DETERMINANTS OF THE CAPITAL STRUCTURE OF U.S. PUBLIC FINANCE INFRASTRUCTURAL ENTERPRISES: EVIDENCE FROM NOT-FOR-PROFIT WATER, POWER AND TRANSPORTATION ENTERPRISES

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ABSTRACT OF THE DISSERTATION

Determinants of the Capital Structure of U.S. Public Finance Infrastructural Enterprises: Evidence from Not-For-Profit Water, Power and Transportation Enterprises

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Infrastructure is the cornerstone of the American economy. It underpins economic development and provides essential services. In the United States (U.S.), an estimated 2.5% of GDP (approximately $448 billion) is spent on infrastructure by both public and private organizations annually. In spite of the significant investments that has gone into infrastructural development over the decades, the American Society of Civil Engineers (2016) estimates a $2 trillion gap in infrastructure spending between 2016 to 2025, a gap that will require an additional $206 billion annually to close. Not-for-profit infrastructural enterprises are pivotal to the provision of infrastructure in the U.S. and their capital structure decisions are of crucial importance to the long term sustainability of these enterprises. Yet, little is known about the financing decisions of these enterprises.

This study uses a mixed methods approach to understand the factors that determine the capital structure decisions of not-for-profit infrastructural enterprises in three sectors including water, power and transportation enterprises. Quantitative research methods are used to analyze the magnitude and direction of the relationship between the capital structure of not-for-profit enterprises (operationalized as leverage) and its determinants. In addition, this study uses case studies and interviews with key finance decision makers in power, water and transportation enterprises to understand the factors influencing capital structure decisions in practice and assess the extent to which the findings provide support for existing capital structure theories.

This study identified seven firm attributes as the key determinants of leverage. They include: profitability, size, tangibility of assets, age of plant, growth, liquidity and

risk. The regression analysis suggests that more profitable infrastructural enterprises prefer using retained earnings to debt financing, and larger infrastructural enterprises are more reliant on debt financing than smaller firms. The qualitative study revealed that the most important factors considered by key financial managers of not-for-profit infrastructural enterprises when choosing the capital structure of the firm are financial flexibility and maintaining high credit ratings.

The findings of this study hold lots of public policy implications; the most notable is the need to preserve the tax-exempt municipal finance market as a crucial financing option available to not-for-profit infrastructural enterprises in the U.S.

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CHAPTER 1: INTRODUCTION

1.1 Background

Infrastructure is the cornerstone of the American economy. It underpins economic development and provides essential services. According to McKinsey Global Institute's Wooetzel, Garemo, Mischke, Hjerpe and Palter (2016), the world spends an estimated $2.1 trillion a year on transportation, power and water infrastructure. In the United States (U.S.), an estimated 2.5% of GDP (approximately $448 billion) is spent on infrastructure by both public and private organizations annually. In spite of the significant investments that has gone into infrastructural development over the decades, the American Society of Civil Engineers (2016) estimates a $2 trillion gap in infrastructure spending between 2016 to 2025, a gap that will require an additional $206 billion annually to close.

A mix of public and private sector funding is needed to close the infrastructural gap. In the U.S., public sector funding typically comes as direct investments by the federal, state and local governments. Private funding for infrastructure also comes through various channels including private companies, public-private partnerships (PPP), direct investment by not-for-profit infrastructural enterprises mostly funded by user charges and tax-exempt bonds etc.

Not-for-profit infrastructural enterprises within the scope of this study are usually customer or community-owned enterprises, a wholly-owned department of a state or local government or a political subdivision of a municipal government dedicated to the provision of infrastructure. These entities are financially self-supporting by relying primarily on user charges rather than appropriations from a governmental entity or tax levies.

Not-for-profit enterprises are pivotal to the provision of infrastructure In the United States. For example, Copeland (2010) notes that about 85% of water systems are not-for-profit enterprises owned and operated by local or regional municipal governments. In addition, the American Public Power Association estimates that 88 percent of the electric utilities in the U.S. are not-for-profit utilities owned by cities, counties and cooperatives across the country. These not-for-profit electric utilities serve approximately 25% of the U.S. population, particularly in rural areas.

This study focuses on understanding the determinants of the capital structure of enterprises providing power, water, and transportation services (airports and toll roads) to millions of people annually. As Calabrese (2012) notes, "understanding the financing decisions made by nonprofits helps us understand not only their capital choices but also how nonprofits can provide the maximum sustainable provision of public goods and services" (p.121).

Financing and capital structure decisions are among the most important decisions made by these not-for-profit enterprises. These decisions determine the relative proportion of internal and external financing used by an organization to finance operations and capital expansions.

How do not-for-profit firms chose their capital structure? In trying to solve the capital structure puzzle, various scholars have drawn extensively (theoretically and empirically) from the corporate finance literature. Specifically, the irrelevance propositions of Modigliani and Miller (1958) is the starting point for all modern treatments of capital structure theory (Frydenberg, 2011). Subsequently, two theories (the

trade-off theory and the pecking order theory) have emerged as the dominant theories in the for-profit and the nonprofit literature.

According to the trade-off theory, firms set a target ratio (by balancing the benefits of tax shield with the cost of distress) and gradually move towards it. The pecking order theory suggests that firms prefer internal to external financing stemming from informational asymmetries and transactional costs from external sources of financing. While these theories have been empirically tested in some studies focusing on some not-for-profit firms particularly hospitals, there is very little consensus on how other not-for-profit firms choose their capital structure.

This study employs a mixed methods approach. First, I explore the literature to identify frequently researched determinants of the capital structure of not-for-profit and for-profit enterprises. Using quantitative research methods, multivariate Ordinary Least Square (OLS) regression is used to analyze the magnitude and direction of the relationship between the capital structure of not-for-profit enterprises (operationalized as leverage) and its determinants. In addition, using qualitative research methods such as reviews of financial documents and interviews, a multiple case study of eight enterprises is used in the study to understand the considerations of financial decision-makers when making capital structure decisions. The case study includes interviews with the key finance decision maker of the sampled enterprises spanning the three infrastructural sectors.

The eight case studies include three power enterprises, three water and sewer enterprises and two transportation enterprises. The selected case studies in each sector

consist of at least one enterprise with low leverage and another enterprise with moderate to high leverage.

1.2 Problem Statement and Significance of the Study

Empirical evidence from capital structure studies on for-profit and not-for profit firms have been mixed with some empirical studies providing support for the trade-off theory while others provide support for the pecking order theory and some others show conflicting support for both theories.

Most of the empirical research on the capital structure of not-for-profit organizations has been limited to the health care industry, and a few studies analyzed the nonprofit sector as a whole. Specifically, Calabrese (2011) investigated the application of the two predominant capital structure theories in corporate finance (pecking order theory and the trade-off theory) to nonprofits and concluded that the pecking order theory was more applicable to nonprofit organizations.

Three studies have been devoted to finding the determinants of the capital structure of not-for-profits organization in the United States (McCue & Ozcan, 1992; Jegers & Verschueren, 2006; Smith, 2010). One of the three studies (McCue & Ozcan, 1992) focused on hospitals and the other two of these studies focused on not-for-profits firms broadly, these included advocacy, research institutes, arts and culture, education, human services, religious organizations etc. Surprisingly, no research has been done on the capital structure of not-for-profit power, water or transportation enterprises. The only mention of public utilities in the literature was an acknowledgment by Smith (2010) that public utilities had the largest total liabilities ratio in a broad sample of nonprofit organizations in the U.S.

Furthermore, almost all of the research on the capital structure of nonprofit firms has been quantitative. The focus has been on using quantitative methods to analyze large samples of financial variables to identify the determinants of capital structure. Studies based on qualitative methods have been rare. Specifically, only two studies focusing on hospitals (Gapenski, 1994; Wheeler, Smith, Rivenson, Reiter, 2000) have used qualitative methods to understand the financing decisions of hospital managers.

This dissertation adds to the literature on the capital structure of not-for-profit firms in a number of significant ways. First, even though some research exists on the determinants of capital structure of hospitals and not-for profit firms in general, a lack of scholarly research exists on the capital structure of water, power or transportation enterprises. This study will therefore attempt to fill the gap in literature evidenced by the lack of any scholarly research pertaining to infrastructural enterprises.

Second, this study is the first to study these enterprises using data extracted from audited financial statements. While this data source is not as comprehensive as the widely used IRS Form 990 data of all nonprofit institutions usually obtained from the National Center on Charitable Statistics (NCCS), it does not suffer from the cost allocation and self-reporting drawbacks of the NCCS data documented by (Gordon, Khumawala, Kraut and Meade, 2007; Froelich, Knoepfle & Poliak, 2000).

Third, using case studies and interviews, this dissertation seeks to bridge the gap between theory and practice, as interviews will help understand the considerations of financial decision-makers when making capital structure decisions – considerations that a quantitative approach may not readily answer.

Fourth, channeling investments to infrastructural development has been at the top of the policy agenda for successive governments in the United States. The results from this research might assist policymakers and practitioners in providing necessary data for benchmarking purposes and further assist in designing the appropriate capital structure.

Finally, this research may also contribute to the debate on ways to channel more investments into infrastructure, by highlighting the financing patterns of infrastructural enterprises and also showing the importance of capital structure to maximizing the organizational objectives of these infrastructural firms.

1.3 Purposes of the Study

The objective of this dissertation is to analyze the factors that determine the capital structure decisions of not-for-profit infrastructural enterprises in three sectors including water, power and transportation. Furthermore, this study investigates the extent to which the two dominant capital structure theories explain the capital structure decisions of not-for-profit infrastructural enterprises.

I explore the literature to identify frequently researched determinants (i.e., profitability, tangibility, age, size, growth, risk and liquidity). In addition, I analyze the patterns, trends and the differences in the capital structure of infrastructural enterprises.

Particular attention is paid to the structure and pattern of the capital structure, the magnitude and direction of the relationship between the capital structure (operationalized as leverage) and the determinants of capital structure identified in the study. Furthermore, a leverage model will be developed to estimate the leverage position of infrastructural enterprises.

Finally, this study uses case studies and interviews with key finance decision makers in power, water and transportation enterprises to understand the factors influencing capital structure decisions in practice and assess the extent to which the findings provide support for this empirical study and existing capital structure theories.

1.4 Research Questions

The following research questions are answered in this study:

1. What are the leverage profiles of power, water and transportation enterprises in this study from 2007-2015 and how does the leverage profiles vary by year, sector and nature of debt (short or long term)?
2. Based on the review of literature, what are the main determinants of the capital structure of for-profit and not-for-profit firms?
3. What is the relationship of the determinants identified above to the capital structure of power, water and transportation enterprises?
4. Do the findings above provide empirical support for existing capital structure theories?
5. Based on case studies and interviews of key finance decision makers in power, water and transportation enterprises, what are the main factors that determine the capital structure of their enterprises, and to what extent do the findings provide support for this empirical study and existing capital structure theories.

1.5 Organization of the Study

The remaining of the study is organized as follows: Chapter 2 presents a review of the literature and Chapter 3 presents the conceptual framework, the research hypothesis, design and methodology. Chapter 4 presents the results and the findings and Chapter 5 provides a summary of the study, the implications and contributions of the study and the directions for future study.

CHAPTER 2: BACKGROUND AND LITERATURE REVIEW

2.1 Introduction

This literature review focuses on a fundamental topic in corporate and nonprofit management – the determinants of capital structure and the financing decisions of an organization. The capital structure of a firm is a widely researched area in corporate finance, and it continues to be an area of great interest. However, as Myers (1984) noted, the capital structure puzzle has been devoid of a consensus, and that assertion still rings true today.

Nonprofit organizations have to make important financing decisions just like for-profit firms. Existing literature on the capital structure of nonprofit firms draws extensively from the for-profit literature. While the empirical and theoretical literature on the capital structure of for-profit corporations abounds, the literature on the capital structure of nonprofit enterprises continues to be relatively scant.

This literature review identifies seven determinants (profitability, size, growth, tangibility, risk, liquidity and age) of the capital structure of nonprofit firms commonly cited in the nonprofit empirical literature. These factors were also found to be important determinants of the capital structure of for-profit firms.

The remainder of this chapter is organized as follows: Section 2.2 discusses the definition of capital structure; Section 2.3 reviews the existing literature on capital structure theories; Section 2.4 reviews the literature on the determinants of capital structure for for-profit organizations; Section 2.5 reviews the empirical literature on the capital structure of nonprofit organizations and Section 2.6 synthesizes the literature review.

2.2 Definition of Capital Structure

The term capital structure refers to the structure of the capital or liability side of the balance sheet; capital structure decisions involve (1) setting the mix of equity and debt financing and setting the mix of short term and long term debt (Gapenski, 1994).

Most organizations seek some form of external financing to invest in capital expansions and also finance the ongoing operations of the organization. Capital structure is essentially the choice that firms have to make between internal financing and external financing.

Generally, the term leverage is used to operationalize the relationship between debt and equity. As Table 1 below shows, leverage has been commonly defined in the nonprofit and the for-profit literature as the ratio of total debt to total assets, the ratio of total liabilities to total assets and the ratio of long-term debt to total assets. A firm with a high concentration of debt in its capital structure is seen to be highly leveraged, while a firm with no debt in its capital structure is unlevered.

Table 1: Definition of Leverage in the Literature

Measure	Definition	Nonprofit	For-profit
Overall Leverage	Total liabilities / Total assets	Turner, Broom, Elliott and Lee (2015), Trussel (2012), Smith (2012), Smith (2010), Bowman (2002), Wedig (1998).	Frank and Goyal (2009), Booth, Aivazian et al. (2001), Bokpin (2009).
Overall Leverage	Total debt / Total assets	Szymanska, Puyvelde and Jegers (2015), Jegers (2011), Jegers and Verschueren's (2006), Bacon (1992), Wedig, Sloan, Hassan, and Morrisey (1988).	Delcoure (2007), Frank & Goyal (2009), Ramjee & Gwatidzo (2012).
Long-term Leverage	Total long-term debt / Total assets	Wedig (1996), McCue and Ozcan (1992).	Delcoure (2007), Frank and Goyal (2009), Ramjee & Gwatidzo (2012).
Short term Leverage	Total current liabilities/Total assets	McCue and Ozcan (1992).	Lemma & Negash (2013)

While the measurement of the leverage ratio of a for-profit enterprise and a not-for-profit enterprise are basically the same, there are fundamental legal distinctions between them. Bowman (2002) identified four differences between for-profit and nonprofit enterprises. They include: "Nonprofit firms (1) do not have owners, but (2) their donors have the power to restrict what nonprofit firms can do with donated assets. In addition, nonprofit firms (3) are not subject to involuntary bankruptcy and (4) can sell bonds at tax-exempt rates" (p.294).

The fact that nonprofit firms do not have owners' means that equity (net assets) in the nonprofit context is notably different from equity in the for-profit context. Jegers and Verschueren (2006) notes that for nonprofit organizations, "equity relates to that part of the funding that remains in the nonprofit organization: what was contributed to the foundation of the organization (in cash and in kind), later gifts, contributions and subsidies, and profits/losses which are to be retained due to the non-distribution constraint" (p.309). This description is in contrasts with the equity components of for-profit equity which comprises of commons stock, preferred stock, and paid-in capital.

Bowman's (2002) reference to a non-profit's legal authority to issue tax-exempt debt is a fundamental distinction that is worth highlighting. For-profit organizations are taxable entities and the interest expense on outstanding debt is tax deductible. The ability to reduce taxable income with interest expenses creates a 'tax shield' which may create an incentive for taxable organizations to use more debt.

In contrast with for-profit organizations, not-for-profits (classified as 501(c) (3) organizations) are generally non-taxable, and borrowing rates are relatively lower because of the tax-exempt feature of their debt issuances.

As Jegers and Verschueren (2006) notes, tax-exempt debt opens the door for tax arbitrage and encourages borrowing, even when there are sufficient internal resources to acquire needed physical assets.

The choice of the capital structure of a nonprofit enterprise is crucial to the long-term sustainability and growth of the organization. As Calabrese (2011) notes, "understanding the financing decisions made by nonprofits helps us understand not only their capital choices but also how nonprofits can provide the maximum sustainable provision of public goods and services" (p.121).

2.3. Capital Structure Theories

Barclay and Smith (1999) notes that:

> "a perennial debate in corporate finance concerns the question of optimal capital structure: Given a level of total capital necessary to support a company's activities, is there a way of dividing up that capital into debt and equity that maximizes current firm value? And, if so, what are the critical factors in setting the leverage ratio for a given company?" (p.8).

Although Barclay and Smith's (1999) observation was made with particular reference to corporate finance, the same fundamental observation can be made about nonprofit enterprises.

In trying to solve the capital structure puzzle for nonprofit enterprises, various scholars have drawn extensively (theoretically and empirically) from the corporate finance literature. Specifically, the irrelevance propositions of Modigliani and Miller (1958) is the starting point for all modern treatments of capital structure theory

(Frydenberg, 2011). Subsequently, two theories (the trade-off theory and the pecking order theory) have emerged as the dominant theories in the for-profit and the nonprofit literature.

2.3.1 Modigliani and Miller (1958)

The seminal work of Modigliani and Miller in 1958 is generally cited as providing the theoretical framework within which various capital structure theories have been developed (Gajurel, 2005). Modigliani and Miller concluded that in a perfect financial market, with no taxes, no brokerage costs, no bankruptcy cost and riskless debt, the value of a firm is independent of its capital structure.

Miller and Modigliani advanced two capital structure propositions. Proposition 1 asserts that "the market value of any firm is independent of its capital structure and is given by capitalizing its expected return at the rate ρk, appropriate to its class of risk" (p. 268). Proposition 1 also asserts that regardless of the proportion of debt in a capital structure, the cost of capital is constant.

Proposition 2 asserts that "the expected yield of a share of stock is equal to the appropriate capitalization rate ρk for a pure equity stream in the class, plus a premium related to financial risk equal to the debt-to-equity ratio times the spread between ρk and r" (p. 271). In other words, the expected rate of return demanded by equity investors increases as a firm uses more debt in its capital structure. Proposition 2 implies that the benefits of additional debt to a firm are offset by the incremental cost of equity to keep the overall cost of capital constant.

As Myers (2001) noted, Modigliani and Miller's propositions are no longer controversial as a matter of theory; the propositions are benchmarks, not end results.

Miller's (1988, p. 100) assertion that "showing what doesn't matter can also show, by implication, what does" sums up why the irrelevance propositions of Miller and Modigliani now form the bedrock on which all other capital structure theories have been built.

2.3.2 Trade-off theory

Subsequent to Modigliani and Miller's 1958 irrelevance propositions, many scholars have relaxed the assumptions of a perfect market and have shown that capital structure is indeed relevant to the value of a firm. A subsequent paper by Miller and Modigliani (1963) relaxed the unrealistic 'no corporate tax' assumption and they concluded that increasing debt would increase a firm's value because interest costs on debt are tax deductible. This conclusion implied a linear relationship between leverage and firm value. Hence, the maximizing firm will use 100% debt financing without taking into consideration the cost of debt.

Robichek and Myers (1966) argued that implying the maximum use of debt lacked intuitive appeal if the cost of financial distress as a result of over leveraging is ignored. Robichek and Myers (1966) further relaxed the assumption that debt is riskless, concluding that "the optimization of the firm's financial structure involves a trade-off between the tax advantage of debt and bankruptcy penalties" (p. 12). This conclusion forms the bedrock of the trade-off theory.

Building on the work of Kraus and Litzenberger (1973), Myers (1984) adds that firms following the trade-off theory set a target debt to value ratio (by balancing the benefits of tax shield with the cost of distress) and gradually move towards it.

The work of Frank and Goyal (2007) synthesized a plethora of scholarly research focusing on dynamic trade-off theory. Frank and Goyal (2007) divided Myer's definition of the trade-off theory into two parts (static trade-off and dynamic trade-off). They note that "a firm is said to follow the static trade-off theory if the firm's leverage is determined by a single period trade-off between the tax benefits of debt and the deadweight costs of bankruptcy" (p. 7). They further concluded that a firm follows a dynamic trade-off theory if "the firm has a target level of leverage and if deviations from that target are gradually removed over time" (p. 7). This distinction between static and dynamic trade-off theory has become the central theme in the corporate finance capital structure literature (Frydenberg, 2011).

Does the trade-off theory apply to nonprofit enterprises? Although nonprofit firms are not taxable entities, Gapenski (1994) likened the tax shield associated with debt financing of for-profit firms to an indirect tax subsidy of 'below market interest rates' associated with the tax-exempt debt markets of nonprofits.

What about the cost of distress? Nonprofit firms are subject to bankruptcy just like for-profit firms. However, as Bowman (2002) notes, "because bankruptcy laws are friendly to nonprofit firms, the cost of distress may be weaker for nonprofit firms than for investor-owned ones" (p. 300).

If the costs and benefits associated with the use of debt by for-profit firms apply to nonprofit firms, we can expect the trade-off theory to apply to nonprofit firms.

2.3.3 Pecking Order Theory

Another prevailing theory of capital structure often cited in the literature is the pecking order theory outlined by Myers and Majluf (1984) and Myers (1984). The

pecking order theory suggests that firms prefer internal to external financing, and debt to equity if external funds are needed. Myers and Majluf (1984) argue that the preference for internal funds stems from informational asymmetries and transactional costs from external sources of financing.

The information asymmetry occurs because unlike an equity investor, the manager of a firm is well aware of the firm's assets and growth opportunities and only willing to sell equity when the firm is overvalued. The manager of an undervalued firm will seek to capture all the value by not selling equity to outside investors. Myers and Majluf (1984) tie the information asymmetry to an adverse signaling effect where the announcement of equity issuance implies an overvalued firm. Hence, investors react by discounting the value of the securities to compensate for the perception of an overvalued firm.

When debt issuance is introduced into the pecking order theory, the information asymmetry is reduced. Hence debt issuance is interpreted as a positive signal that the firm is confident about future growth opportunities. Therefore, if external financing is needed, debt should be preferred.

In contrast to the trade-off theory, the pecking order theory asserts that firms do not target an optimal capital structure; instead, more profitable firms borrow less because they have more internal funds available and less profitable firms require external funding and consequently accumulate debt (Myers, 1984). Therefore, the debt ratio reflects the cumulative requirement for external financing (Myers & Majluf, 1984)

Does the pecking order theory apply to nonprofit enterprises? Non-profit firms do not issue common stock; hence external financing is limited to borrowing, and internal

financing is generated from an accumulation of operating earnings. As Smith (2012) notes, adverse selection costs associated with for-profit firms are also associated with nonprofit firms. Interest expense, restrictive bond covenants and other restrictions on managerial discretion give nonprofit managers the incentive to use internal financing to external financing. Furthermore, as Calabrese (2011) notes, nonprofits managers may be wary of debt obligations because of the reputational damage that comes with defaulting on debt obligations.

2.4 Determinants of Capital Structure – Corporate Literature

While the trade-off theory and the pecking order theory underpin the theoretical literature on capital structure, some empirical studies have identified specific firm characteristics that influence the capital structure of for-profit firms. As Harris and Raviv (1991) note:

> "Several studies shed light on the specific characteristics of firms and industries that determine leverage ratios (Bradley et al. (1984), Castanias (1983), Long and Malitz (1985), Kester (1986), Marsh (1982), and Titman and Wessels (1988)). These studies generally agree that leverage increases with fixed assets, non-debt tax shields, growth opportunities, and firm size and decreases with volatility, advertising expenditures, research and development expenditures, bankruptcy probability, profitability and uniqueness of the product" (p. 334).

A few other recent studies have further identified specific factors influencing the capital structure of corporate entities (Frank and Goyal, 2009; Bessler, Drobetz and Kazemieh, 2011).

2.4.1 Core Model of Leverage

Frank and Goyal's (2009) study identified 38 factors that determine the capital structure of U.S. corporations with some degree of theoretical plausibility. Frank and Goyal (2003) noted that:

> "Many factors that have been advocated by various authors do not have reliably important effects. R&D expenditures, advertising, having an investment grade credit rating, and past stock returns all have univariate significance but do not prove to be reliably important factors in the multivariate setting" (p. 13).

Frank and Goyal's (2009) analysis concluded that six factors proved to be empirically robust and financially significant in determining leverage. The core set of six factors includes growth, firm size, tangibility of assets, profitability, industry median debt ratios and expected inflation. The relationship between the trade-off theory, the pecking order theory and the determinants of leverage identified by Frank and Goyal are shown in Table 2.

Table 2: Predictions of the Two Capital Structure Theories

Factors	Trade-off theory	Pecking Order Theory
Profitability	+	-
Size	+	-
Growth Opportunities	-	+
Tangibility	+	-
Expected Inflation	+	+
Industry Median Debt Ratio	-/+	
Source Frank and Goyal (2009)		

Bessler, Drobetz and Kazemieh (2011), in a similar review of empirical studies, also identified six specific determinants from ten empirical studies. Table 3 from Bessler, Drobetz, and Kazemieh (2011) provides a summary of the conclusions of

selected empirical studies of for-profit organizations. The review below will focus on the factors identified in Bessler, Drobetz, and Kazemieh (2011).

Table 3: Correlation Signs Between Leverage and its Determinants – Selected Empirical Studies

Study	Profitability	Size	Growth opportunities	Tangibility	Volatility / Risk	Tax shields
Frank and Goyal (2009)	-	+	-	+		
Kayhan and Titman (2007)	-	+	-	+		
Fan, Titman and Twite (2003)	-	+	-	+		-
Goyal, Lehn, and Racic (2002)	-	+	-	-		
Hovakimian, Opler, and Titman (2001)	-	+	-	+		
Shyam-Sunder and Myers (1999)	-			+	-	
Rajan and Zingales (1995)	-	+	-	+		
Jensen, Solberg, and Zorn (1992)	+			+	-	
Titman and Wessels (1988)	-	-				
Kim and Sorensen (1986)			-		+	-
Source: Bessler, Drobetz and Kazemieh (2011)						

2.4.1.1 Profitability

The pecking order theory and the trade-off theory see the relationship between profitability and leverage in contrasting ways. The trade-off theory suggests that higher profitability lowers the cost of distress; more profitable firms benefit more from the tax shield on interest expenses which in turn drives profitability higher. Hence, the trade-off theory predicts a positive relationship between leverage and profitability.

In contrast to the trade-off theory, the pecking order theory argues that the preference for internal funds over external funds suggests a positive relationship between leverage and profitability. More profitable firms will retain more funds and resort less to the use of debt to fund investments (Myers and Majluf, 1984). As Table 3 shows, most

empirical studies find a negative relationship between leverage and profitability, a relationship that is consistent with the pecking order theory.

2.4.1.2 Tangibility

Tangibility refers to the availability of collateral to secure debt obligations. It is typically measured by the ratio of fixed assets to total assets. Generally, a high ratio of fixed assets to total assets provides a lender with a high level of security and credit risks are seen to be mitigated since in the event of a default the lender can liquidate the asset. This predicts a positive relationship between leverage and tangibility. As Table 3 shows, most studies have found a positive relationship between tangibility and leverage. This relationship is in line with the prediction of the trade-off theory.

2.4.1.3 Firm Size

There is considerable empirical evidence that there is a positive relationship between firm size and leverage. Frank and Goyal (2009) notes that the trade-off theory predicts that larger firms are perceived to be more diversified, matured and less susceptible to bankruptcy. Hence, larger firms have larger debt capacities and can borrow at relatively lower interest rates.

In contrast with the trade-off theory, Titman and Wessels (1988) note that the pecking order theory suggests a negative relationship between firm size and leverage. They argue that larger firms usually build more internal funds over time and will resort to a relatively lower use of external financing. As Table 3 shows, seven of the eight studies found a positive relationship between size and leverage. This relationship validates the prediction of the trade-off theory.

2.4.1.4 Growth

Most empirical studies predict a negative relationship between growth and leverage. As Frank and Goyal (2009) notes, the trade-off theory predicts a negative relationship between leverage and growth as there will be less need for the disciplining role of debt. Growing firms prefer equity co-investments to reduce the use of much-needed cash flow to pay interests to creditors.

Pecking order theory contradicts the trade-off theory by implying that firms with more growth accumulate more debt over time as internal resources will not be enough to finance the growth (Myers and Majluf, 1984).

2.4.1.5 Volatility/ Risk

The pecking order theory and the trade-off theory predict a negative relationship between business risk and leverage. The trade-off theory suggests that volatile cash earnings increase the cost of bankruptcy or financial distress as firms with volatile earnings may not generate enough cash flow to service debt obligations. This leads to lower leverage to minimize the cost of financial distress.

The pecking order theory suggests that firms with more volatile cash flows try to accumulate cash during very profitable years to prevent under-investment in future. Myers (1984) notes that firms with surpluses should pay off debt or preserve cash to safeguard their debt capacity for future financing needs resulting in a negative relationship between earnings volatility and leverage as shown by Shyam-Sunder and Myers (1999).

2.4.1.6 Non-Debt Tax Shields

The trade-off theory predicts that the tax benefit of debt encourages firms to issue more debt when tax rates are higher. Non-debt tax shield (net operating loss carryforwards, investment tax credits, and depreciation expenses) also play an important role in the capital structure decisions of corporations. DeAngelo and Masulis (1980) note that non-debt tax shields are substitutes for the tax benefits of debt financing because firms will have less need to exploit the tax benefit of debt if they stand to lose the tax benefits from non-debt tax shields. As a result, non-debt tax shields should be negatively related to leverage (Kim and Sorensen, 1986). The ratio of annual depreciation to total assets was used as a proxy for non-debt tax shields by Titman and Wessels (1988).

2.5 Review of Empirical Studies – Nonprofit Literature

The focus of much of the empirical research for nonprofit organizations is limited to the health care industry (Wedig, Sloan, Hassan, and Morrisey, 1988; McCue and Ozcan, 1992; Bacon 1992; Wedig, Hassan, & Morrisey, 1996; Wedig, Hassan, Van Horn, and Morrisey, 1998; Gentry, 2002; Trussel, 2012; Turner, Broom, Elliott, and Lee, 2015). Besides hospitals, a few studies also explored the determinants of the capital structure of universities and colleges (Shultz, 2000; Keith, 2013; Denison, Fowles, and Moody, 2014; Rosen and Sappington, 2016).

More recently some studies have focused on the nonprofit sector as a whole (Bowman, 2002; Jegers and Verschueren, 2006; Yan, Denison, and Butler, 2008; Denison, 2009; Smith, 2010; Calabrese, 2011; Jegers, 2011; Smith, 2012; Calabrese and Ely, 2015; Szymanska, Puyvelde and Jegers, 2015).

This section will summarize each of the empirical studies identified above. The selection of literature was mostly limited to specific studies which identified several determinants of the capital structure of nonprofit organizations.

2.5.1 Empirical Studies – Nonprofit Healthcare Organizations

2.5.1.1 Wedig, Sloan, Hassan, and Morrisey (1988)

Wedig et al. (1988) conducted the empirical study on the capital structure of mostly nonprofit hospitals. The study analyzed 1,407 hospitals, of which eighty-five percent were private nonprofit, three percent were for-profit hospitals, and twelve percent were government district hospitals. The study used data from the American Hospital Association from 1978 through 1983. The study had three objectives. The first was to show the impact of the capital payment policy of commercial insurer has affected the capital structure of the hospitals. The second sought to highlight differences in capital structure due to ownership types and the third objective was an empirical analysis of hospital capital structure.

The study relied on a multiple linear regression model for its estimates. The dependent variable was the hospital's long-term debt-to-asset ratio. Independent variables included seven financial variables and six dummy variables. They include the fraction of hospital gross patient revenue (charges) from cost-based payers, volatility, ratio of bad debt plus charity care to hospital's gross patient revenue, tangibility ratio, hospital non-patient revenue as a fraction of total revenue, a tax shield variable defined, and age of the hospital's tangible asset. Dummy variables with the following characteristics were included: whether the hospital is a district hospital, whether the hospital is an investor-owned hospital, whether the hospital is the only hospital in the county, whether the

hospital is located in a Standard Metropolitan Statistical Area (SMSA), hospital size and hospital affiliation with a medical school.

Wedig et al. (1988) found that tangibility, size, and the fraction of hospital gross patient revenue (charges) from cost-based payers show a statistically significant positive relationship with leverage. In addition, they also found that volatility, age and tax shield show a statistically significant negative relationship with leverage. Wedig et al. (1988) concluded that the results show that revenue payer, bankruptcy risk, and tax shields are the key determinants of leverage.

2.5.1.2 McCue and Ozcan (1992)

McCue and Ozcan (1992) analyzed the determinants of a hospital's capital structure. The study analyzed 414 California hospitals using audited financial data from 1985 to 1987 with some variables using data from 1982-1987. The study relied on multiple linear regression for its estimates. The models specified two dependent variables namely long-term debt to total assets and current liabilities to total assets. Independent variables included were: profitability, tangibility, risk, growth, size and tax shield. Dummy variables measuring ownership, system affiliation, payment systems and market share. The long-term debt model explained 24.8% of the variation in the long-term leverage ratio and the 29.5% in the short term model.

McCue and Ozcan (1992) found that system affiliation, market condition, ownership, bed size, risk, growth and asset structure were statistically significant and positively associated with long-term leverage. While profitability and uncompensated care show a negative relationship with long-term leverage, they are not statistically significant.

In addition, the authors found risk, size, system affiliation and uncompensated care show a statistically significant positive relationship with short-term debt to total assets. The authors also found tangibility, profitability, tangibility, growth size and payer mix show a statistically significant negative relationship with short-term debt to total assets.

McCue and Ozcan (1992) conclude that the negative relationship between profitability and short-term debt supports the pecking order theory. They note that the findings for tangibility and growth reconfirm research in the for-profit area that hospitals with more tangible assets and also experiencing high growth are more likely to use long-term debt rather than short-term debt.

2.5.1.3 Bacon (1992)

Bacon (1992) posed the question do capital structure theories apply to nonprofit hospitals? The author tested the application of the static trade-off theory and the pecking order theory to nonprofit hospitals. The study was based on a sample of 181 medium to large nonprofit hospitals randomly selected from an AHA Guide. Financial data for the sample selected was obtained from HFMA's Medicare Cost Report Service from 1986-1989.

Bacon (1992) used a multiple linear regression model to test the relationship between the debt ratio (total debt to total assets) of the hospitals and seven independent variables. The independent variables used include profitability, growth, risk, tangibility, size, a lagged leverage variable, and variable for the percentage of Medicare discharges.

Bacon (1992) found that growth, tangibility and the lagged leverage show a statistically significant positive relationship with leverage. In addition, the author found a statistically significant negative relationship between leverage and profitability.

Bacon (1992) concludes that the results contradict the static trade-off theory and provides strong support for the pecking order theory. The positive relationship between leverage and growth and the negative relationship between leverage and profits suggests that nonprofit hospitals borrow for expansion and not in response to attaining a target leverage ratio.

2.5.1.4 Wedig, Hassan, & Morrisey, 1996

Wedig et al. (1996) specifically studied tax-exempt debt and the capital structure of nonprofit hospitals. They presented a theory of nonprofit capital structure explaining how the tax-exempt nature of nonprofits incentivizes the use of debt.

The authors sampled 155 hospitals from the Annual Hospital Disclosure Report collected by the Office of Statewide Health Planning and Development (OSHPD) for the state of California for the period 1986 to 1991.

Wedig et al.'s (1996) analysis used four regression models with four dependent variables including flows (changes) of total long-term debt, tax-exempt long-term debt, long-term taxable debt and fixed investment outlays. Independent variables include a target level of long-term debt, fixed assets, and cash. Deviations variables from targets for the three independent variables were also created. The other variables included as independent variables include hospital's excess debt capacity, hospital affiliation and hospital size.

Wedig et al. (1996) concluded that the results support their debt targeting hypothesis. They noted that hospitals "attempt to substitute tax-exempt debt for taxable debt. Even where the overall debt level is at its target" (p. 1277) In addition, they pointed out that larger hospitals are less likely to use tax-exempt debt as a response to excess debt capacity and chain hospitals generally do more debt targeting.

2.5.1.5 Wedig, Hassan, Van Horn, and Morrisey (1998)

Wedig et al. (1998) also studied the effect of affiliation and market structure on the capital structures of nonprofit hospitals. The study specifically examined evidence of nonprofit chain and freestanding hospitals use of tax-exempt debt specifically and debt in general. In addition, the study reviewed the impact of market area demographics and payer mix on the hospitals' use of debt.

The study used financial data from the States of California and Florida collected for the years 1987, 1989, 1991 and 1993. The data from California was obtained from the Office of Statewide Health Planning and Development (OSHPD), and the data from Florida was obtained from the Florida Agency for Health Care Administration. The data from California was used to study whether chain hospitals with a low incidence of poverty use more leverage and or have superior access to tax-exempt debt markets, and the data from Florida was used to study the influence of chain hospitals and for-profit providers on the capital structure of nonprofit hospitals.

The study used a simple cross-sectional regression and a first differenced panel data design to analyze the California and the Florida dataset respectively. Two dependent variables were specified in both state analyses. The first is a total leverage variable that is defined as the ratio of total liabilities to total assets and the second dependent variable

measures the hospital's access to tax-exempt debt defined as the percent of tax-exempt debt over total debt.

Several independent variables were specified, they include membership of a chain, measures of Medicare and Medicaid dependence, market area income per capita, percent of the market population below 200 percent of the poverty rate and accident rate. Other control variables include total net fixed assets, average asset age, average available beds, teaching hospital dummy, average volatility of cash flows and the Hirschman-Herfindahl index for the hospital's market share.

The results from the California dataset show that a chain affiliation is positively and significantly associated with leverage. In addition, market risk variables (where significant) were seen to be positively related to leverage. The results of the tax-exempt model show that Medicaid dependent free standing hospitals used more debt, while Medicaid chain hospitals used less debt. Furthermore, the study found earnings volatility and asset age to be negatively and significantly associated with tax-exempt debt. The results for the Florida dataset show that multi-hospital systems (MHS) market share penetration decreases tax-exempt debt and total leverage. They also found that occupancy rates and hospitals with a high percentage of Medicare were statistically and negatively associated with leverage. Finally, the authors found a negative and statistically significant relationship between asset age and percentage of tax-exempt debt.

Wedig et al. (1998) conclude that chain hospitals use more debt than freestanding hospitals as a result of their superior debt capacity. Medicaid dependence generally discourages the use of tax-exempt debt; however, they did not see this effect with chain hospitals.

2.5.1.6 Gentry (2002)

Gentry (2002) sought to answer three debt related questions. First, how much tax-exempt debt is potentially a source of profits from tax arbitrage? Second, what characteristics affect the debt levels of nonprofit hospitals? Third, what is the relationship between debt, investment, and endowment accumulation? The study combined financial and operational survey data on 2,627 entities from the American Hospital Association and Form 990 from the IRS for the periods 1993-1996.

The study uses Tobit regression to model the relationship between hospital borrowing and hospital characteristics and market conditions. The author notes that a tobit model is the preferred choice because a large number of hospitals report zero debt. Three dependent variables were specified. First is a ratio of tax-exempt debt to operating assets. Second is the ratio of taxable debt to operating assets. Third is the ratio of total debt to operating assets.

Several independent variables were specified including endowment assets, three measures of hospital size, a measure of profitability defined as return on operating assets, marginal state income tax rates, occupancy rate and percentage of inpatient days associated with Medicare and Medicaid. Several organizational dummy variables were also included as independent variables including variables for market share, monopoly, the presence of unrelated business income, religious affiliation, medical school and teaching affiliation, the presence of neonatal, oncology, angioplasty and trauma services.

Gentry (2002) found that a statistically significant positive relationship exists between endowment assets and tax-exempt borrowing, Gentry attributes this relationship

to tax arbitrage as a motivation for borrowing. The author found an ambiguous relationship between size and tax-exempt borrowing.

> While "operating assets and revenues are positively related to debt, admissions and the numbers of beds are negatively related to debt, suggesting that hospitals that have more assets or revenue for a given level of admissions are more likely to borrow. Conversely, hospitals with many admissions but relatively low assets or revenues are less likely to borrow" (p. 863).

Finally, Gentry (2002) found a statistically significant negative relationship between hospital affiliated with medical and religious programs, hospitals with trauma and neonatal centers with leverage.

2.5.1.7 Trussel (2012)

Trussel (2012) sought to determine if there were differences between the capital structure of for-profit and nonprofit hospitals. The study used cross-sectional data for 163 for-profits and 163 nonprofit hospitals for the years 1995 and 2005. Data for the for-profit hospitals were obtained from Standard and Poor's Compustat database and the data for the nonprofit hospitals were obtained from the Statistics on Income database of the National Center for Charitable Statistics.

Trussel (2012) used an analysis of covariance and multivariate regression equation with leverage (measured as the ratio of total liabilities and total assets) as the dependent variable. Independent variables include profitability, risk, growth, and size. An additional dummy variable was included to represent the institutional type.

Trussel (2012) finds that profitability is statistically significant and negatively associated with leverage – a result that supports the pecking order theory. In addition, the results show that risk is statistically significant and positively associated with leverage.

Growth, size, and type were statistically insignificant. Therefore, Trussel concludes that there is no difference in the capital structure of for-profit and nonprofit hospitals.

2.5.1.8 Turner, Broom, Elliott, and Lee (2015)

Turner et al. (2015) studied the differential use of debt between nonprofit and for-profit hospitals. In contrast to the relatively small sample size (163 for-profit hospitals and 163 nonprofit hospitals) used by Trussel (2012), Turner et al. used a much larger dataset for their study. The sample size consisted of 2,175 nonprofit hospitals and 470 for-profit hospitals obtained from the Centers for Medicare and Medicaid Services Healthcare Cost Report Information System for the period 2006-2011.

Turner et al. (2015) replicated the empirical methodology of Trussel (2012) by using the same dependent and independent variables. Leverage, defined as the ratio of total liabilities and total assets, was specified as the dependent variable. Independent variables were profitability, growth, risk, size and ownership status.

Two general linear regression models were specified. The first model uses ownership type as an independent variable while controlling for profitability, risk, growth and size. Contrary to the results obtained by Trussel (2012), Turner et al. (2015) found a statistically significant positive relationship between leverage and type, and leverage and risk. They also found a statistically significant negative relationship between leverage and profitability.

The second model added four interaction variables to the model to capture the impact of ownership on the four control variables. The results of model 2 were similar to the results of model 1. The authors noted that the fit and significance of model 2 remained largely the same.

Turner et al. (2015) concluded that nonprofit hospitals use "significantly and substantially less debt than their for-profit peers" (p. 10) Furthermore, nonprofit hospitals use more leverage as revenues and asset increase. In addition, they concluded that nonprofit hospitals use less debt as profitability and risk profile increases.

2.5.2 Empirical Studies – Nonprofit Colleges and Universities

2.5.2.1 Shultz (2000)

Shultz (2000) conducted one of the first empirical studies on nonprofit colleges and universities. Specifically, Shultz's applied Wedig (1994) and Wedig et al.'s (1996) financial economic model to four-year colleges and universities to explain the relationship between indicators of financial activity, long-term debt, and financial leverage.

Shultz (2000) sampled all (8,325) four-year colleges and universities in the U.S for the years 1988 to 1996 obtained from the Integrated Postsecondary Education Data System (IPEDS) administered and maintained by the National Center for Education Statistics.

A multiple linear regression was specified with leverage (ratio of long-term debt to the sum of long-term debt plus fund balances) as the dependent variable. Independent variables include the value of buildings and equipment, annual revenue, the value of endowment, assets and dummy variables for the years 1988 to 1996.

Shultz (2000) found that the primary use of long-term debt among colleges and universities was for the purchase of assets like equipment and construction and renovation of buildings. Shultz found a statistically significant positive relationship between total annual revenue, endowment value, and leverage for all colleges and

universities. Shultz also separated the study into public only institutions and private only institutions and found similar results.

Shultz (2000) concludes that financial leverage increased among the four-year colleges and universities during the years 1988 to 1996. This finding suggests that colleges made decisions to increase commitments to debt service and also increase financial risk.

2.5.2.2 Keith (2013)

Keith (2013) examined the relationships between financial variables and institutional characteristics and how they relate to long-term debt and leverage of four-year colleges and universities in the U.S.

Keith (2013) sampled 3,703 universities for the years 2003 to 2013 obtained from the Integrated Postsecondary Education Data System (IPEDS) administered and maintained by the National Center for Education Statistics.

A multiple linear regression was specified with two independent variables (long-term debt and leverage). Long-term debt was defined as the aggregate value of current and noncurrent portions of long-term debt, and leverage was defined as the ratio of total liabilities to total assets. Independent variables were classified into three categories revenues, assets, and institutional characteristics.

Revenue independent variables include tuition and fees, grants and contracts revenues, auxiliary revenues, hospital revenues, independent operations, state appropriations, gifts, federal and local appropriations. The independent variables classified as assets include the value of endowment assets at the end of the year and property, plant, and equipment at the end of the year net of accumulated depreciation. The independent variables

classified as institutional characteristics include enrollment, location (region), simplified Carnegie classification, age of facilities, and revenue diversification index.

Keith (2013) found that most of the variability in long-term debt was associated with property plant and equipment, age and some regional variables. While property, plant, and equipment was found to exhibit a statistically significant positive relationship with long-term debt, the age of facilities was found to exhibit a statistically significant negative relationship with long-term debt. In addition, the authors found that institutions in certain regions (West, Midwest, and Southeast) had less long-term debt than institutions in the Northeast region.

Keith (2013) also found a statistically significant positive relationship between property, plant, and equipment ratio, grants and contracts ratio, and enrollment ratio and leverage. In addition, the authors found that institutions in certain regions (West, Midwest and Southeast) and institutions categorized as Doctoral/Research institutions were negatively related to leverage.

Keith (2013) concludes that public four-year colleges in the U.S. use debt to invest in their facilities and the use of long-term debt by increased from 2005 to 2009. The study found that property, plant, and equipment, grants and contracts revenue, regional location, doctoral/research status, and enrollment were the important factors related to the use of leverage by four-year colleges and universities in the U.S.

2.5.2.2 Denison, Fowles, and Moody (2014)

Denison et al. (2014) compared the utilization of long-term debt between public and private nonprofit universities. The authors sampled 176 (120 public and 56 private, nonprofit) of the 254 universities classified as research/doctoral in the U.S. for the years

2003 to 2009. The data was primarily obtained from IPEDS database and IRS form 990 for debt levels.

A fixed effect regression model was specified with long-term debt per full-time equivalent (FTE) enrolled student as the dependent variable. Independent variables include revenue variables (net tuition and fees, state and local appropriations, state and local grants and contracts, federal appropriations, grants and contracts, private gifts, auxiliary enterprises, hospital operations, investment returns, and endowment), enrollment, enrollment growth and total assets.

Denison et al. (2014) hypothesized that larger enrollments are expected to yield lower levels of long-term debt per student, and rapid growth in enrollments are expected to yield higher levels of debt-financed expansion.

Denison et al. (2014) found that for public institutions, high reliance on revenue from auxiliary enterprises and high growth in student enrolment exhibits a positive statistical significance with long-term debt. In addition, public universities with large enrollments show a statistically significant negative relationship with long-term debt relative to other colleges and universities.

Denison et al. (2014) found that for private institutions, enrollment growth and gifts and investment returns exhibit a statistically significant negative relationship with long-term debt.

Denison et al. (2014) conclude that public and private universities are very similar in their use of long-term debt. While private universities substitute long-term debt with private gifts and investment returns, public universities use revenue from auxiliary enterprises like hospitals to substitute long-term debt.

2.5.2.2 Rosen and Sappington (2016)

Rosen and Sappington (2016) examined the decisions of universities to issue debt. The authors specifically investigated the impact of nonfinancial income on the capital structure of a university.

Rosen and Sappington (2016) sampled a panel data on a sample of 3,703 universities obtained from Integrated Postsecondary Education Data System (IPEDS) for the years 2003 to 2013. The authors applied a two-step model to estimate how the expected value and uncertainty of nonfinancial income affect the leverage decisions of universities.

The first step involved constructing an expectation of nonfinancial income and its uncertainty (coefficient of variation) with a regression model. The second step incorporated estimates of nonfinancial income and the coefficient of variation from model 1 into another regression model using leverage as the dependent variable. Independent variables include: endowment ratio, government share, donor share, tuition share, nonfinancial income and the coefficient of variation

Rosen and Sappington (2016) found that consistent with the pecking order theory, the expectation of nonfinancial income relative to assets, endowment ratio and risk (coefficient of variation) are negatively associated with debt. They conclude that universities will use internal resources from nonfinancial income and endowment resources rather than take on debt.

2.5.3 Empirical Studies – Broader Nonprofit Literature

2.5.3.1 Bowman (2002)

Bowman (2002) was the first to expand the nonprofit empirical literature beyond hospitals using a sample of 1,393 nonprofit firms from IRS's Statistics of Income for the periods 1991 to 1994. Bowman includes colleges and universities, arts and cultural organizations, human service agencies and hospitals.

Two ordinary least square regression models were specified with two leverage ratios. The first model defines leverage as the ratio of total liabilities to all assets including financial assets. The second model defines leverage as the ratio of total liabilities to assets used in operations (total assets minus endowment assets). Independent variables include profitability, volatility, tangibility, size, growth in total assets, public support ratio, endowment ratio and dummy variables for the four subsectors included in the study.

Bowman's study uses the independent variables in Bacon (1992) with two updates. First, Bowman defines growth as the percentage change in revenues not percentage change in assets because growth in assets may depend on the increase in debt creating a simultaneous equation problem. Second, Bowman excludes the lagged leverage variable in Bacon (1992) because they require time-series data extending over many years rather than the three-year timeframe covered by Bacon (1992). In addition, Bowman introduces three additional control variables including an endowment ratio, a ratio of public support and a dummy variable for solvency.

Bowman (2002) study found a statistically significant negative relationship between leverage and risk and a statistically significant positive relationship between

leverage and profitability. In addition, Bowman found a statistically significant negative relationship between leverage and endowment, public support and equity. Bowman concluded that nonprofit managers appear to use a static trade-off decision rule.

Bowman (2002) concludes that endowment “confounds efforts to draw inferences about management’s decision rules from financial data" (p. 308). As a result, they advocate isolating operating assets, liabilities and income when studying leverage and the capital structure of nonprofit firms.

2.5.3.2 Jegers and Verschueren (2006)

Jegers and Verschueren (2006) proposed a theory of capital structure for nonprofit organizations. They noted three factors (equity constraints, agency problems, and borrowing constraints) which help to explain the leverage positions of nonprofit organizations. Jegers and Verschueren (2006) studied a sample of 22,766 California nonprofit organizations for the year 1999 obtained from the National Center for Charitable Statistics (NCCS) at the Urban Institute.

A binary choice model (probit model) was combined with an ordinary least square regression to separate the study of the decision to borrow from the amount to borrow. For the OLS model, two dependent variables (all liabilities and financial debt) were specified. Independent variables include profitability (representing the equity constraint) and salaries and wages (representing agency costs). In addition, dummy variables associated with the hospital’s affiliation was included (this represents the borrowing constraint). Control variables for size and type of organization (public or private) were also included in the models. In the probit model, the independent variables in the OLS model were maintained, and the dependent variable was the choice to borrow.

Jegers and Verschueren (2006) found that larger organizations were more likely to use more debt in general and financial debt in particular. In addition, they noted that less profitable nonprofit organizations are associated with higher chances of debt financing. They also found that nonprofit organizations with higher wages and salaries were more likely to use debt in general and financial debt in particular.

Jegers and Verschueren (2006) concluded that the capital structure of nonprofits is described by the pecking order theory.

2.5.3.3 Yan, Denison, and Butler (2008)

Yan et al. (2008) focused on the impact of revenue diversification and public support on the capital structure of arts, culture, and humanities nonprofit organizations. The authors argued that prior research fails to consider the role of intergovernmental grants in affecting capital decisions and the mitigation of financial risk that comes with revenue diversification which may, in turn, affect leverage.

Yan et al. (2008) analyzed a sample of 1,387 organizations from data from the IRS' Statistics of Income (SOI) microdata from 2000 to 2003. The authors noted that only 44 percent of the organizations had debt in 2003, however, 86 percent used debt during the period 2000-2003. Hence, the sample was divided into debt issuing or non-debt issuing entities. As a result, a two-stage model was needed to analyze the determinants of leverage.

The first stage involved using a probit model to estimate the likelihood that an arts organization will issue debt or not. Independent variables include a revenue diversification variable, percent revenue from government grants, percent revenue from public support, percent revenue from goods and services, profitability, percent

compensation relative to total expenses (a measure of agency cost), tangibility and growth.

The second stage involved using a Heckman selection model to control for selection bias. The dependent variable is leverage, measured as the ratio of long-term financial debt divided by total assets. The independent variables are the same as specified in the probit model above without the profitability and the agency cost variables.

Yan et al.'s (2008) empirical findings show that on the question of issuing debt, the diversification index, size proportion of revenues from government, public support, and goods and services are important factors that increase the probability that an arts organization will issue debt.

Yan et al.'s (2008) results also show that the proportion of revenues from government, public donations, and service fees, the level of assets and the fixed asset ratio are all statistically significant, and they show a positive relationship with leverage.

Yan et al. (2008) conclude that revenue diversification is an important factor when a nonprofit firm decides to issue debt or not. In addition, they conclude that revenue diversity positively contributes to the financial capacity of a nonprofit and its use of leverage.

2.5.3.4 Denison (2009)

Denison (2009) focused on identifying the factors that motivate non-profit organizations to obtain long-term financing through a mortgage or tax-exempt bonds. The study analyzed data from 990 forms obtained from the IRS for the years 2000 to 2004. The dataset covered 14,887 organizations from 26 major classifications of nonprofits

organizations with four classes (health, education, human services and arts) making up 66 percent of the total number of organizations in the sample.

As a result of the binary nature of the research question, two probit models were specified to determine the probability of issuing a tax-exempt bond or holding a mortgage. The dependent variables were mortgage and bonds. The independent variable for both models includes program revenues, dues, investment income, fund-raising, contributions, other income, total assets and total revenues (size), fixed assets ratio (tangibility), unrelated business activity, executive compensation (agency cost). Dummy variables for year and sector classification were also included.

Denison (2009) found that five of the six revenue sources in the mortgage model (program revenues, dues, fund-raising, contributions and other income) increase the likelihood that a nonprofit firm will hold a mortgage. In the bond model, investment income, contributions, special event fund-raising, and dues decrease the likelihood of holding a bond. Furthermore, total assets, total revenues, fixed asset ratio, and compensation of the top executive all show a significant positive relationship with a nonprofit's decision to issue a tax-exempt bond or hold a mortgage.

Denison (2009) concludes that size and program revenues increase the probability that a nonprofit organization will hold a mortgage or issue a tax-exempt bond. Contributions, other income, and compensation of the top executive also increase the likelihood of issuing a mortgage. Finally, Denison (2009) finds that firms with significant investment income are less likely to issue tax-exempt debt, suggesting that firms with endowments likely can generate enough cash flow to avoid borrowing.

2.5.3.5 Smith (2010)

Smith (2010) focused on the capital structure determinants of tax-exempt organizations. Smith noted that his study improves existing literature by using a much larger dataset, expanding the definition of leverage, and introducing new capital structure determinants applicable to tax-exempt enterprises.

Smith (2010) sampled 61,644 organizations from 990 forms obtained from the IRS for the years 1998 to 2003. The sample was analyzed with a Tobit regression model to account for the fact that many nonprofit organizations have no debt. Four leverage ratios (total liability ratio, the financial debt ratio, outside debt ratio and taxable debt ratio) were specified as dependent variables. Independent variables include a profitability ratio, growth, a tangibility ratio, gross revenues (size), percentage of gross revenue from contributions, gifts, and grants from the general public, a ratio of working capital to total assets (liquidity), a governance variable, total insider compensation as a percentage of gross revenue, percentage of gross revenue from contributions, gifts, and grants from government and charitable organizations and change in gross land, buildings, and equipment, divided by total assets.

Smith (2010) found a statistically significant positive relationship between leverage and asset tangibility, growth, size, the governance index and the percentage of officers, directors, trustees, and key employees that are paid. In addition, Smith found a statistically significant negative relationship between debt and age, liquidity and profitability. Finally, Smith found a significant industry effect for tax-exempt organizations noting that public utilities had the largest total liabilities ratio.

2.5.3.6 Calabrese (2011)

Calabrese (2011) analyzes whether leverage varies across nonprofit firms as predicted by the static trade-off and pecking order capital structure theories. He also analyzed how nonprofit organizations adjust their capital structure over time.

The study was conducted based on a sample of 116,476 organizations obtained from the National Center for Charitable Statistics (NCCS)—GuideStar National Nonprofit Research Database of 990 forms for the years 1998 to 2003. A multivariate regression model was specified with two leverage (total liabilities/total assets and total financial debt/total assets) dependent variables. Independent variables include profitability, endowment ratio, tangibility ratio, a revenue diversification index, size, ratio of total compensation to total expenses, percent total revenue from goods and services, percent total revenue from donations and special events, and percent total revenue from government grants.

Calabrese (2011) found a statistically significant negative relationship between profitability, endowment, size and leverage. In addition, Calabrese found a statistically significant positive relationship between leverage and asset tangibility.

Calabrese (2011) also addressed whether nonprofits have target ratios and whether they converge towards their target ratios over time. The results showed a statistically positive relationship leverage and the target leverage variable indicating that nonprofits have target capital structures and they converge towards the target capital structure over time. However, this result contradicts the pecking order theory while showing proof of a static trade-off theory.

Calabrese (2011) explains the contradiction in the two results by noting that nonprofits do not want to use up all their internal resources before taking on external debt. Hence, the need to maintain some internal capital to lower the cost of not having the capital for future expansion may drive nonprofits to adjust towards target leverage. Calabrese calls this financial behavior 'a modified pecking order theory.'

Calabrese (2011) concludes that nonprofit organizations show preferences consistent with the pecking order theory. However, nonprofits also maintain internal capital for future growth opportunities.

2.5.3.7 Jegers (2011)

Jegers (2011) replicated an earlier study (Jegers and Verschueren's, 2006) which proposed a theory of capital structure for nonprofit organizations and tested the theory on a sample of 22,766 California nonprofit organizations for the year 1999.

Jegers and Verschueren (2011) extended the study to a sample of 844 Belgian nonprofit organizations for the period 2007. A binary choice model (probit model) was combined with an ordinary least square regression to separate the study of the decision to borrow from the amount to borrow.

For the OLS model, two dependent variables (all liabilities and financial debt) were specified. Independent variables include a profitability variable (representing the equity constraint) and a salaries and wages variable (representing agency costs). In addition, dummy variables associated with the hospital's affiliation was included (this represents the borrowing constraint). Control variables for size, tangibility and type of organization (public or private) were also included in the models. In the probit model, the

independent variables in the OLS model were maintained, and the dependent variable was the choice to borrow.

Jegers (2011) results show that, similarly to the California study, size and organizational activity were likely drivers of the decision to borrow. Jegers found that larger nonprofit organizations have less debt and were less likely to borrow and nonprofit organizations in an association were less likely to borrow. In addition, Jegers also found that the agency problem indicator and asset tangibility shows a statistically significant positive relationship with leverage.

Jegers (2011) concludes that the decision to borrow and the choice of the amount to borrow reveal that different factors affect the two choices. In assessing the decision to borrow, the profitability and the borrowing constraints did not matter in the decision to borrow but were present when evaluating the level of debt to take on.

2.5.3.8 Smith (2012)

Smith (2012) was also a replication study which extended the analysis in Smith (2010) on the determinants of capital structure for tax-exempt organizations in the United States of America to tax-exempt organizations in the United Kingdom (UK).

Smith's (2012) study sampled 969 organizations for fiscal ending 2006 from the GuideStar Data Services database which includes trustees report filed by nonprofit organizations with the UK Charity Commission.

The sample was analyzed with a Tobit regression model to account for the fact that many nonprofit organizations have no debt. Two leverage ratios (total debt ratio and financial debt ratio) were specified as dependent variables. Independent variables include

age, endowment, governance structure, growth, industry grouping, liquidity, profitability, size, tangibility, and voluntary income.

The result from Smith (2012) study shows that total debt is negatively associated with age, endowment, liquidity, profitability, tangibility and voluntary income. The results also show that debt is positively related to size. Furthermore, the results show significant industry effect on leverage. Smith notes that the UK study validates the US study which shows similar relationships.

Smith (2012) concludes that the factors affecting the capital structure of tax-exempt entities in the U.S (age, asset tangibility, governance structure, liquidity, profitability, size, endowment, and donations) are similar to the factors affecting the capital structure of tax-exempt organizations in the U.K. This finding, the author notes, validates the portability of the findings in Smith (2010) beyond the U.S.

2.5.3.9 Calabrese and Ely (2015)

Calabrese and Ely (2015) sought to build on existing literature on the capital structure of nonprofit organizations by identifying the factors associated with the growth of tax-exempt bonds relative to other external financing options. The authors note that their study is different from existing literature which focused on whether a nonprofit has debt and the amount of debt.

Calabrese and Ely (2015) analyzed 23,210 nonprofit organizations for the years 2001 through 2009. The data was sourced from Form 990 data in the Statistics of Income database maintained by the National Center for Charitable Statistics. An ordinary least square model was specified with the percentage of total borrowing that is tax-exempt as the dependent variable. Independent variables include unrelated business activity,

contributions, tangibility, profitability, managerial compensation, age, size, revenue diversification, and endowment.

Calabrese and Ely's (2015) empirical results show that tangibility, age, and size are all statistically significant and they show a positive relationship with tax-exempt debt. The results also show that ratio of donations revenue and revenue diversity index are both statistically significant and they show a negative relationship with tax-exempt debt. The profitability and endowment ratio were not statistically significant.

Calabrese and Ely (2015) conclude that industry effect, asset tangibility, and size are all important factors in explaining the growth of tax-exempt debt in nonprofit organizations.

2.5.3.10–Szymanska, Puyvelde, and Jegers (2015)

Szymanska, Puyvelde, and Jegers (2015) studied the capital structure determinants of social purpose companies in Belgium. The authors analyzed a sample of 2,228 entities for the years 2004 to 2013 obtained from ConcerES asbl and Bel-first.

The analysis was done with a two-stage model. In the first stage, an ordinary least square regression was estimated using the ratio of total debt to total assets as the dependent variable. Independent variables include previous year's leverage, size, liquidity, tangibility, profitability, growth, agency problems and dummy variables for legal form, industry, year, region and presence of financial debt.

In the second stage, a Heckman two-step estimation method is estimated to evaluate when social purpose companies take on more financial debt and how much. A tobit regression model is applied to explain the level of financial debt. In the second

stage, the dependent variable is the ratio of financial debt. Independent variables are the same as the first stage OLS model.

Szymanska, Puyvelde and Jegers' (2015) empirical results from the OLS model show that size, liquidity, and profitability are all statistically significant and they show a negative relationship with leverage. The results also show that the probability of agency problems and previous year's leverage level exhibits a statistically significant positive relationship with leverage. Industry effects are also shown to be significant. The probit and tobit models specified for entities carrying financial debt show that size and agency problems exhibit a statistically significant positive relationship with financial debt.

Szymanska, Puyvelde and Jegers' (2015) concludes that size and asset tangibility are very important factors in determining the capital structure of social purpose companies in Belgium. They note that larger social purpose companies use more debt. However, once the sample is narrowed down to only social enterprises that use financial debt the relationship is reversed. They also conclude that social purpose companies favor internal to external sources of debt in line with the pecking order theory.

2.6 Review of Empirical Studies – Special Purpose Entities/Public Authorities

There is another strand of research on public enterprises or authorities that is relevant to the focus of this study. Mitchell (1996) defines public authorities as "a corporate entity that is chartered by one or more governments (national, state, or local); that is governed by an appointed board; and that is responsible for various public service functions" (p. 141). Mitchell (1996) further explains public authorities by stating that they are characterized by an ability to be self-supporting businesses by raising money from the bond markets, the discretion to establish rates and charges and the freedom to

establish their own personnel and budget systems. Public authorities were also setup to be largely free from the political apparatus of the government.

Eger (2000) uses the term special purpose entity to describe entities that are structurally and conceptually like public authorities. As Eger (2000) notes, "the broad concept of a "Public Authority" includes a multitude of nomenclatures, such as government corporations, off-budget enterprises, special districts, public benefit corporations, board, commissions, bond banks, authorities, special purpose governments, and the like."

Special districts are another class of municipalities that are structurally like public authorities but are fundamentally different because they usually have tax levying powers. Most not-for-profit infrastructural enterprises within the scope of this study are a wholly-owned department of a state or local government or a political subdivision of a municipal government dedicated to the provision of infrastructure.

There are contradictory accounts on the origin of public authorities. Smith (1964) traces the origin of infrastructural enterprises to the British government's Mersey Docks and Harbor Act of 1857 which created the Mersey Docks and Harbor Board to own and operated the port facilities of Port Liverpool. Gunn (1988) traces the origin to the United States in 1816 when the Erie Canal Commission was established in New York to administer the state's canal system. Eger (2000) noted that the creation of the Port of New York Authority in 1921 started the wave of special purpose entities in the United States. Mitchell (1996) attributed the proliferation of modern day authorities to President Roosevelt's use of authorities to accomplish the infrastructural push of the New Deal in the 1930's and the President's encouragement of States to use authorities to build local

infrastructure. Today, there are thousands of public authorities and corporations, mostly at the state and local government level, operating in the U.S. In spite of the proliferation of these entities, no published scholarly work has explored their capital structure.

2.7 Synthesis of Literature Review

Although the literature on the capital structure of nonprofits is scant relative to the for-profit literature, some studies have attempted to identify the main determinants of the capital structure of hospitals, universities and nonprofits broadly. Table 4, 5 and 6 show the dependent variables used in the articles summarized in section 2.5.

Table 4: Broader Nonprofit Literature - Selected Empirical Studies

Study	Profitability	Size	Growth Rate	Tangibility	Risk /Volatility	Age	Liquidity	Lagged Leverage
Bowman (2002)	+		+	+	-			
Jegers and Verschueren (2006)	-	-						
Yan, Denison & Butler (2009)	ns	+		+				
Denison (2009)		+		+				
Smith (2010)	-	+	+	+		-	-	
Calabrese (2011)	-	-		+				
Jegers (2011)		-		+				
Smith (2012)	-	+		-		-	-	
Calabrese and Ely (2015)	ns	+		+		+		
Szymanska, Puyvelde and Jegers (2015)	-	-	-	ns			-	+

The size of the organization is the most common factor identified across all the nonprofit studies reviewed. An overwhelming majority of the literature defined size as the natural log of total assets. However, a few studies defined size as the log of revenues (Yan, Denison & Butler, 2009; Denison, 2009; Smith 2012; McCue and Ozcan, 1992; Trussel, 2012; Turner, Broom, Elliott and Lee, 2015). As Table 4 and 5 shows, most of

the studies found a statistically significant positive relationship between size and leverage. These findings support the conclusions in the for-profit literature and they validate the trade-off theory that larger firms are perceived to be more diversified, matured and less susceptible to bankruptcy. Hence, larger firms have larger debt capacities, borrow more and borrow at relatively lower interest rates. A few studies showed a statistically significant negative relationship between size and leverage (Verschueren, 2006; Calabrese, 2011; Jegers, 2011; Szymanska, Puyvelde and Jegers, 2015). The negative relationship supports the pecking order theory.

Profitability, defined as the ratio of operating earnings to total assets, largely followed the pecking order theory, which predicted a negative relationship between leverage and profitability. The findings in the nonprofit literature suggest that more profitable will retain funds and resort less to the use of debt to fund investments. As Table 4 and 5 shows, all the nonprofit studies show a negative relationship between profitability and leverage. Furthermore, Calabrese (2011) adds that nonprofits do not want to use up all their internal resources before taking on external debt. Hence, Calabrese noted 'a modified pecking order theory' which stems from the need to maintain some internal capital to lower the cost of not having the capital for future expansion.

Table 5: Hospitals - Selected Empirical Studies

Study	Profitability	Size	Growth Rate	Tangibility	Risk / Volatility	Age
Wedig, Sloan, Hassan, and Morrisey (1988)		+		+	-	-
McCue and Ozcan (1992)	ns	+	+	+	+	
Bacon (1992)	-	ns	+	+	ns	
Wedig (1996)						
Wedig (1998)		+			-	-
Gentry (2002)	-	+ & -				
Trussel (2012)	-	ns	ns		+	
Turner, Broom, Elliott and Lee (2015)	-	+	ns		-	

Tangibility, generally defined as the ratio of net fixed assets to total assets by most of the nonprofit literature, consistently showed a positive statistical relationship with leverage across all the nonprofit empirical studies reviewed. This relationship validates the prediction of the trade-off theory, which suggests that nonprofits with tangible assets to secure debt use more leverage. This conclusion is also consistent with most of the empirical studies in the for-profit literature.

Another factor related to tangibility often cited as a determinant of the capital structure of a nonprofit organization is the age of property, plant and equipment. This was operationalized by most studies as accumulated depreciation divided by depreciation expense. Smith (2010) explains that newly established firms may find it difficult to demonstrate creditworthiness because of a short financial track record. In addition, Smith (2010) notes that nonprofit firms may choose to pay off debt as they become more established with age. This explanation is consistent with the pecking order theory's preference for internal resources. Wedig et al. (1988), Wedig (1998), Smith (2010) and Smith (2012) show a statistically significant negative relationship between age and leverage. Only Calabrese and Ely (2015) show a statistically positive relationship. This

may because they define age as years since the nonprofit received its tax-exempt status from the IRS rather than estimating age from the accumulated depreciation and depreciation expense.

Several nonprofit empirical studies (Bowman, 2002; Smith, 2012; McCue and Ozcan, 1992; Bacon, 1992) found a statistically significant positive relationship between growth and leverage. Growth was commonly defined as the rate of growth in revenues or assets in the literature. The nonprofit findings support the pecking order theory by implying that firms with more growth opportunities accumulate more debt over time to fund growth as internal resources will not be enough to finance the growth opportunities.

Table 6: Higher Education - Selected Empirical Studies

Study	Size = Annual Revenue	Size = Total Assets	Value of Buildings	Risk	Enrollment growth	Endowment Ratio
Shultz (2000)	+	ns	ns			+
Keith (2013)			+			
Denison, Fowles, and Moody (2014) - **Public Universities**		+			+	ns
Denison, Fowles, and Moody (2014) - **Private Universities**					-	-
Rosen and Sappington (2016)				-		

Risk, usually measured as the volatility (standard deviation) of return on assets, is also frequently cited in the nonprofit literature as an important determinant of the capital structure. Most studies (Wedig, Sloan, Hassan, and Morrisey, 1988; Bowman, 2002; Wedig 1998; Turner, Broom, Elliott and Lee, 2015; Rosen and Sappington, 2016) show a statistically significant negative relationship between leverage and risk. Wedig (1998) explains that earnings volatility reduces the ability to access tax-exempt debt. This finding supports the pecking order theory and the trade-off theory predictions of a negative relationship between risk and leverage.

Beyond, the widely used factors noted above, other industry specific capital structure determinants factors have also been identified in the literature. For example, many empirical studies on hospitals use payer mix (ratio of Medicaid and Medicare revenues to total revenues) as an important variable. Denison, Fowles, and Moody (2014) also used enrollment growth as a measure of growth for their study of universities and colleges. The negative relationship between the endowment assets and leverage was emphasized by Bowman (2002), Calabrese (2011) and Smith (2012). In addition, Denison (2009) suggests that firms with endowments likely can generate enough cash flow to avoid borrowing.

In summary, the literature on the capital structure of nonprofit firms supports the use of at least seven factors (profitability, size, growth, tangibility, risk, liquidity and age) in assessing the determinants of the capital structure of nonprofits.

CHAPTER 3: RESEARCH METHODOLOGY

3.1 Introduction

Most studies on the capital structure of not-for-profit firms have been based on the collection and analysis of panel data. As noted in Chapter 1, studies based on qualitative methods have been rare. Specifically, only two studies focusing on hospitals (Gapenski, 1993; Wheeler, Smith, Rivenson, Reiter, 2000) have used qualitative methods to understand the financing decisions of hospital managers.

This study employs a mixed method research approach with an emphasis on quantitative rather than qualitative techniques. As Creswell (2009, pg. 4) notes, "mixed methods approach is more than simply collecting and analyzing qualitative and quantitative data; it also involves the use of both approaches in tandem so that the overall strength of a study is greater than either quantitative or qualitative research." While the focus of this study is quantitative, multiple case studies are analyzed to provide additional context to the findings from the quantitative study and to uncover causal mechanisms that link independent factors to outcome variables.

Using quantitative research methods, multivariate Ordinary Least Square (OLS) regression is used to analyze the magnitude and direction of the relationship between the capital structure of not-for-profit enterprises (operationalized as leverage) and its determinants. In addition, using qualitative research methods such as reviews of financial documents and interviews, a multiple case study of eight enterprises is used in the study to understand the considerations of financial decision-makers when making capital structure decisions. The case study includes interviews with the key finance decision maker of the sampled cases spanning the three infrastructural sectors.

The eight case studies include three power enterprises, three water and sewer enterprises and two transportation enterprises. The two selected case studies in each sector consist of at least one enterprise with low leverage and another enterprise with moderate to high leverage.

3.2 Conceptual Framework

Before establishing the factors that determine the capital structure of nonprofit infrastructural enterprises, it is first necessary to introduce a conceptual framework to provide a better focus for the relationship between capital structure (for which leverage ratio is a proxy) and how they are defined and measured with a particular focus on power, water and transportation enterprises.

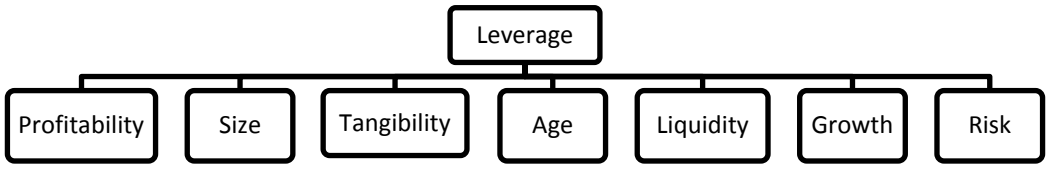
As noted in section 2.2, the term leverage is used to operationalize the relationship between debt and equity. While the focus is on the broadest measure of leverage (total liabilities/total assets), this study considers three other measures of leverage as defined in Table 7 below. The broadest measure of leverage incorporates other liabilities that are often seen as effective substitutes to the use of debt e.g. capital leases, unfunded pension liabilities.

Table 7: Proxies for Leverage

Measure	Definition
Total Leverage	Total liabilities / Total assets
Debt Leverage	Total debt (short-term + long-term) / Total assets
Long-term Leverage	Total long-term debt /Total assets
Short-term Leverage	Total current liabilities/Total assets

Capital structure determinant models consist of a set of fundamental covariates of leverage and these covariates generally reflect firm-specific variables or attributes. An important element of the estimation of capital structure is identifying those firm–level attributes that likely affect leverage. The selection of variables is based on the review of prior nonprofit and for-profit literature. The conceptual framework for the article is visually depicted in Figure 1.

Figure 1: Conceptual Model of Leverage



3.3 Research Hypothesis

Based on the literature review and the conceptual framework discussed above the following hypotheses were framed:

3.3.1 Profitability: Hypothesis 1

The literature review in Chapter 2 showed that profitability largely followed the pecking order theory, which predicted a negative relationship between leverage and profitability. The findings in the nonprofit literature suggest that more profitable firms will retain funds and resort less to the use of debt to fund investments. As Table 4 and 5 in Chapter 2 showed, an overwhelming number of nonprofit studies show a negative relationship between profitability and leverage. Furthermore, Calabrese (2011) adds that nonprofits do not want to use up all their internal resources before taking on external debt. Hence, Calabrese noted ‘a modified pecking order theory’ which stems from the

need to maintain some internal capital to lower the cost of not having the capital for future expansion. Therefore, I hypothesize a negative relationship between leverage and profitability as specified below.

Hypothesis 1 – H1: Leverage is negatively related to profitability.

3.3.2 Firm-Size: Hypothesis 2

The size of the organization is the most common factor identified in the nonprofit literature. As Table 4, 5 and 6 in Chapter 2 showed, most of the studies found a statistically significant positive relationship between size and leverage. These findings support the conclusions in the for-profit literature and they validate the trade-off theory that larger firms are perceived to be more diversified, matured and less susceptible to bankruptcy. Hence, larger firms have larger debt capacities, borrow more and borrow at relatively lower interest rates.

A few studies showed a statistically significant negative relationship between size and leverage (Jegers and Verschueren, 2006; Calabrese, 2011; Jegers, 2011 and Szymanska, Puyvelde and Jegers, 2015). However, these studies found a statistically significant positive relationship when the leverage measure is narrowed to only incorporate financial debt. Therefore, I hypothesize a positive relationship between leverage and firm size as specified below.

Hypothesis 2 – H2: Leverage is positively related to firm size.

3.3.3 Tangibility of Assets: Hypothesis 3

Tangibility consistently showed a positive statistical relationship with leverage across all the nonprofit empirical studies reviewed as shown by Table 4 and 5 in Chapter 2. This relationship validates the prediction of the trade-off theory, which suggests that

nonprofits with tangible assets to secure debt use more leverage. This conclusion is also consistent with most of the empirical studies in the for-profit literature. Therefore, I hypothesize a positive relationship between leverage and tangibility of assets as specified below.

Hypothesis 3 – H3: Leverage is positively related to tangibility of assets.

3.3.4 Age of Firm: Hypothesis 4

Another factor related to tangibility often cited as a determinant of the capital structure of a nonprofit organization is the age of property, plant and equipment. Smith (2010) explains that newly established firms may find it difficult to demonstrate creditworthiness because of a short financial track record. In addition, Smith (2010) notes that nonprofit firms may choose to pay off debt as they become more established with age. This explanation is consistent with the pecking order theory's preference for internal resources. Wedig et al. (1988), Wedig (1998), Smith (2010) and Smith (2012) all show a statistically significant negative relationship between age and leverage. Only Calabrese and Ely (2015) show a statistically positive relationship. This may be because Calabrese and Ely (2015) define age as years since the nonprofit received its tax-exempt status from the IRS rather than estimating age from accumulated depreciation and depreciation expense. Therefore, I hypothesize a negative relationship between leverage and age as specified below.

Hypothesis 4 – H4: Leverage is negatively related to age

3.3.5 Growth: Hypothesis 5

Several nonprofit empirical studies (Bowman, 2002; Smith, 2012; McCue and Ozcan, 1992; Bacon, 1992) found a statistically significant positive relationship between

growth and leverage. The nonprofit findings support the pecking order theory by implying that firms with more growth opportunities accumulate more debt over time to fund growth as internal resources will not be enough to finance the growth opportunities. Therefore, I hypothesize a positive relationship between leverage and growth as specified below.

Hypothesis 5 – H5: Leverage is positively related to growth.

3.3.6 Risk: Hypothesis 6

Risk is also frequently cited in the nonprofit literature as an important determinant of the capital structure. Most studies (Wedig, Sloan, Hassan, and Morrisey, 1988; Bowman, 2002; Wedig 1998; Turner, Broom, Elliott and Lee, 2015; Rosen and Sappington, 2016) show a statistically significant negative relationship between leverage and risk. Hence, a negative relationship is expected between risk and leverage as volatile cash earnings increase the cost of bankruptcy or financial distress. In addition, firms with volatile earnings may not generate enough cash flow to service debt obligations, this leads to lower leverage to minimize the cost of financial distress. In addition, Wedig (1998) notes that earnings volatility reduces the ability to access tax-exempt debt. This finding supports the pecking order theory and the trade-off theory predictions of a negative relationship between risk and leverage. Therefore, I hypothesize a negative relationship between leverage and risk as specified below.

Hypothesis 6 – H6: Leverage is negatively related to risk.

3.3.7 Liquidity: Hypothesis 7

Some studies highlighted liquidity as another determinant of the capital structure of nonprofits (Smith 2010; Smith 2012; Szymanska, Puyvelde and Jegers, 2015). Smith

(2012) notes liquidity could be seen as a signal of creditworthiness which will imply a higher leverage. Smith (2012) also notes that contrastingly, liquidity is also an indication of available internal funds which will lower the use of debt. Hence higher liquidity could have a positive or negative relationship on leverage. Liquidity is operationalized as the ratio of working capital to total assets by Smith (2012) and operationalized as the ratio of current assets to current liabilities by Szymanska, Puyvelde and Jegers (2015). In line with the findings of (Smith 2010; Smith 2012; Szymanska, Puyvelde and Jegers 2015), I hypothesize a negative relationship between leverage and liquidity as specified below.

Hypothesis 7 – H7: Leverage is negatively related to liquidity.

3.4 Variables and Measurement

As shown in the conceptual framework, the dependent and the independent variables are all financial ratios calculated from the audited financial statements of the not-for-profit infrastructural enterprises. The dependent and independent variables are discussed below in sections 3.4.1 and 3.4.2.

3.4.1 Dependent Variables

The dependent variable (leverage ratio) is calculated as total liabilities to total assets. This leverage ratio incorporates all liabilities including accounts payable, pension liabilities, and other liabilities. Other leverage proxies shown in Table 7 (debt leverage, long-term leverage and short-term leverage) are also analyzed relative to the primary leverage ratio and the independent variables.

3.4.2 Independent Variables

As illustrated in the literature review and conceptual framework, the relevant Independent variables include profitability, size, asset tangibility, age, growth, liquidity, and risk. Table 8 below summarizes all the independent variables used in the study along with the expected direction of the variable's relationship with leverage. A detailed description of the formula for each independent variable follows.

Table 8: Explanatory Variables Used in Analysis

Variable Name	Formula	Expected Sign
Profitability	Net Operating Income/Total Assets	-
Size	Log of Total Assets	+
Tangibility	Net Fixed Assets/Total Assets	+
Age	Accumulated Depreciation/ Depreciation Expense	-
Liquidity	Current Assets./ Current Liabilities	-
Growth	Annual Percentage Change in Total Assets	+
Risk	Standard deviation of 5 year change in EBITDA/ 5 year Average of Total Assets	-

3.4.2.1 Profitability

Infrastructural enterprises with consistent profitability are able to establish reserves for harsher times, expand or refurbish their physical plants, purchase new equipment, or add to assets in other ways. As stated in Section 3.3.1, more infrastructural enterprises are expected to retain funds and resort less to the use of debt to fund investments. Profitability is defined as return on assets or the ratio of net operating income to total assets.

$$\text{Profitability} = \frac{\text{Net Operating Income}}{\text{Total Assets}}$$

3.4.2.2 Firm Size

A larger size generally reflects greater stability and ability to withstand market disruptions. Larger firms are perceived to be more diversified, matured and less susceptible to bankruptcy. An overwhelming majority of the literature defined size as the natural log of total assets. However, a few studies defined size as the log of revenues (Yan, Denison & Butler, 2009; Denison, 2009; Smith 2012; McCue and Ozcan, 1992; Trussel, 2012; Turner, Broom, Elliott and Lee, 2015). This study defines size as the log of total assets.

Size = Log of Total Assets

3.4.2.3 Tangibility of Assets

Tangibility: Is measured as ratio of fixed assets to total assets. A high ratio of fixed assets to total assets provides a lender with a high level of security and credit risks are seen to be mitigated since in the event of a default the lender can liquidate the asset. Hence, a positive relationship between tangibility and leverage is expected.

$$\text{Asset Tangibility} = \frac{\text{Net Fixed Assets}}{\text{Total Assets}}$$

3.4.2.4 Age of Firm

This was operationalized by most studies as accumulated depreciation divided by depreciation expense. A negative relationship is expected between leverage and age because newer organizations may find it difficult to demonstrate creditworthiness because of a short financial track record. In addition, Smith (2010) notes that nonprofit firms may choose to pay off debt as they become more established with age. For this

study, age is operationalized as the ratio of accumulated depreciation to depreciation expense.

$$\text{Age of Firm} = \frac{\text{Accumulated Depreciation}}{\text{Depreciation Expense}}$$

3.4.2.5 Growth

The most common indicators of growth used in the nonprofit literature include percentage change in total assets, percentage change in revenues, ratio of capital expenditures to total assets and the ratio of market value to book value of equity. A positive relationship is expected between growth and leverage as firms growing faster are expected to accumulate more debt over time as internal resources will not be enough to finance the growth. For this study, growth is measured as the percentage annual change in total assets.

$$\text{Growth} = \frac{\text{Total Assets in Year 1 - Total Assets in Year 0}}{\text{Total Assets in Year 0}}$$

3.4.2.6 Risk

Risk is usually measured as the volatility (standard deviation) of return on assets or the standard deviation of percentage change in operating income (Titman and Wessels, 1988). A negative relationship is expected between risk and leverage as firms with volatile earnings may not generate enough cash flow to service debt obligations, this leads to lower leverage to minimize the cost of financial distress. In this study, risk is measured as the ratio of the 5 year standard deviation of changes in net operating income to the 5 year average of total assets.

Earnings volatility was operationalized by calculating the standard deviation of return on

$$\text{Risk} = \frac{\text{5 Year Standard Deviation of change in Net Operating Income}}{\text{5 Year Average of Total Assets}}$$

3.4.2.7 Liquidity

Liquidity can have a positive impact on leverage if seen as a signal of creditworthiness. Hence, higher liquidity is associated with lower leverage and greater financial flexibility. Liquidity is defined as the ratio of current assets to current liabilities.

$$\text{Liquidity} = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

3.5 Data Sources and Sampling

This study relies on primary and secondary sources of data as explained below.

3.5.1 Sources of Data

Financial and operating data is provided by Merritt Investor Services' CreditScope database. As Nguyen (2012, p.240) notes, "CreditScope is a comprehensive credit analysis software system that is used by institutional investors, investment bankers, and credit analysts." The database contains detailed income statement and balance sheet data primarily for approximately 9,000 municipalities and nonprofit organizations that are active in the tax-exempt market. The data in the CreditScope database was obtained from the audited financial statement of various nonprofit enterprises.

While this data source is not as comprehensive as the widely used IRS Form 990 data of all nonprofit institutions usually obtained from the National Center on Charitable

Statistics (NCCS), it does not suffer from the cost allocation and self-reporting drawbacks of the NCCS data documented by (Gordon, Khumawala, Kraut and Meade, 2007; Froelich, Knoepfle & Poliak, 2000).

The data source generally contains data from 2000 to 2015. However, the quantitative study focuses on a period of nine years from fiscal year ends 2007 to 2015. The measure of risk incorporates a rolling 5 year standard deviation. Therefore, the 2011 number is a ratio of the standard deviation of changes in EBITDA from fiscal year 2007-2011.

In addition to the use of secondary data noted above, this study also relies on primary data collected from interviews of key financial decision-makers at a sample of eight not-for-profit power, water and transportation enterprises.

3.5.2 Population and Sampling

Beginning with the entire CreditScope database of 791 power enterprises, 764 water and sewer enterprises, 142 airport enterprises and 67 toll road enterprises, this study eliminated all enterprises without a complete 9 year history of relevant income statement and balance sheet items. In addition, I also eliminate firms with overlapping fiscal year ends due to a change in reporting period which leads to two observations for the year of the change in reporting period.

After accounting for missing data and applying the other filter described above, the end result is a panel dataset comprised of 379 power enterprises, 361 water and sewer enterprises and 156 transportation enterprises (118 airports and 38 toll roads). This dataset covers the period 2007 to 2015, for a total of 8,064 observations.

Outliers can also distort the true significance and results of a regression model. Outliers are extreme values compared to the sample data. In addition to the data cleaning process, 13 outliers were eliminated. The outliers eliminated were distressed enterprises with total leverage ratio above 150% and comprise only 0.2% of the total sample. 883 firms (7,947 observations) remain after elimination. To further reduce the potential bias of any remaining outliers in the sample, I winsorize all variables at the first and ninety-ninth percentiles.

Although the 7,947 observations across three infrastructural sectors, covers a wide range of size, age, geographical reach and risk. One of the limitations of this study is that the sample selected from CreditScope is not random; neither can the database be seen as a comprehensive database. It is likely that the sample excludes many small enterprises that do not issue tax-exempt debt.

In addition to the sampling methodology of the secondary data, primary data is collected from interviews of key finance executives as already noted. A convenience, information-oriented and purposive sampling methodology is used to identify eight cases (three power enterprises, three water and sewer enterprises, two transportation enterprises). The two selected case studies in each sector consist of at least one enterprise with low leverage and another enterprise with moderate to high leverage.

As Marshall (1996) notes, convenience sampling is the selection of the most accessible participants with the least amount of time and cost. While generalizations cannot be made due to the non-probability sampling design of the selected sample of case studies, the eight samples provide additional context to the findings from the quantitative study.

3.6 Method of Analysis

The methods of analysis employed in this study includes, (i) trend analysis (ii) qualitative analysis and (iii) quantitative analysis, all of which are described below. All data were maintained in current dollars.

3.6.1 Trend Analysis

To answer the first research question (What are the leverage profiles of power, water and transportation enterprises in this study from 2007-2015 and how does the leverage profiles vary by year, sector and nature of debt (short or long term)?), this study analyzes the leverage profiles of power, water and transportation enterprises from 2007-2015. Particular attention is given to changes in leverage between 2007 and 2015 by sector, degree of leverage and nature of the debt (short-term or long-term).

3.6.2 Qualitative Analysis

As already noted, using qualitative research methods such as reviews of financial documents and interviews, a multiple case study of eight enterprises is used in the study to understand the considerations of financial decision-makers when making capital structure decisions. Yin (1984, p. 23) describes case study research as an "empirical inquiry that investigates a contemporary phenomenon within its real-life context" and uses "multiple sources of evidence to describe and explain the phenomenon of interest". This method is suitable for this study because it provides more in-depth, comprehensive information and gear the collection of data toward context rather than specific variables (Creswell, 2009).

Each case addresses the following issues. First, the cases briefly describe each not-for-profit enterprise, discussing each firm's purpose and origin. Second, each case

describes the business profile of the enterprise with particular focus on the revenue and financial performance and trend between 2007 and 2015. Third, each case describes the capital structure patterns and trends of the enterprise between 2007 and 2015. Fourth, each case describes the capital structure policy of the enterprise. Finally, the results from the interviews conducted with key finance decision makers are synthesized.

According to Yin (1994), when using the case study approach, interviews need to be supplemented by a review of documentation to enhance the ability to triangulate data and corroborate the perspectives provided. Hence, to conduct these case studies, data is gathered from interviews and a review of relevant documents.

The document review and analysis incorporates a review of available documents including comprehensive annual financial reports, budgets, official statements and other relevant publicly available documents. The document reviews help strengthen validity and provides descriptive data and qualitative themes to support the overall analysis of this study.

Interviews also form a critical part of the qualitative research design. The case studies include interviews with the key finance decision maker of the sampled enterprises spanning the three infrastructural sectors. All interviews were conducted on the phone for duration of 30 to 45 minutes. Interview questions were drawn from questions in a landmark survey (Graham and Harvey, 2002) of the chief financial officers (CFOs) of approximately 400 for-profit firms. In addition, more questions from another study (Gajurel, 2005) were included. Several modifications were made to make the interview questions more relevant to not-for profit firms. To ensure consistency and minimize

variation in questions used during interviews, the interview protocol included mostly structured questions with some semi-structured questions.

3.6.3 Quantitative Analysis

Following previous empirical studies (Bowman, 2002; Jegers and Verschueren, 2006; Yan, Denison, and Butler, 2008; Denison, 2009; Smith, 2010; Calabrese, 2011; Jegers, 2011; Smith, 2012; Calabrese and Ely, 2015; Szymanska, Puyvelde and Jegers, 2015) and the conceptual framework outlined in Section 3.2, I model the general form of leverage for nonprofit infrastructural enterprises as:

$$\text{Leverage} = f(\text{PROFITABILITY, SIZE, TANGIBILITY, AGE, GROWTH, RISK, LIQUIDITY})$$

The choice of statistical method applied in this study is informed by the overwhelming use of OLS Multiple Regression to explore the relationship between leverage and several predictor variables in the nonprofit literature (Wedig, Sloan, Hassan, and Morrisey (1988); McCue and Ozcan (1992); Bacon (1992); Wedig (1996); Bowman (2002), Trussel (2012), Calabrese and Ely (2015), Turner, Broom, Elliott and Lee (2015).

As Tabachnick & Fidel (2007) notes, multiple regression allows a researcher to assess the relationship between a dependent variable and several independent variables. Tabachnick & Fidell (2007) further explain that regression analysis is also used to assess the strength of the relationship between dependent and independent variables and the relative importance of each of the explanatory variables to the relationship.

This study employs an ordinary least squares (OLS) model with seven independent variables with year and state fixed effects. The year fixed effects is used to

capture time-invariant heterogeneity within each of the three infrastructural sectors to control for macro-level time varying effects like economic growth and inflation trends that affect all enterprises in the same way. I also use state fixed effects to capture differences in the regulatory environment by state that similarly affect enterprises in the same state. This is important for this analysis as the regulatory environment may vary from one state to another, particularly in the water and power sectors.

A number of tests are performed to make sure the fundamental assumptions of using OLS regression are not violated. First, I test for heteroscedasticity using the Breusch–Pagan and Cook–Weisberg tests for heteroscedasticity. Heteroscedasticity is a systematic pattern in the errors where the variances of the errors are not constant (Gujarati, 2003). Heteroscedasticity makes OLS estimators not efficient because the estimated variances and covariance of the coefficients are biased and inconsistent. I correct for heteroscedasticity by reporting robust standard errors.

Second, I test for the presence of multicollinearity between the explanatory variables. Multicollinearity exists when independent variables are correlated and the presence of multicollinearity can distort the standard error of estimate and the conclusions reached when interpreting the regression model. To evaluate the presence of multicollinearity, I evaluate the pairwise correlation matrix and the Variance Inflation Factor (VIF).

Third, I evaluate the normality of the sample data by observing the histogram of the variables and also evaluating two common methods (Shapiro-Wilk test and IQR test) of assessing the normal distribution of a sample. In addition, I observe the linearity of the

data by evaluating the scatterplots of each independent variable relative to the dependent variable.

Fourth, outliers can also distort the true significance and results of a regression model. Outliers are extreme values compared to the sample data. In addition to the data cleaning process, 13 outliers were eliminated. The outliers eliminated were distressed enterprises with total leverage ratio above 150% and comprise only 0.2% of the total sample. 883 firms (7,947 observations) remain after elimination. To further reduce the potential bias of any remaining outliers in the sample, I winsorize all variables at the first and ninety-ninth percentiles.

Finally, consideration is given to a one year lag for all independent variables to mitigate any endogeneity problems (Calabrese, 2011; Grizzle, Sloan and Kim, 2015).

CHAPTER 4: RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents the qualitative study, data and the empirical results of the study. The rest of the chapter is organized as follows Section 4.2 presents the case studies and Section 4.3 presents a synthesis of the findings from the qualitative study. Section 4.4 presents the descriptive data by sector and by degree of leverage. Section 4.5 presents the correlation analysis. Section 4.6 presents the pattern and trend of the leverage profiles of not-for-profit power, water and transportation enterprises during the period 2007-2015. Section 4.7 presents the results of the tests of the assumptions of Classical Linear Regression Models (CLRM). Section 4.8 presents the results of the regression between leverage proxies and the determinants identified in the study and Section 4.9 presents the results of the hypothesis.

4.2 Case Study and Analysis of Qualitative Study

Eight cases including three power enterprises, three water and sewer enterprises and two transportation enterprises are described in this section. Each case addresses the following issues. First, the cases briefly describe each not-for-profit enterprise, discussing each firm's purpose and origin. Second, each case describes the business profile of the enterprise with particular focus on the revenue and operating performance trend since 2007. Third, each case describes the capital structure trend of the enterprise. Finally, each case describes the capital structure policy of the enterprise.

All descriptive information on the case studies were obtained from Comprehensive Annual Financial Reports, Bond Official Statements, websites and directly from management.

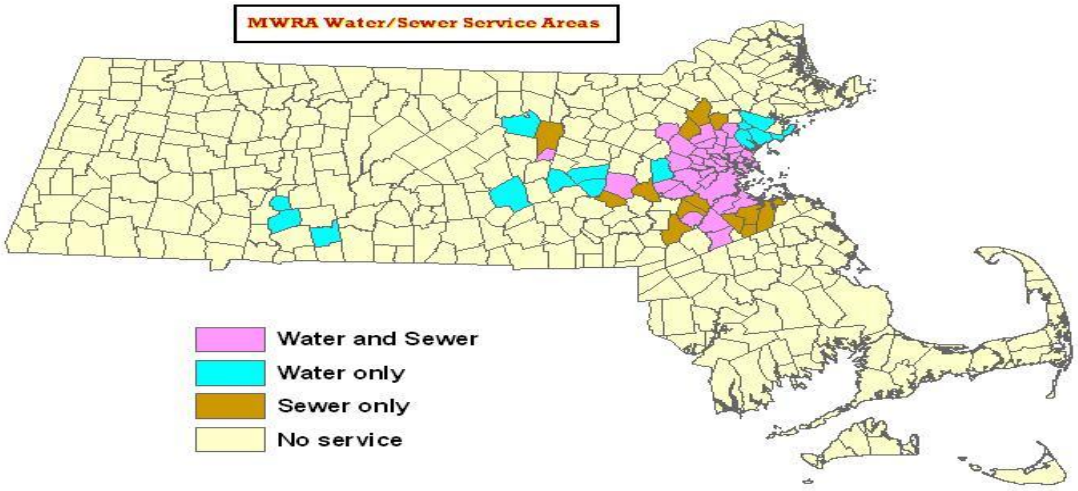
4.2.1 Massachusetts Water Resources Authority

Massachusetts Water Resources Authority (MWRA) was established by Chapter 372 of the Acts of 1984. MWRA was mandated to provide wholesale water and sewer services to residents and businesses in 61 communities primarily in eastern Massachusetts, including the Boston metropolitan area as shown in Figure 2 below. The authority started operations in 1985 by taking over the facilities of the water department of the state – Metropolitan District Commission.

Currently MWRA serves 2.5 million people (approximately 40% of the population of the state of Massachusetts). MWRA was established as a public authority independent of the supervision or control of the executive branch of the Commonwealth of Massachusetts. The Authority is self-supporting, relying on user assessment and charges to operate and also maintain its facilities.

The Authority is governed by an eleven member board of directors. Three members of the board are appointed by the Governor of Massachusetts and the remaining eight board members are appointed by the 61 customer communities.

Figure 2: MWRA – Service Area



Source: MWRA

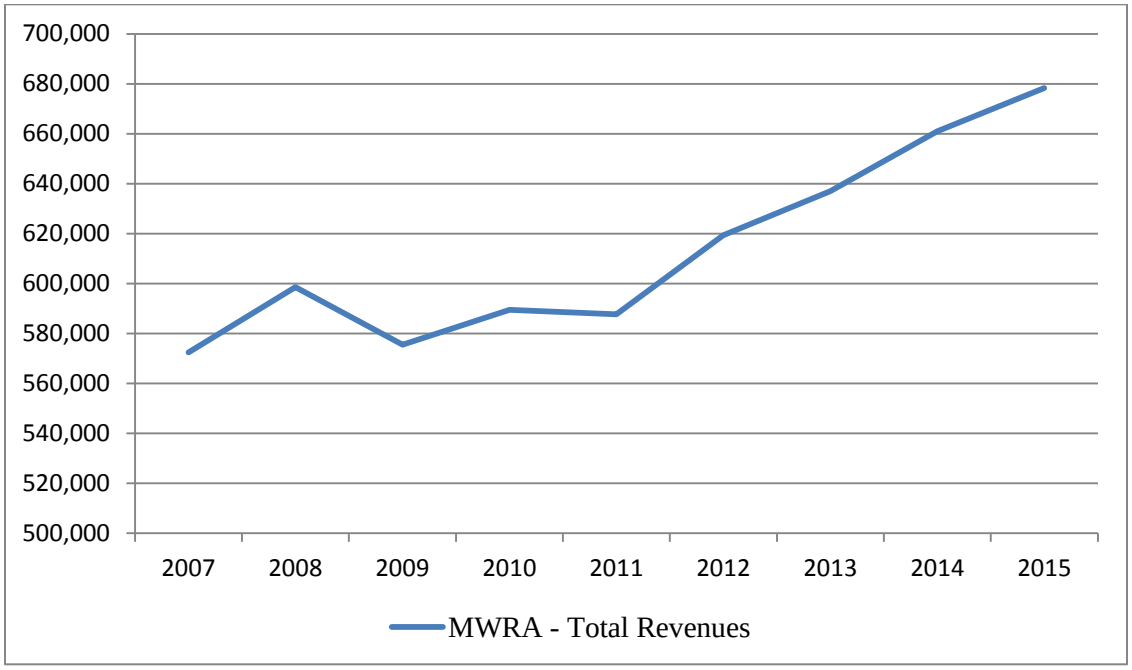
4.2.1.1 Business Profile

As already noted, MWRA is a self-supporting provider of wholesale water and sewer services. As a result, MWRA is funded with charges assessed on the retail water enterprises of the service area communities based on water volume. For example, the Boston Water and Sewer Commission, Boston's primary retail provider of water and sewer services, accounts for 31% of the MWRAs total revenues.

MWRA's rate setting authority is solely exercised by the Board of Directors independent of any restriction or interference of the executive or legislature. Hence, MWRA is statutorily required to set charges at levels sufficient enough to cover operations and debt service.

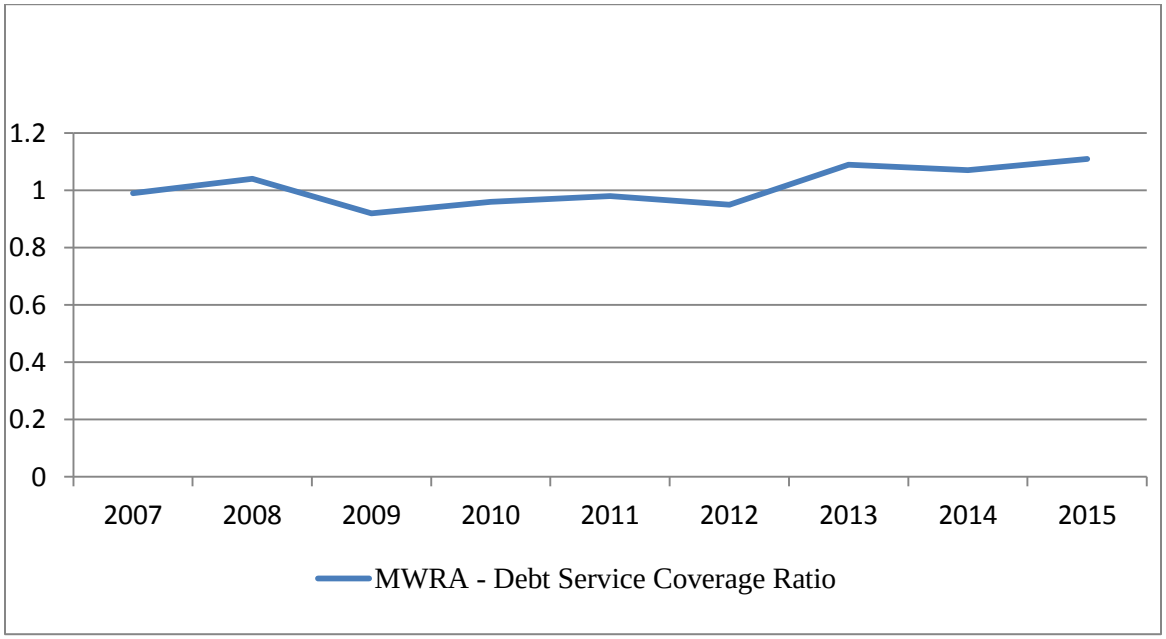
As Figure 3 below shows, total revenues have increased steadily (cumulative growth of 17%) since 2011, primarily due to increases in rate assessments.

Figure 3: MWRA – Total Revenues



As a measure of financial performance, Figure 4 below shows the debt service coverage ratio (defined as earnings before interest depreciation and amortization as a multiple of annual principal and interest) of the enterprise.

Figure 4: MWRA – Debt Service Coverage Ratio

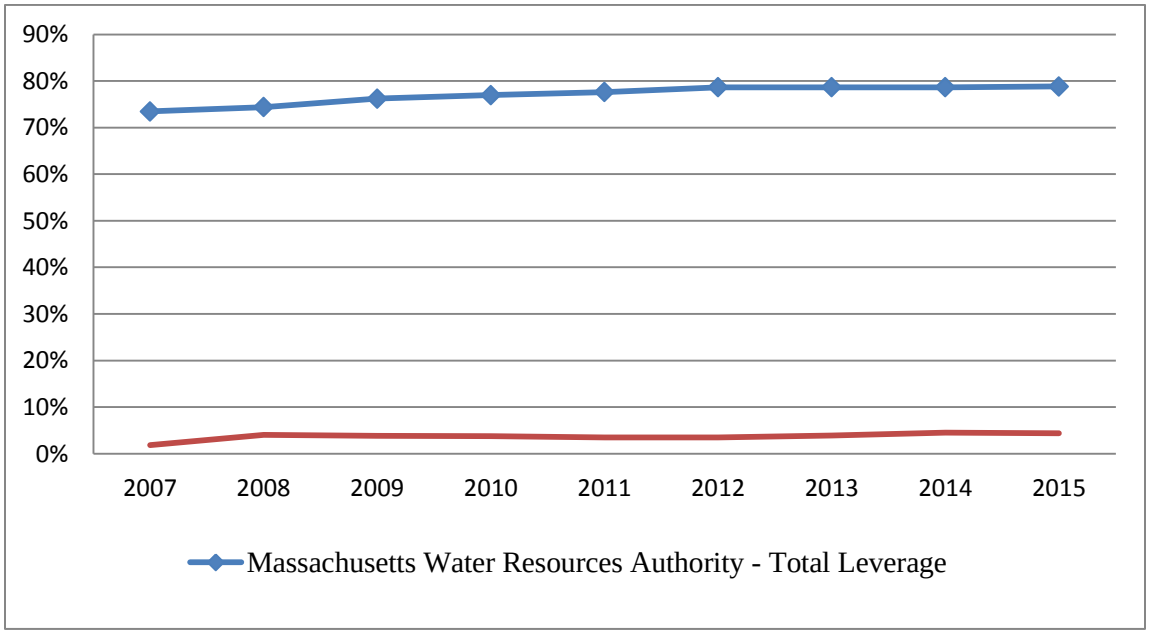


The chart shows that MWRA covered principal and interest payments from operating cash flows in four of the nine years. Between 2009 and 2012 the coverage ratio ranged from 0.92 to 0.98, additional cash needed for debt service in those years were transferred from cash reserves.

4.2.1.2 Capital structure patterns and trends of the enterprise

MWRA's reliance on leverage is high. As Figure 5 shows total leverage has been historically high, it was 73% in 2007 and has steadily increased to approximately 80% in 2015. Figure 5 also show very minimal use of short-term leverage as short term leverage ratio was between 2% and 5% for the 2007 to 2015 fiscal years.

Figure 5: MWRA- Short-Term and Total Leverage



MWRA's total leverage has been very high for decades. This is attributed to a court mandated cleanup of the Boston Harbor and its tributaries. The enforcement action

came into effect in 1985 and ended in 2015. As a result, MWRA has expended approximately $6 billion dollars on capital improvements mostly financed with debt.

4.2.1.3 Capital Structure Policy

MWRA's capital structure policy is embedded in its Capital Finance Management Policy document. The policy provides a framework for the management and reporting of all debt obligations of MWRA.

The policy requires the Board of Directors to review, evaluate and approve all debt issuances. The policy mandates a multiyear approach to planning for debt financing and requires responsible debt financing while taking into consideration intergenerational equity. Furthermore, the policy tasks MWRA to strive to achieve the lowest cost of borrowing, while minimizing market risks and maintain the highest credit rating possible.

A number of debt issuance considerations are highlighted in the policy. They include legal constraints on the issuance of debt based on debt capacity in the form of a minimum debt service coverage level. In addition, the policy notes that due consideration should be given to the interest rate environment considerations, evaluation of other funding sources, type of debt obligations to be issued and the nature and useful life of the capital improvement to be financed. The policy also restricts the use of derivative instruments to only hedge debt transactions and only when it provides significant savings or mitigates interest rate risk.

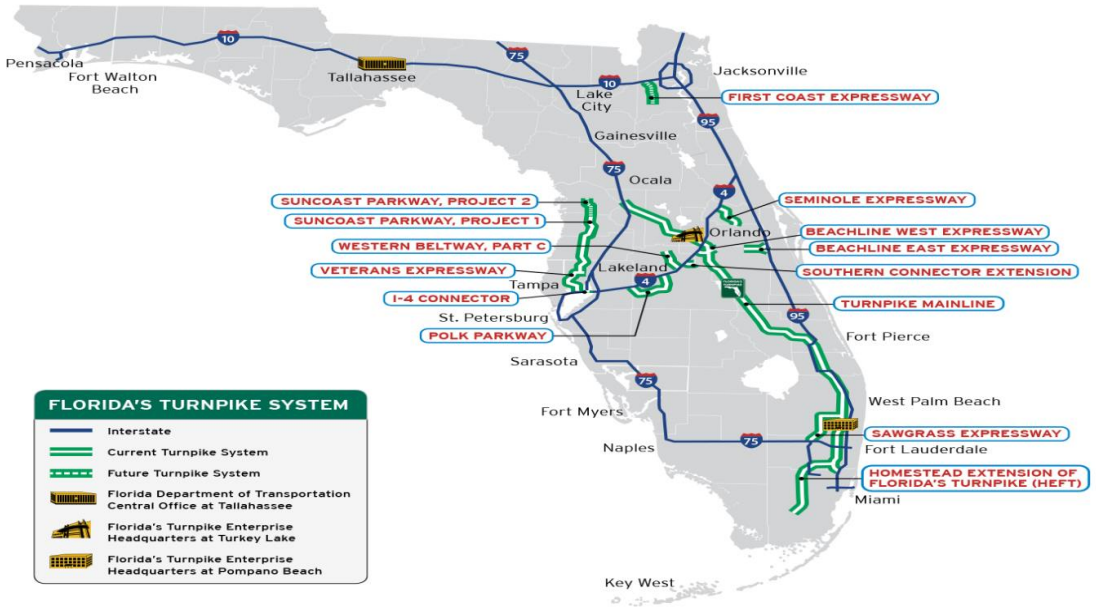
4.2.2 Florida Turnpike Enterprises

The Florida Turnpike Enterprise is part of the Florida Department of Transportation (DOT). The enterprise was created by Chapter 2002-20 of the laws of Florida by authorizing that the States' Office of Toll Operations be folded into the

Enterprise. The act created the Enterprise as an entity, tasked with the mission to meet the transportation needs of the state and manage the Turnpike in a ‘ business-like manner.’

The Florida Turnpike Enterprise manages a 431 mile toll road network that spans the length and breadth of the State of Florida as shown in Figure 6 below. The toll network includes several components, the 320 mile Turnpike Mainline (accounts for approximately 70% of total revenues) stretches from north to south with an east to west segment.

Figure 6: Florida Turnpike Enterprises - Service Area



Source: Florida Turnpike Enterprises

As noted earlier, the Enterprise is a separate business unit of the Florida DOT reporting directly to the governor. The Enterprise is managed by an executive director, who reports to the Secretary of the Florida DOT. The Secretary of the Florida DOT is appointed by the Governor, reports to the governor and subject to Senate confirmation. Furthermore, additional oversight is provided indirectly by a citizen’s oversight body (the

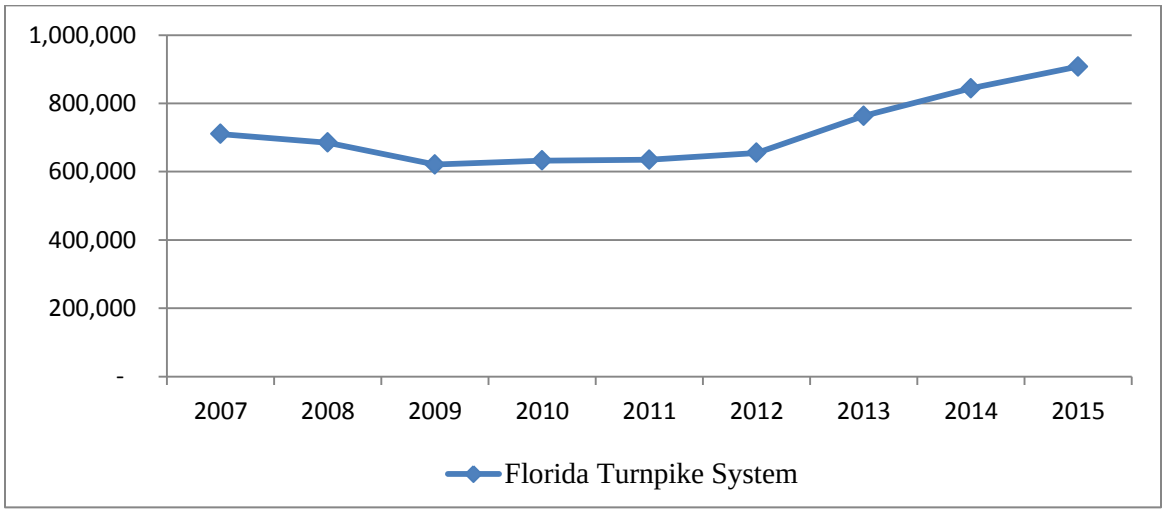
Florida Transportation Commission). The Commission consists of nine members appointed by the Governor.

4.2.2.1 Business Profile

The Florida Turnpike Enterprise serves 61% of the states' over 20 million population. In fiscal year 2015, the Enterprise processed approximately 770 million transactions generating almost $866 million in toll revenues. The Enterprise also has considerable flexibility to increase toll rates to maintain operations and also service the debt of the enterprise. Annual CPI rate increases have been implemented annually since 2012.

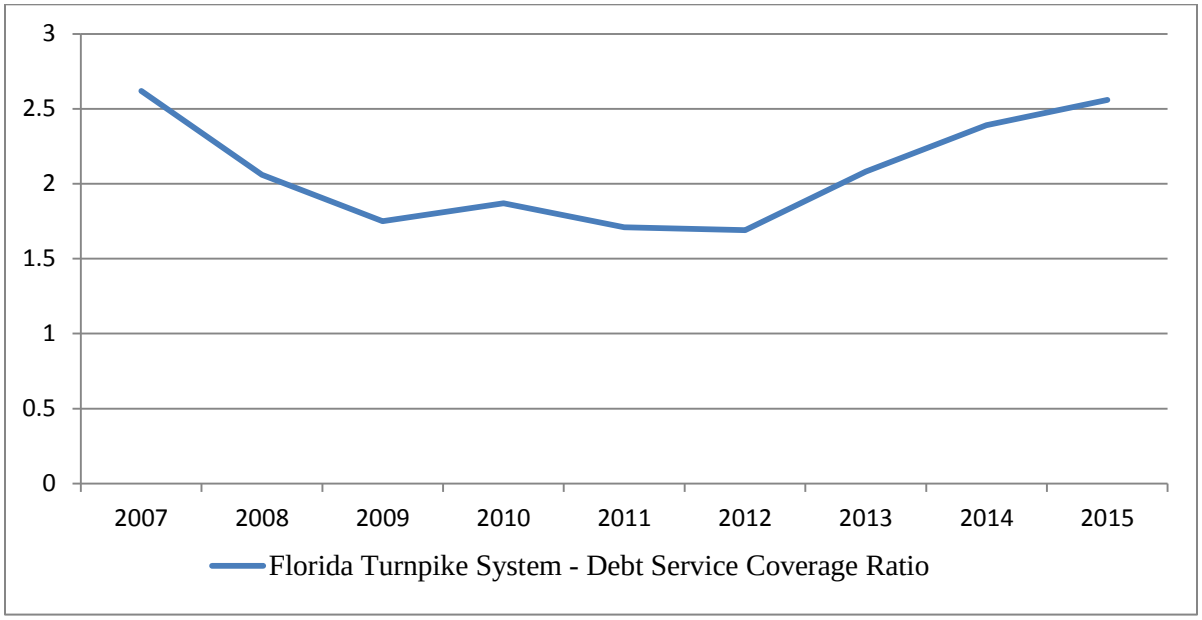
Figure 7 below shows that the total revenues of the Enterprise has been steadily growing since the declines experienced as a result of the impact of the great recession on the economy of Florida.

Figure 7: Florida Turnpike Enterprises - Total Revenues



As a measure of financial performance, Figure 8 below shows the debt service coverage ratio of the Florida Turnpike Enterprises.

Figure 8: Florida Turnpike Enterprises – Debt Service Coverage

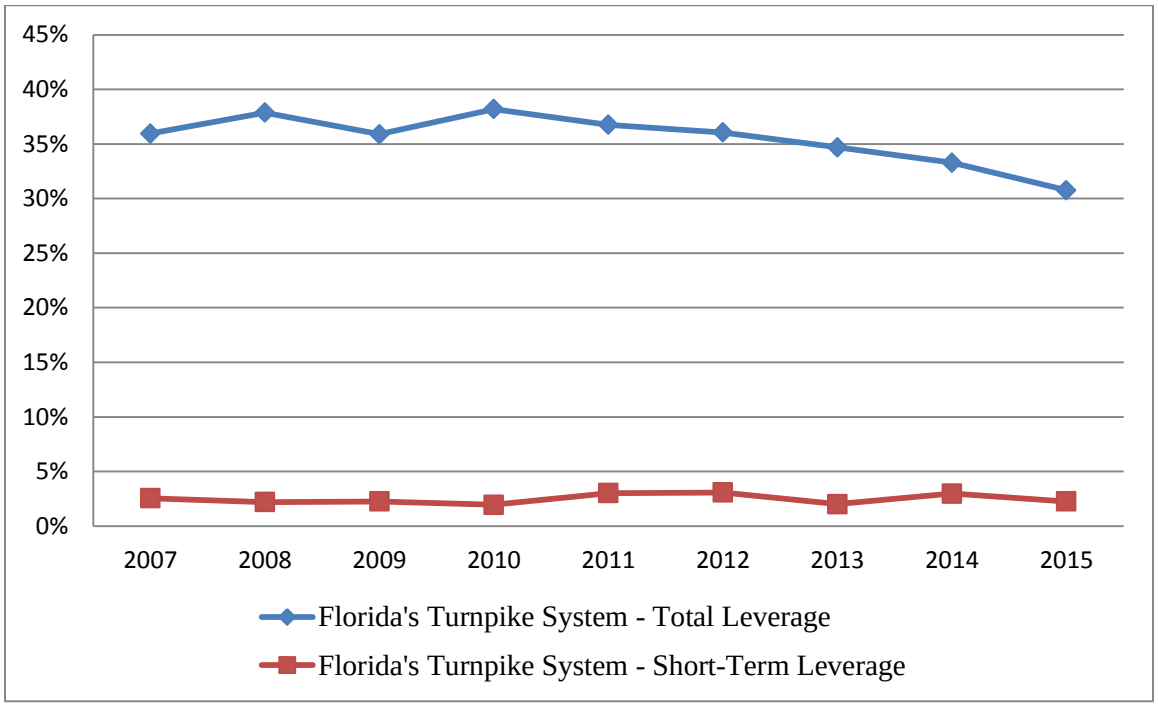


The chart above shows debt service coverage of 2.5 in 2007, declining to an average of 1.6 between 2009 and 2012 as a result of revenue declines attributed to the great recession. Since 2012, debt service coverage steadily increased to 2.5 in 2015 as revenues recovered.

4.2.2.2 Capital structure patterns and trends of the enterprise

Florida Turnpike's reliance on leverage is low. As Figure 9 below shows, total leverage has historically been below 40% since 2007 and gradually trended down to 30% in 2015. Figure 9 also show very minimal use of short-term leverage as short term leverage ratio was between 2% and 3% for the 2007 to 2015 fiscal years.

Figure 9: Florida Turnpike Enterprises – Short-Term and Total Leverage



4.2.2.3 Capital Structure Policy

Florida Turnpike's capital structure policy is titled 'Debt Management Guidelines for the Turnpike System.' The policy provides a framework to guide the debt management and credit quality decisions of management. The policy establishes a $10 billion dollar limit on debt issuance and mandates that debt proceeds are only used to fund capital expenditures with useful lives less than the term of the bond. It explicitly prohibits the use of debt to fund operations.

The policy also requires the turnpike to maintain annual debt service coverage of at least 1.5 times net revenues or 2.0 times gross revenues. Finally, the policy expressed intent to maintain high credit ratings and requires that necessary relevant information should be provided to credit rating agencies.

4.2.3 Los Angeles World Airports

Los Angeles World Airports (LAWA) was established by Article 24, Section 238 of the City of Los Angeles Charter as an independent, self-supporting department of the City of Los Angeles. The Charter authorized LAWA to acquire, develop and operate all air travel related property, plant and equipment, levy rates and charges for its operations and borrow to finance the development of the airport.

LAWA owns and operates Los Angeles International Airport (LAX), Van Nuys Airport (VNY) and LA/Ontario International Airport (ONT). However, LAWA derives an overwhelming majority (97%) of its revenues from LAX, which is the third busiest airport in the United States, serving more than 72 million passengers in fiscal year 2015. ONT is a medium-hub airport serving approximately 4 million passengers annually and VNY is a general aviation airport with approximately two hundred and twenty thousand takeoffs and landings.

LAWA is governed by a seven-member Board appointed by the Mayor of Los-Angeles and subject to confirmation by the City Council.

4.2.3.1 Business Profile

As already noted, LAWA is an independent self-supporting owner and operator of three airports. As a result, LAWA is solely funded with fees and revenues generated by the airports. These include landing fees assessed to airlines, terminal rental fees assessed to airlines, building rental fees assessed to airlines and concession revenues assessed to food vendor lessors, duty free shops, parking and car rental companies.

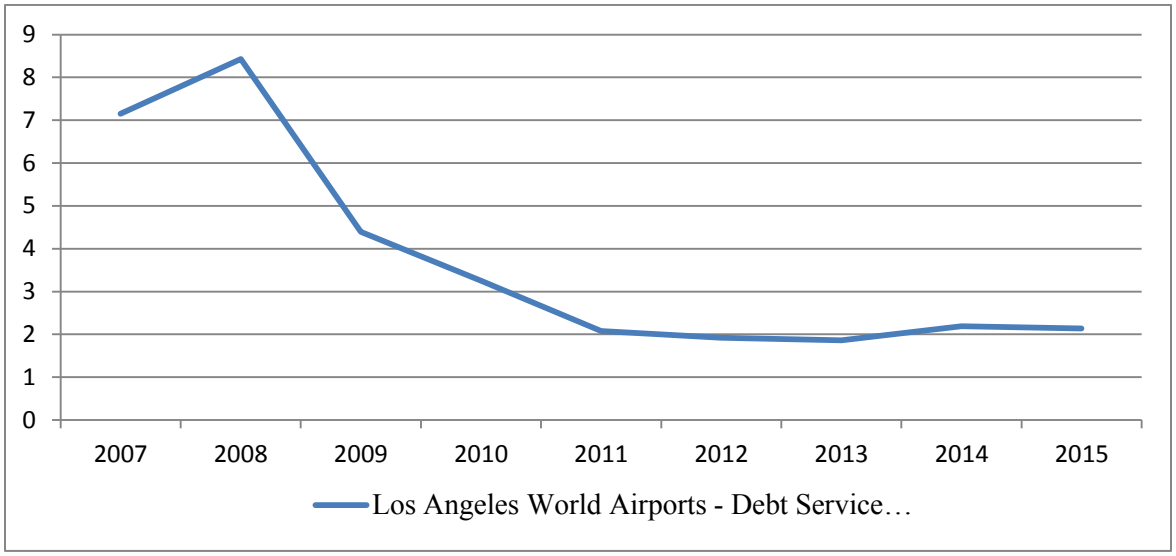
LAWA's price setting framework involves long term agreements with airports and concessionaires based largely on a full recovery of operations and maintenance cost, debt service and capital improvement expenditures over multiple years.

As Figure 10 shows total revenues have increased steadily (cumulative growth of 57%) since 2007, primarily due to an increase in passenger growth and concession revenues.

Figure 10: LAWA - Total Revenues

As a measure of financial performance, Figure 11 below shows the debt service coverage ratio of the LAWA.

Figure 11: LAWA– Debt Service Coverage

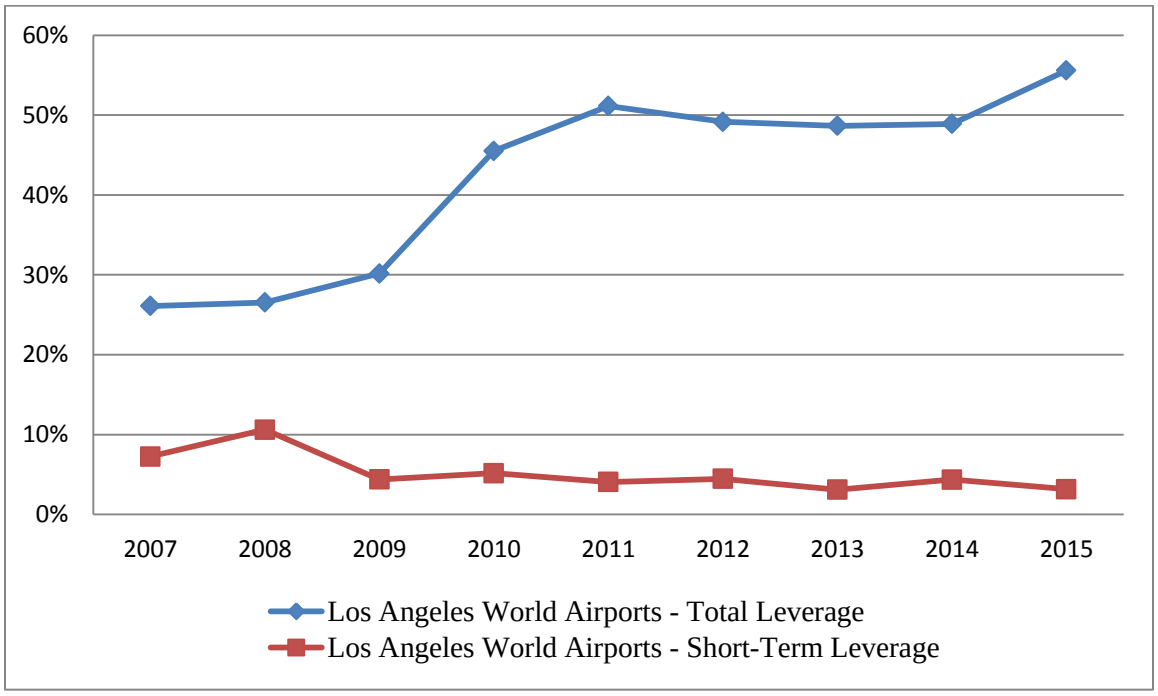


LAWA's debt service coverage ratio peaked at 8.4 in 2008, but significantly declined to 2 in 2011. The rapid decline in debt service coverage is primarily due to a major capital expansion funded with debt noted in Section 4.2.3.2 below.

4.2.3.2 Capital structure patterns and trends of the enterprise

As Figure 12 below shows, LAWA's capital structure has significantly changed over the last 10 years. Total leverage was approximately 30% in 2009. However, between 2009 and 2011, LAWA' total leverage ratio increased sharply to 50%. The leverage ratio stayed relatively stable from 2011 to 2014 before increasing to 56% in 2015. Figure 12 also show very minimal use of short-term leverage as short-term leverage ratio was between 3% and 5% for the 2009 to 2015 fiscal years. Prior to 2009, short-term leverage peaked at 10% in 2008. As the chart shows, the decline in short term leverage coincides with the sharp increase in total leverage.

Figure 12: LAWA - Total Leverage and Short Term Leverage



The sharp increase in leverage between fiscal year 2009 to 2011 was primarily due to a $5.6 billion capital Improvement embarked upon in 2009. Approximately 60% of this capital expenditure was financed with long term bonds. Capital improvements included the construction of nine new gates, interior improvements, the creation of almost one million square feet of terminal and concourse space and the construction of secure walkways between terminals.

4.2.3.3 Capital Structure Policy

LAWA's capital structure policy is embedded in its 'Debt Issuance & Management Policy and Debt Guidelines & Procedures Handbook.' The Handbook spells out the guidelines governing the issuance and management of debt and financial management practices in capital planning.

The policy sets explicit debt affordability metrics. For example, debt service coverage for senior lien bonds must be equal to or greater than 1.25 and 1.15 for subordinate liens. Furthermore, the policy requires that the maturity of any bonds being issued should not exceed the economic life of the project being financed. The policy also spells out various policies guiding the use of variable rate debt including a general interest rate cap of 12% and a guideline which says that variable interest rate debt cannot exceed 20-25% of the debt structure. The policy also restricts the use of interest rate derivatives only to a few specific circumstances like hedging.

4.2.4 Silicon Valley Power

Silicon Valley Power (SVP), formerly known as City of Santa Clara Electric Department, was established in 1896 by the Santa Clara Board of Town Trustees. In 1998, the city changed the name of the enterprise to Silicon Valley Power to reflect the vital role the company played in the technological revolution ushered in by Silicon Valley (home to some of the world's largest companies including Facebook, Google and Apple).

Since 1896, SVP has been providing retail electric services to all residents and business within the city limits of Santa Clara as shown in Figure 13 below. At the end of 2015, SVP served an estimated 53,000 customers per month, located in a 19 square mile area of Santa Clara.

SVP is governed by an elected seven-member City Council. The City Council appoints the Director and other top management employees of SVP and the Director reports to the City Manager.

Figure 13: Silicon Valley Power - Service Area

Source: Worldatlas

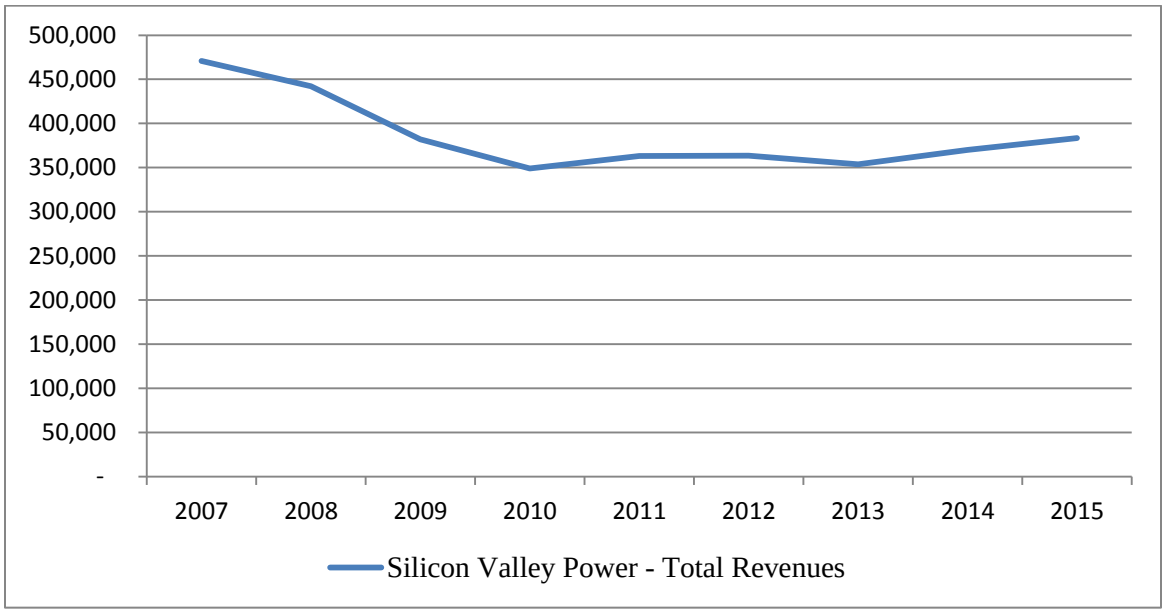
4.2.4.1 Business Profile

While not independent of the City of Santa Clara, SVP supports its operations and life cycle costs from electric charges to its customers. Approximately 90 percent of total revenues are derived from large industrial and commercial customers (mostly technology companies).

The City Council is responsible for the establishment of rates and charges without any restrictions or regulatory oversight.

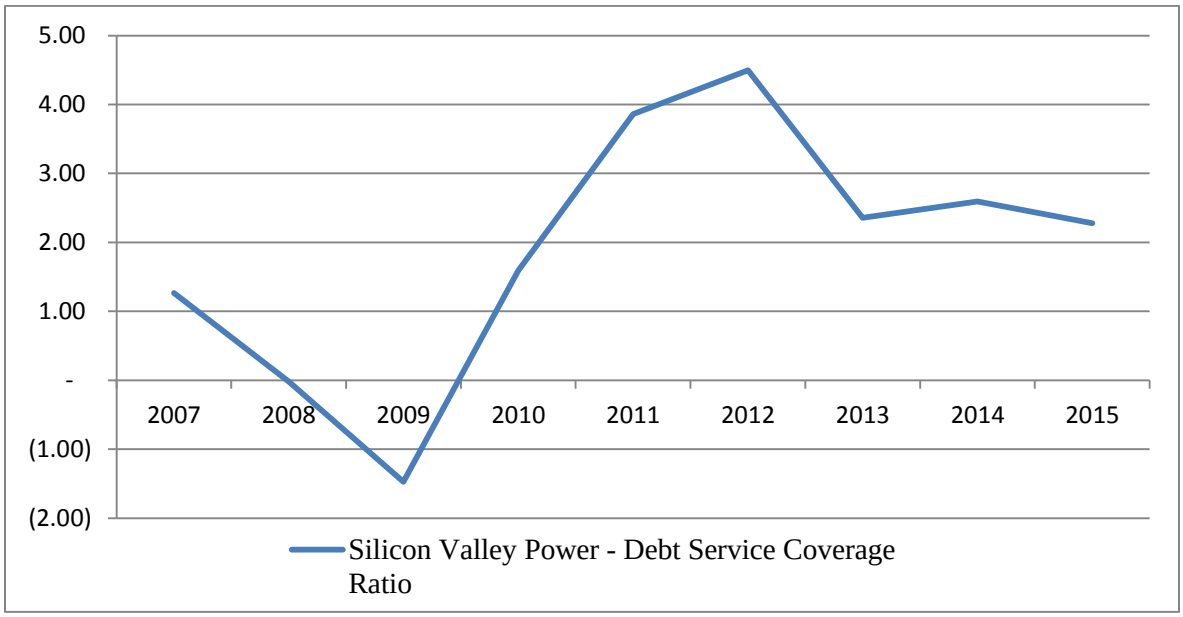
As Figure 14 below shows, total revenues have been relatively flat (cumulative growth of 10%) since 2010. Between 2007 and 2010 total revenues declined by 25% due to the economic impact of the Great Recession. Silicon Valley Power was relatively more vulnerable to the economic decline as a result of the concentration of its customer base in large industrial and commercial customers.

Figure 14: Silicon Valley Power- Total Revenues



As a measure of financial performance, Figure 15 shows the debt service coverage ratio of SVP.

Figure 15: Silicon Valley Power – Debt Service Coverage



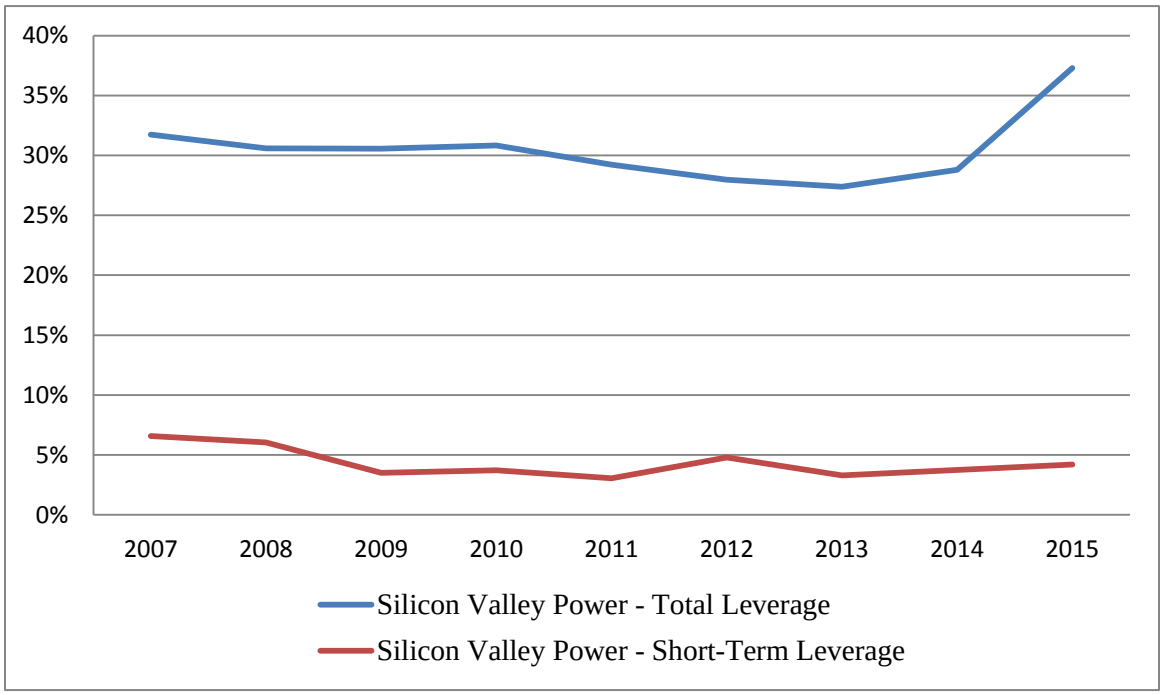
SVP's debt service coverage ratio was below 1 in 2008 and 2009 as a result of the revenue shock due to the impact of the Great recession. During this time SVP relied on

its Cost Reduction Fund to service debt. However, since 2010 debt service coverage has been above 2.

4.2.4.2 Capital structure patterns and trends of the enterprise

As Figure 16 shows, SVP's reliance on leverage is low. Total Leverage stayed relatively stable, ranging from 32% to 27% from 2007 to 2014, before increasing to 37% in 2015. Figure 16 also show very minimal use of short-term leverage as short-term leverage ratio was between 3% and 7% for the 2007 to 2015 fiscal years.

Figure 16: Silicon Valley Power – Short-Term and Total Leverage



4.2.4.3 Capital Structure Policy

Silicon Valley does not have a formal capital structure policy.

4.2.5 Orange County Water and Sewer Authority

Orange County Water and Sewer Authority (OWASA) was established in 1976 under the North Carolina Water and Sewer Authorities Act, Article 1 of Chapter 162A of the General Statutes of North Carolina. The Enterprise began operations as OWASA in 1977 upon the sale, purchase and transfer of the water and wastewater utilities of the University of North Carolina at Chapel Hill (UNC), the Town of Chapel Hill, Town of Carrboro and Orange County. OWASA was mandated to consolidate, improve and operate the water and sewer systems in Southern Orange County as shown in Figure 17.

Figure 17: OWASA - Service Area.

Sources: OWASA & Worldatlas

Currently OWASA serves an estimated population of 80,000 mostly in Chapel Hill and approximately 21,000 water and sewer customers. OWASA's largest customer (The University of North Carolina at Chapel Hill) makes up approximately 20% of the total water sales.

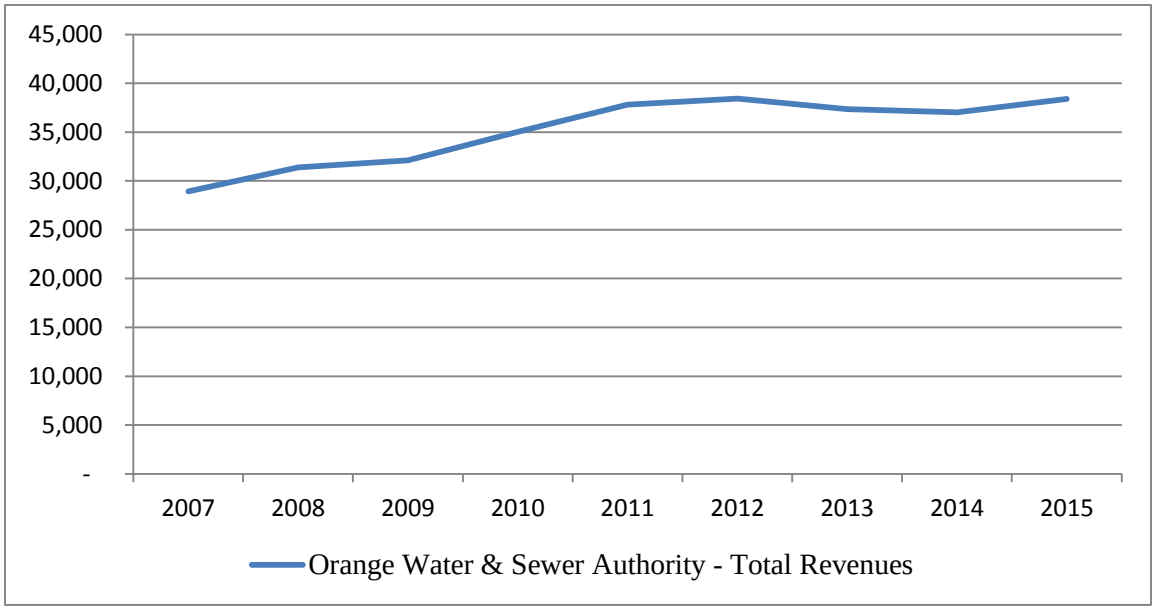
The Authority is governed by a nine member Board of Directors. Five members of the board are appointed by the Chapel Hill Town Council, the Orange County Board of Commissioners appoints two members and the Carrboro Board of Aldermen appoints the remaining two board members. The Board appoints the Executive Director and other senior members of OWASA. In addition, the Board is ultimately responsible for all financial decisions including the approval of budgets, issuance of debt, setting water and sewer rates and fees.

4.2.5.1 Business Profile

OWASA was established by law as a self-supporting provider of retail water and sewer services to its service area. Hence, OWASA is mandated to set rates based on cost of service. As a result, OWASA is primarily funded (approximately 99%) with charges and fees assessed on the households and businesses in the area.

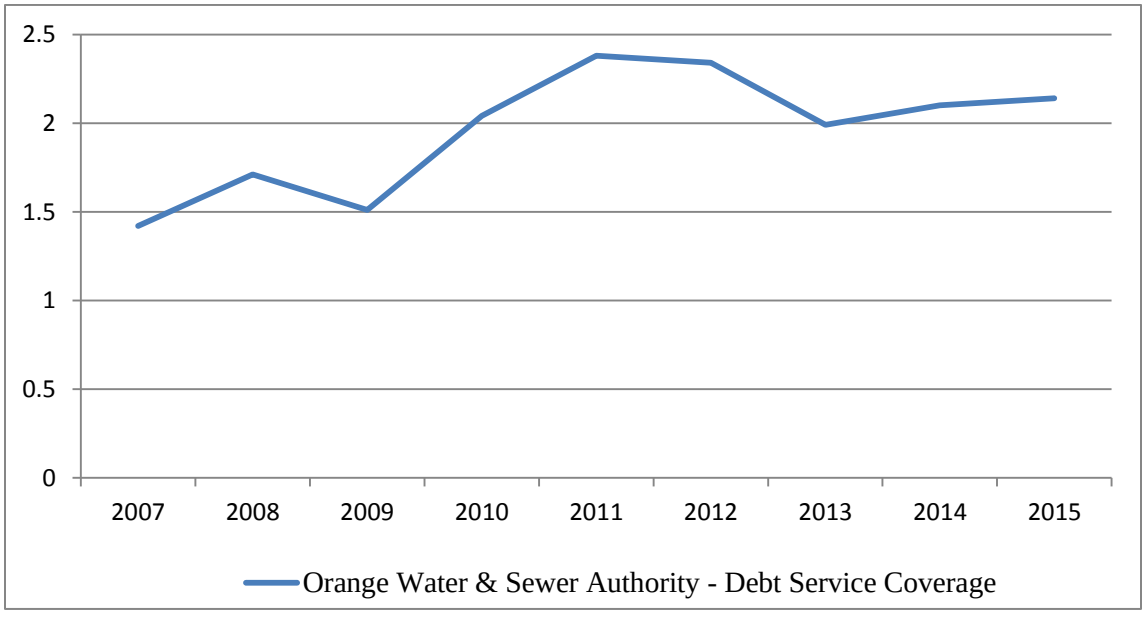
OWASA's rate setting authority is solely exercised by the Board of Directors independent of any restriction, regulatory oversight or interference of the executive or legislature. As Figure 18 shows, total revenues of OWASA have steadily grown from approximately $29 million in 2007 to $39 million in 2015, a cumulative growth of about 33%, primarily due to rate increases.

Figure 18: OWASA - Total Revenues



As a measure of financial performance, Figure 19 shows the debt service coverage ratio of the OWASA.

Figure 19: OWASA – Debt Service Coverage

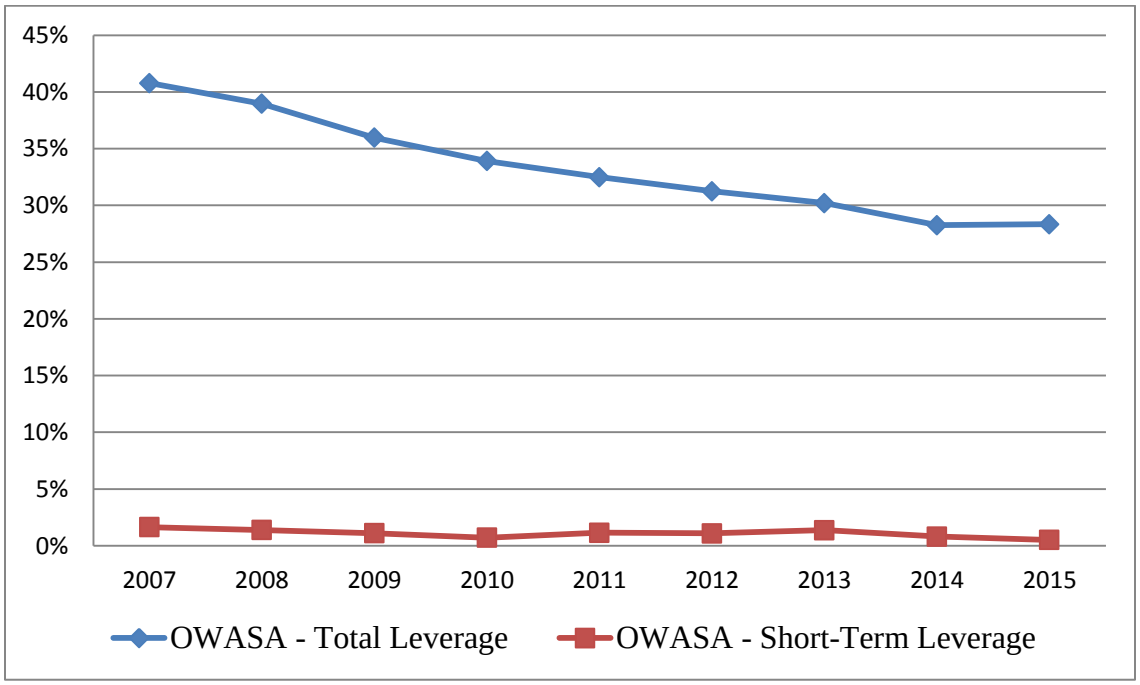


OWASA's debt service coverage ratio has consistently stayed above 1.5 since 2008 and above 2 since 2010. This demonstrates OWASA's strong financial performance since 2007.

4.2.5.2 Capital structure patterns and trends of the enterprise

OWASA's reliance on leverage is low. As Figure 20 below shows, total leverage steadily declined from 41% in 2007 to 28% in 2015. Figure 20 also show very minimal use of short-term leverage as short term leverage ratio was between 0.5% and 1.6% for the 2007 to 2015 fiscal years.

Figure 20: OWASA - Short-Term and Total Leverage



OWASA's ample plant and operational capacity, as noted by management, is expected to be sufficient for the next 30 years. Hence, this is expected to limit capital needs and the use of debt in the near future. As a result, leverage is expected to trend down even more coupled with an aggressive repayment schedule of existing debt.

4.2.5.3 Capital Structure Policy

OWASA's capital structure policy is embedded in its Financial Management Policy. The policy provides a framework for strategic financial planning decisions.

Specifically, the capital structure guidance is addressed in Section D. Debt Management Policies. This section prescribes a minimum annual debt service coverage ratio of 2.0; the policy allows the debt service coverage to be no less than 1.5 in the event of unforeseen adverse circumstances like droughts. In addition, debt service as a percentage of revenue cannot exceed 35% of revenues. The policy also dictates that the debt burden, measured as outstanding debt as a percentage of total fixed assets cannot exceed 50%.

Furthermore, the policy requires that debt can only be issued to finance capital assets and the debt issuance must be structured such that the repayment period is equal to or shorter than the expected useful life of the assets that is financed. Finally, the policy specifies that OWASA maintains Credit Ratings of at least AA+ from Fitch and Standard & Poor's and Aa2 from Moody's.

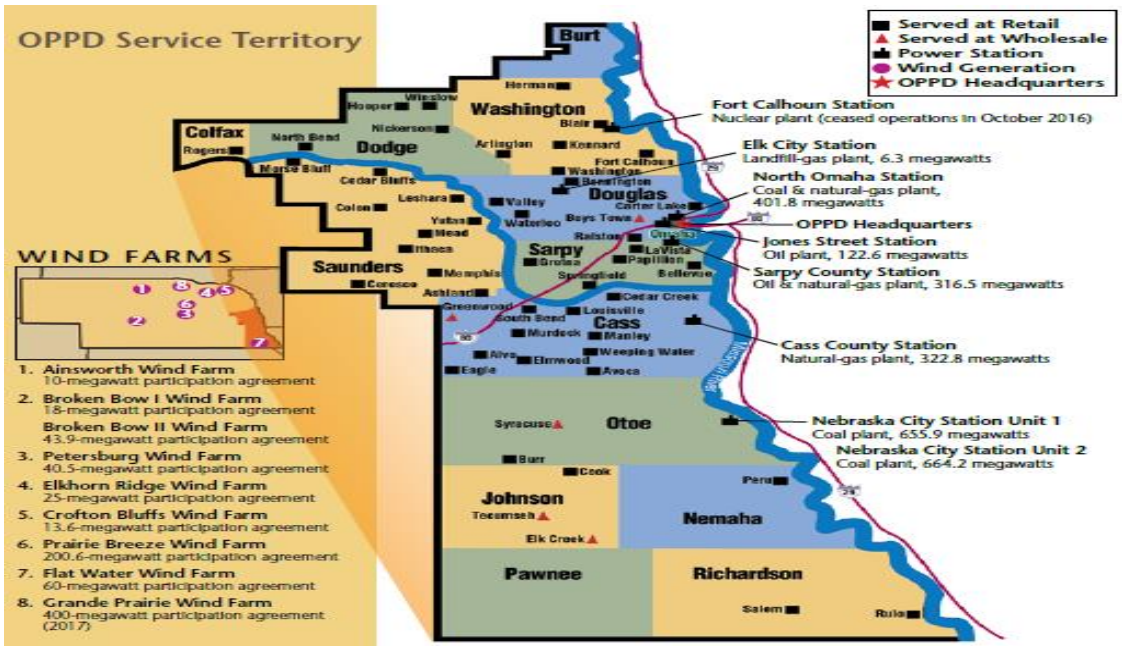
4.2.6 Omaha Public Power District (OPPD)

Omaha Public Power District was established in 1945 by the state legislature, under the authority of the Enabling Act, as a public corporation and a political subdivision of the state of Nebraska. The law mandated that OPPD generate, transmit and distribute electric power energy within its service area.

The State of Nebraska is the only State served solely by not-for-profit power enterprises. OPPD is the largest power enterprise in the state and the 12th largest in the country, based on customers served. OPPD serves a population of approximately 800,000 primarily in the South-Eastern part of the State of Nebraska. The service area

includes the City of Omaha with an estimated population of about 450,000. As Figure 21 shows OPPD provides retail and wholesale electric services to 13 counties (52 cities, villages and municipalities) in the State. This includes an estimated 360,000 in residential, commercial and industrial customers.

Figure 21: OPPD - Service Area



Source: OPPD

OPPD is governed by an eight member Board of Directors elected by the people within the 8 electoral subdivisions in the service area. The Board of Directors has oversight over the Chief Executive Officer of the Enterprise. OPPD has no power of taxation; hence all revenues needed to support the District are derived from rate, charges and fees assessed to its customers.

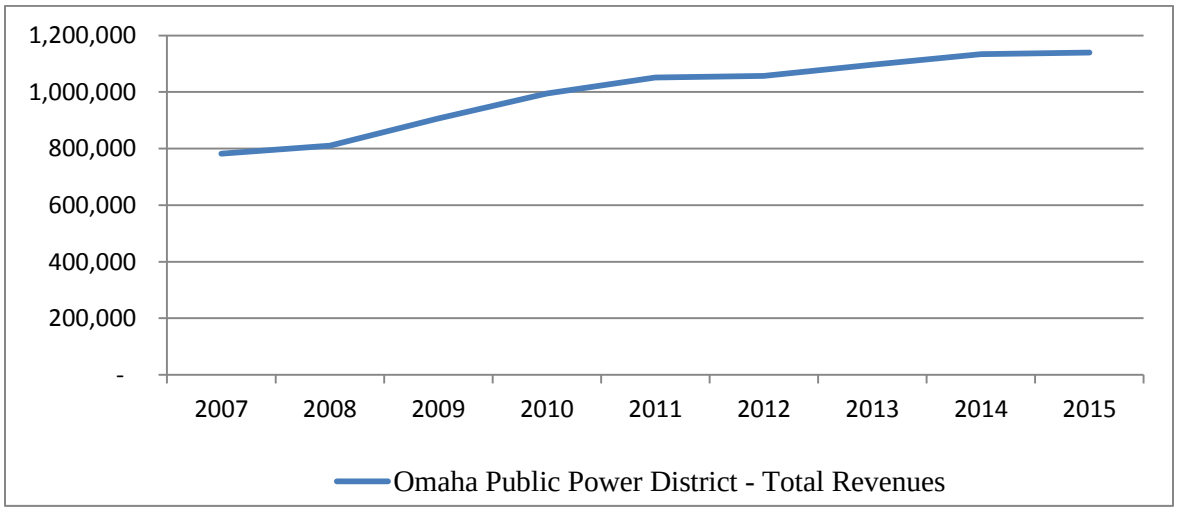
4.2.6.1 Business Profile

As noted above, OPPD was established by law as a self-supporting provider of retail and wholesale electric services. As a result, OPPD is funded with charges and fees assessed on the households and businesses in the area.

OPPD's rate setting authority is solely exercised by the Board of Directors independent of any restriction, regulatory oversight or interference of the executive or legislature. The Enabling Act specifies that rates and charges have to be adjusted in an equitable manner.

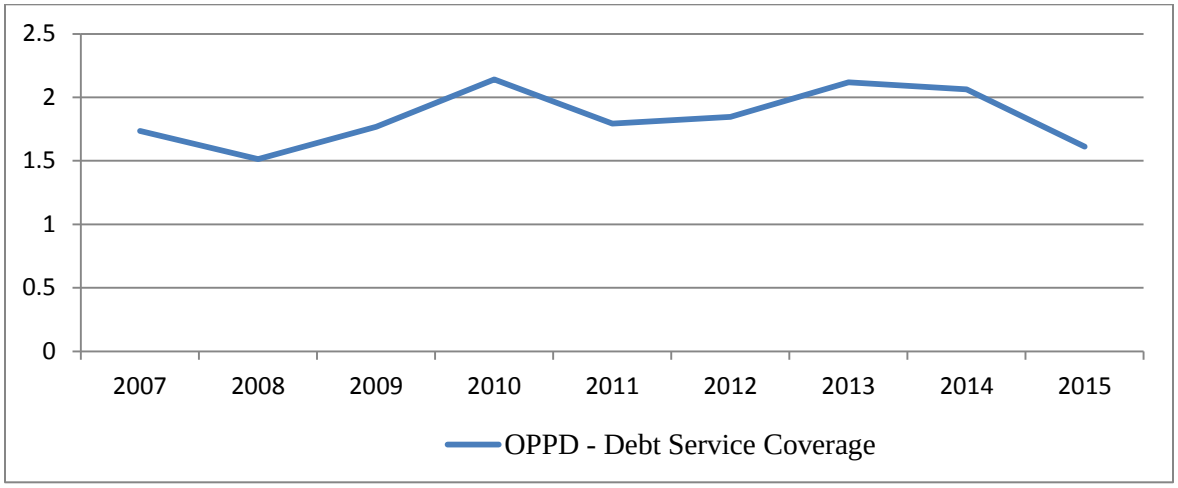
Figure 22 below shows, total revenues of OPPD have steadily increased from approximately $800 million in 2007 to $1.1 billion in 2015, a cumulative growth of approximately 46%. This steady growth in revenues is primarily due to rate adjustments.

Figure 22: OPPD - Total Revenues



As a measure of financial performance, Figure 23 below shows the debt service coverage ratio of the OPPD.

Figure 23: OPPD – Debt Service Coverage

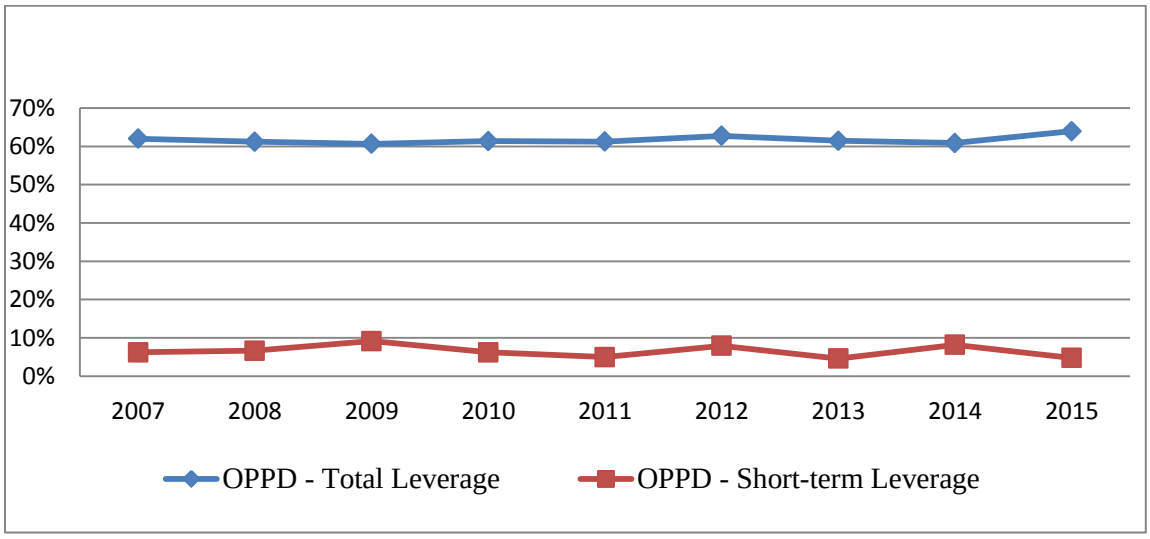


OPPD's debt service coverage ratio has consistently stayed above 1.5 since 2008. This demonstrates OPPD's strong financial performance since 2007.

4.2.6.2 Capital structure patterns and trends of the enterprise

OPPD's reliance on leverage is high. As Figure 24 below shows, total leverage has been fairly stable between 61% and 64% between fiscal year 2007 to 2015. Figure 24 also show a low use of short-term leverage as short term leverage ratio was between 5% and 9% for the 2007 to 2015 fiscal years.

Figure 24: OPPD – Short-Term and Total Leverage



4.2.6.3 Capital Structure Policy

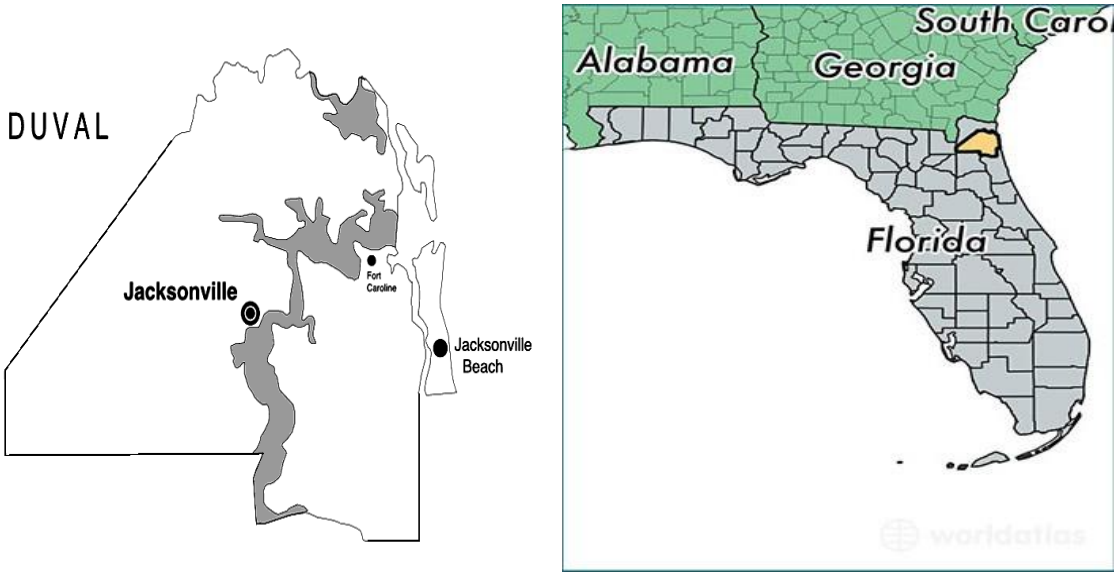
OPPD's capital structure policy is one of the Strategic Directive Policies in the Board Governance Policy document. Section SD-3 titled 'Access to Credit Markets' spells out the directives related to capital structure. The policy requires a minimum Total Debt Service Coverage Ratio of 2.0 times. In addition the policy specifies a credit rating goal of 'AA'.

4.2.7 JEA

JEA, formerly known as Jacksonville Electric Authority, was established in 1968 as an independent agency of the City of Jacksonville, Florida with a mandate to own, operate and manage a city electric utility in existence since 1895. In 1997, the Jacksonville's legislative council transferred the City's Water & Sewer Utility to JEA, effectively making JEA a combined electric, water and sewer utility.

Going by customer's served; JEA is one of the municipally owned electric utility in the United States (8^{th} Largest). In FY 2015, JEA's served approximately 443,705 electric customers and 476,000 water and sewer customers primarily covering the City of Jacksonville as shown in Figure 25 below.

Figure 25: JEA - Service Area



Sources: Worldatlas and University of South Florida

JEA is an independent agency of the City of Jacksonville governed by a seven member Board appointed by the Mayor of Jacksonville and subject to confirmation by the City Council to four year staggered terms. The Board is responsible for strategy, policy and the determination of rates.

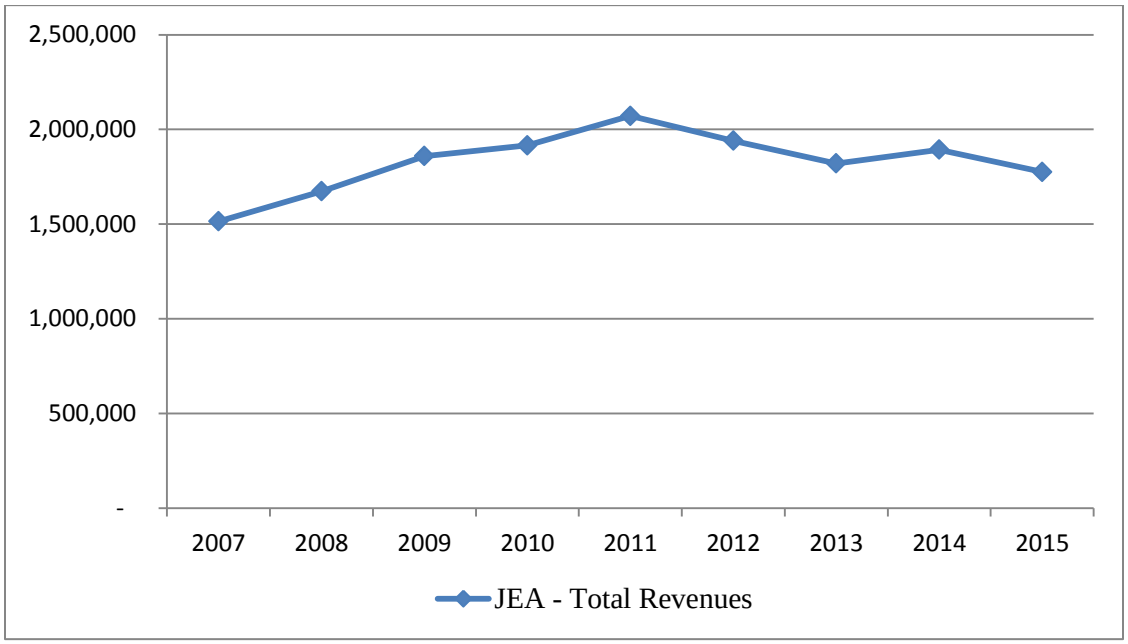
4.2.7.1 Business Profile

JEA is a self-supporting provider of electricity and water primarily to the City of Jacksonville. JEA is primarily funded with charges assessed on its customers. JEA's rate setting authority is solely exercised by the Board of Directors, independent of any restriction or interference of the executive or legislature. Hence, JEA is statutorily required to set charges at levels sufficient enough to cover operations and debt service.

As Figure 26 below shows, total revenues steadily increased from $1.5 billion in 2007 to $2.07 billion in 2011. However, total revenues have been on a downward trend

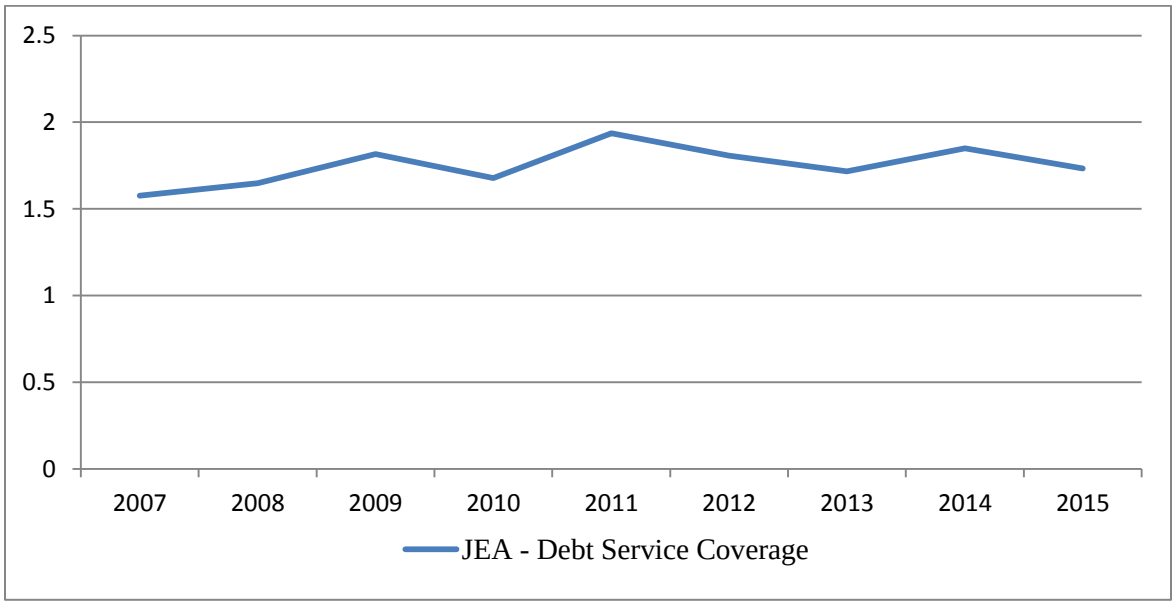
since 2011. This is primarily due to decreases in unit sales due to mild conditions and reductions in the variable fuel rate due to lower than expected fuel costs.

Figure 26: JEA - Total Revenues



As a measure of financial performance, Figure 27 below shows, the debt service coverage ratio of the JEA.

Figure 27: JEA – Debt Service Coverage

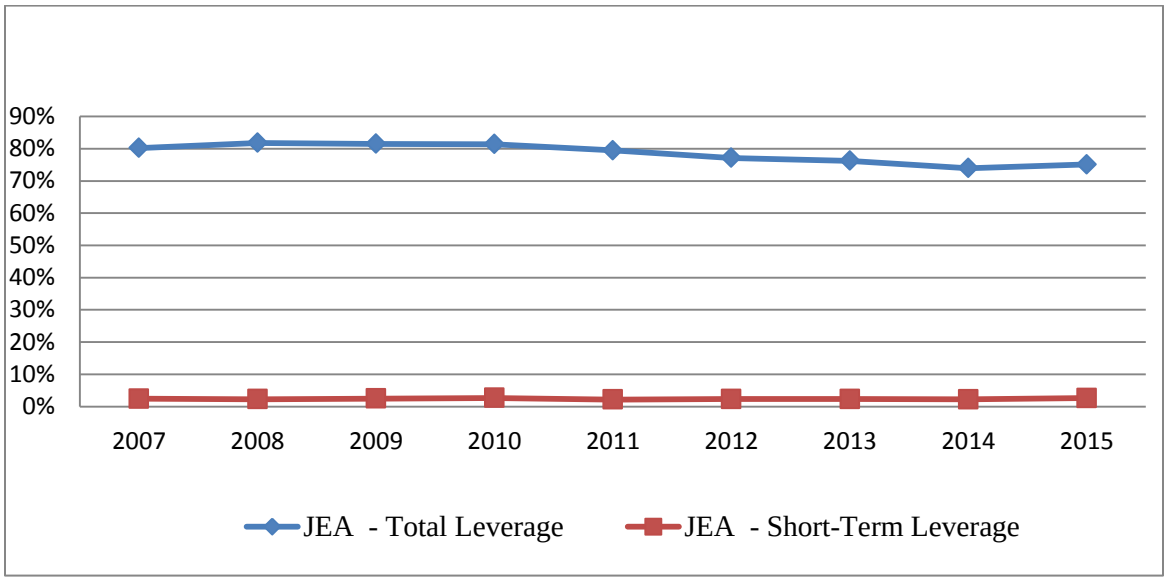


JEA's debt service coverage ratio has consistently stayed above 1.5 since 2008. This demonstrates JEA's strong and steady financial performance since 2007.

4.2.7.2 Capital structure patterns and trends of the enterprise

JEA's reliance on leverage is high. As Figure 28 shows, total leverage has been historically high, averaging 79% to 80% between 2007 and 2011 and slightly declining to 75% in 2015. Figure 28 also show very minimal use of short-term leverage as short term leverage ratio was between 2% and 3% for the 2007 to 2015 fiscal years.

Figure 28: JEA – Short-Term and Total Leverage



JEA's leverage has been historically high due to the Enterprise's reliance on debt to fund capital expenditures, however the declining total leverage reflects JEA' strategy to aggressively pay down debt and rely more on internal liquidity to fund capital expenditures.

4.2.7.3 Capital Structure Policy

JEA's capital structure policy is embedded in its 'Debt Management Policy' document. The policy provides broad policies to guide the management and control of debt. The policy states an overall philosophy of taking a long term approach to borrowing at low cost.

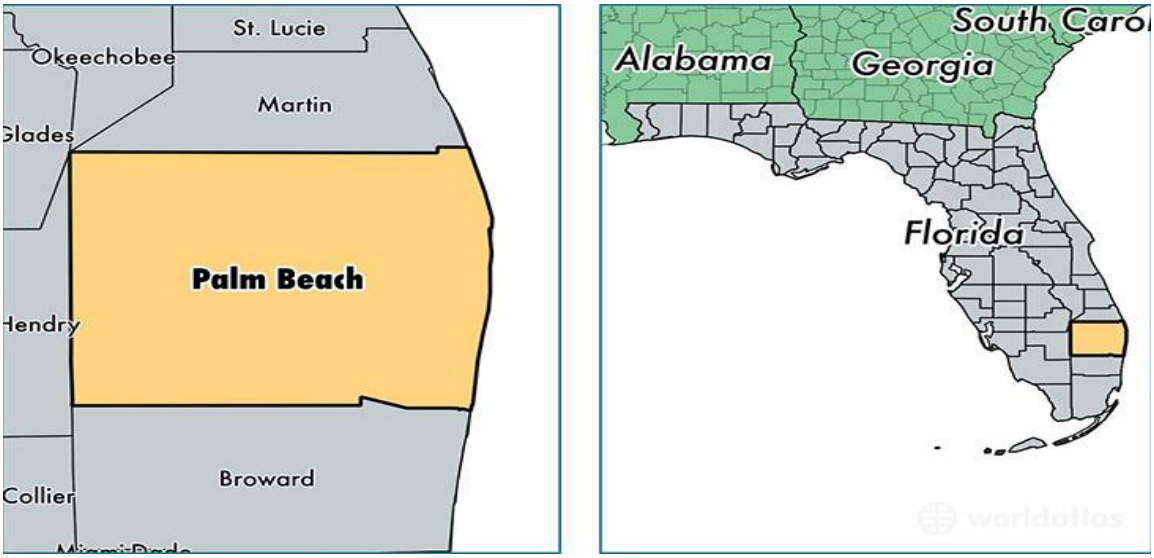
The policy explicitly targets a 'AA' category credit rating and requires proper matching between the life of the asset being financed and the maturity of the debt used to finance the asset. In addition, the policy mandates that net variable rate exposure (debt and derivatives) not exceed 55% of total debt. The policy does not specify a minimum debt service coverage ratio, but encourages a desired debt service coverage ratio consistent with a highly rated electric, water and sewer utility.

4.2.8 Palm Beach County Water Department

Palm Beach County Water Utilities Department (PBCWUD) was established by the Palm Beach County Water and Sewer Act, passed by the Florida legislature in 1967 (Laws of Florida Chapter 67-1880). PBCWUD was mandated to acquire and operate a water and sewer system within Palm Beach County with exclusive control and jurisdiction. PBCWUD is self-supporting, it relies on user assessment and charges to operate and also maintain its facilities.

Currently PBCWUD serves approximately 580,000 residents primarily Palm Beach County as shown in Figure 29.

Figure 29: PBCWUD - Service Area



Source: Worldatlas

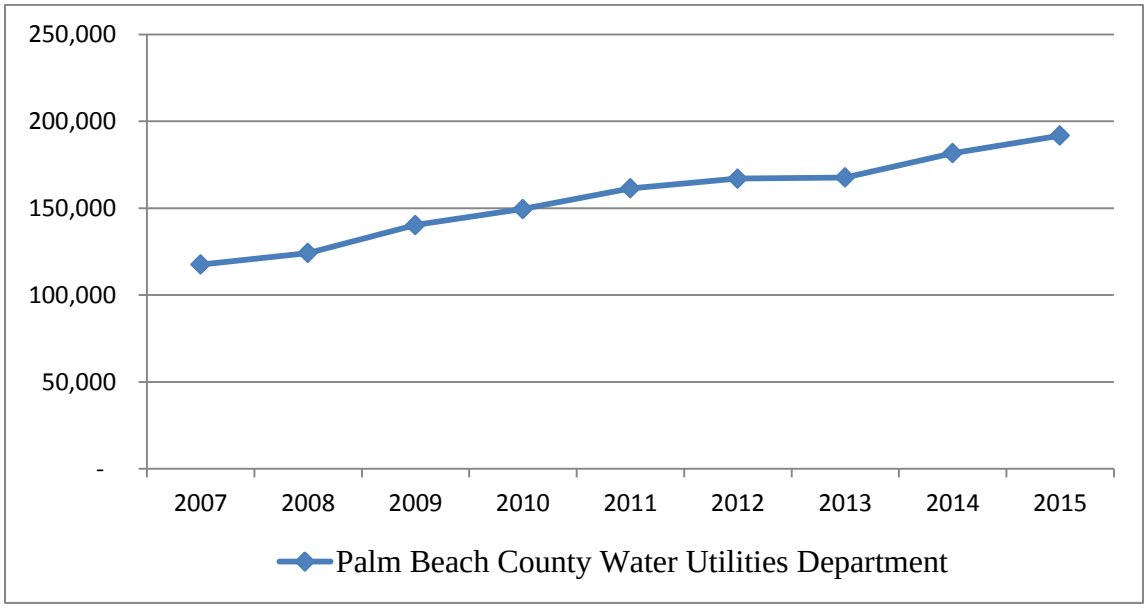
PBCWUD operates as an enterprise unit of the Palm Beach County Board of County Commissioners (BCC) – a seven member legislative and governing council of the County. Hence, PBCWUD reports primarily to the County Administration. In addition, an eleven-member Citizen's Advisory Board provides advice on rate-making and policy issues.

4.2.8.1 Business Profile

Although PBCWUD is governed by the County administration, the Palm Beach County Water and Sewer Act requires the enterprise to be self-supportive funded by charges to its customers. The law specifically mandates that rates must be set to sufficiently cover operations, maintenance and debt service. Furthermore, the law also states that rate setting authority must be independent of political or state interference.

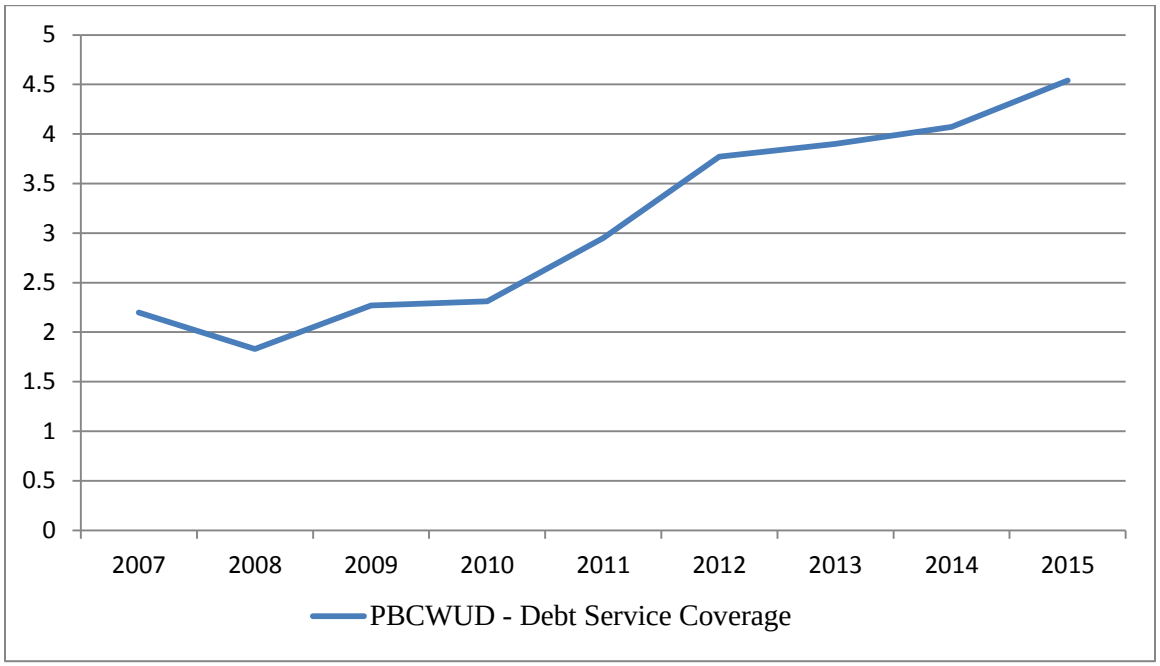
As Figure 30 below shows total revenues have increased steadily (cumulative growth of 68%) since 2007, primarily due to annual increases in rates and customer base.

Figure 30: PBCWUD - Total Revenues



As a measure of financial performance, Figure 31 below shows the debt service coverage ratio of the PBCWUD.

Figure 31: PBCWUD – Debt Service Coverage

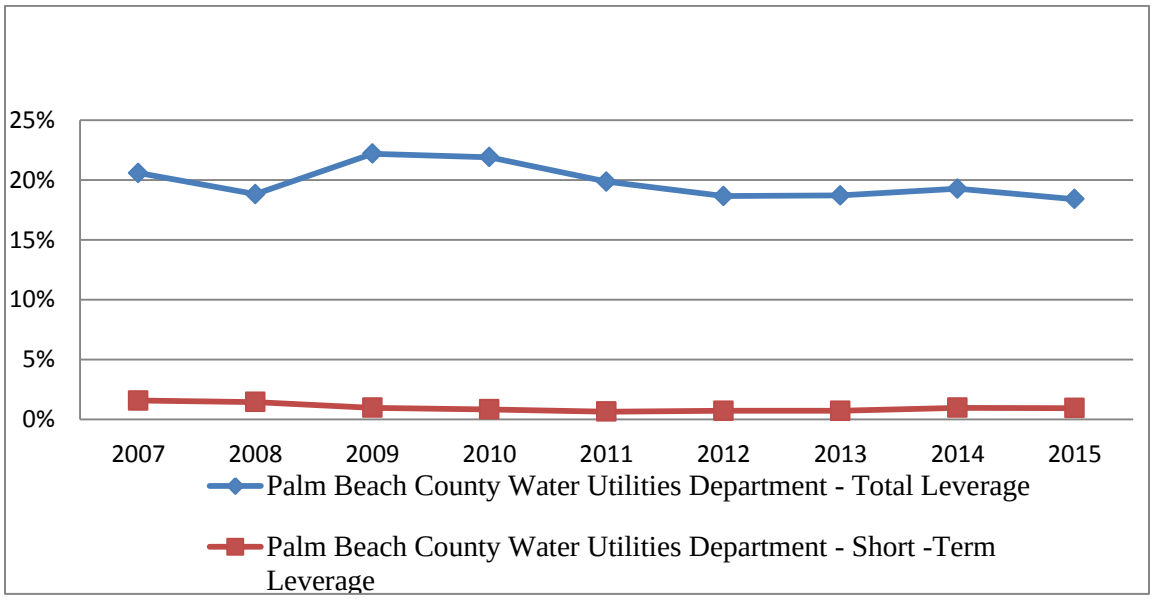


PBCWUD's debt service coverage ratio has significantly increased from approximately 2 in 2007 and 2008, to 3.8 in 2012 and 4.5 in 2015. This demonstrates JEA's strong and steady financial performance since 2007. This trend also reflects PBCUWD's very conservative capital structure policy to primarily use internally generated cash flow to fund capital expansions.

4.2.8.2 Capital structure patterns and trends of the enterprise

PBCWUD's reliance on leverage is low. As Figure 32 shows total leverage has been historically low, peaking at 22% in 2010 and has since decreased to approximately 18% in 2015. Figure 32 also show very minimal use of short-term leverage as short term leverage ratio was between 1% and 2% for the 2007 to 2015 fiscal years.

Figure 32: PBCWUD – Short-Term and Total Leverage



PBCWUD's has always employed a very conservative capital structure. This is primarily due to its strong generation of strong cash flows which are used to finance capital expenditures.

4.2.8.3 Capital Structure Policy

PBCWUD's capital structure policy follows the 'Debt Management Policy' document for Palm Beach County. The policy establishes a framework for the management of all debt obligations of Palm Beach County.

The policy explicitly states that debt obligations will be issued in a manner to achieve the highest possible credit rating and long-term financial stability. The policy requires that debt can only be used to finance capital expenditures and prohibits the use of debt to finance current operations. In addition, the policy allows the use of variable rate debt under specific circumstances. The policy does not specify a minimum debt service coverage ratio.

4.3 Views from Management – A Synthesis

This section presents the results and conclusions of the interviews conducted with the Chief Financial officers/Treasurers of the eight enterprises described in Section 4.2. The interview protocol is included in Appendix 1. The interviews sought to understand the considerations of financial decision-makers when making capital structure decisions and whether they make decisions according to the main theories of capital structure (pecking order theory or trade off theory). The interviews revealed that the most important factors considered by the key financial managers of nonprofit infrastructural enterprises when choosing the capital structure of the firm are financial flexibility (keeping debt levels and

debt service burdens low in other to be able to react adequately to unforeseen financial and economic changes) and maintaining high credit ratings. There was evidence of mixed support for both the trade-off theory and the pecking order theory. This seems to suggest the need for models that incorporates the pecking order theory and the trade-off theory.

Finally, the results also indicate that when evaluating the choice between long and short term debt, firms consider matching the life of debt with the life of the assets as the most important factor.

This section is divided into 4 sections. Section 4.3.1 presents the factors affecting capital structure decisions in practice. Section 4.3.2 explores the relevance of capital structure decisions in practice. Section 4.3.3 focuses on the impact of firm specific attributes on leverage in practice and Section 4.3.4 explores the factors that affect the decision on whether to use short term debt or long term debt.

4.3.1 Factors Affecting Capital Structure Decisions

Capital structure decisions incorporate several considerations. Table 9 below shows the responses to the question of how the financial managers of infrastructural enterprises choose the appropriate amount of debt. The results show that managers consider the firm's financial flexibility and credit ratings as the most important factors, with an average rating of 3.6. All eight executives noted that the two factors were either very important or important in their choice of the appropriate amount of debt for the firm.

Table 9: How will you say the following factors affect how you choose the appropriate amount of debt for your firm? 0 = Not Important, 4 = Very Important

	A	B	C	D	E	F	G	H	Mean
a. The debt levels of other firms in our industry	4	0	2	2	0	1	2	4	1.9
b. Our credit rating (as assigned by rating agencies)	4	4	3	3	4	4	3	4	3.6
c. The transactions costs and fees for issuing debt	3	1	2	3	2	2	1	3	2.1
d. Financial flexibility	3	3	3	4	4	4	4	4	3.6
e. The potential costs of bankruptcy, near-bankruptcy, or financial distress	2	0	4	0	0	4	4	4	2.3
f. Low interest rates and favorability of market conditions	3	2	3	4	2	4	2	3	2.9
g. The volatility of our earnings and cash flows	3	1	4	3	1	1	3	2	2.3
h. Recent profits (internal funds) are not sufficient to fund our activities	0	0	0	3	0	0	2	3	1.0

The importance of financial flexibility and credit ratings suggests that managers are very mindful of preserving not only the ability to borrow in the future but also the cost of borrowing. The importance of preserving financial flexibility when making capital structure decisions has received little attention in the not-for profit literature. The only mention of this phenomenon is Calabrese's (2011) 'modified pecking order' that "nonprofits do prefer internal financing to external financing, but also prefer to maintain some amount of internal pools of capital (for future growth, as a rainy day fund, etc.)" (p. 120).

Financial flexibility is difficult to measure in part because firms use multiple financing sources like commercial paper, bank loans and even trade vendor financing in the form of accounts payables to preserve financial flexibility. While some for-profit studies have attempted to measure financial flexibility (Gamba and Triantis, 2008; Rapp, Schmid & Urban, 2014), this area of research is largely unexplored in the not-for-profit

literature and will need to be explored further to understand the impact of financial flexibility on the capital structure decisions of not-for-profit organizations.

Another consideration noted by the finance managers of infrastructural enterprises is the importance of low interest rates and the favorability of market conditions. Unsurprisingly, the volatility of earnings and cash flows and the potential costs of bankruptcy, near bankruptcy or financial distress also play a role when choosing the appropriate amount of debt. Volatility of cash flows heightens the fear of financial distress. These two considerations support the negative relationship between risk and leverage predicted by the pecking order and trade off theories.

Most managers did not think the transactions cost and fees for issuing debt and the debt levels of other were important considerations. Finally, the lack of importance attributed to "recent profits not sufficient to fund activities" is understandable as most infrastructural enterprises are specifically prohibited from using debt to fund operations.

4.3.2 Capital Structure Theories

Another area of focus for this study was to understand whether capital structure decisions of finance executives of nonprofit infrastructural enterprises conformed to either the pecking order theory or trade off theory. Table 10 below shows the responses to the question of the relative importance of certain principles adopted by the firm in designing the capital structure. The results show that seven of the eight enterprises in the study follow a financing hierarchy by exhausting the most advantageous financing source first before using other sources of financing. Furthermore, in response to the question of preference for internal to external financing, only one of the eight executives noted that it

was most unimportant. These responses show that approximately 90% of the views expressed are consistent with the pecking order theory.

Three of the eight enterprises note that striving to maintain an approximately constant leverage ratio was most important. In addition, Table 10 also shows that four of the eight executives noted that they maintain either a strict or flexible target leverage ratio; and six of the eight executives expressed their preference for a low or moderate leverage ratio. These views provide support for the trade-off theory.

Table 10: Please indicate the relative importance of the following principles your firm adopts in designing the capital structure. (1 for most unimportant and 3 for most important)

	A	B	C	D	E	F	G	H	Mean
a. Strive to maintain an approximately constant leverage ratio?	3	1	1	1	1	3	3	2	1.9
b. Prefer internal to external financing?	1	2	3	3	3	2	3	2	2.4
c. Follow an order of priority by exhausting the most advantageous financing source before using other sources of financing?	3	3	3	3	3	3	3	1	2.8

The preference for low to moderate leverage ratios expressed by the executives also supports the general preference for financial flexibility; they suggest that the financial managers of these enterprises are keenly aware of the cost of debt relative to the benefits and the need to make sure that the current and future costs of debt are minimized.

Finally, most of the firms do not have a limit on the amount of debt they can take on. One of the managers noted a statutory limit of $10 billion and another manager noted a limit tied to a specific maximum debt service coverage ratio.

Table 11: Other Questions on Capital Structure Theories

	A	B	C	D	E	F	G	H
a. Does your firm have a target range for your debt ratio? No target, flexible target, strict target.	No target	No target	No target	No target	Strict	Flexible	Flexible	Flexible
b. What is your preferred leverage ratio? Below 40%; b. 40-60%; c. 60-80%; d. Above 80%	None	None	Low	Moderate	Moderate	Moderate	Moderate	Moderate
c. Is there a limit on what you can borrow (debts)?	Yes	Yes	None	None	None	None	None	None

While the preferences of four of the eight executives seem to be consistent with the pecking order theory, three other executives seem to follow both the pecking order and the trade-off theories, while one executive does not seem to follow either theory. The results above seem to suggest that some finance executives do not see characteristics of the pecking order theory (a preference for internal to external funding and having a financing hierarchy) and characteristics of the trade-off theory (striving to maintain a target leverage ratio) as mutually exclusive.

This result also seems to support the finding above that future research will need to explore the possibility of a model that incorporates important elements of both theories, particularly given the lack of an explicit profit motive in not-for-profit enterprises.

4.3.3 Firm Specific Attributes

This study asked questions to understand the extent to which the key empirical findings from this study are supported in practice. All seven firm independent variables included in the empirical model were presented to assess their relationship with leverage from the perspective of the finance executives. Table 12 below presents the responses.

Table 12: In your opinion, do the following attributes affect leverage? Positively, negatively, don't know or undecided.

Firm Specific Attributes	A	B	C	D	E	F	G	H
Profitability	+	0	+	0	0	-	-	0
Liquidity	+	+	+	-	-	-	-	0
Growth	+	+	+	+	+	+	+	+
Tangibility of Assets	-	0	+	0	+	+	+	+
Firm Size	+	0	0	+	0	+	+	+
Business Risk	-	-	-	-	0	-	-	0
Age of Plant	-	0	0	-	+	-	-	-

Surprisingly, four of the eight executives don't think profitability has an influence on leverage, a finding that contradicts the pecking order and the trade-off theory. Two executives noted a positive relationship and two others noted a negative relationship. All the finance executives noted a positive influence between leverage and growth, this finding suggests that all the executives see the need to increase leverage for the growth and expansion of their enterprise.

A majority of the executives noted a negative relationship between risk, age of plant and leverage. Furthermore, a majority of the executives noted a positive relationship between firm size, tangibility of assets and leverage.

The impact of liquidity is mixed, while four of the eight executives noted that liquidity affects leverage negatively, another three think the relationship is positive and one other executive does not see a relationship.

Perhaps, the most important takeaway is the lack of influence the finance executives think profitability has on leverage and the mixed impact of internal liquidity. It is clear that the executives sampled in this study think that overwhelmingly growth positively influences leverage.

4.3.4 Short-Term or Long Term Leverage

To understand the factors that influenced the decision to use long-term versus short-term leverage, managers were asked to indicate the relative importance of five factors that may affect the choice between short term and long term debt. The results are presented in Table 13 below.

Table 13: What factors affect your firm's choice between short and long-term-debt? 0 = Not Important, 4 = Very Important

	A	B	C	D	E	F	G	H	Average
When short-term interest rates are low compared to long-term rates	3	0	2	2	2	0	2	2	1.6
Matching the maturity of our debt with the life of our assets	3	4	3	3	4	1	4	4	3.3
When we are waiting for long-term market interest rates to decline	3	0	0	2	0	1	1	2	1.1
We expect our credit rating to improve, so we borrow short-term until it does	1	0	0	2	0	0	1	2	0.8
We issue long-term debt to minimize the risk of having to refinance in 'bad times'	4	0	3	3	0	0	0	2	1.5

The most important factor indicated by managers is the matching of the maturity of long term debt with the life of the assets. The use of long-term debt to minimize refinance risk and the avoidance of long-term debt when waiting for long-term interest rates to fall and when short-term interest rates are low are all seen as moderately important factors. Finally, the results show that managers don't look to time the debt issuances to expected improvement in credit ratings.

These findings show that, generally, infrastructural enterprises do not time the issuance of debt, whether short-term or long-term; to avoid interest rate risk, refinance risk and changes in credit worthiness.

4.4 Descriptive Statistics

The not-for profit enterprises included in this study are from three broad infrastructural sectors (power, water and transportation). As Grizzle, Sloan and Kim (2015, p. 79) notes, it is most desirable to compare financial ratios by sector as "ratios are best understood in relation to similar organizations," hence, all descriptive statistics are presented for the whole sample and by sector. Table 14a and 14b shows descriptive statistics by sector for the total leverage ratio (defined as the percentage ratio of total liabilities to total assets).

Transportation enterprises make up 17% of the firms in the whole sample, power enterprises make up 42% and water enterprises make up 41% of all firms in the study. The data covers nine fiscal years from 2007 to 2015. Table 14a presents winsorized statistics for the total leverage ratio and Table 14b presents the original dataset. Given the heterogeneous nature of infrastructural enterprises, all variables are winsorized, by sector, at the 1% and the 99% levels to reduce the potential bias of outliers in the sample.

The mean total leverage ratio for our sample of 7947 observations is 47 percent with a median of 44 percent for the winsorized and the original dataset. Median total leverage ratios are within a tight range of 3% for the three sectors – 42% for transportation and 45% for power.

Table 14a - Total Leverage 2007-2015 - Water, Power, Transportation (Winsorized)

Sector	No of Firms	Obs	Mean	Median	Min	Max	S.D.
Water / Sewer	360	3240	46%	44%	8%	101%	21%
Power	372	3348	49%	45%	4%	100%	26%
Transportation	151	1359	43%	42%	2%	101%	25%
Total	883	7947	47%	44%	2%	101%	24%

Table 14b - Total Leverage 2007-2015 - Water, Power, Transportation (Original Data)

Sector	No of Firms	Obs	Mean	Median	Min	Max	S.D.
Water / Sewer	360	3240	46%	44%	2%	114%	21%
Power	372	3348	49%	45%	1%	127%	26%
Transportation	151	1359	43%	42%	1%	155%	25%
Total	883	7947	47%	44%	1%	155%	24%

Table 15, 16a, 16b, and 16c provide descriptive statistics for all dependent and independent variables used in this study. While, Table 10 shows the descriptive sample for the entire dataset, Table 16a, 16b and 16c show the descriptive statistics by sector.

Table 15: All Sectors (2007-2015) - Water, Power & Transportation - Winsorized

Variable	n	Mean	Mdn	Min	Max	S.D.
Total Leverage Ratio	7947	47%	44%	2%	101%	24%
Total Debt Ratio	7947	39%	37%	0%	94%	22%
Long Term Debt Ratio	7947	37%	35%	0%	91%	21%
Short Term Leverage Ratio	7947	5%	4%	0%	31%	5%
Profitability	7947	2%	1%	-8%	15%	3%
Size	7947	5.46	5.41	3.93	7.06	0.67
Asset Tangibility	7947	72%	75%	26%	96%	13%
Age of Plant	7947	12.70	12.97	-	39.52	7.11
Liquidity	7947	4.76	3.14	0.31	39.12	5.37
Growth	7947	4%	2%	-13%	67%	9%
Risk	6181	2%	1%	0%	8%	1%
Total Revenues ($000)	7947	170,000	52,202	2,441	3,100,000	350,000
Total Asset ($000)	7947	920,000	260,000	8,596	11,000,000	1,800,000

Data presented for total debt ratio and long term debt ratio are identical with median of 37% and 35% and mean of 39% and 37% respectively. Short term leverage ratio (defined as the percentage ratio of current liabilities to total assets) is significantly lower than long term leverage ratios demonstrating a much lower reliance on short term leverage. Median short term leverage is 4% with a maximum of 31%.

The average profitability in our sample is 2% with median of 1%, reflecting the not-for-profit nature of the infrastructural enterprises where tariffs and charges are generally just high enough to support the solvency, debt service and continued operations of the enterprise.

The sample shows some variability with regards to size measured as total assets. While the median total asset is $260 million, the largest enterprise in the winsorized sample is $11 billion and the smallest is approximately $8.6 million. For example, Story City Municipal Electric Utility with assets of $10 million serves Story City, Iowa with population of about 3,500 and Florida Turnpike Enterprise with assets of approximately $11 billion and approximately 10 million in traffic transactions annually. This typifies the span of not-for-profit infrastructural enterprises where many small enterprises serve very small rural areas while a few serve large metropolitan areas.

Infrastructural enterprises are capital intensive; hence, it is not surprising to see that the median asset tangibility (ratio of fixed assets to total assets) is 75% and median age of plant is approximately 13 years demonstrating the longevity of the assets of the firms. Liquidity shows significant variability with median of 3.14 times, with a minimum of 0.31 and a maximum of 39.12. Growth (measured as change in total assets) also shows significant variability with a median of 2%, a maximum of 67% and a minimum of negative 13%. The data also shows that the risk appetite of these enterprises is very modest with a median of 1%.

To test the representativeness of the data sample, descriptive statistics for the universe of the database was compared to the descriptive statistics of the sample data. Most of the descriptive statistics for the database were almost identical with the sample

data with two notable. First, median and mean profitability is 3% in the universe, while the sample median is 1%, with a mean of 2%. In addition, median total assets of the universe is $110 million with a mean of $550 million, while median total assets of the sample is $260 million with mean of $1 billion. Hence, it can be concluded that the sample consists of larger, but slightly less profitable enterprises.

Table 16a, 16b and 16c below shows the descriptive statistics by sector. For the water sector presented in Table 17a, median total leverage ratio of 44% and profitability of 3% are the same as the whole sample presented in Table 15. Median ratios for the other variables are also approximately the same with the exception of asset tangibility. Median asset tangibility for the water sample of 80% is 5% higher than median asset tangibility of the whole sample of 75%.

Table 16a: Water Sector (2007-2015) - Winsorized

Variable	n	Mean	Mdn	Min	Max	S.D.
Total Leverage Ratio	3240	46%	44%	8%	101%	21%
Total Debt Ratio	3240	42%	39%	5%	92%	19%
Long Term Debt Ratio	3240	39%	37%	4%	90%	19%
Short Term Leverage Ratio	3240	4%	3%	0%	18%	3%
Profitability	3240	1%	1%	-4%	7%	2%
Size	3240	5.56	5.54	4.21	6.85	0.57
Asset Tangibility	3240	78%	80%	47%	95%	10%
Age of Plant	3240	11.58	12.49	-	32.10	7.15
Liquidity	3240	5.67	3.60	0.33	39.12	6.49
Growth	3240	4%	2%	-7%	44%	8%
Risk	2520	1%	1%	0%	5%	1%
Total Revenues ($000)	3240	97,933	41,866	2,441	950,000	150,000
Total Asset ($000)	3240	830,000	340,000	16,247	7,100,000	1,200,000

Table 16b below shows the descriptive statistics for the power sector. Median total leverage ratio of 45% and profitability of 3% are about the same as the whole

sample and the water sector presented above. The data shows a higher reliance on short term leverage by power enterprises relative to the water sector. Median asset tangibility of 68% and liquidity of 2.66 are significantly lower in the power sector compared to the water sector with median asset tangibility of 80% and median liquidity of 3.6.

Table 16b: Power Sector (2007-2015) - Winsorized

Variable	n	Mean	Mdn	Min	Max	S.D.
Total Leverage Ratio	3348	49%	45%	4%	100%	26%
Total Debt Ratio	3348	38%	34%	0%	94%	24%
Long Term Debt Ratio	3348	35%	32%	0%	90%	23%
Short Term Leverage Ratio	3348	8%	7%	1%	31%	5%
Profitability	3348	3%	3%	-4%	15%	3%
Size	3348	5.22	5.09	3.93	7.06	0.71
Asset Tangibility	3348	65%	68%	26%	88%	13%
Age of Plant	3348	14.03	13.77	-	39.52	7.54
Liquidity	3348	3.54	2.66	0.35	19.28	3.15
Growth	3348	4%	2%	-13%	67%	11%
Risk	2604	2%	2%	0%	8%	2%
Total Revenues ($000)	3348	230,000	56,436	2,694	3,100,000	480,000
Total Asset ($000)	3348	770,000	120,000	8,596	11,000,000	1,900,000

Table 16c shows the descriptive statistics for the transportation sector. Notably, median total leverage ratio of 42%, median short term leverage of 2% and median profitability of 0% are the lowest of the three sectors. In addition, transportation enterprises are the largest with mean total assets of $1.5 billion compared to $770 million for power and a $830 million. Median growth of 2% and risk of 1% are approximately the same compared to the power and the water sectors.

Table 16c : Transportation Sector (2007-2015) - Winsorized

Variable	n	Mean	Mdn	Min	Max	S.D.
Total Leverage Ratio	1359	43%	42%	2%	101%	25%
Total Debt Ratio	1359	38%	38%	0%	92%	24%
Long Term Debt Ratio	1359	36%	36%	0%	91%	23%
Short Term Leverage Ratio	1359	3%	2%	0%	16%	3%
Profitability	1359	0%	0%	-8%	8%	3%
Size	1359	5.78	5.71	4.65	7.02	0.59
Asset Tangibility	1359	76%	77%	49%	96%	10%
Age of Plant	1359	12.13	12.21	-	26.55	5.15
Liquidity	1359	5.60	3.77	0.31	38.35	6.10
Growth	1359	4%	2%	-10%	49%	9%
Risk	1057	1%	1%	0%	3%	1%
Total Revenues ($000)	1359	180,000	65,986	4,889	1,300,000	270,000
Total Asset ($000)	1359	1,500,000	510,000	44,316	10,000,000	2,300,000

To further understand the variables, median descriptive statistics by degree of median total leverage is presented. First, the whole sample is classified as shown in Table 17 below.

Table 17 : Leverage Classifications

Classification	Median Total Leverage
Very low leverage	Median total leverage below 20%
Low leverage	Median total leverage between 20% and 40%
Moderate leverage	Median total leverage between 40% and 60%
High leverage	Median total leverage between 60% and 80%
Very high leverage	Median total leverage above 80%

Median descriptive statistics for the categories prescribed above are shown in Table 18.

Table 18: Median Total Leverage by Degree of Leverage - All Sectors (2007-2015)

All Variables (2007-2015)	1.Very Low Leverage (0% - 20%)	2.Low Leverage (20% - 40%)	3.Moderate Leverage (40% - 60%)	4.High Leverage (60% - 80%)	5.Very High Leverage (80% - 100%)
Total Leverage Ratio	13%	30%	49%	69%	91%
Total Debt Ratio	8%	24%	42%	59%	77%
Long Term Debt Ratio	7%	23%	40%	56%	72%
Short Term Leverage Ratio	4%	5%	5%	6%	9%
Profitability	1.8%	2.2%	2.1%	1.4%	0.8%
Size	5.1723	5.2877	5.4302	5.7864	5.8499
Asset Tangibility	0.73	0.74	0.73	0.71	0.66
Age of Plant	13.94	12.65	12.16	12.28	14.67
Liquidity	8.63	5.65	4.74	3.11	3.59
Growth	3%	4%	5%	5%	6%
Risk	2%	2%	2%	1%	1%
Total Revenues ($000)	314,950	464,839	766,213	1,875,565	2,813,361
Total Asset ($000)	57,830	76,570	131,169	337,017	517,103
No of Observations	972	2,455	2,336	1,277	907
No of Firms	108	273	260	142	101
Percentage No of Firms	12%	31%	29%	16%	11%

The table above shows additional descriptive observations that could not be gleaned from Tables 15, 16a, 16b and 16c. First, it is evident that infrastructural firms use more short term leverage as total leverage increases. However, short term leverage only increases marginally as the degree of total leverage increases. Not surprisingly, as the degree of leverage increases, size increases. However, the gradual decline in asset tangibility as the degree of leverage increases is somewhat surprising as the conventional wisdom is that higher leverage is used mainly to increase asset tangibility. Age of plant is relatively higher on both ends of the leverage spectrum. While growth increases steadily from 3% to 6% as the degree of leverage increases suggesting that infrastructural enterprises rely on leverage to fuel growth. Risk marginally declines from 2% at low levels of leverage to 1% at high levels of leverage. The liquidity metric suggests that

firms with very low to moderate leverage show much higher liquidity levels relative to firms with much higher leverage.

Perhaps the most important evidence from this analysis is the observation that mean profitability increases from 1.8% to 2.2% as median total leverage increases from very low levels to low and starts to decline steadily to 0.8% as the use of leverage increases from moderate to very high. This suggests that firms with low to moderate levels of leverage are more profitable compared to firms with high levels of leverage. However, it should be noted that not-for-profit infrastructural firms generally do not seek to maximize profits; they are therefore likely to sacrifice profitability if higher total leverage is necessary for capital expansion.

4.5 Correlation Analysis

Correlation analysis highlights the strength of the linear relationship between two variables. Table 19 shows the correlation matrix of all the variables used in the study. Unsurprisingly, the matrix shows the very high correlation between the primary measure of leverage (total leverage ratio) and two other dependent variables (total debt ratio and total long term debt ratio) explored in this study; they both show correlation higher than 0.9. As a result of this very high correlation between total leverage ratio, total debt ratio and total long term debt ratio, the analysis in this study will only focus on the total leverage ratio as the primary measure of leverage.

The matrix also shows a low correlation of 0.2 between total leverage ratio and short term leverage ratio. As noted in the prior section, this observation suggests that infrastructural enterprises do not necessary increase short term leverage with increases in long term leverage or substitute long term leverage with short term leverage.

Table 19: Correlation Matrix

Variables	Total Leverage Ratio	Total Debt Ratio	Long Term Debt	Short Term Leverage	Profitability	Size	Asset Tangibility	Age of Plant	Liquidity	Growth	Risk
Total Leverage Ratio	1.00										
Total Debt Ratio	0.95	1.00									
Long Term Debt Ratio	0.92	0.98	1.00								
Short Term Leverage Ratio	0.23	0.07	0.00	1.00							
Profitability	-0.11	-0.16	-0.17	0.23	1.00						
Size	0.34	0.35	0.35	-0.17	-0.25	1.00					
Asset Tangibility	-0.17	-0.06	-0.05	-0.35	-0.28	0.12	1.00				
Age of Plant	0.00	-0.06	-0.07	0.08	0.09	-0.03	-0.16	1.00			
Liquidity	-0.24	-0.17	-0.15	-0.42	0.00	-0.07	-0.07	-0.02	1.00		
Growth	0.06	0.05	0.06	0.04	0.14	0.07	-0.18	0.00	-0.01	1.00	
Risk	-0.08	-0.15	-0.16	0.30	0.32	-0.38	-0.32	0.06	-0.03	0.03	1.00
Total Revenues ($000)	0.33	0.26	0.25	0.13	(0.04)	0.61	(0.12)	0.06	(0.14)	0.04	(0.10)
Total Asset ($000)	0.35	0.32	0.32	(0.01)	(0.13)	0.74	(0.00)	0.02	(0.12)	0.05	(0.20)

The correlation matrix also shows no high correlation between total leverage and all the independent variables explored in the study. The measure of size (Log of Total Assets) shows the maximum absolute correlation with total leverage of 0.34. Further observation of the matrix shows no significant correlation among the independent variables. The maximum absolute correlation among the independent variables is 0.38, between risk and size.

The correlation matrix also shows no significant correlation between short term leverage and all the independent variables. Unsurprisingly, liquidity shows the maximum absolute correlation with short term leverage of 0.42.

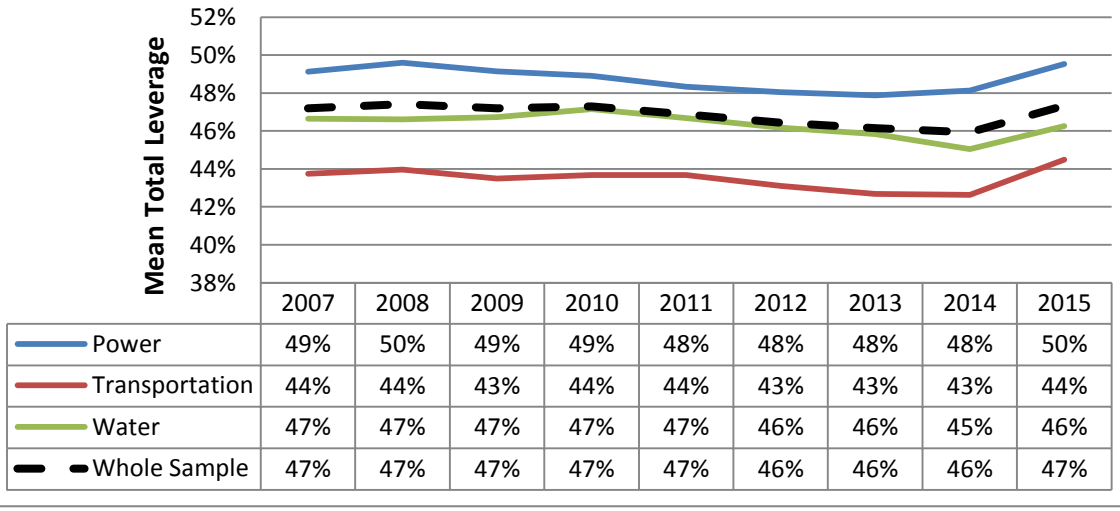
4.6 Trend Analysis

The trend analysis section takes a look at the historical data for all sectors from 2007-2015 to answer the first research question: What are the leverage profiles of power, water and transportation enterprises in this study from 2007-2015 and how does the leverage profiles vary by year, sector and nature of debt (short or long term)?

Figure 33 below show mean total leverage by year and sector for the period 2007 to 2015. Figure 33 shows largely stable leverage ratios for the entire sample and by sector for the years presented. For the power sector, mean total leverage was consistently noticeably higher than the leverage profiles of the water and transportation sectors. Mean total leverage was 50% in 2008, marginally declined from 2009 to 2014, before getting back to 50% in 2015.

In the transportation sector, mean total leverage was consistently the lowest of the three sectors, with a range between 43% and 44% throughout the period 2007 to 2015. In the water sector, mean total leverage stayed flat at 47% from 2007 to 2011, with modest declines thereafter.

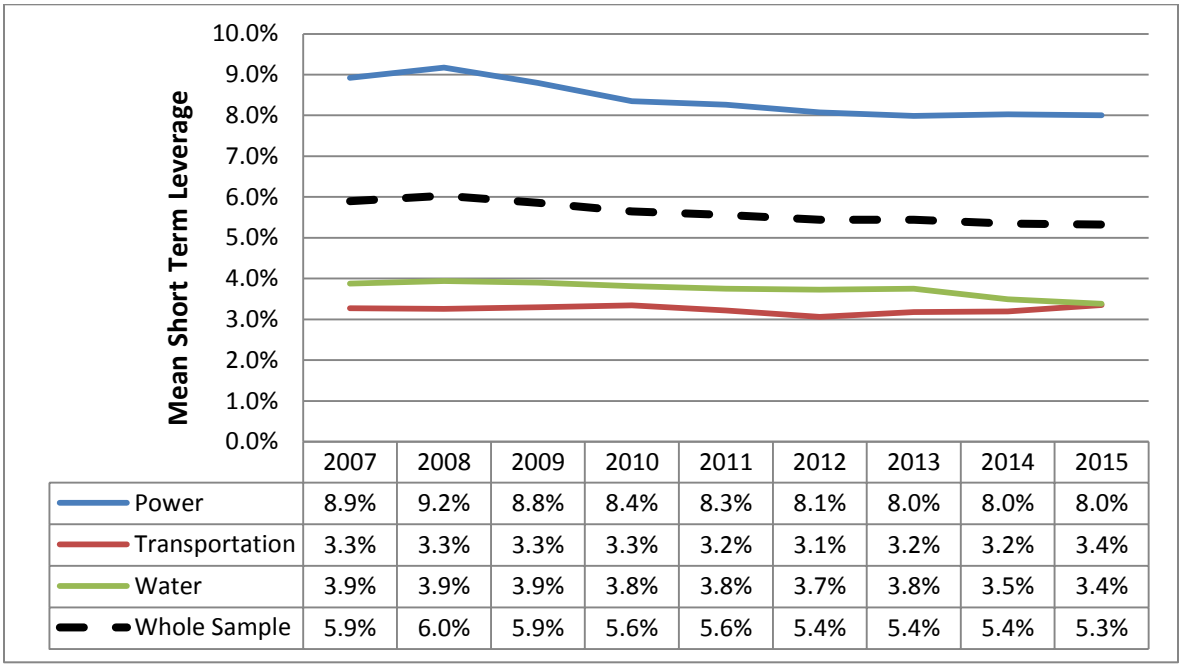
Figure 33: Mean Total Leverage by Sector (2007-2015)



	2007	2008	2009	2010	2011	2012	2013	2014	2015
Power	49%	50%	49%	49%	48%	48%	48%	48%	50%
Transportation	44%	44%	43%	44%	44%	43%	43%	43%	44%
Water	47%	47%	47%	47%	47%	46%	46%	45%	46%
Whole Sample	47%	47%	47%	47%	47%	46%	46%	46%	47%

Figure 34 shows mean short term leverage by year and sector for the period 2007 to 2015.

Figure 34: Mean Total Short-Term Leverage by Sector (2007-2015)



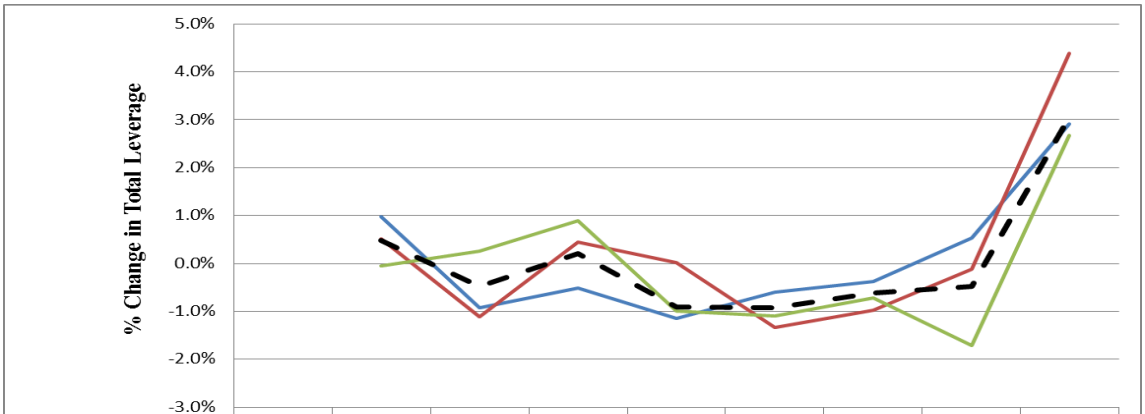
	2007	2008	2009	2010	2011	2012	2013	2014	2015
Power	8.9%	9.2%	8.8%	8.4%	8.3%	8.1%	8.0%	8.0%	8.0%
Transportation	3.3%	3.3%	3.3%	3.3%	3.2%	3.1%	3.2%	3.2%	3.4%
Water	3.9%	3.9%	3.9%	3.8%	3.8%	3.7%	3.8%	3.5%	3.4%
Whole Sample	5.9%	6.0%	5.9%	5.6%	5.6%	5.4%	5.4%	5.4%	5.3%

The figure above also shows relative stability of short term leverage for the whole sample and by sector for the years presented. For the power sector, mean short-term leverage was consistently higher than the short-term leverage profiles of the water and transportation sectors. Mean leverage peaked at 9.2% in 2008 and steadily declined thereafter to 8% in 2015.

In the transportation sector, mean short-term leverage was consistently the lowest of the three sectors, with a range between 3.1% and 3.4% for the period 2007 to 2015. In the water sector, mean short-term leverage marginally declined from 3.9% in 2007 to 3.4% in 2015.

The trend can also be observed from Figure 35 and 36 which show the percentage change in total leverage ratio and percentage change in short term leverage ratio respectively.

Figure 35: Percentage Change in Median Total Leverage- All Sectors (2007-2015)

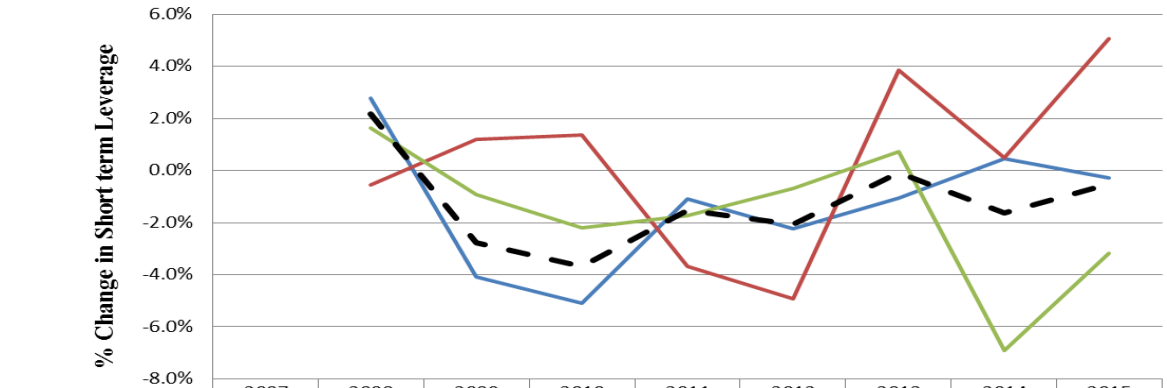


	2007	2008	2009	2010	2011	2012	2013	2014	2015
Power		0.98%	-0.92%	-0.51%	-1.15%	-0.59%	-0.37%	0.54%	2.91%
Transportation		0.51%	-1.11%	0.45%	0.01%	-1.33%	-0.98%	-0.13%	4.38%
Water		-0.06%	0.26%	0.89%	-0.99%	-1.10%	-0.71%	-1.72%	2.67%
Whole Sample		0.49%	-0.48%	0.21%	-0.90%	-0.92%	-0.61%	-0.48%	3.05%

Figure 35 above shows percentage changes in total leverage by sector for the period 2007 to 2015. The table in Figure 35 shows largely stable leverage ratios for the whole sample and by sector for the period. Maximum change in total leverage, across all sectors before 2014 was a decline of 1.72% in 2014. However, 2015 showed the largest percentage increase from prior years across all sectors. While the transportation sector showed the largest percentage increase of 4.38%, the power and water sectors showed relatively modest increases of 2.91% and 2.6% respectively. The increase in median total leverage for the whole sample was 3.05% in 2015. This may be as a result of the expectation of higher interest rates as the Federal Reserve signaled their intention to start increasing the Federal Funds Rate starting December 2015.

Figure 36 below show percentage changes in mean short-term leverage by sector for the period 2007 to 2015. Across all the sectors, the chart generally shows haphazard percentage increases and decreases with no consistent trend. However, the whole sample shows consistent, albeit modest, declines in the short term leverage ratio from 2008 to 2015.

Figure 36: Percentage Change in Median Short-Term Leverage by Sector- All Sectors (2007-2015)



	2007	2008	2009	2010	2011	2012	2013	2014	2015
Power		2.79%	-4.09%	-5.08%	-1.09%	-2.22%	-1.06%	0.44%	-0.28%
Transportation		-0.56%	1.19%	1.36%	-3.69%	-4.94%	3.84%	0.50%	5.07%
Water		1.62%	-0.94%	-2.20%	-1.72%	-0.70%	0.72%	-6.91%	-3.18%
Whole Sample		2.16%	-2.76%	-3.68%	-1.53%	-2.07%	-0.09%	-1.62%	-0.50%

4.7 Regression Diagnostics

A number of diagnostic tests were performed to make sure the fundamental assumptions of using OLS regression are not violated. In this section, I test for the presence of multicollinearity, heteroscedasticity, non-normality and outliers.

4.7.1 Multicollinearity

Multicollinearity exists when independent variables are correlated. The presence of multicollinearity can distort the standard error of estimate and the conclusions reached when interpreting the regression model. To evaluate the presence of multicollinearity, I evaluate the pairwise correlation matrix and the Variance Inflation Factor (VIF).

As noted in Section 4.5 and in the correlation matrix in Table 20, there is no high correlation between all the independent variables explored in the study. Generally, an absolute correlation coefficient higher than 0.70 may indicate the presence of multicollinearity (Gujarati, 2003). The maximum absolute correlation among the

independent variables is 0.38, between risk and size. Hence, I conclude that multicollinearity is not present among the independent variables.

Table 20: Correlation Matrix of all Independent Variables- All Sectors (2007-2015)

Variables	Profitability	Size	Asset Tangibility	Age of Plant	Liquidity	Growth	Risk
Profitability	1.00						
Size	-0.25	1.00					
Asset Tangibility	-0.28	0.12	1.00				
Age of Plant	0.09	-0.03	-0.16	1.00			
Liquidity	0.00	-0.07	-0.07	-0.02	1.00		
Growth	0.14	0.07	-0.18	0.00	-0.01	1.00	
Risk	0.32	-0.38	-0.32	0.06	-0.03	0.03	1.00

For the VIF test, Gujarati (2003) notes that a VIF greater than 10 which happens when correlation exceeds 0.9, shows the presence of multicollinearity. As Table 21 shows, the VIF test shows an average VIF below 2 for the whole sample and the samples for the power, water and transportation sectors. This corroborates the conclusion reached from the correlation matrix by indicating the absence of multicollinearity.

Table 21: Variance Inflation Factor- All Sectors (2007-2015)

Variables	Whole Sample VIF	Water & Sewer VIF	Power VIF	Transportation VIF
Profitability	1.34	1.29	1.35	1.54
Size	1.55	1.44	1.66	1.69
Asset Tangibility	1.37	1.50	1.40	1.92
Age of Plant	1.23	1.43	1.27	1.78
Liquidity	1.21	1.43	1.46	1.73
Growth	1.08	1.21	1.07	1.31
Risk	1.50	1.33	1.44	1.61
Mean VIF - 7 Independent Variables	**1.33**	**1.38**	**1.38**	**1.65**

4.7.2 Heteroscedasticity

Heteroscedasticity is a systematic pattern in the errors where the variances of the errors are not constant. As Gujarati (2003) notes, the presence of heteroscedasticity is likely in a dataset that combines cross sectional and time series data. The presence of heteroscedasticity may lead to misleading inferences in the regression results because the estimated standard errors of the coefficients are biased and inconsistent.

I test for heteroscedasticity using the Breusch–Pagan and Cook–Weisberg tests for heteroscedasticity. In the test conducted, the null hypothesis states that residuals are not heteroscedastic (i.e. homoscedastic) and a very small p-value below the 5% threshold indicates the presence of heteroscedasticity. The results of the Breusch–Pagan and Cook–Weisberg tests are shown in Table 22 below.

Table 22: Breusch Pagan/Cook-Weisberg Test for Heteroscedasticity - All Sectors (2007-2015)

Variables	Whole Sample	Water	Power	Transportation
chi2(1)	0.28	24.83	9.25	3.74
Prob > chi2	0.60	0.00	0.00	0.05

As the table above shows, the presence of heteroscedasticity was not detected in the whole sample but was detected in the water, power and transportation samples. Hence, to control for the presence of heteroscedasticity, I report robust standard errors in all four models models.

4.7.3 Outliers

As noted in Chapter 3.5.2, after accounting for missing data and applying the other filter described above, the end result is a panel dataset comprised of 379 power

enterprises, 361 water and sewer enterprises and 156 transportation enterprises. This dataset covers the period 2007 to 2015, for a total of 8,064 observations.

Outliers can also distort the true significance and results of a regression model. Outliers are extreme values compared to the sample data. In addition to the data cleaning process, 13 outliers were eliminated. The outliers eliminated were distressed enterprises with total leverage ratio above 150% and comprise only 0.2% of the total sample. 883 firms (7,947 observations) remain after elimination. To further reduce the potential bias of any remaining outliers in the sample, I winsorize all variables at the first and ninety-ninth percentiles.

4.7.4 Assumption of Normality

I evaluate the normality of the sample data by observing the histogram of the variables and also evaluating two common methods of assessing the normal distribution of a sample – the Shapiro-Wilk test and the IQR test. Table 23 shows the result of the two tests.

Table 23: Shapiro Wilk and IQR tests for Normality

	Shapiro Wilk Test		**IQR test**			
	Z	Prob > Z	No of Severe Outliers	% of Severe Outliers	No of Mild Outliers	% of Mild Outliers
Transportation Model	7.3	0.0	0.0	0.0	78.0	1.26%
Water & Sewer Model	6.7	0.0	0.0	0.0	118.0	1.91%
Power Model	10.8	0.0	0.0	0.0	61.0	0.99%
Whole Sample Model	9.1	0.0	0.0	0.0	61.0	1.01%

The Shapiro-Wilk test shows p-values below 0.05 for all the models. These results suggest that the error terms of all the models are not normally distributed. In addition, the IQR test was applied to all four models to validate the Shapiro-Wilk test. The IQR tests

did not show any severe outliers and a maximum of 2% mild outliers across all four models. This indicates a fairly symmetric distribution of the residuals.

As Cohen (1988) notes, moderate departure from the assumption of normality have negligible effects on the validity of regression estimates, particularly when sample sizes are large (above 30). Hence, the moderate departure from the assumption of normality in this study, with a sample size of more than 6,000 observations, is considered appropriate.

4.8 Regression Results

Multiple regression allows a researcher to assess the relationship between a dependent variable and several independent variables (Tabachnick & Fidel, 2007). They further explain that regression analysis is also used to assess how strong the relationship is between dependent and independent variables.

As noted in Section 4.7, as a result of this very high correlation between total leverage ratio, total debt ratio and total long term debt ratio, the analysis in this study will only focus on the total leverage ratio as the primary measure of leverage. I also model the impact of the determinants on long-term term leverage.

The general form of total leverage and Long-term leverage for nonprofit infrastructural enterprises are modeled as:

1) Total Leverage = *f*(PROFITABILITY, SIZE, TANGIBILITY, AGE, GROWTH, RISK, LIQUIDITY)
2) Long-Term Leverage = f(PROFITABILITY, SIZE, TANGIBILITY, AGE, GROWTH, RISK, LIQUIDITY)

4.8.1 Total Leverage

Table 24 below presents the results of the regression between total leverage and the seven determinants of leverage identified in this study. I estimate four models with state and year fixed effects for the period 2010 – 2015. The first model shows OLS estimates for the whole sample of all infrastructural enterprises. The second, third and fourth models shows estimates for the water, power and transport sector respectively. All models are highly significant as identified by the chi-squared test.

Table 24: Regression Results - Dependent Variable = Total Leverage

	Whole Sample		Water & Sewer		Power		Transportation	
Profitability	-0.481***	0	-0.759***	0	-0.743***	0	-0.802***	-0.01
Size	0.102***	0	0.0276***	0	0.120***	0	0.252***	0
Asset Tangibility	-0.471***	0	-0.646***	0	-0.325***	0	-0.254***	-0.01
Age of Plant	-0.00146***	0	-0.0038***	0	-0.000227	-0.70	-0.00127	-0.45
Liquidity	-0.0974***	0	-0.0932***	0	-0.122***	0	-0.0103	-0.26
Growth	-0.00978	-0.75	0.0336	-0.52	0.0377	-0.30	-0.0798	-0.34
Risk	-0.00937**	-0.03	-0.00489	-0.40	-0.0317***	0	0.0162	-0.11
_cons	0.463***	0	1.411***	0	0.0613	-0.27	-0.839***	0
State Fixed Effects	Yes		Yes		Yes		Yes	
Year Fixed Effects	Yes		Yes		Yes		Yes	
N	6181		2520		2604		1057	
R-sq	0.368		0.392		0.526		0.581	
adj. R-sq	0.361		0.378		0.516		0.554	
p-values in parentheses = * p<0.10 ** p<0.05 *** p<0.01								

For the whole sample, all variables excluding growth are statistically significant at the 5% level. Profitability, asset tangibility, age, liquidity, risk all show a statistically significant negative relationship with total leverage. On the other hand, size shows a statistically significant positive relationship with total leverage.

For the water sector sample, all variables excluding growth and risk are statistically significant at the 5% level. Profitability, asset tangibility, age and liquidity all show a statistically significant negative relationship with total leverage. On the other hand, size shows a statistically significant positive relationship with total leverage.

For the power sector sample, all variables excluding age of plant and growth are statistically significant at the 5% level. Profitability, asset tangibility, liquidity, risk all show a statistically significant negative relationship with total leverage. On the other hand, size shows a statistically significant positive relationship with total leverage.

For the transportation sector sample, while profitability, size and asset tangibility are statistically significant at the 5% level; age, liquidity, growth and risk are not statistically significant. Profitability and asset tangibility both show a statistically significant negative relationship with total leverage and size shows a statistically significant positive relationship with total leverage.

The strong negative significant relationship between profitability and total leverage, across all four models, is consistent with the pecking order theory and the findings of an overwhelming majority of the nonprofit literature shown in Chapter 2. This demonstrates that more profitable infrastructural enterprises prefer internal sources of financing to external financing in the form of debt.

The strong positive significant relationship between size and total leverage, across all four models, indicates that larger infrastructural enterprises are more reliant on leverage than smaller firms. This is not surprising given the capital intensive nature of infrastructural enterprises and the limited profitability of most of them. In addition, larger

organizations are likely to use their established reputations to attract more external financing. This finding is in line with expectation and consistent with many other nonprofit studies (McCue and Ozcan, 1992; Wedig 1998; Yan, Denison & Butler, 2009; Denison, 2009; Smith, 2012).

The results show an insignificant relationship between asset tangibility and total leverage for the transportation sector. However, the statistically significant negative relationship between asset tangibility and total leverage for the water and power sectors and the whole sample is surprising. This result is inconsistent with an overwhelming majority of the literature but consistent with the results obtained by Smith (2012). Further research is needed to understand the negative relationship between asset tangibility and total leverage.

Age of plant variable shows a strong statistically significant negative relationship with total leverage for the water sector and the whole sample and an insignificant relationship with total leverage in the transportation and power sectors. This suggests that enterprises in the water sector are paying off debt as they become more established or using retained earnings from profitability to substitute debt. This is consistent with the pecking order theory and some findings in the nonprofit literature (Smith, 2010; Smith, 2012; Wedig, Sloan, Hassan, and Morrisey, 1988; Wedig, 1998).

Liquidity shows a statistically significant negative relationship with total leverage in the power and water sectors and the whole sample, in line with expectations. Liquidity is also an indication of available internal funds which will lower the use of debt as

predicted by the pecking order theory and in line with the findings of (Smith 2010; Smith 2012; Szymanska, Puyvelde and Jegers 2015).

Risk also shows a statistically significant negative relationship with total leverage in the power sector and the whole sample. This finding suggests that volatile cash earnings increase the cost of bankruptcy and infrastructural firms with more volatile cash flows minimize the risk of financial distress by using lower leverage. This finding supports the pecking order theory and the trade-off theory predictions of a negative relationship between risk and leverage and it is consistent with the findings of (Wedig, Sloan, Hassan, and Morrisey, 1988; Bowman, 2002; Wedig 1998; Turner, Broom, Elliott and Lee, 2015).

For total leverage, endogeneity problems may arise if there is a potential for reverse causality between the dependent variable and the determinants. To mitigate endogeneity concerns, I model all four models with a one year lag. I find that the significance and the direction of the estimates are unchanged for all variables. I also find that the magnitude of the estimates is very identical for all variables in all four models.

4.8.1.1 Economic and Practical Substance of Coefficients.

To assess the relative strength of each of the explanatory variables, beta coefficients were obtained to show the standardized units of the coefficients. Liquidity (-36%), total assets (29%) and Asset tangibility (-25%) have the largest beta coefficients in absolute values.

Thus, a one standard deviation increase in liquidity leads to a 0.36 standard deviation decrease in predicted leverage ratio, with the other variables held constant. Furthermore, a one standard deviation increase in size leads to a 0.29 standard deviation

increase in predicted leverage ratio, with the other variables held constant. Finally, a one standard deviation increase in asset tangibility leads to a 0.25 standard deviation decrease in predicted leverage ratio, with the other variables held constant.

4.8.2 Long-Term Leverage

In addition to the regression results for total leverage above, Table 25 presents the results of the regression between long-term leverage and the seven determinants of leverage identified in this study. Four long-term leverage models are also estimated with state and year fixed effects for the period 2010 – 2015. The first model shows OLS estimates for the whole sample of all infrastructural enterprises. The second, third and fourth models shows estimates for the water, power and transport sector respectively. All models are highly significant as identified by the chi-squared test.

Table 25: Regression Results - Dependent Variable = Total Long-Term Leverage

	Whole Sample		Water & Sewer		Power		Transportation	
Profitability	-0.647***	0	-0.707***	0	-0.796***	0	-1.032***	0
Size	0.0904***	0	0.0201***	-0.007	0.101***	0	0.242***	0
Asset Tangibility	-0.245***	0	-0.479***	0	-0.157***	0	-0.192**	-0.031
Age of Plant	-0.0025***	0	-0.0037***	0	-0.0015***	-0.01	-0.00229	-0.14
Liquidity	-0.0549***	0	-0.0654***	0	-0.0653***	0	0.00509	-0.545
Growth	0.0630**	-0.043	0.0821	-0.103	0.0912**	-0.02	-0.0681	-0.379
Risk	-0.0164***	0	-0.002	-0.67	-0.0407***	0	0.0112	-0.255
_cons	0.0656*	-0.073	0.839***	0	-0.195***	0	-0.917***	0
State Fixed Effects	Yes		Yes		Yes		Yes	
Year Fixed Effects	Yes		Yes		Yes		Yes	
N	6181		2520		2604		1057	
R-sq	0.284		0.392		0.526		0.581	
adj. R-sq	0.276		0.378		0.516		0.554	
p-values in parentheses = * p<0.10 ** p<0.05 *** p<0.01								

For the whole sample, all variables excluding growth are statistically significant at the 5% level. Profitability, asset tangibility, age, liquidity, risk all show a statistically significant negative relationship with total long-term leverage. On the other hand, size and growth shows a statistically significant positive relationship with total leverage.

For the water sector sample, all variables excluding growth and risk are statistically significant at the 5% level. Profitability, asset tangibility, age of plant and liquidity all show a statistically significant negative relationship with total long-term leverage. On the other hand, size shows a statistically significant positive relationship with total long-term leverage.

For the power sector sample, all variables are statistically significant at the 5% level. Profitability, asset tangibility, age of plant, liquidity, risk all show a statistically significant negative relationship with total long-term leverage. On the other hand, size and growth shows a statistically significant positive relationship with total long-term leverage.

For the transportation sector sample, while profitability and size are statistically significant at the 5% level; asset tangibility, age of plant, liquidity, growth and risk are not statistically significant. Profitability shows a statistically significant negative relationship with total long-term leverage and size shows a statistically significant positive relationship with total long-term leverage.

The strong negative significant relationship between profitability and total long – term leverage, across all four models, is consistent with the findings relative to total leverage. In addition, the strong positive significant relationship between size and total

long-term leverage, across all four models, is also consistent with the findings relative to total leverage. These findings show are not surprising, as total leverage of these enterprises primarily consists of long-term leverage.

4.9 Hypothesis Testing: Overall Results

Table 26 presents a summary of the hypothesized relationships and the observed relationships across all four models. All significant signs for the individual sectors are the same as the sign of the whole sample. Hence, the analysis below will focus on the observed sign of the whole sample.

Table 26: Summary of Hypothesis Testing Results

Explanatory Variable	Hypothesized Sign	Observed Sign - Whole Sample	Observed Sign - Water & Sewer	Observed Sign - Power	Observed Sign - Transportation
Profitability	-	-	-	-	-
Size	+	+	+	+	+
Asset Tangibility	+	-	-	-	-
Age of Plant	-	-	-	- (ns)	- (ns)
Growth	+	- (ns)	+ (ns)	+ (ns)	- (ns)
Risk	-	-	- (ns)	-	+ (ns)
Liquidity	-	-	-	-	- (ns)
ns - not significant					

4.9.1 Results for Hypothesis 1: Profitability

In Section 3.3, I hypothesized a negative relationship between leverage and profitability. Specifically, the null hypothesis stated that leverage is not negatively related to profitability and the alternate hypothesis stated that leverage is negatively related to profitability.

The profitability coefficients in all four models show a statistically significant negative relationship between profitability and total leverage at a 5% level of significance. This empirical finding is consistent with the pecking order theory and demonstrates that more profitable infrastructural enterprises prefer internal sources of financing to external financing in the form of debt. Hence, more profitable firms will retain funds and resort less to the use of debt to fund investments.

I will therefore reject the null hypothesis that leverage is not negatively related to profitability and accept the alternate hypothesis stated that leverage is negatively related to profitability.

4.9.2 Results for Hypothesis 2: Firm Size

In Section 3.3, I hypothesized a positive relationship between leverage and size. Specifically, the null hypothesis stated that leverage is not positively related to size and the alternate hypothesis stated that leverage is positively related to size.

The size coefficients in all four models show a statistically significant positive relationship between size and total leverage at a 5% level of significance. This empirical finding is validates the trade-off theory that larger firms are perceived to be more diversified, matured and less susceptible to bankruptcy. Hence, larger firms have larger debt capacities, borrow more and borrow at relatively lower interest rates

I will therefore reject the null hypothesis that leverage is not positively related to size and accept the alternate hypothesis stated that leverage is positively related to size.

4.9.3 Results for Hypothesis 3: Tangibility of Assets

In Section 3.3, I hypothesized a positive relationship between leverage and tangibility of assets. Specifically, the null hypothesis stated that leverage is not positively related to tangibility of assets and the alternate hypothesis stated that leverage is positively related to tangibility of assets.

The tangibility of assets coefficient in all four models shows a statistically significant negative relationship between profitability and total leverage across at a 5% level of significance. This empirical finding is inconsistent with the hypothesized relationship and it suggests that infrastructural enterprises with more tangible assets use less leverage.

I will therefore reject the null hypothesis that alternate hypothesis stated that leverage is negatively related to tangibility of assets and accept the null hypothesis that leverage is not negatively related to profitability.

4.9.4 Results for Hypothesis 4: Age of Firm Assets

In Section 3.3, I hypothesized a negative relationship between leverage and age of firm assets. Specifically, the null hypothesis stated that leverage is not negatively related to age of firm assets and the alternate hypothesis stated that leverage is negatively related to age of firm assets.

The results show a statistically significant negative relationship between age of firm assets and total leverage in the whole sample and the power sample at a 5% level of significance.

I will therefore reject the null hypothesis that leverage is not negatively related to age of firm assets in the whole sample and the power sample and accept the alternate hypothesis stated that leverage is negatively related to age of firm assets in the whole sample and the power sample. For the water sample and the transportation sample, the relationship is not statistically significant.

4.9.5 Results for Hypothesis 5: Growth

In Section 3.3, I hypothesized a positive relationship between leverage and growth. Specifically, the null hypothesis stated that leverage is not positively related to growth and the alternate hypothesis stated that leverage is positively related to growth.

The growth coefficients in all four models do not show a statistically significant relationship between growth and total leverage. I will therefore accept the null hypothesis that leverage is not positively related to profitability and reject the alternate hypothesis stated that leverage is positively related to growth.

4.9.6 Results for Hypothesis 6: Risk

In Section 3.3, I hypothesized a negative relationship between leverage and risk. Specifically, the null hypothesis stated that leverage is not negatively related to risk and the alternate hypothesis stated that leverage is negatively related to risk.

The risk coefficients in the power sector sample and the whole sample show a statistically significant negative relationship between risk and total leverage at a 5% level of significance. This empirical finding is consistent with both the pecking order theory and the trade-off theory and suggests that infrastructural firms with volatile earnings may not generate enough cash flow to service debt obligations leading to lower leverage to minimize the cost of financial distress.

I will therefore reject the null hypothesis that leverage is not negatively related to risk and accept the alternate hypothesis stated that leverage is negatively related to risk.

4.9.7 Results for Hypothesis 7: Liquidity

In Section 3.3, I hypothesized a negative relationship between leverage and liquidity. Specifically, the null hypothesis stated that leverage is not negatively related to liquidity and the alternate hypothesis stated that leverage is negatively related to liquidity.

The liquidity coefficients in the power, water and the whole sample models show a statistically significant negative relationship between liquidity and total leverage at a 5% level of significance. However, the liquidity coefficient in the transportation model is not statistically significant. This suggests that for the power, water and the whole sample models, liquidity is an indication of available internal funds which will lower the use of debt.

I will therefore reject the null hypothesis that leverage is not negatively related to liquidity and accept the alternate hypothesis stated that leverage is negatively related to liquidity for the power, water and the whole sample models.

For the transportation model, I will accept the null hypothesis that leverage is not negatively related to liquidity and reject the alternate hypothesis stated that leverage is negatively related to liquidity.

CHAPTER 5: SUMMARY, CONTRIBUTIONS AND POLICY IMPLICATIONS

5.1 Introduction

This chapter presents the summary, contributions and policy implications of the study. Section 5.2 summarizes the main findings of the study. Section 5.3 discusses the contributions and Section 5.4 discusses the implications of this study to the management of these enterprises and public policy. Section 5.5 presents the limitations of this study and Section 5.6 presents the directions for future study.

5.2 Summary of the Research Findings

This dissertation analyzed the factors that determine the capital structure decisions of not-for-profit infrastructural enterprises in three sectors including water, power and transportation. First, I analyzed the trends and the differences in the capital structure of infrastructural enterprises by sector between 2007 and 2015. Second, I explored the literature to identify frequently researched determinants and using multiple linear regression, I explored the relationship between leverage and the determinant identified in the literature review. Third, I investigated the extent to which the two dominant capital structure theories explain the capital structure decisions of not-for-profit infrastructural enterprises. Finally, this dissertation used case studies and interviews with key finance decision makers in power, water and transportation enterprises to understand the factors influencing capital structure decisions in practice and assess the extent to which the findings from the qualitative study provide support for this empirical study and existing capital structure theories.

5.2.1 Leverage Profile of Infrastructural Enterprises.

To answer the research question (What are the leverage profiles of power, water and transportation enterprises in this study from 2007-2015 and how does the leverage profiles vary by year, sector and nature of debt?), this study found that mean total leverage ratio for the all the infrastructural enterprises sampled in this study was 47% with a median of 44%. Median total leverage ratios are within a tight range of 3% for the three sectors – 42% for transportation, 44% for water and 45% for power.

The use of short-term leverage is significantly lower than total leverage demonstrating a much lower reliance on short-term leverage. Median short term leverage is 4% with a maximum of 31% for all the infrastructural enterprises sampled. A closer look at the sectoral medians shows short-term leverage ratio of 2% for transportation, 3% for water and 8% for power. This is not surprising as these enterprises primarily borrow long-term debt to finance long-term assets.

To further understand the determinants of leverage, descriptive statistics by degree of median total leverage was also analyzed. Perhaps the most important evidence from this analysis was the observation that average profitability increased from 1.8% to 2.2% as the use of leverage increased from very low levels to low and starts to decline steadily to 0.8% as the use of leverage increases from moderate to very high. This suggests that firms with low to moderate levels of leverage are more profitable and vice versa. However, not-for-profit infrastructural firms generally do not seek to maximize profits; they are therefore likely to sacrifice profitability if higher total leverage is necessary for capital expansion.

With regards to the trend of total and short-term leverage ratio between 2007 and 2015, leverage ratios were very stable for the entire sample and by sector. For all the infrastructural enterprises, mean total leverage ratio was between 46% and 47%, and short-term leverage was between 5% and 6%. For the power sector, mean total leverage was approximately 50% between 2007 and 2015 and short-term leverage was between 8% and 9%. In the transportation sector, mean total leverage was consistently the lowest of the three sectors, with a range between 43% and 44% throughout the period 2007 to 2015 and short-term leverage ranged between 3.2% and 3.4%. In the water sector, mean total leverage stayed flat at 47% from 2007 to 2011, with modest declines to 46% thereafter and short-term leverage ranged between 5.3% and %.

From the above, it can be concluded that the use of leverage in the capital structure of infrastructural enterprises is moderate and the use of short-term debt is minimal; these trends were consistent between 2007 and 2015.

5.2.2 Determinants of Capital Structure, Relationship with Leverage and Existing Theories

This study identified seven firm attributes from the literature as the key determinants of leverage. They include profitability, size, tangibility of assets, age of plant, growth, liquidity and risk.

Consistent with the pecking order theory, this study found a strong negative significant relationship between profitability and total leverage, across all infrastructural enterprises and the three individual sectors. This demonstrates that more profitable infrastructural enterprises prefer internal sources of financing to external financing in the form of debt.

In addition to the finding on total leverage, this study found a strong positive significant relationship between profitability and long-term leverage, across all four models. This finding suggests that more profitable infrastructural enterprises are more likely to use more long -term debt than less profitable enterprises.

Liquidity shows a statistically significant negative relationship with total leverage in the power and water sectors and the whole sample. Liquidity is also an indication of available internal funds which will lower the use of debt as predicted by the pecking order theory. In addition, liquidity shows a statistically significant negative relationship with long-term debt across all four models.

Consistent with the trade-off theory, the study found a strong significant positive relationship between size and both total leverage and total long-term leverage, across all four models, suggesting that larger infrastructural enterprises are more reliant on leverage than smaller firms. This is not surprising given the capital intensive nature of infrastructural enterprises and the limited profitability of most of them. In addition, larger organizations are likely to use their established reputations to attract more external financing.

From the empirical study, I find mixed support for both the pecking order theory and the trade-off theory. While the negative relationship between leverage and profitability provides support for the pecking order theory, the positive relationship between size and leverage provides support for the trade-off theory.

5.2.3 Findings from Qualitative Study

Eight cases including three power enterprises, three water and sewer enterprises and two transportation enterprises were studied. Three of the enterprises had low levels of leverage; two had moderate levels of leverage and another three with high levels of leverage.

All the enterprises were established by either the state or city legislature to provide transportation (airport and a toll road), power, and water and sewer services. All the enterprises were created to be self-supporting -relying on customer charges and fees to operate, maintain its facilities and service debt. Five of the eight enterprises studied are governed by elected or appointed board members, two others are governed by the county/city legislative council and another enterprise reports to the Department of Transportation.

From a financial performance standpoint, six of the eight enterprises studied generated enough earnings to service their principal and interest payments at all times. The other two enterprises used reserve funds in the deficit years after the recession. A review of the debt policies of the sampled firms revealed that seven of the eight enterprises studied had formal debt policies guiding the use of debt in the capital structure. The most common guideline in the debt policies reviewed pertains to a specified minimum debt service coverage ratio and minimum expected credit ratings.

A number of insights were gleaned from the interviews conducted with the key finance decision maker from the sampled cases. First, the interviews revealed that the most important factors considered by the key financial managers of nonprofit infrastructural enterprises when choosing the capital structure of the firm are financial

flexibility (keeping debt levels and debt service burdens low in other to be able to react adequately to unforeseen financial and economic changes) and maintaining high credit ratings. To further support the importance of financial flexibility a majority of the executives also noted their preference for a low to moderate leverage ratio – below 60% total leverage ratio.

Second, to understand whether capital structure decisions of finance executives of nonprofit infrastructural enterprises conformed to either the pecking order theory or trade-off theory, the results show a mix of responses. While the preferences of some seem to be consistent with the pecking order theory, others seem to follow both the pecking order and the trade-off theories; they therefore do not see characteristics of the pecking order theory and characteristics of the trade-off theory as mutually exclusive.

Third, perhaps the most surprising takeaway from the interviews is the lack of influence the finance executives think profitability has on leverage and the mixed impact of internal liquidity on leverage. It is clear that the executives sampled in this study think that overwhelmingly growth positively influences leverage and a majority of the executives think that firm size positively influences leverage. Finally, the results also indicate that when evaluating the choice between long and short term debt, firms consider matching the life of debt with the life of the assets as the most important factor.

Overall, the empirical results suggest that both the pecking order and the trade-off theories contribute to the capital structure decisions of infrastructural enterprises. Furthermore, the opinion of practicing finance executives seems to validate some parts of both theories and refute others. However, the factor that does not seem to be captured by the two theories is the importance of financial flexibility to the capital structure decisions

of infrastructural enterprises. In the not-profit-literature, Calabrese's (2011) suggestion of a modified pecking order theory incorporates the importance of financial flexibility in the pecking order theory. It also seems to reconcile some of the differences between the trade-off theory and the pure pecking order theory.

5.3 Contributions of the Research Study

This dissertation adds to the literature on the capital structure of not-for-profit firms in a number of significant ways. First, even though some research exists on the determinants of capital structure of hospitals and not-for profit firms in general, a lack of scholarly research exists on the capital structure of water, power or transportation enterprises. This study is the first to focus on the capital structure of these types of enterprises that are mostly quasi-government entities providing discrete services to millions of people annually.

Second, this study is the first to study not-for-profit firms using data extracted from audited financial statements. Other studies have relied primarily on IRS Form 990 data of all nonprofit institutions usually obtained from the National Center on Charitable Statistics (NCCS). While using actual audited financial statements is not as comprehensive, it does not suffer from the cost allocation and self-reporting drawbacks of the NCCS data documented by many scholars.

Third, by highlighting the capital structure patterns and trends of infrastructural enterprises, this study will assist policymakers and practitioners in providing necessary data for benchmarking purposes. For managers and board members of not-for-profit enterprises, a better understanding of capital structure patterns enhances strategic management and planning and ultimately the long term sustainability of these enterprises.

Fourth, this study demonstrated that financial flexibility is the most important consideration of financial decision makers in not-for-profit infrastructural enterprises. In addition, this study demonstrated that the financing behavior of not-for-profit infrastructural enterprises is not one that is explained exclusively by either the pecking order theory or the trade-of theory, but by a combination of the two theories.

5.4 Policy Implications of the Research Study

The question of how and who should provide much needed infrastructure or improve the existing stock across the U.S. is currently very topical. Hence, the findings of this study hold lots of public policy implications. First, the role of tax-exempt bonds in financing infrastructural development is crucial. This study showed that, on average, approximately 50% of the capital structure of these enterprises providing critical infrastructure is primarily sourced from leverage, mostly tax-exempt bonds. This underscores the need to preserve the tax-exempt market as a crucial part of the financing options available to these firms.

There is a legislative push to repeal the tax-exempt status of some infrastructural enterprises that fall under the scope of this study. While the house bill repeals so called tax-exempt private activity bonds (PABs), the senate bill preserves it. The tax-exempt status of these bonds is crucial to maintaining the inflow of private capital into the financing of infrastructure. If the tax-exempt status is repealed, it not only affects investment flows into infrastructure, it also affects the cost of borrowing and the costs of the services provided. As this study shows, on average profitability in this study is low (median of 1%), hence increased borrowing costs are likely to be passed on to final consumers, many of whom are in rural areas, with low to moderate incomes.

There is a perennial debate about the motives for having quasi-governmental entities (applies to most of the enterprises within the scope of this study) provide key infrastructure across state and local governments. Critics of the use of these entities note that they are used only as 'borrowing machines' (financial rather than administrative entities) established to circumvent statutory debt limitations on general obligation debt. Some other critics have noted the lack of direct public oversight and representation of these enterprises, while many have noted a lack of real independence since many of these enterprises maintain indirect ties to city and state executives and legislatures. Proponents have argued the corporate-like nature of these entities increases efficiency and expertise relative to a traditional governmental unit and lower costs relative to a purely private enterprise. Given the moderate use of leverage and the stability of leverage over the study period, it can be argued that these infrastructural entities are not 'borrowing machines'. The organizational structure and governance of these enterprises appears to work well and ultimately provide affordable services and infrastructure to various communities in the United States.

Finally, the question of privatizing these firms is also one that is often debated, since they provide goods that can be and are also provided by private corporations. In fact some cities have sold their water and power enterprises to the private sector. Not-for-profit enterprises are pivotal to the provision of infrastructure In the United States. Particularly in rural areas where the economic incentives may not be high enough, given the low profitability of these enterprises. To the extent that these enterprises are truly self-supporting and providing affordable infrastructural services to their communities, the

long-term policy thrust should be to maintain their organizational structure and financing in its current form.

5.5 Limitations of the Research Study

Despite the contributions and implications noted in Sections 5.3 and 5.4, a few limitations should be noted. First, although the sample used in this study of three infrastructural sectors covers a wide range of size, age, geographical reach and risk. One of the limitations of this study is that the sample selected from the database of accounting data is not random; neither can the database be seen as a comprehensive database. The database includes detailed audited income statement and balance sheet data for not-for-profit enterprises that are active in the tax-exempt market. Therefore, it is likely that the sample excludes many small not-for-profit enterprises that do not issue tax-exempt debt. Furthermore, the study period spanning the years 2007 to 2015 is relatively short compared to some of the studies done in corporate finance which spanned time horizons of 20 to 50 years. This time period covers the time period of the Great recession and the subsequent recovery. Consequently, a study covering multiple economic cycles could produce different results.

In addition to the secondary data collected from audited financial statements, primary data are collected from interviews of the key finance decision maker from a sample of eight enterprises used in the case study. A convenience, information-oriented and purposive sampling methodology was used to identify these eight cases. The limited sample size of the case studies may limit the generalizability of the findings from the qualitative study.

5.6 Directions for Future Research

This dissertation has highlighted some notable results from both the econometric study and the qualitative study. However, many insights garnered from this study present further areas of study. First, this research brought to the fore the need to further study the impact of financial flexibility on the capital structure of not-for-profit firms in general and not-for-profit infrastructural enterprises in particular. Second, this research also identified the need to study empirically the influence of credit ratings on the capital structure of not-for-profit firms. Third, a more exhaustive qualitative study of the key financial decision makers of not-for-profit enterprises will likely provide results that go beyond the insights gleaned from study.

Fourth, a study of debt policies and their impact on the capital structure of not-for-profit firms will be helpful in determining if these policies are being followed and the extent to which they dictate the capital structure of a not-for-profit firm.

Finally, future research can look at variations of these not-for-profit enterprises across states. These can include state characteristics that affect the legal origin and scope, financing, and governance of these enterprises.

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Appendix 1

Interview Questions

Part 1: Introduction

1. Please state your name, job title and firm.
2. Briefly discuss your firm's purpose.
3. Please describe your roles and responsibilities.

Part 2: Capital Structure Policy

4. Currently, what type of capital do you have employed and what are your preferred financing alternatives?
    a. Debt Securities, Bank Loans, Retained Earnings (Internal Liquidity), Others (If any, specify)
5. Does your firm have restrictions on the use of long-term debt?
6. Do you have a formal or written capital structure policy/debt policy? Briefly describe the policy?
7. How does your capital structure policy guide your capital structure decisions?
8. How will you say the following factors affect how you choose the appropriate amount of debt for your firm? 0 = Not Important, 4 = Very Important
    a. The debt levels of other firms in our industry
    b. Our credit rating (as assigned by rating agencies)
    c. The transactions costs and fees for issuing debt
    d. Financial flexibility (we restrict debt so we have enough internal funds available to pursue new projects when they come along)
    e. The potential costs of bankruptcy, near-bankruptcy, or financial distress
    f. Low interest rates and favorability of market conditions
    g. The volatility of our earnings and cash flows
    h. Recent profits (internal funds) are not sufficient to fund our activities
    i. Others
9. What factors affect your firm's choice between short and long-term-debt?
    i. 0 = Not Important, 4 = Very Important
    a. When short-term interest rates are low compared to long-term rates
    b. Matching the maturity of our debt with the life of our assets
    c. When we are waiting for long-term market interest rates to decline

d. We expect our credit rating to improve, so we borrow short-term until it does

e. We issue long-term debt to minimize the risk of having to refinance in 'bad times'

f. Other

10. In your opinion, do the following attributes affect leverage?

Firm Specific Attributes	Positive Influence	Negative Influence	Don't Know / Undecided
Profitability			
Liquidity			
Growth			
Tangibility of Assets			
Firm Size			
Business Risk			
Age of Plant			

Part 3: Practical Application of Capital Structure Theories

11. Does your firm have a target range for your debt ratio? 1 = No target, 2 = Flexible target, 3 = Strict target.

12. What is your preferred leverage ratio? Below 40%; b. 40-60%; c. 60-80%; d. Above 80%

13. Is there a limit on what you can borrow (debts)?

14. Please indicate the relative importance of the following principles your firm adopts in designing the capital structure. (Please indicate"1" for most unimportant and "3" for most important)

    a. Strive to maintain an approximately constant leverage ratio?

    b. Prefer internal to external financing?

    c. Follow an order of priority by exhausting the most advantageous financing source before using other sources of financing?