Why is your City Hoarding Cash?
Determinants and Implications of Municipal Cash Holdings

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Abstract

My paper examines the determinants of municipal cash holdings, as well as some of the agency implications of holding high levels of cash. The first part of my paper empirically examines municipal managers' incentives to accumulate cash as part of normal operations. My results indicate that municipalities with a higher variation in revenues and more limited revenue sources accumulate more cash. Larger municipalities, and those with greater access to credit markets, are less likely to accumulate cash.

In further analysis, I examine whether high levels of cash are associated with agency problems, and find that those with high cash holdings spend more on investment overall, as well as on non-essential fixed assets, a form of perquisite consumption. While I find no evidence that municipalities with excess cash effectively distribute it to citizens by reducing taxes, I do find that those with cash shortages are associated with an increase in taxes. Overall, I conclude that governments with high cash levels appear to have agency problems relative to those with relatively lower cash holdings.

1. Introduction

Although the notion that governments could accumulate large cash holdings seems counter-intuitive, the State of Illinois recently documented that over one quarter of all Illinois towns (379) hold funds greater than two years' annual expenditures[1]. In other words, these towns could operate at normal spending levels for two years without collecting any additional revenue. In addition to illustrating the magnitude of the funds held, this anecdote is also compelling in light of past court rulings. The Illinois Supreme and Appellate courts have consistently held that accumulating funds of more than two years' average annual expenditures is "strong evidence of an unnecessary accumulation and is sufficient to sustain an objection to the fund's tax levy."[2]

This anecdotal evidence raises issues that have largely been unexplored in the literature, which I address in this paper. For example, how much cash do local governments typically hold, and are there legitimate reasons for accumulating cash? Is the accumulation of high cash levels associated with agency problems?

I begin by documenting, through descriptive statistics, the prevalence of municipal cash holdings. Using a large sample of local governments from 1997-2002, I find that the extent of cash accumulation is economically significant, with governments holding an average of six months' worth of operating expenditures in cash. In other words, the average local government could operate for six months without collecting any additional revenue. To put this in perspective, bond rating agencies recommend that governments maintain a balance of 5-10% of operating expenditures, or approximately one month, with 2.4 months cited as evidence of a strong financial position (Standard & Poors, 1999).

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[1] From "Local government line: fiscal responsibility and township government," Illinois Comptroller's Office, 2002. Note that I use the terms 'funds' and 'cash' interchangeably throughout this paper. A discussion of the implications of this choice occurs later in the paper.

[2] See Toynton v. Commonwealth Edison, 285 Ill. App. 3d 357; 674 N.E. 2d 809 (3rd Dist 1996).

Although these cash levels appear high, it is possible that managers have legitimate reasons for accumulating cash as part of normal operations, such as to shield against revenue volatility. In the first part of my paper, I examine the determinants of expected municipal cash holdings to better understand municipal managers' operating incentives to accumulate cash. As part of this analysis, I define "expected" cash holdings as the level of cash accumulated in the absence of agency problems, and find evidence consistent with managers holding cash for precautionary reasons. Specifically, I find that governments with a higher variation in revenues and fewer sources of revenues are more likely to accumulate cash. Larger governments, and those with greater access to the capital markets, are less likely to accumulate high cash holdings.

While managers have incentives to hold cash for precautionary reasons, it is also plausible that accumulating very high cash levels could exacerbate agency problems between managers and citizens. High levels of cash can free managers from the discipline of requesting voter approval for large projects, for example. In the second part of the paper, I investigate whether excess cash holdings imply future agency problems. Specifically, I examine three predictions based on Jensen's (1986) free cash flow theory, previously studied in the corporate sector context. Jensen (1986) predicts that holding excess cash leads to agency problems, in that managers will spend it on investment and perquisite consumption, and will not return it to shareholders. Applying his predictions to the municipal sector, I test whether municipal managers with high cash reserves (a) increase overall investment levels, (b) increase investment in non-essential fixed assets, a form of perquisite consumption, and (c) effectively distribute excess cash to citizens by reducing taxes.[3]

[3] I follow Figlio and O'Sullivan (2001) and define essential services as police and fire, and the remainder as non-essential. I discuss this, along with corroborating measures, in more detail later in the paper.

In order to test how managers use cash reserves, I first define "excess" cash holdings as the residuals from the empirical model of expected cash holdings, following prior literature such as Core et al. (2005), who examine cash holdings in nonprofit entities. In contrast to Core et al. (2005), who find no relation between excess cash and investment, I find that governments with high cash holdings spend more on fixed assets overall. I also find evidence that managers spend more on non-essential fixed assets, consistent with perquisite consumption. Finally, I find no evidence that municipalities distribute excess cash to citizens by reducing future taxes. However, I do find that those with cash shortages increase taxes. I conclude that governments with high cash levels appear to have agency problems relative to those with lower cash reserves.

My study extends the literature by documenting the determinants of expected cash holdings by local governments, as well as by exploring whether high cash holdings imply agency problems. Further, my findings complement those of Core et al. (2005), who find that nonprofit managers spend excess cash on increased compensation, by documenting that non-corporate managers also spend excess cash on non-essential fixed assets, another form of perquisite consumption. In so doing, I exploit the use of Census data, which provides a detailed breakdown of investment purchases, enabling a classification between essential and non-essential fixed assets. In contrast, data used in the nonprofit and corporate literature only provides the total fixed asset purchases.

The results of my study have implications for both regulators and citizens. While state regulators often monitor financial shortfalls caused by fiscal distress, fewer appear to monitor the accumulation of excess funds. Citizens are similarly unlikely to monitor excess cash holdings. Most citizens have difficulty assessing municipal finances due to the complexity of government financial reports, as discussed by Zimmerman (1977), reducing their effectiveness as monitors.

The evidence presented here suggests that in addition to setting minimum cash reserve balances to avoid fiscal distress, municipalities should also consider setting maximum balances to avoid potential agency problems.

The remainder of this paper is organized as follows. Section 2 examines the determinants of expected cash holdings, absent agency concerns. Section 3 explores the agency implications of excess cash holdings, while Section 4 concludes.

2. Determinants of expected cash holdings

2.1 Theory

Jensen (1986) discusses the agency problems caused by corporations holding excess cash. Excess cash, or free cash flow, is generally defined as cash flow in excess of that needed to finance all positive net present value projects. By definition, excess cash flow should be distributed to shareholders, since corporations cannot profitably invest it. However, managers have incentives to retain excess cash, either to reduce firm risk, or to increase their discretion - that is, to invest in value-decreasing mergers, and/or consume perquisites. Thus, corporate managers may accumulate cash in excess of that required to maximize shareholder wealth, and generally prefer to retain excess cash.

Prior research in the nonprofit sector finds evidence consistent with each of these incentives. Fisman and Hubbard (2002) find that nonprofit managers accumulate cash as precautionary savings against future revenue shocks, in order to smooth the provision of services, consistent with risk-reduction incentives. Core et al. (2005) find that nonprofit managers with excess cash are paid higher salaries, consistent with excess cash leading to perquisite consumption.

In theory, the extent to which municipalities have incentives to accumulate excess cash is not obvious, however. In one respect, municipal managers face pressure to spend cash from a variety of constituents which may not allow an accumulation of cash to occur. In other words, politicians have incentives to spend cash for political reasons, which may lead to little, if any, cash accumulation.

On the other hand, similar to the theory advanced by Fisman and Hubbard (2002) for nonprofits, municipal managers are likely to hold cash as a form of precautionary savings against adverse revenue shocks. Although municipal revenues may be volatile, citizens require that the level of services (such as police and fire) remain constant, thus encouraging the accumulation of cash. At the same time, municipal managers are also likely to maintain cash reserves to increase their discretion. If managers wish to construct new municipal offices, for example, then it is easier to do so using internal funds, rather than going to the voters for approval to issue bonds or raise taxes for the project. However, citizens are likely to prefer to subject municipal managers to outside monitoring. For example, the *Wall Street Journal* recently opined that without such monitoring, government managers do not have strong incentives to reduce excessive spending, or to increase the efficiency of operations. Thus, municipal managers and citizens are likely to view the costs and benefits of holding liquid assets differently, with citizens preferring lower cash balances, *ceteris paribus*.

I begin my analysis by examining the factors associated with managers' incentives to maintain efficient cash balances as part of normal operations, as follows[4]:

[4] Note that the concept of efficiency is from the taxpayers' viewpoint. Thus, I do not include variables which may in fact be associated with cash holdings, however, are not efficient. While managers have incentives to accumulate cash to increase their discretion (that is, because agency problems exist), following Core et al. (2005), I first explore managers' incentives to accumulate cash as part of normal operations in section 2. In section 3, I separately examine the agency implications of high cash holdings.

Uncertainty of cash flows. Fisman and Hubbard (2002) model nonprofit endowment (that is, cash holdings) as a function of precautionary savings, showing a positive relation between the volatility of donation revenue and cash holdings. Similarly, when municipalities have revenue sources that are volatile, managers are likely to increase cash holdings in order to maintain a constant level of services. I therefore expect the volatility of revenue to be positively associated with cash reserves. Similar to Fisman and Hubbard (2002) and Core et al. (2005), I use the coefficient of variation of revenue to capture the uncertainty of revenue.

Limited access to credit markets. One way of reducing the amount of precautionary cash holdings is by borrowing from credit markets. That is, municipalities with relatively more access to credit markets are less likely to hold cash. Core et al. (2005) and Fisman and Hubbard (2002) find that nonprofits maintain higher cash levels when firms have more limited financing sources. I therefore expect a negative relation between credit market access and cash holdings. Following Opler et al. (1999), I include total debt per capita to represent access to credit markets[5].

Limited revenue sources. When municipalities have access to a variety of revenue sources, then it allows them to raise funds relatively more quickly, and renders them less susceptible to adverse revenue shocks. Conversely, when revenues are concentrated in fewer sources, such as a high reliance upon property taxes, then the municipality is more likely to maintain relatively higher cash reserves. I therefore expect a positive relation between limited revenue sources and cash holdings. I measure limited revenue sources by using a dummy

[5] Core et al. (2005) and Fisman and Hubbard (2002) measure nonprofits' access to credit markets as a dummy variable equal to one if debt is issued in any of the prior ten years. Note that while nonprofit debt issuance is a relatively rare occurrence, municipalities make much greater use of the credit markets. I therefore measure this variable following Opler et al (1999) by using a measure of total debt outstanding. The use of total debt outstanding is further appealing because it includes debt accessed from both public bond markets as well as private markets (i.e., banks and lines of credit).

variable equal to one if a municipality derives more than 50% of its revenue from either property taxes, sales taxes, or income taxes, and zero otherwise.

Size. Larger organizations have economies of scale in liquid assets, such that large firms can hold relatively less cash, as discussed by Opler et al. (1999). Consistent with this hypothesis, Opler et al. (1999) and Core et al. (2005) find size inversely related to cash reserves. Following prior municipal literature, I control for municipal size by using the log of population.

2.2 Research design

I use the following OLS model to measure the determinants of expected municipal cash holdings, following literature such as Core et al. (2005), Fisman and Hubbard (2002), and Opler et al. (1999):

$$CASH/EXPENDITURES_{it} = \alpha_0 + \alpha_1 CV\_REVENUE_{it} + \alpha_2 DEBT\_CAPITA_{it-1} + \alpha_3 LIMITED\_REVENUE + \alpha_4 SIZE_{it} + S\alpha_j TYPE_j + S\alpha_k QUARTER_k + S\alpha_m STATE_m + S\alpha_t YEAR_t \quad (1)$$

CASH/EXPENDITURES is the ratio of cash and cash equivalents to monthly operating expenditures[6]; CV_REVENUE is the coefficient of variation of revenue, defined as the ratio of the standard deviation of revenue to mean revenue, measured over the previous four years; DEBT_CAPITA is total debt/total population; LIMITED_REVENUE is a dummy variable equal to one if either property taxes, sales taxes, or income taxes are greater than 50% of total revenue, and zero otherwise; SIZE is the log of total population; TYPE is a series of dummy variables which represent the type of local government (i.e., counties, cities, townships, and school

[6] An alternative measure of available funds encompasses measuring fund balance (or fund equity). However, Fisman and Hubbard (2002) find results that are virtually identical when fund equity (i.e., total assets less total liabilities) is used. One may also argue that only unrestricted funds should be included in this test, since not all funds are allowed to be expended. Note that a similar argument may be made with respect to the corporate literature on excess cash holdings. However, Core et al. (2005) find stronger results (that is, coefficients of larger magnitude) when the sample is constrained to unrestricted funds. In order to partially address this concern, I exclude cash holdings that are restricted to service future debt (Census account W01-sinking funds), which is likely to be the largest source of restricted fund equity. Finally, data constraints prohibit further analysis because the fund equity amounts are not available from the Census database.

districts); QUARTER is a series of dummy variables indicating the quarter of the fiscal year end; STATE is a dummy variable indicating the state; and YEAR is a dummy variable indicating the year.

Cash is defined as total cash and cash equivalents, or Census items W31+W61[7]. Note that a detailed description for all Census data items used in my tests is presented in Table I. I use two alternate deflators. The first is monthly operating expenditures. The second (not reported) is total expenditures per month, which includes interest expense, as well as transfers to other governments outside of the municipality. While the use of monthly expenditures as a deflator is appealing due to its economic interpretation,[8] I recognize that the use of expenditures can be confounded by offsetting agency effects, as discussed by Core et al. (2005). I therefore include the log of population as an alternate deflator (not reported), and find my results robust to its inclusion.

Following both the corporate and nonprofit sector literature, I measure cash at the end of each fiscal year. However, if governments tend to collect large amounts of cash at the end of the fiscal year, then it would appear that they have 'excess' cash, when in fact, they have a timing issue. For example, if property taxes are collected close to year-end, and governments are highly reliant on these revenues, then they may have a high level of cash at year-end. I control for this possibility by including a dummy variable to indicate the government's quarter of fiscal year-

[7] Note that I exclude cash from sinking funds. I also do not include cash reserves within pension plans, as I assume they are not available to spend. However, anecdotal evidence indicates that local governments may be able to expend such funds. For example, see www.cafrman.com for a detailed explanation about the availability of pension fund cash. It is therefore possible that I understate the extent of cash holdings.

[8] Anecdotal evidence indicates that a common rule of thumb in practice is to evaluate cash holdings in terms of the number of months' expenditures that they represent. Thus, deflating cash by monthly operating expenditures shows the number of months the government can operate without collecting revenue.

end. In addition, many governments collect property taxes over a period of time, thus negating this concern[9].

Other state-specific effects could also affect the expected level of cash holdings. For example, local governments in states with closer monitoring over municipal finances in general may carry lower cash balances. I therefore include a series of indicator variables to represent the local governments' state. Finally, I incorporate yearly fixed effects.

2.3 Sample selection and descriptive statistics

I gather data for 1997-2002 from the Census Bureau's Annual Survey of Governments, for all cities, towns, counties, and school districts in the database. The Census contains detailed data for all "income statement" accounts, which includes revenues, expenditures, and transfers, as well as limited data for "balance sheet" accounts such as cash and debt. I eliminate municipalities for which there are not five years' consecutive data, the minimum number of observations necessary to estimate my regression models. I further eliminate outliers and data with apparent errors (e.g., negative debt). My sample selection procedures, outlined in Table II, yield 41,325 observations, comprising 2,718 observations for counties, 3,052 for cities and townships, and 35,555 for school districts.

Descriptive statistics are presented in Table III. Panel A shows the mean and median of cash flows deflated by monthly operating expenditures, by type of government, as well as by year, for the whole population of governments. Overall, cities and towns carry the highest cash balances, with a median of 9.8 months' operating expenditures for the total sample. Counties carry a median of 5.4 months' operating expenditures, and school districts 3.6 months.

[9] The measure of limited revenue sources is also likely to control for this effect. However, I also substitute the ratio of property taxes/total revenues as an additional control (not tabulated), and find results consistent with those presented.

Panel B presents descriptive statistics for select variables used in my tests. Overall, 18% of municipalities derive over 50% of their total revenue from a single source - that is, property taxes, sales taxes, or income taxes. During the sample time frame, municipalities increased taxes on average, with an average increase of 7% for property taxes, and 16% for total taxes.

2.4 Empirical results

I estimate OLS regressions to determine expected cash holdings, and present the results in Table IV. In each regression, the dependent variable is the ratio of cash/monthly operating expenditures. Because Core et al. (2005) find some differences in cash holdings across types of nonprofit entities, I also present the results after separately estimating the regressions for each type of government - that is, cities/towns, counties, and schools. Fiscal year-end, state, and year dummies are included in the regressions, but are not tabulated. All regression specifications report White's t-statistics.

The results show that municipalities with more volatile cash flows and more limited revenue sources have higher cash holdings, while larger municipalities, and those with greater access to credit markets, have less cash. With the exception of debt per capita, which is not significant for cities and counties, all of the model's explanatory variables are significant, and in the predicted direction. The explanatory power of the full model presented in Column (1) is 30%, which is similar to that reported in Core et al. (2005) of approximately 24%. Further, the models are relatively similar across types of government. Overall, my results are consistent with the theory that municipal managers hold cash for precautionary reasons.

3. Agency implications of excess cash holdings

3.1 Excess cash and overall investment

While section 2 explores the determinants of expected cash holdings, I now turn to an examination of managers' subsequent use of excess cash, which is defined as holdings above levels expected for normal operating reasons. In theory, firm investment should not be related to the amount of internal cash flows. Managers fund positive NPV projects, and if cash is needed to finance a project, then funds are raised from the external capital markets.

While theory predicts no relation, empirical results about the relation between excess cash and investment, and more generally, about whether excess cash holdings lead to agency problems, have been somewhat mixed. Harford (1999) finds that managers use excess cash to engage in value-decreasing acquisitions, consistent with high cash holdings leading to agency issues. Richardson (2005) finds a positive relation between excess cash and investment for a large sample of firms, and interprets it as consistent with agency problems. On the other hand, Mikkelson and Partch (2003) find that persistent large cash holdings do not lead to poor operating performance and do not indicate an agency problem. Opler et al. (1999) find an overall positive relation between excess cash and investment, however, their results are driven by those with negative excess cash - in other words, those with negative excess cash reduced investment more than those with positive excess cash increased investment. However, in the non-profit setting, Core et al. (2005) find no association between excess cash holdings and investment, which suggests some caution in extrapolating results from the corporate sector to the municipal setting.

I empirically examine the relation between excess cash and investment in fixed assets using the following OLS model, based upon Core et al. (2005) and Opler et al. (1999):

$$INVESTMENT_{it} = \alpha_0 + \alpha_1 EXCESS\_CASH_{it-1} + \alpha_2 REVENUE\_GROWTH_{it} + \alpha_3 NEW\_DEBT_{it} + \alpha_4 SIZE_{it} + S\alpha_j TYPE_j + S\alpha_k STATE_k + S\alpha_t YEAR_t \quad (2)$$

where INVESTMENT is defined as total expenditures on capital outlay, which includes buildings, construction, and equipment, deflated by total operating expenditures; REVENUE_GROWTH is the natural log of revenue in year t, minus the natural log of revenue in year t-1; NEW_DEBT is defined as the log of new debt issued in year t; and the remaining variables are as defined previously.

I use two measures of investment. The first is based upon Opler et al. (1999), and is defined as the total investment in year t, deflated by total operating expenditures. I also include the change in investment as a robustness check, following Core et al. (2005), with the results unchanged (unreported). This measure is defined as the total investment in year t, minus the total investment in year t-1, deflated by total operating expenditures.

I include two measures of excess cash, following Core et al. (2005). The first uses a continuous variable to measure excess cash, using the residuals from the model of the determinants of expected cash presented in Table IV. The second measure uses a dummy variable to represent municipalities in the highest quartile of residuals, as well as those in the lowest quartile. I use annual cross-sectional estimation to permit the model coefficients to change each year, thus allowing the determinants of cash holdings to vary over time, following Faleye (2004).

Opler et al. (1999) find that revenue growth is positively associated with the level of investment. Firms with financing constraints are less likely to invest in capital assets, and prior research such as Richardson (2005) documents a negative relation between leverage and investment. I include the log of new debt issued in the current year to measure access to capital markets. Core et al. (2005) and Opler et al. (1999) find that smaller municipalities are more likely to invest in fixed assets, so I use the log of population as a size control.

Table V presents the results[10]. Model (1) shows that there is a positive and significant relation between excess cash and investment levels, when excess cash is measured using a continuous measure. Model (2) shows that the significant positive relation between excess cash and investment is robust to using a dummy variable for the highest quartile of excess cash. In terms of economic significance, the results show that municipalities in the highest excess cash quartile invest approximately 14% more than those in the bottom three quartiles. I also find that the relation between excess cash and investment is significantly lower for municipalities in the lowest quartile of excess cash holdings. Those in the bottom quartile invest 4% less in fixed assets.

With respect to the remaining variables, I find that investment is negatively associated with municipal size in model (1), and insignificant in model (2). Municipalities experiencing a recent growth in revenues, which also roughly proxies for growth, invest more in fixed assets. Municipalities who have access to debt markets are more likely to purchase fixed assets, inconsistent with managers' being constrained by access to capital markets. In addition, counties and schools are significantly less likely to invest in fixed assets than are cities and towns. Overall, the investment model regression adjusted r-squares are comparable to those in both the corporate and nonprofit literature.

3.2 Excess cash and non-essential investment

Although prior literature has had mixed results with respect to overall investment levels, studies that examine the relation between excess cash and merger activity have had relatively clear results: managers with excess cash are more likely to engage in value-decreasing mergers

[10] Note that the sample size in Table V is smaller than that of Table IV because excess cash is measured in the prior year, thus eliminating approximately 1/3 of the observations.

(Harford, 1999). While there is no exact equivalent to value-decreasing mergers in the municipal setting, one analogy is that of non-essential investment in fixed assets.

While some investment is likely to be met with voter approval because it reflects services which they consider essential, such as the construction of a new water plant facility, other investment may not be viewed as favorably. For example, municipal managers may use excess cash to purchase fixed assets as a means of perquisite consumption, such as new municipal offices or large motor pools. As an example of the latter, the State of Indiana maintains a motor pool which contains a vehicle for every three state employees, which the media argues is excessive (Wall Street Journal, January 31, 2005). Similarly, it is also plausible that government managers use excess cash to fund projects that are unpopular with citizens. For instance, the City of Eugene, Oregon, recently proposed using internal funds to construct new municipal office buildings when voters twice refused to approve the issuance of new bonds to finance the project. Therefore, rather than increasing overall spending on capital assets, managers may use excess cash to increase investment in non-essential capital assets.

I next examine the relation between excess cash and investment in non-essential fixed assets. While defining non-essential fixed assets is problematic, I use three alternate measures. The first follows Figlio and O'Sullivan (2001), and defines police and fire services as essential, with the remaining services as non-essential. The second (not reported) expands the Figlio and O'Sullivan (2001) measure to also include water and sewer services as essential. The third measure defines non-essential services as general, miscellaneous fixed asset investments that are not assigned to a specific program. Because school districts do not separately classify fixed assets, but rather, only include the total investment, I exclude them from these tests[11].

[11] Note that I retain counties because they often provide fire, police, water and sewer services. The results are essentially unchanged if I exclude them, however.

The results are presented in Table VI. I find that the level of investment in non-essential fixed assets is positively associated with excess cash for all measures of non-essential investment. In terms of economic significance, I find that municipalities with excess cash spend approximately 4% more on non-essential investment when essential services are defined as police and fire (model 2), and approximately 2% more when non-essential investment is defined as miscellaneous fixed asset purchases (model 4). With respect to my control variables, I find that revenue growth and new debt are positively associated with investment in non-essential fixed assets. Size is insignificant in all regressions.

The preceding results suggest that excess cash plays an important role in fixed asset investment. However, it is possible that my results depend upon the measure of excess cash holdings. I therefore use an alternate measure of excess cash (untabulated), using the ratio of cash/operating expenditures directly, following Faleye (2004). The results for this alternate measure show that excess cash is positively related to investment.

3.3 Distributing excess cash to citizens

For corporations, one means of resolving agency concerns caused by holding excess cash is to return it to shareholders in the form of a dividend. Payouts to shareholders reduce the resources under managers' control, thus reducing the potential agency problems associated with excess cash.

Nonprofit entities are subject to a non-distribution constraint, however, which means that they are prohibited from distributing profits to anyone exercising control over the firm, as described by Core et al. (2005). In contrast, municipalities are not restricted from returning excess cash to citizens, and could effectively do so by reducing taxes or paying rebates[12].

[12] It is possible that some municipalities do not have complete control over the level of property tax rates, which could be set (or limited) through state law. I control for this in the empirical tests that follow by including a series of

I test the relation between excess cash and taxes by using the following OLS regression model:

$$TAXES_{it} = \alpha_0 + \alpha_1 EXCESS\_CASH_{it-1} + \alpha_2 TAX\_LIMIT + \alpha_3 SIZE_{it} + S\alpha_j TYPE_j + S\alpha_k STATE_k + S\alpha_t YEAR_t \quad (3)$$

where TAXES is defined alternately using the change in property taxes from year t-1 to t, and the change in total taxes from year t-1 to t, with each deflated by beginning population; and TAX_LIMIT is a dummy variable equal to 1 if the government resides in a state imposing effective property tax limits, and 0 otherwise, following Poterba and Rueben (1995)[13]. The remaining variables are as defined previously.

Table VII presents the results. I find no association between excess cash and the change in property taxes (model 1), and a negative association between excess cash and the change in total taxes (model 3), when excess cash is measured using the continuous measure of residuals. However, the results appear to be primarily driven by municipalities with low cash holdings, as demonstrated in models 2 and 4. When dummy variables are used to represent the highest and lowest quartiles of excess cash, I find that the dummy variable for high excess cash is insignificant. On the other hand, the dummy variable for low excess cash is positive and significant. My results suggest that while managers with high cash holdings do not reduce taxes, managers with low cash reserves increase taxes.

To provide assurance that my results are not due to model misspecification, I also estimate a logit model, where the dependent variable is defined as 1 if taxes are reduced, and

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state dummy variables, as well as a control for those governments with property tax limitation measures in place. Further, while some local governments have maximum levels set by state law, it is relatively rare for states to set minimum levels. Thus, municipal governments are likely able to reduce taxes.

[13] Ideally, the dependent variable would be a measure of tax rates rather than tax revenue changes, since it is possible that taxes decrease simply due to economic conditions, rather than municipal managers reducing taxes. However, the data for individual municipal tax rates are not available through the Census database. Another concern with my measures is that it is possible that very few municipal governments experience a reduction in taxes. Descriptive statistics reveal that 23% of local governments experienced a decrease in property taxes, and 22% a decrease in total taxes, however, thus negating this concern.

zero otherwise (not tabulated). The results are consistent with those presented, in that municipalities with high cash holdings do not decrease taxes, while those with low cash holdings increase taxes. Overall, my results are consistent with the premise that municipal managers prefer to maintain the flexibility afforded by excess cash.

4. Conclusion

Local governments comprise a significant and growing sector of the economy, holding approximately $1.2 trillion in cash in 2002. As such, the lack of research examining the implications of municipal cash holdings is surprising. My paper examines the determinants of local government cash holdings from 1997-2002, as well as some of the agency implications of holding high cash levels. My study is motivated in part by the growing academic literature about excess cash in both corporate and nonprofit entities. In contrast, the determinants of municipal cash holdings have not been empirically examined, nor are the implications of holding excess cash in a municipal setting well-understood.

Absent agency concerns, I find evidence consistent with managers accumulating cash for precautionary reasons. Namely, I find that municipalities with a higher variation in revenues, and those with more limited revenue sources hold higher levels of cash. Larger municipalities, and those with higher access to the capital markets, tend to hold less cash.

My analysis also provides evidence that municipalities with very high cash levels, or "excess" cash, spend significantly more on capital assets overall. Further, I find that those with excess cash spend more on non-essential fixed assets, a form of perquisite consumption. While I find no evidence that municipalities with excess cash effectively return it to citizens by reducing taxes, I do find that those with cash shortages tend to increase taxes. Overall, my evidence is

consistent with the view that holding high cash levels is associated with agency problems between municipal managers and citizens.

My paper has limitations, however. For example, my paper does not distinguish between prudent financial management (i.e., "saving up" for capital projects), versus excessive spending without voter approval. Future research may address this issue by comparing spending patterns for municipalities with permanent versus transitory cash holdings.

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Table I
Variable descriptions and Census data definitions

Variable name	Variable description	Census data definitions
Cash/operating expenditures	Ratio of year-end cash to monthly operating expenditures	Account (W31+W61)/(E/12)
Excess cash	Residuals from OLS model of cash determinants (in Table III)	n/a
High excess cash	1 if cash residuals are in the highest quartile in year t-1; else 0.	n/a
Low excess cash	1 if cash residuals are in the lowest quartile in year t-1; else 0.	n/a
Change in property taxes	(Property taxes in year t - property taxes in year t-1)/population in year t	$(T01_t - T01_{t-1})/population_t$
Change in total taxes	(Total taxes in year t - total taxes in year t-1)/population in year t	$(T_t - T_{t-1})/population_t$
County	1 if the government is a county; else 0.	1 if account type=1; else 0.
CV revenue	Coefficient of variation in revenue	n/a
Debt per capita	Ratio of total debt outstanding to total population	Account type 1/$population_t$
Investment	Ratio of fixed asset expenditures to operating expenditures	Accounts (F+G+K)/E
Limited revenue	1 if at least 50% of revenue is from property taxes, sales taxes, or income taxes, else 0.	1 if T01, T09, or T40 >= 50%, else 0.
New debt	Log of total new debt issued in year t.	Log (account type 3)
Non-essential investment	Ratio of ((total capital outlay)-(capital outlay for police and fire services))/operating expenditures	(F21+F31+F89+G21+G31+G89+K21+K31+K89)/E
Revenue growth	Log of total revenue in year t, minus the log of total revenue in year t-1	Log $(A+B+C+D+T+U)_t$ - log $(A+B+C+D+T+U)_{t-1}$
School	1 if the government is a school district; else 0.	1 if account type=5; else 0.
Size	Log of total population	n/a

Table II
Sample Selection

	# observations
Total local governments in Census database	163,621
Less municipalities with less than five years of data	-119,759
	43,862
Less outliers	-2,537
Final sample	41,325

Table III
Descriptive statistics

Panel A. Ratio of cash/monthly operating expenditures by year and government type. Mean (median).

Year	*Total population (n=163,621)*	*Counties (n=11,939)*	*Cities/ Towns (n=75,128)*	*School districts (n=76,554)*
1997	12.22	6.38	15.80	4.70
	(6.32)	(5.16)	(8.76)	(3.27)
1998	7.00	6.73	13.01	5.06
	(4.33)	(5.24)	(8.30)	(3.53)
1999	7.50	6.91	14.22	5.33
	(4.57)	(5.41)	(8.98)	(3.68)
2000	7.45	7.11	13.21	5.28
	(4.70)	(5.51)	(9.16)	(3.69)
2001	6.43	7.28	12.76	5.42
	(4.21)	(5.83)	(9.42)	(3.71)
2002	14.33	7.10	19.10	5.34
	(7.86)	(5.53)	(11.62)	(3.71)
Total	10.52	6.87	16.54	5.19
	(5.62)	(5.40)	(9.76)	(3.60)

Panel B. Descriptive statistics for select test variables (n=41,325).

Variable	*Mean*	*Median*	*Standard deviation*	*25th percentile*	*75th percentile*
Cash/operating expenditures	9.08	5.44	28.32	2.76	10.82
CV revenue	0.09	0.08	0.07	0.05	0.11
Debt per capita	2337.35	396.02	9157.00	13.08	1642.00
Limited revenue	0.18	0.00	0.38	0.00	0.00
Size	7.44	7.31	1.94	6.20	8.57
Investment/op. expenditures	0.20	0.09	0.58	0.03	0.20
Change in property taxes	0.07	0.02	1.11	-0.00	0.12
Change in total taxes	0.16	0.04	29.33	0.00	0.13

Table IV
Determinants of local government cash holdings

Variable	*Full model (n=41,325)*	*Cities/towns (n=3,052)*	*Counties (n=2,718)*	*School districts (n=35,555)*
Intercept	12.11	16.39	6.76	5.55
	(15.46)***	(10.35)***	(2.87)***	(15.58)***
CV revenue$_{t-t-4}$	11.65	11.61	5.37	11.76
	(43.42)***	(9.29)***	(5.95)***	(41.25)***
Debt per capita$_t$	-0.27	0.45	-0.28	-0.31
	(-5.67)***	(0.82)	(-1.30)	(-6.27)***
Limited revenue	2.48	5.26	5.16	2.17
	(22.39)***	(7.82)***	(9.57)***	(18.42)***
Size$_t$	-0.40	-0.51	-0.22	-0.44
	(-25.45)***	(-5.54)***	(-3.23)***	(-26.16)***
County	-3.41			
	(-34.30)***			
School	-6.66			
	(-67.90)***			
Quarter dummies	Included[2]	Included[2]	Included[2]	Included[2]
Year dummies	Included[2]	Included[2]	Included[2]	Included[2]
State dummies	Included[2]	Included[2]	Included[2]	Included[2]
Adjusted R^2	0.30	0.35	0.33	0.25

*, **, *** indicate significance at p <.10, .05, and 01; based on two-tailed tests.

[1]White's t-statistics are reported in parentheses.
[2]For brevity, the quarter-specific, year-specific, and state-specific intercept terms are not reported.

This table presents estimates for an OLS regression model, where the dependent variable is the ratio of total cash and cash equivalents to monthly operating expenditures. Variable descriptions are as follows: *CV revenue* is the coefficient of variation of total revenue, measured as the ratio of the standard deviation of total revenue/mean total revenue, over the prior four years ending at year t; *Debt per capita* is total debt outstanding/total population; *Limited revenue* is a dummy variable equal to 1 if either property taxes, sales taxes, or income taxes are greater than 50% of total revenue, and 0 otherwise; *Size* is the log of population; *County* is a dummy variable equal to 1 if the local government is a county, and 0 otherwise; and *School* is a dummy variable equal to 1 if the local government is a school district, and 0 otherwise.

Table V
The relation between excess cash and investment in fixed assets

Variable	*Model 1 (n=25,921)*	*Model 2 (n=25,921)*
Intercept	0.31	0.23
	(13.00)***	(9.42)***
Excess $cash_{t-1}$	0.02	
	(65.73)***	
High excess $cash_{t-1}$		0.14
		(44.27)***
Low excess $cash_{t-1}$		-0.04
		(-11.10)***
Revenue growth	0.19	0.20
	(17.88)***	(18.57)***
New debt	0.01	0.01
	(19.59)***	(19.01)***
Size	-0.00	-0.00
	(-3.88)***	(-1.44)
County	-0.11	-0.11
	(-14.26)***	(-13.51)***
School	-0.08	-0.06
	(-12.44)***	(-8.79)***
Year dummies	Included[2]	Included[2]
State dummies	Included[2]	Included[2]
Adjusted R^2	0.21	0.16

*, **, *** indicate significance at p <.10, .05, and 01; based on two-tailed tests.

[1]White's t-statistics are reported in parentheses.
[2]For brevity, the year-specific and state-specific intercept terms are not reported.

This table presents estimates for an OLS regression model, where the dependent variable is the ratio of total capital outlay/total operating expenditures. Capital outlay is measured as expenditures on property, plant and equipment, land, and construction in progress. Variable descriptions are as follows: *Excess cash* is the residuals from an OLS regression of the model shown in Table IV, and is calculated separately for each year; *High excess cash* is a dummy variable equal to 1 if the Excess cash residuals are in the upper quartile for each year, and *Low excess cash* is a dummy variable equal to 1 if the residuals are in the lower quartile for each year; *Revenue growth* is the log of total revenues in year t minus the log of total revenues in year t-1; *New debt* is the log of new debt issued in the current year; *Size* is the log of population; *County* is a dummy variable equal to 1 if the local government is a county, and 0 otherwise; and *School* is a dummy variable equal to 1 if the local government is a school district, and 0 otherwise.

Table VI
The relation between excess cash and investment in non-essential fixed assets

	Dependent variable: total capital outlay less capital outlay for police and fire/operating expenditures		*Dependent variable: total miscellaneous capital outlay/operating expenditures*	
Variable	*Model 1 (n=2,750)*	*Model 2 (n=2,750)*	*Model 3 (n=2,750)*	*Model 4 (n=2,750)*
Intercept	0.35	0.34	0.04	0.04
	(8.21)***	(7.83)***	(1.94)**	(1.87)*
Excess $cash_{t-1}$	0.01		0.00	
	(12.63)***		(6.17)***	
High excess $cash_{t-1}$		0.04		0.02
		(5.79)***		(2.43)**
Low excess $cash_{t-1}$		-0.04		-0.01
		(-5.93)***		(-3.62)***
Revenue growth	0.05	0.06	0.04	0.04
	(2.11)**	(2.23)**	(2.86)***	(2.91)***
New debt	0.00	0.00	0.00	0.00
	(7.72)***	(7.59)***	(5.03)***	(4.97)***
Size	-0.00	-0.00	-0.00	0.00
	(-1.22)	(-0.91)	(-0.08)	(0.03)
County	-0.11	-0.11	-0.02	-0.02
	(-15.82)***	(-15.67)***	(-6.67)***	(-6.70)***
Year dummies	Included[2]	Included[2]	Included[2]	Included[2]
State dummies	Included[2]	Included[2]	Included[2]	Included[2]
Adjusted R^2	0.25	0.24	0.10	0.10

*, **, *** indicate significance at p <.10, .05, and 01; based on two-tailed tests.

[1]White's t-statistics are reported in parentheses.
[2]For brevity, the year-specific and state-specific intercept terms are not reported.

This table presents estimates for an OLS regression model, where the dependent variable is the ratio of non-essential capital outlay/total operating expenditures. For models 1 and 2, non-essential capital outlay is defined as total capital outlay less capital outlay for essential services, where essential services are police and fire services; while for models 3 and 4, non-essential capital outlay is defined as miscellaneous general capital outlay. Variable descriptions are as follows: *Excess cash* is the residuals from an OLS regression of the model shown in Table IV, and is calculated separately for each year; *High excess cash* is a dummy variable equal to 1 if the Excess cash residuals are in the upper quartile for each year, and *Low excess cash* is a dummy variable equal to 1 if the residuals are in the lower quartile for each year; *Revenue growth* is the log of total revenues in year t minus the log of total revenues in year t-1; *New debt* is the log of new debt issued in the current year; *Size* is the log of population; and *County* is a dummy variable equal to 1 if the local government is a county, and 0 otherwise.

Table VII
The relation between excess cash and the reduction of taxes

	Dependent variable: Change in property taxes		*Dependent variable: Change in total taxes*	
Variable	*Model 1 (n=25,921)*	*Model 2 (n=25,921)*	*Model 3 (n=25,921)*	*Model 4 (n=25,921)*
Intercept	0.51	0.48	0.25	0.20
	(10.03)***	(9.35)***	(6.23)***	(5.07)***
Excess $cash_{t-1}$	-0.00		-0.00	
	(-0.12)		(-2.51)***	
High $cash_{t-1}$		0.00		0.01
		(0.53)		(1.03)
Low $cash_{t-1}$		0.03		0.06
		(2.26)**		(5.91)***
Size	-0.04	-0.04	-0.01	-0.01
	(-11.80)***	(-11.36)***	(-5.21)***	(-4.45)***
Tax limits	0.17	0.17	0.16	0.16
	(2.03)**	(2.02)**	(2.40)**	(2.39)**
County	0.05	0.06	0.03	0.03
	(1.86)*	(1.92)**	(1.17)	(1.32)
School	0.01	0.02	0.09	0.11
	(0.50)	(0.85)	(4.50)***	(5.20)***
Year dummies	Included[2]	Included[2]	Included[2]	Included[2]
State dummies	Included[2]	Included[2]	Included[2]	Included[2]
Adjusted R^2	0.03	0.03	0.05	0.06

*, **, *** indicate significance at p <.10, .05, and 01; based on two-tailed tests.

[1]White's t-statistics are reported in parentheses.
[2]For brevity, the year-specific and state-specific intercept terms are not reported.

This table presents estimates for an OLS regression model, where the dependent variable is the ratio of the change in property taxes deflated by population (models 1 and 2), and the ratio of the change in total taxes deflated by population (models 3 and 4). Variable descriptions are as follows: *Excess cash* is the residuals from an OLS regression of the model shown in Table IV, and is calculated separately for each year; *High excess cash* is a dummy variable equal to 1 if the Excess cash residuals are in the upper quartile each year, and *Low excess cash* is a dummy variable equal to 1 if the residuals are in the lower quartile for each year; *Size* is the log of population; *Tax limits* is a dummy variable equal to 1 if the local government resides in a state with effective property tax limitation measures, and 0 otherwise; *County* is a dummy variable equal to 1 if the local government is a county, and 0 otherwise; and S*chool* is a dummy variable equal to 1 if the local government is a school district, and 0 otherwise.