City Savings:

An Empirical Study of the Level and Impact of Fiscal Reserves in California Cities

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April 6, 2022

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Abstract

Reserve funds are an understudied fiscal tool for cities. This study collected reserve fund data for California cities, separated by formal reserve funds (restricted or committed funds according to GFOA Statement 54 fund definitions, designated for general emergency or budget-balancing purposes) and informal reserve funds (all unrestricted general fund balance). In 2019, just under half of the cities in the study (45.5%) had some type of formal reserve fund. Nearly all cities had an informal reserve fund greater than 16% of total expenditures, which is the GFOA recommended minimum level. Panel regressions for fiscal years 2017 to 2019 show that cities decide whether to create a reserve fund and how much to save based on various financial factors, city characteristics, and institutional variables. The factors that explain variation in the presence and amount of formal reserve funds differ from informal reserve funds. Finally, this study demonstrated empirically through panel regressions that greater informal reserve funds are associated with an increase in the expenditures of a city.

Introduction

The COVID-19 pandemic has highlighted for many cities a need to prepare for a sudden loss of income. One way that many municipalities can prepare is by reserving money for future use, either in a formal separate fund or by leaving surplus money in the general fund. While saving money by creating a surplus in the general fund is a well-known method for cities, the formal reserve fund has been studied considerably less. Many authors cite a lack of established reserve funds, but Anita Lawrence (2000) suggests otherwise through her survey of California cities in 2000, where 33% of the fiscal city officers reported having a formal reserve fund at their local government. In an ongoing project with lead researchers from Occidental College, USC and UC Davis, I began to collect data on formal fiscal reserves for local governments in fiscal years 2019-2021 (https://sites.usc.edu/ca-regional-impact/). In a sample of sixty-four cities, budget documents for California cities show that most cities have established at least one formal reserve fund as of March 2020, before COVID-19 began. The minimum reserve goal set by a California city varies greatly; the policies range from 2% to 100% of the agency's expenditures or revenues, although most of the reserve policies require under 10%. Some of the cities indicated that they used reserves during the pandemic. However, the sample size was small. Delving deeper, this study aims to explain the variation in the amount of reserve funds held by California cities, then determine whether reserve funds in the previous year have a statistically significant effect on cities' expenditures.

Exploring the variation in level of reserve policies can provide insight on whether county and state legislation should facilitate the growth of reserve funds, or even create specific recommendations for reserves at the city level, similar to the minimum reserve fund requirements for school districts. Secondly, if reserve funds do have a positive effect on

expenditures, this project would indicate that reserves are a useful tool to help cities provide important services. In that case, city fiscal staff and city council members should be more interested in creating and maintaining reserve funds, especially in preparation for future emergencies.

Background

Local governments provide many important services, such as sanitation, health, water, other utilities, road infrastructure, and recreational facilities for their residents. All these services cost money, so cities must raise revenue. Municipalities have several sources of revenue, including property taxes, sales taxes, fines, charges and fees, transfers from state and federal governments, and bonds/accruing debt.

Many cities have a requirement or a goal to ensure that the total revenue for the fiscal year is greater than or equal to the expenditures for the year, otherwise known as balancing their budget. Balancing the city's budget shows residents that the city is managing their tax money properly while fulfilling their citizens' needs. Yet within the year and at the end of the year, budget deficits may arise when revenue does not equal or exceed expenditures. Month to month, some revenue sources and expenditures have a cyclical nature. For example, salaries for government workers are level throughout the year, but property taxes are collected and distributed to local governments only twice a year. Capital projects may increase expenditures for certain months. Other factors may affect revenue in the long-term; for example, declining economic conditions could lower revenue as people and firms spend less money, or population decline. Emergencies and sudden revenue changes may also create a budget deficit.

Cities have a multitude of tools available to solve a budget deficit, where expenditures exceed revenues. A straightforward way is to increase revenues. Yet as Anita Lawrence details in "The Adoption Of Reserve Policies In California Cities", over the past two decades, California cities and counties have lost flexibility to increase their income (Lawrence, 2000). This has happened mainly through three statewide propositions: Prop 13 (which limited property tax, removed cities' ability to change the property tax, restricted increases on assessed property value, and required a two-thirds vote to approve general obligation bonds), Prop 4, also known as Gann Limits (which limited government funding, while factoring in the extent to which a government overcharges a fee), and Prop 218 (which "added restrictions to other taxes, fees and assessments, making it necessary to ask for voter approval for many of them") (Lawrence, 2000).

Another option is to decrease expenditures. However, cutting spending may decrease the amount and quality of important city services, including water, sewer, power, transportation, streets and planning, emergency services, and more. Additionally, many expenditures are fixed or pre-negotiated, so cities may be unable to quickly decrease certain costs.

Cities could take on debt through bonds or loans from the federal government. The Federal Reserve, for example, offered up to $500 billion to loan for sub-national governments struggling with decreased revenues due to COVID-19, through the CARES Act in 2020 (Federal Reserve, 2020). Borrowing money requires the city to have a good credit rating and places additional fiscal burden on the city in the future.

The final solution, more relevant to this paper, is spending from reserve funds. Reserves is a general term used to describe any money that a government sets aside for later use.

Some authors use the terms 'fund balance' and 'reserves' interchangeably. In this paper, I distinguish between the formal and informal ways of saving money for a city. The formal method creates a separate reserve fund with specific legislation or policies that may dictate the creation, amount, and/or use of the fund. Informal reserves, where there is no separate reserve fund, is measured in the form of the municipalities' unrestricted end-of-year fund balance.

Another way to categorize formal and informal reserve funds is by the way the fund was formed. The GASB (Governmental Accounting Standards Board) Statement No. 54 (Fund Balance Reporting and Governmental Fund Type Definitions) established four types of governmental funds: Restricted, Committed, Assigned, Unassigned. Restricted funds are money that can only be spent for a specific purpose defined by the city's constitution, external resource providers, or legislation (GFOA, 2009). Committed funds are also designated for specific purposes, but the fund is created by a formal action from the city's highest level of decision-making authority, such as the city council. Assigned funds indicate that a city intends to use the money for specific purposes, but the fund does not meet the requirements of a Restricted or Committed category. Finally, the Unassigned balance in the general fund is the classification for all other spendable funds. In this paper, formal reserve funds met either the Restricted or Committed classifications. Assigned and Unassigned funds were not included as a formal reserve fund.

There are specific subtypes of formal reserve funds that cities can create. One such type is a budget stabilization fund. These reserve funds are created specifically to counter year-to-year cyclical effects on the general budget, in the case that revenues do not cover expenditures. This type of fund is more commonly found in state government's budgets than in local

governments, and the literature reflects this. However, at the state level, one study suggests that the current budget stabilization funds are not optimal for smoothing out deficits (Marlowe, 2005). The state budget stabilization funds may lack controls for the creation and use of the reserve funds or may cap the reserve fund at a low amount, often around five percent of the state's total expenditures (Marlowe, 2005). Other formal reserve funds may be created for specific funds, such as a retirement or debt reserve fund. These funds are not used for covering a budget deficit in the general fund, so this paper will instead focus on formal reserve funds that are not tied to a specific fund.

Cities that do not have a separated reserve fund policy can instead choose to spend less, which leaves the extra funds in their general fund as a positive general fund balance. This positive fund balance carries over from the previous fiscal year to the new fiscal year, so it can be used later to cover a deficit, like how a formal reserve fund would be used. Following methodology from the California State Auditor, general fund unrestricted fund balances was used to represent informal reserves. Unrestricted general fund balance is the sum of Committed, Assigned, plus Unassigned fund balances, according to fund definitions in GASB Statement No. 54. This means that some of the committed funds specifically set aside for reserves will be counted in both informal and formal reserve funds. One author refers to this unrestricted balance as "free money", since cities can use it freely when needed (Snow et al., 2015). Because the highest level of funds in unrestricted funds can be changed by an action of the city council, unrestricted funds should be flexible enough for cities to use it as needed.

<u>Literature Review</u>

While there is a limited number of studies on the incidence and impact of reserves for local governments, this paper will review literature on formal reserve funds, unrestricted general fund balances, and the effects of both reserve types. The review will help identity gaps in current research and place this paper among the existing literature.

Formal Reserve Funds

While there is a lack of legislation requiring formal reserve policies for local governments, one major organization has stated the importance of reserve funds for cities. The Government Finance Officers Association represents public finance officials throughout the United States and Canada, and they publish resources and best practices. In their Reserve Policy Template, most recently updated in 2020, the GFOA recommends that formal reserve policies should be based on the types of risk the local government is trying to manage, but a general guideline for a minimum reserve policy is 16% – 17% of revenues or expenditures.

Not only do local governments have to consider the types of risk a formal reserve fund would mitigate, but Wolkoff (1987) also describes the political and economic aspects of reserve funds. He points out that "taxpayers and politicians have incentives to avoid forced savings" (Wolkoff, 1987), as politicians and citizens would rather use the funds to provide more city services. Saving the money would help to lessen the impact of economic fluctuations on businesses and residents, but it requires that cities spend less on current expenditures. Because of mobility between cities, some current taxpayers will burden the cost of lower spending for the same amount of taxation, while others who move in will reap the stabilization benefits in the

future. The expenditure tradeoff and delayed benefits complicate the decision making for how much reserves to hold, especially for formal reserve funds.

The political aspect builds on Tiebout's paper (1956) on how migration between cities is affected by the fiscal policies of each city. Tiebout proposed that people would move to the city that most closely matched their preferences for taxation and spending, given there is variation in fiscal policies between all the cities. By moving, people "vote with their feet" to influence fiscal policies, such as the amount of savings a city will hold. This theory implies that the amount of reserves held (both formal and informal) should vary, based not only on the types of risk present, but also on voters' different preferences for saving versus spending.

To begin assessing formal reserve savings in cities, Wolkoff conducted a survey of large cities in the United States. Of the 27 cities that responded, only 6 had a formal rainy day or contingency reserve fund (Wolkoff, 1987). According to the author, he limited his sample pool because large cities were more likely to have a formal rainy day fund. However, the limited scope of the study makes it difficult to draw conclusions about formal reserve funds in the 1980s.

By 2000, Anita Lawrence conducted a more expansive survey for all California cities with populations of 10,000 to 200,000. Out of 142 respondents, 33% had a formal, adopted written reserve policy for their city. 28% of the cities had a reserve policy that was informal, and 8% responded that they had a reserve policy, but in another form besides formal and informal. Formal reserve policies typically set a goal for the minimum fund amount, in either a fixed dollar amount or as a percentage of the city's total revenue or expenditure. For the California cities in Lawrence's survey, cities that set a dollar amount for their formal reserve policies had a minimum range from $1 to $20 million. For reserves measured as a percentage of revenues or

expenditures, policies ranged from 2% to 150%. Lawrence's survey results counter other literature that claim formal reserve funds are rare in local governments. For example, Hembree and Tyer (1999) specifically mention that formal reserve funds are unlikely to be found in North and South Carolina cities.

Lawrence (2000) asked the financial officers to rank the importance of certain criteria in determining reserve policy size. The criteria were cash flow, exposure to natural or other disasters, exposure to economic conditions, vulnerability to State actions which results in reduction of income, and other factors. Over half responded that exposure to economic conditions was either most important or more important. Vulnerability to state actions and exposure to natural disasters were mostly listed around average importance, while cash flow was generally evenly spread between the rankings.

Besides this survey, one other work specifically studies what factors influence the level of formal reserve funds for cities. Working off of Wolkoff's (1987) theories, Snow, Gianakis, and Haughton (2015) studied the political factors which affect the level of budget stabilization reserve funds per capita for 239 municipalities in Massachusetts from 1993 to 2010. They transformed the budget stabilization fund balance per capita to a log variable, so there is no descriptive data on the level of reserves held by these cities. Using the mean voting outcomes for ballot questions related to tax increases and a binary variable for years where a city successful overrode the property tax limit, Snow et al. (2015) observed that higher anti-tax communities and communities with a propensity for enacting overrides are associated with smaller budget stabilization funds. This follows Wolkoff's (1987) arguments because it shows

that residents who dislike the local government overtaxing them will also dislike the forced

saving inherent for formal reserve funds.

Wolkoff's (1987) first study into budget stabilization funds for municipalities brought

interest to formal reserve funds. However, Lawrence (2000) and Snow et al. (2015) remain some

of the only subsequent papers that study formal reserves funds at the city level. Additionally,

Snow et al. (2015) do mention that stabilization funds did not seem to decline in many

Massachusetts cities during recession periods, but otherwise they did not study the impact of

reserve levels on city spending.

Unrestricted Fund Balances

Like formal reserve policies, the GFOA published a Best Practices resource for

unreserved general fund balances, which recommended that "general-purpose governments,

regardless of size, maintain unrestricted budgetary fund balance in their general fund of no less

than two months of regular general fund operating revenues or regular general fund operating

expenditures." This Recommended Practice 4.1 was published in 2015, from the GFOA's

National Advisory Council on State and Local Budgeting. An unrestricted fund balance equal to

two months is approximately 16-17% of a city's revenues or expenditures, similar to the

GFOA's recommendation for formal reserve policies.

There is significantly more literature on reserves in the form of unrestricted fund balances

for local governments. Part of this may be a representation of municipal finance practices;

Hembree and Tyer (1999) found that North and South Carolina cities rely on their unassigned

fund balances as a reserve and rarely budget formal reserve funds. Positive fund balances

typically range from 20% to 50% of total expenditures in the South Carolina cities, and the mean

percentage is even higher for North Carolina cities. By sorting the cities and fund amounts into size categories, the authors observed that the population of the cities had a negative relationship with the percentage of fund balance. Besides total population and whether cities provided electric service, this study did not include other variables that might affect the amount of fund balance.

Arapis and Reitano (2018) studied the unassigned fund balance for 103 cities in Florida with populations above 5,000 (financial data was missing for the remaining 111 cities). Over an 8 year period, from 2005 to 2012, 70% of the cities held a fund balance higher than 15% of cities' operating expenditures, which is the GFOA's recommended minimum amount, according to Arapis and Reitano. Arapis and Reitano (2018) used a slightly different range for fund balances than the minimum range recommended by the GFOA in their Best Practices for Fund Balances (2015). However, it is still notable that fewer than 10% of the cities in the Florida study had lower than the minimum fund balance (5%). This adds to the positive fund balance ranges in North and South Carolina cities from Hembree and Tyer (1999).

Arapis and Reitano (2018) also studied the variables that may affect unrestricted fund balance. They categorized the level of fund balances by below, within, and above 5-15% of operating expenditures, and used a regression to estimate the probability of each category happening before (2005-2007), during (2008-2009), and after the Great Recession (2010-2012). They found that property taxes are a statistically significant variable during and after the Great Recession for cities with a fund balance level below 5%. As property taxes increased, the likelihood of the fund being below the GFOA level and during or after 2008 increases. The authors included net enterprise transfers, which is the net amount transferred from enterprise, or

business-like, activities, such as city-owned airports, electricity, transit, or golf courses. Net enterprise transfers decreased the probability of a fund balance below 5% to exist from 2005 to 2009. Income per capita and population were also statistically significant for all three time periods. Because this paper compared the existence of a certain unrestricted fund balance during different time periods, the methods were not able to explore why some Floridian cities had a higher unrestricted fund balance than other cities.

In North Carolina counties, Wang and Hou (2012) studied the level of general fund balance and the relationship with fiscal and demographic explanatory variables. This study focused on total general fund balance, as opposed to only unrestricted general fund balance. The average fund balance per capita was $95.98 for these 100 counties, during 1990 to 2007. Wang and Hou (2012) found that increasing property tax and sales tax amount by $1 was associated with increasing fund balance by $0.35 and $1.36 per capita respectively, while increasing capital outlay was associated with a decrease. For socioeconomic variables, the data from Wang and Hou (2012) showed that a thousand dollar increase in personal income per capita increases fund balance by $4.6 per capita. This research echoes the significance of property taxes and income per capita seen in Arapis and Reitano (2018).

Findings on Effects of Fund Balances

Another essential question about fund balances is whether the fund balance helps cities to stabilize and boost their expenditures. There are two ways that general fund balance can affect expenditures: a counter-cyclical effect or a procyclical (siphoning) effect.

In 2005, Marlowe tested this question on general fund balances of Michigan cities, by estimating a 10 year linear forecast of each city's expenditures, then creating an expenditure gap

measure, calculated as the difference between the forecasted expenditure and the actual expenditure. The mean of the expenditure gap was 0.892%. For unreserved general fund balances, Marlowe's (2005) regression models indicate a near statistically significant countercyclical effect on expenditures in downturn years only. For an average city, the effect of unreserved fund balance to counter the economic downturn is a less than 1 percent reduction of the negative expenditure gap. On the other hand, reserved general fund balance has a siphoning effect, where increasing the fund balance exerts a reduction in the city's expenditures. During boom years, the average for all cities, a 7.03% reserved general fund balance out of total expenditures, causes a less than 0.5% reduction of the positive expenditure gap. As the author explains, the expenditure gap has a mean below 1% so the seemingly small effects from the unreserved and reserved fund balances could shift the expenditure from negative to positive. Additionally, Marlowe (2005) found that institutional factors, such as whether the city had a council-manager government, significantly impacted the counter-cyclical effects.

Wang and Hou (2012) also tested the effects of previous year fund balances on total expenditures. In one section, the authors compared the carried-over fund balance from the previous fiscal year with the expenditures of each fiscal year. The average total expenditure for these counties in North Carolina was $549.28 per capita. Supporting Marlowe's (2005) findings, Wang and Hou's (2012) study demonstrated that a fund balance does increase total expenditure in the next year. A $1 increase in fund balance per capita was associated with a $0.146 increase in total expenditure the next fiscal year. This shows that cities are on average spending about 15% of their carried-over general fund balance in order to increase expenditures.

When Wang and Hou (2012) measured the difference in total expenditure from year to year, fund balance as a percentage of total expenditures had a significant effect. The average difference in total expenditures was $17.05 per capita. A 1% increase in the previous fiscal year's fund balance was associated with a $0.829 increase in the change for total expenditure.

Research Gaps

While it is notable that Lawrence (2000) surveyed and found that 65 out of 205 California cities with a population between 10,000 and 200,000 had a formal reserve policy, there is little empirical research on the impact of formal reserves on municipalities' expenditures. Arapis and Reitano (2018) studied the level of informal reserve funding but did not specifically explore factors that may cause one city to hold a higher level of reserves compared to another city.

This study aims to close this gap by quantifying the specific levels of reserve funding in California cities, both formal and informal reserves. I will follow a similar methodology to Wang and Hou (2012) to discover whether there are variables associated with increasing or decreasing the level of reserve funds and if fund balances influence the following year's expenditure levels, except at the city level instead of counties, using reserve funds rather than total fund balance. This will test the procyclical versus countercyclical effects that Marlowe (2005) explored. A countercyclical effect means that reserve funds are used when expenditures fall below what is typical for the city, so a higher reserve fund should be associated with a lower negative expenditure gap. A procyclical effect means the funds are used to increase expenditures when spending is already increasing, so a higher reserve fund should be associated with a lower positive expenditure gap.

Methods

Why California

This paper provides an empirical counterpart to Anita Lawrence's survey based data in 2000. The survey focused on cities with populations of 10,000 to 200,000 in California. Reserve funds may also be more important to cities in California; Lawrence writes about certain state laws that restrict California cities' ability to increase their income. In the case of a future budget imbalance, cities will have a harder time increasing revenue, so they must either cut expenditures or use reserve funds. Additionally, California has two fiscal data sources which are useful for this study – the state Controller's Financial Transactions Report and the Auditor's Local Government High Risk program. Finally, collecting the formal reserve data by hand takes time, so choosing one state helped to narrow the scope of the study.

Presence of Reserves

The goal of this research is to understand what influences the level of reserve funds and unrestricted general fund balances for cities in California, then to determine the impacts of the level of reserve funds on cities' expenditures.

The first step to understanding the level of formal and informal reserves in California cities is to describe the number of cities that have a formal and informal reserve.

For formal reserves, my hypothesis is that most cities had a formal reserve fund in 2020-2021, because Lawrence found that 33% of California cities had a formal reserve fund in 2000 (Lawrence, 2000), and more cities may have added reserve funds since then.

For informal reserves, my hypothesis is that most cities will have an unrestricted general fund balance above 16% of total expenditures, because cities use the positive fund balance to cover months when expenditures exceed revenues and to save for financing large capital expenditures. I specifically chose 16% because the GFOA recommended minimum is 16-17% of cities' operating expenditures. Both Hembree and Tyer (1999) and Arapis and Reitano (2018) found that most of the study cities had a general fund balance above 5-15%.

City Characteristics and Reserve Amounts

The second part of the analysis tests whether fiscal and community characteristic variables influence the presence and amount of each reserve fund type. I used a logistic regression to estimate association between city characteristics (including fiscal, institutional, and socioeconomic variables) and having a reserve fund. I estimated the odds ratio separately for the presence of a formal reserve fund and presence of an unrestricted fund balance above 16% of expenditures, with a year fixed effect.

I used an OLS regression to estimate the correlation between the same city characteristic variables and the amount of reserve funds, separately for formal and informal reserve funds, with a year fixed effect.

There are many reasons that cities may choose to hold reserves. However, as Wolkoff (1987) points out, migration in and out of cities means that the people who placed aside the money might not receive the benefit of the reserves. Residents who expect to live in their current city for the foreseeable future could capture more of the benefits of saving. Therefore, I hypothesize that cities with a lower migration rate should be associated with a higher level of saving.

On the other hand, cities could act like a singular entity saving a portion of its income. Similar to a consumer's marginal propensity to save, as a city's income increases, it may be easier to satisfy the need for services. I would expect to see an increase in reserve amounts as total governmental revenue increases.

Cities could also be saving based on perceptions of future need and stability of revenues. The GFOA suggests cities to save 16-17% of revenues or expenditures, but also that "The size of the reserves should be based on an analysis of the types of risk your government is trying to manage with reserves." (GFOA, 2020). Since reserve funds help mitigate the risk of expenditures exceeding revenues, cities should be evaluating possible changes in expenditure as well. The percentage of residents under the federal poverty line, unemployment rate, and total population may increase the need for services, so an increase in those three variables might be correlated with an increase in both formal and informal reserves. Additionally, reliance on certain revenue sources like sales tax and intergovernmental transfers could be perceived as less stable than property taxes, prompting cities to hold larger reserves. Opposingly, future debt and pension obligations may place extra burden on a city's fund balance, incentivizing cities to reserve less. I hypothesize that an increase in the percentage of residents under the poverty line, unemployment rate, total population, sales tax, and intergovernmental transfers, would each be associated with a higher reserve amount. Debt and pension obligations (measured as a fraction of revenue) may be associated with a lower reserve amount.

Differences in voter base could affect the perception of the need for reserves. Previous literature (Arapis and Reitano, 2018, Wang and Hou, 2012) found that property tax and median household income is positively correlated with unrestricted fund balances. A higher property tax

and median household income could lead to a lower perceived need for stabilizing mechanisms like reserve funds, so a city may save less.

In 2019, Pew Research Center found differences in anti-tax sentiment between the surveyed Republican and Democratic voters; "A majority of Republicans (56%) say they pay more than their fair share in taxes, compared with 38% who say they pay about the right amount." (Pew Research, 2019). Snow et. al (2015) hypothesized that anti-tax communities would be more hesitant to create savings, since it seems like excess tax money that is wasted. If Republican voters have more anti-tax sentiment, the percentage of Republican voters should show a negative association with the presence of reserve funds.

Besides the voter registration parties, I added a dummy variable for charter versus general law cities. By becoming a charter city, a city is no longer bound to the state's general laws for municipal affairs. Although municipal affairs are not strictly delineated, a charter city has more control over the form of government, public contracts, finance and taxing power, and more. As the legal team from the League of California Cities succinctly writes, "A charter maximizes local control." (League of California Cities, 2001). The additional control could influence reserves by allowing cities to save more without too much oversight from the state.

$$Formal\ Reserve\ Fund = \beta_0 + \beta_1(Fiscal\ Characteristics) + \beta_2(SE\ Characteristics) + \beta_3(Institutional\ Characteristics)$$

$$Unrestricted\ General\ Fund\ Balance = \beta_0 + \beta_1(Fiscal\ Characteristics) + \beta_2(SE\ Characteristics) + \beta_3(Institutional\ Characteristics)$$

Effect of Reserves on Expenditures

The third part of this research asks the all-important question: Does saving reserves benefit cities? Since this study centers around the fiscal years 2017 to 2019, it is not possible to estimate the effect of reserves on a major fiscal shock, like COVID-19. Instead, the effects of reserves (X_t) will be measured on the total expenditures per capita in the following year (Y_{t+1}). Wang and Hou (2012) use a similar regression, except with total expenditures per capita (Y_t) as the dependent variable and previous year fund balances (X_{t-1}) as the independent variable.

I hypothesize that unrestricted fund balances will have a positive correlation with the following year's expenditures (governmental expenditures, not including enterprise/business-type activities). Unrestricted fund balances are essentially free cash that cities can spend, allowing cities to spend more than revenues taken in and still balance the budget. A city that has more informal reserves in one year may spend more in the following fiscal year.

I hypothesize that formal reserve funds will have a negative relationship with expenditures for the following fiscal year. This would show the tradeoff that Wolkoff (1987) describes, between spending more now or saving the money to spend in the future. Cities that increase their formal reserve funds will have less to spend in the following fiscal year. Oppositely, in a period of fiscal stress, reserve funds may decrease if used to cover lost revenue, while expenditures increase or stay stable.

I used a panel regression to help control for differences in cities and fiscal years. I used three regression specifications: one with the next year's expenditures (Y_{t+1}) on reserves and revenues, then another with the same variables plus controlling for the city characteristics

variables, and finally one regression comparing reserves and revenues to the current year's expenditures (Y_t).

$$Expenditures\ per\ capita_{t+1}$$
$$= \beta_0 + \beta_1(Formal\ Reserve\ Fund)$$
$$+ \beta_2(Unrestricted\ General\ Fund\ Balance)$$

Data

I collected formal reserve data from the largest cities in California: from Los Angeles (the largest) with a population of 3.97 million, until Tulare city at a population of 65.5 thousand. I also included some formal reserve data found in the ongoing Occidental College, USC, and UC Davis research project (Bay Area to Central Valley Migration and its Impacts). Currently, neither the California Controller nor the Auditor collect data on cities' formal reserve funds. However, many cities list their reserve fund amounts and policy in their annual budgets and Annual Comprehensive Financial Report. Using a combination of city budget documents and the Annual Comprehensive Financial Reports, I found whether the city had a formal reserve policy and the total formal reserve amount for fiscal years 2017-2021. I also noted if the city had a minimum fund balance policy for their general fund's unrestricted balance, and the level of that goal.

I defined formal reserve policies as a fund either committed or restricted for general reserve purposes, and not specific purposes such as debt or loans, pensions, or natural disasters. Assigned reserve balances were not included if there was no stated process for approving use of the reserve funds. Many of the included formal reserve funds were named "Operating Reserve", "Emergency Reserve", "Contingency Reserve", and other combinations. I also included reserve

funds named "Budget Stabilization" if the descriptions allowed the city to use it for a variety of scenarios. Wolkoff (1987) theorized that city governments would be hesitant to create formal reserve funds because it was essentially forced savings, which might put off some anti-tax communities. By choosing only reserve funds that have formal processes for approving a use of reserve funds, I emphasize the difference between informal and formal reserve funds.

On the other hand, data on unrestricted fund balance, which is a city's informal reserve fund, is readily available through the California Auditor's Office. As a part of their Local Government High Risk program, California State Auditor has compiled the unrestricted fund balance for all California cities from 2017-2020. Besides the actual amount, many cities have a policy goal for a minimum unrestricted general fund balance. Although this money is not as separated from committed expenditure as formal reserve funds, it does indicate that many cities are creating savings through their unrestricted fund balances.

I used the debt burden and pension obligation variables from California State Auditor's Local Government High-Risk program raw data. Debt burden is measured as all long term obligations excluding retirement obligations, divided by governmentwide revenue. Pension costs are the sum of net pension liability and pension-related debt outstanding divided by governmentwide revenues.

For the percentage of revenue sources, the California State Controller's Office releases Financial Transaction Reports for each year, by city. I used this data for municipalities' total revenue and revenue broken down by source (Sales tax, Charges for services, Property tax, Intergovernmental transfers, and other) each as a percentage of total revenue. In the regressions for reserves on expenditures, the expenditure data is from the Financial Transaction Reports.

The socioeconomic variables that help to characterize the cities were downloaded from US Census American Community Survey, or ACS, on the IPUMS National Historical Geographic Information System (NHGIS), a data integration software by the University of Minnesota. These variables include median home value for owner-occupied housing, percentage of the population that moved into a different house in the past year, percentage of total population under the federal poverty line, ethnicity (Black, Asian & Pacific Islander, and Hispanic as percentage of total population), unemployment rate as a share of total labor force, and total population.

The percentage of voters by party was from the website StatewideDatabase. I used the number of registered voters in the general election, downloaded at the zip code level then merged to city data. Because the general election only happens during even years, I also used the party registration data to represent party distributions for the previous year.

The charter versus general law city data is from the Construction Industry Force Account Council (CIFAC). Their website has a list of all California cities by county, and whether each city is a charter or general law city. The data was last updated on October 13, 2021.

Table 1. Descriptive Statistics of All Variables for FY 2019.

	Min	Q1	Median	Mean	Q3	Max
Population that moved (% of Total Population)	0.787	9.878	13.139	14.11	16.456	89.45
Revenue Source (% of Total Revenue)						
Sales Tax	0	10.738	16.738	18.172	24.258	67.494
Charges for Service	0	3.855	7.257	8.56	11.901	39.166
Property Tax	-0.125	8.798	13.414	15.74	20.708	60.063
Intergovernmental Transfers	0.166	5.651	8.672	11.655	13.4	79.47
Governmental Revenue ($ in thousands)	343.8	21206	50414.5	190051.2	125965	1.82E+7
Population Under the Federal Poverty Line (%)	0	2.395	3.589	4.162	5.397	14.358
Unemployment Rate (% of Labor Force)	0.1	2.7	3.6	4.31	4.8	31.2
Total Population (in thousands)	0.021	10.824	29.541	66.629	70.101	3966.93
Debt Obligations ($)	0	15.453	41.814	56.467	76.893	406.709
Pension Obligations ($)	-31.673	30.132	54.884	59.753	86.619	197.011
Median Home Value ($ in thousands)	77.1	281.6	456.5	596.133	729.2	2000.001
Republican Voters (% of Registered Voters)	0	20.99	31.744	32.045	42.44	100
Charter (1) vs General law (0)	0	0	0	0.252	1	1
Black Population %	0	0.765	1.834	3.576	4.284	39.646
Hispanic Population %	0	15.449	30.567	36.522	53.339	98.968
API Population %	0	2.481	6.507	11.655	15.534	67.675

Formal reserve amount ($ in thousands)		0	5285.541	14435.46	27985.76	21625	365830
Unrestricted general fund balance ($ in thousands)		-16545	4897.391	14516.4	35353.03	33897.66	2390787
Governmental expenditure (t+1) ($ in thousands)		195.076	12951.41	37684.96	115759.5	88342.61	9102910

Findings

Presence of Reserves

Table 2.a Formal Reserves

|	
All CA municipalities in fiscal year 2019	482
Total municipalities for which formal reserve data was collected	209
Cities with a formal reserve	93 (45.5% of collected)
Cities with NO formal reserve	116 (55.5% of collected)

Table 2.b Informal Reserves

Total municipalities for which unrestricted fund balance data is available in 2019	467
Cities with an informal reserve of 16% of expenditures or less	69 (14.8% of available)
Cities with an informal reserve greater than 16% of expenditures	397 (85.2% of available)

Tables 2.a and 2.b show the number of cities that have a formal reserve fund and an informal reserve fund in the fiscal year 2019.

For the study cities in the fiscal year 2018-2019, 45.5% had a formal reserve fund policy and money in the reserve fund. This is less than my hypothesis of greater than 50%. However, more cities have established a formal reserve fund policy since Lawrence's study in 2000. A larger percentage of cities have a formal reserve fund in 2019 (45.5%) than in 2000 (33%).

On the other hand, the majority of all California cities held more than 16% of expenditures in their unrestricted general fund balance in 2019. Over 85% of cities had a balance greater than 16% of governmental expenditures, which supports my hypothesis. This adds to the findings of existing studies, namely Hembree and Tyer (1999) and Arapis and Reitano (2018), where most cities meet this minimum threshold.

The two graphs below depict the distribution of reserve fund sizes, as a fraction of total governmental expenditures, in 2019. For formal reserves, the majority of the reserves are below 20% of the city's expenditures. On the other hand, the magnitude of informal reserve funds is much greater, sometimes even adding up to over 100% of a city's expenditures. Most of the informal reserve fund balances are still equal to less than 50% of the cities' expenditures.
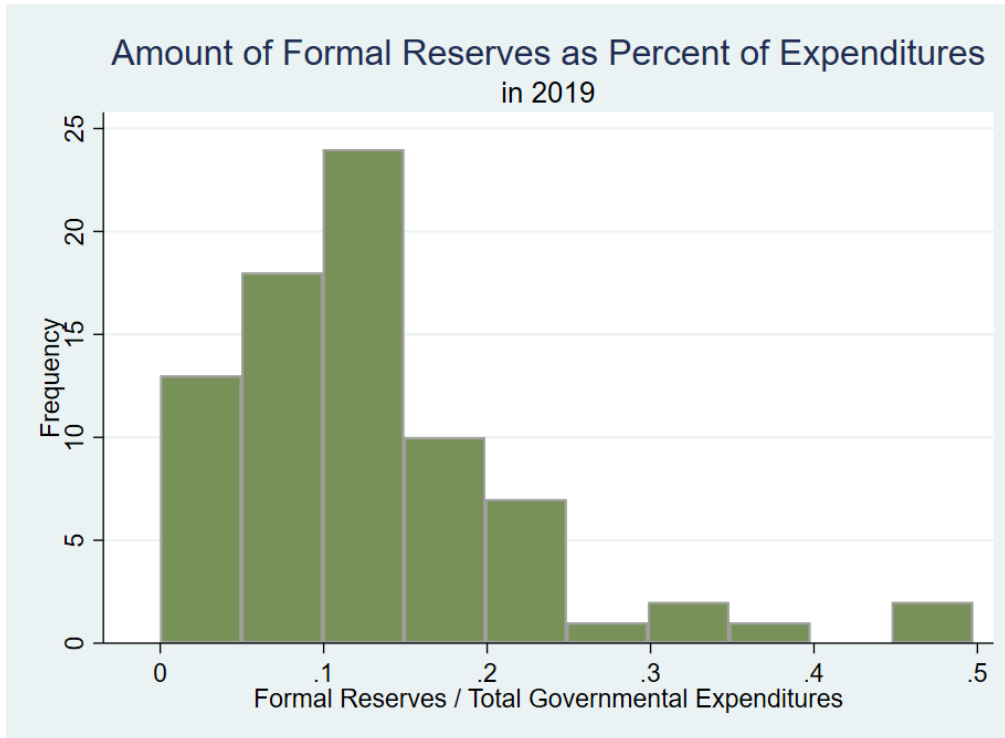
Graph A. Histogram of Formal Reserve Amount, as a fraction of Total Governmental Expenditures in 2019.
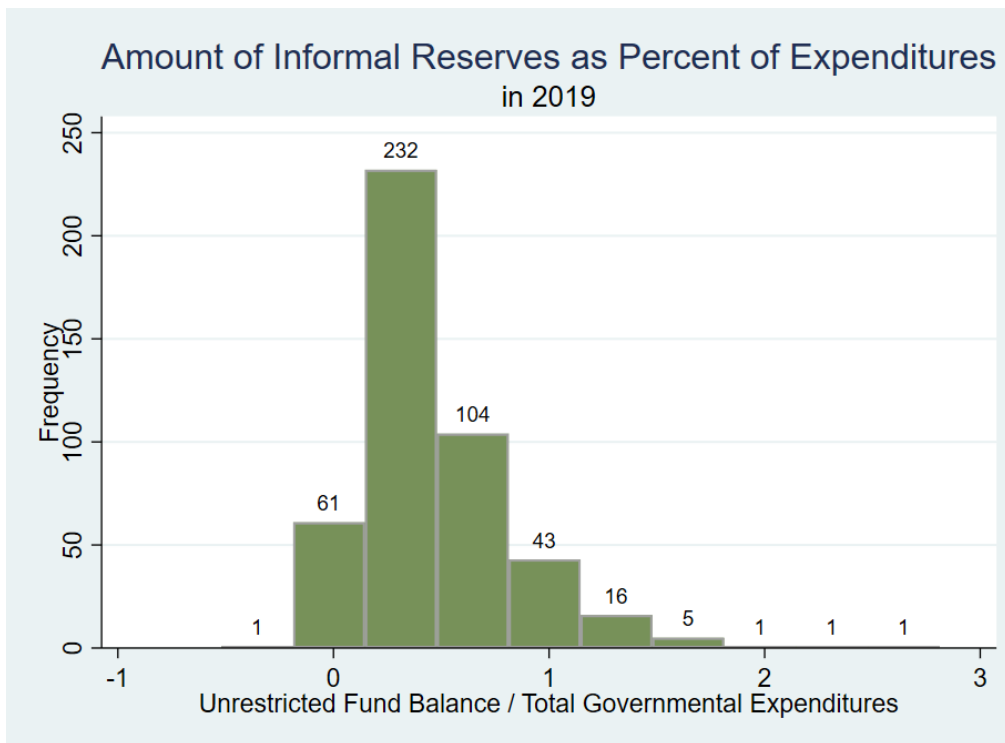
Graph B. Histogram of Informal Reserve Amount, as a fraction of Total Governmental Expenditures in 2019.

City Characteristics and Reserve Amounts

Estimating the Presence of Reserve Funds: Logistic Regressions

To test for the presence of a reserve fund, I used a logistic regression on each dummy variable. In Table 3, the first regression is on the presence of any reserve fund for the cities where reserve data was collected. The second regression is on the presence of an unrestricted general fund balance (the informal reserve fund) greater than 16% of the city's expenditures. Both regressions are pooled for the three fiscal years from 2017 to 2019, and the estimated coefficients are listed as the odds ratio.

The first column for the presence of a formal reserve fund shows that only three of the seventeen variables are statistically significant at the 90% level. The percent of households that moved in the city is a statistically insignificant variable, suggesting that the time mismatch between current saving and future spending does not factor in heavily when a city decides whether to hold formal reserve funds.

Of the variables that measure a part of future need, intergovernmental transfers and the unemployment rate are statistically significant. As the fraction of revenue from intergovernmental transfers increases, it decreases the odds for a city to have a formal reserve fund by a small amount, 0.955. This counters the hypothesis that higher reliance on intergovernmental transfers would be positively correlated with reserve funds, assuming that transfers are seen as an unstable revenue source. Increasing the unemployment rate also decreases the odds for a city to have a reserve fund, by 0.853. This is a greater magnitude than intergovernmental transfers.

The percent of that is Black statistically significant as well. As the Black population

increases, the odds of having a formal reserve fund. Otherwise, none of the other explanatory

variables are statistically significant in this logit regression.

Table 3. Logit regression. **Pooled fiscal years 2017-2019, robust standard errors.**		
	Y = Presence of Reserve Fund	**Y = Presence of Unrestricted Balance above 16%**
	Odds Ratio (SE)	*Odds Ratio (SE)*
Governmental Revenue ($ in thousands)	1.000	1.000^
	(0.000000731)	(0.000000118)
Sales Tax (% of Total Revenue)	1.006	1.033^**
	(0.0137)	(0.0115)
Charges for Service (% of Total Revenue)	0.990	0.962^**
	(0.0171)	(0.0128)
Property Tax (% of Total Revenue)	1.025	0.977
	(0.0160)	(0.0143)
Intergovernmental Transfers (% of Total Revenue)	0.955^**	0.957^**
	(0.0158)	(0.0122)
Debt Obligations ($)	0.996^	0.997^*
	(0.00196)	(0.00138)
Pension Obligations ($)	1.001	0.991^**
	(0.00249)	(0.00241)
Total Population (in thousands)	1.002	0.998^**
	(0.00339)	(0.000732)
Population that moved (% of Total Population)	1.032	0.985

	(0.0255)	(0.0143)
Population Under the Federal Poverty Line (% of Total Population)	1.184^*	1.067
	(0.0905)	(0.0587)
Unemployment Rate (% of Labor Force)	0.853^**	0.951^
	(0.0457)	(0.0249)
Median Home Value ($ in thousands)	1.000	1.002^**
	(0.000444)	(0.000577)
Black Population %	0.924^**	1.019
	(0.0210)	(0.0186)
Hispanic Population %	1.006	0.989^
	(0.00806)	(0.00625)
API Population %	0.996	1.009
	(0.00885)	(0.0101)
Republican Voters (% of Registered Voters)	0.985	1.008
	(0.0103)	(0.00908)
Charter (1) vs General law (0)	0.848	0.825
	(0.240)	(0.174)
2018	0.874	0.968
	(0.198)	(0.202)
2019	0.886	0.957
	(0.205)	(0.208)
N	553	1164
Exponentiated coefficients; Standard errors in parentheses		
^ p<0.10	^* p<0.05	^** p<0.01

The second column is the logistic regression for the presence of an informal reserve fund, or unrestricted general fund balance, greater than 16% of the city's expenditures. There are six

statistically significant variables at the 0.1 level. The percent of moved households and total governmental revenues were again both insignificant.

The fraction of revenue from sales tax has a positive impact on the odds for a city to have an informal reserve fund greater than 16%. More reliance on sales tax is associated with a higher likelihood for an informal reserve fund, which supports the hypothesis that sales tax may seem more unstable, prompting cities to save reserve funds. Adversely, a higher fraction of revenue from charges for services and intergovernmental transfers are associated with decreased odds for an unrestricted general fund balance above 16%.

Pension obligations are included as a statistically significant variable. As pension obligations increase, the odds for an informal reserve fund decrease. This odds ratio supports the hypothesis that pension obligations place pressure on the expenditures of a city, leading to a lower chance of setting aside revenues.

Total population and median home value are statistically significant. However, the odds ratio of both are close to 1. An odds ratio of 0.998 suggests that as total population increases by 1000, the odds of an informal reserve fund greater than 16% of expenditures decreases slightly. Median home value has a slightly opposite effect, as the median value increases by 1000, a city is 1.002 times more likely to have an informal reserve fund greater than 16%.

For both the formal and informal logit regressions, the odds ratios are generally close to one for the statistically significant variables, ranging from 0.853 to 1.033. The explanatory variables are not changing the odds of having a reserve fund, formal or informal, by a large amount. Additionally, the statistically significant coefficients for formal versus informal funds are different, except for the intergovernmental transfers.

Estimating the Amounts of Reserve Funds: Linear Panel Regressions

After exploring the relationship between city characteristics and the presence of a reserve fund, the next step is to use the same explanatory variables but estimating the dollar amount in the formal and informal reserve funds. Table 4 shows the two panel regressions with formal reserve funds in the first column and informal reserve funds in the second column.

Table 4. Panel linear regression. Cities in fiscal years 2017-2019, robust standard errors.		
	Y = Formal Reserve Fund (in thousands)	**Y = Informal Reserve Fund (in thousands)**
Governmental Revenue ($ in thousands)	0.0134***	0.162**
	(0.00407)	(0.0565)
Sales Tax (% of Total Revenue)	703.0*	204.1
	(311.9)	(120.0)
Charges for Service (% of Total Revenue)	-259.0	-183.3
	(195.8)	(184.0)
Property Tax (% of Total Revenue)	721.7	363.3
	(570.2)	(207.2)
Intergovernmental Transfers (% of Total Revenue)	-397.6	-38.78
	(269.1)	(52.94)
Debt Obligations ($)	2.613	141.6
	(37.30)	(83.74)
Pension Obligations ($)	-113.2*	-6.685
	(47.51)	(44.28)
Total Population (in thousands)	33.21	-379.1*
	(22.49)	(185.1)
Population that moved (% of Total Population)	904.2*	412.0*

	(397.9)	(189.0)
Population Under the Federal Poverty Line (% of Total Population)	-3623.0**	-2132.7
	(1320.7)	(1109.9)
Unemployment Rate (% of Labor Force)	-2383.7	-1798.6**
	(1411.0)	(666.7)
Median Home Value ($ in thousands)	-4.349	6.501
	(9.593)	(6.414)
Black Population %	90.44	577.9
	(428.0)	(391.7)
Hispanic Population %	374.7**	318.5*
	(143.6)	(148.3)
API Population %	356.4*	827.2***
	(154.8)	(209.1)
Republican Voters (% of Registered Voters)	3.959	241.7
	(236.5)	(154.2)
Charter (1) vs General law (0)	7504.8*	24183.0**
	(3692.3)	(8147.6)
Constant	-10681.8	-13106.8
	(18088.9)	(11312.5)
N	201	1164
Standard errors in parentheses		
* p<0.05 ** p<0.01 *** p<0.001		

For the amount in each formal reserve fund, there are eight statistically significant

variables at the 0.05 level. The percentage of the population that moved within the past year is

positively correlated with the formal reserve amount; an increase in the percentage is associated

with a $904,200 increase in the reserve amount, holding the other variables constant. This

correlation is the opposite of my hypothesis that a higher migration will lead to lower savings because current residents may not benefit from current saving.

An increase in the total governmental revenue is correlated with an increase in formal reserve amounts, which supports my hypothesis. Since both variables are calculated in the thousands of dollars, a $100,000 increase in total revenue is associated with a $1,340 increase in formal reserve amounts. The magnitude may seem small in comparison to other fiscal variables, but the median for total governmental revenue is $50,414,500, so the coefficient is still meaningful when estimating how much a city will save. Another fiscal variable, the fraction of revenue from sales tax, is also significant. Increasing revenue from sales tax by one point percentage is correlated with a $703,000 increase in the formal reserve amount. Both variables support my hypotheses on a city's ability to fulfill needs and perceived revenue source stability.

The poverty percentage and pension obligations both have negative correlations with formal reserve funds. As the percent in poverty increases by one, the estimated decrease in reserve amount is $3,623,000. The magnitude of this variable is much greater than the other explanatory variables. A contrasting example is pension obligations as a percentage of total governmental revenue. A one point percentage increase in pension obligations is associated with a $113,200 decrease in formal reserve amount.

The largest magnitude of a statistically significant variable is the charter city dummy variable. Being a charter city as opposed to a general law city is correlated with a $7,504,800 increase in formal reserve funds on average.

Finally, the Hispanic population and Asian & Pacific Islander population have a positive relationship with formal reserve amounts, of similar magnitude. A one percent increase is correlated with a $374,700 and $356,400 increase, respectively.

For the amount in the unrestricted general fund balance, there are seven statistically significant variables at the 0.05 level, as shown in the last column on Table 4. The percent of the population that moved into the city within the past year has a positive correlation to formal reserve funds. As the percent increases by one point, the informal reserve fund increases by $421,000. This does not support my hypothesis that more migration would decrease the incentive to save.

A $100,000 increase of governmental revenue is correlated with an increase of unrestricted fund balance of $16,200, which is larger than the coefficient for total governmental revenue on formal reserve funds. Similarly, the coefficient is smaller than other explanatory variables. However, in this regression, none of the revenue source variables are statistically significant.

Instead, the total population and unemployment rate have a statistically significant correlation with informal reserve fund amounts. As total population increases by a thousand, the informal reserve fund decreases by $379,100, holding all other variables constant. Compared to total revenue, the magnitude of total population is greater. The sign of this coefficient is opposite of what I expected for the total population. The unemployment rate also has a negative correlation, with an even larger magnitude. A one point increase of the unemployment rate is associated with a $2,383,700 decrease in the unrestricted fund balance.

Like formal reserves, the charter city variable is statistically significant and again has the largest magnitude of the regression for informal reserves. A charter city is associated with a $24,183,000 increase in unrestricted general fund balance. This is a very large magnitude, given that the median of unrestricted fund balance is $12,860,020.

Overall, there are differences in the statistically significant variables for the estimates of presence versus amounts of reserve funds. Some of the explanatory variables have coefficients that support my hypotheses. Other variables suggest that cities are being more reactive in spending rather than proactive in saving. For example, the unemployment rate has a negative correlation with the presence of formal reserve funds, the amount of formal reserve funds, and the amount of informal reserve funds. I had expected to see an increase in the reserve funds as the unemployment rate increases, since cities might see the need to increase expenditures in the future. However, the negative correlation for unemployment rate suggests that cities with a higher unemployment rate may already be using reserves or contributing less to reserve funds, resulting in lower reserve amounts.

Another variable with the opposite correlation than expected is the share of intergovernmental revenue. In both reserve presence regressions, the intergovernmental revenue decreases the odds of a city having a formal or an informal reserve fund. My hypothesis rested on the assumption that intergovernmental revenues are more unstable than other revenue sources; if the state or federal government was tight on revenue, the amount of intergovernmental transfer revenue going to the city might decrease, putting the city at risk of a budget imbalance. This phenomenon does not seem to be the case in these regression estimates. One reason for this

negative correlation may be that intergovernmental transfers are already designated for certain expenditures, so cities are unable to place any of that increase in total revenue into a reserve fund. For example, the CARES Act stipulated that the payments to states and some municipalities were only used for necessary expenditures. (U.S. Department of the Treasury, 2021). If intergovernmental revenues increase total revenue but do not increase the funds cities can use for reserves, the lower odds for a reserve fund makes sense.

There are explanatory variables that support my hypothesis. Pension obligations decrease the odds for the presence of an informal reserve fund and decrease the amount of formal reserve funds held. This aligns with what I expected to see, since pension obligations place additional expenditure burden on the city, so cities are less likely to set money away in an informal reserve fund or into a committed reserve fund that makes it difficult to spend the saved money. The share of revenue from sales tax also supports my original hypothesis for the same regression; as the share increases, the odds for an informal reserve increase and the amount of formal reserve funds.

To help address Wolkoff's (1987) thoughts on the tradeoff between current and future expenditures, I added a migration variable. Cities with higher rates of movers to non-movers may be inclined to view the tradeoff differently. Counter to my hypothesis, the moving rate has a positive correlation with the amount of formal and informal reserve amounts. Because the migration variable is measuring in-migration, this means that as more people move into a city, the city creates larger reserves. While tradeoff between current spending and future savings might still exist, the migration component is not evident in these regression estimates.

Finally, while total governmental revenue did not have an effect on the odds of a city having a formal or informal reserve, it does increase the amount of formal and informal reserve funds held. This supports my hypothesis; if a city has a higher revenue, they may be able to satisfy the expenditure needs more easily and have more leftover to place into a reserve fund.

Effect of Reserves on Expenditures

Finally, I explored the effects of reserves on expenditures. One of the main benefits of holding reserves is the ability to use it in the following year to increase expenditures without increasing revenues. Table 5 lists three panel regressions with expenditures (in thousands) as the dependent variable and reserves as the explanatory variable. Revenue is also included as a control variable in all three regressions. The third regression includes all the previous explanatory variables.

The first panel regression estimates the correlation between reserve fund amount and the following year's expenditures per capita. The formal reserve amount is statistically insignificant, even at the 0.1 level. This regression suggests that formal reserve funds may not have a counter cyclical effect. However, unrestricted general fund balance is statistically significant at any level. An increase of the unrestricted general fund balance by $1,000 is associated with a $330 increase in expenditures the following year, holding the other variables constant. This regression estimate supports the hypothesis that informal reserve fund balances have a positive correlation with expenditures. When cities have a higher level of "free cash" at the end of a fiscal year, the cities spend more in the next year.

Table 5. Panel regression. Cities in fiscal years 2017-2019, robust standard errors.

	Y = Expenditures (t+1)	Y = Expenditures (t)	Y = Expenditures (t+1)
Formal Reserve Amount (in thousands)	0.244	-0.771	0.148
	(0.255)	(0.780)	(0.233)
Informal Reserve Amount (in thousands)	0.330***	0.300**	1.141***
	(0.0490)	(0.0925)	(0.127)
Governmental Revenue	0.481***	0.491***	0.286***
	(0.0104)	(0.00930)	(0.0332)
Other Fiscal, SE, Institutional Variables	No	No	Yes
Constant	34406.0**	34927.3**	102135.7
	(11650.9)	(12369.4)	(68346.0)
N	216	305	201
Standard errors in parentheses			
* p<0.05 ** p<0.01 *** p<0.001			

Governmental revenue also has a positive correlation with governmental expenditure the next year. Reasonably, if a city collects more revenue in one year, they will have more to spend the following year. Interestingly, the coefficient is 0.481, implying that a $1 increase in revenue is associated with a $0.48 increase in expenditures the following year. There is a fiscal year difference between the changes of these variables, so we cannot directly calculate a city's marginal propensity to spend and save, but there seems to be some element of saving already in the study cities.

The additional specifications in the remaining columns of Table 5 support the findings in the first regression. The second regression estimates the relationship between fund amounts and total revenue with total expenditures in the same fiscal year. The third regression adds the fiscal, socioeconomic, and institutional variables to the first regression, where total expenditures in the next fiscal year is the dependent variable. The same sign and the statistically significance for the formal and informal reserve amounts holds the same through each variation of regression. In the third regression with additional control variables, the informal reserve fund coefficient increases, so that a $1,000 increase is associated with a $1,141 increase in expenditures the following year.

Policy Application

There are three main policy implications from the results of this study on the effectiveness of a mandated minimum reserve policy from the state for cities, the state of transparency in municipal reserve funds, and the need for further research on the budget balancing effectiveness of formal reserve funds.

One of the main questions for the policy application of this study is whether California state should mandate cities to establish a reserve fund policy. A state mandated policy would ensure that more cities hold a formal reserve fund and greater informal reserve funds, with the goal to help stabilize city finances. Currently, the state only requires school districts to save a minimum amount in a formal reserve fund, but not cities. The recommendation from the GFOA seems to be the leading resource for cities in developing a reserve fund policy. In fact, six of the cities mention a recommendation from the GFOA in their reserve policies, including Stockton, Vallejo, South San Francisco, Chowchilla, San Buenaventura, and Berkeley. There seems to be

some confusion on the exact recommendation from the GFOA - Vallejo and South San Francisco both quote the minimum as 15% instead of 16.67%, or two months of expenditures or revenues (See Appendix A). Regardless, there is evidence that cities are using the GFOA's resources when creating reserve fund policies.

In order to evaluate whether it would be beneficial for the state to create a minimum reserve fund policy, I should first establish that reserves are useful. As this study shows, an increase in the unrestricted general fund balance is correlated with an increase in expenditures. Assuming that the purpose of reserves is to boost municipality expenditures, informal reserves are useful.

The next step is to establish whether a state mandated policy would be useful. Many cities are already saving in both formal and informal reserve funds. As Table 2 listed, 97.2% of all cities have an informal fund amount greater than the GFOA recommended amount, 16% of expenditures. I also collected data on informal reserve policies, where a city has a minimum policy for their unrestricted general fund balance. I found an informal reserve policy for 34% of the cities where the data was collected. This percentage is greater than Lawrence's survey data from 2000, where 28% of respondents had an informal reserve policy. Since many cities are already holding surplus funds, it would not be a unique policy proposal to require cities to create a minimum goal for their informal reserve funds. It may be unnecessary for the state to require a certain amount of informal reserve funds.

An additional counterargument for a state law is the idea of home rule, or that local governments know best in terms of the risk and needs of each city. Each government should have the ability to decide its own allocation of resources. Cities may deal with variation in the

types of risk or want to create more specific types of reserve funds instead of leaving it as unrestricted general fund balance.

On the other hand, the expenditure regressions during the fiscal years 2017 to 2019 did not reveal a statistically significant correlation for formal reserve funds. Showing the effect of formal reserve funds on expenditures in this period could be more difficult because committed and restricted funds can only be used for a specific purpose and may require approval from the city council or other authority. During the fiscal years 2017 to 2019, it is likely that most cities did not have major shocks that might require a use of the formal reserve fund. In the subsequent years, when COVID-19 impacted all cities' spending and ability to collect revenue, cities may have been more likely to use reserve funds. In the future, it would be useful to study the effects of reserves on expenditures starting in 2020.

The lack of evidence that formal reserve funds are useful has implications for measuring fiscal condition and stress. Fiscal condition essentially measures the ability for a municipality to pay current and future expenditures, using fiscal measures like revenues per capita, capital expenditures, deficits, debt, and other fiscal factors.

An alternative recommendation arising from this paper is the need for better data transparency on reserves. Tracking the amount of formal reserve funds cities are holding would make future studies on effects of reserves at the city level easier. Also, one could argue that including formal reserves would provide a fuller picture of key financial indicators for the Auditor's Office. As mentioned previously, the California State Auditor's Office focuses on fiscal indicators only to evaluate cities' fiscal health and monitor for fraud or mismanagement. While informal reserve funds are included in the fiscal indicators, formal reserve funds are not.

The California State Controller does not require cities to report formal reserve funds in the annual Financial Transaction Reports either. However, if formal reserves are not making an impact on city expenditures, then the Auditor and Controller may be justified in not measuring this type of reserve fund.

While the data from 2017 to 2019 were not able to show that formal reserve funds help increase expenditures or counteract budget imbalances, there is some evidence from the past two years to suggest otherwise. As the COVID-19 pandemic placed downward pressure on revenues and increased expenditures for cities, I expected to see cities use some formal reserve funds in 2020 and 2021. For the sampled cities with a formal reserve fund, the average amount of formal reserves does drop in 2020, then the mean increases again in 2021, shown in Table 6. Unfortunately, t-tests do not show statistical significance for the difference in the means between 2019, 2020, and 2021, as listed in Table 7.

Table 6. Descriptive Statistics Comparing Formal Reserves (in thousands) for Fiscal Years 2017 to 2021.

Fiscal Year	Min	Q1	Median	Mean	Q3	Max	N
2017	0	6449.882	12395.23	23799.29	21367.8	273400	67
2018	30.042	6830	14124.64	28855.72	21565.86	339600	73
2019	0	5285.541	14435.46	27985.76	21625	365830	78
2020	-2367.469	4470.696	14632.59	22122.55	22611.9	229069	92
2021	-1704.437	4306.368	12797.7	26980.93	22226.55	509870	79

Table 7. T-Test for Difference in Means of Formal Reserves, by Fiscal Year.				
H_0 :	H_A :	Difference	t =	Pr =
Mean(2019) - Mean(2020) = 0	Mean(2019) > Mean(2020)	5,863,215	0.8135	0.2085
Mean(2019) - Mean(2021) = 0	Mean(2019) > Mean(2021)	1,004,834	0.1044	0.4585
Mean(2020) - Mean(2021) = 0	Mean(2020) ≠ Mean(2021)	-4,858,381	-0.6400	0.5230

Conclusion

Formal reserve funds seem to be an understudied fiscal tool for cities, based on the limited amount of literature. This study collected reserve fund data for California cities, partly to gauge how many cities have established restricted or committed funds (according to GFOA Statement 54 fund definitions) for budget balancing purposes. Of the 209 cities searched, a little under half had some type of formal reserve fund. Nearly all cities had an informal reserve fund greater than 16% of total expenditures. Cities do decide whether to create a reserve fund and how much to save based on financial factors, such as total governmental revenue, fraction of revenue from sales tax and intergovernmental revenue, pension obligations. City characteristics also varied with the amount of reserve funds a city holds, including the poverty level, the unemployment rate, total population, migration, and percentage of non-white ethnicities. Additionally, the factors that explain variation in formal reserve funds differed from informal reserve funds. Finally, this study demonstrated empirically that greater informal reserve funds were associated with an increase in the expenditures of a city.

As mentioned above, data availability constrained this study's ability to test the effects of formal reserves. Another element to consider is the possibility of measurement error when collecting the formal reserve data. In this study, a formal reserve fund is defined as a restricted or committed fund, with the primary purpose of helping to balance the city's budget when needed. It is possible that some reserve funds were improperly categorized because there is no standard language for reserve funds, besides the GFOA guidance on fund types from Statement 54. Some cities provide more language on the use and details of reserves compared to other cities. Further, by defining informal reserve funds as total unrestricted general fund balance, there may be some overlap between formal and informal funds. Although the California Auditor's office defines reserves as unrestricted fund balance, it may be more appropriate to only include assigned and unassigned fund balance in the informal reserve fund balance, given that committed funds are more difficult to reappropriate. In a policy brief about informal reserve funds and municipal bankruptcies, one author considers only the assigned and unassigned general fund balances as the informal reserve fund (Joffe, 2020). This definition of reserve funds is also used by the Florida State Auditor, while the Ohio state auditor only considers the unassigned fund balance. In future studies on city reserve funds, researchers may consider measuring formal and informal reserves differently.

Regardless, this study is a start to describing empirically the state of reserves for cities in California, and testing whether reserves are useful in paying for city expenditures. In the fiscal years before the pandemic, unrestricted fund balance was already correlated with increased expenditures. As revenues begin to increase after the COVID-19 shock, cities and their residents may want to reconsider the amount of reserves held by their city.

Appendix A. Examples of Reserve Policies that mention the GFOA Recommendation

Stockon - "Working Capital. Two months or 16.67% of operating expenditures and transfers-out of the unassigned fund balance shall remain unspent and shall serve the working capital "reserve" in order to accommodate normal fluctuations in the timing of revenues and unforeseen operational costs. The two (2) month or 16.67% level is the GFOA recommended minimum benchmark for working capital."

Vallejo - "The General Fund reflected a total ending fund balance of $28.3 million, down by $3.9 million or 12% from the previous fiscal year. Of the total fund balance, $18 million (64%) is unassigned. This balance represents 16% of Fiscal Year 2020-21 budgeted expenditures (including Measure B programs), which exceeds the City's goal and GFOA recommended reserve level at 15%."

South San Francisco - "The unassigned reserves are designated by the City Council based on the City's Reserves Policy, which follows best practices from the Government Finance Officers' Association (GFOA) of between 15-20 percent of General Fund operating revenue. Within the City's unassigned reserves, the City Council designated funds for economic contingencies, potential catastrophe and budget contingencies."

Chowchilla - "The Government Finance Officers Association (GFOA) recommends a minimum of two months (17%) of operating expenditures, excluding capital expenditures, to be the level of the Unrestricted Fund Balance, which includes the last three categories (Committed, Assigned & Unassigned) where the only constraint on spending, if any, is imposed by the government itself."

San Buenaventura - "General Fund Reserve a. In accordance with Governmental Finance Officers Association (GFOA) Best Practices on Budgeting the City shall strive to maintain a

minimum reserve fund of 17% of annual expenditures and will be classified as Committed Fund Balance. Committed Fund Balance is defined by GASB as amounts that can be used only for the specific purposes determined by a formal action of the City's highest level of decision-making authority (City Council approval). b. The reserve fund is intended to equate to approximately 60 days of operating and maintenance budget; however, the reserve may be increased upon Council action."

Berkeley - "the current General Fund Reserve level of 17.43% is consistent with GFOA's best practice recommended minimum General Fund level of 16.7%".

Appendix B. Table 8. Additional Panel Regressions for City Characteristics and Reserve Amounts.

Table 8. Panel 3-years vs. 1-year Regressions for City Characteristics and Reserve Amounts, Robust Standard Errors. (Expansion of Table 4).				
	Y = Formal Reserve Fund (in thousands)	Y = Informal Reserve Fund (in thousands)	Y = Formal Reserve Fund (in thousands) 2017 only.	Y = Informal Reserve Fund (in thousands) 2017 only.
Governmental Revenue ($ in thousands)	0.0134***	0.162**	0.00447	0.170***
	(0.00407)	(0.0565)	(0.00273)	(0.00621)
Sales Tax (% of Total Revenue)	703.0*	204.1	-41.56	479.0
	(311.9)	(120.0)	(459.0)	(284.8)
Charges for Service (% of Total Revenue)	-259.0	-183.3	-396.5	-551.5
	(195.8)	(184.0)	(404.7)	(406.8)
Property Tax (% of Total Revenue)	721.7	363.3	358.6	764.5*
	(570.2)	(207.2)	(514.9)	(350.8)
Intergovernmental Transfers (% of Total Revenue)	-397.6	-38.78	-362.2	-664.5
	(269.1)	(52.94)	(471.9)	(359.1)
Debt Obligations ($)	2.613	141.6	-11.80	198.8***
	(37.30)	(83.74)	(53.84)	(40.33)
Pension Obligations ($)	-113.2*	-6.685	-83.19	-90.03
	(47.51)	(44.28)	(62.59)	(70.80)
Total Population (in thousands)	33.21	-379.1*	58.24***	-391.7***
	(22.49)	(185.1)	(10.95)	(26.06)
Population that moved (% of Total Population)	904.2*	412.0*	823.9	1033.0*

	(397.9)	(189.0)	(718.0)	(452.9)
Population Under the Federal Poverty Line (% of Total Population)	-3623.0**	-2132.7	-2039.5	-2851.8
	(1320.7)	(1109.9)	(2370.2)	(1683.9)
Unemployment Rate (% of Labor Force)	-2383.7	-1798.6**	-2572.0	-1280.1
	(1411.0)	(666.7)	(2719.9)	(957.9)
Median Home Value ($ in thousands)	-4.349	6.501	-4.748	1.367
	(9.593)	(6.414)	(16.88)	(10.60)
Black Population %	90.44	577.9	-205.6	556.8
	(428.0)	(391.7)	(641.9)	(588.0)
Hispanic Population %	374.7**	318.5*	269.7	438.2*
	(143.6)	(148.3)	(224.3)	(169.6)
API Population %	356.4*	827.2***	482.7	951.1***
	(154.8)	(209.1)	(247.8)	(219.4)
Republican Voters (% of Registered Voters)	3.959	241.7	61.57	121.4
	(236.5)	(154.2)	(358.6)	(260.3)
Charter (1) vs General law (0)	7504.8*	24183.0**	3432.9	23671.7***
	(3692.3)	(8147.6)	(5455.8)	(6069.3)
Constant	-10681.8	-13106.8	6861.8	-21275.9
	(18088.9)	(11312.5)	(34586.4)	(23343.7)
N	201	1164	64	399
R-sq			0.882	0.799
adj. R-sq			0.839	0.790
Standard errors in parentheses				
* p<0.05 ** p<0.01 *** p<0.001				

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