Local Revenue Structure and Pension Liability Funding: Evidence from Government-wide Financial Statements

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Abstract

Studies of local government fiscal health have traditionally focused on budgetary-level financial performance variables (e.g. revenue wealth, budgetary balance) - as indicators of fiscal health and financial structure and institutional variables (e.g. revenue diversity, balanced budget requirements, tax and expenditure limits) as its predictors. In this paper, I focus on local pension plan liability funding as a dimension of fiscal health. Compared to budgetary-level measures, pension liability funding level reflects a government's longer-term fiscal condition or sustainability – its ability to fulfill already undertaken obligations in the future.

If a government is experiencing fiscal stress, resources designated for pension funding may be redirected to operating expenditures, bridging revenue gaps but at the same time negatively affecting the government's long-term fiscal health. Intergovernmental aid and own source revenue diversification are two important mechanisms on the revenue side that may be used by governments to counteract negative effects of fiscal stress. This paper explores effects of intergovernmental aid and revenue diversification on pension liability funding levels among 216 city governments across the U.S. over five years (FY2003-FY2007). A multilevel model is fitted that accounts for observation clustering at the city level and for city nesting within a county and within a state. Additionally, three models are estimated with fixed effects at the state, county and city levels.

The results suggest that cities receiving higher levels of intergovernmental aid tend to have lower levels of pension liability funding. Effects of revenue diversification away from property tax are negative but not statistically significant. While intergovernmental aid may be improving a government's flexibility by providing additional revenue, it may also act as a soft budget constraint and prevent governments' from assuming full responsibility for their fiscal policies.

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Introduction

Adequate funding of pension obligations has long been recognized as a key aspect of longer-term fiscal health for local governments (Berne and Shramm 1980; Nolenberger et al. 2004). Empirical research on the management of public pension plans by local governments, however, is scarce. Only a few publications have analyzed determinants of local pension plan funding (Pew, 2013; Rich &Zhang 2013). This paper offers an insight into the relationship between pension plan funding and local revenue structures of local governments. Specifically, it examines whether intergovernmental aid acts as a soft budget constraint for local governments and whether local revenue diversification from property tax is associated with differential patterns of pension plan funding. Since public employee pensions are the largest long-term commitment of city governments and since the opportunity costs of spending on pensions are always high, a better understanding of how governments make choices about pension plan funding is valuable to both the research and the practitioner community. .

Pension funding as the dependent variable

Pension funding by local governments is an aspect of long-term fiscal health that has become amenable for quantitative research relatively recently – after the adoption of GASB Statement 34 in 1999 and a gradual transition of governments to the new financial reporting model. Besides preparing two additional financial statements as part of Comprehensive Annual Financial Reports (CAFRs), governments were now to provide more details on their economic bases, report about their business-type activities separately from reporting about government activities, and report on their pension plan assets and liabilities. Government Finance Officers Association (GFOA) has been collecting financial indicators from local CAFRS since 1994 and is the largest source of such

audited financial records to date. Since 2003, the GFOA database reflects the implementation of GASB 34 by governments and includes unique data local pension plan funding for up to three pension plans that a local government participates in. Importantly, the GFOA data includes pension assets and obligations by city, not by pension plan as data collected by the Center for Retirement Research at Boston College.

Pension liability obligations are long-term commitments of governments to pay pensions to retired employees. Unlike other post-employment benefits (OPEBs), another type of long-term obligations of local governments, pension obligations are contractual so that a government cannot walk away from them or decrease benefit levels with relative facility. In other words, pension liability obligations are the largest, the most binding, and therefore the most financially consequential type of local government long-term direct obligations.

Public pension plans are generally more expensive than private plans as public retirement benefits are more generous than benefits in comparable private plans (Brown, Clark, Rauh, 2011). There is usually a different plan for general government (all employees other than safety and teachers) and for public safety employees and teachers (if the local government mandate includes education worker employment). All full-time employees are eligible to participate in retirement systems. In addition, part-time employees may be eligible to participate if they meet specific participation criteria. Cities often participate in multiple-employer public employee retirement systems that act as investment and administrative agents of all participants. Local pension contributions may go to locally administered or state administered plans (42% and 52% respectively, according to Munnell et al., 2011). Locally-administered plans are heterogeneous, including the largest New York City plans with assets over 30 billion dollars and plans that have less than 10 million dollars in assets. Single-employer pension plans provide benefits to employees

or one employer and multiple-employer pension funds pool assets from a number of employers to make investments and then distribute pension plan assets to employees based on their shares of contributions as reflected on the separate accounts of each agent employer.

As activities of pension funds benefit retired employees – third parties - and not the general public, they are usually accounted for in separate fiduciary funds and not reported as part of the direct government financial statements. Data on pension obligations are not part of the U.S. Census of Governments Annual Governments Survey. A number of local pension plans make part of the Public Plans Database maintained by the Boston College. A large number of local pension systems, however, are still not amenable to research because they are not part of any database.

Many cities participate in several pension plans and fund them at different levels. Since GFOA provides data only on three pension plans, the analytic sample needs to be limited to governments that participate in a maximum of three plans. To arrive as a measure of the adequacy of pension plan funding, the sum of government accumulated assets from all pension plans is divided by the sum of the present value of actuarially accrued liabilities. The resulting aggregate funding ratio is then multiplied by 100 to indicate a percentage of pension plan liabilities funded by a city. Though actuarial assumptions used to discount future pension obligations have been criticized by many economists, government accountants, actuaries themselves and the Government Accounting Standards Board (GASB) have been defending their approaches.

Discount rate controversy

The use of a risk free rate to discount pension liabilities has been the subject of controversy. GASB recommends that governments discount their pension liabilities using the rate of return on their pension plan assets (Easterday & Eaton, 2012). As a result, a vast majority of public pension plans discount their liability at an inappropriately high rate of 7-9 percent (Brown, Clark, Rauh

2011). Novy-Marx and Rauh (2009, 2011) view this approach to discounting benefits as misguided, primarily because it does not account for the risk of pension plan assets investment and may confuse users of the information about the amount of unfunded pension liabilities. They emphasize that if the governments choose assets with higher rates of return to fund liabilities, the latter will appear smaller after discounting. But assets with higher rates of return are usually riskier and may or may not yield the expected outcomes. The Financial Accounting Standards Board (FASB) requires corporate pension plans to use risk-adjusted discount rates for their future obligations. According to Easterday &Eaton (2012) while the Public Employee Retirement Systems steadily used the 8% discount rate in the calculations of liabilities in 2001-2010, the corporate rates dropped from 7.25% in 2001 to 5.55 % in 2005, went up to 6.3% by 2007 and dropped to 5.35% by 2010. The expected rate of return on pension assets in government administered plans was a stable 8%, while the expected rates of return on corporate pension plan assets went down from 8.8% to 7.55% from 2001 to 2010 (Easterday and Eaton, 2012). In fact, most economists object to currently used discount factors (Brown and Wilcox, 2009; Brown, Clark, Rauh, 2011; Munnell, 2011) and suggest that an appropriate discount rate should reflect the risk of the liabilities. As benefits of pension funds are usually guaranteed under state laws, the appropriate discount rate is a riskless rate (Munnell, 2011). According to the analysis by Munnell et al. (2011), the optimal discount rate for pension plan liabilities should be close to 30-year Treasury bonds, a most common type of similarly riskless securities. Applying alternative discount rates, Munnell et al. (2011) show that the 2009 pension funding gap for a sample of 126 state and local plans goes up from $0.7 trillion to $2.7 trillion. Munnell et al. (2011) highlight that a more realistic measure of pension liability funding may have a sobering effect and prevent plan managers from offering more generous benefits. However, a change in the discount rate that might

be needed to reflect a more realistic amount of unfunded liabilities, cannot not be accommodated by governments easily, especially given the state of the economy. Localities just cannot significantly increase their pension plan contributions. The implementation of a change would need to wait until the economy exhibits a stable growth. "Moreover, changing the discount rate would have to be considered by the community of actuaries, accountants, and sponsors in the context of other changes, such as perhaps extending the amortization period from 30 to 40 years. That is, an increase in the measure of the unfunded liability need not automatically translate into an immediate and intolerable increase in annual amortization payments for states and localities." (Munnell et al. 2013, 262)

While the choice of a more realistic discount rate may increase the denominator of the fund ratio and reduce the resulting percent of funded obligations, the existing fund ratio is still informative and relevant as a variable for analysis for several reasons. First, the fund ratio makes part of the information that financial managers use to decide on the amount of annual required contributions. Thus, pension plan funding policy decisions are likely to be based on existing fund ratios. Second, even if the denominator of the fund ratio is underestimated, the direction of the relationship between the variables of interest and the outcome variable is not affected.

It is important to note that local governments usually control only a portion of their pension plan funding: their annual pension contributions. Investment strategies, market performance and resulting investment revenues are usually outside the scope of the government's direct control.

As for the technical aspect of pension plan funding, levels of annual required contributions (ARC) to pension plans are developed by actuaries. They are usually based on two types of assumptions: demographic and economic. Demographic assumptions include expected mortality, length of service, salary growth (SLGE, 2013). Economic assumptions include expected inflation and

investment returns. “The ARC includes the so-called “normal cost,” which is the projected growth in the present value of benefits generated by active employees in the coming year. It also includes any payment required to address unfunded liabilities, which are typically calculated over a 30-year amortization period.” (p.2) If the fund sponsor (government) consistently makes 100% of ARC and if the demographic and economic assumptions are accurate (and they usually are in the long-run according to SLGE, 2013), then pension liabilities are fully funded. When either contributions are not made in full or assumptions diverge from actual demographic or economic conditions, the plans report unfunded liabilities. According to SLGE (2013), the value of the pension plan assets may go down because of a financial crisis so that it may fall below the present value of promised future pension obligations. Alternatively, pensions may be over-funded if pension plan assets generate high returns in the period of an economic boom. (SLGE 2013). Both locally-administered and state-administered pension plans may or may not generate expected investment revenues.

Local governments participating in both locally-administered and state-administered plans firmly control only levels of their annual required contributions to the pension plans. In spite of the name – annual required contributions - there are often no laws that would require the contributions to be made. While some local pension plans are locally-administered and others - state-administered, all local governments act as plan sponsors in their plans and make annual required contributions (ARC). Whereas local governments do not decide on the amount of annual pension contributions (APC) that they should be making (these amounts are determined by actuaries), government officials do use discretion in deciding whether to make an APC in full.

Examining pension contributions in a sample of state and local pension plans, Munnell et al. (2008) find that only 50 percent of the sample make their Actuarial Required Contributions (ARCs) in

full. Not making an ARC in full may happen for various reasons but at the end of the day it is still a failure to follow the funding plan suggested by GASB as part of Statemenrs # 25 and 27, adopted in 1994. (Munnell et al. 2008). In a number of states, according to Munnell, legal restraints may impede plan sponsors from making their pension payments in full. Other reasons for the failures to fund pensions adequately include the lack of discipline required to stick to a funding regime, fiscal stress, excessive benefit enhancements by people engaged in governance without regard for funding capacity or characteristics of the plan that make funding difficult.

Theory of how pension funding relates to IG aid and local revenue diversification

If a government is experiencing fiscal stress, resources designated for pension funding may be redirected to operating expenditures, bridging revenue gaps but at the same time negatively affecting the government's long-term fiscal health. Intergovernmental aid and own source revenue diversification are two important mechanisms on the revenue side that may be used by governments to counteract effects of fiscal stress and improve the ability of a government to make pension contributions in full.

Fiscal Effects of Intergovernmental aid

In 2011, intergovernmental aid to local governments amounted to 33 % of total local revenues, with 29 % of the aid coming from states and 4 % - from the federal government.[2] Intergovernmental aid is a significant revenue source for local government. The aggregate percentage, however, masks a substantial variation exists in the amount of intergovernmental support across cities. So, for example, over the observation years, Plano TX, Irving TX, Dallas

[2] http://www2.census.gov/govs/local/summary_report.pdf

TX, Denton TX, Tacoma WA received less than 5 percent of their total revenues from intergovernmental aid while Baltimore MD, Detroit MI, New Britain CT, Portsmouth VA, Suffolk VA, Worcester MA received over 50 % of their revenue budgets from intergovernmental transfers. Nearly all states provide grants to localities to finance primary and secondary education. Some states also fund a wide range of municipal services. In the US, intergovernmental support is often allocated among local governments based on their differenced in revenue-generating capacity. Grant formulas that account for differences among provincial and local governments in expenditure needs or need capacity gaps are rare (Reschovsky 2008). Thought normatively, grant formulas are often designed to compensate for local government fiscal disparities (Ladd and Yinger1994) or influence the distribution of services, in practice, formulas for aid distribution may not always capture local needs accurately and may not adequately address capacity gaps (Bradbury and Zhao, 2009). Because in this case, when aid is not distributed according to need, effects of state aid are likely to go beyond capacity equalization and spill over onto other aspects of local financial management. Zhao and Coyte (2011) find that the distribution of state unrestricted aid to municipalities is not strongly correlated with municipal capacity gaps. Given the size of the aid, changes in aid may have effects on both state and local finances (Ladd, 1990). Expectations and experiences of changes in aid levels may also affect local fiscal behavior. Analyzing local finances after the 2001 fiscal crisis Dye and Reschovsky (2008) and Wu (2009) find that when intergovernmental aid is in short supply, local governments tend to respond to the shortage by increasing property taxes.

Bartle (1995) suggests that intergovernmental aid may have income effect, substitution effect or a combination of both. By increasing total revenues available to a city, it may lead to an increase in spending (income effect) or/and it may decrease spending by offering an alternative to

own-source revenues, especially the property tax (substitution effect). Bartle finds that general aid primarily funds reductions in property taxes; federal aid has a strong positive effect on local expenditures; categorical aid leads not only to an increase in local spending but also to an increase in local revenues. While state-local intergovernmental relationship is more visible than federal-local relationship because of the relative size of state aid compared to federal aid, Bartle points out that state and federal aid tend to substitute for each other and their interactions are important for analyzing relationships between state aid and local budgets.

Local fiscal decisions – both on the revenue and expenditure side – are likely to be made non-independently of the expectations of intergovernmental transfers. It is likely that local governments that are used to certain magnitudes of intergovernmental aid into their financial structures will view the aid as a relatively stable revenue source. Intergovernmental aid may provide local governments with additional flexibility in financial management. In this scenario, it will be positively associated with pension liability funding. Alternatively, intergovernmental support may act as a soft budget constraint that may prevent local governments from assuming full responsibility for fiscal decisions. If a government receives a high level of intergovernmental support, it may be less concerned about maintaining discipline in pension funding. With higher levels of aid engrained into its budget, the city may expect intergovernmental transfers to address its needs and difficulties in the future.

Fiscal Effects of Revenue Diversification

In 2011, local property tax generated $429.1 billion in revenue, which made up 74.2

percent of total local tax revenue and 25.7 percent of total local revenue.[3] While property tax is still the most visible and stable local tax source on average, many localities have been diversifying their own-source revenue structures to rely more on sales taxes, charges and fees, the income tax and other locally available revenue instruments. Existing theory suggests that revenue diversification may help governments prepare for exogenous shocks such as economic or fiscal crises by making revenues more stable (White 1983; Shannon 1987; Carroll 2009). From this perspective, revenue diversification may be viewed as a strategy of effective fiscal management (Carroll 2009). Under a diversified revenue structure, a good mix of revenue sources should protect a government from severe revenue shortfalls because the increment of each revenue source in total revenue stream is relatively small. Carroll (2009) notes, however, that revenue diversification may increase revenue volatility because it means a higher reliance on sources of revenue that are less stable than the property tax. Her empirical findings suggest that when revenue structures are not overly complex (when the overall number of revenue sources is relatively small), revenue diversification does increase revenue stability. Some researchers observe that municipalities with higher revenue diversification tend to have lower tax effort (Hendrick 2002), while others find that imperfect information and tax complexity may result in higher tax burdens (Thomas & Boonyapratuang 1993 – cited in Carroll 2009).

Revenue diversification may also have effects on spending. Oates (1988) suggests that it may produce fiscal illusion - a misperception of the true cost of government among taxpayers – and lead to increased expenditures. When many revenue sources exist and the increments of each in revenue generation are small, taxpayers are more likely to underestimate the tax burden associated with public programs. A more diversified tax system reduces voter resistance to higher

[3] Calculations by author from tables in http://www2.census.gov/govs/local/summary_report.pdf

levels of taxation (Chernick, Langley, Reschovsky (2010, 15). Similarly, when revenue systems are complex, revenue sources become less visible and tax prices – more difficult to determine. Revenue diversification thus creates conditions for government expansion (Oates 1988), which – if pursued by managers intentionally or, on the contrary, completely uncontrolled by any government actor - may lead to an overproduction of public goods.

Several measures of revenue diversification have been offered by researchers over the years. One of the early applications of the diversification theory to public revenue structures suggested that a tax system is diversified best when all three major revenue sources contribute equal shares of tax revenue (Shannon, 1987). Shanonn's Hirschman-Herfindahl Index of diversification was criticized from both a practical standpoint – because it included only three tax sources – and from a theoretical standpoint – diversification to such a degree was hardly achievable by governments or even desirable. Syuderhoud (1994) focused on the comparison of several versions of HHI to suggest that the degree of diversification depends on the choices that researchers make when they construct the measure.[4] Carroll also criticized the index suggesting that it assumes equal local ability to use and diversify revenue sources that are included in the index. Yet, the Hirshman Herfindahl Index has become a popular measure of revenue diversification for local governments (Hendrick 2004; Carroll 2009; Yan, 2011; Chapman and Gorina, 2012).

This study acknowledges that not all local governments have equal access to property, sales and income taxes as well as a variety of non-tax sources. This fact makes the use of HHI problematic. The study adopts a very simple measure of own-source revenue diversification

[4] HHI may be based a different number of sources and measure tax revenue diversity, non-tax revenue diversify or both. For example, it may include only three revenue sources: property, sales and income and other taxes or four sources: property, sales, income taxes and other revenue sources.

variable based on a diversity index constructed by Chernick, Langley and Reschovsky (2010): a percentage of local own-source revenues generated from all sources other than the property tax.

Revenue Diversification may be a strategy for a local government to handle revenue generating problems at times of fiscal stress or more general problems of the mismatch of the current revenue generating system and expenditure pressures. If the current revenue burden on residents is moderate or low, governments can tap it by charging additional fees or increasing the burden in conventional source collections. Since raising taxes is an unpopular measure, local governments experiencing fiscal stress may be more likely to increase total revenues through non-tax sources.

What is the link between pension funding and revenue diversification? If revenue diversification is used by managers as a strategy to stabilize revenues and if it does effectively make revenues more stable, then local governments with higher diversification levels will be less likely to shortchange pension funding and fill budget gaps with what should be pension contributions. If both revenue diversification and adequate pension funding are a strategy of fiscal managers to maintain fiscal health, then diversification and pension funding would be positively correlated but effectively rooted in a third factor, not linked in a cause-and-effect manner. If the fiscal illusion effect of revenue diversification exists and if fiscal managers use information asymmetries to support goals in a self-interested way, thus foreshadowing the need to fund pensions with more pressing political spending needs, then revenue diversification may be negatively associated with pension funding.

Intergovernmental aid and revenue diversification are definitely not the only variables that may affect pension plan liability funding. To model their effects on a multivariate framework, other important groups of factors need to be explicitly included in models.

Data and Method

I explore effects of intergovernmental aid and revenue diversification on pension liability funding levels among 216 city governments by working with five years of financial and accounting records from CAFRs. I run both multilevel random effect model and fixed effect models that account for observation clustering at the city level and for city nesting within a county and within a state.

The GFOA municipal financial indicators database only includes data on governments that have applied for the certificate of financial reporting excellence. Such self-selection suggests that the sample may be biased towards better organized and better performing governments (Maher and Nollenberger, 2009). However, it is likely that a bias towards better performing governments is not strong. The GFOA has been granting financial reporting awards without any regard for local financial performance. The single main goal of Financial Reporting Excellence Awards - that were in place since 1946 – has been to standardize financial reporting. So, for example, Flint, Michigan received the GFOA award for 10 consecutive years since its first fiscal emergency in 2001-2002 and even after the beginning of the second financial emergency in 2011.[5] In spite of the above mentioned shortcomings, the data used in this study is a unique and probably the largest dataset of local government CAFR information combined with financial and employment data from the U.S. Bureau of the Census and the Bureau of Labor Statistics. Years 2003-2007 were chosen because

[5] "We are pleased to report that the Government Finance Officers Association of the United States and Canada (GFOA) awarded a Certificate of Achievement for Excellence in Financial Reporting to the City of Flint for its Comprehensive Annual Financial Report for the fiscal year ended June 30, 2011. The City has now received this award ten years in a row. In order to be awarded a Certificate of Achievement, a government must publish an easily readable and efficiently organized Comprehensive Annual Financial Report. This report must satisfy both generally accepted accounting principles and applicable legal requirements." Flint, Michigan, CAFR 2012.

FY 2003 was the first year in the database with government-wide data on net assets and FY 2007 is the last year of data released by the GFOA up until August 2013.

The uniqueness of the GFOA data is not only in the fact that it reflects information from Government-wide statements but also in presenting data that are not available elsewhere. For example, pension liability data disaggregated by city are not easily available. Often researchers collect the data manually. So, for example, Rauh (2010) manually worked with CAFRs of 115 pension plans sponsored by states to create the dataset, so did researchers at the Pew center (Pew 2013) – city level data for 61 cities and Munnell et al (2011) in compiling their famous database. Actual value of all property, both real and personal that is taxable by the government is also a unique variable.

The analysis of data with spatially clustered repeated measurements on the same subjects over time presents several econometric challenges. First, these repeated measurements are non-independent. As a result, errors in the models may be auto-correlated. In this case, it is important to model the covariance structure of the repeated measurements by indicating that one subject (city) repeats across years. Thus, the amount of information (data variability) and degrees of freedom used in calculations is reduced. For example, the correct modeling of covariance acknowledges that the dataset has only 216 subjects repeatedly over 5 years, rather than 784 independent subjects (it is an unbalanced panel).

The dataset is a five-year panel that needs to be adjusted for inflation. Several different price indexes are available for this purpose that were developed by the Bureau of Economic Analysis, as part of the National Income and Product Accounts (NIPA) reports. The most widely publicized are the Consumer Price Index, the GDP price Deflator, the Producer Price Index and a very large number of the CPI and GDP Deflator component indices. The choice between them

usually depends on the data series that is being analyzed. The State and Local Purchases Deflator – a version of the GDP Price Deflator that is based on price changes in goods and services purchased by governments – is used for this analysis. This index is also applied to adjusting mean per capita income for inflation. The CPI might be a better option for this variable because it is based on the consumer basket of goods and services but it uses a different set of base years which would complicate the interpretation of model results.

Table 1. State and Local Government Purchases Deflator

Year	State and Local Government Purchases Deflator[6]	Implicit Price Deflator
2003	90.425	94.099
2004	94.062	96.769
2005	100.000	100.000
2006	105.276	103.260
2007	111.112	106.220

All fiscal variables in the model are in 2005 real dollars per capita, income, income, population and property value per capita are transformed into natural logarithms at the estimation stage.

[6] http://www.economagic.com/em-cgi/data.exe/nipa/A301504-B829RG - Series Title: State and local: Other economic affairs: Income security: Price Indexes for Government Consumption Expenditures and Gross Investment by Function.

Model

The econometric model of pension liability funding includes five groups of factors described below and a time trend. The multilevel approach models a hierarchy of random effects (yearly observations nested within cities, cities nested within counties, countries nested within states); three fixed effect models include state-, county-, and city-specific effects, respectively.

$$\boldsymbol{PF}_{it} = GS_{it} + EN_{it} + \boldsymbol{RS_{it}} + FS_{it} + FC_{it} + \varepsilon,$$

where PF – is the percent of funded pension liabilities, GS - government structure, EN – expenditure needs, RS – revenue structure, FS – financial position, FC – fiscal capacity. Intergovernmental aid and own-source revenue diversification are the 'Revenue Structure" variables in the models. As mentioned previously, the relationship between revenue structure and pension liability funding is the focus of this study.

REVENUE DIVERSITY: The own-source revenue diversity index based on a similar measure constructed by Chernick, Langley and Reschovsky (2010). The initial diversity index as one minus the proportion of own-source revenues coming from the property tax. I multiply the resulting ratio by 100 to arrive at a percentage of own-source revenues generated from sources other than the property tax. I expect revenue diversity to have a positive effect on pension liability funding given its potential to increase local revenues.

INTERGOVERNMENTAL AID: The measure of aid includes federal and state support to localities as reported in the Census Bureau Annual Survey of Government Finances. This aid includes grants to education as well as support for the provision of other municipal goods and services. The distinction between federal and state aid is not made because the overall level of external support is substantively important in this research. A distinction between state and federal aid would make it more difficult to detect effects of non-local revenue because state and federal

aid often act as substitutes.

Control variables: government structure, expenditure needs, financial position, and fiscal capacity

Besides revenue structure variables, four other factors may affect pension funding. The first is fiscal capacity which is best captured through available tax base. It may determine not only local revenues, but also the level of aid that a city receives and the degree of diversification that the city can safely practice. Variables that make part of this factor are income (Ladd and Yinger, 1989), percentage of occupied housing units (Bradbury and Zhao 2009) and the aggregate of property values in the city (both real and personal property values) Zhao and Coyne (2011). The next factor essential for pension funding analysis is financial position of a city. Unlike fiscal capacity that measures the potential for revenue generation, financial position reflects already existing fiscal policies. The group is represented by five variables. Some are conventional: total revenue per capita and long term debt per capita,[7] while others are the privilege of the unique GFOA dataset: the percentage of self-supported government activity program costs (self-supported means that this share of program costs is covered by program revenues), a change in net assets of government activities,[8] a change in net assets of business type activities, and a binary variable for the presence of property sales in a fiscal year.

The need-based side of local environment may also affect spending and pension funding

[7] Real debt per capita has been advocated in the analysis of pension funding by Chaney, Copley, and Stone (2002) and Munnell et al. (2008)

[8] Change in government activities net assets is calculated as a percent of direct program costs of government activities. An identical approach is used to calculate the change in business type activities.

in particular. Expenditure need variable that are outside the direct control of local officials include city population, racial diversity and age distribution. In addition, the number of employees per 1000 residents is viewed as an Expenditure need variable. The higher the number of employees – the more services the city is likely to be providing and the higher its expenditure needs, pressures or demands. Government structure variables are another group of controls that can potentially affect pension funding. In includes the percent of full-time employees and the percent of financial administration employees in the city.

Besides variables from the GFOA database, the dataset includes demographic and economic variables that were linearly interpolated from the Decennial Census, Annual Survey of Government Finances, and the Bureau of Economic Analysis. Descriptive statistics for the sample are presented in Table 2.

Table 2. Descriptive statistics for the sample, FY 2003-2007

Descriptive Statistics									
	All years				2003	2004	2005	2006	2007
Variable	**Mean**	**Std Dev**	**Min**	**Max**	**Mean**	**Mean**	**Mean**	**Mean**	**Mean**
Funded pension liabilities (%)	84.85	19.69	15.50	153.80	91.09	85.02	83.49	82.07	83.71
Full-time employees (%)	82.43	11.52	45.34	100.00	82.95	82.12	82.82	82.23	82.14
Financial Admin. Employees (%)	4.51	1.93	0.64	11.47	4.47	4.56	4.54	4.47	4.50
Employees per 1000 residents	11.18	5.69	0.66	33.66	11.42	11.08	11.14	10.78	11.46
Population*	284171	720431	65269	8214426	324269	283724	267508	294527	262191
White (%)	65.37	15.41	11.44	92.98	64.35	65.19	65.89	65.72	65.52
Over 65 (%)	11.64	4.65	4.95	69.10	11.80	11.39	11.88	11.41	11.70
Intergovernmental aid (% total revenue)	16.75	10.96	0.00	54.19	17.44	16.96	18.35	17.35	14.31
Own revenue NOT from property tax (%)	77.87	13.96	18.78	100.00	79.60	78.32	77.22	78.38	76.45
Total revenues per capita (in $1000s)	2.12	1.47	0.23	13.04	1.61	1.82	2.05	2.27	2.64
Self-supported government activities (%)	16.44	8.58	0.00	57.72	15.61	16.44	17.15	16.81	16.13
Δ in government activity net assets	14.71	20.25	-48.92	203.17	11.31	11.58	14.48	18.57	16.68
Δ in business type activity (BTA) net assets	19.65	31.01	-249.17	357.40	11.86	20.88	22.21	21.03	20.81
Long-term debt per capita (in $1000s)	2.62	3.98	0.00	68.94	2.22	2.44	2.62	2.88	2.82
Property sale (binary, 1 if any sold)	0.73		0	1	0.64	0.59	0.66	0.70	1.00
Mean income per capita*	25248	7812	10306	81768	23519	24696	25321	25666	26491
Occupied housing units (%)	92.71	3.86	72.12	97.97	93.05	93.05	92.73	92.71	92.20
EAV - estimated actual value of taxable property per capita*	545085	7246084	3676	167003227	64325	1114254	534481	593492	400834
N Total / N for the variable "Δ in BTA net assets"	825/784				140/131	159/151	165/156	159/153	202/193

Not all governments in the sample have business type activities, they have missing values for the variable 'Change in business type astivity net assets.'

Table 3. Correlations between Variables in the Models

Pearson Correlation Coefficients, Prob > |r| under H0: Rho=0																			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Funded pension liabilities (%)	1	1.00	-0.22	0.16	-0.08	0.03	-0.01	-0.05	-0.09	0.14	0.02	-0.04	0.04	0.04	-0.05	0.07	0.10	0.18	0.02
			0.00	0.00	0.02	0.39	0.78	0.13	0.01	0.00	0.54	0.31	0.23	0.21	0.12	0.04	0.01	0.00	0.50
Full-time employees (%)	2	-0.22	1.00	-0.01	0.30	0.18	0.01	0.08	0.04	0.13	0.26	-0.18	-0.22	-0.08	0.20	-0.08	-0.25	-0.41	0.03
		0.00		0.87	0.00	0.00	0.86	0.02	0.20	0.00	0.00	0.00	0.00	0.02	0.00	0.02	0.00	0.00	0.43
Financial Administration Employees (%)	3	0.16	-0.01	1.00	-0.16	-0.19	0.11	0.03	0.07	-0.10	-0.06	0.09	0.08	0.19	-0.05	-0.14	0.15	0.01	0.01
		0.00	0.87		0.00	0.00	0.00	0.47	0.05	0.00	0.11	0.01	0.02	0.00	0.15	0.00	0.00	0.88	0.79
Employees per 1000 residents	4	-0.08	0.30	-0.16	1.00	0.31	-0.09	0.22	0.18	0.08	0.78	-0.26	-0.20	-0.08	0.25	0.01	0.05	-0.43	0.04
		0.02	0.00	0.00		0.00	0.01	0.00	0.00	0.02	0.00	0.00	0.00	0.03	0.00	0.87	0.12	0.00	0.28
Population	5	0.03	0.18	-0.19	0.31	1.00	-0.20	-0.01	0.09	0.07	0.41	-0.09	-0.16	-0.08	0.19	0.08	-0.03	-0.03	0.02
		0.39	0.00	0.00	0.00		0.00	0.71	0.01	0.04	0.00	0.01	0.00	0.03	0.00	0.02	0.39	0.41	0.51
White (%)	6	-0.01	0.01	0.11	-0.09	-0.20	1.00	0.17	-0.24	0.06	-0.15	0.10	0.16	0.06	-0.11	-0.17	0.25	-0.02	-0.05
		0.78	0.86	0.00	0.01	0.00		0.00	0.00	0.07	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.65	0.12
Over 65 (%)	7	-0.05	0.08	0.03	0.22	-0.01	0.17	1.00	-0.01	0.02	0.16	-0.05	-0.04	-0.13	0.06	-0.03	0.13	-0.28	0.14
		0.13	0.02	0.47	0.00	0.71	0.00		0.69	0.59	0.00	0.18	0.28	0.00	0.11	0.47	0.00	0.00	0.00
Intergovernmental aid (% total revenue)	8	-0.09	0.04	0.07	0.18	0.09	-0.24	-0.01	1.00	-0.44	0.19	-0.26	-0.13	0.00	0.05	-0.08	-0.16	-0.07	-0.07
		0.01	0.20	0.05	0.00	0.01	0.00	0.69		0.00	0.00	0.00	0.00	1.00	0.15	0.02	0.00	0.05	0.04
Own revenue NOT from property tax (%)	9	0.14	0.13	-0.10	0.08	0.07	0.06	0.02	-0.44	1.00	0.03	0.16	0.07	0.01	0.12	0.05	-0.16	-0.11	0.05
		0.00	0.00	0.00	0.02	0.04	0.07	0.59	0.00		0.37	0.00	0.04	0.79	0.00	0.15	0.00	0.00	0.14
Total revenue per capita (in $1000s)	10	0.02	0.26	-0.06	0.78	0.41	-0.15	0.16	0.19	0.03	1.00	-0.27	-0.14	-0.08	0.40	0.13	0.11	-0.26	0.10
		0.54	0.00	0.11	0.00	0.00	0.00	0.00	0.00	0.37		0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00
Self-supported government activities (%)	11	-0.04	-0.18	0.09	-0.26	-0.09	0.10	-0.05	-0.26	0.16	-0.27	1.00	0.25	0.14	-0.11	0.00	0.02	0.00	-0.02
		0.31	0.00	0.01	0.00	0.01	0.00	0.18	0.00	0.00	0.00		0.00	0.00	0.00	0.89	0.64	0.89	0.60
Δ in government activity net assets	12	0.04	-0.22	0.08	-0.20	-0.16	0.16	-0.04	-0.13	0.07	-0.14	0.25	1.00	0.10	-0.03	0.02	0.21	-0.01	-0.03
		0.23	0.00	0.02	0.00	0.00	0.00	0.28	0.00	0.04	0.00	0.00		0.01	0.35	0.59	0.00	0.79	0.34
Δ in business type activity net assets	13	0.04	-0.08	0.19	-0.08	-0.08	0.06	-0.13	0.00	0.01	-0.08	0.14	0.10	1.00	-0.03	-0.08	0.00	-0.03	-0.01
		0.21	0.02	0.00	0.03	0.03	0.08	0.00	1.00	0.79	0.02	0.00	0.01		0.35	0.02	0.99	0.33	0.82
Long-term debt per capita (in ($1000s)	14	-0.05	0.20	-0.05	0.25	0.19	-0.11	0.06	0.05	0.12	0.40	-0.11	-0.03	-0.03	1.00	0.06	-0.04	-0.14	0.07
		0.12	0.00	0.15	0.00	0.00	0.00	0.11	0.15	0.00	0.00	0.00	0.35	0.35		0.09	0.20	0.00	0.04
Property sale (binary, 1 if any sold)	15	0.07	-0.08	-0.14	0.01	0.08	-0.17	-0.03	-0.08	0.05	0.13	0.00	0.02	-0.08	0.06	1.00	0.04	0.07	0.04
		0.04	0.02	0.00	0.87	0.02	0.00	0.47	0.02	0.15	0.00	0.89	0.59	0.02	0.09		0.31	0.05	0.26
Mean income per capita*	16	0.10	-0.25	0.15	0.05	-0.03	0.25	0.13	-0.16	-0.16	0.11	0.02	0.21	0.00	-0.04	0.04	1.00	0.13	0.05
		0.01	0.00	0.00	0.12	0.39	0.00	0.00	0.00	0.00	0.00	0.64	0.00	0.99	0.20	0.31		0.00	0.17
Occupied housing units (%)	17	0.18	-0.41	0.01	-0.43	-0.03	-0.02	-0.28	-0.07	-0.11	-0.26	0.00	-0.01	-0.03	-0.14	0.07	0.13	1.00	0.00
		0.00	0.00	0.88	0.00	0.41	0.65	0.00	0.05	0.00	0.00	0.89	0.79	0.33	0.00	0.05	0.00		0.94
EAV - estimated actual value of taxable property per capita	18	0.02	0.03	0.01	0.04	0.02	-0.05	0.14	-0.07	0.05	0.10	-0.02	-0.03	-0.01	0.07	0.04	0.05	0.00	1.00
		0.50	0.43	0.79	0.28	0.51	0.12	0.00	0.04	0.14	0.00	0.60	0.34	0.82	0.04	0.26	0.17	0.94	
Number of observations		825	825	825	825	825	825	825	825	825	825	825	825	784	825	825	825	825	825

Multilevel model with random effects

City governments are nested in counties which are in turn nested in states. Ignoring a level of nesting in data may influence estimated variances and lead to errors in detecting statistically significant effects. To build a multilevel model that reflects nesting, it is important to estimate the amount of variation in the outcome that exists at various levels of nesting. In the multilevel framework, this is usually done through the analysis of the intraclass correlation coefficient (ICC). The higher the percent of variability in the outcome variable is accounted for by higher level units – the more support there is for using a multilevel model.

In the case of a time-series data for cities, the data structure is as follows. Observations for different time periods are nested within cities, the cities are nested within counties, and the counties are nested within potentially heterogeneous states. In the multilevel framework, time periods are viewed as Level 1 units, cities – Level 2 units, counties – level 3 predictors, and states – Level 4 predictors. Examining an unconditional model with no predictors, I can assess the amount of variation in pension funding between cities, counties, and states and then choose the levels that absorb significant variation and need to be included in the model.

In multilevel models, random effects are key components that make them different from single-level models (Bell et al., 2013). MLMs allow researchers to specify unique group effects through random intercepts and random slopes. Like in OLS, results include the overall intercept and overall intercept across all levels but at the estimation stage MLMs also model a deviation from the average intercept and slope for groups of observations at specified levels (in this case for cities within a county and counties within states).

Below is the formula for calculating the ICC for the proportion of city-level variation in the model. County- and state-level proportions of variation are calculated in a similar way.

$$ICC = \frac{\delta^2_{city}}{\delta^2_{city} + \delta^2_{county} + \delta^2_{state} + \delta^2_{\varepsilon}}$$

All levels of the suggested hierarchy (states, counties and cities) have statistically significant intercepts. I start by assessing variation between cities.

Covariance Parameter Estimates					
Cov Parm	**Subject**	**Estimate**	**Standard Error**	**Z Value**	**Pr > Z**
Intercept	city(county*state)	106.60	21.26	5.01	0.000
Intercept	county(state)	69.80	32.07	2.18	0.015
Intercept	state	315.05	105.73	2.98	0.001
Residual		47.90	2.74	17.48	0.0000

$$ICC_{city} = \frac{106.6}{106.6 + 69.8 + 315.05 + 47.9} = 0.196$$

Only 19.6 percent of the variation in the data is accounted for by the variation between cities. Following the same formula, 12.9 percent of the variation exists between counties. In contrast, a much larger share of the variation is explained at the state level – 58.4 percent and the remaining 8.8 percent is relegated to the error term. The influence of the state level predictors is not surprising, given that cities often participate in pension plans that are administered by states. Additionally, local fiscal affairs may be guided by states, especially in Dillon's rule municipalities.

Solution for Fixed Effects					
Effect	**Estimate**	**Standard Error**	**DF**	**t Value**	**Pr > |t|**
Intercept	85.4657	3.6980	28.5	23.11	<.0001
Time	-1.6801	0.1778	624	-9.45	<.0001

Time is also included in the otherwise unconditional model, making it a three-level growth model. Time is coded as a continuous variable (2003=1 2004=2 2005=3 2006=4 2007=5) to capture a

potential trend in pension funding that develops over time.[9] This approach is an alternative to using year-specific fixed effects. The results suggest that the time effect is present. The average pension funding level growth over time is negative and statistically significant. Over the period of FY 2003-FY 2007, pension funding levels declined on average by 1.68 percentage points per year. In a multilevel setting, this coefficient will change slightly and will remain significant.

The intercept of an unconditional multilevel model is equivalent to the grand mean for all cities across all years and equals 85.4 (percent). Such level of pension funding is considered high by existing pension funding conventions but it is still lower than 100 percent.

Results

The results suggest that intergovernmental aid is negatively associated with pension plan funding. A percentage point increase in intergovernmental aid as a share of total local revenue is related to a 0.18 percentage points decrease in pension liability funding. The effect is present in the multilevel model with random effects, as well as in the models with state and county effects. It is on the margin of statistical significance in the city-fixed effects model. This relatively robust effect signals that cities with higher levels of intergovernmental aid have lower pension funding levels. Two explanations of the effects are possible. Either intergovernmental aid provides a type of soft budget constraint to local governments – a promise of a potential bailout or other intervention – and thus makes local governments less responsible for their pension funding policies and less disciplined. Or intergovernmental aid does indeed target and reach the most needy communities but does not fully compensate for the fiscal disparities. In this case the negative correlation between

[9] **proc mixed** data=APPAM_10012013 covtest noclprint method=ml;
class gid_compatible_id fips_st_count fips_state; model pensf_percent=time/solution ddfm=kenwardroger;
random intercept / sub=gid_compatible_id (fips_st_count fips_state) type=vc; random intercept / sub=fips_st_count (fips_state) type=vc; random intercept / sub=fips_state type=vc; **run**;

aid and pension funding may just reflect some aspects of weak fiscal capacity that has not been included in the model explicitly.

Own-source revenue diversification away from property tax does not appear to have a discernible effect on pension funding though the negative direction of the effect if worth noting. Property sales within a fiscal year – though not a strategy but rather an ad hoc measure – are strongly associated with pension funding. Cities that sell property tend to have a two percentage point higher funding levels than cities who do not sell property. This finding may deserve further attention in light of a paper by Costello et al. (2012) who find evidence of property 'fire sales' by states that face strict balanced budget requirements. The most intriguing finding from the models is that governments with government activity programs that run successfully and cover increasing amounts of program costs appear to have lower pension liability funding levels. The mechanics of this effect is still to be understood. The number of employees per capita, which served as a proxy for the scope of expenditure needs of a city, has an expected and consistent negative effect on pension funding. Apparently, cities with higher expenditure pressures tend to find it more difficult to fund pensions adequately.

Surprisingly, local economic base, as captured through income, property values and the percentage of occupied housing units – does not affect pension funding. Successful pension funding is not a linear function of resources available for generating revenue.

Table 4. Percentage of Pension Liability funding by cities, regression parameter estimates (standard errors in parentheses)

Predictors and Controls	MLM	State FE	County FE	City FE
Government Structure				
Full-time employees (% of total)	-0.026 (0.079)	-0.003 (0.080)	-0.044 (0.161)	-0.072 (0.099)
Financial admin. employees (% of total)	-0.009 (0.321)	-0.009 (0.319)	-0.004(0.291)	-0.336 (0.323)
Expenditure Needs				
Employees per 1000 residents	-0.642 (0.229)**	-0.557 (0.224)**	-0.980 (0.236)**	-0.598 (0.348)$^{+}$
Population (ln)	-0.865 (1.310)	-0.558 (1.296)	-2.540 (0.971)**	-6.600(5.982)
White	-0.044 (0.076)	-0.054 (0.074)	0.071 (0.067)	0.273 (0.357)
Over 65	-0.077 (0.192)	-0.097 (0.174)	0.199 (0.282)	-1.965 (1.056)$^{+}$
Revenue Structure				
Intergovernmental aid (% of total revenue)	-0.178 (0.072)**	-0.175 (0.073)**	-0.244 (0.069)**	-0.110 (0.071)
Diversification (% of OSR not from property tax)	-0.019 (0.069)	-0.011 (0.074)	-0.024 (0.069)	-0.128 (0.073)$^{+}$
Financial Position				
Total revenue per capita (in $1000s)	1.466 (0.745)*	1.625 (0.755)*	0.809 (0.710)	1.318 (0.775)$^{+}$
Self-supported government activities (%)	-0.286 (0.077)**	-0.322 (0.077)**	-0.156 (0.070)*	-0.216 (0.078)**
Change in government activity net assets	0.033 (0.021)	0.035 (0.021)$^{+}$	0.040 (0.020)*	0.120 (0.019)
Change in business type activities net assets	0.020 (0.012)$^{+}$	0.022 (0.012)*	0.012 (0.011)	0.019 (0.011)$^{+}$
Long-term debt per capita (in $1000s)	-0.114 (0.133)	-0.126 (0.131)	-0.147 (0.141)	-0.063 (0.125)
Property sale (equals 1 if any property sold)	2.015 (0.786)**	2.009 (0.787)**	1.785 (0.776)*	2.169 (0.694)**
Fiscal Capacity				
Mean income (ln)	-0.484 (3.646)	0.268 (3.402)	-7.827 (3.560)*	-3.341 (7.772)
Occupied housing units (%)	0.433 (0.314)	0.570 (0.317)*	-0.124 (0.241)	1.368 (0.734)$^{+}$
EAV of taxable property per capita (ln)	0.439 (0.492)	0.485 (0.493)	0.397 (0.480)	0.396 (0.438)

Time (continuous)	-2.244 (0.382)**	-2.311(0.372)**	-1.597 (0.375)**	-1.563 (0.688)*
Intercept	72. 89 (48.69)	55.49 (47.93)	173.97(42.13)	57.61 (125.75)
-2 Restricted Log Likelihood	5780.2	5689.4	5400.5	4954.2
AIC	5827	5789	5700	5402
N	784	784	784	784

Limitations

Intergovernmental grants are only one instrument available to states to influencing local government fiscal capacity. Another powerful approach to alleviating local fiscal distress is state centralization of services (Warner 2001). When states fund road construction and maintenance, the scope of local responsibility narrows down, which naturally eases fiscal pressures. I am unable to control for the degree of state centralization other than indirectly, through the use of the number of employees per 1000 of city residents.

While most public sector pension plans are defined benefit plans, defined contribution plans are also part of the picture and are gaining popularity (Chen et al. 2013). I do not directly distinguish between defined benefit and defined contribution pension plans in the models. Differences between these plans may be important for the administration of these plans. However, from the perspective of local fiscal health, if a pension plan is underfunded, it does not make much difference whether the plan is a defined benefit or a defined contribution plan. There is no theoretical reason why intergovernmental aid and revenue diversification would affect pension plan funding differently.

This study will also benefit from controlling for the actuarial costing method used to estimate plan liabilities. The use of different methods may affect both the funding discipline and the amount of contributions (Munnell et al., 2008). So, for example, in a survey of state and local pension plans Munnell et al. (2008) note that the entry age costing method, used by a majority of pension plans, usually recognizes a larger accumulated pension obligation for active employees than the projected unit credit and generally requires larger annual contributions (Munnell et al. 2008). In terms of funding discipline they also find that "plans using the projected credit costing method are a whopping 36 percentage points more likely to miss their ARC payment."(5).

The entry age (EA) is the most commonly used costing method; the projected unit credit method and the aggregate method are less common; frozen entry age method, attained age, frozen attained age are significantly less common methods for accruing pension liabilities. Since the fund ratio is based on the aggregate of assets and liabilities across all pension plans, that may use different costing methods, it is not clear what costing method to assign to a fund ratio.

This study of pension plan funding by cities does not allow for a distinction between locally-administered plans and state-administered plans. The variables indicating the type of plan are just not part of the GFOA database. To add to the challenge, governments often participate in both types of pension plans. For example, they may participate in a locally-administered plan for general employees and in a state-administered plan for the fire department employees. Important differences may exist between locally-administered and state-administered plans in terms of how they manage pension investments and in the requirements that they put forth for participants. So, for example, state-level plans might be more demanding to participants in requiring Annual Required Contributions to be made in full. Or, on the contrary, state-level plans may be more lenient in comparison with locally-administered plans in requiring the contributions because they have many participants contributing to the investment pool and the share of a single contributor's contributions is small. At the same time, there is no empirical evidence that such a distinction exists at the level of cities. Only one study has been found that subsampled the GFOA data - Rich and Zhang (2013) and made a very crude comparison between state and local-administered plans. Rich and Zhang (2013) classified local pensions as locally-administered if the city's general employees are enrolled in a locally-administered plan and found find that local and state plans are funded at similar levels on average and share most of the other plan characteristics.

Competition for fiscal resources that may exist between cities and other overlapping

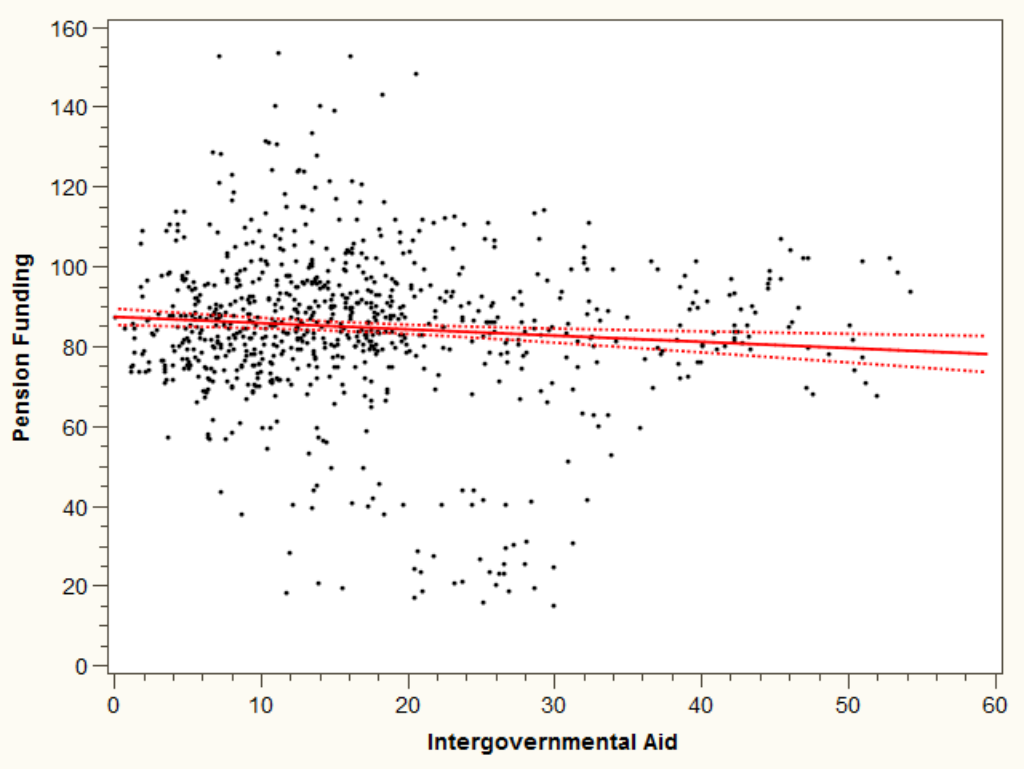
governments, including school districts, counties and states, has not been carefully modeled in the data, except for nesting cities within counties and states. Expenditure needs that may differ dramatically between cities, have not been assessed with a great precision either. As Chernick, Langley and Reschovsky (2010) highlight, the level of provided services may be dramatically different across localities and as a result their expenditure needs may differ as well. A step forward in this direction would be to construct cities with comparable expenditure needs – similar to constructed cities by Chernick, Langley and Reschovsky (2010). This could be done using a version of the propensity matching method.

Conclusion

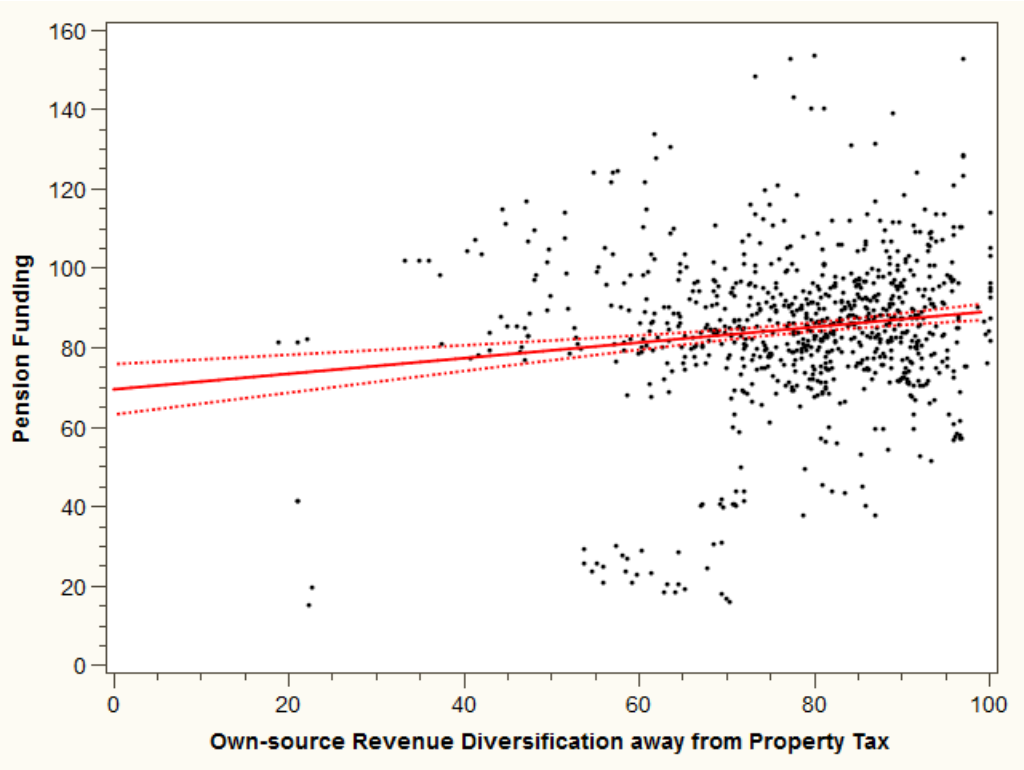
Academic research on the management of pension plans at the local level is in its infancy. Only one working paper on the city level pension funding was found in an extensive literature. Research on pensions at the state level is more developed in large part due to better opportunities and lower costs of obtaining data (the universe is only 50 units of analysis). The results of this study point at substantial effects of external support to localities on local pension funding. The negative relationship between intergovernmental transfers and pension funding is the most important finding of the study and may be explained in two ways. States may be unsuccessful in mitigating local fiscal stress. Then, localities with lower revenue capacities may struggle to fund pensions even after receiving transfers. Or, local governments receiving aid may be more likely to underfund their pensions because state aid may act as a soft budget constraint preventing governments from facing the reality of their risky fiscal paths. Cities that are more reliant on state aid may not plan for self-sustaining futures and may be expecting intergovernmental support to be forthcoming in the future.

Appendix

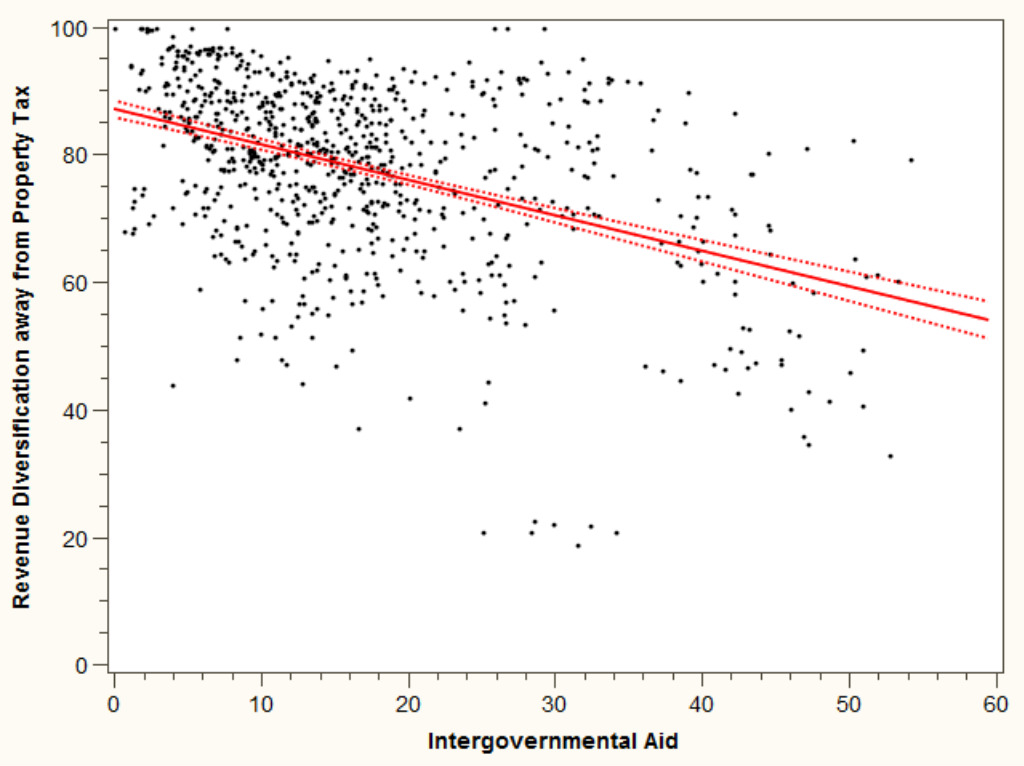
Plot of Pension Funding Percentage across percentage of Intergovernmental Aid



Plot of Pension Liability Funding levels against Revenue Diversification



Plot of Revenue Diversification against Percentage of received Intergovernmental Aid



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(not cross-checked, occasional references may be missing)

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