE, we see that the average city saw its receipts fall by about 1% from 1930 to 1931, however, some cities saw as much as a 25% fall in revenues, while still others saw revenues rise by as much as 50%.

Likewise, there is substantial variation in the demographic and socioeconomic variables. The table above presents population figures in terms of the logarithmic transformation that we use in the model. To make sense of these, they must be converted back to levels. For example, the average city in our sample had a population of about 78,000. We use the natural logarithm of this amount, which is 11.27. The results of estimating equation (1) are given in column 1 (logit model, with no state fixed effects) of the table below.

[8] Having more years of data would allow us to calculate the variance of revenue, and a reviewer suggested this would be a useful predictor of default. Unfortunately, lack of data prevents us from calculating revenue variance, but because the Census reported financial statistics annually for most cities in the 1920s and early 1930s this analysis could be done in the future with further data collection.

[9] For the interested reader we note that the correlation between the independent variables ranged from|0.02| to |0.14|. As a result, we are not worried about the presence of multicollinearity.

Table 9: Logit Analysis of Great Depression-Era Municipal Defaults

VARIABLES	Logit No Fixed Effects	Firthlogit No Fixed Effects	Firthlogit With Fixed Effects
lnPOP	0.600***	0.583***	0.715***
	(0.18)	(0.19)	(0.23)
SEI	-0.112	-0.105*	-0.141**
	(0.07)	(0.05)	(0.06)
INT_BY_REV	16.48***	15.96***	22.34***
	(2.96)	(3.20)	(6.00)
REV_CHANGE	-4.386**	-4.067**	-3.444
	(1.88)	(2.06)	(2.22)
Constant	-7.213**	-7.118***	-9.056***
	(3.01)	(2.54)	(3.47)
Estimation strategy	logit	firthlogit	firthlogit
State fixed effects?	no	no	yes
Correctly classified	270	269	281
Observations	305	305	305
% correctly classified	88.5	88.2	92.1

Notes:

1) Robust standard errors in parentheses:
*** p<0.01, ** p<0.05, * p<0.1

In the column 1 we see that the coefficient on lnPOP is positive, suggesting greater default risk with increased population. While this sign may be inconsistent with rating analyst intuition, we can reject the hypothesis that the true population coefficient is zero or negative with more than 99% confidence. It is also worth noting that two of the ten most populous cities in 1970, New York and Cleveland, defaulted during the 1970s – a decade with very few municipal defaults overall. The coefficient on SEI is negative, as expected; suggesting cities with richer citizens are less likely to default. However, this coefficient estimate is not significant at the 95% level. The coefficient on INT_BY_REV is positive, as expected, and statistically significant. Cities with higher interest payments (relative to their

revenues) are more likely to default. Finally, the coefficient on REV_CHANGE is also consistent with our expectations. It is negative and significant at the 95% level.

It is possible that a failure could include certain unobserved factors, for example state rules that affect a city's likelihood of defaulting could bias the estimates reported in column 1. It is also possible that the fiscal ratio variables have differential impacts on cities in different states (that is, there may be heterogeneous effects as well as fixed effects.) While a more detailed analysis of these possibilities is left for future research, it is straightforward to implement a fixed-effect strategy as a first pass at controlling for unobserved state fixed effects (even if this does not address the possibility of heterogeneous effects.) A complication that arises in a fixed-effect logit context, due to the so-called separation problem (where a lack of variation in the dependent variable for cities in some states prevents the possibility of estimation) requires that a new estimation strategy be employed if fixed effects are to be included.

In column 2 (firthlogit model, with no state fixed effects) we estimate the same model as in column 1, except the coefficients are estimated using a firthlogit package for the statistical program, Stata™(Note, this package does not allow for estimating robust standard errors). We do not yet include state fixed effects;, however, as we first want to determine whether the new estimation strategy by itself causes any differences in the coefficient estimates. Comparing the coefficient estimates across the first two columns, it is clear there are only small differences. Hence our goal in showing column 2 is to provide evidence that our estimates are not sensitive to estimation strategy.[10]

[10] There is a small difference in that the firthlogit strategy results in one fewer city being correctly classified.

In column 3 we again utilize the firthlogit package. However, now we include state fixed effects.[11] This model performs best in terms of default outcomes predicted correctly; out of the 305 cities included in this model, 281 (or 92.1%) are correctly classified as defaulting or non-defaulting. While none of the coefficient estimates change signs when including state fixed effects, they all change in magnitude.[12]

Using the Great Depression Experience to Predict Defaults in the Contemporary Context

The coefficient estimates from column 3 can be used to estimate the default probabilities for cities in-sample and out-of-sample as shown below. The default probability formula implied by the model is:

$$Prob(DEFAULT|X) = \frac{1}{1+e^{-(-9.056+0.715*\text{lnPOP}-0.141*\text{SEI}+22.34*\text{IR}-3.444*\Delta\text{R})}} \quad (2)$$

Where IR = INT_BY_REV, and ΔR = REV_CHANGE, and "e" refers to the base of the natural logarithm, (i.e., the mathematical constant which is approximately equal to 2.718).

Two things are needed to produce default probability estimates for a contemporary sample of cities: a model, such as equation (2), and data for the contemporary sample. We explored whether data from the *Cities Annual Report* produced by the California State Controller's Office (what we refer to as the SCO data), could be used to obtain measures of

[11] To prevent perfect multicollinearity, we use indicator variables for all states except California. Thus, the intercept term presented in the table should be interpreted as the fixed state effect for California.

[12] The average change in magnitude is 26%, and the change is smallest for lnPOP at 11.4% and largest for INT_BY_REV, which changed by 43.4%. These figures were calculated as the difference between the coefficient estimate in column two and three, over the value in column two, and multiplying by 100. So for example for lnPOP, the figure of 11.4 was arrived at as follows: (0.583-0.715)/0.583 = 0.114, and 100*0.114=11.4%.

INT_BY_REV and REV_CHANGE. However, we found that there were 49 cities for which complete data was unavailable.[13] In light of the insufficiencies of the SCO data, we gathered Comprehensive Annual Financial Reports (CAFRs) for all cities in California for 2010 and 2011 directly from the individual cities. We describe this massive data collection project elsewhere in this report. For now, we emphasize that we produced default probability estimates using equation (2) and data gathered directly from CAFRs.[14]

Given our earlier discussion about the greater seniority of pension obligations, we include pension costs in the numerator of the INT_BY_REV variable for current data.[15] This new ratio of "uncontrollable costs" to revenues—which is the contemporary variable we use to proxy for INT_BY_REV to produce the risk scores above—provides a simple and attractive way to incorporate a variable that lately has been the subject of extensive discussion.

Since much of today's municipal solvency discussion focuses on public employee pension costs, it is worth taking another moment to explain how they enter into our model.

[13] As discussed below, the variable INT_BY_REV requires three individual measures to calculate: interest payments, pension payments, and revenue. The variable REV_CHANGE requires two individual measures (revenue measures from two years.) Thus, when we say complete data are unavailable for 49 cities, this means that there are 49 cities in the SCO data for which at least one of these individual measures is missing. In a few cases, the missing data may reflect an actual magnitude of zero, but based on our review of the CAFR data, we do not believe that this explanation accounts for a large proportion of the missing fields.

[14] We did calculate default probabilities for the 211 cities for which SCO data was available. However, the resulting probabilities were, in some cases, drastically different from those produced using the CAFR data. These differences are depicted visually in Figure A1 (see Appendix 2). Moreover, as the CAFRs are audited, they contain more reliable data. We discuss differences between the CAFR data and the SCO data in more detail in Appendix 2, though for now we emphasize that using this model to produce estimated default probabilities based on CAFR data for future years will likely require nontrivial data collection costs. We have reduced these costs by locating most of the FY 2012 CAFRs, which are posted at http://www.publicsectorcredit.org/ca.

[15] On the other hand, we do not apply this approach to OPEB costs. As the Government Accountability Office noted in a 2007 report, relative to pensions, "state and local law provides much less protection for retiree health benefits. Retiree health benefits are generally treated as an operating expense for that year's costs on a pay-as-you-go basis and managed together with active employee benefits." Since OPEBs appear to be junior to debt service and pension obligations, it seems inappropriate to include them in a ratio intended to predict municipal bond defaults.

We use actual employer contributions obtained from the city's CAFR. For California cities, this amount is generally the same as Actuarially Required Costs (ARC), because most cities belong to the California Public Employees Retirement System (CalPERS) which sets employer contribution rates based on ARC.

As our goal is to estimate one-year default probabilities, a city's Unfunded Actuarially Accrued Liabilities (UAAL) are less relevant. The UAAL represents the present value of future payments needed to bring a pension system to full funding. It is not necessary for cities to remedy pension underfunding in one year. Indeed, in the case of a single employer system, it is not necessary for a city to remedy underfunding at all. Pensions, like Other Post-Employment Benefits (OPEBs), may be funded on as a pay-as-you-go basis, although doing so may place an unsustainable burden on the city's revenue base. [16]

In addition to the two fiscal ratios taken from CAFRs, equation (2) also contains two socioeconomic variables. Although Duncan's SEI index is not readily available for cities in the contemporary period, we use median family income in its place.[17] Data on median family income for cities is taken from the 2009-2011 three year estimates from American

[16] In April 2013, CalPERS (2013) changed its method for amortizing UAAL with the goal of achieving full funding within 30 years. For cities and other local agency CalPERS members, this new approach results in higher annual pension costs relative to what they would have been under the existing actuarial method. The change will be phased in starting in fiscal year 2016. At that time, the employer contribution rates for the median public safety employee plan will increase from 29.3% to 30.8%. In FY 2020, the expected increase will be from 33.9% to 39.5%. This means that, all other things being equal, an average city will face an increase in pension costs of 5% in FY 2016 and 17% in FY 2020. In fiscal 2011, pension costs accounted for about 7% of total governmental revenues, so the budgetary impact of this change should average roughly 1% of revenues by FY 2020.

[17] We considered five income measures to proxy for SEI: median family income, median household income, mean household income, mean family income, and per capita income. To select between these five income measures, we evaluated each variable's distribution, and selected the variable whose distribution most closely resembled that of the Duncan SEI. Specifically, we calculated the range of each variable (its maximum value minus its minimum value), and then normalized this range by dividing by the variable's mean. Of the five measures, the range over mean value for median family income was closest to the range over mean value for SEI.

Community Survey (ACS). To make median family income more comparable to Depression-era SEI values, we divide by 2,000.[18] The 2009 three-year ACS is also the source of the population measure that appears in equation (2).

Below we present default probability estimates for 260 California cities with populations over 25,000 that filed CAFRs in fiscal year 2011.[19] To assess the extent to which we should have confidence in the ability of a historical model that only relies on statistical evidence to predict future defaults, we make use of the 2012 defaults by San Bernardino and Stockton. If this model is able to predict defaults in these cities, or at least if our model could have indicated that these cities were at risk based on 2011 data, then we believe that the model can be used as the basis for predicting future defaults.

Would this analysis have predicted defaults in Stockton and San Bernardino? Out of 260 cities, the Great Depression-era model ranks San Bernardino as 18th most likely to default, and Stockton as 33rd most likely to default. In other words, while the model does not rank these two cities at the very top of the ranking of all cities, it does place them in the quintile of cities rated as most likely to default. It is important to emphasize that the model is not a crystal ball. However, the fact that a model, which was estimated with 1930s data, does so well at predicting defaults more than 70 years later is encouraging.

Based upon risk probabilities generated by the model, we identified quintiles labeled "Very safe", "Safe", "Moderately safe", "Moderately at risk" and "At risk". Each

[18] The mean value of median family income is 74,644. Dividing this by 2,000 yields 37.32, which is quite close to the mean value of SEI.

[19] In 2012, there were 265 California cities with population in excess of 25,000. Jurupa Valley, newly incorporated on July 1, 2011 did not have reportable financial activity in FY 2011. Eastvale, another city incorporated on October 1, 2010, did not have prior year revenues in FY 2011, so we exclude it from the 2011 reported population as well. All of the remaining 263 cities had filed 2011 Comprehensive Annual Financial Reports by April 2013 with the exception of Adelanto, Bell and Maywood (In June 2013, after our cutoff, Maywood issued its 2011 Audited Financials). We do not report results for these three cities, but note that their apparent failure to produce audited financials 22 months after the close of the 2011 fiscal year should be a cause for concern.

quintile covers 20% of the universe, or 52 cities each. We then sorted the cities according to the estimated default probability into these quintiles. Stockton and San Bernardino fall into the "At risk" quintile.

Table 10: Location of Defaulting Cities in Default Likelihood Ranking

Cities ranking	Risk level	Number of defaults
1-52	At risk	2
53-104	Moderately at risk	0
105-156	Moderately safe	0
157-208	Safe	0
209-260	Very safe	0

Notes: This table is based on the estimated default probabilities that were produced by applying contemporary period data to equation (2). Then, cities were ranked from highest to lowest according to default probability, with the most "At risk" cities near the top.

Both of the cities that actually defaulted in 2012 were ranked as "At risk" by our model.

Table 11: Estimated Default Probabilities for California Cities, based on Great Depression Model

Rank	City	Estimated Default Probability	Rank	City	Estimated Default Probability
	At risk			Moderately at risk	
1	Los Angeles	84.8	53	Pasadena	17.2
2	Escondido	81.9	54	La Mesa	17.0
3	Colton	76.3	55	San Marcos	15.1
4	Pittsburg	66.8	56	National City	14.6
5	Rialto	62.3	57	Tulare	14.6
6	Hesperia	61.0	58	Chico	14.4
7	Cathedral City	58.3	59	Burbank	14.4
8	Azusa	57.9	60	Oxnard	14.2
9	Fresno	57.5	61	Indio	14.0
10	Desert Hot Springs	57.2	62	Bellflower	13.8
11	Sacramento	55.9	63	Roseville	13.5
12	Pomona	53.8	64	Manteca	13.4
13	Oakland	53.7	65	Inglewood	12.7
14	El Centro	52.5	66	Moreno Valley	12.1
15	Perris	51.3	67	Palmdale	12.0
16	San Jose	50.2	68	Delano	12.0
17	Soledad	49.4	69	Los Banos	11.8
18	San Bernardino	48.4	70	Lynwood	11.3
19	Riverside	47.7	71	Modesto	11.3
20	San Diego	46.1	72	Palm Springs	11.3
21	Montclair	44.5	73	Alhambra	11.1
22	Redding	43.6	74	Ridgecrest	10.8
23	Atwater	42.0	75	Hanford	10.5
24	Fontana	37.0	76	Hollister	10.1
25	Montebello	36.7	77	Eureka	10.0
26	Bell Gardens	36.2	78	Visalia	9.9
27	Lancaster	35.6	79	Chula Vista	9.8
28	South Gate	33.4	80	Apple Valley	9.2
29	Salinas	33.0	81	Glendale	9.1
30	El Monte	31.6	82	Paramount	8.8
31	Anaheim	28.7	83	West Covina	8.8
32	Long Beach	28.6	84	Gardena	8.5
33	Stockton	28.5	85	Lincoln	8.1
34	El Cajon	27.7	86	Lake Elsinore	8.1
35	Yuba City	26.2	87	Victorville	8.1
36	Porterville	25.9	88	San Pablo	7.8
37	Compton	25.5	89	Torrance	7.5
38	Watsonville	24.7	90	Wasco	7.5
39	Santa Ana	24.2	91	Corona	7.3
40	Coachella	24.1	92	Downey	6.9
41	Santa Maria	23.5	93	Oceanside	6.9
42	Baldwin Park	22.5	94	Lemon Grove	6.8
43	Ontario	22.4	95	Poway	6.8
44	Huntington Park	22.2	96	Merced	6.7
45	Lompoc	21.6	97	Monrovia	6.6
46	Banning	21.5	98	Upland	6.4
47	Ceres	21.1	99	Garden Grove	6.3
48	Vista	20.5	100	Bakersfield	6.1
49	Madera	19.6	101	Fullerton	6.1
50	Monterey Park	18.5	102	Richmond	6.0
51	Rancho Cucamonga	17.9	103	Hemet	6.0
52	Novato	17.6	104	Calexico	6.0

(table continued on next page)

Table 11: Estimated Default Probabilities for California Cities, based on Great Depression Model

Rank	City	Estimated Default Probability	Rank	City	Estimated Default Probability
	Moderately safe			Safe	
105	El Paso de Robles (Paso Robles)	5.9	157	Tustin	1.8
106	Fairfield	5.9	158	Tracy	1.7
107	La Puente	5.7	159	Santa Clara	1.6
108	Lodi	5.7	160	Antioch	1.6
109	Rohnert Park	5.5	161	La Quinta	1.5
110	Rosemead	5.3	162	Petaluma	1.5
111	Hawthorne	5.1	163	Suisun City	1.4
112	Arcadia	5.1	164	Berkeley	1.4
113	Seaside	4.9	165	Santa Paula	1.4
114	Palm Desert	4.8	166	Gilroy	1.3
115	Turlock	4.7	167	Oakley	1.3
116	Stanton	4.5	168	Redlands	1.3
117	San Rafael	4.5	169	Brea	1.1
118	Westminster	4.5	170	Costa Mesa	1.1
119	Santa Rosa	4.4	171	Folsom	1.1
120	La Mirada	4.4	172	Citrus Heights	1.1
121	Concord	4.1	173	Glendora	1.1
122	East Palo Alto	4.1	174	Daly City	1.1
123	Hayward	4.0	175	South San Francisco	1.1
124	Twentynine Palms	4.0	176	Rancho Cordova	1.1
125	Whittier	3.7	177	Santa Clarita	1.0
126	Carson	3.6	178	West Hollywood	1.0
127	San Leandro	3.6	179	La Habra	1.0
128	San Francisco	3.5	180	Santa Cruz	1.0
129	Paradise	3.4	181	Cypress	0.9
130	Huntington Beach	3.4	182	Covina	0.9
131	Pico Rivera	2.9	183	Redwood City	0.9
132	San Buenaventura	2.9	184	San Dimas	0.9
133	Lawndale	2.9	185	Sunnyvale	0.8
134	Chino	2.8	186	Monterey	0.7
135	Woodland	2.8	187	Imperial Beach	0.7
136	Napa	2.7	188	Lakewood	0.7
137	Milpitas	2.7	189	Murrieta	0.7
138	San Jacinto	2.7	190	Simi Valley	0.7
139	Brawley	2.6	191	Atascadero	0.7
140	San Luis Obispo	2.6	192	Fremont	0.7
141	Brentwood	2.6	193	Camarillo	0.7
142	Buena Park	2.6	194	Orange	0.6
143	Alameda	2.4	195	Santee	0.6
144	Vallejo	2.4	196	Culver City	0.6
145	Highland	2.4	197	Menifee	0.5
146	Cerritos	2.3	198	Temecula	0.5
147	Norwalk	2.2	199	Davis	0.5
148	Beaumont	2.2	200	Temple City	0.5
149	San Juan Capistrano	2.1	201	Fountain Valley	0.5
150	Union City	2.1	202	San Mateo	0.4
151	Norco	2.1	203	San Bruno	0.4
152	West Sacramento	2.0	204	Rocklin	0.4
153	Vacaville	2.0	205	Pacifica	0.4
154	Elk Grove	1.9	206	Windsor	0.4
155	San Gabriel	1.9	207	Campbell	0.4
156	Clovis	1.9	208	Wildomar	0.4

(table continued on next page)

Table 11: Estimated Default Probabilities for California Cities, based on Great Depression Model

Rank	City	Estimate Default Probability
	Very safe	
209	Martinez	0.34
210	Santa Barbara	0.32
211	Carlsbad	0.31
212	Santa Monica	0.28
213	Livermore	0.27
214	Irvine	0.27
215	Chino Hills	0.23
216	Yucaipa	0.22
217	Placentia	0.21
218	Mountain View	0.21
219	La Verne	0.19
220	Pleasant Hill	0.18
221	Newark	0.12
222	Benicia	0.12
223	Redondo Beach	0.11
224	South Pasadena	0.09
225	Walnut	0.08
226	Diamond Bar	0.08
227	Morgan Hill	0.08
228	Encinitas	0.08
229	Thousand Oaks	0.07
230	San Clemente	0.06
231	Walnut Creek	0.06
232	Mission Viejo	0.05
233	Yorba Linda	0.05
234	Claremont	0.04
235	Laguna Hills	0.04
236	Dana Point	0.04
237	Beverly Hills	0.04
238	Moorpark	0.03
239	Pleasanton	0.03
240	San Ramon	0.03
241	Lake Forest	0.02
242	Burlingame	0.02
243	Foster City	0.02
244	Rancho Santa Margarita	0.02
245	Rancho Palos Verdes	0.02
246	Newport Beach	0.02
247	Palo Alto	0.01
248	Laguna Niguel	0.01
249	Aliso Viejo	0.01
250	Dublin	0.01
251	Cupertino	0.01
252	Goleta	0.01
253	Menlo Park	0.005
254	San Carlos	0.004
255	Belmont	0.003
256	Los Gatos	0.002
257	Danville	0.001
258	Manhattan Beach	0.001
259	Los Altos	0.001
260	Saratoga	0.0004

Notes: these rankings were based on 2011 CAFR data and the Depression-era model (equation 2)

Despite the correspondence between predictive risk and actual risk produced by our model, we do believe it is important to highlight some of the shortcomings of our approach.

First, the Estimated Default Probability shown in Table 11 is the default probability that is implied by the Depression-era model. As should be clear, circumstances during the Depression were drastically different from today. Therefore, there is little reason to expect these estimates to be accurate, objective assessments in the current context. That said, we do believe an analyst could calibrate these default probability estimates to make them more accurate in the current context (for example, because we believe these estimates are too high, they could simply scaled by a judiciously chosen number[20]). Alternatively, one may prefer to think of the default probability estimates as "risk scores," in which case the ranking of cities produced by our Depression-era model suggests which cities are the most at-risk of default.

Second, to produce this ranking, we utilized CAFR data that we gathered directly from each city's websites, from the MSRB's EMMA website, and by contacting individual cities that had not posted their reports. The problem with this approach is that, although the data are audited and the most reliable that we know of, the cost of collecting this data on an ongoing basis is non-trivial.

Third, there are other model specifications that other researchers may prefer to the ones we have presented here. Other researchers may prefer different functional forms, different variables, or estimation strategies. All of the methodological choices we have made undoubtedly affect the ranking of cities produced by this model. It is important for

[20] We discuss calibration in Chapter 5.

the public to understand that the discipline of economics does not prescribe one accepted approach for this type of analysis, and while our approach is unbiased, there is no consensus among economists that any given approach is perfect. We welcome further research here, and we plan to continue to work on this topic ourselves.[21]

Finally, the model implementation we present later may be used with current balances and annual cash flows or with *projected* future balances and cash flows. The latter option provides forward-looking default probability estimates that should be more useful to investors. For CalPERS member cities, it is possible to obtain future employer contribution rates from actuarial reports published on the system's website.[22]

[21] In an earlier draft of this report, we did present two additional models that differ somewhat from that presented here. This working paper can be found here: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2258801 . Other than using these two models, and the one we present here (which takes into account feedback we received on our working paper) we have not calculated default probabilities for contemporary period cities based on any other model. We mention this because it is possible that a researcher would estimate multiple models using the Depression-era data, determine which one best predicts current-era defaults, and then present this model as the preferred model. However this is a methodologically unsound approach as it abuses the appropriate procedure of estimating the model in a testing sample (which for us is the Depression-era sample), and validating it in with a validation sample (for us, the contemporary sample of California cities.) In short, we estimated three models with the testing sample, and presented the one that was econometrically most sound (based on feedback from the scholarly community.)

[22] These can be found at http://www.calpers.ca.gov/index.jsp?bc=/about/forms-pubs/calpers-reports/actuarial-reports/home.xml (Accessed June 10, 2013). These reports also include a sensitivity analysis showing the effect of different portfolio return rates on future employer contribution rates.

Chapter 3: Municipal Bond Defaults in California: History and Case Studies

Over California's 160-year history, city bond defaults have been relatively rare. Default activity has varied over time, peaking during the Great Depression. This chapter surveys the entire history of payment defaults by California cities, with sections on each of the five cities filing municipal bankruptcy petitions since 2001. It concludes with a brief discussion of defaults attendant to the dissolution of redevelopment agencies and a review of city fiscal emergencies.

Pre-1930

For the period from statehood through 1930, Hillhouse (1935) lists eight defaults ascribed to California cities, but a review of original sources indicates that not all of these are legitimate defaults in the contemporary sense.

The highest profile municipal bond default in California's early years was that of Placerville in 1866 (Placerville Mountain Democrat, 1900). Three years earlier, the city issued $100,000 in bonds to finance a rail connection to Folsom, where service from Sacramento terminated at the time. The funds were invested in the newly created Placerville and Sacramento Valley Railway Company. The company was unable to complete the railroad, terminating it 12 miles short of the city. Meanwhile, Placerville suffered declining population due to the end of the Gold Rush. In 1866, the city stopped making interest and principal payments. In 1873, city leaders decided to avoid personal liability by disbanding the municipal government. In 1900, the city government was re-established and an accommodation was made with the holders of $34,500 still outstanding.

Holders of $7,000 in Placerville fire department bonds issued earlier in 1863 did not fare as well. In the case of Wichman v. City of Placerville (1905), 81 Pac. 537, the California Supreme Court invalidated their bonds. Placerville was incorporated by the State legislature in 1859 and then reincorporated on April 6, 1863, when it was authorized to issue the railroad bonds. The previous city corporation issued the fire department bonds on April 3, 1863. The court held that the bonds were obligations of a liquidated city corporation and thus not the responsibility of the new government. California courts invalidated a number of other city bonds listed among Hillhouse's defaults. These cases are listed below:

Table 12: 19th Century Court Cases Invalidating Municipal Bond Issues

City	Issue	Case	Description
Sacramento	General obligations issued in 1854	Bates v. Gregory (1891) 26 Pac. 891	City was reincorporated in 1863. Bonds matured in 1874 but were not presented for payment until 1887. Court ruled that under the statute of limitations, the city's liability for the bonds lapsed in 1878.
San Diego	Railroad Aid bonds issued in 1874	McCoy v. Briant (1878), 53 Cal. 247 and Lehman v. City of San Diego (1897), 83 Fed. 669	In McCoy v. Briant, bonds were invalid because Board of Trustees failed to pass a resolution authorizing them. In Lehman v. City of San Diego, bonds were issued after statutory authorization was repealed but antedated so that they would appear to be valid.
San Francisco	Dupont Street and Montgomery Avenue street construction bonds issued in 1872 and 1877 respectively	Shapter v. San Francisco (1901), 110 Fed. 615 and Liebman v. City and County of San Francisco (1885), 24 Fed. 705	The Dupont Street bonds were held to be a special assessment and thus an obligation of neighborhood property owners rather than a general obligation of the city. The Montgomery Avenue bonds were determined to be obligations of a public works corporation, rather than city general obligations. The public works corporation's taxing authority had previously been invalidated in Mulligan v. Smith (1881), 59 Cal. 206.
Santa Cruz	Water works bonds issued in 1885	Santa Cruz Water Company v. Kron (1887), 15 Pac. 772	Bond issued after enabling state legislation was passed but prior to its effective date.

Sources: Dean (1912), Court Filings.

Hillhouse also lists a San Francisco default on Improvement Obligations, but his reference - Sakolski (1932) - suggests that the payment failures dating to the 1850s were not related to bonds. Apparently, San Francisco, like many Gold Rush-era boomtowns, issued scrip to compensate vendors before taxes were collected. San Francisco was unable to redeem the scrip with cash in a timely manner and its value depreciated. Sakolski describes the exploits of one speculator, Peter Smith, who bought a substantial amount of the scrip at a discount and then profited by obtaining judgments against the city – compelling it to redeem the IOUs by selling its real estate holdings.

State and local governments across the country have resorted to issuing scrip at various times. The state of California did so in 2009 during a budget impasse. Although the use of scrip may be characterized as a default in the popular press, it does not meet the definition of a payment default used by contemporary bond market participants or in this study.

The last default listed by Hillhouse involved the City of Stockton in 1870. In that year, voters overwhelmingly approved $300,000 to fund the proposed Stockton & Visalia Railroad (Tinkham, 1923). The Council expected the new railroad to lay 15 miles of new track terminating at the San Joaquin River and connecting it to the rest of the Central Valley. The railroad laid one mile of new track connecting Stockton to a pre-existing railway line, and then demanded payment from the city (Burrill, 2011). Stockton's City Council refused to levy taxes required to service the bonds, which appear to have been held by the railroad. After extended litigation, the city and the railroad reached an out of court settlement (Tinkham, 1923).

Great Depression Era

California local government issuers experienced a substantial number of defaults during the Great Depression. Most of these defaults affected irrigation and reclamation districts as well as special assessment districts (older equivalents of today's Mello Roos issuers). Prior to the Depression, many special assessment districts had been created to pave roads and build other local infrastructure under the state's 1915 Improvement Act.

Available documents contain reports of 11 California towns and cities that defaulted on general obligation bond payments. These defaults are listed in the following table.

Table 13: Great Depression-Era California City Defaults

City	Population	Date	Comments	Source
Alturas	2,400	As of 11/1936	Defaults on both general obligation and 1915 Act bonds. Cause not given. Voters approved issuance of refunding bond issue in December 1936.	*Moody's Government Securities Manual* 1937, p.228.
Arcadia	5,216	1/1/1932	Defaults on water, street and library general obligation bonds. Three corporate taxpayers who accounted for 30% of the town's property tax revenue became delinquent.	*Bond Buyer*, 4/7/1934, p. 825.
Benicia	2,913	10/1/1932	Cured by May 1933. Cause not given.	*Bond Buyer*, 5/27/1933, p. 1115.
Blythe	1,020	1930	Population fell after a 1922 flood. Special assessment defaults began in 1927. General obligations defaulted in 1930. City clerk told the *Bond Buyer* that "the taxes were so prohibitive that no taxes could be collected. At one time our tax rate was over $36 per hundred."	*Bond Buyer*, 7/2/1935, p. 1763.
Brawley	11,300	As of 10/1/1935	26% of fiscal 1935 tax levy uncollected within the fiscal year.	*Moody's Government Securities Manual* 1936, p.173.
Calexico	6,299	As of 9/11/1933	Property tax revenue decline due to lower assessments and higher delinquencies.	*Moody's Government Securities Manual*

				1934, p.202.
Calipatria	1,554	As of 11/18/33	Only 65% of tax levy was collected in 1931.	*Moody's Government Securities Manual* 1934, p.202.
Culver City	7,500	As of 6/30/34	Fall in property tax collections.	*Moody's Government Securities Manual* 1936, p.175.
Imperial	1,943	As of 11/17/1933	50% of fiscal 1933 tax levy uncollected within the fiscal year.	*Moody's Government Securities Manual* 1934, p.204.
Lynwood	10,000	As of 7/25/39	Tax delinquencies rate exceeded 30% in the mid-1930s, but had fallen substantially by the time the default was reported.	*Moody's Government Securities Manual* 1940, p.150.
Oroville	3,698	1/1/1933	Cured by May 1933. Cause not given.	*Bond Buyer*, 5/25/33, p. 1093.
Vacaville	1,556	11/1/1932	Default not due to lack of funds, but rather a clerical oversight. Missed coupon paid in full less than one month late.	*Bond Buyer*, 11/30/32, p. 2892.

None of the defaulting cities had population of more than 12,000. According to the 1932 Census of State and Local Governments, 40 of the state's cities had populations in excess of 12,000 at the time – suggesting that solvency problems during the Depression were confined to smaller cities. However, it should be noted that several larger cities experienced defaults in special assessment districts. Los Angeles, already the state's largest city, contained 30 defaulting districts. San Diego and Oakland also had assessment bond defaults.

Property tax delinquencies appear to be the primary cause of Depression-era defaults. As noted in Table 13, a number of cities experienced delinquency rates in excess of 30%. It is reasonable to assume that the bonds were issued with the expectation that the

bulk of property taxes would be paid on a timely basis. When this did not occur, towns and cities with substantial debt burdens became unable to meet them. This is consistent with the nationwide trend described in the previous chapter. It is why we include Annual Revenue Change as a factor in our models.

Post-1940

After the Depression, benign credit conditions returned. Only three defaults by a city (as opposed to a special assessment district) appear to have occurred between 1940 and 1993. In 1965, Redondo Beach defaulted on an unrated $9 million harbor bond issue. According to a contemporary *Moody's Government Securities Manual* (1968), the bonds were secured by revenues from the boat harbor and taxes collected in the harbor area in excess of the amount realized in fiscal 1958. The bonds were thus tax supported but not a general obligation or general fund obligation of the city. According to the *Wall Street Journal* (1965), "The city blamed the default on a number of factors including construction delays, unusually severe winter storms in 1962 and the failure of expected offshore oil revenue to materialize." The *Journal* report went on to state that the 1959 feasibility study for the harbor project had been "overly optimistic."

In 1982, Parlier defaulted on general obligation bond payments, as well as debt service obligations to a bank and the Farmers Home Administration. The city's population was reported as 2,902 or 5,093 by different sources, perhaps because it was in the process of annexing an unincorporated area known as West Parlier. According to the U.S. Advisory Commission on Intergovernmental Relations ([ACIR] 1985), the city had $110,000 in general obligation bonds outstanding and defaulted on a $6,000 debt service payment. As

of December 15, 1982, the city had total debts of $819,089, and cash of only about $2,000. A *Los Angeles Times* article (Taylor, 1982a) attributed the city's financial distress to a cost overrun on a recently completed community center, and the initial failure of an industrial park project to attract tenants. Interest in the park suffered after a carcinogen was found in the town's well water. The *Times* coverage also cited fiscal mismanagement which included the lack of a "meaningful audit" of the city's books between 1975 and 1982. The ACIR report noted that the city ran persistent deficits ahead of the financial crisis, culminating in a fiscal 1982 shortfall that amounted to 36% of revenues.

Once the extent of the crisis was determined, the city took drastic action to avoid a municipal bankruptcy and cure its various defaults. Measures included terminating 16 of the 22 city employees. The terminations included all of Parlier's police officers, as Fresno County took responsibility for local law enforcement (Taylor, 1982b). By June 30, 1983, the city had resolved all of its defaults.

In 1993, the small city of Arvin defaulted on $2.945 million of Certificates of Participation (COP) used to finance temporary housing for farmworkers. In early 1994, it defaulted on $7.89 million in COPs used to finance a golf course (Altman, 1994). Although the city considered a Chapter 9 filing, it appears to have reached an accommodation with certificate owners. According to Mysak (2010), bondholders received about 28 cents on the dollar for the defaulted golf course COPs.

In 1998, the City of Healdsburg issued $7 million in bonds on behalf of Nuestro Hospital Group to purchase the local hospital (*California Healthline*, 1998). The bonds did not constitute a claim on tax revenues and apparently went into default when the hospital generated insufficient revenue to service them. We were unable to locate further

information about this default, which is listed in Mergent Corporation's municipal bond database.

Since 2001, five California cities have made municipal bankruptcy filings under Chapter 9 of the federal bankruptcy code: Desert Hot Springs (2001), Vallejo (2008), Stockton (2012), Mammoth Lakes (2012) and San Bernardino (2012). Four of these situations also involved municipal bond defaults. We describe each of these cases in separate sections below.

Desert Hot Springs, 1999

Although Desert Hot Springs' December 19, 2001, bankruptcy filing (case number 6:01-bk-30756-DN Central District of California) followed an adverse court decision, its financial problems were not wholly attributable to the lawsuit. In fact, the city's 1999 default on unrated revenue anticipation notes occurred well before the bankruptcy filing.

According to financial statements attached to offering documents available on the Municipal Securities Rulemaking Board's (MSRB) Electronic Municipal Market Access (EMMA) system, the city experienced large and growing all-fund deficits in fiscal 1995, 1996 and 1997. The city also experienced a large general fund deficit in fiscal 1997 – amounting to 36% of revenues.

On August 27, 1997, the city issued $1,275,000 in Revenue Anticipation Notes bearing a 4.75% interest rate and due the following year. These notes, rated F-2 by Fitch, were apparently redeemed with proceeds from a second set of Revenue Anticipation Notes

issued on September 30, 1998. This second issue, totaling $1,415,000 was unrated and carried an 8.25% interest rate – a clear signal of the city's financial distress.

Selected fiscal statistics for Desert Hot Springs gathered from contemporaneous financial statements are provided in the accompanying tables. All governmental fund revenues fell 4% in fiscal 1997, but rose 7% and 8% in 1998 and 1999 respectively. These robust increases were primarily attributable to intergovernmental revenue; real estate assessment and property tax revenues were relatively weak during this period, despite the strong national housing market. A later filing on EMMA (City of Desert Hot Springs, 2004) shows that assessed valuations rose 3% in fiscal 1998 and fell 1% in fiscal 1999. Overall, valuations remained stagnant throughout the mid- and late-1990s, dropping slightly from $490.6 million in fiscal 1994 to $487.0 million in 1999.

Interest expense accounted for 17% of all fund revenue in 1996 and 15% in 1997 and 1998. Also, in 1998, pension contributions became a significant budgetary factor, following the city's entry into the CalPERS. In 1999, the city's interest expense fell due to the default.

While aggregate governmental fund balances remained positive ahead of the city's default, Desert Hot Springs' general fund balance fell below zero in fiscal 1996 and became increasingly negative ahead of the 1999 default. General fund exhaustion appears to be the key driver of the Desert Hot Springs default – a theme that repeats in the Vallejo, Stockton and San Bernardino cases described below (red columns denote default year data).

Figure 1: Desert Hot Springs, All Governmental Fund Data Pre-Default

City of Desert Hot Springs - All Governmental Funds				
Statement of Revenues, Expenditures and Changes in Fund Balances				
	Total Governmental Funds			
	1996	1997	1998	1999
Revenues				
Taxes	3,910,047	3,778,247	3,921,255	3,461,885
Permits and fees	186,355	158,992	250,835	549,967
Intergovernmental	956,230	1,008,842	1,491,961	2,089,252
Licenses	145,208	120,710	115,212	113,607
Interest	582,585	323,448	343,186	256,268
Miscellaneous	268,671	398,663	56,404	202,337
Total Revenues	6,049,096	5,788,902	6,178,853	6,673,316
Expenditures				
General government	1,743,931	1,872,688	1,775,738	2,052,264
Public safety	2,078,876	2,987,568	2,666,403	2,393,606
Public works	467,096	525,026	911,993	730,159
Parks and recreation	466,688	576,999	74,700	41,053
Capital outlay	851,832	425,726	771,725	60,478
Principal	918,297	2,523,996	416,657	22,253
Interest	1,009,056	860,125	895,990	365,347
Economic development	192,688	100,204	193,161	307,922
Prior year expenditures	603,889	207,344	165,894	652,175
Total Expenditures	8,332,353	10,079,676	7,872,261	6,625,257
Excess (Deficiency) of Revenues over Expends.	(2,283,257)	(4,290,774)	(1,693,408)	48,059
Other Financing Sources (Uses) + Adjustments	427,784	424,579	118,580	(302,887)
Net Change in Fund Balances	(1,855,473)	(3,866,195)	(1,574,828)	(254,828)
Beginning Fund Balances	11,246,073	9,390,600	5,524,405	3,949,577
Ending Fund Balances	9,390,600	5,524,405	3,949,577	3,694,749
Pension Contributions		40,957	203,951	*200,000*
Annual Revenue Change		-4.30%	6.74%	8.00%
(Interest + Pension) / Revenue	16.68%	15.57%	17.80%	8.47%
Source: Audited Financial Reports, FY 1996-1999.				
Pension contributions for 1999 not available; estimated value entered.				

Figure 2: Desert Hot Springs, General Fund Data Pre-Default

City of Desert Hot Springs - General Fund					
Statement of Revenues, Expenditures and Changes in Fund Balances					
		General Fund			
		1996	1997	1998	1999
Revenues					
	Taxes	2,235,026	2,200,461	2,337,528	2,160,812
	Permits and fees	168,770	141,281	169,281	512,408
	Intergovernmental	582,359	606,870	598,647	740,025
	Licenses	145,208	120,710	115,212	113,607
	Interest	35,048	3,297	30,161	5,503
	Miscellaneous	233,125	335,812	53,369	171,578
Total Revenues		3,399,536	3,408,431	3,304,198	3,703,933
Expenditures					
	General government	1,375,135	1,417,084	1,448,594	1,617,127
	Public safety	2,075,894	2,955,166	2,263,685	1,690,046
	Public works	93,952	81,959	233,801	177,311
	Parks and recreation	53,277	121,020	74,700	21,867
	Capital outlay	-		134,974	
	Principal	-	46,095	42,152	
	Interest	-	3,994	122,047	38,000
	Economic development	-			
	Prior year expenditures	10,297			1,126
Total Expenditures		3,608,555	4,625,318	4,319,953	3,545,477
Excess (Deficiency) of Revenues over Expends.		(209,019)	(1,216,887)	(1,015,755)	158,456
Other Financing Sources (Uses) + Adjustments		(663,407)	417,079	1,026	105,441
Net Change in Fund Balances		(872,426)	(799,808)	(1,014,729)	263,897
Beginning Fund Balances		214,503	(657,923)	(1,457,731)	(2,472,460)
Ending Fund Balances		(657,923)	(1,457,731)	(2,472,460)	(2,208,563)
Pension Contributions			40,957	203,951	*200,000*
Annual Revenue Change			0.26%	-3.06%	12.10%
(Interest + Pension) / Revenue		0.00%	1.32%	9.87%	6.43%
Source: Audited Financial Statements, FY 1996-1999.					
Pension contributions for 1999 not available; estimated value entered.					

In 2000, voters ratified additional property taxes and utility taxes that were projected to raise $1.8 million in additional revenue (Deborah, 2000). The city may have been able to cure its default and avoid bankruptcy had it not suffered a legal setback in 2001.

As reported by Gold (2001) in the *Los Angeles Times*, Desert Hot Springs chose to enter Chapter 9 after losing a decisive battle in an 11-year fight with Silver Sage Developers. The litigation began in 1990 after City Council threw out the company's plan to build a mobile home park. The developer sued, claiming that the Council's decision violated the Fair Housing Act by discriminating against low-income families. The initial jury award to Silver Sage of $3 million was later reduced to $1 by a second jury. But, in July 2001, the 9th Circuit Court of Appeals reinstated the $3 million award and added another $3 million for interest and legal fees. On December 18, 2001, a federal judge declined to block Silver Sage from seizing city assets to satisfy the judgment. Desert Hot Springs filed for Chapter 9 bankruptcy to forestall the asset seizure.

Gold's 2001 article also notes that developers had been hesitant to start projects in Desert Hot Springs because of the legal uncertainty. This effect may explain the relatively stagnant real estate assessments mentioned earlier.

Vallejo, 2008

On May 23, 2008, Vallejo became the largest city to file a Chapter 9 bankruptcy petition (case number 2:08-bk-26813 Eastern District of California) since Congress first allowed municipal bankruptcies in 1934. Vallejo's bankruptcy involved a default on Certificates of Participation (COPs). These certificates, unlike General Obligations or

General Fund Obligations, are not senior claims on a city's tax revenue. Instead, they represent the investor's share in lease revenues the city agrees to pay on certain facilities. As noted in the COPs offering materials, "the City could choose to fund other services before making Lease Payments" and that holders have limited recourse in the event of a default or bankruptcy (Wulff, Hansen & Company, 2003).

According to documents filed with the court and posted on the city's website, bankruptcy was necessitated by the fact that the city's general fund had been exhausted and was expected to continue running large deficits in fiscal year 2009. Media coverage in early 2008 also attributed the situation to high police and fire employee costs as well as unwillingness on the part of public safety unions to make concessions (see, for example, Jones, 2008 and Rohrs, 2008).

Data retrieved from CAFRs and other reports during this period confirm the exhaustion of the general fund, but show large positive balances in other funds. A February 28, 2008, staff memo showed $137 million in cash balances across all funds (Mayer, 2008). Governmental Fund balances reported as of June 30, 2008, in the CAFR were $105 million.[23]

It would appear that the city could have avoided or postponed bankruptcy by lending money from other governmental funds to the general fund. The city may not have chosen this option because of a strict reading of Governmental Accounting Standards. Mayer (2008) states that these standards "as applied by the City and examined by our external auditors, permit short-term interfund borrowing … only to the extent that there is a demonstrated ability to repay these loans." Further, staff appears to have underestimated

[23] As discussed by the Governmental Accounting Standards Board (GASB) (2006), the concept of fund balance varies across fund types, so aggregating balances across all funds may be misleading.

the costs of the Chapter 9 process. In a May 6, 2008, staff memo, bankruptcy costs were estimated at $750,000 to $2 million (City of Vallejo, 2008). A 2011 *Wall Street Journal* article put the final cost at $9 million (White, 2011).

During each year between 1999 and 2003, the city issued COPs totaling more than $54 million. After the city filed its bankruptcy petition, Vallejo capped interest payments below the contractual rate. As the bankruptcy progressed, the city completely suspended interest and principal payments twice (City of Vallejo, 2011). At the end of the bankruptcy, the COPs were replaced with new lease agreements. Creditors were still entitled to receive all principal originally lent, but later than expected and with less interest than required by the original COPs. The city's remaining debt, composed mostly of revenue bonds issued by enterprise (i.e., business type or non-governmental) funds, was not adjusted.

The accompanying tables show Total Governmental and General Fund values for fiscal years 2005-2009. The bankruptcy filing occurred at the end of fiscal year 2008. Annual government-wide revenue fell 5% in 2006, rose 4% in 2007 and fell almost 10% in 2008. While this last observation is consistent with the idea that falling revenue is predictive of default, it would not have been available until well after the bankruptcy filing since the CAFR in which it appeared was published several months after the fiscal year end. Some cities, including Vallejo, publish interim financials, so it may have been possible to estimate this value during the fiscal year.

Interest and retirement costs as a proportion of total revenue were not especially high. In the year of the default, the ratio peaked at 11.36%. Overall, the parameters derived from the Depression-era data do not effectively predict the Vallejo default. On the other hand, large general fund deficits and low balances seem to have been the major

contributors. As suggested above, city management did not take all possible measures to stave off insolvency and appear to have been surprised by the high cost of the bankruptcy filing.

Figure 3: Vallejo, All Governmental Fund Data Pre-Default

City of Vallejo - All Governmental Funds					
Statement of Revenues, Expenditures and Changes in Fund Balances					
	Total Governmental Funds				
	2005	2006	2007	2008	2009
Revenues					
Taxes	55,161,490	57,550,479	59,919,619	58,729,898	55,815,958
Licenses, permits and fees	11,852,968	6,000,434	4,677,963	3,327,060	2,440,614
Fines and forfeitures	1,450,743	3,887,337	1,683,911	1,827,945	1,560,809
Intergovernmental	55,423,739	49,780,261	48,824,041	38,546,090	36,743,052
Use of money and property	6,419,396	6,702,584	7,789,616	6,891,090	4,520,458
Charges for services	14,692,748	11,326,489	17,925,042	20,234,105	20,026,448
Other	2,717,589	4,448,399	4,543,088	1,833,312	841,040
Total Revenues	147,718,673	139,695,983	145,363,280	131,389,500	121,948,379
Expenditures					
Current:					
Legislative and advisory	311,994	323,174	270,743	292,370	215,485
Executive	1,413,534	1,374,916	1,425,841	736,846	621,003
Finance	1,286,935	1,864,644	1,926,168	1,159,374	1,696,164
Human resources	973,717	1,282,442	1,319,304	723,493	553,254
Law	628,677	764,614	871,733	892,284	863,429
Development services	3,078,353	3,650,863	2,786,231	3,248,627	2,633,028
Community development	52,217,190	39,856,041	46,712,048	33,707,475	39,056,197
Fire services	22,742,661	24,723,674	28,072,502	28,063,568	23,107,207
Police services	32,898,573	36,630,148	40,252,109	41,185,818	34,354,261
Public works	12,204,692	13,793,065	13,486,711	14,077,984	12,713,924
Nondepartmental	6,120,498	6,826,980	7,284,198	11,045,020	11,426,993
Capital outlay	5,867,421	5,218,215	18,761,691	14,039,215	7,499,257
Debt Service:					
Principal	5,056,682	1,657,337	3,966,314	1,497,254	1,464,697
Interest and fiscal agent fees	2,463,555	2,705,865	2,667,960	2,589,723	2,336,172
Total Expenditures	147,264,482	140,671,978	169,803,553	153,259,051	138,541,071
Excess (Deficiency) of Revenues over Expends	454,191	(975,995)	(24,440,273)	(21,869,551)	(16,592,692)
Total Other Financing Sources (Uses)	509,605	(1,613,209)	724,900	3,666,290	(513,905)
Net Change in Fund Balances	963,796	(2,589,204)	(23,715,373)	(18,203,261)	(17,106,597)
Beginning Fund Balances	148,931,220	149,895,016	147,305,813	123,590,440	105,387,179
Ending Fund Balances	149,895,016	147,305,812	123,590,440	105,387,179	88,280,582
Pension Contributions	9,599,955	11,293,291	11,734,043	12,332,457	10,372,222
Annual Revenue Change		-5.43%	4.06%	-9.61%	-7.19%
(Interest + Pension) / Revenue	8.17%	10.02%	9.91%	11.36%	10.42%

Source: Comprehensive Annual Financial Reports, FY 2005-2009.

Figure 4: Vallejo, General Fund Data Pre-Default

City of Vallejo - General Fund						
Statement of Revenues, Expenditures and Changes in Fund Balances						
			General Fund			
		2005	2006	2007	2008	2009
Revenues						
	Taxes	51,579,991	53,083,876	55,617,416	53,821,263	51,071,916
	Licenses, permits and fees	7,436,293	3,440,959	2,749,888	2,431,928	1,846,301
	Fines and forfeitures	1,372,316	1,410,820	1,483,923	1,428,818	1,430,689
	Intergovernmental	11,191,393	14,321,658	11,553,159	12,718,335	11,908,871
	Use of money and property	558,743	546,224	262,559	473,351	599,651
	Charges for services	6,782,717	2,193,226	5,867,269	7,682,796	8,061,261
	Other	213,559	2,826,607	3,017,544	117,944	131,494
Total Revenues		79,135,012	77,823,370	80,551,758	78,674,435	75,050,183
Expenditures						
Current:						
	Legislative and advisory	311,994	323,174	270,743	247,668	215,485
	Executive	1,170,568	1,310,691	1,312,440	736,846	621,003
	Finance	1,274,935	1,864,644	1,926,168	1,159,374	1,696,164
	Human resources	973,717	1,282,442	1,319,304	723,493	553,254
	Law	628,677	764,614	871,733	892,284	863,429
	Development services	2,199,270	2,338,949	2,726,448	2,812,419	2,457,265
	Community development	-	416,290	559,173	795,304	744,688
	Fire services	20,715,988	22,533,874	25,238,098	25,286,403	20,424,746
	Police services	32,013,022	35,264,688	38,050,873	38,204,475	31,487,056
	Public works	4,615,794	5,055,339	4,052,169	4,210,768	3,987,009
	Nondepartmental	5,902,455	5,041,656	6,228,746	9,868,036	9,894,757
Capital outlay		114,776	-	-	-	-
Debt Service:						
	Principal	127,330	581,866	543,912	286,700	219,899
	Interest and fiscal agent fees	5,962	125,755	78,727	99,577	50,157
Total Expenditures		70,054,488	76,903,982	83,178,534	85,323,347	73,214,912
Excess (Deficiency) of Revenues over Expends.		9,080,524	919,388	(2,626,776)	(6,648,912)	1,835,271
Total Other Financing Sources (Uses)		649,886	(3,919,060)	(1,208,499)	3,140,555	(1,022,443)
Net Change in Fund Balances		9,730,410	(2,999,672)	(3,835,275)	(3,508,357)	812,828
Beginning Fund Balances		4,125,934	13,856,344	10,856,672	7,021,397	3,513,040
Ending Fund Balances		13,856,344	10,856,672	7,021,397	3,513,040	4,325,868
Pension Contributions		9,599,955	11,293,291	11,734,043	12,332,457	10,372,222
Annual Revenue Change			-1.66%	3.51%	-2.33%	-4.61%
(Interest + Pension) / Revenue		12.14%	14.67%	14.66%	15.80%	13.89%
Source: Comprehensive Annual Financial Reports, FY 2005-2009.						

Mammoth Lakes, 2012

The town of Mammoth Lakes filed a Chapter 9 bankruptcy petition with the Eastern District of California Bankruptcy Court (Case Number 2:12-bk-32463) on July 3, 2012. The town, which had 8,234 residents in 2010, did not default on any of its bonded indebtedness and the bankruptcy case was dismissed on November 16, 2012.

Mammoth Lakes filed for bankruptcy after it lost a law suit to Mammoth Lakes Land Acquisition LLC (MLLA), exhausted its appeals and failed to convince the plaintiff to reduce the amount of the judgment. MLLA sued the town because it reneged on a 1997 development agreement in which MLLA improved the municipal airport in exchange for the right to build a hotel/condominium project at the site. The town did not grant approval for the hotel/condominium project because of safety concerns expressed by the Federal Aviation Administration, but officials were aware of these concerns when they signed the 1997 agreement (Goodwin Proctor, 2011). The original judgment of $30 million awarded in 2008 increased to over $42 million by early 2012 due to attorneys' fees and interest.

According to Mammoth Lakes' financial statements, the town had no general obligation bonds or revenue bonds outstanding when it filed, but did have about $2.5 million in Certificates of Participation issued in 2000 and 2004. The 2000 COPs were rated while the 2004 issue was unrated and sold privately to Citizen's Bank. After the bankruptcy filing, S&P downgraded the 2000 COPs issue from BB to C (Standard & Poors, 2012a).

In the town's initial plan of adjustment, it stated its intention to continue servicing the 2000 COPs on time and in full. On the other hand, it planned to extend the term of the 2004 Citizen's Bank COPs by three years (Town of Mammoth Lakes, 2012a).

Ultimately, no default occurred because the town reached a settlement with MLLA. Under the settlement, MLLA agreed to accept $29.5 million plus interest paid over 23 years. The town accommodated the annual cost of the settlement through budget cuts and by increasing its revenue forecast (Town of Mammoth Lakes, 2012b). Once the settlement was reached, the bankruptcy case was dismissed and S&P upgraded the 2000 COPs to BB+ (Standard & Poors, 2012b).

Stockton, 2012

The City of Stockton filed a Chapter 9 petition on June 28, 2012 (case number 2:12-bk-32118), after it was unable to secure concessions from creditors during the California Assembly Bill 506 (AB 506) mediation process.[24] Most of Stockton's municipal bonds are insured by Ambac, National Public Finance Guarantee and Assured Guarantee.

During the AB 506 discussions the city stopped making debt service payments on 2004 Lease Revenue Bonds. These bonds are secured by parking garage revenues and are not a general obligation of the city. The bond insurer, National Public Finance Guarantee, initially received payments from a reserve fund administered by the bond trustee. Once that fund was exhausted the trustee took possession of the three parking facilities covered by the lease agreement and diverted a portion of the proceeds to debt service (Wells Fargo, 2013).

In February 2013, the city reached an agreement with Ambac to scale back payments on 2003 Certificates of Participation, but the other two insurers continued to

[24] Assembly Bill 506 requires cities contemplating a bankruptcy filing to engage in a neutral evaluation process with creditors. During the neutral evaluation process, which can last up to 90 days, the city is shielded from legal action on the part of creditors.

press their objections to the bankruptcy filing in court. They were joined by Franklin Templeton, which holds uninsured city obligations. On April 1, 2013, Judge Christopher Klein upheld the city's bankruptcy filing clearing the way for it to reduce debt service payments without facing legal action.

Stockton's reasons for filing a bankruptcy were given in a recent news release:

> *On July 1, 2012, the City had less than $2 million in cash, all of which would have been entirely depleted within the first few days of the fiscal year. It was not even enough to make the City's July payroll. Thus, the City would not have been able to pay its employees, let alone its creditors, during any month of the 2012-2013 fiscal year. ... The City could not balance its budget outside of chapter 9, absent massive giveups by creditors who refused to make such concessions. The proposed 2012-2013 budget that City staff submitted to the City Council in May 2012 confirmed what the City already knew: It could not close its $26 million "gap" and balance its budget without chapter 9 protection. Its anticipated revenues remained depressed. And while it had already made across-the-board reductions in employee costs, the costs of healthcare, pensions, and debt service in particular were trending upward (City of Stockton, 2013).*

As of this writing, the city's 2012 CAFR has not been filed and no data for total governmental funds is available for the most recent fiscal year. The accompanying tables show data for fiscal 2008-2011. General fund estimates for 2012 and 2013 were derived from the city's most recent budget report submitted to City Council in March 2013. No more recent financial statistics appear to be available on Stockton's website.

The 2011 data reflect $15 million in adverse prior period adjustments to the city's general fund balance – part of $109.7 million in such adjustments across all funds. The adjustments are described in footnote 14 of the CAFR starting at page 129 (although the adjustments described in the note to not appear to account for the full $109.7 million in adjustments mentioned on page 4).

The General Fund adjustments included $12.3 million in allowances for doubtful accounts, $1.2 million in accrual adjustments, and $0.5 million for double-counted parking citation revenue. Most of the adjustment to other governmental funds was attributable to a change in accounting method for city loan programs. Although the note does not explicitly say this, the adjustments appear to address the possibility that a large proportion of these loans will not be fully repaid.

The fact that audited financials had to be adjusted post-filing compromises their usefulness for analyzing a city's credit risk. If the data are not reliable, they may not provide meaningful insight. In this connection, it is worth noting that the vast majority of the adjustments are related to accrual accounting issues such as allowances for doubtful loans. These concepts are less concrete than cash values, including total revenue, interest expense and pension cost. Thus they are more vulnerable to restatement.

As in the case of Vallejo, Stockton's filing is closely associated with general fund exhaustion. Although the city reported a $12 million general fund balance at the end of fiscal year 2011 – just prior to its default – this amounted to less than 7% of annual expenditures.

Figure 5: Stockton, All Governmental Fund Data Pre-Default

City of Stockton - All Governmental Funds				
Statement of Revenues, Expenditures and Changes in Fund Balances				
	Total Governmental Funds			
	2008	2009	2010	2011
Revenues				
Taxes				
Property	63,998,000	58,640,000	45,549,000	41,051,105
In lieu of sales tax	10,164,000	9,823,000	7,087,000	8,118,132
Utility user	30,861,000	30,854,000	30,717,000	30,993,997
Sales (levied by City)	9,409,000	7,921,000	7,652,000	7,875,429
Franchise fees	11,537,000	11,608,000	11,354,000	11,502,735
Business license	10,772,000	9,699,000	9,717,000	9,855,031
Hotel/motel room	2,287,000	1,962,000	1,749,000	1,798,740
Document transfer	686,000	702,000	559,000	583,418
Other	246,000	234,000	203,000	154,983
Licenses and permits	5,273,000	4,335,000	4,257,000	3,584,311
Federal grants and subsidies	13,617,000	12,976,000	26,034,000	33,243,873
Other shared revenue (sales and use tax levied by state)	36,098,000	31,245,000	28,856,000	30,060,798
Other governmental	59,976,000	53,498,000	47,779,000	47,929,416
Charges for services	55,244,000	31,462,000	26,174,000	21,261,669
Fines and forfeitures	3,321,000	4,499,000	5,090,000	3,538,020
Use of money and property	12,922,000	13,234,000	11,962,000	14,966,292
Investment income:				
Interest income	13,100,000	11,375,000	5,352,000	1,338,707
Refunds and reimbursements	4,253,000	4,113,000	5,186,000	9,789,326
Miscellaneous	8,515,000	13,429,000	8,449,000	7,594,326
Total revenues	352,279,000	311,609,000	283,726,000	285,240,308
Expenditures				
Current:				
General government	22,285,000	24,272,000	21,818,000	30,900,316
Public safety	168,372,000	163,339,000	152,714,000	152,526,746
Public works	18,464,000	16,113,000	14,029,000	13,528,150
Library	13,432,000	12,485,000	11,041,000	10,252,107
Parks and recreation	27,185,000	22,376,000	17,948,000	19,669,013
Capital outlay	135,071,000	105,384,000	84,194,000	66,974,739
Debt service:				
Principal retirement	1,017,000	3,973,000	11,739,000	22,661,216
Cost of issuance	777,000	99,000	846,000	0
Interest and fiscal charges	10,771,000	11,938,000	12,523,000	12,705,728
Total expenditures	397,374,000	359,979,000	326,852,000	329,218,015
Excess (Deficiency) of Revenues over Expenditures	(45,095,000)	(48,370,000)	(43,126,000)	(43,977,707)
Total Other Financing Sources (Uses)	53,608,000	7,122,000	39,911,000	4,869,469
Special Items	0	(8,736,000)	(288,000)	3,269,612
Net Change in Fund Balances	8,513,000	(49,984,000)	(3,503,000)	(35,838,626)
Prior Period Adjustments	0	0	0	(109,666,067)
Beginning Fund Balances	303,721,000	312,234,000	262,250,000	258,748,200
Ending Fund Balances	312,234,000	262,250,000	258,747,000	113,243,507
Pension Contributions	17,715,000	20,512,027	21,110,516	21,030,435
Annual Revenue Change		-11.54%	-8.95%	0.53%
(Interest + Pension) / Revenue	8.09%	10.41%	11.85%	11.83%
Source: CAFRs				

Figure 6: Stockton, General Fund Data Pre-Default

City of Stockton - General Fund						
Statement of Revenues, Expenditures and Changes in Fund Balances						
	General Fund					
	2008	2009	2010	2011	2012	2013
Revenues						
Taxes						
Property	37,077,000	33,030,000	29,170,000	28,318,427	26,375,894	25,988,000
In lieu of sales tax	10,164,000	9,823,000	7,087,000	8,118,132	8,392,001	9,937,924
Utility user	30,861,000	30,854,000	30,717,000	30,993,997	31,504,354	31,943,600
Sales (levied by City)						
Franchise fees	11,537,000	11,608,000	11,354,000	11,502,735	12,464,835	11,611,700
Business license	10,134,000	9,197,000	9,289,000	9,249,774	8,915,457	8,900,000
Hotel/motel room	2,287,000	1,962,000	1,749,000	1,798,740	1,932,630	1,940,000
Document transfer	686,000	702,000	559,000	583,418	603,313	495,000
Other	2,000	1,000	2,000			
Licenses and permits	377,000	641,000	392,000	339,636	395,949	370,109
Federal grants and subsidies		467,000	55,000	44,417		
Other shared revenue (sales and use tax levied by state)	31,900,000	27,522,000	25,623,000	26,550,862	29,504,817	29,696,242
Other governmental	24,872,000	25,299,000	27,160,000	26,370,481	27,624,762	31,872,634
Charges for services	10,213,000	11,894,000	13,043,000	10,763,721	1,907,657	1,890,668
Fines and forfeitures	3,302,000	4,492,000	5,045,000	3,452,493	1,729,835	1,115,605
Use of money and property	2,462,000	3,669,000	7,082,000	7,417,175	6,651,317	
Investment income:						
Interest income	1,316,000	1,126,000	888,000	(387,403)	260,885	(6,328)
Net increase (decrease) in value of investments	302,000	593,000	178,000			
Refunds and reimbursements	3,709,000	3,583,000	2,300,000	9,092,383	872,486	298,596
Miscellaneous	6,086,000	10,763,000	6,091,000	1,075,037	(291,469)	(60,500)
Total Revenues	187,287,000	187,226,000	177,784,000	175,284,025	158,844,723	155,993,250
Expenditures						
Current:						
General government	15,089,000	13,871,000	11,469,000	12,665,758	16,812,203	16,512,454
Public safety	143,955,000	141,427,000	133,901,000	134,539,420	123,753,893	115,287,031
Public works	13,936,000	11,965,000	3,541,000	3,515,999	7,438,423	6,805,947
Library			10,695,000	9,937,259	3,977,759	3,907,000
Parks and recreation	8,904,000	6,724,000	15,814,000	17,323,254	10,374,653	8,742,603
Capital outlay	86,000	46,000	60,000	158,851	500,000	575,000
Debt service:					3,013,468	978,560
Principal retirement						
Cost of issuance	30,000	99,000	177,000			
Interest and fiscal charges						
Contingency					850,000	2,000,000
Total expenditures	182,000,000	174,132,000	175,657,000	178,140,541	166,720,399	154,808,595
Excess (Deficiency) of Revenues over Expenditures	5,287,000	13,094,000	2,127,000	(2,856,516)	(7,875,676)	1,184,655
Total Other Financing Sources (Uses)	(11,198,000)	(7,097,000)	(2,392,000)	7,053,572	1,578,515	836,528
Special Items		(6,340,000)	(4,793,000)			
Net Change in Fund Balances	(5,911,000)	(343,000)	(5,058,000)	4,197,056	(6,297,161)	2,021,183
Prior Period Adjustments			5,124,000	(15,088,027)		
Beginning Fund Balances	28,992,000	23,081,000	28,205,000	8,059,178	12,256,234	4,342,349
Ending Fund Balances	23,081,000	22,738,000	23,147,000	12,256,234	5,959,073	6,363,532

Sources: CAFRs, 2012-13 Adopted Budget (http://www.stocktongov.com/files/2012-13_Final_Budget.pdf); 2012-13 Budget Update 2Q (http://www.stocktongov.com/clerk/granicusagendas/citycouncil/20130319.pdf)

San Bernardino, 2012

The City of San Bernardino filed a Chapter 9 petition on August 1, 2012 (case number 6:12-bk-28006-MJ), after defaulting on a general fund debt service payment due July 20, 2012.

Citing the exhaustion of the city's general fund and an estimated fiscal year 2013 general fund deficit of $45.8 million, San Bernardino staff recommended that the city declare bankruptcy and adopt an emergency budget that deferred debt service payments, retiree health contributions and other items. Staff argued that these steps were necessary to meet the city's payroll on August 15. The affected obligations included Taxable Pension Obligation Bonds Series 2005-A and Refunding Certificates of Participation issued in 1999. All city obligations were insured so the defaults did not directly affect bondholders. The affected insurers, Ambac and National Public Finance Guarantee filed objections to the city's bankruptcy filing.

Ultimately, the city defaulted on a July 20, 2012, pension obligation bond debt service payment but appears to be continuing to perform on its COPs.[25] The city has defined the Pension Bond as part of its overall pension expense, which it has chosen to defer.

As of this writing, the bankruptcy case is still being litigated, so the ultimate outcome is unknown. The court docket and media reports (summarized by Shafroth, 2012-2013) suggest that the San Bernardino case is particularly contentious for a number of reasons (Reid, Podkul and McNeill, 2012):

[25] An August 15, 2012, court filing on behalf of National said that the city had informed the insurer it would not be making an $861,000 payment due that date. However, the EMMA system shows no payment default for the affected bond.

- The city skipped the 60-day AB 506 creditor mediation process before filing, arguing that it has a right to do so because City Council declared a fiscal emergency.
- The city suspended payments to CalPERS at the time of its filing.
- A total of 51 city employees (about 4% of the work force) retired in the three months prior to the filing, receiving $2 million for unused sick and vacation time

In October 2012, the SEC announced an informal investigation into San Bernardino's finances. In January 2013, both the interim city manager and finance manager resigned. Finally, in March 2013, the State Controller's office accused the city of improperly transferring $529 million in former Redevelopment Agency assets to the San Bernardino Economic Development Corporation. Given these troubles, the city is very likely to face very large legal costs associated with the bankruptcy process. This outcome may deter other cities from filing Chapter 9 petitions.

The accompanying tables show San Bernardino's total government and general fund revenues and expenditures leading up to the bankruptcy filing. As of this writing, the 2012 CAFR has not appeared; incomplete data were obtained from budget documents. Since budget documents do not use the modified accrual basis of accounting employed in CAFRs, the 2012 numbers are likely to vary somewhat from the final audited amounts that will appear in the CAFR.

For the general fund, we provide both the original 2013 budget estimates presented to Council in July 2012, when it authorized the Chapter 9 filing, and estimates presented in February 2013 as part of the 2013-14 budget presentation. The projected deficit shrank from $45.8 million to $6.3 million. While most of this change is the result of the city's pendency plan implementation, the original deficit calculation appears to have been pessimistic.

Figure 7: San Bernardino, All Governmental Fund Data Pre-Default

City of San Bernardino - All Governmental Funds						
Statement of Revenues, Expenditures and Changes in Fund Balances						
	All Governmental Funds					
	2008	2009	2010	2011	2012 unaudited	2013 revised
Revenues						
Taxes	135,605,049	138,027,508	120,443,480	123,896,615		
Licenses and permits	11,116,513	10,048,833	8,796,052	8,516,516		
Impact fees	5,268,475	1,065,305	2,036,352	618,030		
Fines and forfeitures	3,880,674	4,721,725	5,850,072	2,338,684		
Investment Income	8,413,713	5,708,816	4,191,386	2,485,053		
Intergovernmental	36,683,544	37,970,647	42,318,633	48,775,893		
Charges for services	13,465,003	11,020,644	10,932,430	12,886,715		
Other	6,803,988	6,213,253	8,603,639	8,925,459		
Total revenues	221,236,959	214,776,731	203,172,044	208,442,965	197,344,437	206,698,054
Expenditures						
Current:						
General Government	24,983,025	23,468,564	23,815,033	17,234,673		
Public Safety	100,534,357	105,613,213	96,130,768	101,657,184		
Streets	27,129,532	25,150,386	20,267,012	24,433,688		
Culture and Recreation	9,480,585	6,842,658	5,228,540	6,579,287		
Community Development	9,363,769	11,777,679	12,817,428	15,901,097		
Community Service	6,914,615	4,329,133	9,150,336	10,266,256		
Economic Development	18,165,689	22,276,482	34,168,768	29,735,854		
Debt service:						
Principal retirement	10,759,184	11,223,004	12,285,742	12,627,234		
Interest and fiscal charges	13,146,478	14,101,348	13,420,944	13,745,859		
Total expenditures	220,477,234	224,782,467	227,284,571	232,181,132	213,429,031	209,268,929
Excess (deficiency) of revenues over expends	759,725	(10,005,736)	(24,112,527)	(23,738,167)	(16,084,594)	(2,570,875)
Total other financing sources (uses)	7,325,889	5,873,219	10,191,103	29,139,935		
Net change in fund balances	8,085,614	(4,132,517)	(13,921,424)	5,401,768		
Beginning Fund Balances	208,819,975	216,905,589	212,773,072	198,851,648		
Ending Fund Balances	216,905,589	212,773,072	198,851,648	204,253,416		
Pension Contributions	13,696,000	15,923,153	15,763,362	15,817,310		
Annual Revenue Change	2.58%	-2.92%	-5.40%	2.59%	-5.32%	4.74%
(Interest + Pension) / Revenue	12.13%	13.98%	14.36%	14.18%	NA	NA
Sources: CAFRs and FY 2013-14 Budget Message (http://www.sbcity.org/civica/filebank/blobdload.asp?BlobID=14807)						

Figure 8: San Bernardino, General Fund Data Pre-Default

City of San Bernardino - General Fund							
Statement of Revenues, Expenditures and Changes in Fund Balances							
	General Fund						
	2008	2009	2010	2011	2012 unaudited	2013 budget	2013 revised
Revenues							
Taxes	100,443,781	94,030,428	83,518,733	85,428,247	87,209,311	89,775,443	89,326,711
Licenses and permits	10,122,997	9,385,470	8,387,017	8,091,822	9,045,223	9,441,900	9,221,900
Fines and forfeitures	1,499,214	2,250,060	3,379,135	2,283,426	1,904,360	2,104,300	2,204,300
Investment income	1,441,416	736,536	789,438	609,721	794,158	733,000	733,000
Intergovernmental	9,181,679	8,916,249	7,213,053	7,718,864	2,614,369	7,297,722	1,734,259
Charges for services	6,388,869	6,419,995	6,509,637	7,423,815	6,008,881	6,898,400	5,499,000
Other	4,181,440	4,122,007	6,051,308	4,341,597	6,317,022	4,173,400	7,461,600
Total revenues	133,259,396	125,860,745	115,848,321	115,897,492	113,893,323	120,424,165	116,180,770
Expenditures							
Current:							
General government	24,307,456	22,936,346	23,540,159	16,910,683	17,486,830	38,659,593	18,400,960
Public safety	95,611,918	100,610,784	89,121,424	92,732,629	96,657,228	106,754,372	86,475,347
Streets	9,666,812	8,280,754	7,356,336	8,318,267	8,127,566	9,971,142	8,259,249
Culture and recreation	6,899,521	5,770,269	4,301,541	5,067,528	5,551,123	5,425,725	4,656,966
Community development	2,482,040	2,039,117	-	-			
Community service	-	-	1,426,189	1,244,529			
Economic development	-	-	-	-			
Debt service:					5,551,123	5,425,725	4,656,966
Principal	1,780,591	1,824,372	2,290,508	1,623,576			
Interest and fiscal charges	2,219,639	2,590,600	3,054,448	2,516,407			
Total expenditures	142,967,977	144,052,242	131,090,605	128,413,619	133,373,870	166,236,557	122,449,488
Excess (deficiency) of revenues over expends	(9,708,581)	(18,191,497)	(15,242,284)	(12,516,127)	(19,480,547)	(45,812,392)	(6,268,718)
Total other financing sources (uses)	7,264,977	4,746,772	12,944,258	10,924,230	8,708,983	4,829,642	10,371,754
Net change in fund balances	(2,443,604)	(13,444,725)	(2,298,026)	(1,591,897)	(10,771,564)	(40,982,750)	4,103,036
Beginning Fund Balances	18,596,648	16,153,044	2,708,319	410,293	(1,181,604)	(11,953,168)	(11,953,168)
Ending Fund Balances	16,153,044	2,708,319	410,293	(1,181,604)	(11,953,168)	(52,935,918)	(7,850,132)

Sources: CAFRs, Attachment A to City of San Bernardino Budgetary Analysis and Recommendations for Budget Stabilization (http://www.sbcity.org/civica/inc/displayblobpdf2.asp?BlobID=13856) and FY 2013-14 Budget Message (http://www.sbcity.org/civica/filebank/blobdload.asp?BlobID=14807)

The cases presented above do not account for all recent California city defaults. The following two sections address defaults that were not accompanied by municipal bankruptcy filings.

Special District Bond Defaults

Over the past 20 years, there have also been a number of special assessment district bond defaults. While special assessment districts are often administered by a city, our focus is on city-wide tax revenue supported obligations so a detailed study of these situations is beyond the current scope. California cities experiencing recent payment defaults by special assessment districts include Borrego, Lathrop, Palmdale and Ione. Descriptions of these situations may be found on the MSRB EMMA system.

Redevelopment Agency Defaults

In June 2011, the legislature passed and the governor signed ABX1 26, a law that mandates dissolution of local redevelopment agencies (RDAs). The California Supreme Court upheld the law and allowed the dissolutions to take effect on February 1, 2012 (California State Association of County Auditors, 2012). Redevelopment agency assets and liabilities mostly reverted to the cities and counties that created them.

Many California cities took on significant amounts of bonded debt as a result of the dissolution act, but also began to receive incremental property tax revenues necessary to service them. While most of these transitions did not impact RDA bondholders, the cities of Hercules and Monrovia did experience temporary defaults.

On February 1, 2012, Hercules defaulted on $2.4 million of interest payments on RDA Tax Allocation bonds. The default did not directly impact municipal bondholders because payment was made by Ambac, the agency's municipal bond insurer. Ambac filed suit against the city claiming it had failed to remit RDA-related property tax collections to the bond trustee as required. Instead the proceeds were placed in a pooled cash account (Hercules Redevelopment Agency, 2012). In March 2012, Ambac and the city settled the litigation with the city pledging two parcels of land to the insurer (Kearney, 2012). The city further agreed to place these two properties on the market, apparently to offset the $4.05 million property tax remittance the city had failed to make earlier (City of Hercules, 2012).

The fact that city assets had to be sold to clear the RDA default situation shows that the Hercules episode is indicative of a fiscal insolvency. Although the city's population is slightly below 25,000, its fiscal indicators may be relevant to the larger cities in this study.

Unfortunately, the city had yet to publish 2011 or 2012 CAFRs at the time of this writing. The city's 2010 CAFR shows total governmental funds revenue of $37,740,183 and interest expenses of $10,268,495. Pension expenses were $1,596,456. Interest and pension expenses thus accounted for 31.44% of revenue. The 2010 total revenues were 10.04% below prior fiscal year revenues of $41,667,224. The city's general fund balance was relatively healthy, but it was running a substantial deficit.

The failure to file CAFRs on a timely basis is part of a larger financial management issue in Hercules. In May and November 2012, the State Controller's Office issued three audits highly critical of the city's fiscal controls. One report "found the City of Hercules' administrative and internal accounting control deficiencies to be serious and pervasive." (California State Controller's Office, 2012a). These insufficient controls may explain why RDA tax revenues could be directed away from debt service, thereby subjecting the city to costly litigation.

On June 1, 2012, Monrovia failed to redeem $11,750,000 in maturing RDA bonds. On February 22, 2013, the city paid off the overdue principal with 12% interest (which included a 3% default penalty rate). Funds to pay off the defaulted bonds came from the proceeds of a refunding issue floated by the city (Monrovia Redevelopment Agency, 2013). According to news accounts, the bonds were not refunded upon maturity because state law did not permit it (Smith, 2012). On June 27, 2012, Governor Brown signed AB 1484 which specifically allowed successor agencies to issue RDA refunding bonds.

City Fiscal Emergencies

Press reports indicate that 13 California cities have declared fiscal emergencies since 2011 of which eight have more than 25,000 residents. The cities are listed in Table 14.

Table 14: List of Recent City Fiscal Emergency Declarants

City Declaring Emergency	2010 Population
Arvin	19,304
Atwater	28,168
Culver City	38,883
El Monte	113,475
Fairfield	105,321
Grover Beach	13,156
La Mirada	48,527
Lancaster	156,633
Monrovia	36,590
Riverbank	22,678
San Fernando	23,645
Stanton	38,186
Tehachapi	14,414

Sources: Buchanan (2012), Garcia (2013), Taxin and Dreier (2012), White (2012).

Some press accounts suggest that these declarations constitute an official notification to the municipal bond market (see, for example, Buchanan, 2012). But the

MSRB EMMA system does not have a section for fiscal emergency declarations, and it does not appear that the cities in question have made event disclosures to this effect.

Instead, these declarations should be understood in the context of the state constitution. Normally, tax increases may only be approved by voters during a general election. However, Article 13 Section 2 permits one exception. If the city council (or equivalent legislative body in another local agency) unanimously declares a fiscal emergency, a special election may be held to consider a tax increase.[26]

Fiscal emergency declarations may also be employed to alter collective bargaining agreements and other contracts. Although this prerogative is not specifically granted in the state constitution, Holtzman, Dickey and Cikes (2011) identified cases in which it has been invoked by local agencies and supported by courts.

Consequently, fiscal emergency declarations may be seen as a way of balancing budgets or avoiding spending reductions when a regular election is not imminent. A fiscal emergency declaration is thus not necessarily a precursor to default or bankruptcy.

Concluding Comments

General fund exhaustion – a factor not considered in the Depression-era survey – seems to be a significant driver of recent city bankruptcies and their attendant bond defaults. Other factors accounting for recent default activity, such as adverse court judgments and the dissolution of redevelopment agencies, should be less relevant for the purpose of modeling major city defaults. Cities below the 25,000 population threshold, like Mammoth Lakes, are more vulnerable to lawsuit-driven defaults or bankruptcies because

[26] Section 13B also allows a local agency to exceed its appropriation limit by declaring a fiscal emergency.

their revenue base is less able to absorb multi-million dollar awards. The two RDA-related defaults appear to be, at least in part, transitional issues.

While we have enumerated a significant number of payment difficulties in this section, it is important to put these in context. California currently has 480 cities, and it has had at least 200 cities through most of its history as a state. With the exception of 1933, it appears that the municipal default rate has not exceeded 1% in any given year. In the vast majority of years, the rate has been zero.

Chapter 4: Prospects for a Model Using Contemporary Defaults

Recent California Case Study Evidence

The case study evidence provided in the previous chapter suggests that general fund exhaustion played a pivotal role in recent California defaults and bankruptcies. While interest over revenue and annual revenue change remain intuitively attractive, they seem to have had a lesser role in these more contemporary situations. Outside California, as we discuss in Appendix 3, pension costs appear to have played a major role in the Prichard and Central Falls bankruptcy filings.

It is worth noting that one variable in the CAFR database, General Fund Balance over General Fund Expenditure, is highly correlated with the San Bernardino and Stockton defaults. Of the 260 California observations from fiscal 2011, these cities rank 258th and 250th respectively. In other words, the two defaulters both rank in the bottom 4% of this variable's distribution. It would be tempting to use this single variable as a standalone indicator of impending default, but the very limited record of municipal defaults in California suggests caution.

Given the apparent power of this general fund balance indicator, it is worth comparing it to the model described in Chapter 2. The following table shows risk ranking produced by the Great Depression model and a reverse order ranking of the General Fund Balance over General Fund Expenditure indicator. For both columns. a lower number is associated with a higher risk.

Table 15: Default Risk Ranking Based on General Fund Balance Indicator and Great Depression Model

City	GF Balance Rank	Depression Model Rank	City	GF Balance Rank	Depression Model Rank
Alameda	97	143	Colton	20	3
Alhambra	46	73	Compton	1	37
Aliso Viejo	254	249	Concord	60	121
Anaheim	18	31	Corona	182	91
Antioch	40	160	Costa Mesa	133	170
Apple Valley	225	80	Covina	105	182
Arcadia	147	112	Culver City	184	196
Atascadero	109	191	Cupertino	150	251
Atwater	2	23	Cypress	216	181
Azusa	136	8	Daly City	153	174
Bakersfield	93	100	Dana Point	167	236
Baldwin Park	190	42	Danville	244	257
Banning	205	46	Davis	38	199
Beaumont	161	148	Delano	121	68
Bell Gardens	253	26	Desert Hot Springs	201	10
Bellflower	230	62	Diamond Bar	191	226
Belmont	69	255	Downey	77	92
Benicia	43	222	Dublin	235	250
Berkeley	84	164	East Palo Alto	224	122
Beverly Hills	165	237	El Cajon	102	34
Brawley	89	139	El Centro	159	14
Brea	127	169	El Monte	137	30
Brentwood	138	141	El Paso de Robles (Paso Robles)	108	105
Buena Park	176	142	Elk Grove	139	154
Burbank	164	59	Encinitas	209	228
Burlingame	90	242	Escondido	120	2
Calexico	56	104	Eureka	14	77
Camarillo	245	193	Fairfield	27	106
Campbell	171	207	Folsom	12	171
Carlsbad	237	211	Fontana	206	24
Carson	104	126	Foster City	183	243
Cathedral City	110	7	Fountain Valley	214	201
Ceres	116	47	Fremont	57	192
Cerritos	256	146	Fresno	16	9
Chico	35	58	Fullerton	32	101
Chino	170	134	Garden Grove	148	99
Chino Hills	186	215	Gardena	55	84
Chula Vista	70	79	Gilroy	193	166
Citrus Heights	238	172	Glendale	197	81
Claremont	149	234	Glendora	194	173
Clovis	50	156	Goleta	247	252
Coachella	163	40	Hanford	168	75

City	GF Balance Rank	Depression Model Rank
Hawthorne	179	111
Hayward	107	123
Hemet	15	103
Hesperia	189	6
Highland	166	145
Hollister	45	76
Huntington Beach	83	130
Huntington Park	217	44
Imperial Beach	234	187
Indio	7	61
Inglewood	44	65
Irvine	185	214
La Habra	113	179
La Mesa	132	54
La Mirada	248	120
La Puente	251	107
La Quinta	258	161
La Verne	88	219
Laguna Hills	114	235
Laguna Niguel	257	248
Lake Elsinore	157	86
Lake Forest	239	241
Lakewood	236	188
Lancaster	222	27
Lawndale	240	133
Lemon Grove	111	94
Lincoln	115	85
Livermore	100	213
Lodi	37	108
Lompoc	63	45
Long Beach	41	32
Los Altos	74	259
Los Angeles	22	1
Los Banos	142	69
Los Gatos	199	256
Lynwood	53	70
Madera	96	49
Manhattan Beach	101	258
Manteca	117	64
Martinez	92	209
Menifee	123	197
Menlo Park	126	253
Merced	122	96
Milpitas	223	137
Mission Viejo	178	232
Modesto	28	71
Monrovia	17	97
Montclair	129	21
Montebello	19	25
Monterey	144	186
Monterey Park	112	50
Moorpark	52	238
Moreno Valley	154	66
Morgan Hill	72	227
Mountain View	203	218
Murrieta	181	189
Napa	76	136
National City	106	56
Newark	71	221
Newport Beach	130	246
Norco	25	151
Norwalk	174	147
Novato	207	52
Oakland	128	13
Oakley	208	167
Oceanside	80	93
Ontario	145	43
Orange	141	194
Oxnard	75	60
Pacifica	33	205
Palm Desert	250	114
Palm Springs	79	72
Palmdale	152	67
Palo Alto	95	247
Paradise	31	129
Paramount	204	82
Pasadena	62	53
Perris	218	15
Petaluma	5	162
Pico Rivera	232	131
Pittsburg	158	4
Placentia	65	217
Pleasant Hill	198	220
Pleasanton	78	239
Pomona	13	12
Porterville	213	36
Poway	241	95
Rancho Cordova	180	176
Rancho Cucamonga	212	51
Rancho Palos Verdes	220	245

City	GF Balance Rank	Depression Model Rank
Rancho Santa Margarita	215	244
Redding	29	22
Redlands	118	168
Redondo Beach	49	223
Redwood City	82	183
Rialto	188	5
Richmond	86	102
Ridgecrest	4	74
Riverside	172	19
Rocklin	211	204
Rohnert Park	99	109
Rosemead	200	110
Roseville	160	63
Sacramento	26	11
Salinas	24	29
San Bernardino	3	18
San Bruno	81	203
San Buenaventura	103	132
San Carlos	177	254
San Clemente	156	230
San Diego	51	20
San Dimas	242	184
San Francisco	23	128
San Gabriel	94	155
San Jacinto	246	138
San Jose	58	16
San Juan Capistrano	119	149
San Leandro	98	127
San Luis Obispo	73	140
San Marcos	202	55
San Mateo	39	202
San Pablo	227	88
San Rafael	21	117
San Ramon	47	240
Santa Ana	8	39
Santa Barbara	68	210
Santa Clara	135	159
Santa Clarita	228	177
Santa Cruz	67	180
Santa Maria	221	41
Santa Monica	219	212
Santa Paula	59	165
Santa Rosa	66	119
Santee	85	195
Saratoga	125	260
Seaside	64	113
Simi Valley	195	190
Soledad	34	17
South Gate	229	28
South Pasadena	173	224
South San Francisco	61	175
Stanton	252	116
Stockton	11	33
Suisun City	187	163
Sunnyvale	196	185
Temecula	162	198
Temple City	255	200
Thousand Oaks	226	229
Torrance	91	89
Tracy	146	158
Tulare	124	57
Turlock	169	115
Tustin	259	157
Twentynine Palms	243	124
Union City	87	150
Upland	30	98
Vacaville	10	153
Vallejo	54	144
Victorville	9	87
Visalia	151	78
Vista	140	48
Walnut	233	225
Walnut Creek	131	231
Wasco	36	90
Watsonville	6	38
West Covina	143	83
West Hollywood	231	178
West Sacramento	134	152
Westminster	155	118
Whittier	175	125
Wildomar	42	208
Windsor	210	206
Woodland	48	135
Yorba Linda	249	233
Yuba City	192	35
Yucaipa	260	216

The following table presents summary statistics for the focus variables for the 260 California observations from 2011. As the table shows, the ratio of general fund surplus to general fund revenue also appears to distinguish defaulting and non-defaulting cities.

Table 16: Descriptive Statistics from the 2011 CAFR Data Set

Category	N	(Interest + Pension) / Revenue	Annual Revenue Change	GF Surplus / GF Revenue	GF Balance / GF Expenditure
California 2011 Sample	260	12.44%	2.69%	-0.44%	63.67%
Stockton & San Bernardino	2	13.01%	1.56%	-6.21%	2.98%
All except Stockton and San Bernardino	258	12.39%	2.71%	-0.33%	65.42%
Cities Declaring Emergency	8	15.24%	0.14%	-13.13%	77.68%
Cities Not Defaulting or Declaring Emergency	250	12.30%	2.80%	0.08%	65.03%

Statistical Analysis of Contemporary Data

We collected financial statistics for 260 California cities with populations greater than 25,000 for fiscal year 2011 from comprehensive annual financial reports. Two of these cities, Stockton and San Bernardino, defaulted the following year. Unfortunately, a sample containing two defaults out of 260 cities does not contain enough variation to be conducive to modeling.

While we only used the CAFR data to compute default scores with the Depression-era model, the data set may conceivably be used to create a contemporary fiscal default probability model with a few enhancements. As we discuss in Appendix 3, some larger cities outside of California – Harrisburg, Scranton and Detroit – have recently defaulted. Aside from Detroit, four Michigan cities with more than 25,000 residents have recently

been placed under emergency financial management. Prichard, Alabama, declared bankruptcy but did not appear to have bonds on which to default. Finally, we have the Vallejo default in 2008. If variables for these nine entities – together with data for some non-defaulting cities outside California – are added to our CAFR data set, there may be a sufficient number of default observations to fit a model. This is a task we leave to future research. For now, we simply note that our descriptive statistics underscore the primacy of general fund exhaustion as a predictor of default.

Determinants of Revenue and General Fund Balance

Since General Fund exhaustion appears to be such an important factor, and since market participants would benefit from a forward looking approach, we provide a discussion of general fund balance modeling next.

Informed by a review of budget forecasting research, we estimate models for revenue and general fund balance. Forecasts derived from these models could be used either to estimate actual values for the most recent fiscal year or to predict values for future years. Our modeling is based on the California State Controller's Office (2012b) *Cities Annual Report* data discussed in Appendix 2. Although we found issues with this data, it is the only long time series of general fund balances available. Further, because it covers all California cities, and not just those with 25,000 or more residents, we can fit models against larger panels.

We first present estimates of a fund balance model of the following form using the method of ordinary least squares (OLS):

$$\ln(FUND\_BALANCE_{it}) = X_{it}\beta + \alpha_i + \gamma_t + \varepsilon_{it} \qquad (3)$$

Where $FUND\_BALANCE_{it}$ describes city i's general fund balance in year t, and ln() denotes the natural logarithmic transformation of this variable. On the right side of the equation, X_{it} is a vector containing various measures that are likely to predict a city's general fund balance (these are discussed in detail starting in the next paragraph), β is a coefficient vector to be estimated, α_i represents entity (city) fixed effects, γ_t represents time fixed effects, and ε_{it} is an error term with the usual properties. The inclusion of entity and time fixed effects in this panel data regression model eliminates omitted variable bias arising both from unobserved variables that are constant over time and from unobserved variables that are constant across cities. As such, the modeling technique is more sophisticated than many of the forecasting techniques discussed in our literature review, but is not so sophisticated that it is outside the reach of analysts with a good undergraduate training in econometrics, and with access to modern statistical software packages.

We hypothesize that a variety of variables explain a city's general fund balance. In equation (3), the X_i matrix includes the following variables: the city's general revenues,[27] population, median family income, and the unemployment rate. All of these variables are contemporary, that is, measured in year *t*. The revenue, population and income variables are transformed into natural logarithms, while the unemployment rate is expressed as a fraction (number of unemployed civilians divided by civilian labor force). The table below presents summary statistics for these variables. Later, we discuss the variables logASSESS and sales_tax, which are not included in equation 3. Both of these variables were gathered from the California Board of Equalization website.[28]

[27] As discussed in Appendix 2, we did not find general fund revenue data in the SCO database. We found a category labeled "General Revenue" which we assume varies proportionately.
[28] Assessment data was taken from http://www.boe.ca.gov/annual/table11.htm (Accessed June 20, 2013).

Table 17: Summary Statistics, Revenue and Fund Balance Models, SCO Data

Variable	Obs	Mean	Std. Dev.	Min	Max
logREV	5,652	17.199	1.429	12.106	23.513
logASSESS	5,722	14.537	1.579	9.378	19.841
logPOP	5,628	10.079	1.425	4.489	15.159
logINC	5,747	11.077	0.445	9.783	12.429
unemp	5,745	0.080	0.044	0.000	0.318
sales_tax	5,772	0.009	0.002	0.008	0.039
logFB	5,490	15.864	1.535	9.525	20.515

As mentioned, the source of the fund balance (dependent) variable is the *Cities Annual Report* (referred to above as the SCO data.) This is also the source of logREV (the natural logarithm of city *i*'s revenues in year *t*.) The sources for unemp and logINC are the 2000 Census and the 2007 and 2011 American Community Survey five-year estimates. Values for years in between are interpolated. The variable logPOP was gathered from the Rand California government statistics database.

Relatively low revenue in a given year will increase the likelihood that the city will experience a low fund balance in that year, since reduced revenue increases the need to dip into reserves to meet expenses. While it is not clear whether larger or smaller cities are more likely to run higher or lower general fund balances, a declining population likely leads to declining fund balances as reductions in revenue likely exceed reduction in expenditures, due to the fixed cost nature of many city services. A city with a rising unemployment rate, and with a low and falling median income, is more likely to suffer general fund exhaustion, as the city may be under pressure to provide more services.

Below, in column 4, we present the results of estimating equation (3) using the data sources described above. In columns 1 through 3, we present the estimates using subsamples of the data, which utilize only single years (2000, 2007, and 2011). The idea behind these

subsample estimations is to both show the power of the fixed effect specification, and also to enable a deeper exploration of the conditions during three periods: a baseline period (2000), the boom period (2005-2007), and the bust period (2008-2011) of the most recent business cycle, for the benefit of the interested reader.

Table 18: Fund Balance Models, SCO Data

	Ordinary Least Squares (OLS) Models			
VARIABLES	Cross-sectional Year 2000	Cross-sectional Year 2007	Cross-sectional Year 2011	Panel-data Years 2000-2011
logREV	0.676***	0.673***	0.585***	0.329***
	(0.075)	(0.077)	(0.135)	(0.055)
logPOP	0.213**	0.166**	0.208	0.690***
	(0.083)	(0.084)	(0.145)	(0.166)
logINC	0.571***	0.558***	0.634***	0.0567
	(0.149)	(0.129)	(0.171)	(0.220)
unemp	-3.098**	-1.152	-1.598	0.682
	(1.470)	(1.282)	(2.311)	(0.552)
Constant	-4.113**	-3.437**	-3.265	1.433
	(1.843)	(1.724)	(2.331)	(3.265)
Observations	449	451	437	5,379
r^2	0.72	0.697	0.549	0.917
fixed effects?	none	none	none	city and year
sample year(s)	2000	2007	2011	2000-2011

Notes:

2) Robust standard errors in parentheses:
*** p<0.01, ** p<0.05, * p<0.1

In describing the results reported above, we focus on column 4 (the OLS model using panel-data, for years 2000-2011). The coefficient of 0.329 on logREV means that an increase in revenue, all else equal, of 10%, raises the general fund balance by 3.29%. The coefficient on logPOP is also statistically significant; a city that grows by 10% can expect to see its fund balance rise by 6.9%.

The coefficients on the variables logINC and unemp are not statistically significant in the panel model. The fact that these variables is significant in some of the individual-year models suggests these models suffer from omitted variable bias, and the coefficients on logINC and unemp are picking up the effect of unmeasured factors. Despite this, the explanatory power of the panel model, as measured by r^2, is high at 0.917.

Given that revenue plays a major role in our models, and as shown above also contributes to fund balance exhaustion, we next report on a revenue forecasting model that we estimate. Our revenue model is identical to equation (3) with three exceptions. First, the dependent variable is $\ln(REV_{it})$ rather than $\ln(FUND\_BALANCE_{it})$. In other words, we substitute a measure of revenues for a measure of fund balance as the dependent variable. Second, we substitute logASSESS for logREV as a key independent variable. We gathered property tax assessment data from the California State Board of Equalization webpage. As property taxes are a major source of revenue for cities, changes in this variable should explain changes in revenue to a substantial degree. Finally, we include a new variable sales_tax, also taken from the California Board of Equalization webpage. The sales tax variable is derived from historical city rate changes in California State Board of Equalization (2013) Publication 71. It includes the specific city sales taxes as well as the city share of state sales tax (0.0075% in recent years). Cities with a higher sales tax rate should be in a better financial position relative to those that do not, and thus should have a higher fund balance.[29] The models of revenue described above are presented in the table below.

[29] Though we note it is possible that cities in financial trouble may raise tax rates, and thus higher tax rates may be correlated with lower revenue. This is an endogeneity problem for which we have not attempted to control.

Table 19: Revenue Models, SCO Data

	Ordinary Least Squares (OLS) Models			
VARIABLES	Cross-sectional Year 2000	Cross-sectional Year 2007	Cross-sectional Year 2011	Panel-data Years 2000-2011
logASSESS	0.954***	0.942***	0.897***	0.408***
	(0.061)	(0.086)	(0.067)	(0.041)
sales_tax	112.6***	98.34***	28.14	7.453**
	(14.240)	(27.260)	(17.900)	(3.075)
logPOP	0.0438	0.0137	0.0627	0.159***
	(0.061)	(0.088)	(0.066)	(0.060)
logINC	-1.029***	-1.133***	-1.022***	0.167**
	(0.103)	(0.136)	(0.115)	(0.084)
unemp	0.148	-0.0143	0.343	-0.889***
	(0.758)	(0.866)	(0.835)	(0.206)
Constant	13.04***	15.20***	14.64***	11.07***
	(1.025)	(1.309)	(1.101)	(1.210)
Observations	461	462	457	5,528
r^2	0.902	0.897	0.881	0.984
fixed effects?	none	none	none	city and year
sample year(s)	2000	2007	2011	2000-2011

Notes:

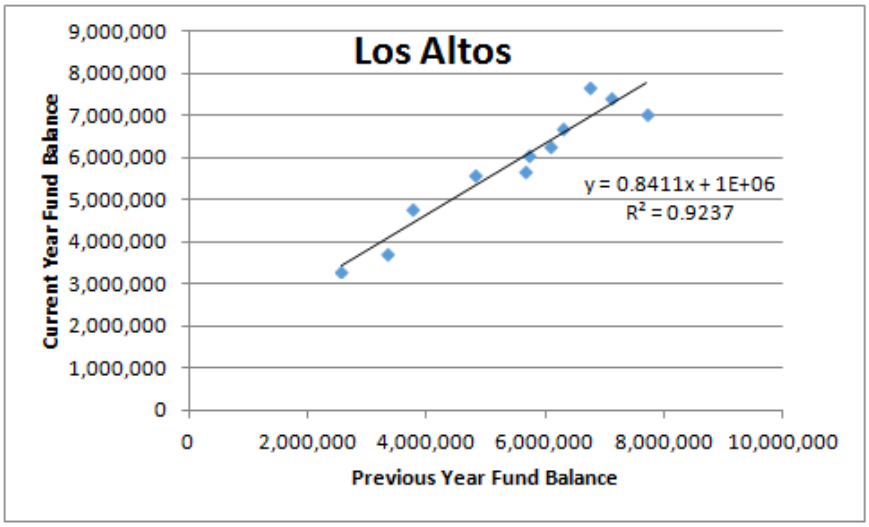
1) Robust standard errors in parentheses:
*** p<0.01, ** p<0.05, * p<0.1

As expected, property tax assessments explain a large fraction of variation in revenues; focusing on the results in column 4, results indicate a 10% decrease in assessment leads to a 4.08% decrease in revenues. The coefficient on sales_tax is also positive and statistically significant. A 10% increase in population is associated with a 1.59% increase in revenue, while a 10% increase in median family income is associated with a 1.67% increase in revenue. The overall explanatory power of the panel model is even higher than the fund balance model, as measured by the r^2 of 0.984.

In the remainder of this section, we return to the question of fund balance. In unreported results, we estimated models of fund balance using two years of CAFR data. Results showed

that previous year's general fund balance was a powerful predictor of next year's general fund balance *when looking at a cross-section of cities*, though the effects of other variables, including interest over revenues, population, median income, unemployment, were not statistically significant.[30] Here, we explore whether previous year's fund balance is a strong predictor of next year's fund balance *when looking at a time series for a given city*. To provide a clear picture of the type of analysis we present, consider the figure below, which shows data from Los Altos, California.

Figure 9: Time Series Fund Balance Model, Los Altos



Note: All values in dollars.

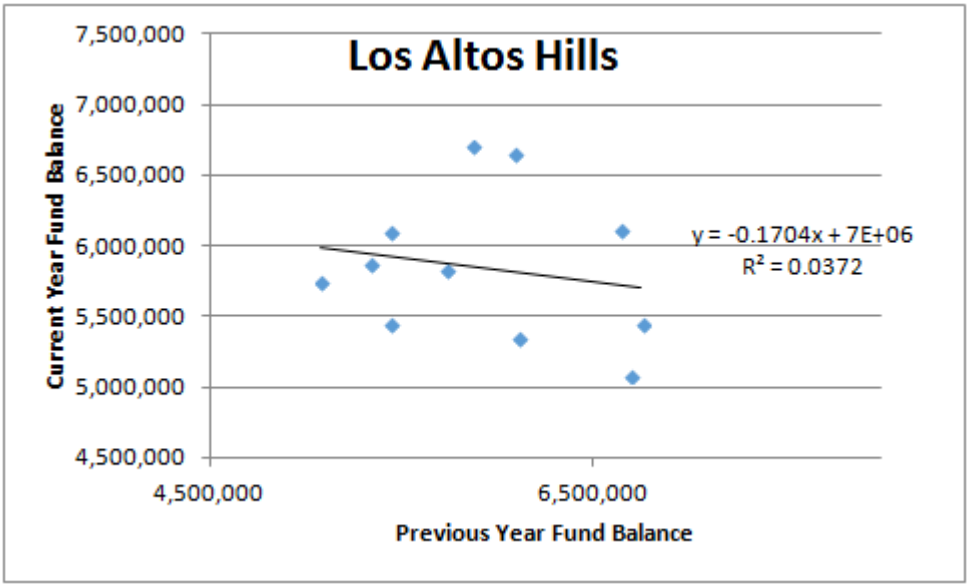
Each point in this scatter plot relates current and previous year fund balances. This figure is based on the following data:

[30] As we show in the table above, predicting fund balance based on only one year of data generally produces biased estimates. Thus it is not surprising that even though the CAFR data is more reliable than the SCO data, models based on these data did not perform as well.

	Los Altos	
	previous year FB (in dollars)	current year FB (in dollars)
2001	2,556,479	3,334,138
2002	3,334,138	3,749,228
2003	3,749,228	4,809,932
2004	4,809,932	5,644,223
2005	5,644,223	5,716,730
2006	5,716,730	6,078,131
2007	6,078,131	6,288,226
2008	6,288,226	6,719,978
2009	6,719,978	7,688,829
2010	7,688,829	7,081,167
2011	7,081,167	7,469,328

Note there is a very strong, positive relationship between the previous year's fund balance and the current year's fund balance. The implication of this is that knowing the current year's fund balance allows one to predict Los Altos' fund balance next year with a high degree of accuracy. Now, contrast the figure above with the figure for Los Altos Hills:

Figure 10: Time Series Fund Balance Model, Los Altos Hills



Note: All values in dollars.

Note here, there is only a very weak relationship between the data; the line slopes downward, however, the r^2 is only 0.0372. This figure is based on the data shown below.

	Los Altos Hills	
	previous year FB (in dollars)	current year FB (in dollars)
2001	6,750,324	5,440,041
2002	5,440,041	5,440,042
2003	5,440,042	6,090,150
2004	6,090,150	6,643,434
2005	6,643,434	6,103,532
2006	6,103,532	5,339,653
2007	5,339,653	5,872,035
2008	5,872,035	6,696,100
2009	6,696,100	5,078,690
2010	5,078,690	5,734,997
2011	5,734,997	5,817,111

Despite the fact that Los Altos and Los Altos Hills are similar in many important respects (they are both small, wealthy cities and are adjacent to one another) modeling current-year fund balances from previous year fund balances works well in one case but not in the other.

Looking across all cities in California, we estimate the same time series models presented above for 479 cities in the SCO database. Both of the figures above are based on 11 data points, which require 12 years of data. The table below describes the data availability of the fund balance variable in the SCO data for the 479 cities.

Table 20: Tabulation Fund Balance by City, SCO Data
(number of years of data)

Obs.	Freq.	Percent	Cum.
2	2	0.42	0.42
3	1	0.21	0.63
5	1	0.21	0.84
6	4	0.84	1.67
7	9	1.88	3.55
8	4	0.84	4.38
9	10	2.09	6.47
10	7	1.46	7.93
11	441	92.07	100

For example, two cities have only two data points, one city has only three data points, and so on. A majority of cities (92.07%) have complete data, covering 12 years, enabling the collection of 11 data points. We use all of the data available, whether complete or not, to estimate the time series models described above. This is to say, we ran 479 regressions of the types presented above for Los Altos and Los Altos Hills, for each city in the SCO database. As shown in the table below, the average r^2 across these 479 regressions is 0.50.

Table 21: Summary Statistics for AR1 Models

Variable	No. of Obs.	Mean	Std. Dev.	Min.	Max.
slope	479	0.63	0.35	-1.284	1.806
constant	479	$7,976,748	$2.15E+07	$-1.18E+07	$3.35E+08
obs	479	10.73	1.07	2	11
r^2	479	0.50	0.29	0	1

As can be seen, the explanatory power of these simple (technically, first-order autoregressive, or AR1) models varies from very high (as with Los Altos) to very low (as with Los Altos Hills), with the average city in between these two extremes (as the average r^2 is 0.50.) Also, the average city shows rising fund balances over this time; this can be seen by the positive

slope value of 0.63. In other words, for the average city, current year fund balances tend to be greater than previous year fund balances.[31]

Why can this simple regression model predict general fund balance well for some cities but not others? To shed light on this question, we estimate a regression model, using the r^2 from the individual city regressions as the dependent variable, and standard socioeconomic variables (identical to those explained above) as explanatory variables. The results are shown in the table below.

Table 22: Predicting r^2 in City-Level AR1 Models

VARIABLES	r^2
logPOP	-0.00171
	(0.00969)
logINC	0.0252
	(0.0426)
unemp	0.15
	(0.481)
Constant	0.216
	(0.526)
Observations	468
r^2	0.001

Notes:
1) Robust standard errors in parentheses:
*** p<0.01, ** p<0.05, * p<0.1
2) Eleven of the original 479 numbers of observations (cities) did not meet the minimum criteria to be included in this analysis, leaving 468 numbers of observations.

None of the socioeconomic variables allows us to explain in which cities the autoregressive time series model successfully predicts fund balances for an individual city. This suggests

[31] All values are current dollars, thus part of the reason for the estimated positive average slope is the effect of inflation.

idiosyncratic factors tend to influence the amount in a city's general fund, and predicting fund balance for an individual city is difficult without detailed case study evidence. One possibility suggested by our own case study review is that some cities make large prior-period adjustments to their general fund balances when updating their audited accounts in subsequent years. Of course, the usual call for more research applies here as well.

In conclusion, we have estimated panel data models of revenues and fund balance. These models explain a large amount of the variation in revenue and fund balance across cities. We have also estimated time series models for individual cities, using a modeling framework that has been suggested in our review of the municipal finance literature. Results from these time series models indicate that a simple modeling framework can be very useful for some cities, but not useful for others.

Chapter 5: A Hybrid Model?

We have now presented two approaches for evaluating default risk among California cities: (1) a Depression-era model that uses an internally consistent data set with a relatively high number of defaults, but which is 80 years old, and (2) a qualitative analysis of municipal defaults, along with a comparison of cross-sectional data from the contemporary period that relies on only two defaults, and which suggests general fund balance is a strong predictor of municipal defaults.

While each of these approaches adds to our understanding of the determinants and predictors of default, neither of these approaches by themselves is entirely satisfactory. Both highlight the role of variables that are supported by strong intuition and/or recent case study evidence. Consequently, we believe that the best approach under the circumstances may be to create a hybrid of the two models – one that uses all of the fiscal variables we have highlighted: (1) interest plus pension expense over revenue, (2) annual revenue change, (3) general fund surplus (or deficit) over general fund revenue and (4) general fund balance over general fund expenditure. The model could be further enhanced by including socioeconomic variables, such as population and SEI, as we did for our Great Depression model.

Creating a hybrid model is challenging and controversial. One possibility would be to combine the Depression-era and recent data sets and then run regression analysis on the aggregate data set. Unfortunately, this is complicated by the lack of comparability between the older and newer data sets. One source of incompatibility is the accounting basis used – Census data in the 1930s was cash-based while modern CAFRs use the modified accrual

standard. However, it is not clear that this accounting standard issue would introduce any systematic bias in the ratios we are studying and could arguably be assumed away.

More problematic is the fact that 1930s-era Census data does not separate general fund revenues, expenditures and balances from those in other funds. While fund accounting was developed and considered to be a best practice well before the Depression (Bureau of Municipal Research, 1913), it is not clear that it was widely used in the early 1930s. To the extent that fund-level data from that period are available at all, they would have to be collected from financial reports produced by individual cities that may no longer be available and would lack the standardization imposed by modern governmental accounting standards.

Finally, even if comparable Depression-era data were available, there would be a question of how to weight them against modern data. Given the data limitations, the best option may be to assign coefficients, subjectively, based on a reading of the case studies and statistical evidence. Without presenting such a subjective model here, we will offer some thoughts on its possible construction.

The general fund balance variable most effectively predicts the San Bernardino and Stockton models. It is also strongly associated with the 2008 default in Vallejo and the 1999 default in Desert Hot Springs, and was cited (conceptually if not by name) as a justification by a couple of the defaulting cities. Therefore this variable should be dominant in a hybrid subjective model.[32] The other three variables could be assigned coefficients intended to give them roughly equal weights in the default probability calculation.

[32] We also note that fund balance factors were assigned higher weights in a recent Fiscal Stress Monitoring System published by the New York State Comptroller's Office (2013).

Instead of using coefficients, we suggest using a calibration procedure to ensure that the bulk of estimated default probabilities fall within a reasonable range. One way to do this would involve estimating an overall default rate for large California cities and then uniformly adjusting the raw probability scores such that the mean score equals the default rate. In 2012, two of the 264 cities in the target population (California cities with over 25,000 residents) defaulted on city obligations yielding a default rate of about 0.76%. However, 2012 may have been an unusual year. If we instead consider seven years of history – roughly the length of a business cycle – a total of three defaults were observed yielding an annual default rate of about 0.16%.

Admittedly, this is a controversial assumption. On the one hand, the 2012 default rate among California cities with population greater than 25,000 is the highest in 140 years. On the other hand, many observers believe that the recent defaults represent the beginning of a much larger wave.

Chapter 6: Conclusion

We have marshaled case study and statistical evidence to identify fiscal and other variables that drive city bond defaults. Since ours appears to be the first recent attempt to develop a municipal bond default probability model, we expect future researchers to extend our results. In this section, we briefly consider some opportunities for enhancement.

First and foremost, the creation of a more rigorous empirical model leveraging recent defaults would be attractive. As we have seen, this is a challenge complicated by the relative paucity of defaults and heterogeneity of fiscal data across states and time periods. We also caution researchers against succumbing to the temptation of using ratings as a proxy for default probabilities in order to obtain a larger pool of current observations. Earlier we raised questions about the responsiveness of ratings to changing municipal financial conditions.

Second, other researchers may find opportunities to alter our list of independent variables, through either substitution or addition. Two variables that we would have liked to have analyzed further are cash and unrestricted general fund balances. While cash has a very strong intuitive basis, we are concerned that cash levels may be quite volatile on a daily basis. Thus, the cash on a city's balance sheet reported at the end of the fiscal year may be unrepresentative of the amount of cash it will have on hand when it has to make interest or pension payments a few weeks later. We would, of course, caution against creating a long list of predictors, given the possibility that imperfect multicollinearity may lead to imprecise estimates. In preparing this study, our team has gained substantial

experience with collecting and handling CAFR data, and we welcome inquiries from other researchers on how to cost-effectively gather this data.

A third opportunity for improvement is to use forward-looking inputs with our existing models. In this study, we report default probability scores derived from CAFR data as of June 30, 2011 (elsewhere we have published scores based on CAFR data as of June 30, 2012).[33] It is possible to collect data from various sources that would support more current and even forward-looking estimates of the independent variables we have highlighted. These include city budgets, monthly or quarterly cash flow reports, pension system actuarial reports (which include future employer contribution rates) and socioeconomic variables. These forecast values could be used with our model specifications to produce forward-looking default probability estimates.

A common objection to the use of budgets in gathering forecast independent variables is that the quality of budget estimates can suffer from political manipulation or the inexperience of financial analysts who prepare them (we discussed research on the accuracy of budget forecasts earlier). These concerns are likely to apply differently across cities: some cities have highly professionalized budgeting processes resistant to political interference, while others do not. Also, tools are available to researchers to assess the validity of budgets. First, CAFRs contain comparisons of budgeted and actual results, so it is possible to gauge the effectiveness of the budget process in prior years. Second, the interim financial results produced by many larger cities can enable a closer to real-time assessment of budget accuracy.

[33] See http://www.publicsectorcredit.org/ca.

While statistical models of corporate credit risk have become quite common over the past fifty years, municipal credit risk modeling has remained relatively undeveloped. Our hope is that this situation begins to change with the release of this study.

Many observers emphasize that municipal default and bankruptcy is a political decision. But political decisions are not immune to modeling. Substantial research has explained and demonstrated how political actions can be predicted based on the conditions faced by political actors.

Standing at the intersection of financial modeling and political analysis, we suggest that a model based on fiscal indicators can improve our ability to predict municipal credit crises. Gaining the ability to predict such events is the first step toward minimizing them. Once a municipal scoring mechanism gains acceptance, it can be used to proactively identify the cities most at risk, thereby creating the opportunity for remedial action.

In this connection, it is worth dwelling on the "to do" list created by our project. Our default probability scores rely on Comprehensive Annual Financial Report (CAFR) data typically filed four to eight months after the end of the fiscal year. While these reports are more standardized and thus easier to exploit, there is no reason that the model cannot be used with forecast variables. All cities publish budgets and many provide interim financials that can be used to project current and out-year fiscal results. Ratios based on these projections can be loaded into a fiscal model to obtain more forward-looking default probability estimates.

Our analysis focuses only on the issuer level, abstracting from the variations in risk associated with different bond issues. While we know that general obligations are less risky

than other types of issues, it would be useful to quantify these risk differentials for any given city.

Thus, this admittedly long study just scratches the surface of what is possible in the area of quantitative municipal default probability modeling. We believe that further work will benefit not only municipal bondholders, but also the political leaders, taxpayers, public employees and beneficiaries who are all victims in a city credit crisis.

Appendix 1: Depression-Era Model Selection

In this section we clarify our method of model selection, and also present some further analysis of the Depression-era sample.

We began by extending the model from Joffe (2012) in three ways. First, we considered as additional variables only theoretically plausible socioeconomic measures. Second, we controlled for unobserved state fixed effects, and third we analyzed a balanced panel, which though contains fewer observations, gives equal weight to all cities. With our focus on parsimony, we then eliminated statistically insignificant variables, re-estimated the model, and selected the model with the highest explanatory power.

Following this approach to model selection (and some technical suggestions made by anonymous referees), we arrived at the model presented in the main text of this report. Later, given the importance of general fund balance revealed to us through the case study analyses, we included two additional fiscal ratio variables in our analysis.[34] Below, we present these additional analyses of the Depression-era sample. The complete set of (four) socioeconomic variables we considered for inclusion in the extended model based on theoretical appeal, along with some additional fiscal ratio variables discussed later in this section, are presented in the Table A1, below. Summary statistics for these variables are presented in Table A2.

[34] The additional fiscal ratio variables did not improve the explanatory power of our preferred Depression-era model. As we emphasize elsewhere, the additional Depression-era fiscal ratio we are calling "fund balance" does not necessarily have a close connection in the modern day construction.

Table A1: Additional Variable Descriptions, Depression-Era Model

Variable	Description	Source
DEFAULT	*An indicator of whether city defaulted in 1931, 1932 or 1933*	Authors' calculation
lnPOP	*Natural logarithm of city population in 1930*	IPUMS
HOMEVALUE	*Average value of owner-occupied housing in city in 1930*	IPUMS
HOMEOWNER	*Fraction of households in city, living in owner-occupied housing in 1930*	IPUMS
SEI	*Average level of Duncan's socioeconomic index among city residents, 1930*	IPUMS
INT_BY_REV	$\frac{total\ interest\ costs\ in\ 1931}{total\ receipts\ in\ 1931}$	CENSUS
REV_CHANGE	$\frac{total\ receipts\ in\ 1931 - total\ receipts\ in\ 1930}{total\ receipts\ in\ 1930}$	CENSUS
SURPLUS	$\frac{total\ receipts\ in\ 1931 - total\ government\ costs\ in\ 1931}{total\ receipts\ in\ 1931}$	CENSUS
FUND_BALANCE	$\frac{aggregate\ assets\ in\ 1931 - gross\ debt\ held\ by\ public\ in\ 1931}{total\ government\ costs\ in\ 1931}$	CENSUS

Table A2: Additional Summary Statistics, Depression-Era Model

Variable	Obs	Mean	Std. Dev.	Min	Max
DEFAULT	305	0.13	0.34	0	1
lnPOP	305	11.27	0.88	10.32	15.77
HOMEOWNER	305	0.46	0.10	0.17	0.74
HOMEVALUE	305	7415	3601	2113	35796
SEI	305	33.83	4.16	21.94	51.13
REV_CHANGE	305	-0.01	0.10	-0.25	0.52
INT_BY_REV	305	0.11	0.05	0	0.33
SURPLUS	305	-0.08	0.18	-1.02	0.25
FUND_BALANCE	305	1.28	1.19	-2.71	6.00

Five of these variables were already discussed in the main body of the report; here we discuss the two new socioeconomic variables and the theoretical rationale for including them in the default model (the variables SURPLUS and FUND_BALANCE are discussed later in this section). HOMEVALUE is the average value of owner-occupied housing in the city. We expect that cities with high values will be less likely to default as property tax revenue will be greater in these cities allowing governments to more easily service debt. The variable HOMEOWNER is the fraction of residents that own their home (either outright or have a mortgage.) It is possible that voters in cities with a high homeownership rate will pressure politicians to not default, as they are worried that bad publicity resulting from a default will lower the value of what, for most of them, is their single largest asset. On the other hand, if default allows cities to "wipe the slate clean," it could be in the financial interest of homeowners for the city to default. Thus, determining the effect of homeownership on default probability is an empirical question.

We first considered an unrestricted model which includes the two fiscal ratio variables used in our earlier analysis and all four socioeconomic variables. As described in the main body of this report, the models differ according to estimation strategy and controls for unobserved, state-level effects, as indicated in the table. These results are presented in Table A3.

Table A3: Additional Logit Analysis of Great Depression-Era Municipal Defaults

VARIABLES	DEFAULT	DEFAULT	DEFAULT
REV_CHANGE	-4.194**	-3.824*	-3.323
	(1.76)	(1.99)	(2.26)
INT_BY_REV	17.92***	17.26***	22.76***
	(3.14)	(3.42)	(6.10)
lnPOP	0.662***	0.636***	0.590**
	(0.22)	(0.20)	(0.23)
HOMEOWNER	2.965	2.886	-3.866
	(2.46)	(2.01)	(2.78)
HOMEVALUE	3.52E-05	3.69E-05	-5.31E-06
	(0.00)	(0.00)	(0.00)
SEI	-0.134**	-0.125**	-0.127**
	(0.07)	(0.06)	(0.06)
Constant	-8.949**	-8.771***	-6.355
	(3.56)	(2.83)	(3.94)
Estimation strategy	logit	firthlogit	firthlogit
State fixed effects?	no	no	yes
Correctly classified	266	265	281
Observations	305	305	305
% correctly classified	87.2	86.9	92.1

Note: Robust standard errors in parentheses:
*** p<0.01, ** p<0.05, * p<0.1

We present the results of the logit estimation strategy in column 1, the firthlogit estimation strategy in column 2, and the fixed effect version of the full specification model in column 3, but columns 2 and 3 are presented for completeness and comparability to the model presented in the main text, for the benefit of an interested reader. In considering the model's explanatory power, we consider the percent correctly classified with the logit strategy, that is, 87.2%. Using the logit estimation strategy, this unrestricted specification correctly classified 266 out of 305 cases (87.2%). Neither of the coefficients on HOMEVALUE nor HOMEOWNER was statistically significant. However, the coefficients on SEI

and lnPOP were significant at the 5% level (as were the coefficients on the two fiscal ratio variables.) We therefore estimated the restricted version of this model, which appears in the main text. As reported there, using the logit estimation strategy, this restricted model correctly classified 270 out of 305 cases. Given the higher rate of correct classifications, the restricted model presented in the main text was selected as our preferred model.

The reason for assigning an explanatory power of the model based on the number of defaults classified correctly in the logit specification, rather than the fixed-effect version, is because when we use this model to estimate default probabilities for California cities in the contemporary period, we will not have the benefit of including state-level fixed effects. Therefore, the appropriate measure of explanatory power by which to compare specifications based on the socioeconomic and fiscal ratio variables only, that is, the measures found when using the logit estimation strategy that does not include state fixed effects.[35]

Before concluding this section, we present a specification that includes the two new fiscal ratio variables listed in the table A2. SURPLUS, which measures the difference between government-wide revenues and expenditures, divided by government-wide receipts, should be negatively correlated with default. As should be obvious, a city with a budget surplus is in a healthy financial position relative to a city with a budget deficit. Finally, FUND_BALANCE is a proxy for the amount of money in a city's general fund. Accounting differences between the Great Depression era and today mean this variable is not perfectly comparable to the fund balance concept we discuss in the case study section.

[35] Alternatively, one could consider the percent classified correctly when using the firthlogit estimation strategy without fixed effects. However doing so would not change the specification selected here. What is most important is that state-level fixed effects are not included when assigning an explanatory power value to the model.

However, assuming it is a reasonable proxy for what we today understand as fund balance, and a city with a positive value of FUND_BALANCE is in a healthy financial position compared to a city with a negative value of FUND_BALANCE and should therefore be less likely to default; that is, we expect to find a negative coefficient on this variable.

Using these data, we estimated the specification presented in the table below:

Table A4: Logit Analysis of Great Depression-Era Municipal Defaults (with Additional Variables)

VARIABLES	DEFAULT	DEFAULT	DEFAULT
REV_CHANGE	-4.800***	-4.372**	-3.61
	(1.833)	(1.947)	(2.202)
INT_BY_REV	13.38***	12.75***	19.89***
	(4.402)	(4.194)	(6.453)
SURPLUS	2.286	2.118*	1.3
	(1.434)	(1.282)	(1.428)
FUND_BALANCE	-0.467**	-0.444*	-0.379
	(0.238)	(0.236)	(0.286)
lnPOP	0.865***	0.818***	0.724***
	(0.214)	(0.213)	(0.250)
HOMEOWNER	2.987	2.877	-3.91
	(2.349)	(1.969)	(2.756)
HOMEVALU	2.31E-05	2.64E-05	-1.89E-05
	(0.000)	(0.000)	(0.000)
SEI	-0.128**	-0.119**	-0.123*
	(0.065)	(0.055)	(0.065)
Constant	-10.19***	-9.801***	-6.851*
	(3.375)	(2.823)	(3.962)
Estimation strategy	logit	firthlogit	firthlogit
State fixed effects?	no	no	yes
Correctly classified	264	264	282
Observations	305	305	305
% correctly classified	86.6	86.6	92.5

Note: Robust standard errors in parentheses:
*** p<0.01, ** p<0.05, * p<0.1

As can be seen in the table in column 1, the full specification correctly classified 264 out of 305 cases, or 86.6%. Therefore, although this analysis left our preferred model

unchanged, we note that the coefficient on FUND_BALANCE is statistically significant and of the theoretically expected sign. However, the explanatory power of this model is lower than in our preferred specification, which correctly classified 270 cases. However, while our approach to model selection did not select FUND_BALANCE into the preferred specification, there are good reasons for including measures of fund balance in a hybrid model, as we discuss in the main body of the report.

Appendix 2: Comparing Data: CAFRs and the SCO's Cities Annual Report

The California State Controller's Office (1912, 2012b) has been collecting fiscal data from all California cities on an annual basis since 1911 and publishes this data in a document entitled the *Cities Annual Report*. Since the report leverages a long established collection mechanism, and cooperation from cities is legally mandated, it could theoretically serve as the data source for a default probability modeling tool. Unfortunately, some aspects of the SCO reporting mechanism limit its effectiveness for this purpose.

The report is published shortly after September 1, on a one year lag. Since the data pertain to the fiscal year ending June 30, the report becomes available at least 14 months after the year closes. For example, data as of June 30, 2012, will be available around September 1, 2013. By contrast, CAFRs for the last fiscal year began appearing in late 2012, and most were available by the end of April 2013.

On the other hand, some cities file audited financials on a very long delay. As of April 2013, the City of Adelanto had yet to publish any CAFR more recent than 2008, while Maywood's most recent audited financials were as of 2009.[36] Both of these cities did provide 2011 fiscal data for the SCO report. At the same time, *Cities Annual Report* coverage for 2011 is also incomplete. The cities of Beaumont, Hawthorne, La Habra and Stockton did not provide SCO with 2011 financial data.

Another concern is that the *Cities Annual Report* data are collected through a process separate from that used to create the city's audited financials. City finance personnel enter

[36] As of June 2013, Maywood had published its 2010 and 2011 audited financials.

data into a custom data collection instrument provided by SCO. Since the reporting process is divorced from the CAFR filing, the data may not be consistent.

To assess the applicability of the *Cities Annual Report* data to municipal default probability modeling, we compared data from the report to selected data obtained from four 2011 CAFRs. Since our proposed model is driven in part by interest expenses, pension contributions and total revenues, we investigated these data items. CAFR data presented in these comparisons is not the same data we used in our modeling. Our models are based on governmental fund totals; here we also included proprietary fund data for greater comparability with the SCO reporting scope.

Interest expenses and pension contributions do not appear on the printed reports issued by SCO. Expenditures are only presented by function, and apparently these two categories are distributed across a variety of functions. However, the SCO data collection instrument includes a form for reporting city expenditures by major object. This form provides fields for interest and retirement expenses. Data from these forms are aggregated into a Microsoft Access database available from SCO.

The following table compares CAFR and *Cities Annual Report* interest expense data (from the Access database) for four cities:

Table A5: Selected Interest Expenditure Data, CAFR v. *Cities Annual Report*

City	2011 Interest Expenditure in City's CAFR	2011 Interest Expenditure in *Cities Annual Report*
Los Angeles	789,232,000	783,740,036
San Francisco	426,809,000	476,954,176
Twentynine Palms	43	185,541
Walnut Creek	0	269,960

None fits precisely, but Los Angeles is quite close. Small discrepancies may be explained by accounting basis differences, but the instructions (California State Controller's Office, 2012c) specify use of modified accrual accounting, consistent with that used in CAFRs. Another possible explanation is post-closing adjustments made between the SCO filing (required 90 to 110 days after the end of the fiscal year) and publication of the audited financials (around six months after the end of the fiscal year).

Walnut Creek was one of about 30 cities in our population that did not report separately report interest expense in the *Cities Annual Report*. According to Walnut Creek's CAFR, its 2011 Interest Expense is attributable to the Redevelopment Agency. It is possible that finance department personnel did not recognize the RDA as an entity of the city when it filed the SCO survey.

The instruction form (California State Controller's Office, 2012c) asks city users to "report payments of interest on debt (e.g., interest payments on bonds, notes and other long-term debt)" (p. 20) and to "report interest payments for all debt that is reported on the balance sheet of this report, including leases" (p. 110). These prompts appear generally consistent with the definition of interest in financial reporting.

The following table compares CAFR and *Cities Annual Report* retirement expense data for four cities:

Table A6: Selected Pension Contribution Data, CAFR v. *Cities Annual Report*

City	2011 Pension Contributions in City's CAFR	2011 Retirement Expenditure in *Cities Annual Report*
Los Angeles	909,831,000	796,818,827
San Francisco	308,823,000	343,717,123
Twentynine Palms	462,025	481,867
Walnut Creek	5,174,324	7,398,862

In this case, orders of magnitude are consistent, but there are some significant differences. In the two instances in which the CAFR is significantly lower than the *Cities Annual Report*, it does not appear that OPEBs explain the difference. The prompt for the Retirement field in the instructions, "Report all contributions to any retirement funds California State Controller's Office, 2012c, p. 109", could be interpreted to include OPEB, but the survey does include a space for employee benefits, and it is likely that OPEBs are being included in this area.

Total annual revenues also show significant differences. The following table compares totals from the Statement of Revenues, Table 3 of the *Cities Annual Report* with aggregated revenues from CAFRs. The CAFR figures include governmental activities, business type activities and (in the case of Los Angeles and San Francisco) discretely reporting components. Had discretely reporting components been excluded, the differences would have been larger.

Table A7: Selected Total Revenue Data, CAFR v. *Cities Annual Report*

City	2011 Total Revenue from CAFR	2011 Total Revenue in *Cities Annual Report*	Percentage Difference
Los Angeles	12,487,588,000	15,350,476,263	23%
San Francisco	7,194,037,000	8,527,657,110	19%
Twentynine Palms	13,496,119	11,506,379	-15%
Walnut Creek	78,954,620	72,568,863	-8%

The *Cities Annual Report* divides revenue into two classifications: General and Functional. This appears to be similar to the distinction made in CAFRS between General and Program Revenues. The next two tables provide comparisons of these two revenue classifications.

Table A8: Selected General Revenue Data, CAFR v. *Cities Annual Report*

City	2011 General Revenue from CAFR	2011 General Revenue in *Cities Annual Report*	Percentage Difference
Los Angeles	3,772,484,000	3,179,675,409	-16%
San Francisco	2,800,234,000	2,367,318,396	-15%
Twentynine Palms	9,479,104	7,861,060	-17%
Walnut Creek	48,773,218	43,398,485	-11%

Table A9: Selected Program/Functional Revenue Data, CAFR v. *Cities Annual Report*

City	2011 Program Revenue from CAFR	2011 Functional Revenue in *Cities Annual Report*	Percentage Difference
Los Angeles	8,715,104,000	12,170,800,854	40%
San Francisco	4,393,803,000	6,160,338,714	40%
Twentynine Palms	4,017,015	3,645,319	-9%
Walnut Creek	30,181,402	29,170,378	-3%

Although we could not find a variable in the SCO data that closely approximates General Fund Revenues or Expenditures, the data set does include a General Fund Equity field that closely approximates General Fund balance in most cases.

Table A10: Selected General Fund Balance Data, CAFR v. Cities Annual Report

City	2011 General Fund Balance from CAFR	2011 General Fund Equity in Cities Annual Report	Percentage Difference
Los Angeles	520,058,000	572,647,938	10%
San Francisco	328,006,000	403,605,260	23%
Twentynine Palms	12,027,732	12,027,731	0%
Walnut Creek	30,415,719	30,415,719	0%

For the overall universe of 260 cities, we found that all but four had a General Fund Equity value in the SCO database and that there was a 98% correlation between the CAFR and SCO data. Unfortunately, one of the four cities that did not report General Fund Equity was Stockton, so we would not have been able to use the SCO data set to identify General Fund exhaustion as a default driver, as we did by collecting CAFR data.

Given both the delayed appearance of the Cities Annual Report and significant differences from audited financials, we do not believe the SCO report provides a viable platform for a credit scoring system using the full set of predictive variables we have identified. To illustrate, the figure below plots the ranking produced by the Great-Depression model (equation 2), using both CAFR and SCO data. Although in some cases both sets of data result in similar rankings, in other cases (e.g., Atwater, Pasadena, Poway, Santa Paula, etc.) the two rankings diverge dramatically. Overall, the r^2 in a model that predicts the CAFR-based rankings based on the SCO-based rankings is only 0.63.

Figure A1: Default Likelihood Ranking Comparison: CAFR v. SCO Data

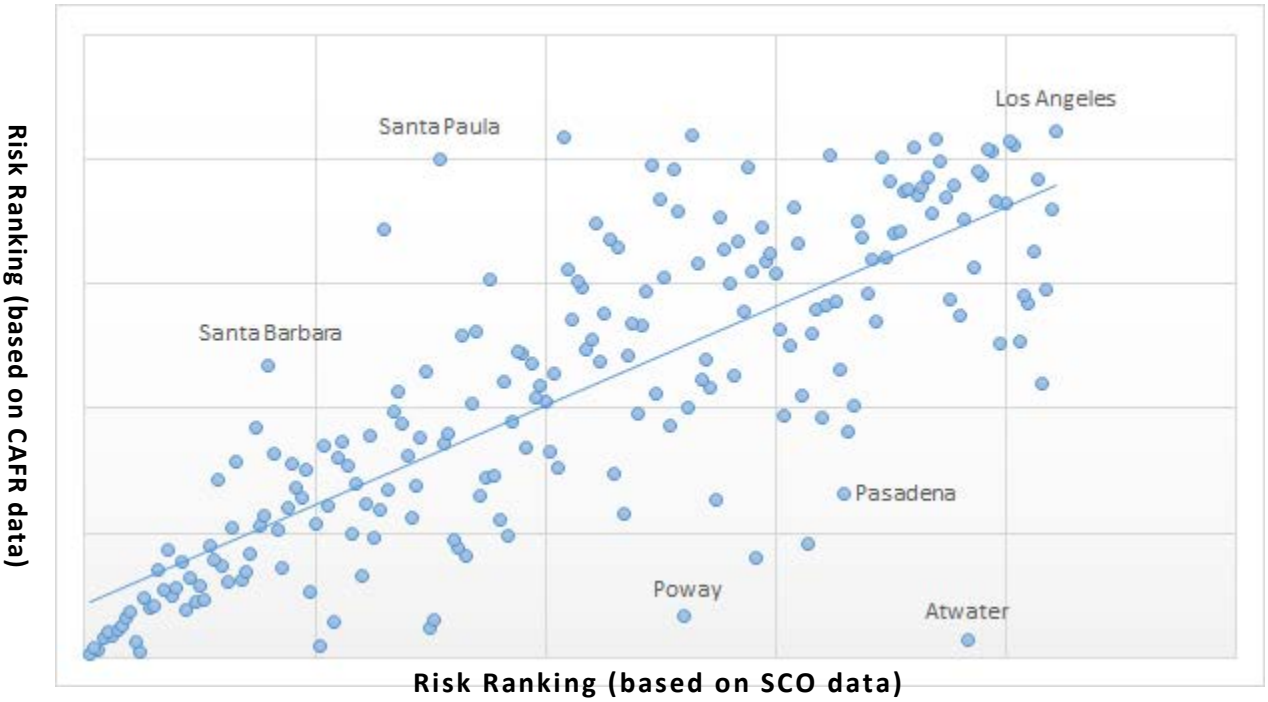


Figure Notes: This figure reports only the rankings of cities for which default probabilities could be estimated. Given incomplete data, we were unable to rank 49 cities using the SCO data. This figure is meant to show that, even for the cities we were able to rank using the SCO data, the rankings are often quite far off of those produced using the more reliable CAFR data. In this figure, a higher ranking - up and to the right – reflects greater risk.

Appendix 3: City Bond Defaults and Bankruptcies Outside California

Since California's city bond default experience is relatively limited, we supplement the previous chapter with information regarding cities in other states. First, we consider two high profile defaults from the 1970s, and then we provide an overview of municipal credit quality issues in other states over the last 25 years.

The 1970s

Between the Great Depression and Vallejo's 2008 bankruptcy, we are aware of only two defaults by major U.S. cities – both of which occurred in the 1970s. These two cases are described in some depth in a 1985 report by the U.S. Advisory Commission on Intergovernmental Relations entitled *Bankruptcies, Defaults and Other Local Government Financial Emergencies*. After summarizing these narratives we review these cities' financial statistics as reported by the U.S. Census.

In November 1975, New York City temporarily suspended debt service payments on short-term obligations after the state legislature passed a Moratorium Act shielding the city from bondholder lawsuits. The ACIR narrative attributes the city's fiscal crisis to persistent operating deficits starting in fiscal 1971. The city became increasingly dependent on short-term borrowing to fund its operations. After declaring the moratorium, New York State took a number of actions to improve the city's finances, including the imposition of a financial emergency control board, provision of short-term loans and establishing the Municipal Assistance Corporation to issue new bonds on behalf of the city. As a result of

these actions, the city's budget was balanced and short-term debt was replaced by longer term obligations.

In December 1978, Cleveland defaulted on a $15 million bond anticipation note as part of a larger fiscal crisis that enveloped the Ohio city. The ACIR report attributed Cleveland's fiscal distress to persistent operating deficits as well as poor accounting and fiscal management practices. A June 30, 1978, audit revealed that the city had used capital funds and other restricted funds to pay general fund obligations and that the city's financial records were in disarray. Cleveland's bond ratings were then lowered and suspended, preventing the city from rolling over its bond anticipation notes, thereby triggering the December default. The city's default was cured after the state auditor declared a fiscal emergency (which allowed for the provision of state loans) and the city raised its income tax, producing surpluses in fiscal years 1980 and 1981.

The U.S. Census Bureau has been reporting city financial data since 1904. Report format, scope and measurement definitions have changed over time, so data are not necessarily comparable across periods. Earlier, we used Census data to obtain independent variables for the Depression-era default modeling. While two defaults are not sufficient to create a model, it may be useful to see how the defaulting cities rank against peers according to selected metrics.

During the 1970s, the Census published detailed financial statistics for cities with populations greater than about 300,000 – a class that includes New York and Cleveland. In FY 1976, New York had the 11th highest interest-to-revenue ratio out of 48 cities in that year's survey. In FY 1979, Cleveland ranked 8th out of 46. While the two defaulters were not

the most indebted relative to revenue, they did place in the upper quartile of peer cities on this measure of debt burden.

The Annual Revenue Change rankings were less indicative – New York was 30th and Cleveland 21st in their respective years of default. In this case, a lower ranking (i.e., a lower revenue change) should reflect greater risk, but in both cases, the impacted cities were near the middle of the distribution.

The Census also reported Employee Retirement Expenditure, but the numbers do not appear to be accurate. For example, Cleveland's Employee Retirement Expenditure was listed as $0 for FY 1979. Several other cities in the survey also reported zero values. According to ACIR (1984), Cleveland did not have its own employee retirement system during the 1970s, apparently relying on the Ohio Public Employee Retirement System (OPERS) to manage its pension obligations. It appears that employer contributions to state systems were excluded from the Census figures. In FY 1976, New York's Employee Retirement Expenditure ranked 15th of 42 cities with non-zero values.

While General Fund balances do not appear in the Census data, General Revenues and General Expenditures are reported, thereby allowing a calculation of General Fund surpluses or deficits. While the Census shows New York running a surplus during the year of its default, the city experienced substantial deficits in three of the four prior fiscal years – consistent with the ACIR report. Cleveland had a substantial deficit in its default year and in each of the four preceding years. In three of those years, the city's deficits exceeded 10% of revenue, placing it near the bottom of peer cities in the measure of general fund balance relative to revenue.

More Recent Experience in Other States

Contemporary data related to municipal bond defaults from other states could potentially be used for default probability modeling. However, there have been few relevant defaults over the last 25 years. Since media reports often conflate state takeovers and bankruptcies with defaults, we include these kinds of municipal fiscal crises in this section.

Although the list includes 32 municipal bankruptcies, many involved small towns that did not issue municipal bonds. In other cases, a larger city filed a petition but the case was dismissed without a default or rescheduling of debt. The list also includes a number of defaults that occurred without a bankruptcy filing as well as several state takeovers, most of which occurred in Michigan. Since takeover situations may have resulted in defaults absent intervention from a higher level of government, the financial statistics of cities requiring takeovers might also be considered for modeling purposes.

Table A11: City Defaults, Bankruptcies and Fiscal Emergencies Outside California - Past 25 Years

City, State (Year) Population Type of Event	Bonds	Notes Source(s)
Allen Park, MI (2012) Population: 28,210 State-appointed emergency financial manager	Yes	In November 2009, the city issued $31 million in long-term general obligation bonds to finance the creation of a movie studio, which failed. Debt service on these bonds has contributed to persistent general fund deficits. *Sources:* *Report of the Allen Park Financial Review Team* (2012). http://www.michigan.gov/documents/treasury/AllenPark-ReviewTeamReport-_8-8-12_417419_7.pdf Burton. Paul (2013 Mar 20). Michigan Treasurer: Orr's the Right Man. *Bond Buyer*. http://search.proquest.com/newsstand/docview/1317819784#

City, State (Year) Population Type of Event	Bonds	Notes Source(s)
Alorton, IL (2005) Population: 2,549 Bankruptcy	No	The closure of Alcoa Aluminum in the 1960s and the loss of the Cahokia Downs Race Track in 1978 prompted the economic decline of the village. Lawsuits from various individuals compounded fiscal issues, leading to the village's bankruptcy. *Source:* Levin, Richard, Jonathan Solomon and Campbell Agyapong. (2011). Some Causes of Municipal Distress and Bankruptcy. http://html.documation.com/cds/NCBJ2011/assets/PDFs/VI_D.pdf
Benton Harbor, MI (2013) Population: 10,047 State-appointed emergency financial manager	No	Formerly an economically vibrant manufacturing center of 20,000, Benton Harbor's per capita income is now roughly $10,000, and 60% of its population is on public assistance. *Sources:* *Report of the Benton Harbor Financial Review Team* (2010). http://www.michigan.gov/documents/treasury/BentonHarbor-ReviewTeamReport-1-29-10_417426_7.pdf Mahler, Jonathan (2011 Dec. 15). Now that the factories are closed, it's tee time in Benton Harbor, Mich. *New York Times*. http://www.nytimes.com/2011/12/18/magazine/benton-harbor.html?pagewanted=all
Bridgeport, CT (1991) Population: 141,719 Bankruptcy	Yes	Dismissed. Court found that the city was not insolvent. No interruption in payments to creditors. The state backed "$53 million in bonds to balance Bridgeport's books." *Sources:* Mills, M. (2011). Bridgeport – Distressed but not insolvent. *Bankruptcy Blog*. http://business-finance-restructuring.weil.com/chapter-9/bridgeport-%E2%80%93-distressed-but-not-insolvent Duby, Christopher. (1995 Oct 9). Bridgeport finally sheds Financial Review Board. Fairfield County Business Journal. http://search.proquest.com/docview/216380696

City, State (Year) Population Type of Event	Bonds	Notes Source(s)
Brighton, AL (2011) Population: 2,947 Default	Yes	The city was unable to make a $22,783 interest payment or comply with a mandatory redemption. The default was attributed to the failure of many residents to pay bills due the city. Some residents had recently been laid off by Jefferson County – also in bankruptcy. *Sources:* Sigo, Shelly (12 Aug 2011). Brighton Ala. Defaults on General Obligation Warrants from 2003. *Bond Buyer*. http://search.proquest.com/docview/884326244
Brooklyn, IL (2003) Population: 626 Bankruptcy	No	The small town was suffering from declining population, internal corruption, and the closure of several strip clubs. The strip clubs had provided much of the tax base for the village but were shut down. Initial estimates showed the town had $100,000 in assets and $500,000 in debts – but a 2006 news report placed total debt at $1,600,000. *Sources:* Shaw, Michael (2003 Oct 15). Brooklyn Goes Broke, Files for Bankruptcy. *St. Louis Post-Dispatch.* http://search.proquest.com/docview/402336061 Hollinshed, Deneice (2006 Dec. 29). Allegations of corruption cast pall over Brooklyn. *St. Louis Post-Dispatch.* http://search.proquest.com/docview/403054028
Camden, NJ (1999) Population: 79,904 Bankruptcy	Yes	An act of brinksmanship during a debate over a potential state takeover. Petition withdrawn shortly after filing. No default. *Source:* Couloumbis, Angela and Dwight Ott (1999 July 25). Camden's Bankruptcy Drama Ends But Self-sufficiency is still far off. *The Philadelphia Inquirer*. http://articles.philly.com/1999-07-25/news/25521825_1_mayor-milton-milan-camden-residents-aid-agreement
Camp Wood, TX (2005) Population: 822 Bankruptcy	Yes	Camp Wood Convalescent Center did not generate sufficient revenue to service certificates of obligation. "The municipality refinanced its debt with bonds and other obligations, but was unable to make payments on its debt due to continued underperformance of the Convalescent Center." *Source:* Levin, Solomon and Agyapong (2011).

City, State (Year) Population Type of Event	Bonds	Notes Source(s)
Central Falls, RI (2011) Population: 19,376 Bankruptcy	Yes	The city was placed into receivership in 2010 under a Financial Stability Act passed by the state legislature. The receiver filed a Chapter 9 bankruptcy petition in 2011. Central Falls had about $21 million of outstanding general obligation bonds at the time of its filing and faced a $4.8 million budget gap for fiscal year 2012. The city continued to service its bonds in bankruptcy, but raised health insurance deductibles and copayments for city employees and retirees. By altering collective bargaining agreements, the city was able to emerge from bankruptcy within a year. Avoidance of default was credited to a 2011 state law giving bondholders the right to place liens on Rhode Island municipal tax revenues. *Sources:* Bidgood, Jess (2012 Sep. 6). Plan to End Bankruptcy in Rhode Island City Gains Approval. *New York Times*. http://www.nytimes.com/2012/09/07/us/central-falls-ri-to-emerge-from-bankruptcy.html City of Central Falls (2012 June 30). Continuing Disclosure Report Rhode Island General Obligation Debt. http://emma.msrb.org/ER644731-ER500139-ER902895.pdf Nolan, Kelly (2011 Aug 1). Rhode Island City Files for Bankruptcy. *Wall Street Journal*. http://search.proquest.com/docview/880200621
Copperhill, TN (1988) Population: 450 Bankruptcy	No	Factory closings and a declining population left the town with no way to pay even the interest on a $400,000 construction loan for a sewage plant. *Source:* Uzelac, Ellen (1991 June 17). A year after bankruptcy, Tenn. town was flooded. *The Baltimore Sun*. http://search.proquest.com/docview/407130678
Detroit, MI (2013) Population: 706,585 State-appointed emergency financial manager, default, bankruptcy	Yes	A long-term population decline, political corruption and inflexible union contracts are cited as general causes for the city's secular fiscal decline. The financial review team identified insufficient cash, eight consecutive general fund deficits, and long-term liabilities including pension and OPEB obligations and bureaucratic inflexibility as causes for the state takeover. On June 13, Detroit missed a $39.7 million payment on pension bonds and its emergency financial manager proposed to restructure the city's debt. On July 18, the city filed a Chapter 9 bankruptcy petition.

City, State (Year) Population Type of Event	Bonds	Notes Source(s)
		Sources: Afford, Harry C. (2013 Mar 15). Long in decline, Detroit can't outrun its past. *The Philadelphia Tribune*. http://search.proquest.com/docview/1321681728 *Report of the Detroit Financial Review Team* (2013). http://www.michigan.gov/documents/treasury/Review-Team-Report-2-19-13_415662_7.pdf Chappatta, Brian, Christoff, Chris and Niquette, Mark (2012 June 14). Detroit Peddles Its Municipal Assets to Avoid Record Bankruptcy. *Bloomberg News*. http://www.bloomberg.com/news/2013-06-14/detroit-on-bankruptcy-s-brink-stops-paying-some-debts-orr-says.html.
East St. Louis, IL (1990) Population: 40,944 State supervision	No	City was declared to be financially distressed by the state, received a state loan and was placed under supervision by a financial advisory authority. Subsequent bond issuance, starting in 1994, has taken place under state supervision - most recently by the Illinois Finance Authority. *Source:* Harrison, Eric (1990 Aug. 9). East St. Louis: Illinois Bails Out Troubled City Close to Bankruptcy. Los Angeles Times. http://articles.latimes.com/1990-08-09/news/mn-375_1_east-st-louis.
Ecorse, MI (2009) Population: 9,512 State-appointed emergency financial manager	Yes	City mayor and controller both arrested for corruption related to public works contracts. The financial review team noted four consecutive general fund deficits and a negative general fund balance in its report. *Source:* *Report of the Ecorse Financial Review Team* (2009). http://www.michigan.gov/documents/treasury/Ecorse-ReviewTeamReport-8-19-09_417433_7.pdf Egan, Paul (2009 Sep 26). Bribery scandal rattles Ecorse: Mayor, controller arraigned on federal corruption charges. *Detroit News*. http://search.proquest.com/docview/404426108
Flint, MI (2011) Population: 101,558 State-appointed emergency financial manager	Yes	Review team declared a fiscal emergency because the city was running persistent and increasing general fund deficits, had insufficient cash to meet short term obligations and lacked a credible plan for addressing its financial problems. The city was also under state emergency financial control from 2002 to 2006. *Sources:*

City, State (Year) Population Type of Event	Bonds	Notes Source(s)
		Michigan Radio (2011). 7 things to know about Michigan's financial emergency law. http://www.michiganradio.org/post/7-things-know-about-michigans-emergency-manager-law *Report of the Flint Financial Review Team* (2011 Nov 7). http://www.michigan.gov/documents/treasury/Flint-ReviewTeamReport-11-7-11_417437_7.pdf
Gould, AR (2008) Population: 1,305 Bankruptcy	No	The town owed more than $900,000 to the IRS, the Arkansas Department of Finance and Administration, Arkansas Natural Resources, a mosquito-control company, the Lincoln County jail, and the U.S. Agriculture Department's Rural Development agency in St. Louis. With assets totaling only $300,000, Gould filed a Chapter 9 petition. *Source:* Hale-Shelton. Debra. Bankruptcy filed, tiny town hopes to rise again. *Northwest Arkansas Times*. http://freerepublic.com/focus/f-chat/2007387/posts
Harrisburg, PA (2011) Population: 49,528 Bankruptcy and default	Yes	A failed incinerator project generated roughly $300 million in city-guaranteed debt, while the city relied on sewerage charges to offset a persistent general fund deficit. The city filed a Chapter 9 petition in October 2011 but the filing was dismissed because it violated a state moratorium on certain municipal bankruptcies. The city has defaulted on three general obligation bond debt service payments since March 15, 2012. *Sources:* Barnes, Tom (2011 Nob 24). Harrisburg's Petition for Bankruptcy Protection Rejected. *Pittsburgh Post-Gazette*. EMMA (2013). Continuing Disclosure for Harrisburg Refunding Notes. http://emma.msrb.org/IssueView/IssueDetails.aspx?id=F68DABD8F80120CF1482B5AD2CB1D695 Unkovic, Steve (2013). *Municipal Financial Distress: Causes and Solutions.* Bond Buyer Distressed Municipalities Conference. http://www.bondbuyer.com/media/pdfs/BBdistressed13-presentations-Unkovic-Municipal-Physical-Distress.pdf

City, State (Year) Population Type of Event	Bonds	Notes Source(s)
Hillsdale, MO (2001) Population: 1,477 Bankruptcy	No	The city had over $250,000 in debt and under $100,000 in assets. Upon being ordered to pay $88,000 to an officer after he slipped on ice, the city filed Chapter 9. *Source:* O'Neil, Tim (2001 Dec 11). Hillsdale files for bankruptcy after order for injury award; village has been scraping by, lawyer says. *St. Louis Post-Dispatch*. http://search.proquest.com/docview/402025863
Inkster, MI (2012) Population: 25,111 State appointed emergency financial manager	No	Financial review team cited negative cashflow, unrealistic budgets and high debt levels. City laid off 20% of its police force shortly before the state takeover. *Sources:* Hullett, Sarah (2011 Dec 14). *Michigan Town Grapples with Shrinking Public Sector*. National Public Radio. http://www.npr.org/2011/12/14/143705814/michigan-town-grapples-with-shrinking-public-sector Report of the Inkster Financial Review Team (2012). http://www.michigan.gov/documents/treasury/Inkster-ReviewTeamReport-3-1-12_417444_7.pdf
Kendleton, TX (2001) Population: 466 Bankruptcy	No	Texas officials seized the town's bank account and withdrew what cash was left -- about $18,600. "The seizure of the city's money was based on a 1997 court ruling that Kendleton owed the state $660,000 as its portion of traffic fines collected between 1990 and 1996." *Source:* Hanson, Eric (2001). Kendleton files for bankruptcy. *Houston Chronicle*. http://search.proquest.com/docview/395856622
Kinloch, MO (1994) Population: 2,699 Bankruptcy	No	City population decreased from 2,699 to 449 between 1990 and 2000 due to the airport buying up homes in the town as part of its expansion. The bankruptcy petition was a response to a dispatching firm's move to garnish the city's income from sales tax. *Source:* Bryant, Tim. Bankruptcy will help Kinloch, Mayor Says. *St. Louis Post-Dispatch*. http://search.proquest.com/docview/303919247

City, State (Year) Population Type of Event	Bonds	Notes Source(s)
Lipscomb, AL (1991) Population: 2,800 Bankruptcy	Yes	Declining tax base. Defaulted in 1985. "Defaulted on $832,000 GO bond and $353,000 GO refunding warrant from Farmer's Home Administration." The FmHA filed suit in 1987 and 1988 with awards totaling $120,000. "In 1991, FmHA filed suit again asking for city to turn over keys to City Hall, 3 police cars and its 1976 and 1954 fire trucks." *Source:* Deal, Keren (2010). *Municipal Bankruptcy in Alabama*. http://www.gfoaa.org/docs/CGAT/CGAT%20Muni%20BR%20Presentation.pdf
Macks Creek, MO (2000) Population: 267 Bankruptcy	No	Macks Creek was financing operations using traffic fines (they accounted for 75-85% of revenue). This was deemed excessive and the state enacted the so-called Macks Creek Law in 1995, capping the maximum revenue permissible from fines at 45% (excess going to county schools). A 1997 state audit found "major financial problems." After this was revealed, almost every town official resigned. *Source:* Frankel, Todd C. (2009 May 17). Speed trap law is full of loopholes in Macks Creek, the town that inspired the measure, has passed into oblivion. *St. Louis Post-Dispatch*. http://search.proquest.com/docview/403205030
Marion, MS (2007) Population: 1,305 Bankruptcy	No	Filed bankruptcy petition to avoid paying a $400,000 judgment won by neighboring Meridian, MS, for waste water treatment. Dismissed. *Source:* Brown, Ida (2009 July 27). Editorial board. *Meridian Star*. http://meridianstar.com/local/x681086861/Editorial-Board
Marshall Creek, TX (2006) Population: 430 Bankruptcy	No	Loss of contract to patrol Marshall Creek Park and the loss of federal police grants resulted in bankruptcy consolidation with neighboring Roanoke, TX. *Source:* McGowen, Lorraine (2011). Presentation to Sovereign & Municipal Debt Roundtable. http://bankrupt.com/DI2011/Docs/doc/0840McGowen.pdf

City, State (Year) Population Type of Event	Bonds	Notes Source(s)
McCurtain Municipal Authority, OK (2007) Population: 466 Bankruptcy	Yes	The authority, which provides water and sewer services to the town, lost a contractor lawsuit over a disputed bill. Case dismissed after the Authority reached an agreement with the contractor. *Sources:* Levin, Solomon and Agyapong (2011), McGowen (2011). U.S. Bankruptcy Court Eastern District of Oklahoma (Okmulgee) (2007). Court Documents related to Bankruptcy Petition #: 07-80363. Available on PACER at https://ecf.okeb.uscourts.gov/.
Menasha, WI (2009) Population: 17,442 Default	Yes	The city defaulted on debt from the spiraling construction costs associated with a steam plant that would not be profitable. Three years later, agreements were made allowing the city to repay $17.5 million in debt over the course of 20 years. *Source:* King, Michael (2012 Mar 6). Menasha steam plant debacle, uncertainty wind down. *Appleton Post-Crescent*. http://www.postcrescent.com/article/20120316/APC030208/120305182/Menasha-steam-plant-debacle-uncertainty-wind-down
Millport. AL (2004) Population: 1,000 Bankruptcy	Yes	Defaulted on $1.3 million of general fund obligations, as well as a $2 million loan from the U.S. Department of Agriculture to improve the town's water and sewer systems. Default attributed to declining population and employment opportunities as well as financial mismanagement under previous administration. *Sources:* Deal (2010). U.S. Fed News Service. Information issued by U.S. Attorney's Office for the Northern District of Alabama on April 15; U.S. Settles Action to Appoint Receiver for Millport, Alabama's Sewer, Water System. http://search.proquest.com/docview/472147666

City, State (Year) Population Type of Event	Bonds	Notes Source(s)
Moffett, OK (2006) Population: 400 Bankruptcy	No	Town was recognized as a speed trap and no longer allowed to finance its operations using traffic fines as its primary revenue source. "Court records show that the town owe[d] nearly $200,000 in secured and unsecured claims from nearly 50 businesses. Moffett generate[d] only about $20,000 in annual sales-tax revenues, a 2004 filing from the state Auditor's Office shows." *Sources:* Walton, Rod. Moffett files for bankruptcy. *Tulsa World*. http://search.proquest.com/docview/400285035
Muldrow, OK (2005) Population: 3,104 Bankruptcy	No	"The immediate cause of the chapter IX filings was the likelihood that Muldrow faced significant fines and penalties from ODEQ [Oklahoma Department of Environmental Quality] for past and ongoing violations of the Clean Water Act and its Oklahoma counterpart." *Source:* Levin, Solomon and Agyapong (2011).
North Bonneville, WA (1991) Population: 350 Bankruptcy	No	In the 1970s, the town was condemned and relocated to allow for construction of a dam. The Army Corps of Engineers moved the town, and 20 years later claimed that the city still owed $365,000 in maintenance and operations costs for the municipal facilities. Due to a declining tax base since the move and city assets totaling only $258,000, the town filed for bankruptcy. The issue was settled with the signing of the 1993 Defense Appropriations Act. The "measure calls for the corps to cancel the city's debt, convey title to the town for the relocation lands and facilities and clean up a hazardous waste site on Hamilton Island, a peninsula on the town's south side. In return, North Bonneville agreed to accept the facilities 'as is.' The city also loses its right to sue the corps for failure to perform according to the terms of the relocation agreement." *Source:* Senior, Jeanie. North Bonneville's fight with the army ends. *The Oregonian*. http://search.proquest.com/docview/416587177

City, State (Year) Population Type of Event	Bonds	Notes Source(s)
North Courtland, AL (1992) Population: 1,000 Bankruptcy	No	Court awarded $100,000 to a former employee of the city on a discrimination claim. Plaintiff began garnishing the city's tax revenues. City could not pay the judgment which amounted to over one-third of the town's annual $290,000 revenue. *Source*: Deal (2010)
Ozan, AR (1995) Population: 69 Bankruptcy	No	City in decline due to a water system that yielded undrinkable water. The town financed the construction of a new water system, but two unexpected stop orders delayed the project. The contractor sued for $55,000 in lost income and the town did not have the resources to pay or fight the suit. "The water system is being paid for with a $291,700 loan from the Rural Economic Development Corp., some $645,782 in grants from the Arkansas Industrial Development Commission and $7,300 from town coffers." *Source:* Copeland, Larry (1995 July 23). Ozan's solution became problem. *Tulsa World*. http://search.proquest.com/docview/399523993
Pontiac, MI (2009) Population: 59,515 State appointed emergency financial manager	Yes	GM plant closing resulted in fewer jobs and a declining population. The financial review team cited persistent large general fund deficits and a deteriorating cash position. *Source:* Holeywall (2012 May). Emergency Financial Managers: Michigan's Unwelcome Savior. *Governing*. http://www.governing.com/topics/mgmt/gov-emergency-financial-managers-michigan-municipalities-unwelcome-savior.html *Report of the Pontiac Financial Review Team* (2010). http://www.michigan.gov/documents/treasury/Pontiac-ReportToGovernor-_6-23-08_417450_7.pdf

City, State (Year) Population Type of Event	Bonds	Notes Source(s)
Prichard, AL (1999/2009) Population: 28,633 Bankruptcy	No	Dwindling population, persistent deficits and substantial pension obligations forced Prichard to file for bankruptcy in 1999. After emerging from bankruptcy in 2007, the city filed again in October of 2009, in an effort to further reduce pension payments. While the city's petition was dismissed in 2010, it drastically reduced pension benefits. Although the city does not have any municipal bonds listed on EMMA, the bankruptcy court docket indicates that it had a lease arrangement with Region's Bank at the time of its 1999 filing. *Sources:* Chang, Semoon (2012). A tale of the Prichard (AL) pension program, *Pensions, 17*(2), 112-120. http://media.al.com/live/other/Prichard%20Pension%20Article%20Semoon%20Chang.PDF Deal (2010). Heck, Hannah (2011). Solving Insolvent Public Pensions: The Limitations of the Current Bankruptcy Option. *Emory Bankruptcy Developments Journal 28*(1), 89-133. http://search.proquest.com/docview/923754470 U.S. Bankruptcy Court Southern District of Alabama. Court Documents related to Bankruptcy Petition #: 99-13465. Available at http://ia600400.us.archive.org/26/items/gov.uscourts.alsb.49664/gov.uscourts.alsb.49664.docket.html. Watson, Douglas, Donna Handley and Wendy Hassett. Financial Distress and Municipal Bankruptcy: The Case of Prichard, Alabama. *Journal of Budget, Accounting and Financial Management, 17*(2), 129-150.

City, State (Year) Population Type of Event	Bonds	Notes Source(s)
Reeds Spring, MO (2002) Population: 465 Bankruptcy	No	A 1998 lawsuit won by a woman who slipped on a city sidewalk left the city owing $100,000 to her and $25,000 in legal fees. The town was also running a deficit: its 2002 revenue of $205,000 was $30,000 less than expenditures. Source: Bengali, Shashank (2002 Nov. 17). Suit pushes town into bankruptcy. *Charleston Sunday Gazette-Mail*. http://search.proquest.com/docview/332227135
Rio Bravo, TX (2002) Population: 5,553 Bankruptcy	No	Town was unable to pay on a $180,000 loan and $800,000 owed to former police chief, and due to 50% of residents not paying taxes or fees. Taylor, Erinn (2003 Sept. 18). Rio Bravo mayor wants taxes paid. *Laredo Morning Times*. http://madmax.lmtonline.com/textarchives/091803/s5.htm
Scranton, PA (2012) Population: 76,089 Default	Yes	On June 1, 2012, the city failed to make a required lease payment to the Scranton Parking Authority causing authority bonds to go into default. In addition, the city temporarily reduced employee salaries to the statutory minimum wage in order to conserve cash. Later in the year, the city's cash crisis was alleviated by state aid, a loan from a union-owned bank and proceeds from additional bond issues. *Sources:* Shafroth, Frank (2012 July 13) *The Week that Was*. Singleton, D. (2012 Dec. 30) Scranton's Financial Crisis Tops 2012 News, *The Times-Tribune*, http://thetimes-tribune.com/news/scranton-s-financial-crisis-tops-2012-news-1.1422801. Wells Fargo Bank (2012 Aug. 17), *Notice of Defaults, Event of Default and Appointment of Receiver*. http://emma.msrb.org/EP678369-EP528610-EP929851.pdf.

City, State (Year) Population Type of Event	Bonds	Notes Source(s)
Tyrone, OK (2000) Population: 880 Bankruptcy	No	"The Texas County town of about 880 has filed for Chapter IX bankruptcy, which will allow it to stave off claims and attorney's fees that now equal the town's annual budget of about $150,000." The suits were filed by two police officers over the town's noncompliance with federal wage laws. *Source:* *Oklahoma City Journal Record* (2000 Oct 6). Lawsuits force Oklahoma Panhandle town into bankruptcy. http://search.proquest.com/docview/259442432
Vadnais Heights, MN (2012) Population: 12,302 Default	Yes	The city issued $27 million in bonds on behalf of an entity that was to build and operate a sports arena. The city was to then lease the facility "for a rental payment equal to its annual operating budget, which includes debt-service costs." The facility brought in significantly less revenue than expected and the city terminated its lease for 2013, triggering a default event. *Source:* Shields, Yvette (2012 Sept 11). Minnesota City Cancels Sports Lease Backing $27M of Bonds. http://www.bondbuyer.com/issues/121_176/moodys-downgrades-Vadnais-Heights-to-junk-status-1043840-1.html
Warrens, WI (2010) Population: 366 Default	Yes	The village of Warrens defaulted on general obligations as well a $3.6 million sewer bond held by the state of Wisconsin. It is in forbearance until April 2013. The bonds were issued in part to finance infrastructure associated with a new hotel and water park complex. The development went into foreclosure before it could be completed, significantly impacting tax revenues. *Sources:* Village of Warrens (2012). Financial Statements as of December 31, 2011. http://emma.msrb.org/ER586883-ER456192-ER858928.pdf Warrens Finance Committee Report (2012 June 20). http://www.co.monroe.wi.us/wp-content/uploads/2012/01/20120625100401063.pdf

City, State (Year) Population Type of Event	Bonds	Notes Source(s)
Washington Park, IL (2004) Population: 5,451 Bankruptcy	No	The 2004 filing was made after losing an employee harassment lawsuit, but was dismissed after the village's finances temporarily improved. The village filed again in 2009 claiming assets of less than $50,000 and debts of over $1 million. The second filing occurred after two village workers were convicted of embezzling a total of over $300,000 from the village. Second filing was dismissed on the grounds that Chapter 9 filings were not authorized under Illinois state law. *Sources:* McGowen (2010). Suhr, Jim (2009 Aug. 4). Illinois village seeks bankruptcy protection. http://dailyreporter.com/2009/08/04/illinois-village-seeks-bankruptcy-protection/
Westfall Township, PA (2009) Population: 2,500 Bankruptcy	No	"Supervisors in rural Westfall Township., with annual revenues of about $1 million, sought Chapter IX protection . . . to force negotiations on a $20 million federal judgment granted to a developer. The compromise under the bankruptcy plan allows the township to make $75,000 quarterly payments over 20 years, funded through a dedicated property tax hike that raises taxes by about $200 a year for the average homeowner." *Source:* McConnell, Steve (2010 Mar. 22). Westfall Township's first-in-the-state bankruptcy may not be Pennsylvania's last. *Scranton Times Tribune*. http://search.proquest.com/docview/458423160

City, State (Year) Population Type of Event	Bonds	Notes Source(s)
Westlake, TX (1997) Population: 250 Bankruptcy	No	"Westlake's woes began this spring after [Ross] Perot -- whose family owns the 2,500-acre Circle T ranch that makes up more than half of Westlake -- was unable to reach agreement on development plans with city officials, notably former Mayor Scott Bradley. The flap ultimately resulted in two Westlake aldermen and Perot sympathizers being voted out of office. But before they left office, the aldermen removed Mr. Bradley from office, approved Mr. Perot's request that his property be disannexed and then approved a separate disannexation request by the owners of the Solana [office] complex." That office complex was responsible for 99% of the town's revenue. A state pool and local bank both temporarily froze the town's accounts while the disannexations were adjudicated. However, because the town had had $1,895,321 in cash and only $122,199 in outstanding obligations, the bankruptcy court dismissed the case. *Sources:* *Wall Street Journal* (1997 June 10). Town near Dallas files for bankruptcy protection. http://search.proquest.com/docview/398562382 *In Re: Town of Westlake, Texas*. U.S. Bankruptcy Court ND Texas (1997 July 25). http://www.leagle.com/xmlResult.aspx?page=2&xmldoc=19971071211BR860_1943.xml&docbase=CSLWAR2-1986-2006&SizeDisp=7
Westminster, TX (2000) Population: 390 Bankruptcy	No	"Twice, the city of Westminster sought to declare for bankruptcy; the first effort, in 2001, failed after creditors rejected a payout plan. In early 2004, the state agencies agreed to relinquish their claims, provided that Westminster disincorporate." *Source:* Collin County Station (2013). *Westminster, Texas History and Information.* http://collincountystation.com/westminsterh.html

City, State (Year) Population Type of Event	Bonds	Notes Source(s)
Winstonville, MS (1997) Population: 277 Bankruptcy	No	"Court records show Winstonville has had financial problems for at least two decades, and filed for bankruptcy in 1997." "The town also owed $323,759 to the USDA for a community facilities loan. After negotiations, the USDA agreed to let Winstonville pay $100 to clear its obligation for the loan". *Mississippi Business Journal* (2011 Dec. 2). Delta town finally gets gas after failing to pay bill. http://msbusiness.com/blog/2011/12/02/delta-town-finally-gets-gas-after-failing-to-pay-bill/

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