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TO PRODUCE OR TO BUY? EXPLORING DETERMINANTS OF LOCAL GOVERNMENT PRIVATIZATION DECISIONS

Zhiwei Zhang
University of Kentucky, zhiwei313@gmail.com

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Zhiwei Zhang, Student

Dr. Edward T. Jennings, Jr., Major Professor

Dr. Edward T. Jennings, Jr., Director of Graduate Studies

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DISSERTATION

A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy in the Graduate School at the University of Kentucky

By
Zhiwei Zhang

Lexington, Kentucky

Director: Dr. Edward T. Jennings, Jr. Professor of Martin School of Public Policy and Administration

Lexington, Kentucky

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ABSTRACT OF DISSERTATION

TO PRODUCE OR TO BUY? EXPLORING DETERMINANTS OF LOCAL GOVERNMENT PRIVATIZATION DECISIONS

The U.S. is experiencing the worst recession since the Great Depression. All levels of government have been hit really hard, this is especially apparent at the local level since services provided at the local level are woven into people's daily life. Thus, how to "do more with less" is more urgent than ever before. The use of privatization came to surface as a sound solution for deficit-plagued governments as it is thought to be more cost effective and outperform the public sector in most cases. This dissertation contains two empirical chapters that examine determinants of privatization and specify the conditions under which it is optimal to buy and under which it is optimal to produce in-house.

Chapter two explores determinants that contribute to the use of privatization at the local level in the U.S. This chapter incorporates spatial technique to perform the analysis, which is a different approach from much of the literature. Empirical results indicate that a local government's sourcing decision is affected by its nearby local jurisdictions. External stakeholders' involvement contributes to the use of outsourcing, whereas having a limited supply of service providers impedes it.

Chapter three applies a transaction cost economics (TCE) framework complemented with a revenue volatility measure to disentangle the mechanisms that drive public services' outsourcing decisions. Results suggest that, in general, services with higher asset specificity and higher contract management difficulty are less likely to be outsourced, and a robust and competitive market facilitates the use of outsourcing.

KEYWORDS: Outsourcing, Spatial, Revenue Volatility, Transaction Cost Economics, Municipal Finance

Zhiwei Zhang
Student's Signature

March 31, 2013
Date

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By

Zhiwei Zhang

Dr. Edward Jennings
Director of Dissertation

Dr. Edward Jennings
Director of Graduate Studies

March 31, 2013

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Chapter 1. Introduction

Privatization is a broad term; it can be defined differently when facing different situations. In most of the world, privatization means transferring a business, enterprise, agency, service or property from the public sector to private hands. This is a phenomenon where lots of state-owned enterprises existed. In the U.S., privatization often refers to taking services that are supplied by the government and delivering them through private provision, either through a business that operates for a profit or through a non-profit organization. Although privatization is a worldwide phenomenon, it is often controversial. This chapter provides an overview of privatization and the bases of this study. The first section briefly introduces privatization in general, including the magnitude of privatization. Section II overviews privatization arguments in the U.S. The following section (III) explains the rationale behind the dissertation. Why do we care to study the use of privatization? The last section (IV) outlines organization of the dissertation.

1.1. Privatization at a Glance

Since the 1980s, governments have tended to purchase more services than before from external actors (i.e. other governments, non-profit sectors, and private firms) to maintain government activities and provide essential public goods and services, such as education, defense, utilities, infrastructure, and public health (Hoekman, 1998). This trend has mushroomed all around the world since then, from developed countries like the U.S., Japan, Great Britain, and France to less developed countries like China, Sri Lanka and Turkey. The trend has made governments more “commercial-enterprises-like” and

encouraged the development of competitive market economies within procurement systems (Moe, 1987).

In addition, expenditures for government procurement tend to consume a considerable share of a country's gross domestic product (GDP). Specifically, McAfee and McMillan (1988) estimate this share to be 10% in the 1980s, whereas Auriol indicates 18% in 2002 (Auriol, 2006). Its significant purchasing power has made government a key consumer of goods and services at international, national, and sub-national levels.

Audet (2002) provides an excellent summary for the magnitude of government procurement. Some of his estimates of the size of government procurement markets by OECD countries (more than 130 countries are examined) are presented here (expressed as percentage of 1998 GDP data or in billions of US dollars):

> For OECD member countries as a whole, the ratio of total procurement (consumption and investment expenditure) for all levels of government is estimated at 20.0% or $4,773 billion and for non-member countries the ratio is estimated at 14.5% or $816 billion.

Central and sub-central governments and state-owned enterprises are major purchasing forces that consume goods and services. However, many government procurers favor domestic suppliers by imposing all kinds of limitations on outside bidders or international sellers (i.e. by using a price preference policy), setting thresholds that virtually exclude outside/international bidders, or simply banning international bidders. Moreover, most sub-national government procurement activities are based on officials' discretion. Those limitations, according to Audet (2002), increase government spending and hinder economic efficiency. Despite the limitations identified here, government

procurement and outsourcing rocketed since the 1980s. And there are several different forms of contracts to fulfill procurements.

The prevailing form for government procurement is the fixed-price contract. The price of the contract is predetermined unless the situation changes. The benefits of this form of contracting are manifold. First, fixed price contracts transfer the risk to the contractors; second, they facilitate cost control for governments; third, they provide incentives for contractors to minimize the cost because the money contractors save is the money contractors earn. However, the drawback for such contracts is obvious too. Considering most contractors are profit driven, they may cut corners to save on cost in a way to maximize their profit. As such, a capable monitoring sector/agency is needed to ensure the quality of goods or services.

Contrary to a fixed price contract is a cost-plus contract. There are three types of cost-plus contracts: cost plus fixed fee (a pre-determined fee will be given in addition to the cost); cost plus award fee (award fee is based on the performance); cost plus percentage of cost (fee rises as the total cost rise). There are both pros and cons associated with cost-plus contracts. The positive side would be that there is little incentive for contractors to minimize cost, presumably decreasing the probability for contractors to cut corners, thus possibly increasing quality and performance. The negative side is that cost-plus contracts require extra oversight and administration to ensure the money is well spent; further, there is no need to be cost-effective from a contractor's point of view, so the waste of resources and energy is more likely to occur (Bajari and Tadelis, 2001).

1.2. Privatization in the U.S.

In the United States, as a way to improve the city government's performance, Savas (2000), who worked as a New York City official, began recommending contracting with private firms as a pragmatic policy to break up municipal monopolies and thereby improve the cost-effectiveness of municipal services. In addition, Savas, as one of America's staunchest advocates of privatization, claims that the benefits for adopting privatization are manifold. These would include such things as reducing the cost of government and government debt, generating revenues, supplying infrastructure that government cannot provide, bringing in specialized skills for advanced activities and initiating or expanding a service quickly. The key to achieve all of those benefits, however, is competition. Savas (2000) believes competition could create an environment for better prices, innovation, choices, and alternatives.

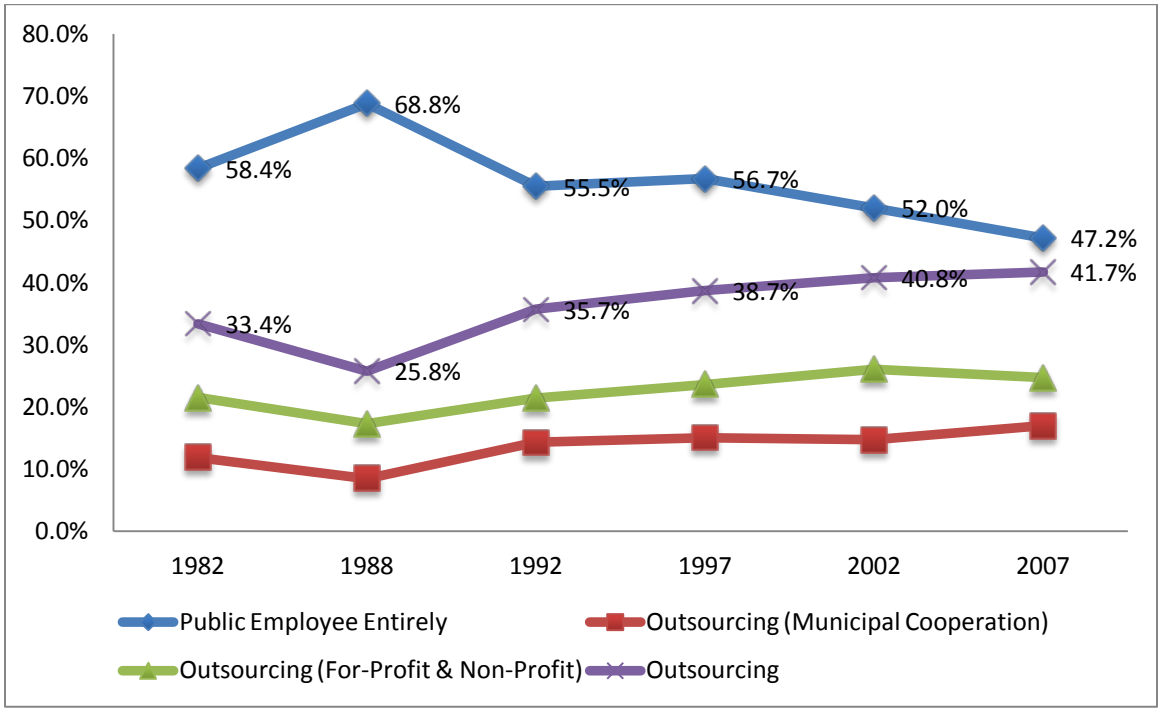
By comparison, opponents of privatization like Terry (2005), Milward, Provan and Else (1993), argue that overuse of privatization could result in a "hollow state". The concept "the hollow corporation" was used to describe a new and more flexible model for business entities first seen in the 1980s. For instance, sports giant Nike did not directly manufacture its product. Instead, it outsourced all of its products, thus giving the idea of the Hollow Corporation (Tao, 2011). In the public sector, the hollow state is formed when provisions are made for services to be provided by sub-governments or non-governmental agencies on behalf of the government and in the government's name. Thus, it requires "public managers to develop special competencies and skills to effectively function" (Rosenbloom, 2004). The direct problem associated with this is that most public administrators are trained for serving in the public sector, rather than managing

contracts and overseeing contractors. Furthermore, hollow states raise questions about democratic accountability and the capacity of the state to carry out the remainder of its duties, thus exacerbating "the erosion of public confidence in government". This is "thinning" of administrative institutions (Terry, 2005). In practice, more drawbacks of using privatization have been identified over time. For example, a) not fully specified contracts and public officials' negligence lead to misunderstanding and disputes; b) public officials fail to conduct a competitive procurement process, thus giving some contractors advantages; c) lack of a solid base for performance measurement, thereby providing loopholes for service providers to cut corners and lower service quality; d) incumbent providers enjoy and exploit monopoly status due to the fact that the market is less competitive once past initial procurement; and e) privatization is subject to strong public employee opposition in certain areas (Savas, 2000; Terry, 2005; Tao, 2011; Rosenbloom, 2004), which might or might not be purely self-interested.

Despite all the criticisms toward privatization, the United States has experienced a boom in using privatization in recent decades. Figure 1.1 shows trends in local government service provision since 1982. It is apparent that services provided through the public sector have declined from 68.8% to 47.2% from 1988 to 2007. In the meantime, the use of private provision has boosted from 25.8% to 41.7%. The use of privatization further breaks down to the service privatized to profit firms or non-profit organizations (green line) and service contracted out to another local government (red line). Although the use of private provision has been growing in both sectors, services that are contracted out to private companies and non-profit organizations account for a larger portion of the services privatized.

Moreover, the use of outsourcing has become a commonplace across all service areas among local jurisdictions. Figure 1.2 shows service provision by different service groups. The data are obtained from the International City County Management Association Alternative Service Delivery (ICMA ASD) 2007 survey. The survey asked the service sourcing decisions on 67 individual services, which are grouped into six categories: public works/transportation, public utilities, public health and safety, parks and recreation, cultural and arts programs and support services (details about each service area will be presented in Chapter 3).

Figure 1.1: Trends in Local Government Service Provision

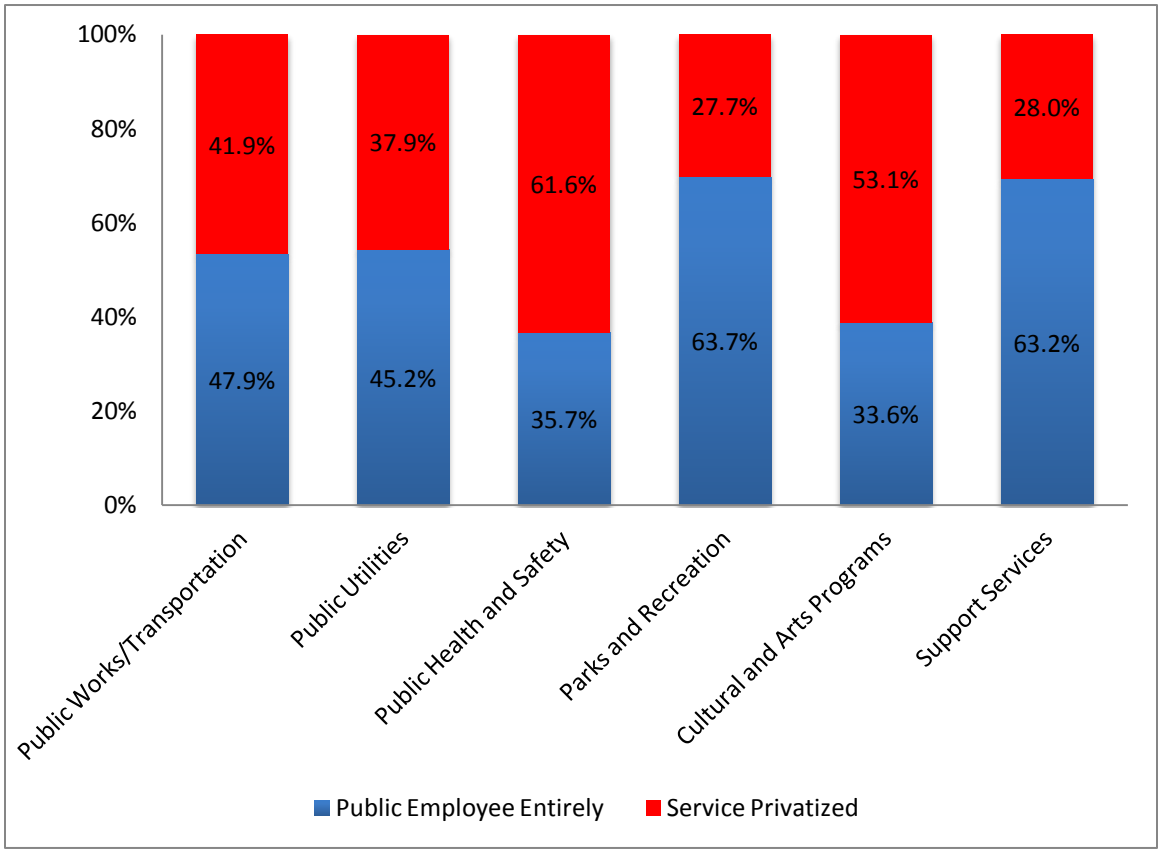


Source: International City/County Management Association (ICMA) Alternative Service Delivery (ASD) Survey

It is obvious that the use of outsourcing is widespread across all six groups. The majority of services in public health and safety and cultural and arts programs are delivered through private provision. It seems counter intuitive that large portion of public health and safety services are outsourced. The truth is, some of the heavily outsourced

services, such as vehicle towing and storage, operation of animal shelters, operation of daycare facilities, drug and alcohol treatment programs, are all listed in public health and safety group. By comparison, a large portion of services in parks and recreation, and support services is still provided/produced in-house, whereas, public provision and private service vendors split the services in public works/transportation and public utilities.

Figure 1.2: Service Provision by Service Area



Source: International City/County Management Association (ICMA) Alternative Service Delivery (ASD) 2007 Survey

In short, I have briefly introduced the term privatization and the arguments around it. The first section looks at the issue from a global point of view and the second section

outlines the use of privatization in the U.S. The following illustrates the rationale behind the dissertation.

1.3. Why Do We Care

The U.S. is experiencing the worst recession since the Great Depression. All levels of government have been hit really hard. This is especially apparent at the local level since services provided at the local level are woven into people's daily life.

If city budgets were bundled together, Hoene projected a shortfall ranging from $56 billion to $83 billion from 2010-2012 (Hoene, 2009). Table 1.1 gives a rough estimate based on different levels (3%, 4%, and 5%) of the budget shortfall. With a 3% projected shortfall, cities all together were facing a $34 billion budget gap over the three-year period (2010-2012). A 4% and 5% shortfall would burden the cities with total of $46 billion and $53 billion shortfall respectively over the same period.

Table 1.1: Projected Municipal Sector Budget Shortfall, 2010-2012 (All $ in 1,000s)

Year	3% Shortfall	4% Shortfall	5% Shortfall
2010	$ 11,933,408	$ 15,911,210	$ 19,889,013
2011	$ 11,575,406	$ 15,274,762	$ 18,894,562
2012	$ 11,228,143	$ 14,663,772	$ 14,359,867
Total	**$ 34,736,957**	**$ 45,849,744**	**$ 53,143,443**

Source: City Budget Shortfalls and Responses, Hoene 2009

Moreover, a number of local jurisdictions have already filed for bankruptcy or declared financial emergency. Figure 1.3 shows a map of municipal bankruptcies. Cities, towns and counties are shown in red. Utility authorities and other municipalities are displayed in black. Since January 2010, a total of 31 municipalities filed for bankruptcy.

As suggested by all the statistics shown above, the financial challenges faced by local communities are present and severe. How to "do more with less" is more urgent than ever before. For many elected officials, privatization came to surface as a perfect

solution for deficit-plagued governments as it is thought to be more cost effective, and private and non-profit organizations are thought to outperform the public sector in most cases. Municipalities turn to private provision to deliver public services as a means to reduce cost and cushion the financial uncertainty.

Figure 1.3: Municipal Bankruptcies Map: Bankruptcies Since 2010 (Cities, towns and counties are shown in **red**. Utility authorities and other municipalities are displayed in **gray**.)

Source: Bankrupt Cities, Municipalities List and Map. Available at: http://www.governing.com/gov-data/municipal-cities-counties-bankruptcies-and-defaults.html

Although there is no systematic evidence on the cost difference between public provision and private provision, there is ample anecdotal evidence for this viewpoint. For example, when Chicago delivered its towing services to haul away abandoned cars through a private company, the net annual savings were estimated at $2.5 million. Similarly, a private hospital took over the South Florida State Psychiatric Hospital, which was once considered as a dumping ground and patients were treated poorly. The private

hospital not only improved the conditions and service quality, but also it appears that it was profitable after just one year of operation (Rosen and Gayer, 2009).

Opponents argue, on the other hand, that service contractors tend to "cream" clients off: provide services to clients who are easy to treat and most likely to succeed, whereas high cost, low profit clients are referred to public agencies. Kamerman and Kahn (1989) investigated childcare programs privatized in North Carolina and confirmed that higher efficiency is achieved by "creaming off" the easier and less costly cases and reducing the service level provided. Similarly, Bendick (1989) argues cost reductions are obtained from the lower quality services that are provided to clients. Those examples show a key counter argument to the use of private production: "private contractors produce inferior products" (Rosen and Gayer, 2009).

As such, it is obvious that outsourcing or private provision of services is beneficial only if the claimed benefits are obtained and service quality is not inferior compared to services provided through public provision. Therefore, it is critical to understand the determinants that drive the use of privatization forward. Moreover it is essential to understand how to properly specify the conditions under which it is optimal to buy and under which it is optimal to produce in-house, so that when a city decides to outsource, it can claim the benefits (i.e. cost saving, improved performance) and avoid hazardous outcomes (i.e. inferior service quality, pay dispute, corruption, pension scandal). Having specified the desirable conditions, it is important to see if cities contract in accord with those conditions. That is exactly what this dissertation investigates. The next section outlines the structure of the dissertation.

1.4. Organization of the Dissertation

After this brief introduction, the following chapters survey the issues listed above. Chapter 2 investigates the determinants of the U.S. local governments' privatization decisions and examines whether there are any spatial interdependencies for privatization policies. Chapter 3 applies a transaction cost economics (TCE) framework complemented with a revenue volatility measure to analyze sourcing decisions. The last chapter offers a concluding discussion.

The second chapter, "Determinants of Privatization in U.S. Municipalities – New Evidence from a Spatial Study" reviews the existing literature in the field and identifies that there is no general consensus explaining why the use of outsourcing is so prevalent across the local jurisdictions in the U.S. In addition, I observe that there is a clear spatial pattern in the use of outsourcing. As such, in an effort to fill in the gap, I incorporate a spatial factor to identify determinants of the use of outsourcing and explores spatial interdependencies that may existed in the sourcing decisions at municipal level.

The following essay, "Produce or Buy? – An Analysis of Government Procurement from Transaction Cost and Revenue Volatility Perspective" responds to the tough economic recession that the U.S. has recently experienced. The essay combines the analytical framework of Traction Cost Economy (TCE) and the concept of revenue volatility to disentangle the conditions under which it is optimal to buy and under which it is optimal to produce in-house. Cities that take these conditions into account would be better equipped when they decide to outsource services to cut cost and cushion financial instability. Analysis in this essay focuses on TCE characteristics such as asset specificity, contract management difficulty, and market competiveness. And both long term revenue

volatility and short term revenue volatility measures are used to capture the fiscal stress level at local level.

In sum, the final chapter concludes the dissertation with the findings from each essay. Policy implications and arenas for future research are also discussed.

Chapter 2. Determinants of Privatization in U.S. Municipalities – New Evidence from a Spatial Study

Privatization reduces the role of government by increasing the role of other organizations, such as non-profit organizations and private businesses. As Savas (2000) puts it, privatization relies more on the private institutions of society and less on government to satisfy people's needs. Although this concept is not new to America, the fight over the 2012 Republican Medicare privatization proposal certainly brought privatization to the forefront again. Advocates and opponents fiercely debate whether or not to increase the pace of outsourcing government provided services. There are numerous scholars who have devoted their research to such phenomena; a general consensus about what to privatize and how to properly privatize is yet to be reached. Despite the lack of consistency in the literature, one commonly held view is that privatization injects competition into the public sector and thus sparks innovative and better policies (Bouche and Volden, 2011).

On another corner of public policy research, policy diffusion theorists are interested in finding out how innovative policies diffuse, and how subnational governments learn and interact with each other. One of the earliest studies that focused on diffusion is a seminal book "*Diffusion of Innovations*" written by Everett Rogers (1962). In the book, Rogers introduces how new ideas and technology spread among members of a social system. The book summarizes four key elements that could affect diffusion of a new idea, which are innovation, communication channels, time and a social system. Innovation is defined as "an idea, practice, or object that is perceived as new by an individual or other unit of adoption" (Rogers, 1983; p. 11). Communication channels

are “the means by which messages get from one individual to another" (Rogers, 1983; p. 17). Time is defined differently based on the different perspectives: "The innovation-decision period is the length of time required to pass through the innovation-decision process" (Rogers, 1983; p. 21) and "Rate of adoption is the relative speed with which an innovation is adopted by members of a social system" (Rogers, 1983; pp. 21, 23). Based on those elements, a new idea or technology spreads among five types of adopters: innovators, early adopters, early majority, late majority and laggards. All the concepts and elements introduced in this book are still widely incorporated into empirical diffusion studies.

Innovation and better policies are key elements for both privatization and diffusion research. It is the aim of this paper to fill in part of the gap; I propose to investigate determinants of privatization and discover whether there are any spatial interdependencies for privatization policies. The paper is organized as follows: the first section outlines theoretical considerations and a brief literature review of both privatization research and spatial studies. In addition, a set of studies that combine privatization and policy diffusion will also be identified. Section 2 specifies the model and variable selections. Section 3 presents empirical results and discussion around it. Concluding remarks follow.

2.1 Theoretical Considerations and Literature Review

Privatization is a choice among alternative ways of providing city services. If city leaders are rational in their decision processes, the choice of whether to provide a service directly or contract it out would depend on a consideration of how well each approach would serve diverse goals: effectiveness of service, efficiency of delivery, responsiveness

to citizens. Attention to these goals lead to the result that "much of the work on urban services in more recent years has focused on patterns of services delivery and on efforts to improve the quality, responsiveness, and effectiveness, as well as efficiency, of a local government services" (Ammons, 2003; p. 254). Because of the complexity of the policy formation process, I break down the theory into three sub-sections: state-local relations, local governments' economic, political, and social environment, and spatial interdependencies.

2.1.1 State-Local Relations

Local governments are not mentioned in the U.S. Constitution and are regarded as creatures of the states. Thereby, local governments are subjected to the legal control of the states. A city charter, which is a document that is analogous to a constitution at the national or state level, assigns municipal authority. Nice and Fredericksen (1995) provide a brief introduction to city charters:

> The fundamental law of a city is its charter. The charter specifies the structure of city government, including what officials it will have, how they will be chosen, and what powers they will possess. The charter also indicates what programs a city may operate, and specifies city boundaries, along with a variety of other provisions. (Nice and Fredericksen, 1995; p.149)

Although there are different charters (i.e. special act charter[1], general act charter[2], and classified charter[3]) states use to regulate local governments, most states consider the needs and scale of cities when they draft charters. Large and more populous cities tend to be assigned with more authorities and more service responsibilities by charters. And thus,

[1] The *special act charter* requires the state legislature to draft an individualized charter for each city.
[2] The *General act charter* applies to all of the cities in the state.
[3] The *classified charter* defines cities of a state into classes, usually by population, and a charter is drafted for each class of cities.

it is reasonable to think that scale and locations of a city may affect the use of privatization.

In the article “The determinants of variations in local service contracting: garbage in, garbage out?” Boyne (1998) examined 12 empirical studies of city contracting out conducted from 1981 to 1996. With respect to the relationship between population and procurement activities, one-quarter of the results favor the finding that smaller local governments are more likely to use external contractors, while another one-third of the results suggest that contracting out is more common in large authorities.

Due to the inconsistency, Boyne suggests that the population size is an inappropriate measure of the scale of service production. Since the service outputs fluctuate greatly across areas with the same population size, their socioeconomic characteristics and political preferences may play more important roles in determining procurement decisions. In addition, large cities tend to have more services responsibilities than small cities. Therefore, a positive coefficient for a population variable may simply indicate that there are more services available to contractors, thus increase the possibility of outsourcing, not that population per se is important. (Boyne, 1998)

One the other hand, location likely serves as a determinant for privatization. According to the Census Bureau, cities are categorized as central, suburban, and independent. Central cities generally have a broader scope of functional responsibility, as assigned by city charters. By comparison, suburbs are commonly defined as the residential areas that surround the metropolitan area. In the United States, suburbs have usually detached single-family homes. And I am aware there is a considerable diversity among suburbs now, including commercial centers and industrial centers. I only focus on

residential suburbs for simplicity reason. Residential suburbs normally have a degree of political autonomy, and most have lower population density than inner city neighborhoods. So the suburban cities are privileged to have choice on how to deliver municipal services (i.e. they could utilize services by working in inter-governmental manner, or contracting with private, for-profit or nonprofit firms, or accomplishing services by themselves) (Thompson, 2000).

Based on the 1988 ICMA survey on privatization, Greene (1996) used data for 188 medium-sized cities to test the relationship between metropolitan status and contracting. Greene found that as the value of metro status[4] increased, privatization levels also increased which supported the hypothesis that privatization levels were higher in suburban cities.

As states enjoy legal control over local governments, it is the responsibility of a local official to provide and maintain public services at the municipal level. Once a charter defines a city's authorities and obligations, it is up to local officials to make policy decisions. The next section explores to what extent the choice of service delivery approach depends on the economic, political, and social environment.

2.1.2 Local Governments' Economic, Political and Social Environment

No matter how much state governments (i.e. through charter) can define or confine local governments' functionality, it is the job of local officials to provide sound and viable public services to their citizens. Because of the complex nature of the policy formation process, there are a large number of factors that need to be taken into consideration before reaching a policy outcome.

[4] 1=Central; 2=Suburban; 3=Independent.

Political Factors

Empirical evidence suggests political factors have influenced privatization in various ways. Political factors refer to citizens' preference for the size and role of government, reflected in the political ideology and partisanship of citizens and elected officials (Morgan, 1988). The strong desire for small and efficient government was a main contributor to privatization. Strong public resistance to tax increases and public employees' opposition to privatization could be other factors that contribute to the use of privatization.

At the same time, the evidence on the consequences of privatization is mixed and it is often subject to ideological dispute as conservative activists sing the praises of the private sector and liberal groups charge that privatization leads to social inequity and a hollowing out of the state that leaves it unable to act effectively in addressing public problems and providing public goods. However, Warner and Hebdon, in their analysis of local government restructuring in the state of New York, argued that they found no evidence indicating that either Democratic or Republican Party membership influenced the extent of government privatization or of more complex forms of restructuring (Warner, 2001).

Bounded Rationality and Fiscal Stress

Earlier literature made the assumption that people are rational and behave accordingly. A more appropriate version for understanding the decision-making that developed later on is bounded, or limited, rationality model. Bounded rationality implies that in decision-making, rationality of individuals is subjected to the information they have, the limited cognitive processing capacities and the finite amount of time they have

to make a decision (Jones, 1994). Based on the idea of bounded rationality, Baumgartner and Jones (1993) developed the punctuated equilibrium social theory. The theory states that the policy cycle is consistent with an extended period of stability, which is later punctuated by sudden shifts in policy change. There are several reasons for such a phenomenon. First and foremost is because of limited rationality. Policy makers tend to leave policies that run relatively smoothly untouched until large, though less frequent, changes happen.

In the context of privatization, a fiscal shortfall does exactly that. When a fiscal shortfall presents, local public officials need to step out of their comfort zone to find alternative ways of doing things. Because privatization is widely promoted as being less costly than direct provision, leaders are more likely to turn to it to stretch public dollars. The growth of contracting out in local government since the 1970s has been widely attributed to fiscal stress. Some scholars believe contracting out would be most prevalent in communities that suffer from the most severe financial pressures. They suggest local officials consider, and often respond to, fiscal problems by privatizing or utilizing intergovernmental arrangements to provide services (Dilger, 1997). Although this is a sound theoretical prediction, it does not mean empirical literature always support the belief.

Brown and Potoski (2003) confirmed this theoretical argument by examining the data primarily drawn from the ICMA's 1997 survey "Profile of Local Government Services Delivery Choices". In addition, Morgan, and England (1988) claim "the choice of external over internal production is more common when… fiscal pressures are prominent". Conversely, Greene (2002) points out the negative relationship between

fiscal stress and privatization level. Greene found that when fiscal stress decreased, privatization levels increased. Therefore, Greene argues that cities with high privatization levels tend to be wealthy and healthy fiscally. By comparison, Boyne (1998) found out that empirical evidence on the relationship between fiscal stress and contracting out is statistically insignificant. As we can see from here, the empirical evidence in the literature is quiet diverse.

Managerial Factors

Recently, more and more studies have begun to suggest that managerial considerations, for example market competitiveness and public officials' ability to write comprehensive contracts and monitor contracting initiatives, have overcome political concerns as determinants of contracting for services (Fernandez*et al.*, 2008). The reason for proposing the management capacity to ensure the success of privatization is that contracting out creates potential agency problems, such as adverse selection and moral hazard that result from information asymmetry and opportunism (Brown, 1995; Savas, 2000; Brown, 2003).

Based on the 2002-2003 ICMA survey responses, which consist of 985 municipalities and 298 counties, Fernandez *et al.* (2008) examined three variables within the realm of managerial factors. The first is the ex ante analysis and planning efforts *(ex ante management)*. The intention for this analysis is to test the feasibility of privatization. The second measure captures contract monitoring capacity *(monitoring capacity)*, which contains the evaluation of citizen satisfaction, cost, and compliance with standards to evaluate private service delivery, and whether it employed citizen surveys, monitoring of citizen complaints, field observations, and analysis of data and records to evaluate private

service delivery. The third is a measure of external stakeholder involvement *(external involvement)*. This measure indicates whether the external stakeholders were involved in studying the feasibility of privatization: potential service providers; professional consultants; service recipients/customers; managers in other local governments; citizen advisory committees; and state agencies, leagues, and associations. Privatization was expected to be positively correlated with the factors mentioned above. And the findings do uphold the positive relationship for ex ante management and contracting out as well as monitoring capacity with privatization. External stakeholder involvement, however, failed to achieve statistical significance. (Fernandez *et al*., 2008)

Competitiveness

Market theory suggests that a more robust and competitive market could yield more efficient outcomes, which also means more savings to the procurers. In addition, competition is thought to be a cure for potential agency problems such as adverse selection and moral hazard that result from information asymmetry and opportunism. Thus, competitiveness could be used as a good predictor for outsourcing practices.

Empirically, Gupta tests how many bidders are required for these markets to be competitive based on the highway construction industry in Florida. Gupta has shown that bid prices fall as the number of bidders increases; more specifically, a minimum of six to eight bidders is required to acquire the competitive threshold. Interestingly, Gupta notes that more than eight bidders will not make any difference (a market with 8, 50, or 500 bidders will generate the same competitive price on average). Moreover, Dutta and John (1995) conduct experimental lab studies to examine the effect of number of suppliers on the supplier's selling price. They recruited undergraduate business students playing the

role of electrical transformer suppliers. Results show sellers in a monopoly condition offer higher prices than in a duopoly condition.

Those finding are consistent with market theory that competition could serve as a safe guard to reduce opportunism and balance information asymmetry. A more efficient and effective outcome could be expected when the market is competitive.

The next section explores some of the findings in spatial studies and policy diffusion research. Although there are hundreds of articles published on spatial and policy diffusion studies during the past decades (Graham, Shipan and Volden, 2008), there are only a handful of articles that incorporate spatial factors into privatization research. Thus, I will first review spatial studies that are in broader settings, and then introduce a few sophisticated methods that have been developed along the road. And lastly, I identify spatial studies that specifically focus on privatization.

2.1.3 Spatial Studies and Policy Diffusion

Strategic interactions among governments have attracted numerous scholars from different disciplines. In public economics, most of the empirical works focus on how to properly specify and estimate reaction functions based on strategic interactions among jurisdictions. One major branch of spatial studies in public economics is spillover model. Spillover models include empirical studies that investigate proper environmental standards, yardstick competition and public expenditure spillovers (Brueckner, 2003).

Spatial studies in political science and political economy are better known as policy diffusion research. The scholars in this area tend to be interested in the question “who, what, when, where, how, and why of policy diffusion” (Graham, Shipan, and Volden, 2008). Policy diffusion is in vogue. A quick keyword search of “policy diffusion” in a

database, such as Web of Science and Google Scholar, provides hundreds of articles within a ten-year span. All those articles reside in the subfields of American politics, comparative politics, and international relations (Graham, Shipan, and Volden; 2008). Regardless of the discipline and models used, scholars believe a firm grasp on spatial studies and/or policy diffusion research could better enable us to understand the dynamics of policy making process and politics. Next, I review spatial studies and policy diffusion research accordingly.

The spillover model generally assumes that a jurisdiction makes its decisions not only based on its own characteristics (i.e. income, grant, demographic and political characteristics); but also on the basis of the decisions made by other jurisdictions (Brueckner, 2003). Case, Hines, and Rosen (1994) are the first to test the spillover model empirically. The authors test the hypothesis that "a state's spending depends on the spending of similarly situated states" (Case, Hines, and Rosen; 1994, p.286). Within the context, they replace the "similarly situated states" with "neighbors". In the study, "neighbors" does not necessarily mean states located next to each other; it is more in a sense that two states are economically and demographically similar. The idea is that residents in one state benefit from public expenditure in other states. For example, in April 1984, Texas governor called for a special legislative session to increase school expenditures by a billion dollar because a study conducted by Department of Education found out Texas ranked at bottom when it comes to public education spending. Case, Hines, and Rosen (1994) estimated state-expenditure reaction functions and found that a state's public expenditure is positively correlated with similarly situated states' public expenditure, 70 cents to a dollar to be exact.

Yardstick competition stems from voters' choices and incumbent behavior. The basic idea of yardstick competition is that voters care about what other jurisdictions do. If voters in jurisdiction *A* are skeptical about a tax increase, the incumbent will be reluctant to increase the tax even by a small amount because he/she is afraid the voter will vote him/her out of the office. However, if other jurisdictions are raising taxes, it might seem like a viable option for incumbent in jurisdiction *A* to raise the exact same tax. The logic is that taxpayers may deem the tax increase is appropriate because everybody else is doing it. This would create a "yardstick" competition between jurisdictions; the incumbent cares about what others are doing (Besley and Case, 1995). By analyzing the U.S. state data from 1960 to 1988, Besley and Case were able to confirm, "vote-seeking and tax-setting are tied together through the nexus of yardstick competition" (Besley and Case, 1995, p. 25).

Public policy research, on the other hand, focuses more on how certain policies spread or diffuse over time. After a comprehensive literature search on policy diffusion research, Graham, Shipan and Volden (2008) survey hundreds of articles published over the past half-century. The authors find most policy diffusion studies are rooted in American politics, but there are also a considerable amount of studies that in international relations and comparative politics. While hundreds of empirical studies reviewed by the authors clearly indicate policies do diffuse, Graham, Shipan and Volden synthesize the literature to answer the question who, what, when, where, how and why policy diffuse. The study points out that which actors get involved in policy diffusion process is the key element for us to understand the foundation of policy adoption. All in all, it is humans that make policy decisions. Actors are categorized into three groups: internal actors,

which are defined as “those in the governments that may be considering an innovation” or adoption (p.17). External actors are those “in an external government that has already adopted a policy” (p.18). And go-betweens belong to neither groups mentioned above. But they have links to both groups in some way.

Those three sets of actors utilize policy diffusion through four channels: learning, competition, coercion and socialization. Learning and competition are self-explanatory. Jurisdictions are likely to adopt a policy deemed to be successful. Competition can lead to diffusion of policies with positive or negative economic spillovers across jurisdictions. Policy adoption, in most cases, is voluntary and passive. Policy coercion, on the other hand, is “a process through which some set of actors attempt to impose their preferred policy solutions on another government” (p.26). Asymmetric power is the key element of the process. It does not matter if policy coercion is in a top-down/vertical setting (i.e. in the U.S., federal government has the power and authority to push through certain policy to state government) or in a horizontal setting (i.e. through sanctions or contingency contracts). Go-betweens are key players in this perspective. While policy coercion’s intention is to change policy directly, socialization is a more subtle way to change actors’ mindset. As Checkel defined, socialization is “a process of inducting actors into the norms and rules of a community” (Checkel, 2005; p.804). The results? No immediate policy change, but it may yield stabilized long term policy change.

Berry and Berry (1999) review the dominant theories of government innovation in the public policy literature. Policy innovation is defined as a program that is new to the government adopting it. There are two principle forms of explanation for the adoption of a new program: internal determinants, which are factors leading a jurisdiction to innovate

are political, economic or social characteristics internal to the state; and diffusion models. National interaction model and regional diffusion model are two most prevalent models of diffusions. National interaction model assumes a national communication network among state officials regarding public sector programs in which officials learn about programs from their peers in other states. The probability that a state will adopt a program is thus proportional to the number of interactions its officials have had with officials of already-adopting states. The regional diffusion model is divided into two sub-models: neighbor model and fixed-region model. The neighbor model describes states are influenced specifically by those states with which they share a border. The model assumes that each state has a unique set of reference points for cues on public-sector innovations. The fixed-region model assumes that the nation is divided into multiple regions and that states tend to emulate the policies of other states within the same region. The model presumes that all states within the same region experience the same channels of influence.

In the study, Berry and Berry (1999) also introduce some other diffusion models. Leader-laggard models assume that certain states are pioneers in the adoption of a policy and that other states emulate these leaders. The idea for isomorphism models is that a state is most likely to take cues about adopting a new policy from other states that are similar, as these states provide the best information about the nature of the policy and the likely consequences of adopting it. Vertical influence models are very similar to policy coercion model introduced above.

The brief introduction about policy diffusion helps us understanding why and how policies diffuse conceptually; next I am going to survey some studies that could help us gain some understandings about policy diffusion empirically.

Corresponding to Graham, Shipan and Volden's study in 2008, Shipan and Volden (2008) investigate the role of the four mechanisms (learning, competition, imitation, and coercion) of policy diffusion in the choice of antismoking policies adopted by 675 largest U.S. cities between 1975 and 2000. After examining the record of adoption of any of three antismoking laws (restrictions on smoking in government buildings, restrictions on smoking in restaurants, and youth access restrictions) of 675 cities, Shipan and Volden confirm that a city is more likely to adopt a policy if the same policy is adopted broadly by other cities throughout the state, or its nearest bigger neighbor adopts the same policy, or there are positive spillovers from nearby cities. By comparison, a city is less likely to adopt a policy if there are negative economic spillovers from that adoption to nearby cities. They have also found that learning is enhanced in bigger cities; smaller cities are more concerned with economic competition; larger cities are less likely to rely on imitation; there is no effect with coercion-population interaction, that is, both large and small cities are coerced by the states in which they are situated.

Berry and Berry's (1990) seminal study of state lottery adoptions as policy innovations employed an Event History Analysis (EHA) to explain state policy makers' decision behavior. When exploring the cause for a government to adopt a new program or policy, the literature back then offered either internal determinant models (i.e. political, economic, and social characteristics motivate policy adoption) or regional diffusion models (i.e. policy adoption decisions are influenced by nearby states). And those two

types of models do not offer insight to each other. Berry and Berry argue that these two views can be integrated together as a unified model to provide more reliable explanations. The authors use an EHA to perform the empirical investigation. Policy adoption, a lottery in this case, by a state is considered as an event. The dependent variable is binary. A risk set is defined as a state is coded 1 if it is "at risk" of enacting a lottery and 0 if the state has already done so. Because of the dichotomous nature of the dependent variable, Probit estimation is applied to perform the analysis. Berry and Berry confirmed all of their core hypotheses, namely, both internal determinants and regional influence received strong support. More specifically, the more fiscal stress a state faces, the higher the probability to adopt a lottery. The lower the level of per capita income, the lower the probability of a lottery adoption. The more a state's neighbors adopt the lottery, the higher probability of the state to adopt a lottery. The only exception is that unified party control was not statistically significant, but it makes sense because lotteries are not very controversial.

Berry and Berry's intelligent contribution (i.e. adopting EHA) to the diffusion literature provided a new path for future research. By applying EHA, Mintrom (1997) tackles the diffusion of innovations from a different perspective: how the presence of policy entrepreneurs-"political actors who promote policy ideas" (Mintrom, 1997; p.738)-articulate policy innovations onto government agendas and energizes the diffusion process. Mintrom looks specifically at the approval of school choice, an idea that the schools can be chosen for children and not determined based on districts, for educational reform. The author creates a taxonomy of event history, which is very similar to Berry and Berry's (1990) work, predicts the probability that a state considers the school choice at a specific time (i.e. hazard rate). Examining the data between 1987 and 1992, Mintrom

confirms that the presence of policy entrepreneurs increases the possibility that a state considers school choice and approval of school choice as a policy innovation.

Volden (2006) builds directed dyad-year event history analysis, modified based on traditional state-year EHA, to examine policy changes in the Children's Health Insurance Program from 1998 to 2001. Volden claims there are two limitations that typical EHA are subjected to. First, it is really hard for typical EHA to discern whether a perceived successful policy helped policy diffuse across states or not. Second, "rather than focus on *whether* a policy is adopted in the states, scholars may learn more about policy diffusion by focusing on *which* policy is adopted" (Volden, 2006; p.295). Directed dyad-year EHA helps to overcome those limitations by examining each pair of states in each year. Equipped with this new model, Volden confirms that successful and low cost policies are more likely to be adopted by other states.

So far, all the articles reviewed cover lots of policy fields, ranging from tax competition and lottery adoptions to school choice. Although they are not directly related to the topic of this paper, they serve as an introduction to spatial studies and policy diffusion research, and also provide theoretical foundation for my own research. Next, I am going to review a small set of articles that are directly related to the core idea of this paper: the diffusion of privatization policy.

Schmitt (2011) addresses what mechanisms lead to the diffusion of telecommunications privatization in the OECD world. In order to identify spatial interdependencies for privatization policies, Schmitt builds four different models that contain different weighting matrices. The first model uses an inverse distance weighting matrix. The second model uses a weight matrix combined with a dummy variable to see

if two countries share a common language. The third model captures the trade volume between two countries. And the last one uses annual turnover rate of the national telecommunications provider for the weight matrix. By examining a panel dataset for 18 OECD countries between 1980 and 2007, Schmitt claims that spatial interdependency is a statistically significant indicator for telecommunications privatization. Countries that have similar geographical or economic conditions are more likely to adopt the same or similar policy. And the diffusion of privatization policy is highly correlated with the openness of the economy. However, countries with similar cultural background seem not to converge on adoption of privatization policies.

Using a sample of 37 Latin American and OECD countries during the period 1980 to 1997, Meseguer (2004) shows rational learning and especially emulation are two most important indicators for privatization decisions. Similarly, Livi-Faur points out policy transfer in Latin American countries is “emulative, coercive and simple” (Levi-Faur, 2003; p.730), and in Europe country policy tends to spread horizontally from country to country due to the fact that European countries tend to emulate each other. Brooks (2005) studies pension privatization from 59 countries with a time span of 1980 to 1999. She reveals that horizontal transformation matters, “the decision to privatize pensions in one country is systematically linked to corresponding decisions made by governments in relevant peer nations” (Brooks, 2005; p.273). However, the strength of this peer dynamic differs around the world. Eastern European and Central Asian nations are more likely to adopt pension privatization if their peers have already done so. Peer dynamics are also highly correlated to policy adoption in Latin America, whereas the OECD world seems to ignore the peer coercion.

Bouche and Volden (2011) ask how four foster care policies spread across 384 counties in five states between 1995 and 2006 and how public and private providers take them differently. In order to capture the full mechanisms of policy diffusion, Bouche and Volden hypothesized: (a) policy diffuses across counties where latecomers learn from early adopters, and (b) privatization increases the likelihood of adopting innovations since privatization injects competition into the public sector. The first hypothesis received partial support, only the learning mechanism (proportion of state population already covered) showed up as statistically significant. The privatization hypothesis received full support from the empirical results. Bouche and Volden found that "both public and privatized counties learn, and learn from the experiences of both public and privatized counties" (Bouche and Volden, 2011; p.439).

All of the aforementioned studies contribute to the literature in various ways. Section 2 outlines the model and variables in the model.

2.2 Model of Local Government Outsourcing and Variable Selection

Following the lead of Berry and Berry's (1990) influential study of lottery adoptions, I incorporate both internal determinants (i.e. political, economic, and social characteristics motivate policy adoption) and diffusion (i.e. policy adoption decisions are influenced by similar jurisdictions) to form a unified model to perform the analysis. Berry and Berry (1990) argue the estimations are more reliable this way. The next section specifies model details.

2.2.1 A Spatial-Autoregressive Model with Spatial-Autoregressive Disturbances

The dependent variable is the proportion of services provided by contracting out with for-profit firms or non-profit organizations. The response is obtained from

International City and County Management (ICMA)'s Alternative Service Delivery (ASD) survey data. ICMA conducts ASD survey asking cities and counties about how 67 services are delivered: provided in house or contracted with private for-profit firms or non-profit organizations if they provide the service. Although Fernandez, Ryu and Brudney (2008) developed their dependent variable by counting the number of services provided through privatization using the same dataset, my method takes into consideration that not all cities or counties provide all services, thus capturing a more accurate picture.

Given the unified model measures spatial interdependencies among local governments, ordinary least square (OLS) model does not fit the task for the following reason.

A standard OLS model can be written as:

$$y_i = X_i\beta + \varepsilon_i \tag{1}$$

One of the standard assumptions of OLS is that the error term ε_i is uncorrelated across observations. In addition, as we know, all unobserved and/or measured variables are categorized into error terms. However, a basic spatial insight is that "everything is related to everything else, but closer things are more closely related"[5] (Waldo Tobler's First Law of Geography, 1970). As such, "errors" ε_i in the current observation are correlated to the "errors" ε_j in other units, which is contradictory to the assumption made by OLS. (Beck and Beardsley, 2006)

Fortunately, the solution for that is readily available. Building off of Cliff-Ord's spatial-autoregressive (SAR) model, introducing a right-hand-side variable as a spatial

[5] This assumption will be tested later in the paper.

lag to address spatial spillovers in the dependent variable, a spatial autoregressive model with autoregressive disturbances is developed to address the concern raised above (Kelejian and Prucha, 1998; Drukker, Prucha, and Raciborski, 2011). The model allows "for spatial interactions in the dependent variable, the exogenous variables, and the disturbances" (Drukker, Prucha, and Raciborski, 2011, p.3):

$$priva\_pro = \lambda \cdot W \cdot priva\_pro + X\beta + u \quad (2)$$

$$u = \rho M u + \varepsilon \quad (3)$$

Where

priva_pro is the dependent variable, proportion of services privatized (an $n \times 1$ vector);

W and **M** are $n \times n$ inverse distance spatial-weighting matrices (with zero diagonal elements);

Wpriva_pro and **Mu** are $n \times 1$ vectors typically referred to as spatial lags, and λ and ρ are the corresponding scalar parameters referred to as spatial-autoregressive parameters;

X is an $n \times k$ matrix of observations on k right-hand-side exogenous variables (where some of the variables may be spatial lags of exogenous variables), and β is the corresponding $k \times 1$ parameter vector. **X** will be specified in next section;

ε is an error term.

In sum, the model specified above is suitable for estimating the spatial dependency with the dependent variable of proportion of services privatized. The next section introduces variables used for the analysis.

2.2.2 Variable Selection

I begin by specifying the connectivity matrix chosen for the spatial autoregressive model. A connectivity matrix "specifies the degree of interdependence between any two observations" (Beck, 2006; p.28). There are normally two connectivity measures geographically: a binary measure of contiguity (i.e. two units are next to each other or closer than a certain distance) and a continuous measure of distance between two units. Although it is optimal to have both measures included in the model (Bouche and Volden, 2011), based on the low response rate for ICMA's ASD survey (i.e. 26.2% for the 2007 ASD survey, 23.9% for the 2002-2003 ASD survey, and 32% for 1997 the ASD survey), the only option I have is to include a continuous measure of distance between two units, more specifically, an inverse distance weighting matrix.

An inverse-distance matrix is calculated as follows. Denote the matrix W, with w_{ij} a typical element in W. $w_{ij} = 1/D(i,j)$ where **D(*i,j*)** is the distance between places *i* and *j*. In practice, ***W*** is often normalized for analysis. In this case, ***W*** is going to be normalized by row, which means each element in row ***i*** is divided by the sum of row ***i's*** elements. (Beck, 2006; Kelejian and Prucha, 1998; Drukker, Prucha, and Raciborski, 2011)

Other explanatory and control variables include political actors and institutions, socio-economic characteristics, and demographic variables. Following the lead of Fernandez, Ryu, and Brudney's (2008) study, various variables will be included in the model, such as "citizens' preference for the size and role of government; the political ideology and partisanship of citizens and elected officials; and public employee and union strength at the local level" (Fernandez, Ryu, and Brudney, 2008; p. 442).

It is a common belief that citizens' preference could shape and affect policy makers' decisions. It is especially so at a city level because of "physical proximity among citizens and elected officials compared to other levels of government" (Fernandez, Ryu and Brudney, 2008; p.442). As such, I expect local citizens opposition to privatization (*citizen opposition*) and local elected officials opposition to privatization (*official opposition*) are all negatively correlated with privatization practices. Additionally, as strong desire for small and efficient government became widespread among the U.S. localities, citizens' desire of a decreased role for government (*small government*) should have a positive impact on local outsourcing.

A city manager with professional training background is more likely to understand how to compose a comprehensive contract for outsourcing and how to appropriately manage and monitor the contract. Thus a city manager is more likely to rely on outsourcing as a means to deliver services (*council-administrator/manager*). Speaking of managerial strength of a city manager, Fernandez et al. (2008) listed a neat set of managerial factors, which will be incorporated in this paper. Those are:

> 1) ex ante analysis and planning efforts (*ex ante management*), which is a factor score created from dichotomous ICMA survey indicators of whether the local government identified successful privatization initiatives in other jurisdictions, established a citizens' advisory committee on privatization, and hired consultants to study the feasibility of privatization. 2) Monitoring capacity (monitoring capacity) is a factor score created from dichotomous ICMA survey indicators of whether the local government evaluated citizen satisfaction, cost, and compliance with standards of private service delivery, and whether it employed citizen surveys, monitoring of citizen complaints, field observations, and analysis of data and records to evaluate private service delivery. 3) External stakeholder involvement (*external involvement*) is an index score (0-6) created from dichotomous ICMA survey indicators of whether the following external stakeholders were involved in studying the feasibility of privatization: potential service providers; professional consultants; service recipients/customers; managers in other local governments; citizen advisory committees; and state agencies, leagues, and associations. And 4) measuring efforts to reduce legal barriers to privatization at the local level (reduce legal barriers), a factor score created

> from dichotomous ICMA survey indicators of whether the local government recommended changes in state and local law to ensure success in implementing privatization. (Fernandez, Ryu, and Brudney, 2008; p. 446)

All four managerial factors should be positively correlated with the dependent variable. Public employees and unions play a critical role in the use of privatization. In this regard, public officials' opposition and public employees' opposition to the use of outsourcing should have negative impacts on local privatization. (Fernandez, Ryu, and Brudney, 2008) However, due to data availability, union variable at local level is not included in the analysis.

Many scholars in privatization research give attention to fiscal stress and competition among providers (Dilger, *et al.* 1997; Brown and Potoski, 2003; Morgan, and England, 1998; Greene, 2002; Boyne, 1998; Fernandez *et al*., 2008). Therefore, the following variables are included in the model as proxies for how well a local government is doing: short term debt, long term debt, and a factor score created from three dichotomous ICMA survey indicators of perceived fiscal stress (*perceived fiscal stress*). A dichotomous ICMA survey indicator of insufficient supply of competent private providers (insufficient providers) is included in the model for competition measure. Again, the last three variables are borrowed from Fernandez *el al*. (2008).

In addition, full time pay per employee is believed to have a negative impact on the use of outsourcing based on two reasons. First, the higher pay means a municipality would be able to recruit higher skilled workers, who are more capable to provide services in-house. Second, city employees that enjoy higher pay may want to retain their benefits by opposing to the use of outsourcing. However, one plausible counter argument is that if a jurisdiction with higher paid workers do not behave any better than other jurisdictions, higher full time pay may actually trigger public officials to consider the use of

outsourcing in order to provide services more efficiently. Considering I do not have the performance measure at this point, I argue full time pay per employee is negatively correlated with the use of outsourcing.

Total tax revenue and direct expenditure are included as a proxy for the size of public employee labor force since the total number of employees are subjected to endogenous issue (i.e. outsourcing is used as a means to reduce city labor force by some local jurisdictions). Local population and metro status are included as control variables.

2.2.3 Data

Table 2.1: Independent and Control Variables

Variable	Sources of data	Expected Impact
Full time pay per employee	U.S. Census Bureau	-
External Involvement	ICMA	+
Citizen opposition	ICMA	-
Official opposition	ICMA	-
Small government	ICMA	+
Reduce legal barriers	ICMA	+
Employee opposition	ICMA	-
Ex ante evaluation	ICMA	+
Monitoring capacity	ICMA	+
Insufficient Providers	ICMA	-
Taxes	U.S. Census Bureau	
Direct Expenditure	U.S. Census Bureau	
Short term debt	U.S. Census Bureau	+
Long term debt-Private Purpose	U.S. Census Bureau	+
Long term debt-Public Purpose	U.S. Census Bureau	+
Perceived fiscal stress	ICMA	+
Population	U.S. Census Bureau	
Metro Status	ICMA	
Form of Government	ICMA	
Region	ICMA	

The privatization data are purchased from the International City/County Management Association (ICMA). The survey covers service delivery choices for the

following areas: public works/transportation, public utilities, public safety, health and human services, parks and recreational activities, cultural arts, and support services. The survey data obtained are for the year 2007. In addition, ICMA data is augmented with city and county financial and demographic data that are obtained from the Census to form the final dataset. Table 2.1 shows sources of independent variable, level of analysis, and expected sign associated with each variable.

Total tax revenue, debt, and expenditures are all measured in millions of dollars. Geographic region and Metro Status are categorical variables. Geographic region has four categories: 1=Northeast (New England and Mid-Atlantic), 2=North Central (East North-Central and West North-Central), 3=South (South Atlantic, East South-Central and West North-Central), and 4=West (Mountain and Pacific Coast). Metro status has three categories: (1) central cities, (2) suburban, and (3) independent cities. Summary statistics are shown in Table 2.2.

Table 2.2: Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Proportion of services privatized	1041	0.315	0.196	0.020	0.935
Full time pay per employee ($1000)	1041	40.239	1.012	1.428	7.968
External involvement	1041	0.671	0.992	0	6
Citizen opposition	1041	0.125	0.331	0	1
Officials opposition	1041	0.159	0.366	0	1
Demand small government	1041	0.069	0.254	0	1
Legal restriction	1041	0.183	0.386	0	1
Employee opposition	1041	0.191	0.393	0	1
Ex ante evaluation	1041	0.279	0.449	0	1
Monitoring capacity	1041	0.476	0.500	0	1
Insufficient provider	1041	0.122	0.327	0	1
Tax	1041	0.153	0.313	<0.001	5.192
Direct expenditure	1041	0.363	0.772	0.001	13.4
Short term debt	1041	0.007	0.026	0	0.202
Long term debt-private purposes	1041	0.076	0.432	0	8.178
Long term debt-public purposes	1041	0.407	1.186	0	16.2
Perceived fiscal stress	1041	0.455	0.498	0	1
Region indicator	1041	2.546	1.022	1	4
Form of government indicator	1041	1.867	0.686	1	7
Metro Status	1041	2.090	0.609	1	3
Population	1041	45857	96351	2522	1552259
Population category indicator	1041	5.616	1.418	0	8
Population Square (1,000,000 squared)	1041	0.001	0.010	<0.001	2.41

Note: Tax, debt, revenue and expenditure are in millions.

This section outlines the model and variables used for the analysis. Section 3 presents the empirical test results and offers some discussions. It is worth noting that although the response rate for the 2007 ICMA survey was 26.2%, the sample was representative in terms of size of population, geographic region, and metropolitan status. The only exception is that Northeast region is a bit under represented (i.e. 19.8% local jurisdictions responded to the survey in this region); whereas West region is somewhat

overrepresented (i.e. 33.4% local jurisdictions responded to the survey in this region). As such, the results should be generalizable to nonrespondents with some caution.

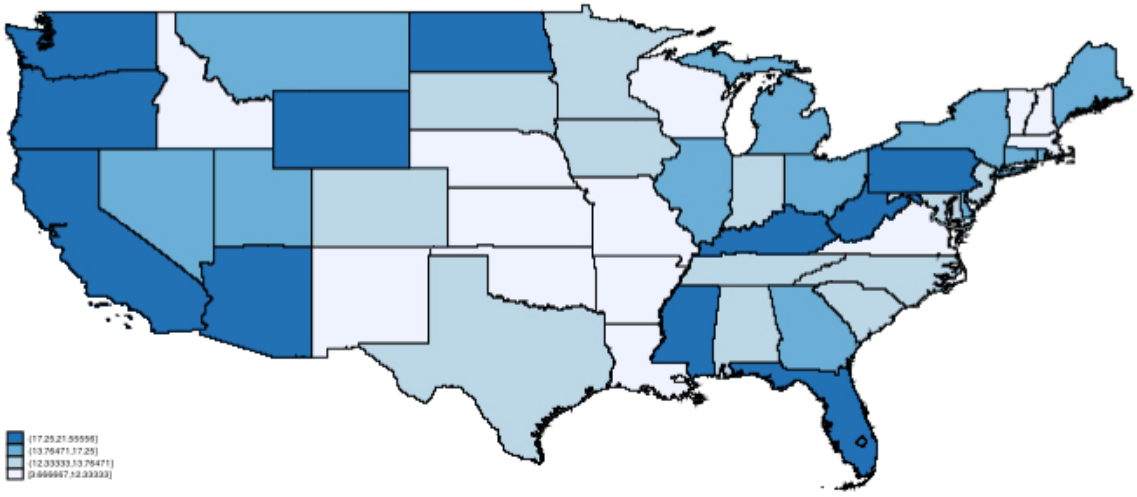
2.3 Empirical Results and Discussion

Due to the nature of a spatial study, Alaska and Hawaii are excluded from the study. A dataset of 1041 observations is formed after merging the ICMA ASD 2007 dataset with the US Census Bureau's database on individual local government employment ("IndEmp") and local government finances ("IndFin").

The number of services provided by the 1041 jurisdictions that are in the dataset ranges from 6 to 67, with an average of 43 services provided to their citizens. Among those services, on average, 32% are provided through privatization. The percentage of services privatized goes down as low as 2%, and goes up as high as 93%. Although the level of analysis for the study is at municipal level, considering the relatively low response rate of ICMA ASD survey, I aggregate the average percentage of service privatized to state level to see if there is any pattern geographically across the US (for illustration purposes only).

The darker shade represents, on average, higher percentages of services delivered through outsourcing. As we can see from the map, the pattern is obvious. There are two blocks on the map utilizing privatizations more than others. One block is the states on the west coast; another block is the states of Pennsylvania, West Virginia, Kentucky, and Illinois. It is also obvious that the states located in the central U.S. use outsourcing the least. It is clear that states that have lower percentage of their services outsourced also stick together.

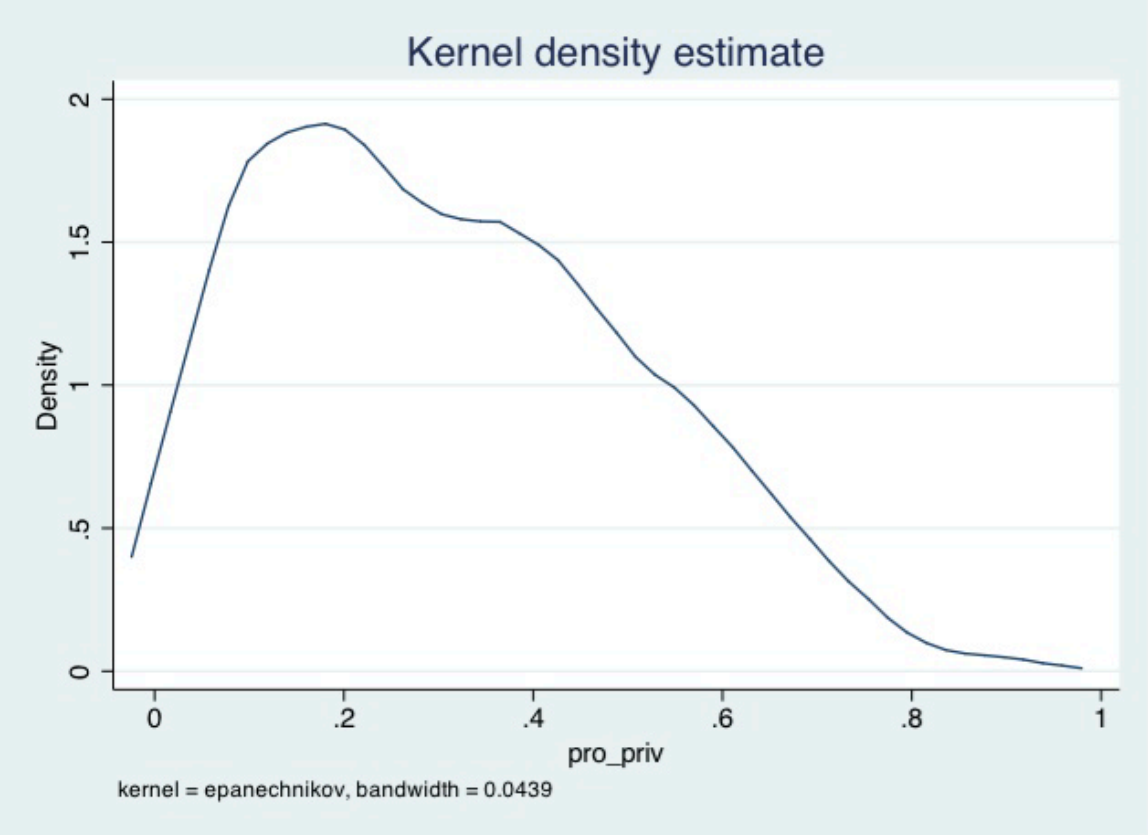
Figure 2.1: Average Percentage of Services Privatized by Municipalities in a State: 2007



Before running the analysis, one problem emerged. A percentage dependent variable that is bounded between 0 and 1 could be problematic in the regression analysis. In addition, Kernel density curve reveals that the dependent variable is not normally distributed (Figure 2.2).

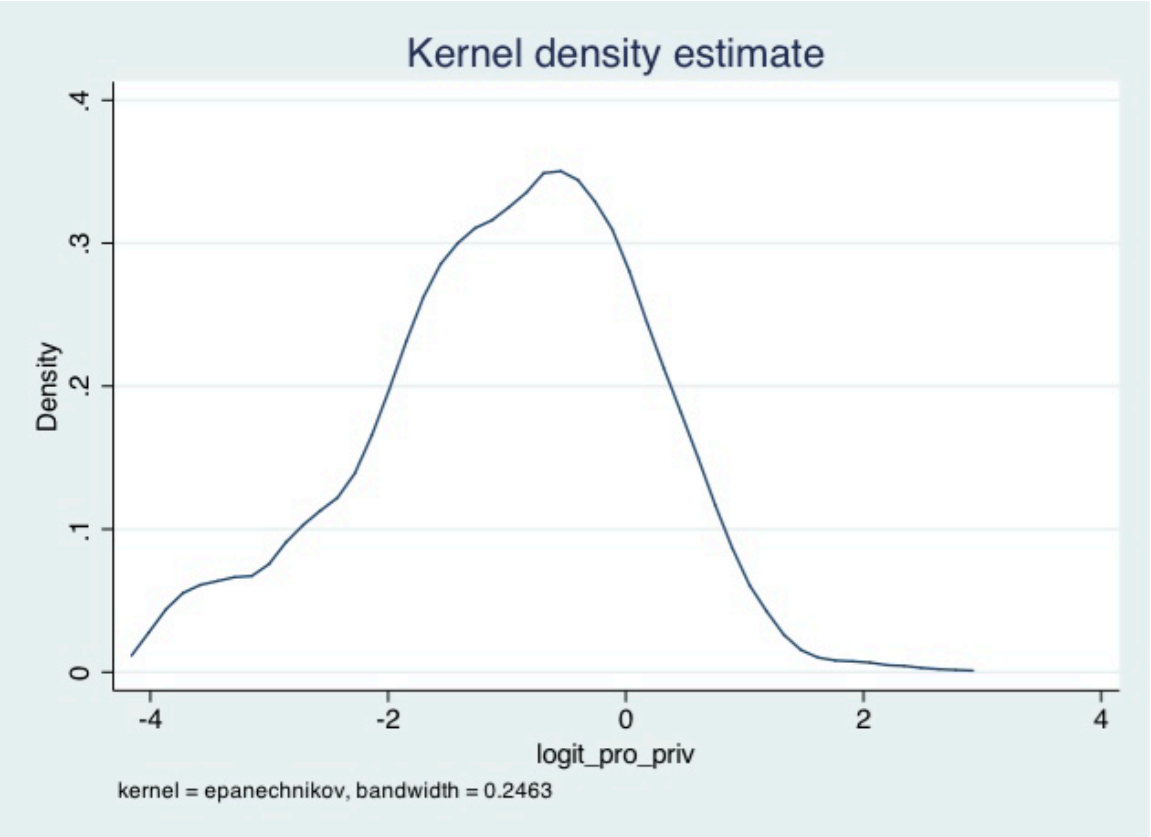
When such problem presents, it is customary to take a logit transformation to map the dependent variable from 0 to 1 to a real line. Moreover, after the transformation, the kernel density curve shows the dependent variable is approximately normally distributed (Figure 2.3). Therefore, the logit transformation of the dependent variable is used as dependent variable in the regression.

Figure 2.2: Kernel Density Curve of Percentage of Service Privatized



In order to verify the validity to use spatial-autoregressive model, spatial autocorrelation of the dependent variable needs to be tested. Both Moran's I and Geary's C are widely used in the literature to test for spatial autocorrelation. Based on the dataset we have, a 1041X1041 normalized row inverse distance matrix (***W***) is created. Using dependent variable "proportion of services privatized" and ***W***, Moran's I and Geary's C are calculated as shown below.

Figure 2.3: Kernel Density Curve of Logit Transformation of Percentage of Service Privatized



Both Moran's I and Geary's C test statistics are statistically significant at the 1% level, which indicates that autocorrelation is significant at the 1% level. The value of Moran's I lies between -1 and 1. A positive test statistic means positive autocorrelation while a negative value means negative autocorrelation. Geary's C's value ranges from 0 (indicating perfect dispersion) to 2 (perfect correlation). Both Moran's I and Geary's C suggest the proportions of services privatized are positively auto correlated.

Those two tests verify the validity of using a spatial-autoregressive model with spatial-autoregressive disturbances. Empirical results are presented in Table 2.4. The first model is analyzed without state fixed effects, which serves as a basic model. The second

model incorporates state fixed effects to see if state fixed effects could have any additional power to explain the use of outsourcing.

Table 2.3: Moran's I and Geary's C Test

	Proportion privatized	Z	p-value
Moran's I	0.039	9.208	<0.001
Geary's C	0.966	-5.629	<0.001

The first two columns show results from the first model. External involvement, as defined earlier, is an index score that sums up who outside a local government organization is involved in evaluating the feasibility of private service delivery. The results suggest the more external actors involved, the more a local jurisdiction outsources its service. This is consistent with our hypothesis because a higher score also indicates that local officials actively seek out alternatives. The measure of scarcity of service providers (insufficient provider) is negatively correlated with the percentage of services outsourced. The impact is as expected since privatization would not be a good candidate if the private market is not competitive. By comparison, more services will be outsourced if a local government enhances its monitoring capacity. In addition, the level of a local jurisdiction's long term debt is positively correlated with the percentage of services outsourced. On average, $1 million debt contributes to 12.7% more services privatized.

Table 2.4: Estimated Effect of Explanatory Variables on Percentage of Service Outsourced (log transformation)

	Log Transformation of Percentage of Service Outsourced		Log Transformation of Percentage of Service Outsourced with State f.e.	
	Coefficient	**Std. Err.**	**Coefficient**	**Std. Err.**
Full time pay per capita ($1,000)	-0.015	0.035	0.017	0.041
External involvement	0.082**	0.040	0.104***	0.040
Citizen opposition	-0.172	0.121	-0.171	0.123
Officials opposition	0.046	0.112	0.005	0.113
Demand small government	-0.076	0.136	-0.048	0.139
Legal restriction	-0.037	0.096	-0.056	0.099
Employee opposition	0.019	0.104	-0.006	0.106
Ex ante evaluation	-0.011	0.088	-0.024	0.088
Monitoring capacity	0.139*	0.075	0.124*	0.075
Insufficient provider	-0.296***	0.104	-0.262**	0.108
Tax	0.150	0.371	-0.183	0.515
Direct expenditure	-0.291	0.202	-0.253	0.229
Short term debt	0.314	1.320	2.420	1.620
Long term debt-private purposes	0.127*	0.076	0.116	0.077
Long term debt-public purposes ($Millions)	0.054	0.065	0.061	0.074
Perceived Fiscal Stress	-0.087	0.179	0.006	0.182
Metro status_2_Suburban	0.235**	0.111	0.244**	0.113
Metro status_3_Independent	0.008	0.128	0.109	0.134
Form of gov. Council-manager	0.045	0.075	-0.027	0.086
Form of gov. Commission	0.180	0.287	-0.178	0.331
Form of gov. Town meeting	0.215	0.166	0.237	0.270
Form of gov. Representative town meeting	-0.502	0.342	-0.502	0.439
North Central Region	-0.120*	0.063	NA	NA
South Region	-0.107	0.080	NA	NA
West Region	-0.222***	0.077	NA	NA
Population	-0.095	0.847	0.550	0.900
lambda (spatial-autoregressive parameter for Wpriva_pro)	1.885***	0.171	2.043***	0.197
rho (spatial-autoregressive parameter for Mu)	-2.106***	0.391	-2.662***	0.410

Geographic region has four categories: Northeast, North Central, South, and West. Northeast region is the base group. The results suggest that South region does not behave statistically differently from the Northeast region in terms of privatization activities.

North Central region and West region tend to privatize less when comparing to Northeast region. Metro status has three categories: (1) central cities, (2) suburban, and (3) independent cities. There is no statistical difference between central cities and independent cities, but suburban cities are more likely to privatize. On average, a suburban city outsources 23.5% more of its services than a central city. This result verifies our argument that suburban cities are more likely to adopt privatization as a means to deliver their services. A positive and statistically significant lambda in the direct reaction function indicates that a local government's sourcing decision is influenced by its nearby neighbors.

The results from the second model remain similar to the first model. Since the state fixed effects are introduced in the analysis, the region categorical variables are no longer needed in the analysis. The coefficients and standard errors on other independent variables change slightly. The only difference, when controlled for state fixed effects, is that the debt level does not show any statistical significance.

2.4 Conclusion

This chapter brings privatization studies and a spatial model together to explore factors that contribute to local jurisdictions' sourcing decisions. A spatial-autoregressive model is used to test the hypothesis. Moran's I and Geary's C tests verify the autocorrelation of privatization activities. This study examines privatization practices at the local level comprehensively. The dataset contains more than 1000 municipalities. This study incorporates spatial econometric techniques to assess how privatization practices are affected by various factors. Both of these are rarely seen in privatization literature.

The results suggest the form and location of local governments matter when it comes to privatization. More specifically, North Central and South regions tend to privatize less compared to the Northeast region. Suburban cities rely more on outsourcing than central cities. In addition, external stakeholders' involvement and monitoring capacity exert positive pressure on the use of outsourcing whereas a limited supply of private vendors impedes it. Some policy implications can be derived from the results shown above.

First of all, a positive spatial-autoregressive parameter in the direct reaction function indicates that learning from other nearby local jurisdictions is important for public officials who consider the use of outsourcing. Such practice not only help local officials to identify dos and don'ts prior to outsourcing a service, but also provide potential opportunities for inter municipal cooperation. Second, getting more external stakeholders on board also helps to facilitate the use of outsourcing. At the same time, enhanced monitoring capacity helps ensure the quality of the service outsourced, which in turn boosts the use of privatization. Last but not least, when the potential market for contracting out services is not competitive, it is helpful for local officials to broaden their view. One possibility is to contact nearby local jurisdictions to see if inter municipal cooperation is feasible. Another possible solution to the problem is to look beyond the local market. It is possible that national market might be thick and robust when potential service provider is lacking at local level.

Chapter 3. Produce or Buy? -- An Analysis of Government Procurement from Transaction Cost and Revenue Volatility Perspective

Governments traditionally provided all kinds of goods and services in-house; however, as more citizens demanded more civil services and more efficiency, governments began to think about how to deliver those services in an effective manner (Brown and Potoski, 2003). More recently, the demand for "do more with less" is more urgent than ever before as the recession eroded cities' financial stability and widened budget shortfalls and deficits. In the worst case, cities have had to file for bankruptcy or declare financial emergency[6] to cope with the situation.

Privatization came to surface as a perfect solution for deficit-plagued governments as it is thought to be more cost effective and outperform the public sector in most cases. Municipalities turn to private provision to deliver public services as a means to reduce cost and cushion the financial uncertainty. One extreme example is that public officials of Maywood, California have announced that the city had fully outsourced on July 1st, 2009, becoming the first city to do so in the country[7]. However, the city lost its contractor as a pay and pension scandal erupted. Although this case is a bit extreme, the use of outsourcing has become widespread all across the U.S. As such, it is essential to understand how to properly specify the conditions under which it is optimal to buy and under which it is optimal to produce in-house, so that when a city decides to outsource, it can claim the benefits (cost saving, improved performance) and avoid hazardous outcomes (pay dispute, corruption, pension scandal). I apply a transaction cost economics

[6] Deficits Push N.Y. Cities and Counties to Desperation. Available at: http://www.nytimes.com/2012/03/11/nyregion/deficits-push-municipalities-to-desperation.html?pagewanted=all&_r=0

[7] The Pros and Cons of Privatizing Government Functions. Available at: http://www.governing.com/topics/mgmt/pros-cons-privatizing-government-functions.html

(TCE) framework complemented with revenue volatility measure to analyze contracting decisions.

The article is divided into five sections. The first section outlines the original TCE argument and revenue volatility. Section 2 presents theoretical considerations and a brief literature review. Section 3 details model, method and variable selections. Empirical results are shown in section 4. The conclusion follows.

3.1 Transaction Cost Economics (TCE) and Revenue Volatility

Because transactions differ in their attributes and governance structures, transaction cost economics aims to determine in which way transactions can be aligned in a transaction-cost-economizing way, which means minimizing the cost for each transaction (Williamson, 1981). This is complemented by assessments of revenue volatility in order to draw efficient boundaries between firms and markets. The concept of efficient boundary here refers to either a firm making a component itself or buying it from an autonomous supplier. Also TCE treats the transaction as the basic unit of analysis (Williamson, 1981). In this manner, TCE can be a crucial analytical tool in deciding whether governments should “produce or buy”.

In order to better understand TCE, assumptions about human actors, the dimensions of transaction, and governance structures are now introduced.

3.1.1 Human Actors

In contrast to neoclassical theory, people in TCE are subjected to bounded rationality and opportunism. To put it differently, bounded rational actors (either principals or agents) are believed to possess limited analytical and data processing abilities, thus experiencing difficulties in formulating and solving complex problems and

in processing (receiving, storing, retrieving, transmitting) information. TCE also recognizes that at least some agents are opportunists who seek self-interest with guile (i.e. disguise attributes or preferences, distort data, obfuscate issues). As such, "incomplete contracting is the best that can be achieved" due to the inability to account for possessed information, future events and opportunism behaviors (Williamson, 1981).

3.1.2 Governance

Commons (1932) expresses the idea that a transaction "must include in itself the three principles of conflict, mutuality, and order". By following this idea, Williamson (2002) defines governance as "the means by which to infuse order, thereby to mitigate conflict and to realize 'the most fundamental of all understandings in economics,' mutual gain from voluntary exchange." In this manner, governance structures could fit into a spectrum. Simple transactions (i.e. office supplies) lie at one end, which represents a pure, anonymous spot market. Markets are thick and competitive at this end. An example would be purchasing office supplies, let us say a printer. Although a buyer may not have the necessary information to know how much it costs to manufacture a printer, because there are multiple vendors (thick market) selling printers, and the market is competitive, she could easily obtain a retail price that ensures she is not overpaying for the product.

By comparison, another end is the fully integrated firm that owns all parts of the supply chain and production process. Again, let us assume printers with very sophisticated technologies that are used in some extreme places (i.e. printers that work in space or Arctic). Under this scenario, the retail price may be way over the production cost due to information asymmetry and non-competitive market. Therefore, the best way to obtain the cost and reasonable retail price is to own the manufacturer and supply

channels. Between the two extremes are “hybrid” modes (i.e. complex contracts and partial ownership arrangements) (Shelanski and Klein, 1995).

3.1.3 Dimensions of Transaction

As the name of TCE suggests, the transaction is critical to TCE analysis. Thus how to better understand transactions is crucial for the analysis. Williamson defines three dimensions of transactions: (1) uncertainty, (2) the frequency with which transactions recur, and (3) asset specificity. Among the three, Williamson (1981) claims asset specificity is the most important dimension for describing transactions. Asset specificity can be described as:

> Site specificity, as when successive stations are located in cheek-by-jowl relation to each other so as to economize on inventory and transportation expenses; physical asset specificity, as where specialized dies are required to produce a component; and human asset specificity that arises from learning by doing (p.555, Williamson, 1981).

When assets are nonspecific, markets are thick and competitive, thus there are lower transaction costs and governance cost through buying rather than making. In addition, markets could combine uncorrelated demand and take advantage of scale economies. Classical market operations are preferred in this scenario. The printer example mentioned above also fits here. However, the advantages for using classical market reduce when assets are semi-specific. For example, when site specificity is needed (i.e. buyer requires manufacturer nearby), the mobility for a purchaser to buy is confined. As such, transaction costs rise because “exchange takes on a progressively stronger bilateral character” (Williamson, 1981). Unified ownership (internal production) is the best way to go when assets are highly specific.

In addition, uncertainty is another key factor in terms of TCE analysis. Bajari and Tadelis (2001) use a perfect example to illustrate uncertainty, which is the building of the

Getty Center Art Museum in Los Angeles. The museum cost $1 billion and took over 8 years to construct. (See Engineering News0Record, 1994 and 1997)

> The project design had to be changed due to site conditions that were hard to anticipate. The geology of the project included canyons, slide planes, and earthquake fault lines, which posed numerous challenges for the team of architects and contractors. For instance, contractors "hit a slide" and unexpectedly moved 75,000 cubic yards of earth. More severely, in 1994 an earthquake struck. Cracks in the steel welds of the building's frame caused the contractors to reassess the adequacy of the seismic design standards that were used. The project design also had to be altered due to the regulatory environment – 107 items had to be added to the building's conditional use permit. (p.388, Bajari and Tadelis, 2001)

As we can see, such problems are extremely hard to anticipate. TCE expects transaction cost increases as uncertainty rises. High uncertainty will for sure increase transaction costs, such as high cost for writing a comprehensive contract or renegotiation cost due to the rise of unexpected issues. However, "TCE does not predict that uncertainty would itself lead to hierarchical governance." It is contingent on asset specificity. If future demand is unclear but assets are nonspecific, the future markets might be competitive and there will likely be many potential suppliers for a component; thus it is cheaper to buy than produce in-house. Otherwise, making internally will be preferable to buying (Shelanski and Klein, 1995).

All in all, TCE was originally developed to address issues mainly in the context of commercial organizations; however, as Williamson put it, so long as any issue can be framed as a contracting problem, directly or indirectly, the issue can be analyzed in transaction-cost-economizing terms (Williamson, 1981). And now, TCE has shown up in various arenas, such as vertical and lateral integration, transfer pricing, corporate finance, marketing, the organization of work, long-term commercial contracting, franchising,

regulation, the multinational corporation, company towns, and other contractual relationships, both formal and informal (Shelanski and Klein, 1995).

Although TCE is a key aspect of determining the produce-or-buy decision for government procurement, it is not sufficient. There are several reasons for that; first of all, TCE aims to bring efficiency into transactions. However, efficiency is not the sole focus for government; it is not even a major focus sometimes. Additionally, fiscal stress is widely regarded as the leading cause for out sourcing in the U.S. local governments (Dilger, *et al.* 1997; Brown and Potoski, 2003; Morgan, and England, 1988). Despite how efficient and/or how cost-effective the contract is, governments need to come up with the revenue to cover the cost.

Here I incorporate a financial well-being measure, revenue volatility, to serve as a key determinant for local governments outsourcing.

3.1.4 Revenue Volatility

Revenue volatility, similar to the financial risk in corporate business, indicates that the market return or profit is fluctuating and hard to predict over time (Yan and Wang, 2010). Revenue volatility measures to what extent the actual revenue differs from the expected revenue (White, 1983). A stable revenue stream helps governments maintain effective operation; whereas volatile revenue "can affect the continuity of public service delivery and cause other long run inefficiencies" (Yan and Wang, 2010; p.3).

Regardless the importance of the TCE framework and revenue volatility for explaining local governments' privatization decisions, there are other factors that need to be taken into consideration. In the private sector, consumers normally do not care who produces/delivers the goods/services as long as they get what they want. This is not the

case when conducting procurement for governments. Citizens sometimes want their governments to deliver the services and they have expectations about how they will be decided and delivered (i.e. citizens involvement and anti-discrimination policies). Details about theoretical considerations and variables selections are specified in the following section.

3.2 Theoretical Considerations and Variable Selection

Propositions presented in this section are synthesized based on the TCE framework, revenue volatility and procurement literature. I begin with specifying theoretical links between TCE and procurement decisions. I then argue about how volatile revenue could affect outsourcing at the municipal level.

3.2.1 Contract Management Difficulty

A high level of uncertainty increases the contract management difficulty and increases the possibility of renegotiating contract terms when unexpected issues occur. Thus, in-house production is preferred. Moreover, if in-house production is not feasible, cost-plus contracts are better than fixed price contracts because, as mentioned above, higher levels of uncertainty associate with higher costs of writing comprehensive contracts, and a fixed price contract has no ability to take all unexpected issues into consideration. Renegotiating for the contract terms will for sure boost the transaction cost. In comparison, cost plus contracts could save on transaction cost by setting up contingency terms. The aforementioned example of the Getty Center Art Museum in Los Angeles is a good fit here to illustrate why in-house production or cost-plus contract is superior to other options.

Walker and Weber (1984) use volume uncertainty and technological uncertainty to examine produce-or-buy decisions from a TCE prospective. They gather the data (a list of automobile components) from a division of a U.S. automobile company to perform the analysis. Authors have shown that volume uncertainty and supplier market competition have a positive, albeit small, effect to produce a component. Technological uncertainty (frequency of changes in product specification and the probability of technological improvements), however, failed to show the effect.

Based on studies in consumer satisfaction and the supply channels literature, Klein, Frazier and Roth (1990) add a TCE perspective to test the level of channel integration in foreign markets. The authors interviewed 375 Canadian exporters. In the analysis, they used asset specificity and environmental uncertainty as endogenous variables. They conclude asset specificity is positively related to the level of channel integration, but there is no consistent support for environmental uncertainty to be positively correlated with the level of channel integration. Later on, a similar study performed by Klein and Roth (1993) focused on determinants of channel satisfaction. Environmental uncertainty and ability to monitor channels are used as explanatory variables, whereas level of firm's satisfaction with existing channels is used as the explained variable. They find that both lower levels of uncertainty and higher ability to monitor channels provide significant explanations for management satisfaction.

Moreover, Rindfleisch and Heide (1997) reviewed a considerable amount of marketing literature in transaction cost analysis. The authors summarize that only a few TCE researchers confirm the positive relationship between environmental uncertainty and vertical integration; the dominant view among TCE researchers is "environmental

uncertainty either has no impact on vertical integration or acts as a disincentive against integration" (p.45). In short, both technical and environmental uncertainties fail to show statistical significance toward make or buy decisions in the reviewed literature.

3.2.2 Asset Specificity and Service/Goods Measurability

Williamson (p.566, 1981) proposes a two-by-two table to illustrate the relationship between human asset specificity (high and low) and measurability (easy and hard). Four quadrants represent four different combinations between the two. I borrow the idea and set up a similar two-by-two table to show the combination effects between asset specificity and measurability that government procurers commonly face (as shown in Figure 3.1).

Figure 3.1: Asset Specificity and Service/Goods Measurability

		Asset Specificity	
		Nonspecific (H_1)	Specific (H_2)
Measurability	Easy (M_1)	Buy	Buy w/ bilateral dependency
	Difficult (M_2)	Buy w/ competitive market Produce w/ thin market	Produce through Joint contacting

H1, M1: Solid waste collection would fit into such situation. Because, first, the outcome is easy to measure (i.e. clean neighborhoods) and second, no specific skills are required performing the task. Under this context, the autonomous spot market provides efficacious solution for government procurement.

- **PROPOSITION (H_1, M_1):** When assets are non-specific and services/goods are easy to measure, *ceteris paribus*, government should buy externally.

H1, M2: Under this context, competitive markets reduce opportunistic behaviors and correct the situation of information asymmetry, thus buying is a preferred choice. In comparison, non-competitive markets help goods/services providers hide information from procurers, which may lead to procurers overpaying for the goods/services. For instance, a local government wants to reduce illiteracy rates by offering some courses to the public. The illiteracy rates, however, will not drop immediately after one or two courses are offered. It requires a relatively long period of time to see the result produced by the courses. As such, if the local government outsources the service, the contractor enjoys certain information advantages over the local government. If the market is not competitive, the contracting agency may not feel the urgency to lower the cost or to provide good lectures.

- **PROPOSITION (H_1, M_2):** When assets are non-specific and services/goods are difficult to measure, *ceteris paribus*, government should buy externally if markets are competitive; otherwise, government should produce in-house.

H2, M1: One example to show such scenario is outsourcing water services and wastewater treatment, both of which require a significant upfront investment and specific skills to perform the job. The outcome is relatively easy to measure. Under this context, a contractor who wins the first round auction enjoys the natural advantage in the following bidding circles because of asset specificity and the initial investment they have made. Thus first round bidding needs some extra efforts to write comprehensive contract and screen bidders.

- **PROPOSITION (H_2, M_1):** When assets are specific and services/goods are easy to measure, *ceteris paribus,* government should procure externally but paying extra attention on the first round.

H2, M2: One situation that fits for such context would be space exploration and transportation. It is obvious that we need highly specific trained personnel to do the job and outcome is extremely hard to measure. Because of that, the private sector would never be able to fully manage a program like that. Under this context, government should produce such services/goods in-house because of enormous self-interest seeking opportunities for opportunists. If producing is not feasible because the start-up cost (i.e. the investment for specific asset) is too high or subjected to technology limitations, government should rely on non-profit driven agencies (i.e. neighboring governments, non-profit organizations).

- **PROPOSITION (H_2, M_2):** When assets are specific and services/goods are difficult to measure, *ceteris paribus,* government should produce in-house or joint contracting with neighboring governments/non-profit agencies.

3.2.3 Asset Specificity

TCE predicts that high level of asset specificity increases transaction costs due to the bilateral dependency and idiosyncratic investment. Empirically, Klein, Frazier and Roth (1990) claim asset specificity is positively related to the level of channel integration. In addition, Walker and Poppo (1991) designed a questionnaire to survey a large U.S. manufacturer about its supply relationships. Their aim is to address relationship between asset specificity and comparative transaction costs. The results support that specialized assets have lower transaction costs within the organization.

Similarly, Pilling, Crosby and Jackson (1994) found asset specificity is positively correlated with both ex ante and ex post costs whereas Sriram, Krapfel and Spekman (1992) confirmed that supplier-specific investments are negatively related to perceived buyer dependence. As such, most empirical studies that address asset specificity and transaction produce results consistent with TCE.

So far, TCE has shed useful light on determining mechanisms used for procurement theoretically. In the meantime, how reliable the revenue stream is should certainly have some impacts on the way in which governments choose service delivery arrangements.

3.2.4 Revenue Volatility

As mentioned above, revenue volatility is used as a proxy for local governments' financial well-being measure. Although the theoretical link between revenue volatility and government procurement is not an obvious one, we can get some hints from the revenue volatility literature.

Revenue volatility is mainly assessed in the literature as a proxy for policy volatility (Afonso, 2010; Afonso, 2012; Ebeke, 2012; Riscado, 2011). Scholars investigate the relationship between political institutions and policy volatility, more specifically, scholars interested in finding out what does policy volatility mean to economic growth. A large body of empirical work exists at the national level. The literature has consistently found that policy volatility impedes economic growth. By using cross-country panel datasets, Aizenman and Marion (1993), Ramey and Ramey (1994), Bleaney (1996), Brunetti (1997) and Fatas and Mihov (2006) all found a strong negative correlation between policy uncertainty or volatility and economic growth.

It is obvious that the revenue volatility literature mentioned above does not link directly to my research. But nothing stops me from borrowing the idea in the literature: instead of using revenue volatility as a proxy for policy volatility or political institutions, I use revenue volatility as a proxy for local governments' financial well-being. I believe this is a more appropriate measure than traditional measures (i.e. employees' pay, and subjective measures like survey response) because revenue volatility specifies to what extent the actual revenue deviates from the expected level of revenue.

As such, I argue highly volatile revenue (in absolute value) presents high level of financial risk to a local jurisdiction, which in turn pushes local officials to seek alternative (i.e. more cost effective alternative) service delivery methods, such as outsourcing and purchasing from external actors to cut cost. By comparison, other things equal, a stable revenue stream may exert less pressure to local officials to seek contracting out services.

So far, I have drawn a theoretical foundation for the paper. The next section specifies variable selection and model specification.

3.3 Variable Selection and Model Specification

3.3.1 Dependent Variable

The dependent variable, following the lead of Fernandez, Ryu and Brudney (2008), is the number of services each government outsources with for-profit and nonprofit providers. The 2007 International City/County Management Association (ICMA) Alternative Service Delivery (ASD) survey covers sixty-seven municipal services' delivery arrangements, which are grouped into six service areas (Public Works/Transportation, Public Utilities, Public Health and Safety, Parks and Recreation,

Cultural and Arts Programs, and Support Services); the dependent variable is a count of services contracted out in each of those service areas.

The independent variables are constructed from three main sources. The first set of independent variables is TCE related variables. The second set consists of revenue volatility measures. And the last set contains other independent variables and control variables, which are adopted from the previous chapter of the thesis.

3.3.2 Independent Variable: TCE

The TCE variables include: asset specificity, contract management difficulty, and market competition. Those variables are borrowed from Hefetz and Warner's newly published study. Based on ICMA 2007 ASD survey list, Hefetz and Warner conducted their own survey to obtain the TCE measure; those variables are presented by service type and metro status in Appendix A.

In the ICMA Service Characteristics survey (Hefetz and Warner, 2012; p308-9), asset specificity is described as:

> Services that require special infrastructure (water pipes, treatment plants, ditch diggers) or technical expertise (legal, environmental) lead government managers to worry about lack of competitiveness in supplier markets and whether to maintain internal expertise or technical capacity. High asset specificity means the investments cannot be easily adapted to produce another service. Specific Infrastructure or Expertise was measured on a scale from low (1) to high (5).

Contract specification is described as:

> Services hard to specify in a contract or monitor are less likely to be contracted out, or require a higher level of performance management expertise on the part of government. Contract specification and monitoring is measured on a scale from easy (1) to difficult (5).

Market competition is described as:

For many services, there is only one supplier, government. When contracting,, competition is the key to cost savings and choice. Some governments face very limited markets of alternative suppliers, especially for some services. Competition was measured on the following scale: 0 = government only; 1 = one alternative provider; 2 = two alternative providers; 3= three alternative providers and 4+ = four or more alternative providers.

3.3.3 Independent Variable: Revenue Volatility Measures

Following Yan and Wang's (2010) lead, I use two variables to capture both long-term and short-term revenue volatility. Long-term revenue volatility measure is simply calculated as the standard deviation of municipalities' general revenue.

$$LRV_{it} = \sigma_{it} = \sqrt{E\left[\left(RV - \mu\right)^2\right]} \tag{1}$$

Where

- LRV_{it} denotes to long term revenue volatility for local government *i* at time *t*;
- σ_{it} represents standard deviation for local government *i* at time *t*;
- RV denotes general revenue for each municipality;
- μ is the mean of RV: $E\left[RV\right] = \mu$.

Short-term revenue volatility (SRV), based on municipalities' general revenue time series data, is the difference between actual revenue and expected level of revenue. In order to calculate the short-term revenue volatility, there will be three steps involved. First, using ordinary least squares (OLS) estimator to obtain the expected level of revenue.

$$REV_{it}^{*} = \partial_i + \beta_i \mathrm{T}_t \tag{2}$$

Where

- REV_{it} is the predicted revenue level;
- ∂_i is an intercept for government *i;*
- β_i is linear trend parameter for government *i*;
- T_t is the time period year t.

Short-term revenue volatility is thus obtained by:

$$SRV_{it} = REV_{it} - REV_{it}^{*} \quad (3)$$

3.3.4 Other Independent Variables

Table 3.1: Independent and Control Variables

Variable	Sources	Exp. sign
Total full time pay ($Millions)	US Census Bureau	
Total full time equivalent (1,000)	US Census Bureau	
External involvement	ICMA	+
Citizen opposition	ICMA	-
Officials opposition	ICMA	-
Demand small government	ICMA	+
Legal restriction	ICMA	-
Employee opposition	ICMA	-
Ex ante evaluation	ICMA	
Monitoring capacity	ICMA	+
Monitoring through survey	ICMA	+
Reduce legal barriers	ICMA	+
Insufficient provider	ICMA	-
Tax ($Millions)	U.S. Census Bureau	
Inter-governmental revenue ($Millions)	U.S. Census Bureau	
Direct expenditure ($Millions)	U.S. Census Bureau	
Short term debt ($Millions)	U.S. Census Bureau	+
Long term debt-private purposes ($Millions)	U.S. Census Bureau	+
Long term debt-public purposes ($Millions)	U.S. Census Bureau	+
Population	U.S. Census Bureau	
Long term revenue volatility	U.S. Census Bureau	+
Short term revenue volatility	U.S. Census Bureau	+
TCE – Asset Specificity	Hefetz and Warner	
TCE – Contract Management difficulty	Hefetz and Warner	
TCE – Market Competition	Hefetz and Warner	
Region	ICMA	

A full set of internal determinants has been specified in the previous chapter, including political actors and institutions, socio-economic characteristics, demographic variables. Considering the similarity of the two studies, I adopted most of the variables here. Table 3.1 presents the variables, data sources, and expected signs.

3.3.5 Model Specification

Not all services are created equal; Lamothe and Lamothe (2010) categorize services into hard services (i.e. Building maintenance, refuse collection, and janitorial services) and soft services (i.e. child protective service) based on service properties. It is obvious that there is no one size fits all approach when outsourcing those different services. For example, a highly competitive market may help a procurer to obtain a better price on street maintenance. It may not be necessarily true for social services where competition could lead to vendor turnover, and in turn hurt patients who require consistent long-term health care (Lamothe and Lamothe, 2010). This situation suggests competition is a valuable market characteristic for hard services, but we may not be able to generalize the same benefit automatically in other service areas. Therefore, I analyze outsourcing decisions by service groups. As mentioned earlier, the ICMA ASD survey groups all municipal services into six area: Public Works/Transportation (20 individual services), Public Utilities (4 individual services), Public Health and Safety (21 individual services), Parks and Recreation (3 individual services), Cultural and Arts Programs (3 individual services), and Support Services (15 individual services).

The dependent variable is a count variable that counts the number of services outsourced in each service group, thus a limited dependent variable model is appropriate. The nature of a count variable with relatively few values lends its support to a Poisson

model (Wooldridge, 2009; Cameron, 2009). In addition, robust standard errors are estimated to mildly relax the underlying assumption that the data are Poisson distributed (Cameron and Pravin, 2009)

A basic form of the model can be written as:

$$\log\left[E\left(y|x_1, x_2, \cdots x_k\right)\right] = \beta_0 + \beta_1 x_1 + \cdots + \beta_k x_k$$

or $$\log\left(y\right) = \beta_0 + \beta_1 x_1 + \cdots + \beta_k x_k$$

where

- **y** is the dependent variable, which will be specified accordingly by each service groups;
- β_0 is intercept;
- **x** is an $n \times k$ matrix of observations on k right-hand-side exogenous variables;
- β_k is the corresponding $k \times 1$ parameter vector.

3.3.6 Factor Analysis

As the analysis is performed based on service groups, one problem emerged. It is difficult to incorporate TCE variables (Asset Specificity, Contract Management Difficulty, and Market Competition) directly in the model as those variables are at individual service level whereas the rest of the variables are at city level. For example, Public Works/Transportation group has twenty individual services; if all three TCE variables are included in the model, there will be sixty (three variables * twenty individual services) more independent variables added. This is not only tedious to report,

but also prone to collinearity problem. As such, I factor analyzed all three TCE variables by each service area.

3.3.6.1 Public Works/Transportation

This service group consists of twenty different services in the public works and transportation area, including residential solid waste collection, street repair, traffic sign/signal installation/maintenance, inspection/code enforcement, operation/maintenance of bus transit system, operation of airport, water treatment, and distribution. Appendix C provides summary statistics of Asset Specificity, Contract Management Difficulty, and Market Competition for individual services.

Table 3.2: Principle Components Analysis for Public Works/Transportation

Public Works/Transportation	Factor	Eigenvalue	Variance	Proportion (%)	Cumulative (%)
Asset Specificity	1	13.04	12.89	64.43	64.43
	2	6.96	7.11	35.57	100
Contract Management Difficulty	1	12.77	10.42	52.11	52.11
	2	7.23	9.58	47.89	100
Market Competition	1	18.61	11.55	57.74	57.74
	2	1.39	8.45	42.26	100

Since services grouped in this category have similar characteristics and do not vary much in terms of their asset specificity, contract management difficulty, and market competition, it is appropriate to use factor analysis method to identify one or more common dimensions. Exploratory factor analysis assists me to determine underlying patterns in each of the three TCE variables, and I use principal components analysis to extract factors, the factors with eigenvalues equal or higher than 1 are retained. For asset specificity, two factors are retained (Table 3.2). Factor 1 accounts for 64% of the observed total variance and factor 2 accounts for 35%. There are also two factors retained for contract management difficulty. Factor 1 and 2 comprise 52.11% and 47.89% of the

variance respectively. Similarly, two factors of market competition are extracted from the market competition variable. The pattern matrix table can be found in Appendix B.

3.3.6.2 Public Utilities

Four municipal services fall into this group: electric utility operation and management, gas utility operation and management, utility meter reading, and utility billing. Table 3.4 below provides summary statistics on three TCE variables.

Principal components analysis is used to extract common factors, the factors with eigenvalues equal or higher than 1 are retained. Table 3.3 provides information on eigenvalues and variance that the retained factors account for.

Table 3.3: Principle Components Analysis for Public Utilities

Public Utilities	Factor	Eigenvalue	Variance	Proportion (%)	Cumulative (%)
Asset Specificity	1	3.19	3.19	79.83	79.83
Contract Management Difficulty	1	3.05	3.05	76.28	76.28
Market Competition	1	3.20	3.20	80.08	80.08

One factor is extracted from each variable. The asset specificity factor accounts for 79.83% of the variance. The factor of contract management difficulty and market competition comprises 76.28% and 80.08% of the total variance respectively.

3.3.6.3 Public Health and Safety

There are twenty-two individual services included in this service group, including crime prevention/patrol, emergency medical service, ambulance service, sanitary inspection, animal control, and drug and alcohol treatment programs. See Appendix C for summary statistics of asset specificity, contract management difficulty, and market competition.

Both asset specificity and contract management difficulty retain two factors, and only one factor remained for market competition (Table 3.4). Factor 1 and 2 of asset specificity represent 57.59% and 42.41% of the total variance. Two common factors of contract management difficulty account for 60.66% and 39.34% of the total variance, and the market competition factor accounts for all the variance in its group.

Table 3.4: Principle Components Analysis for Public Health and Safety

Public Safety	Factor	Eigenvalue	Variance	Proportion (%)	Cumulative (%)
Asset Specificity	1	12.76	12.67	57.59	57.59
	2	9.23	9.33	42.41	100
Contract Management Difficulty	1	13.36	13.34	60.66	60.66
	2	8.64	8.66	39.34	100
Market Competition	1	22.00	22.00	100	100

3.3.6.4 Parks and Recreation

This service section consists of operation and maintenance of recreation facilities, parks landscaping and maintenance, and operation of convention centers and auditoriums. Within this section, one common factor is identified for asset specificity and market competition. Asset specificity factor accounts for 67.49% of the total variance and market competition factor represents 98.14% (Table 3.5). Two factors are retained for contract management difficulty variable, first of which accounts for 64.49% of the total variance, and the other one depicts 35.51% of the total variance.

Table 3.5: Principle Components Analysis for Parks and Recreation

Parks and Recreation	Factor	Eigenvalue	Variance	Proportion (%)	Cumulative (%)
Asset Specificity	1	2.02	2.02	67.49	67.49
Contract Management Difficulty	1	1.99	1.94	64.49	64.49
	2	1.01	1.07	35.51	100
Market Competition	1	2.94	2.94	98.14	98.14

3.3.6.5 Cultural and Arts Programs

This section is composed of services like operation of cultural and arts programs, operation of libraries, and operation of museums. There are two factors retained for asset specificity variable. Only one factor is identified for both contract management difficulty and market competition . Table 3.6 presents the eigenvalue and the variance each factor accounts for.

Table 3.6: Principle Components Analysis for Cultural and Arts Programs

Cultural and Arts Programs	Factor	Eigenvalue	Variance	Proportion (%)	Cumulative (%)
Asset Specificity	1	1.98	1.67	55.68	55.68
	2	1.02	1.32	44.32	100
Contract Management Difficulty	1	2.21	2.21	73.51	73.51
Market Competition	1	2.42	2.42	80.89	80.89

3.3.6.6 Support Services

This is the last group of services identified in ICMA ASD survey. Legal services, secretarial services, personnel services, building security, fleet management, payroll, and tax bill processing are all in this group, a total of fifteen services.

Table 3.7: Principle Components Analysis for Support Services

Support Services	Factor	Eigenvalue	Variance	Proportion (%)	Cumulative (%)
Asset Specificity	1	11.28	7.64	50.97	50.97
	2	3.72	7.35	49.03	100
Contract Management Difficulty	1	8.02	7.79	51.95	51.95
	2	6.97	7.20	48.05	100
Market Competition	1	13.98	7.53	50.21	50.21
	2	1.02	7.46	49.79	100

Among those services, each of the three TCE variables identifies two common factors. There is a similar pattern can be seen in Table 3.7, each factor accounts roughly half of the total variance in the variable it represents.

In sum, all the common factors in every service group have been identified and will be used in the subsequent analysis. A detailed factor loading pattern matrix for all the factor scores identified above can be found in Appendix B.

The creation of all the factor scores completes the data set with 1,003 observations. Summary statistics for all the variables are shown in Table 3.8 and summary statistics for TCE factor scores are presented in Table 3.9.

Table 3.8: Summary Statistics

Variable	Mean	Std. Dev.	Min.	Max.
Dependent Variables				
Public Works/Transportation	4.54	3.44	0.00	17.00
Public Utilities	0.70	1.29	0.00	4.00
Public Safety	3.46	4.45	0.00	15.00
Parks and Recreation	0.45	0.76	0.00	3.00
Cultural and Arts Programs	0.66	0.94	0.00	3.00
Support Services	3.29	2.94	0.00	13.00
ICMA ASD Measures				
External involvement	0.67	0.99	0.00	6.00
Citizen opposition	0.12	0.33	0.00	1.00
Officials opposition	0.16	0.37	0.00	1.00
Employee opposition	0.19	0.40	0.00	1.00
Ex ante evaluation	0.28	0.45	0.00	1.00
Monitoring capacity	0.48	0.50	0.00	1.00
Monitoring through survey	0.46	0.50	0.00	1.00
Reduce legal barriers	0.04	0.19	0.00	1.00
Insufficient provider	0.12	0.33	0.00	1.00
US Census Bureau Data				
Total full time pay per employee	4258.10	1112.67	1386.42	8570.25
Tax ($Millions)	0.15	0.28	0.00	4.30
Inter-governmental revenue ($Millions)	0.06	0.13	0.00	1.27
Direct expenditure ($Millions)	0.36	0.74	0.00	13.42
Short term debt ($Millions)	0.01	0.03	0.00	0.20
Long term debt-private purposes ($Millions)	0.08	0.44	0.00	8.18
Long term debt-public purposes ($Millions)	0.41	1.19	0.00	16.18
Population (Millions)	0.05	0.10	0.00	1.55
Region	2.54		1.00	4.00
Revenue Volatility Measure				
Long term revenue volatility	237.99	142.84	178.37	2016.75
Short term revenue volatility	7645.53	9767.70	0.89	135171.40

Table 3.9: Summary Statistics of Factor Scores of TCE Variables

Variable	Mean	Std. Dev.	Min.	Max.
Asset_Works_1	0.00	1.00	-1.64	1.56
Asset_Works_2	0.00	1.00	-1.76	0.76
Asset_Utility	0.00	1.00	-1.38	1.92
Asset_Safety_1	0.00	1.00	-0.74	1.62
Asset_Safety_2	0.00	1.00	-2.35	0.77
Asset_Parks	0.00	1.00	-0.78	1.44
Asset_Arts_1	0.00	1.00	-0.61	2.27
Asset_Arts_2	0.00	1.00	-0.79	1.78
Asset_Support_1	0.00	1.00	-0.79	1.34
Asset_Support_2	0.00	1.00	-2.12	1.19
Contract_Works_1	0.00	1.00	-1.78	0.79
Contract_Works_2	0.00	1.00	-2.27	0.61
Contract_Utility	0.00	1.00	-1.73	0.69
Contract_Safety_1	0.00	1.00	-1.78	0.62
Contract_Safety_2	0.00	1.00	-0.49	2.38
Contract_Parks_1	0.00	1.00	-1.73	1.17
Contract_Parks_2	0.00	1.00	-0.69	2.10
Contract_Arts	0.00	1.00	-1.78	0.77
Contract_Support_1	0.00	1.00	-0.63	1.77
Contract_Support_2	0.00	1.00	-0.48	2.39
Market_Works_1	0.00	1.00	-1.30	0.79
Market_Works_2	0.00	1.00	-1.23	2.08
Market_Utility	0.00	1.00	-1.76	0.65
Market_Safety	0.00	1.00	-2.04	0.49
Market_Parks	0.00	1.00	-1.79	0.57
Market_Arts	0.00	1.00	-1.66	1.41
Market_Support_1	0.00	1.00	-1.04	2.22
Market_Support_2	0.00	1.00	-1.46	0.78

3.4 Empirical Results

In order to capture a comprehensive image of how volatile revenue and different transaction cost measures could affect the use of outsourcing, analyses are based on different service groups, which are categorized by ICMA ASD survey. Before performing the actual analysis, another problem must be addressed. The factor scores created for asset specificity, contract management difficulty, and market competition, are

highly correlated with each other (descriptive statistics and correlation matrices for TCE variables can be found in Appendix D). This may lead to a multicollinearity issue and potentially create large standard errors in the analysis. To curb such an issue, I introduce asset specificity, contract management difficulty, and market competition factor scores separately in the regression.

3.4.1 Public Works/Transportation

The results of the Poisson regression with total number of services outsourced in Public Works/Transportation as the dependent variable are shown in Table 3.10.

Two ICMA survey measures are statistically significant, external stakeholder involvement and monitoring capacity. External stakeholder is an index score created from the survey question "Who outside your local government was involved in evaluating the feasibility of private service delivery", the score ranging from 0 to 6 as the response include potential service providers, professional consultants, service recipients/customers, managers in other local governments, citizen advisory committees, and state agencies, leagues, and associations. Monitoring capacity is an indicator variable that describes whether a local government evaluates citizen satisfaction, cost, and compliance with standards of private service delivery. As expected, both external stakeholders' involvement and monitoring capacity are positively correlated with the number of service outsourced. On average, one more external stakeholder's involvement increases .076 services outsourced in log count. If a local government beefs up its monitoring capacity, the city tends to, on average, have .27 more services outsourced in log count. Higher full time pay per employee increases the number of services outsourced, but the magnitude of

Table 3.10: Poisson Regression Results: Effect of Explanatory Variables on Number of Public Works/Transportation Services Outsourced

Public Works/Transportation	Coeff.	Robust Std. Err.	Significance
ICMA ASD Measures			
External involvement	0.076	0.026	***
Citizen opposition	-0.122	0.077	
Officials opposition	0.086	0.072	
Employee opposition	-0.021	0.065	
Ex ante evaluation	0.053	0.054	
Monitoring capacity	0.271	0.112	**
Monitoring through survey	-0.085	0.110	
Reduce legal barriers	-0.080	0.120	
Insufficient provider	0.068	0.070	
US Census Bureau Data			
Total full time pay per employee (1,000s)	0.069	0.029	**
Total Tax Revenue	-0.043	0.336	
Inter-governmental revenue	0.239	0.280	
Direct expenditure	-0.068	0.161	
Short term debt	-0.866	0.995	
Long term debt-private purposes	0.036	0.038	
Long term debt-public purposes	-0.014	0.054	
Population	0.198	0.271	
Region-North Central	-0.234	0.070	***
Region-South	-0.212	0.078	***
Region-West	-0.095	0.081	
Revenue Volatility Measure			
Long term revenue volatility	-9.03E-05	2.87E-04	
Short term revenue volatility	3.02E-06	3.71E-06	
Factor Scores of TCE Variables			
Asset_Works_1	-0.034	0.026	
Asset_Works_2	0.063	0.026	**
Contract_Works_1♦	0.057	0.027	**
Contract_Works_2♦	0.044	0.025	*
Market_Works_1♠	0.071	0.026	***
Market_Works_2♠	0.014	0.025	

Note: *Significance at 10% level, ** Significance at 5% level, *** Significance at 1% level
Tax, revenue, population, and expenditure variables are in millions.
♦♠Factor scores are introduced into regression, along with other independent variables, separately. The coefficients and significance on other explanatory variables do not change.

the increase is rather small. The omitted group in region variable is Northeast. Comparing to Northeast, both North Central and South utilize outsourcing less.

Neither revenue volatility measure shows up as statistically significant for services in public works and transportation. Interestingly, both the asset specificity measure and contract management difficulty measure exert positive impact on the use of outsourcing in this category. According to TCE theory, we would expect those two measures to be negatively correlated with the use of contracting out; however, we have to keep in mind that outsourcing services specified in this group (i.e. residential solid waste collection, street repair, traffic sign/signal installation/maintenance, water treatment, and etc.) have become less controversial and more commonplace. In addition, market competition, as expected, is positively correlated with the number of services outsourced.

Although using log linear to interpret coefficient in Poisson regression is acceptable (Wooldridge, 2009; Cameron, 2009; Cameron and Trivedi, 2009), a better estimate could be obtained through marginal effects. The marginal effects are presented in Table 3.11.

As the marginal effects results suggest, one unit increase in external involvement score increases .33 services outsourced in public works and transportation group. By comparison, with a discrete change from 0 to 1, having some form of mechanisms to monitor the service privatized, on average, increases the number of service outsourced by 1.2. In addition, it is interesting to note that citizen opposition shows up as statistically significant. Experiencing opposition from citizen decreases service outsourced by .52. The marginal effect on full time pay per employee is negligible. Local governments

located in the North Central or South regions, on average, outsource one less service comparing to cities in the Northeast.

Table 3.11: Marginal Effects of Explanatory Variables on Number of Public Works/Transportation Services Outsourced

Public Works/Transportation	dy/dx	Std. Err.	Significance
ICMA ASD Measures			
External involvement	0.337	0.114	***
Citizen opposition	-0.515	0.312	*
Officials opposition	0.389	0.337	
Employee opposition	-0.092	0.281	
Ex ante evaluation	0.238	0.246	
Monitoring capacity	1.206	0.504	**
Monitoring through survey	-0.373	0.484	
Reduce legal barriers	-0.341	0.491	
Insufficient provider	0.310	0.325	
US Census Bureau Data			
Total full time pay per employee (1,000s)	0.304	0.130	**
Total Tax Revenue	-0.192	1.482	
Inter-governmental revenue	1.056	1.234	
Direct expenditure	-0.298	0.712	
Short term debt	-3.821	4.392	
Long term debt-private purposes	0.158	0.168	
Long term debt-public purposes	-0.060	0.240	
Population	0.873	0	
Region-North Central	-0.991	0.284	***
Region-South	-0.895	0.316	***
Region-West	-0.407	0.339	
Revenue Volatility Measure			
Long term revenue volatility	-3.985E-04	1.270E-03	
Short term revenue volatility	1.330E-05	2.000E-05	
Factor Scores of TCE Variables			
Asset_Works_1	-0.151	0.115	
Asset_Works_2	0.280	0.113	**
Contract_Works_1♦	0.251	0.120	**
Contract_Works_2♦	0.195	0.108	*
Market_Works_1♠	0.312	0.116	***
Market_Works_2♠	0.062	0.112	

Note: *Significance at 10% level, ** Significance at 5% level, *** Significance at 1% level
Tax, revenue, population and expenditure variables are in millions.

3.4.2 Public Utilities

There are total of four services listed in this section: electric utility operation and management, gas utility operation and management, utility meter reading and utility billing. The total number of services provided through outsourcing ranges from 0 to 4, with an average of .70. The results of the Poisson regression for this section are shown in Table 3.12.

Three variables show up statistically significant in this section. Both long term debt and short term revenue volatility contribute to the use of outsourcing as a means to delivery utility services.

Comparing to the results from public works and transportation, region is less significant for outsourcing utilities services. Only the North Central region uses less private provision for utility services. TCE factor scores do not show any statistical significance this time. To better understand the magnitude of the impacts, marginal effects results are listed in Table 3.13.

Citizen opposition shows up statistically significant. Citizen opposition decreases the number of service outsourced by .22. Two economic measures that are statistically significant are long term private debt and short term revenue volatility. Long term private debt varies from zero to eight million dollars. With one million dollars increase in debt, the number of utility service outsourced increase by .07. I have also calculated the predicted counts of service outsourced at different debt levels, holding other variables in the model at their mean values. The results are presented in Table 3.14. By comparison, the magnitude of short term revenue volatility is rather small.

Table 3.12: Poisson Regression Effect of Explanatory Variables on Number of Public Utility Services Outsourced

Public Utility	Coeff.	Robust Std. Err.	Significance
ICMA ASD Measures			
External involvement	0.079	0.066	
Citizen opposition	-0.387	0.259	
Officials opposition	-0.091	0.209	
Employee opposition	-0.104	0.177	
Ex ante evaluation	0.094	0.155	
Monitoring capacity	-0.131	0.324	
Monitoring through survey	-0.110	0.325	
Reduce legal barriers	0.232	0.314	
Insufficient provider	0.100	0.189	
US Census Bureau Data			
Total full time pay per employee (1,000s)	-0.036	0.071	
Total Tax Revenue	-0.399	0.869	
Inter-governmental revenue	0.470	0.698	
Direct expenditure	-0.144	0.367	
Short term debt	-0.890	2.807	
Long term debt-private purposes	0.100	0.043	**
Long term debt-public purposes	0.108	0.116	
Population	-0.914	0.894	
Region-North Central	-0.328	0.185	*
Region-South	-0.329	0.209	
Region-West	0.034	0.195	
Revenue Volatility Measure			
Long term revenue volatility	-6.00E-04	6.31E-04	
Short term revenue volatility	2.13E-05	9.38E-06	**
Factor Scores of TCE Variables			
Asset_Utility	0.053	0.080	
Contract_Utility	0.061	0.080	
Market_Utility♠	0.093	0.068	

Note: *Significance at 10% level, ** Significance at 5% level, *** Significance at 1% level
Tax, revenue, population and expenditure variables are in millions.

♠Factor score is introduced into regression, along with other explanatory independent variables, separately. The coefficients and significance on other variables do not change.

Table 3.13: Marginal Effects of Explanatory Variables on Number of Public Utility Services Outsourced

Public Utility	dy/dx	Std. Err.	Significance
ICMA ASD Measures			
External involvement	0.053	0.044	
Citizen opposition	-0.223	0.128	*
Officials opposition	-0.059	0.130	
Employee opposition	-0.067	0.110	
Ex ante evaluation	0.064	0.107	
Monitoring capacity	-0.087	0.215	
Monitoring through survey	-0.073	0.215	
Reduce legal barriers	0.172	0.259	
Insufficient provider	0.069	0.136	
US Census Bureau Data			
Total full time pay per employee (1,000s)	-0.024	0.050	
Total Tax Revenue	-0.265	0.575	
Inter-governmental revenue	0.312	0.464	
Direct expenditure	-0.096	0.244	
Short term debt	-0.591	1.866	
Long term debt-private purposes	0.066	0.029	**
Long term debt-public purposes	0.072	0.077	
Population	-0.607	0	
Region-North Central	-0.206	0.109	*
Region-South	-0.204	0.122	*
Region-West	0.023	0.132	
Revenue Volatility Measure			
Long term revenue volatility	-3.99E-04	4.20E-04	
Short term revenue volatility	1.41E-05	1.00E-05	**
Factor Scores of TCE Variables			
Asset_Utility	0.035	0.053	
Contract_Utility	0.041	0.053	
Market_Utility♠	0.062	0.045	

Note: *Significance at 10% level, ** Significance at 5% level, *** Significance at 1% level
Tax, revenue, population and expenditure variables are in millions.

Table 3.14: Marginal Effect of Private Long Term Debt on Public Utility Outsourcing

Debt Level	Margin	Std. Err.
0	0.692	0.040
1	0.765	0.050
2	0.846	0.079
3	0.935	0.122
4	1.033	0.177
5	1.142	0.243
6	1.262	0.321
7	1.395	0.415
8	1.541	0.524

Note: debt level is in millions of dollars.

3.4.3 Public Health and Safety

This service section consists of crime prevention/patrol, fire prevention, ambulance service, public health programs, and eighteen other public health and safety services. The number of services outsourced in this group varies from zero to fifteen with an average of 3.46. The regression results are presented below (Table 3.15).

Neither TCE variables nor revenue volatility measures show any statistical significance; the variables that matter are private long term debt and west region. Private long term debt positively correlate with the number of services outsourced. To be exact, one more million in debt increases the number of services outsourced by .9 log count.

Table 3.15: Poisson Regression: Effect of Explanatory Variables on Number of Public Health and Safety Services Outsourced

Public Health and Safety	Coeff.	Robust Std. Err.	Significance
ICMA ASD Measures			
External involvement	0.049	0.045	
Citizen opposition	-0.152	0.144	
Officials opposition	-0.052	0.126	
Employee opposition	0.086	0.112	
Ex ante evaluation	-0.114	0.103	
Monitoring capacity	0.207	0.222	
Monitoring through survey	-0.158	0.224	
Reduce legal barriers	0.214	0.195	
Insufficient provider	0.123	0.118	
US Census Bureau Data			
Total full time pay per employee (1,000s)	-0.006	0.049	
Total Tax Revenue	-0.793	0.613	
Inter-governmental revenue	0.348	0.540	
Direct expenditure	0.042	0.326	
Short term debt	-1.910	1.870	
Long term debt-private purposes	0.089	0.033	***
Long term debt-public purposes	0.024	0.093	
Population	-0.479	0.403	
Region-North Central	-0.175	0.133	
Region-South	-0.020	0.145	
Region-West	0.312	0.140	**
Revenue Volatility Measure			
Long term revenue volatility	5.336E-04	3.708E-04	
Short term revenue volatility	8.720E-07	6.000E-06	
Factor Scores of TCE Variables			
Asset_Safety_1	-0.009	0.045	
Asset_Safety_2	-0.014	0.044	
Contract_Safety_1♦	0.013	0.046	
Contract_Safety_2♦	0.010	0.044	
Market_Safety_1♠	-0.012	0.050	

Note: *Significance at 10% level, ** Significance at 5% level, *** Significance at 1% level
Tax, revenue, population and expenditure variables are in millions.

♦♠Factor scores are introduced into regression, along with other independent variables, separately. The coefficients and significance on other explanatory variables do not change.

Table 3.16: Marginal Effects of Explanatory Variables on Number of Public Health and Safety Services Outsourced

Public Health and Safety	dy/dx	Std. Err.	Significance
ICMA ASD Measures			
External involvement	0.164	0.151	
Citizen opposition	-0.481	0.431	
Officials opposition	-0.172	0.406	
Employee opposition	0.295	0.396	
Ex ante evaluation	-0.373	0.328	
Monitoring capacity	0.696	0.752	
Monitoring through survey	-0.526	0.742	
Reduce legal barriers	0.792	0.797	
Insufficient provider	0.430	0.433	
US Census Bureau Data			
Total full time pay per employee (1,000s)	-0.021	0.160	
Total Tax Revenue	-2.651	2.052	
Inter-governmental revenue	1.164	1.803	
Direct expenditure	0.141	1.091	
Short term debt	-6.387	6.271	
Long term debt-private purposes	0.299	0.108	***
Long term debt-public purposes	0.079	0.310	
Population	-1.600	0	
Region-North Central	-0.567	0.418	
Region-South	-0.068	0.480	
Region-West	1.142	0.561	**
Revenue Volatility Measure			
Long term revenue volatility	0.002	0.001	
Short term revenue volatility	2.920E-06	2.000E-05	
Factor Scores of TCE Variables			
Asset_Safety_1	-0.029	0.151	
Asset_Safety_2	-0.045	0.148	
Contract_Safety_1♦	0.042	0.153	
Contract_Safety_2♦	0.033	0.146	
Market_Safety_1♠	-0.038	0.167	

Note: *Significance at 10% level, ** Significance at 5% level, *** Significance at 1% level
Tax, revenue, population and expenditure variables are in millions.

Localities in West region use more private service provision for public health and safety services than local governments in Northeast region. Marginal effects (Table 3.16)

indicate that a $1 million increase in private long term debt leads to .30 more services outsourced in the area of public health and safety. Whether a city is located in West region or not has a considerable marginal effect (1.14) on the use of privatization for public health and safety services.

3.4.4 Parks and Recreation

Operation and maintenance of recreation facilities, parks landscaping and maintenance and operation of convention centers and auditoriums are listed under parks and recreation services. The average number outsourced in this section is .45. The regression results are shown in Table 3.17.

For parks and recreation services, ex ante evaluation and external involvement are positively correlated with the use of privatization, whereas the total tax revenue is negatively correlated with it. Ex ante evaluation is an indicator variable that shows whether a local government identified successful privatization initiatives in other jurisdictions, established a citizens' advisory committee on privatization, and hired consultants to study the feasibility of privatization prior to outsourcing a service. A local government adopting such an effort tends to have, on average, .28 log count services outsourced in parks and recreation services. External stakeholders' involvement also contributes to the use of privatization in this area. Total tax revenue, as expected, exerts negative pressure on the use of privatization since higher tax revenue indicates a local government is less likely to subject to fiscal stress. Marginal effects of such variables are shown in Table 3.18.

Table 3.17: Poisson Regression: Effect of Explanatory Variables on Number of Parks and Recreation Services Outsourced

Parks and Recreation	Coeff.	Robust Std. Err.	Significance
ICMA ASD Measures			
External involvement	0.101	0.056	*
Citizen opposition	-0.128	0.184	
Officials opposition	0.134	0.149	
Employee opposition	0.094	0.136	
Ex ante evaluation	0.276	0.127	**
Monitoring capacity	0.110	0.411	
Monitoring through survey	0.048	0.410	
Reduce legal barriers	-0.197	0.269	
Insufficient provider	0.051	0.144	
US Census Bureau Data			
Total full time pay per employee (1,000s)	0.095	0.065	
Total Tax Revenue	-1.466	0.884	*
Inter-governmental revenue	0.111	0.774	
Direct expenditure	0.194	0.387	
Short term debt	-0.933	2.548	
Long term debt-private purposes	-0.078	0.130	
Long term debt-public purposes	0.114	0.116	
Population	1.050	0.723	
Region-North Central	0.101	0.186	
Region-South	-0.029	0.204	
Region-West	0.169	0.194	
Revenue Volatility Measure			
Long term revenue volatility	-2.49E-05	5.86E-04	
Short term revenue volatility	2.76E-07	7.51E-06	
Factor Scores of TCE Variables			
Asset_Parks_1	-0.046	0.070	
Contract_Parks_1	-0.052	0.072	
Contract_Parks_2♦	-0.044	0.058	
Market_Parks_1♦	-0.026	0.063	

Note: *Significance at 10% level, ** Significance at 5% level, *** Significance at 1% level
Tax, revenue, population and expenditure variables are in millions.
♦Factor scores of Asset Specificity, Contract Management Difficulty, and Market Competition are introduced into regression, along with other independent variables, separately. The coefficients and significance on other variables do not change.

Table 3.18: Marginal Effects of Explanatory Variables on Number of Parks and Recreation Services Outsourced

Parks and Recreation	dy/dx	Std. Err.	Significance
ICMA ASD Measures			
External involvement	0.043	0.024	*
Citizen opposition	-0.052	0.071	
Officials opposition	0.059	0.069	
Employee opposition	0.041	0.061	
Ex ante evaluation	0.125	0.061	**
Monitoring capacity	0.047	0.175	
Monitoring through survey	0.021	0.175	
Reduce legal barriers	-0.076	0.095	
Insufficient provider	0.022	0.063	
US Census Bureau Data			
Total full time pay per employee (1,000s)	0.041	0.030	
Total Tax Revenue	-0.622	0.375	*
Inter-governmental revenue	0.047	0.329	
Direct expenditure	0.082	0.164	
Short term debt	-0.396	1.082	
Long term debt-private purposes	-0.033	0.055	
Long term debt-public purposes	0.048	0.049	
Population	0.445	0	
Region-North Central	0.044	0.082	
Region-South	-0.012	0.085	
Region-West	0.075	0.090	
Revenue Volatility Measure			
Long term revenue volatility	-1.06E-05	2.50E-04	
Short term revenue volatility	1.17E-07	0	
Factor Scores of TCE Variables			
Asset_Parks_1	-0.020	0.030	
Contract_Parks_1	-0.022	0.030	
Contract_Parks_2♦	-0.019	0.024	
Market_Parks_1♦	-0.011	0.027	

Note: *Significance at 10% level, ** Significance at 5% level, *** Significance at 1% level
Tax, revenue, population and expenditure variables are in millions.

The same variables showed up statistically significant in marginal effect results.

One more external stakeholder involved in the process increases the service outsourced

by .04. Ex ante evaluation is also positively correlated with the number of services privatized. Evaluating the feasibility of outsourcing a service contributes to .13 more services outsourced. When holding other explanatory variables at their mean values, higher tax revenue reduces the number of services outsourced. As shown in table 3.19, when tax revenue is less than a million dollars, the average service privatized is .67; when tax revenue hits the two million dollar mark, the number of services outsourced drops to .04. This actually confirms the assumption that financially struggling local governments are more likely to turn to privatization to stretch public dollars.

Table 3.19: Marginal Effect of Tax Revenue on Parks and Recreation

Tax Revenue	Margin	Std. Err.
0	0.667	0.376
1	0.154	0.055
2	0.036	0.044
3	0.008	0.017
4	0.002	0.006

Note: tax revenue is in millions of dollars.

3.4.5 Cultural and Arts Programs

Cultural and arts programs include operation of cultural and arts programs, operation of libraries and operation of museums. Among the U.S. local governments, .66 services are provided through private provision on average. Regression results are presented in Table 3.20.

None of the TCE variables nor volatility measures contribute to the use of private provision for cultural and arts programs. External involvement is again positively correlated with number of cultural and arts programs outsourced and the West region utilizes private provision for libraries and museums more than the Northeast region. The magnitude of marginal effects is shown in the table below (Table 3.21).

Table 3.20: Poisson Regression: Effect of Explanatory Variables on Number of Cultural and Arts Programs Outsourced

Cultural and Arts Programs	Coeff.	Robust Std. Err.	Significance
ICMA ASD Measures			
External involvement	0.084	0.050	*
Citizen opposition	-0.220	0.173	
Officials opposition	0.120	0.145	
Employee opposition	0.082	0.125	
Ex ante evaluation	-0.082	0.118	
Monitoring capacity	0.084	0.236	
Monitoring through survey	-0.075	0.238	
Reduce legal barriers	-0.082	0.275	
Insufficient provider	0.143	0.132	
US Census Bureau Data			
Total full time pay per employee (1,000s)	0.036	0.055	
Total Tax Revenue	-1.141	0.709	
Inter-governmental revenue	0.170	0.600	
Direct expenditure	0.418	0.321	
Short term debt	-0.770	2.383	
Long term debt-private purposes	0.055	0.051	
Long term debt-public purposes	-0.103	0.103	
Population	0.153	0.473	
Region-North Central	-0.145	0.158	
Region-South	0.117	0.159	
Region-West	0.282	0.162	*
Revenue Volatility Measure			
Long term revenue volatility	4.20E-04	5.06E-04	
Short term revenue volatility	-3.88E-06	7.09E-06	
Factor Scores of TCE Variables			
Asset_Arts_1	0.064	0.048	
Asset_Arts_2	0.064	0.048	
Contract_Arts♦	-0.063	0.049	
Market_Arts♠	-0.041	0.050	

Note: *Significance at 10% level, ** Significance at 5% level, *** Significance at 1% level
Tax, revenue, population and expenditure variables are in millions.

♦♠Factor scores of Asset Specificity, Contract Management Difficulty, and Market Competition are introduced into regression, along with other independent variables, separately. The coefficients and significance on other variables do not change.

Table 3.21: Marginal Effects of Explanatory Variables on Number of Cultural and Arts Programs Outsourced

Cultural and Arts Programs	dy/dx	Std. Err.	Significance
ICMA ASD Measures			
External involvement	0.054	0.032	*
Citizen opposition	-0.131	0.092	
Officials opposition	0.083	0.099	
Employee opposition	0.056	0.084	
Ex ante evaluation	-0.047	0.073	
Monitoring capacity	0.052	0.149	
Monitoring through survey	-0.048	0.149	
Reduce legal barriers	-0.051	0.161	
Insufficient provider	0.105	0.093	
US Census Bureau Data			
Total full time pay per employee (1,000s)	0.019	0.030	
Total Tax Revenue	-0.721	0.447	
Inter-governmental revenue	0.055	0.378	
Direct expenditure	0.309	0.206	
Short term debt	-0.400	1.472	
Long term debt-private purposes	0.036	0.030	
Long term debt-public purposes	-0.081	0.066	
Population	0.270	0	
Region-North Central	-0.088	0.095	
Region-South	0.088	0.106	
Region-West	0.194	0.120	
Revenue Volatility Measure			
Long term revenue volatility	2.72E-04	3.30E-04	
Short term revenue volatility	-2.73E-06	0	
Factor Scores of TCE Variables			
Asset_Arts_1	0.040	0.030	
Asset_Arts_2	0.040	0.030	
Contract_Arts♦	-0.040	0.031	
Market_Arts♠	-0.026	0.032	

Note: *Significance at 10% level, ** Significance at 5% level, *** Significance at 1% level
Tax, revenue, population and expenditure variables are in millions.

As we can see, only external stakeholder involvement shows statistical significance; one more unit change leads to .05 more services outsourced.

3.4.6 Support Services

Services such as buildings and grounds maintenance, fleet management, vehicle maintenance, legal services and personnel services are categorized into support services.

There are fifteen individual services in this section, and the number of service outsourced varies from zero to thirteen. On average, 3.29 services are provided through private provision among the U.S. local jurisdictions. Table 3.22 provides the regression results.

There are seven variables that are statistically significant, all of which behave as hypothesized. External stakeholders' involvement and monitoring capacity are positively correlated to the number of services outsourced in the support services group, whereas insufficient providers impede the use of outsourcing. Higher asset specificity and a complicated contract to oversee lead to the services produced in-house, and a robust market with multiple potential service providers contribute to higher number of support services provided through private provision. The marginal effects of those variables are shown in Table 3.23.

Involving more external stakeholders on board to evaluate the feasibility of outsourcing a service leads to higher number of services outsourced, to be more specific, one more external stakeholder contributes to .23 more services. Having a mechanism to ensure the quality of service outsourced also has a positive impact on the total number of services provided through private provision. A discrete change from not having one to having one in place leads to 1.12 more services outsourced. Experiencing insufficient potential providers reduces the total number of services outsourced by .66.

Table 3.22: Poisson Regression: Effect of Explanatory Variable on Number of Support Services Outsourced

Support Services	Coeff.	Robust Std. Err.	Significance
ICMA ASD Measures			
External involvement	0.072	0.031	**
Citizen opposition	-0.121	0.103	
Officials opposition	-0.016	0.092	
Employee opposition	0.107	0.077	
Ex ante evaluation	0.037	0.074	
Monitoring capacity	0.342	0.149	**
Monitoring through survey	-0.223	0.147	
Reduce legal barriers	-0.196	0.160	
Insufficient provider	-0.189	0.081	**
US Census Bureau Data			
Total full time pay per employee (1,000s)	0.014	0.034	
Total Tax Revenue	-0.219	0.449	
Inter-governmental revenue	-0.031	0.379	
Direct expenditure	-0.192	0.227	
Short term debt	0.919	1.122	
Long term debt-private purposes	0.038	0.042	
Long term debt-public purposes	0.101	0.063	
Population	0.343	0.314	
Region-North Central	-0.125	0.091	
Region-South	0.030	0.096	
Region-West	0.088	0.099	
Revenue Volatility Measure			
Long term revenue volatility	2.55E-04	3.61E-04	
Short term revenue volatility	-1.55E-07	5.49E-06	
Factor Scores of TCE Variables			
Asset_SupportService_1	-0.081	0.031	**
Asset_ SupportService _2	0.025	0.032	
Contract_ SupportService _1♦	-0.054	0.032	*
Contract_ SupportService _2♦	-0.066	0.032	**
Market_ SupportService _1♠	-0.033	0.032	
Market_ SupportService _2♠	0.078	0.032	**

Note: *Significance at 10% level, ** Significance at 5% level, *** Significance at 1% level
Tax, revenue, population and expenditure variables are in millions.
♦♠Factor scores are introduced into regression, along with other independent variables, separately. The coefficients and significance on other explanatory variables do not change.

Table 3.23: Marginal Effects of Explanatory Variables on Number of Support Services Outsourced

Support Services	dy/dx	Std. Err.	Significance
ICMA ASD Measures			
External involvement	0.234	0.099	**
Citizen opposition	-0.373	0.303	
Officials opposition	-0.052	0.293	
Employee opposition	0.357	0.265	
Ex ante evaluation	0.120	0.243	
Monitoring capacity	1.118	0.493	**
Monitoring through survey	-0.716	0.469	
Reduce legal barriers	-0.579	0.429	
Insufficient provider	-0.658	0.304	**
US Census Bureau Data			
Total full time pay per employee (1,000s)	0.045	0.110	
Total Tax Revenue	-0.706	1.449	
Inter-governmental revenue	-0.101	1.223	
Direct expenditure	-0.622	0.734	
Short term debt	2.968	3.618	
Long term debt-private purposes	0.124	0.136	
Long term debt-public purposes	0.325	0.202	
Population	1.110	0	
Region-North Central	-0.394	0.280	
Region-South	0.098	0.313	
Region-West	0.291	0.334	
Revenue Volatility Measure			
Long term revenue volatility	8.24E-04	1.17E-03	
Short term revenue volatility	-4.99E-07	2.00E-05	
Factor Scores of TCE Variables			
Asset_SupportServices_1	-0.262	0.101	***
Asset_ SupportServices _2	0.081	0.104	
Contract_ SupportServices _1♦	-0.174	0.104	*
Contract_ SupportServices _2♦	-0.212	0.102	**
Market_ SupportServices _1♠	-0.108	0.104	
Market_ SupportServices _2♠	0.252	0.102	**

Note: *Significance at 10% level, ** Significance at 5% level, *** Significance at 1% level
Tax, revenue, population and expenditure variables are in millions.

All TCE factor scores have the same impact on total number of services outsourced as the TCE theory suggests. High asset specificity leads to channel integration, which

means producing in-house is a preferred option. The marginal effects suggest one unit change in asset specificity reduces total number of service privatized by .26.

In addition, a contract that is difficult to manage and oversee also exerts negative pressure on the use of privatization. The first common factor in contract management difficulty indicates a one-unit increase actually decreases total number of services outsourced by .17. By comparison, second factor score in contract management difficulty group contributes to .21 less services privatized with a one-unit change. Market competition, on the other hand, is positively correlated with the use of privatization in the support services group. One unit increase in the factor score leads to .25 more services outsourced.

In sum, Table 3.24 summarizes all the results presented above. There are several variables that are particularly worth noting. External stakeholders' involvement is critical in terms of implementing outsourcing at the municipal level. The variable shows statistical significance in all service groups except in Public Utility and Public Health and Safety. Region is another important indicator to show the total number of services privatized. Generally speaking, comparing to Northeast region, local jurisdictions located in North Central and South region are less likely to use private provision to provide public services, whereas localities in West region tends to utilize privatization more in service areas like Public Health and Safety and Cultural and Arts Programs. Revenue volatility measures do not have much impact on the use of privatization. There are two possible reasons for that: first, local government officials may not take revenue volatility into consideration when making outsourcing decisions. Second, the revenue volatility measures specified in the paper may not be good enough to capture the level of fiscal

stress at municipal level. If the latter is true, future improvement on the volatility measure is needed.

Table 3.24: Summary Results of All Service Groups

Summary Results	Works	Utility	Safety	Park	Art	Supp
ICMA ASD Measures						
External involvement	+			+	+	+
Citizen opposition						
Officials opposition						
Employee opposition						
Ex ante evaluation				+		
Monitoring capacity	+					+
Monitoring through survey						
Reduce legal barriers						
Insufficient provider						-
US Census Bureau Data						
Total full time pay per employee	+					
Total Tax Revenue				-		
Inter-governmental revenue						
Direct expenditure						
Short term debt						
Long term debt-private purposes		+	+			
Long term debt-public purposes						
Population						
Region-North Central	-	-				
Region-South	-					
Region-West			+		+	
Revenue Volatility Measure						
Long term revenue volatility						
Short term revenue volatility		+				
Factor Scores of TCE Variables						
Asset_Specificity_1						-
Asset_Specificity_2	+					
Contract_ Difficulty _1	+					-
Contract_Difficulty_2	+					-
Market_Competition_1	+					
Market_Competition_2						+

Note: *Significance at 10% level, ** Significance at 5% level, *** Significance at 1% level
Tax, revenue, population and expenditure variables are in millions.

TCE variables receive limited support from the empirical results. They behaved as hypothesized only in the support services group. Higher asset specificity and higher contract management difficulty leads to closer cooperation between service vendors and service providers, in public sector, which means services are better off produced in-house or through inter municipal cooperation. In Public Works and Transportation section, however, TCE variables showed reverse effects. Higher asset specificity and higher contract management difficulty all lead to more outsourcing. The reason might be the use of privatization in this service area has become more commonplace and local governments may just follow the trend without fully evaluating the market characteristics.

3.5 Conclusions

The TCE theory, complemented with revenue volatility measures, provides a useful analytical lens to examine government procurement and help us disentangle the mechanisms that drive public services' outsourcing. To the best of my knowledge, to date there are no studies that have applied TCE theory and revenue volatility to address contractual relationship simultaneously. This article fills in part of the gap and helps to broaden the way in which we analyze public procurement decisions at local level.

The results presented above indicate that there are a number of policy implications that could facilitate private provision in service delivery arrangement in the future. Municipalities with more stakeholders involved in evaluating the feasibility of outsourcing a service are more likely to have more services provided through private provision. Although the revenue volatility measure does not show any statistical significance, the long term debt, which is positively associated with the number of

services outsourced and tax revenue, which is negatively correlated with the number of service privatized, together may indicate local governments facing financial hardship turn to privatization to stretch public dollars. In addition, caution must be exercised when outsourcing services in Public Works and Transportation. The empirical results show services are privatized regardless of the high asset specificity and contract management difficulty. In such case, it is always a good idea to get more external stakeholders on board to evaluate the feasibility and work with other local governments if privatization must proceed.

Although the analysis sheds some light on disentangling determinants that contribute to the use of privatization, it is subject to a few limitations. First, TCE variables are subject to a collinearity problem due to the relatively small sample. Only 164 places responded to Hefetz and Warner's (2012) ICMA service characteristics survey. Because revenue volatility measures do not matter much in the analysis, it may be an indication that the method used to extract volatility measure is not good enough to use as a proxy for financial hardship. Future research should improve on those two areas. In addition, analyzing outsourcing decisions by service groups may lose some insights on individual services. Therefore, the research provides a number of future avenues for research focusing on key individual services rather than service groups.

Chapter 4. Summary and Future Research

Privatization is neither a panacea for all the public sector's problems, nor is there a "one size fits all" approach that can be applied to all public organizations. However, the importance of using privatization as a means to reduce cost and cushion financial uncertainty cannot be undermined. Ample examples have been shown in the dissertation to illustrate such a point. Moreover, the fight over the Republican's Medicare privatization proposal certainly brought privatization to the forefront again. Advocates and opponents fiercely debate whether or not to increase the pace of outsourcing government provided services. There are numerous scholars who have devoted their research to such phenomena; a general consensus about what to privatize and how to properly privatize is yet to be reached. This dissertation attempts to fill in part of the gap. By adopting spatial techniques, measures for market characteristics, and level of fiscal uncertainty, the dissertation disentangles the common determinants that contribute to the use of outsourcing and specifies suitable conditions that welcome the use of outsourcing.

4.1. Dissertation Summary

Chapter two contributes to the literature in explaining why the use of outsourcing is so prevalent across the U.S. despite the constant opposition and criticisms. The study deviates from previous research by introducing spatial techniques to identify determinants of privatization. This study examines comprehensively privatization practices at the local level. The dataset contains more than 1000 municipalities. The estimation is based on cross-section data from 2007 using a spatial autoregressive model with spatial autoregressive disturbances.

The study identifies a positive spatial autocorrelation for sourcing decisions, which indicates a local government's sourcing decision is not solely based on internal determinants. Nearby local jurisdictions affect its decision making process. One important policy implication that could derive from this is that learning from other nearby local jurisdictions is essential for public officials who consider the use of outsourcing. There are two obvious benefits. First, such practice could help local officials gain knowledge about the use of outsourcing as a service delivery option. It also helps them identify dos and don'ts prior to outsourcing a service. Second, connecting with nearby localities provides elected officials potential opportunities for inter-municipal cooperation. This is especially helpful to cope with situations such as when the private market is not competitive and/or not enough service vendors could be identified. Inter-municipal cooperation also helps neighboring governments to achieve economies of scale.

Other results suggest the form and location of local governments matter when it comes to privatization. More specifically, localities in the North Central and South regions tend to privatize less compared to those in the Northeast region. Suburban cities rely more on outsourcing than central cities. In addition, external stakeholders' involvement and monitoring capacity exert positive pressure on the use of outsourcing, whereas a limited supply of private vendors impedes it. As such, getting more external stakeholders on board also helps to facilitate the use of outsourcing. In addition, enhanced monitoring capacity helps ensure the quality of the service outsourced, which in turn boosts the use of privatization. To deal with limited availability of potential service providers, one approach, as identified above, is to contract out with nearby local

governments. Another solution is to broaden the search; it is possible that there might be a robust national market when local competition is lacking.

Chapter three attempts to specify the conditions under which it is optimal to buy and under which it is optimal to produce in-house, so that when a city decides to outsource, it can claim the benefits (cost saving, improved performance) and avoid hazardous outcomes (pay disputes, corruption, pension scandals). The contribution of this chapter is to combine the transaction cost economics (TCE) framework with a revenue volatility measure to analyze contracting decisions. The estimation is based on different service areas that are specified by ICMA ASD survey: Public Works/Transportation, Public Utilities, Public Health and Safety, Parks and Recreation, Cultural and Arts Programs, and Support Services.

While all results are not entirely robust, there are several variables that are particularly worth noting. External stakeholders' involvement is critical in terms of implementing outsourcing at the municipal level. The variable shows statistical significance in all service groups except in Public Utility and Public Health and Safety. Region is another important indicator to show the total number of services privatized. Generally speaking, comparing to Northeast region, local jurisdictions located in North Central and South region are less likely to use private provision to provide public services, whereas localities in West region tends to utilize privatization more in service areas like Public Health and Safety and Cultural and Arts Programs. Revenue volatility measures do not have much impact on the use of privatization. There are two possible reasons for that: first, local government officials may not take revenue volatility into consideration when making outsourcing decisions. Second, the revenue volatility

measures specified in the paper may not be good enough to capture the level of fiscal stress as it is experienced at the municipal level. If the latter is true, future improvement on the volatility measure is needed.

TCE variables received limited support from the empirical results, the expectations hold in the support services group, which indicate higher asset specificity and higher contract management difficulty lead to less contracting out. It is a totally different story in Public Works and Transportation section. Higher asset specificity and higher contract management difficulty all lead to more outsourcing. The reason might be the use of privatization in this service area has become more commonplace and local governments may just follow the trend without fully evaluating the market characteristics.

As a whole, the empirical results presented here shed some light on disentangling determinants that contribute to the use of outsourcing and specify hospitable situations for such practice. There are several measures that are particularly important. External stakeholders' involvement is very robust across all the analyses, which makes it critical in implementing privatization at the local level. When outsourcing seems like a sound and viable option for a local government official, he/she should reach out and get more external stakeholders (i.e. potential service providers; professional consultants; service recipients/customers; managers in other local governments; citizen advisory committees; and state agencies, leagues, and associations) on board to help facilitate the whole process. Strong monitoring capacity is an area public officials should pay attention to if they are thinking about outsourcing some of their municipality's services. There is a positive and direct link between the capacity that a city has to oversee contracts and ensure the quality of service outsourced and the use of private provision to provide

services. Although the revenue volatility measure fails to show statistical significance, a tight fiscal situation (higher debt burden and lower tax revenue) seems to trigger the use of outsourcing as well. Combining the findings identified in the literature and empirical results presented here, outsourcing should be considered as a viable option to cut costs and deal with financial uncertainty under the right circumstances.

4.2. Future Research

The dissertation provides several unique ways to survey the use of outsourcing at the local level in the U.S. There are some limitations that have been identified though. The immediate next step of the future research would be to address those limitations. First, chapter two explores the determinants that contribute to the use of outsourcing and identifies that spatial autocorrelation exists in local governments' sourcing decisions. However, one drawback is that the study is based on aggregation of all the individual services at municipal level. Such aggregation may smooth out variations that exist at the service level. A finer analysis based on individual service or service groups should be able to help researchers and practitioners gain more insight on the matter.

In addition, revenue volatility measures do not show much impact on the use of outsourcing. As identified above, one possible reason is that the method used to extract volatility measures is rough. Borrowing from corporate finance literature to construct a new revenue volatility measure is necessary.

Because of the unavailability of the data, the analysis has failed to capture the impact of the recent economic recession. With the new privatization data due to come out soon, it would be particularly important to measure what are the impacts that recent the recession has had on the use of outsourcing. A direct survey to local government officials

to gather measures on asset specificity, contract management difficulty, and market competitiveness would also put an edge on the future research.

Moreover, municipalities are facing a very hard time financially with increasingly tight resources. It is not realistic to solve the problem with a single solution or practice. Future research is likely needed to incorporate the use of outsourcing with a variety of other factors that may help municipalities to cope with financial instability and limited resources.

Last but not least, the use of privatization is a worldwide phenomenon. So it should be treated as such. A comparison of the use of privatization in the U.S. and elsewhere should give more insight to anyone who is interested in the subject. In addition, as a rising economic power, China has just recently started to outsource its municipal services. I am particularly interested in comparing the use of outsourcing in the U.S. and China. This would be especially beneficial to Chinese practitioners since they virtually have no experience in such area.

Appendix A

Table A1 Average Scores by Service and Metro Status: Asset Specificity, Contract Management Difficulty

	Asset Specificity				Contract Management Difficulty			
Service	All	Core	Sub	Rural	All	Core	Sub	Rural
Residential waste collection	2.91	2.8	2.85	3.19	2.17	1.88	2.28	2.23
Commercial waste collection	2.83	2.9	2.78	2.89	2.15	1.84	2.27	2.17
Waste disposal	3.81	4.12	3.69	3.72	2.82	3.03	2.73	2.77
Street repair	3.32	3.3	3.33	3.35	2.56	2.46	2.6	2.56
Street/lot cleaning	2.4	2.33	2.38	2.51	1.94	1.89	1.93	2
Snow plowing/sanding	2.7	2.35	2.7	3	2.37	2.23	2.42	2.38
Traffic sign maintenance	3.6	3.46	3.71	3.47	2.61	2.49	2.65	2.65
Parking meter maintenance	1.87	1.74	2.03	1.65	2.07	2.17	2.08	1.92
Tree trimming/planting	2.61	2.54	2.62	2.66	2.34	2.29	2.36	2.34
Cemeteries maintenance	2.26	1.91	2.14	2.87	2.07	1.97	2.13	2.06
Inspection/code enforcement	3.94	3.88	3.92	4.06	3.43	3.53	3.46	3.23
Lots/garages operation	2.18	1.97	2.27	2.23	2.04	2.27	2	1.84
Bus system maintenance	3.18	3.17	3.36	2.79	2.91	3.14	2.98	2.44
Paratransit system maintenance	3.1	3.21	3.05	3.05	2.92	3.03	2.96	2.62
Airport operation	3.99	4.34	3.72	4.12	3.47	3.75	3.4	3.25
Water distribution	4.45	4.54	4.45	4.35	3.5	3.63	3.55	3.19
Water treatment	4.45	4.47	4.47	4.35	3.54	3.64	3.57	3.33
Sewage collection/treatment	4.49	4.54	4.49	4.44	3.59	3.79	3.55	3.45
Sludge disposal	3.7	3.86	3.7	3.53	2.93	2.97	3.08	2.48
Hazardous materials disposal	4.14	4.21	4.2	3.93	3.56	3.59	3.6	3.41
Electric utility management	4.2	4.27	4.19	4.14	3.59	3.8	3.67	3.09
Gas utility management	4.11	4.25	4.16	3.83	3.55	3.82	3.59	3.05
Utility meter reading	2.88	2.56	3	2.93	2.37	2.26	2.47	2.25
Utility billing	3.03	2.86	3.03	3.24	2.45	2.37	2.52	2.37
Crime prevention/patrol	4.07	4.1	3.99	4.26	3.89	4.18	3.95	3.4
Police/fire communications	4.28	4.1	4.34	4.34	3.64	3.58	3.8	3.34
Fire prevention/suppression	4.35	4.32	4.39	4.3	3.64	3.8	3.74	3.18
Emergency medical service	4.4	4.42	4.37	4.47	3.42	3.47	3.5	3.13
Ambulance service	4.11	4.08	4.11	4.15	3.17	3.06	3.29	2.96
Traffic control/parking enforcement	2.91	2.64	2.96	3.13	2.77	2.55	3	2.43
Vehicle towing and storage	2.23	2.19	2.23	2.29	2.14	2.03	2.18	2.16
Sanitary inspection	3.24	3.47	3.16	3.21	2.93	3.19	2.82	2.9
Insect/rodent control	2.74	2.68	2.73	2.88	2.44	2.5	2.37	2.54
Animal control	2.98	2.97	2.96	3.03	2.83	2.79	2.81	2.94
Animal shelter operation	3.1	2.97	3.15	3.13	2.69	2.64	2.66	2.81
Daycare facilities operation	2.99	3.04	3	2.91	2.74	2.93	2.67	2.7

Table A1 (continued)
Average Scores by Service and Metro Status: Asset Specificity, Contract Management Difficulty

	Asset Specificity				Contract Management Difficulty			
Service	All	Core	Sub	Rural	All	Core	Sub	Rural
Child welfare programs	3.29	3.59	3.05	3.52	3.47	3.96	3.28	3.35
Elderly programs	3	2.91	3.03	3.03	2.99	3.19	2.97	2.83
Hospital operation/management	4.14	4.25	4.08	4.14	3.92	3.93	3.87	4.05
Public health programs	3.66	3.87	3.49	3.81	3.6	3.63	3.61	3.56
Drug/alcohol treatment programs	3.32	3.36	3.14	3.74	3.38	3.25	3.41	3.48
Mental health programs operation	3.63	3.92	3.43	3.79	3.53	3.54	3.48	3.65
Prisons/jails	4.09	4.41	3.84	4.32	3.73	4.21	3.56	3.57
Homeless shelters operation	2.65	2.53	2.69	2.73	2.92	2.83	2.96	2.91
Job training programs	3.09	3.19	2.93	3.39	3.05	2.94	3.03	3.26
Welfare eligibility determination	2.94	3.07	2.68	3.38	3.11	3.11	3.07	3.22
Recreation facilities maintenance	3.3	3.4	3.12	3.58	2.83	2.9	2.79	2.83
Parks landscaping/maintenance	2.9	3.03	2.71	3.19	2.47	2.49	2.48	2.44
Convention centers/auditoriums operation	3.27	3.55	3.19	3.13	3.02	3.07	3.02	2.96
Cultural/arts programs operation	2.79	2.69	2.72	3.18	2.87	2.91	2.87	2.76
Libraries operation	3.53	3.63	3.45	3.61	3.07	3.17	2.99	3.15
Museums operation	3.39	3.52	3.34	3.38	2.94	3.1	2.95	2.7
Buildings/grounds maintenance	2.94	2.93	2.88	3.11	2.45	2.4	2.41	2.59
Building security	2.78	2.5	2.82	3.03	2.37	2.24	2.43	2.38
Heavy equipment maintenance	3.66	3.51	3.71	3.71	2.71	2.85	2.63	2.71
Emergency vehicles maintenance	3.74	3.68	3.77	3.72	2.7	2.93	2.64	2.56
All other vehicles maintenance	3.39	3.28	3.4	3.48	2.61	2.75	2.56	2.58
Payroll	3.33	3.15	3.27	3.69	2.37	2.4	2.31	2.5
Tax bill processing	3.23	3.28	3.15	3.37	2.56	2.61	2.46	2.73
Tax assessing	3.72	3.77	3.64	3.86	3.02	3.09	3.08	2.79
Data processing	3.75	3.71	3.7	3.94	2.91	3.03	2.84	2.94
Delinquent tax collection	3	2.86	2.94	3.29	2.53	2.53	2.43	2.77
Title records/plat map maintenance	3.45	3.53	3.32	3.62	2.8	2.69	2.8	2.9
Legal services	4.2	4.15	4.17	4.34	2.9	3.15	2.83	2.79
Secretarial services	2.61	2.38	2.52	3.09	2.14	1.97	2.21	2.18
Personnel services	3.4	3.17	3.35	3.76	2.78	2.79	2.76	2.82
Public relations/public information	3.1	3.05	3.05	3.32	2.77	2.74	2.74	2.9
ICMA Service Characteristics survey 2007. N=164 places (41 metro core, 87 suburban, 36 rural). Scores ranked from low (1) to high (5).								

Source: Hefetz, A., and M. E. Warner. 2012. Contracting or Public Delivery? The Importance of Service, Market, and Management Characteristics. *Journal of Public Administration Research and Theory* 22 (2):289-317; p.309-10

Table A2 Average Scores by Service and Metro Status: Market Competition

Service	Market Competition			
	All	Core	Suburban	Rural
Residential waste collection	2.59	2.66	2.82	1.94
Commercial waste collection	2.85	3.1	2.95	2.33
Waste disposal	1.69	1.59	1.92	1.28
Street repair	2.79	3.16	2.92	1.97
Street/lot cleaning	2.01	2.42	2.2	1.09
Snow plowing/sanding	1.76	1.9	1.9	1.32
Traffic sign maintenance	1.66	1.72	1.88	0.97
Parking meter maintenance	1.16	1.14	1.5	0.41
Tree trimming/planting	2.91	3	3.09	2.37
Cemeteries maintenance	1.63	1.84	1.72	1.23
Inspection/code enforcement	1.07	1.03	1.22	0.74
Lots/garages operation	1.83	2.09	2.1	0.88
Bus system maintenance	1.04	1.34	1.13	0.44
Paratransit system maintenance	1.23	1.38	1.38	0.62
Airport operation	0.68	0.52	1	0.22
Water distribution	0.79	0.78	0.94	0.45
Water treatment	0.88	0.83	1.08	0.39
Sewage collection/treatment	0.67	0.71	0.78	0.35
Sludge disposal	1.28	1.76	1.24	0.86
Hazardous materials disposal	1.51	1.66	1.69	0.85
Electric utility management	1.43	1.37	1.49	1.36
Gas utility management	1.4	1.32	1.5	1.23
Utility meter reading	1.35	1.55	1.43	0.89
Utility billing	1.54	1.91	1.59	0.96
Crime prevention/patrol	0.23	0.34	0.27	0.03
Police/fire communications	0.57	0.65	0.71	0.14
Fire prevention/suppression	0.41	0.33	0.41	0.52
Emergency medical service	1.23	1.16	1.32	1.1
Ambulance service	1.86	1.54	1.33	
Traffic control/parking enforcement	0.61	0.7	0.73	0.19
Vehicle towing and storage	3.18	3.42	3.17	2.94
Sanitary inspection	0.9	0.61	1.26	0.32
Insect/rodent control	2.3	2.61	2.5	1.33
Animal control	0.82	0.61	1.1	0.36
Animal shelter operation	1.28	1.4	1.36	0.97
Daycare facilities operation	3.44	3.7	3.3	3.52
Child welfare programs	1.36	0.96	1.76	0.83
Elderly programs	2.04	2.68	2.09	1.21

Table A2 Average Scores by Service and Metro Status: Market Competition (continued)

Service	Market Competition			
	All	Core	Suburban	Rural
Hospital operation/management	2.32	2.52	2.6	1.41
Public health programs	1.21	1.28	1.39	0.73
Drug/alcohol treatment programs	2.66	3.15	2.66	2.13
Mental health programs operation	2.05	2.52	2.09	1.46
Prisons/jails	0.84	0.73	1.15	0.25
Homeless shelters operation	2	2.38	2.02	1.45
Job training programs	2.01	2.26	2.03	1.63
Welfare eligibility determination	0.81	0.7	1.07	0.33
Recreation facilities maintenance	1.51	1.64	1.75	0.81
Parks landscaping/maintenance	2.26	2.38	2.6	1.31
Convention centers/auditoriums operation	1.67	2.07	1.84	0.79
Cultural/arts programs operation	2.35	2.71	2.24	2.14
Libraries operation	0.6	0.74	0.65	0.32
Museums operation	1.63	1.7	1.68	1.38
Buildings/grounds maintenance	2.53	2.92	2.64	1.8
Building security	2.26	2.89	2.51	0.94
Heavy equipment maintenance	2.08	2.41	2.24	1.31
Emergency vehicles maintenance	2.08	2.48	2.18	1.34
All other vehicles maintenance	2.44	2.77	2.42	2.09
Payroll	1.96	2.35	2.07	1.21
Tax bill processing	1.04	1.06	1.24	0.52
Tax assessing	0.71	0.68	0.81	0.53
Data processing	2.28	2.5	2.58	1.26
Delinquent tax collection	1.68	2.32	1.83	0.63
Title records/plat map maintenance	0.78	0.87	0.92	0.4
Legal services	3.28	3.59	3.37	2.71
Secretarial services	2.68	2.86	2.76	2.29
Personnel services	2.03	2.49	2	1.62
Public relations/public information	2.31	2.55	2.44	1.63
ICMA Service Characteristics survey 2007. N=164 places (41 metro core, 87 suburban, 36 rural). Competition ranked from no alternate providers (0), and one= one alternative provider, two = two, three = three, and four = four or more alternative providers.				

Source: Hefetz, A., and M. E. Warner. 2012. Contracting or Public Delivery? The Importance of Service, Market, and Management Characteristics. *Journal of Public Administration Research and Theory* 22 (2):289-317; p.311-12

Appendix B Factor Loading Matrix for TCE Variables

Principle Components Analysis	Asset Specificity		Contract Management Difficulty		Market Competition	
	Factor1	Factor2	Factor1	Factor2	Factor1	Factor2
Residential waste collection	0.97	-0.24	-0.78	0.63	1.00	-0.09
Commercial waste collection	0.37	-0.93	-0.69	0.72	0.97	0.25
Waste disposal	-0.48	-0.87	0.77	-0.64	0.93	-0.36
Street repair	0.92	0.39	-0.64	0.77	0.97	0.25
Street/lot cleaning	1.00	-0.07	-0.92	-0.40	0.98	0.21
Snow plowing/sanding	0.95	0.30	-0.71	0.71	1.00	0.06
Traffic sign maintenance	-0.39	0.92	-0.86	0.50	1.00	-0.08
Parking meter maintenance	-0.56	0.83	0.91	0.41	0.98	-0.21
Tree trimming/planting	0.87	0.49	-0.64	0.77	1.00	-0.04
Cemeteries maintenance	0.99	-0.12	-0.49	0.87	0.97	0.25
Inspection/code enforcement	0.99	-0.14	0.84	0.55	0.96	-0.27
Lots/garages operation	0.42	0.91	1.00	0.01	1.00	0.06
Bus system maintenance	-0.80	0.59	0.83	0.55	0.96	0.29
Paratransit system maintenance	-0.56	-0.83	0.80	0.60	1.00	0.06
Airport operation	0.15	-0.99	0.99	-0.11	0.90	-0.44
Water distribution	-0.98	-0.20	0.80	0.59	0.98	-0.21
Water treatment	-0.94	0.35	0.83	0.55	0.97	-0.24
Sewage collection/treatment	-0.97	-0.24	0.99	-0.12	1.00	-0.07
Sludge disposal	-0.98	-0.22	0.57	0.82	0.71	0.71
Hazardous materials disposal	-0.95	0.32	0.66	0.75	1.00	0.03
Electric utility management	1.00		0.90		0.85	
Gas utility management	0.88		0.84		0.93	
Utility meter reading	-0.67		0.88		0.94	
Utility billing	-0.98		0.87		0.85	
Crime prevention/patrol	0.99	0.10	0.94	0.35	-1.00	
Police/fire communications	-0.21	0.98	0.94	-0.35	1.00	
Fire prevention/suppression	-0.98	0.19	0.99	0.14	1.00	
Emergency medical service	1.00	0.02	1.00	-0.02	1.00	
Ambulance service	0.59	0.80	0.86	-0.50	-1.00	
Traffic control/parking enforcement	0.28	0.96	0.83	-0.56	1.00	
Vehicle towing and storage	0.63	0.78	-0.02	-1.00	-1.00	
Sanitary inspection	0.40	-0.92	-0.08	1.00	1.00	
Insect/rodent control	0.77	0.64	-0.84	0.55	-1.00	
Animal control	0.95	0.32	-0.99	-0.17	1.00	
Animal shelter operation	-0.34	0.94	-0.99	-0.16	-1.00	

Daycare facilities operation	-0.72	-0.69	0.04	1.00	-1.00	
Child welfare programs	0.91	-0.42	0.06	1.00	1.00	
Elderly programs	-0.21	0.98	0.68	0.73	-1.00	
Hospital operation/management	0.60	-0.80	-0.97	0.23	1.00	
Public health programs	0.90	-0.44	0.94	0.34	1.00	
Drug/alcohol treatment programs	0.99	0.14	-0.57	-0.82	-1.00	
Mental health programs operation	0.86	-0.51	-0.97	0.24	-1.00	
Prisons/jails	0.90	-0.44	0.16	0.99	1.00	
Homeless shelters operation	0.05	1.00	0.28	-0.96	-1.00	
Job training programs	1.00	-0.03	-0.94	-0.33	-1.00	
Welfare eligibility determination	1.00	-0.02	-0.99	0.17	1.00	
Recreation facilities maintenance	0.99		0.30	0.95	1.00	
Parks landscaping/maintenance	1.00		0.95	-0.32	0.99	
Convention centers/auditoriums operation	0.22		1.00	0.01	0.98	
Cultural/arts programs operation	0.05	1.00	0.98		0.76	
Libraries operation	0.82	0.57	-0.58		0.98	
Museums operation	1.00	-0.06	0.95		0.94	
Buildings/grounds maintenance	0.86	0.52	0.78	0.62	1.00	-0.08
Building security	0.08	1.00	-0.66	0.76	1.00	-0.02
Heavy equipment maintenance	-0.47	0.88	0.74	-0.67	1.00	0.02
Emergency vehicles maintenance	-0.91	0.41	0.10	-0.99	1.00	-0.10
All other vehicles maintenance	0.09	1.00	0.50	-0.87	0.90	-0.44
Payroll	0.59	0.81	0.97	0.23	1.00	-0.08
Tax bill processing	0.97	0.23	0.99	0.16	0.93	0.37
Tax assessing	0.97	0.23	-0.79	-0.61	0.85	0.53
Data processing	0.77	0.64	0.85	-0.53	0.98	0.21
Delinquent tax collection	0.62	0.78	0.93	0.37	0.99	-0.13
Title records/plat map maintenance	0.99	0.15	0.30	0.95	0.97	0.24
Legal services	0.68	0.73	0.25	-0.97	1.00	-0.08
Secretarial services	0.61	0.79	-0.52	0.86	1.00	0.00
Personnel services	0.50	0.86	0.98	0.21	0.86	-0.51
Public relations/public information	0.75	0.66	0.81	0.59	1.00	0.06

Appendix C

Table C1: Summary Statistics of Asset Specificity and Contract Management Difficulty

	Asset Specificity				Contract Management Difficulty			
	Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Min	Max
Residential waste collection	2.94	0.16	2.80	3.19	2.20	0.15	1.88	2.28
Commercial waste collection	2.83	0.06	2.78	2.90	2.17	0.15	1.84	2.27
Waste disposal	3.77	0.16	3.69	4.12	2.79	0.11	2.73	3.03
Street repair	3.33	0.02	3.30	3.35	2.56	0.05	2.46	2.60
Street/lot cleaning	2.41	0.07	2.33	2.51	1.94	0.04	1.89	2.00
Snow plowing/sanding	2.73	0.22	2.35	3.00	2.38	0.07	2.23	2.42
Traffic sign maintenance	3.59	0.12	3.46	3.71	2.62	0.06	2.49	2.65
Parking meter maintenance	1.87	0.18	1.65	2.03	2.05	0.09	1.92	2.17
Tree trimming/planting	2.62	0.04	2.54	2.66	2.34	0.03	2.29	2.36
Cemeteries maintenance	2.32	0.37	1.91	2.87	2.08	0.06	1.97	2.13
Inspection/code enforcement	3.96	0.07	3.88	4.06	3.40	0.12	3.23	3.53
Lots/garages operation	2.21	0.11	1.97	2.27	2.00	0.14	1.84	2.27
Bus system maintenance	3.15	0.25	2.79	3.36	2.84	0.27	2.44	3.14
Paratransit system maintenance	3.08	0.06	3.05	3.21	2.87	0.17	2.62	3.03
Airport operation	3.95	0.25	3.72	4.34	3.41	0.17	3.25	3.75
Water distribution	4.44	0.06	4.35	4.54	3.45	0.18	3.19	3.63
Water treatment	4.43	0.06	4.35	4.47	3.51	0.12	3.33	3.64
Sewage collection/treatment	4.48	0.03	4.44	4.54	3.56	0.11	3.45	3.79
Sludge disposal	3.68	0.11	3.53	3.86	2.88	0.27	2.48	3.08
Hazardous materials disposal	4.12	0.13	3.93	4.21	3.54	0.09	3.41	3.60
Electric utility management	4.19	0.04	4.14	4.27	3.52	0.29	3.09	3.80
Gas utility management	4.08	0.17	3.83	4.25	3.47	0.29	3.05	3.82
Utility meter reading	2.90	0.16	2.56	3.00	2.37	0.11	2.25	2.47
Utility billing	3.06	0.13	2.86	3.24	2.45	0.07	2.37	2.52
Crime prevention/patrol	4.09	0.12	3.99	4.26	3.82	0.29	3.40	4.18
Police/fire communications	4.30	0.09	4.10	4.34	3.62	0.20	3.34	3.80
Fire prevention/suppression	4.35	0.04	4.30	4.39	3.58	0.27	3.18	3.80
Emergency medical service	4.41	0.04	4.37	4.47	3.38	0.17	3.13	3.50
Ambulance service	4.12	0.02	4.08	4.15	3.15	0.15	2.96	3.29
Traffic control/parking enforcement	2.96	0.16	2.64	3.13	2.75	0.27	2.43	3.00
Vehicle towing and storage	2.24	0.04	2.19	2.29	2.15	0.05	2.03	2.18
Sanitary inspection	3.23	0.11	3.16	3.47	2.91	0.13	2.82	3.19
Insect/rodent control	2.77	0.08	2.68	2.88	2.44	0.08	2.37	2.54
Animal control	2.98	0.03	2.96	3.03	2.85	0.06	2.79	2.94
Animal shelter operation	3.11	0.07	2.97	3.15	2.70	0.07	2.64	2.81
Daycare facilities operation	2.98	0.05	2.91	3.04	2.72	0.09	2.67	2.93

Child welfare programs	3.28	0.25	3.05	3.59	3.42	0.25	3.28	3.96
Elderly programs	3.01	0.05	2.91	3.03	2.97	0.12	2.83	3.19
Hospital operation/management	4.13	0.06	4.08	4.25	3.93	0.08	3.87	4.05
Public health programs	3.65	0.17	3.49	3.87	3.60	0.03	3.56	3.63
Drug/alcohol treatment programs	3.36	0.26	3.14	3.74	3.40	0.08	3.25	3.48
Mental health programs operation	3.62	0.21	3.43	3.92	3.54	0.07	3.48	3.65
Prisons/jails	4.08	0.26	3.84	4.41	3.67	0.24	3.56	4.21
Homeless shelters operation	2.67	0.07	2.53	2.73	2.92	0.05	2.83	2.96
Job training programs	3.11	0.20	2.93	3.39	3.08	0.12	2.94	3.26
Welfare eligibility determination	2.96	0.31	2.68	3.38	3.12	0.07	3.07	3.22
Recreation facilities maintenance	3.31	0.21	3.12	3.58	2.82	0.04	2.79	2.90
Parks landscaping/maintenance	2.91	0.22	2.71	3.19	2.47	0.02	2.44	2.49
Convention centers/auditoriums operation	3.23	0.15	3.13	3.55	3.01	0.04	2.96	3.07
Cultural/arts programs operation	2.85	0.22	2.69	3.18	2.84	0.06	2.76	2.91
Libraries operation	3.53	0.08	3.45	3.63	3.07	0.08	2.99	3.17
Museums operation	3.38	0.06	3.34	3.52	2.90	0.14	2.70	3.10
Buildings/grounds maintenance	2.96	0.10	2.88	3.11	2.46	0.08	2.40	2.59
Building security	2.83	0.18	2.50	3.03	2.38	0.07	2.24	2.43
Heavy equipment maintenance	3.68	0.08	3.51	3.71	2.69	0.08	2.63	2.85
Emergency vehicles maintenance	3.74	0.03	3.68	3.77	2.67	0.13	2.56	2.93
All other vehicles maintenance	3.40	0.07	3.28	3.48	2.60	0.07	2.56	2.75
Payroll	3.38	0.21	3.15	3.69	2.38	0.08	2.31	2.50
Tax bill processing	3.24	0.10	3.15	3.37	2.57	0.12	2.46	2.73
Tax assessing	3.73	0.10	3.64	3.86	2.99	0.13	2.79	3.09
Data processing	3.77	0.11	3.70	3.94	2.90	0.07	2.84	3.03
Delinquent tax collection	3.03	0.17	2.86	3.29	2.55	0.15	2.43	2.77
Title records/plat map maintenance	3.45	0.14	3.32	3.62	2.81	0.07	2.69	2.90
Legal services	4.22	0.08	4.15	4.34	2.87	0.13	2.79	3.15
Secretarial services	2.67	0.28	2.38	3.09	2.16	0.09	1.97	2.21
Personnel services	3.44	0.22	3.17	3.76	2.78	0.03	2.76	2.82
Public relations/public information	3.13	0.12	3.05	3.32	2.79	0.07	2.74	2.90

Table C2: Summary Statistics of Market Competition

	Market Competition			
	Mean	Std. Dev.	Min	Max
Residential waste collection	2.53	0.39	1.94	2.82
Commercial waste collection	2.79	0.31	2.33	3.10
Waste disposal	1.67	0.28	1.28	1.92
Street repair	2.67	0.47	1.97	3.16
Street/lot cleaning	1.90	0.54	1.09	2.42
Snow plowing/sanding	1.72	0.27	1.32	1.90
Traffic sign maintenance	1.58	0.40	0.97	1.88
Parking meter maintenance	1.11	0.48	0.41	1.50
Tree trimming/planting	2.86	0.32	2.37	3.09
Cemeteries maintenance	1.59	0.24	1.23	1.84
Inspection/code enforcement	1.04	0.21	0.74	1.22
Lots/garages operation	1.73	0.56	0.88	2.10
Bus system maintenance	0.96	0.35	0.44	1.34
Paratransit system maintenance	1.15	0.35	0.62	1.38
Airport operation	0.68	0.35	0.22	1.00
Water distribution	0.76	0.21	0.45	0.94
Water treatment	0.83	0.30	0.39	1.08
Sewage collection/treatment	0.64	0.19	0.35	0.78
Sludge disposal	1.21	0.30	0.86	1.76
Hazardous materials disposal	1.43	0.38	0.85	1.69
Electric utility management	1.43	0.06	1.36	1.49
Gas utility management	1.39	0.12	1.23	1.50
Utility meter reading	1.29	0.27	0.89	1.55
Utility billing	1.45	0.35	0.96	1.91
Crime prevention/patrol	0.21	0.12	0.03	0.34
Police/fire communications	0.53	0.26	0.14	0.71
Fire prevention/suppression	0.43	0.07	0.33	0.52
Emergency medical service	1.23	0.10	1.10	1.32
Ambulance service	1.38	0.09	1.33	1.54
Traffic control/parking enforcement	0.56	0.25	0.19	0.73
Vehicle towing and storage	3.14	0.16	2.94	3.42
Sanitary inspection	0.86	0.43	0.32	1.26
Insect/rodent control	2.16	0.55	1.33	2.61
Animal control	0.79	0.33	0.36	1.10
Animal shelter operation	1.25	0.18	0.97	1.40
Daycare facilities operation	3.44	0.15	3.30	3.70
Child welfare programs	1.34	0.44	0.83	1.76
Elderly programs	1.92	0.52	1.21	2.68

Hospital operation/management	2.23	0.54	1.41	2.60
Public health programs	1.17	0.29	0.73	1.39
Drug/alcohol treatment programs	2.58	0.35	2.13	3.15
Mental health programs operation	1.97	0.37	1.46	2.52
Prisons/jails	0.81	0.40	0.25	1.15
Homeless shelters operation	1.91	0.33	1.45	2.38
Job training programs	1.95	0.23	1.63	2.26
Welfare eligibility determination	0.78	0.33	0.33	1.07
Recreation facilities maintenance	1.45	0.42	0.81	1.75
Parks landscaping/maintenance	2.17	0.57	1.31	2.60
Convention centers/auditoriums operation	1.56	0.52	0.79	2.07
Cultural/arts programs operation	2.29	0.20	2.14	2.71
Libraries operation	0.57	0.17	0.32	0.74
Museums operation	1.59	0.14	1.38	1.70
Buildings/grounds maintenance	2.43	0.43	1.80	2.92
Building security	2.10	0.78	0.94	2.89
Heavy equipment maintenance	1.99	0.45	1.31	2.41
Emergency vehicles maintenance	1.98	0.43	1.34	2.48
All other vehicles maintenance	2.38	0.23	2.09	2.77
Payroll	1.86	0.44	1.21	2.35
Tax bill processing	0.99	0.32	0.52	1.24
Tax assessing	0.70	0.12	0.53	0.81
Data processing	2.17	0.60	1.26	2.58
Delinquent tax collection	1.55	0.63	0.63	2.32
Title records/plat map maintenance	0.75	0.23	0.40	0.92
Legal services	3.21	0.34	2.71	3.59
Secretarial services	2.63	0.23	2.29	2.86
Personnel services	1.97	0.29	1.62	2.49
Public relations/public information	2.21	0.39	1.63	2.55

Appendix D Correlation Matrix for TCE Factor Scores by Service Area

Table D1: Correlation Matrix for TCE Factor Scores in Public Works/Transportation

Public Works	Asset_1	Asset_2	Cont_1	Cont_2	Mark_1	Mark_2
Asset_1	1.00					
Asset_2	0.00	1.00				
Contract_1	-0.92	0.40	1.00			
Contract_2	0.40	0.92	0.00	1.00		
Market_1	-0.29	0.96	0.65	0.76	1.00	
Market_2	-0.96	-0.29	0.76	-0.65	0.00	1.00

Table D2: Correlation Matrix for TCE Factor Scores in Public Utilities

Public Utility	Asset	Contract	Market
Asset	1.00		
Contract	0.57	1.00	
Market	0.63	0.99	1.00

Table D3: Correlation Matrix for TCE Factor Scores in Public Health and Safety

Public Safety	Asset_1	Asset_2	Cont_1	Cont_2	Mark
Asset_1	1.00				
Asset_2	0.00	1.00			
Contract_1	-1.00	1.00	1.00		
Contract_2	1.00	-1.00	0.00	1.00	
Market	-1.00	1.00	1.00	-1.00	1.00

Table D4: Correlation Matrix for TCE Factor Scores in Parks and Recreation

Parks	Asset	Cont_1	Cont_2	Market
Asset	1.00			
Contract_1	-0.61	1.00		
Contract_2	0.79	0.00	1.00	
Market	-0.82	0.96	-0.29	1.00

Table D5: Correlation Matrix for TCE Factor Scores in Cultural and Arts Programs

	Asset_1	Asset_2	Contract	Market
Asset_1	1.00			
Asset_2	0.00	1.00		
Contract	-0.01	-1.00	1.00	
Market	0.29	-0.96	0.96	1.00

Table D6: Correlation Matrix for TCE Factor Scores in Support Services

	Asset_1	**Asset_2**	**Cont_1**	**Cont_2**	**Mark_1**	**Mark_2**
Asset_1	1.00					
Asset_2	0.00	1.00				
Contract_1	0.83	0.55	1.00			
Contract_2	0.55	-0.83	0.00	1.00		
Market_1	0.10	-0.99	-0.46	0.89	1.00	
Market_1	-0.99	-0.10	-0.89	-0.46	0.00	1.00

References

Afonso, A., and D. Furceri. 2010. Government size, composition, volatility and economic growth. *European Journal of Political Economy* 26 (4):517-532.

Afonso, A., and J. T. Jalles. 2012. Fiscal volatility, financial crises and growth. *Applied Economics Letters* 19 (18):1821-1826.

Aizenman, J., and N. Marion. 1993. Policy uncertainty, persistence and growth. *Review of International Economics* 1:145-163.

Ammons, David N. 2003. Urban Services. In *Cities, Politics, and Policy A Comparative Analysis*, edited by J. P. Pelissero: CQ Press.

Audet, Denis. 2002. Government Procurement: A Systhesis Report. *OECD Journal on Budgeting* 2 (3).

Auriol, E. 2006. Corruption in procurement and public purchase. *International Journal of Industrial Organization* 24 (5):867-885.

Bajari, Patrick, and Steven Tadelis. 2001. Incentives versus Transaction Costs: A Theory of Procurement Contracts. *The RAND Journal of Economics* 32 (3):21.

Baumgartner, Frank, and Bryan D. Jones. 1993. *Agendas and Instability in American Politics*. Chicago: University of Chicago Press.

Beck, N., K. S. Gleditsch, and K. Beardsley. 2006. Space is more than geography: Using spatial econometrics in the study of political economy. *International Studies Quarterly* 50 (1):27-44.

Berry, F. S., and W. D. Berry. 1990. State Lottery Adoptions As Policy Innovations – An Event History Analysis. *American Political Science Review* 84 (2):395-415.

Berry, Frances Stokes, and William D. Berry. 1999. Innovation and Diffusion Models in Policy Research. In *Policy*, edited by P. A. Sabatier: Westview Press.

Berry, W. D., E. J. Ringquist, R. C. Fording, and R. L. Hanson. 1998. Measuring citizen and government ideology in the American states, 1960-93. *American Journal of Political Science* 42 (1):327-348.

Besley, T., and A. Case. 1995. Incumbent Behavior – Vote-Seeking, Tax-Setting, and Yardstick Competition. *American Economic Review* 85 (1):25-45.

———. 2003. Political institutions and policy choices: Evidence from the United States. *Journal of Economic Literature* 41 (1):7-73.

Bleaney, M. F. 1996. Macroeconomic stability, investment and growth in developing countries. *Journal of Development Economics* 48 (2):461-477.

Bouché, Vanessa, and Craig Volden. 2011. Privatization and the Diffusion of Innovations. *The Journal of Politics* 73:428-442.

Boyne, G. A. 1998. The determinants of variations in local service contracting - Garbage in, garbage out? *Urban Affairs Review* 34 (1):150-163.

Brooks, S. M. 2005. Interdependent and domestic foundations of policy change: The diffusion of pension privatization around the world. *International Studies Quarterly* 49 (2):273-294.

Brown, R. D. 1995. Party Cleavages and Welfare Effort in the American States (Vol. 89, pg 23, 1995). *American Political Science Review* 89 (4):996-996.

Brown, Trevor L., and Matthew Potoski. 2003. Managing contract performance: A transaction costs approach. *Journal of Policy Analysis and Management* 22 (2):275-97.

Brudney, J. L., S. Fernandez, J. E. Ryu, and D. S. Wright. 2005. Exploring and explaining contracting out: Patterns among the American states. *Journal of Public Administration Research and Theory* 15 (3):393-419.

Brueckner, J. K. 2003. Strategic interaction among governments: An overview of empirical studies. *International Regional Science Review* 26 (2):175-188.

Brunetti, A. 1997. Policy volatility and economic growth: a comparative, empirical analysis. *European Journal of Political Economy* 14:35-52.

Cameron, Adrian Colin. *Advances in Count Data Regression Talk for the Applied Statistics Workshop*, March 28, 2009 2009. Available from http://cameron.econ.ucdavis.edu/racd/count.html

Cameron, Adrian Colin, and Pravin K. Trivedi. 2009. *Microeconometrics Using Stata*. College Station, TX: Stata Press.

Case, A. C., J. R. Hines, and H. S. Rosen. 1994. Budget Spillovers and Fiscal-Policy Interdependence – Evidence from the States (Vol. 52, pg 285, 1993). *Journal of Public Economics* 53 (2):325-325.

Checkel, J. T. 2005. International institutions and socialization in Europe: Introduction and framework. *International Organization* 59 (4):801-826.

Commons, John R. 1932. The Problem of Correlating Law, Economics, and Ethics. *Wisconsin Law Review* 8.

Dilger, Robert Jay, Randolph R. Moffett, and Linda Struyk. 1997. Privatization of municipal services in america's largest cities. *Public Administration Review* 57 (1).

Dorey, Peter. 2005. *Policy Making in Britain: An Introduction*: SAGE Publications Ltd.

Drukker, David M., Ingmar R. Prucha, and Rafal Raciborski. 2011. Maximum-Likelihood and Generalized Spatial Two-Stage Least-Squares Estimators for a Spatial-Autoregressive Model with Spatial-Autoregressive Disturbances. *Working paper, University of Maryland, Department of Economics,* *http://econweb.umd.edu/~prucha/Papers/WP_spreg_2011.pdf*.

Dutta, S., and G. John. 1995. Combining Lab Experiments and Industry Data in Transaction Cost Analysis – The Case of Competition as a Safeguard. *Journal of Law Economics & Organization* 11 (1):87-111.

Ebeke, C., and H. Ehrhart. 2012. Tax Revenue Instability in Sub-Saharan Africa: Consequences and Remedies. *Journal of African Economies* 21 (1):1-27.

Fatas, Antonio, and Ilian Mihov. 2006. Policy Volatility, Institutions and Economic Growth. *C.E.P.R. Discussion Papers. Available at* *http://ideas.repec.org/p/cpr/ceprdp/5388.html*.

Fernandez, Sergio, Jay Eungha Ryu, and Jeffrey L. Brudney. 2008. Exploring variations in contracting for services among american local governments: Do politics still matter? . *American Review of Public Administration* 38 (4):439-62.

Gordon, R. H. 1983. An Optimal Taxation Approach to Fiscal Federalism. Quar*terly Journal of Economics* 98 (4):567-586.

Graham, Erin, Charles R. Shipan, and Craig Volden. 2008. The Diffusion of Policy Diffusion Research. *Unpublished paper*.

Greene, J. D. 1996. Cities and privatization: Examining the effect of fiscal stress, location, and wealth in medium-sized cities. *Policy Studies Journal* 24 (1):135-144.

Greene, Jeffrey D. 2002. *Cities and privatization : Prospects for the new century*. Upper Saddle River, N.J.: Prentice Hall.

Gupta, Srabana. Competition and Collusion in a Governemnt Procurement Auction Market.

Hackbart, Merl. 2006. The Federal Purchase Card: Use, Policy and Best Practice. In *AGA CPAG Research Series*.

Hefetz, A., and M. E. Warner. 2012. Contracting or Public Delivery? The Importance of Service, Market, and Management Characteristics. *Journal of Public Administration Research and Theory* 22 (2):289-317.

Hoekman, B. 1998. Using international institutions to improve public procurement. *World Bank Research Observer* 13 (2):249-269.

Hoekman, Simon Evenett and Bernard. 1999. Government Procurement: How Does Discrimination Matter.

Hoene, Christopher W. 2009. City Budget Shortfalls and Responses: Projections for 2010-2012. Washington D.C.

Jones, Bryan D. 1994. *Reconceiving Decision-Making in Democratic Politics: Attention, Choice, and Public Policy*: The University of Chicago Press.

Kamerman, Sheila B., and Alfred J. Kahn. 1989. *Privatization and the welfare state*. Princeton, NJ: Princeton University Press.

Kelejian, H. H., and I. R. Prucha. 1998. Generalized spatial two-stage least squares procedure for estimating a spatial autoregressive model with autoregressive disturbances. *Journal of Real Estate Finance and Economics* 17 (1):99-121.

Klein, Saul, Gary L. Frazier, and Victor Roth. 1990. Determinants of Export Channel Structure: The Effects of Experience and Psychic Distance Reconsidered. *International Marketing Review* 7 (5).

Klein, Saul, and Victor J. Roth. 1993. Satisfaction With International Marketing Channels. *Journal of the Academy of Marketing Science* 21.

Lamothe, M., and S. Lamothe. 2010. Competing for What? Linking Competition to Performance in Social Service Contracting. *American Review of Public Administration* 40 (3):326-350.

Levi-Faur, D. 2003. The politics of liberalisation: Privatisation and regulation-for-competition in Europe's and Latin America's telecoms and electricity industries. *European Journal of Political Research* 42 (5):705-740.

———. 2005. The global diffusion of regulatory capitalism. *Annals of the American Academy of Political and Social Science* 598:12-32.

Manski, C. F. 2000. Economic analysis of social interactions. *Journal of Economic Perspectives* 14 (3):115-136.

Marc Bendick, Jr. . 1989. Privatizing the delivery of social welfare services: An idea to be taken seriously. In *Privatization and the welfare state*, edited by S. B. Kamerman and A. J. Kahn. Princeton, NJ: Princeton University Press.

McAfee, R. P., and J. McMillan. 1989. Government Procurement and International Trade. *Journal of International Economics* 26 (3-4):291-308.

Merl Hackbart, Dwight Denison. 2007. The Federal Travel Card: Uses, Policies and Best Practices. In *AGA CPAG Research Series*.

Meseguer, Covadonga. 2004. What Role for Learning? The Diffusion of Privatisation in OECD and Latin American Countries. *Journal of Public Policy* 24 (3):299-325.

Milward, Brinton, Keith Provan, and Barbara Else. 1993. What does the "hollow state" look like? In *Public management: The state of the art*, edited by B. Bozeman. San Francisco, CA: Jossey-Bass.

Mintrom, M. 1997. Policy entrepreneurs and the diffusion of innovation. *American Journal of Political Science* 41 (3):738-770.

Moe, Ronald C. 1987. Exploring the limits of privatization. *Public Administration Review* 47 (6):453-60.

Morgan, David R. 1988. The decision to contract out city services: A further explanation. *Political Research Quarterly* 41 (2).

Morgan, David R., and Robert E. England. 1988. The two faces of privatization. *Public Administration Review* 48 (6):979-87.

Neumayer, Eric, and Thomas Plümper. 2012. Conditional Spatial Policy Dependence: Theory and Model Specification. *Comparative Political Studies, 2012. Available at SSRN: http://ssrn.com/abstract=1840589*.

Nice, David C., and Patricia Fredericksen. 1995. *The Politics of Intergovernmental Relations*. Second ed: Nelson-Hall Publishers/Chicago.

Oates, W. E. 1999. An essay on fiscal federalism. *Journal of Economic Literature* 37 (3):1120-1149.

Ohashi, H. 2009. Effects of Transparency in Procurement Practices on Government Expenditure: A Case Study of Municipal Public Works. *Review of Industrial Organization* 34 (3):267-285.

Pilling, B. K., L. A. Crosby, and D. W. Jackson. 1994. Relational Bonds in Industrial Exchange – An Experimental Test of the Transaction Cost Economic Framework. *Journal of Business Research* 30 (3):237-251.

Plumper, T., and E. Neumayer. 2010. Model specification in the analysis of spatial dependence. *European Journal of Political Research* 49 (3):418-442.

Preuss, L. 2009. Addressing sustainable development through public procurement: the case of local government. *Supply Chain Management-an International Journal* 14 (3):213-223.

Ramey, G., and V. A. Ramey. 1994. Cross-country evidence on the link between volatility and growth. *NBER Working Paper No. 4959*.

Rindfleisch, A., and J. B. Heide. 1997. Transaction cost analysis: Past, present, and future applications. *Journal of Marketing* 61 (4):30-54.

Riscado, S. M., J. Stancik, and T. Valila. 2011. Macro-Fiscal Volatility and the Composition of Public Spending. *Fiscal Studies* 32 (4):511-538.

Rogers, Everett M. 1962. *Diffusion of innovations*. New York,: Free Press of Glencoe.

———. 1983. *Diffusion of innovations*. 3rd ed. New York:Free Press.

Rosen, Harvey S., and Ted Gayer. 2009. *Public Finance*. 9th ed: McGraw-Hill/Irwin.

Rosenbloom, David, and Robert Kravchuk. 2004. *Public Administration: Understanding Management, Politics, and Law in the Public Sector*. 6th ed: McGraw-Hill Humanities/Social Sciences/Languages.

Savas, Emanuel S. . 2000. *Privatization and public-private partnerships*. New York: Chatham House.

Schmitt, C. 2011. What Drives the Diffusion of Privatization Policy? Evidence from the Telecommunications Sector. *Journal of Public Policy* 31 (1):95-117.

Shelanski, H. A., and P. G. Klein. 1995. Empirical Research in Transaction Cost Economics – A Review and Assessment. *Journal of Law Economics & Organization* 11 (2):335-361.

Shipan, C. R., and C. Volden. 2006. Bottom-up federalism: The diffusion of antismoking policies from US cities to states. *American Journal of Political Science* 50 (4):825-843.

———. 2008. The mechanisms of policy diffusion. *American Journal of Political Science* 52 (4):840-857.

Sriram, V., R. Krapfel, and R. Spekman. 1992. Antecedents to Buyer-Seller Collaboration – An Analysis from the Buyers Perspective. *Journal of Business Research* 25 (4):303-320.

Tao, Jill L., and Barbara C. McCabe. 2011. The Hollow State and Private Governance: Local Privatization of Political Processes through Homeowner Associations. In *7th Annual International Critical Management Studies Conference*. Naples, Italy.

Terry, Larry D. 2005. The Thinning of Administrative Institutions in the Hollow State. *Administration & Society* 37 (4):426-444.

Thompson, Lyke, and Richard C. Elling. 2000. Mapping patterns of support for privatization in the mass public: The case of Michigan. *Public Administration Review* 60 (4).

Volden, C. 2006. States as policy laboratories: Emulating success in the children's health insurance program. *American Journal of Political Science* 50 (2):294-312.

Walker, G., and L. Poppo. 1991. Profit Centers, Single-Source Suppliers, and Transaction Costs. *Administrative Science Quarterly* 36 (1):66-87.

Walker, G., and D. Weber. 1984. A Transaction Cost Approach to Make-Or-Buy Decisions. *Administrative Science Quarterly* 29 (3):373-391.

Ward, Hugh, and Peter John. 2011. Competitive Learning in Yardstick Competition: Testing Models of Policy Diffusion. *Available at SSRN: http://ssrn.com/abstract=1958677 or http://dx.doi.org/10.2139/ssrn.1958677*.

Warner, Mildred, and Robert Hebdon. 2001. Local government restructuring: Privatization and its alternatives. *Journal of Policy Analysis and Management* 20 (2):316-36.

White, F. C. 1983. Trade-Off in Growth and Stability in State Taxes. *National Tax Journal* 36 (1):103-114.

Williamson, O. E. 1979. Transaction-Cost Economics – Governance of Contractual Relations. *Journal of Law & Economics* 22 (2):233-261.

———. 1979. Assessing Vertical Market Restrictions – Antitrust Ramifications of the Transaction Cost Approach. *University of Pennsylvania Law Review* 127 (4):953-993.

———. 1981. The Economics of Organization – The Transaction Cost Approach. *American Journal of Sociology* 87 (3):548-577.

———. 1997. The making of economic policy: A transaction-cost politics perspective. *Economic Journal* 107 (445):1886-1887.

———. 2002. The theory of the firm as governance structure: From choice to contract. *Journal of Economic Perspectives* 16 (3):171-195.

Wooldridge, Jeffrey M. 2009. *Introductory econometrics : a modern approach*. Mason, Ohio: South-Western Cengage Learning.

Yan, Wenli, and Wen Wang. 2010. Revenue Volatility and Its Tangible Impact on Local Debt Finance. In *Association for Budgeting & Financial Management*. Omaha, Nebraska.

VITA

Zhiwei Zhang

Education

- UNIVERSITY OF KENTUCKY – Lexington, KY Expected:
  - *Ph.D. Public Policy and Public Administration* May 2013
  - **Dissertation Title**: "To Produce or To Buy? Exploring Determinants of Local Government Privatization Decisions"
- KANSAS STATE UNIVERSITY – Manhattan, KS
  - *Master of Public Administration* May 2009
- BEIJING INSTITUTE OF MACHINERY – Beijing, China
  - *Public Administration* June 2006

Research and Teaching Interests

- Research Interests:
  - *Public Finance and Budgeting, Public Procurement and Public Private Partnership, Donors' Philanthropy Behavior, Nonprofit Finance and Management*
- Teaching Interests:
  - *Research Methods, Statistics, Public Budgeting and Financial Management, Nonprofit Management, and Policy Analysis*

Honors and Awards

- 2012 SECOPA at Florida Morris Collins Award for the Best Doctoral Student Paper
- 2012 ARNOVA at Indiana Participate in Professional Development Workshop
- 2007-2008 Academic year $1000 John Carlin Scholarship KSU
- 2005-2006 1" semester ¥800 2nd Academic Award with Scholarship BIM
- 2004-2005 2" semester ¥800 2nd Academic Award with Scholarship BIM
- 2004-2005 1" semester ¥800 2nd Academic Award with Scholarship BIM
- 2004-2005 Academic year ¥1000 scholarship for excellent students leader BIM
- 2002-2003 1" semester ¥800 2nd Academic Award with Scholarship BIM
- 2002-2003 Academic year ¥1000 scholarship for excellent students leader BIM

Teaching Experience

- UNIVERSITY OF KENTUCKY – Lexington, KY
  - Instructor of Math Camp for New Master Students August 2012
  - Instructor of Math Camp for New Ph.D. Students August 2012
- UNIVERSITY OF KENTUCKY – Lexington, KY

    - Instructor of Eco 391: Statistics for Management And Economics Fall 2011
    - Teaching Evaluation: 3.6/4.0
- KANSAS STATE UNIVERSITY – Manhattan, KS
    - Graduate Teaching Assistant Fall 2007 – May 2009

Research Experience

- UNIVERSITY OF KENTUCKY – Lexington, KY
    - Graduate Research Assistant Fall 2009 – Spring 2011& Spring 2012 – Present

Peer-Reviewed Publications

- Edward T. Jennings, Jr., Jeremy L. Hall, and Zhiwei Zhang. 2012. The American Recovery and Reinvestment Act and State Accountability. *Public Performance & Management Review* 35 (3): 527-549.

Policy Briefs and Non-Refereed Publications

- Edward T. Jennings, Jr., and Zhiwei Zhang. 2011. A Brief Report on Recipient Use of Credit Cards in Home and Community Based Services or Supports for Community Living Waiver Programs. Lexington, KY: Prepared for the Kentucky Council on Developmental Disabilities.
- Zhang, Zhiwei, Elle Hull, and Edward T. Jennings, Jr. 2012. A Brief Report on Adult Abuse Registries. Martin School of Public Policy and Administration, University of Kentucky.
- Zhang, Zhiwei, and Edward T. Jennings, Jr. 2012. A State Comparison about How Employment First Works. Lexington, KY: Martin School of Public Policy and Public Administration, University of Kentucky.

Research Under Review

- "Does Public Perception Matter in Charitable Contributions -- An Empirical Analysis of Health Care Nonprofit Organizations." (with Edward Jennings)
- "Explaining the Service Levels of Home and Community Based Waiver Programs: A Comparative State Policy Analysis." (with Edward Jennings)

Working Manuscripts

- "Addressing ICMA Alternative Service Delivery Survey Selection Bias Issue – An Empirical Analysis to Assign Sampling Weights" (with JS Butler)
- "How Employment First Improves Employment Rate with People with Intellectual and Developmental Disabilities" (with Edward Jennings)

Presentations

- Zhang, Zhiwei, and Longjin Chen. November, 2012. Determinants of Privatization in the U.S. Municipalities -- New Evidence from Spatial Study of Policy Diffusion. In Association for Public Policy Analysis & Management. Baltimore, MD.
- Zhang, Zhiwei. October, 2012. Is Privatization a Response to Revenue Volatility? In Association for Budgeting & Financial Management. New York City, New York.
- Zhang, Zhiwei, and Longjin Chen. October, 2012. What Drives Privatization in U.S. Municipalities. In Southeastern Conference of Public Administration. Coral Springs, Florida.
- Zhang, Zhiwei, and Jr. Edward T. Jennings. October, 2012. How Nonprofits' Professionalism and Quality Affect Donations -- An Empirical Analysis of Nursing Homes. In Southeastern Conference of Public Administration. Coral Springs, Florida.
- Zhang, Zhiwei. 2011. An Empirical Analysis of Americans' Charitable Giving with Respect to Income. In *Association of Budgeting and Financial Management*. Washington, D.C.
- Edward T. Jennings, Jr., and Zhiwei Zhang. September, 2011. Explaining the Service Levels of Home and Community Based Waiver Programs: A Comparative State Policy Analysis Redux. In *Southeastern Conference of Public Administration*. New Orleans, LA.
- Zhang, Zhiwei. September, 2011. Does Public Perception Matter in Charitable Contributions -- An Empirical Analysis of Health Care Nonprofit Organizations. In *Southeastern Conference of Public Administration*. New Orleans, LA.
- Edward T. Jennings, Jr., Jeremy L. Hall, and Zhiwei Zhang. March, 2011. The American Recovery and Reinvestment Act and State Accountability. In *Center for Accountability and Performance Symposium, ASPA*. Baltimore, MD.
- Edward T. Jennings, Jr., and Zhiwei Zhang. October, 2010. Explaining the Service Levels of Home and Community Based Waiver Programs: A Comparative State Policy Analysis. In *Southeastern Conference of Public Administration*. Wilmington, NC.
- Zhang, Zhiwei. June, 2010. Produce or Buy? A Theoretical Analysis of Government Procurement from a Transaction Cost Perspective. In *2010 Sino-US International Conference on Public Administration (5th)*. Xiamen, China.

Work/Intern Experience Work/Intern Experience

- CITY MANAGER'S OFFICE – Junction City, KS May-July 2008
  - MPA Internship
- KANSAS LEGAL SERVICE – Topeka, KS February – March 2008
  - Volunteer
- HALE LIBRARY – Manhattan, KS June-September 2007
  - Student Assistant
- CHINA CENTRAL TELEVISION – Beijing, China March - July 2006
  - Graduation Intern as Office Assistant