Keeping Decentralisation in Check

An Exploration of the Relationship between Municipal Audit Outcomes and Levels of Service Delivery in South African Local Government

By

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PLAGIARISM DECLARATION

I certify that this thesis presented for examination for the Masters in Commerce degree at the University of Cape Town is solely my own work; other than where ideas, information and data used by myself have been clearly referenced. I confirm that all data collation, statistical analysis, literature review and paper composition has been undertaken by myself.

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ABSTRACT

In a decentralised system of governance, checks and balances are important to prevent corruption and ensure the optimal performance of public service organisations. However, such regulations need to strike a careful balance between not being too simple and avoiding onerous, unnecessary complexity. Furthermore, the devolution of responsibility cannot occur in isolation – it must be accompanied by financial and operational support.

Although South Africa has always had some form of a decentralised governing system, the Constitution of 1996 has formally entrenched this into the country's current public administration. Local government, now a sphere within itself, is thus responsible for bringing the Bill of Human Rights to life, acting increasingly as the implementation arm for national government's policies and initiatives.

Following the passing of the Local Government Municipal Financial Management Act of 2003 (MFMA), South African municipalities are also required to comply with rigorous, annual auditing regulations. Intended to enforce sound financial governance and prevent abuse of devolved power, the influence of the audits is widely expected to positively impact other areas of municipal operations, ensuring well-run public organisations able to fulfil their service delivery mandate. Indeed, the general public uphold clean audit outcomes – a standard unique to South African municipal audits – as the only acceptable result and indication of effective local governance. However, this is not always the case.

By examining the extent to which financial compliance, as represented by municipal audit outcomes, relates to local government service delivery performance, this thesis investigates whether the auditing regulations are appropriately designed to achieve their intended outcomes and asks how much of an impact sound financial management has upon municipal operations.

The results suggest that, whilst there does appear to be a weak, positive relationship between clean audits and service delivery in some instances, on the whole the audit outcomes are not strongly related to municipal operational performance. The capacity of local governments to deliver services appears to be far more a function of their operational context - particularly the regional wealth levels, population density, political influence and available infrastructure - than financial compliance and audit outcomes.

Given the costs of the current auditing system and difficulties faced by municipal employees in relation to the regulations, this thesis concludes with recommendations for its adaptation. These include amending its current one-size-fits-all design and moving away from a compliance focus towards performance, value-based auditing. In addition, local municipalities should be provided with greater amounts of operational support, as financial regulations alone – even when optimally designed – cannot be relied upon to keep the performance of South Africa's decentralised system of governance in check.

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Chapter One: Introduction

The concept of a local municipality has been in existence since the Ancient Greek and Roman times. (Siddle & Koelble, 2013). In modern day South Africa, this is the level of government with which citizens come into contact most frequently. Responsible for basic services such as the provision of water, electricity, weekly refuse removal and sewage services – local municipalities play a major role in the daily life of South Africans and influence public opinion concerning the state of governance affairs in the country. The effective operation of local municipalities is thus crucial for South Africa's economic development and democratic prosperity.

This imperative was kept in mind by policy-makers during South Africa's transition to democracy, and the rise in popularity of New Public Management (NPM) principles informed the formation of the country's current three-tier, decentralised system of governance. Prior to the 1980s, public administration 'relied on centralized control, set rules and guidelines, separated policymaking from implementation, and employed a hierarchical organizational structure,' as was evident in the structure of South Africa's Apartheid era government (Dunleavy & Hood, 1994). In contrast, NPM focuses on enabling local government to effectively engage with competitive, market-based economies by infusing private sector efficiencies into a decentralised public sphere (Dunleavy & Hood, 1994). Emerging from lessons learnt in the OECD countries, NPM aims to cut costs, improve public sector management practices, encourage entrepreneurial initiatives and emphasises performance management (Dunleavy & Hood, 1994).

The adoption of NPM principles has led to comprehensive and extensive regulations regarding the auditing and performance of local government entities in South Africa. Chapter 12, Section 19-1941 of the South African constitution establishes the office, independence, powers and functions of the Auditor-General, whose task it is to 'audit and report on all the accounts and financial statements of any local government, board, fund, institution, company, corporation or other organisation' (Constitution of the Republic of South Africa, 1996). A plethora of supporting legislation - including

the Local Government Municipal Systems Act 32 of 2000 and the Local Government Municipal Finance Management Act (MFMA) 56 of 2003 - further entrench this ethos of performance management into local government entities.

Consequently, South African municipalities are required to comply with a complex set of internal and external auditing requirements, intended to prevent corruption, optimise operational performance and instil good governance practices. They are, in fact, held to an even higher standard than international comparisons, as the concept of a 'clean audit' is more nuanced and difficult to achieve than the standard 'unqualified audit' outcome. The concept of a 'clean audit' does not in fact exist in standard accounting terminology and is a governance construct unique to South Africa (Zille, 2015; Hugo, 2013). The intention of the audits is to enforce strong, transparent financial governance, which will spill over into other areas of municipal operations and ensure well-run public organisations, able to fulfil their mandate and deliver services to the community.

The results of such initiatives however, have been less than ideal. For the most part, audit outcomes across the provinces in South Africa have been woeful since they began with the introduction of the MFMA in 2003. For example, in the latest set of results, only 54 out of the 278 municipalities achieved clean audit outcomes, 109 were given unqualified audits with findings whilst 29 achieved disclaimers with findings (AGSA, 2015b). This despite the fact that a study conducted by the Municipal Demarcation Board (MDB) highlighted a significant amount of financial and human resources being allocated to administrative tasks (MDB, 2012). Meanwhile, numerous service delivery protests continue to occur across South Africa since 2004, reaching reached peak levels in 2009 (Allan & Heese, 2011).

Thus, the question must be asked – is the current local government auditing system in South Africa achieving its performance management objectives and does it merit the amount of time and resources it requires? Does financial compliance have as strong a link to service delivery performance as the legislation envisions? Performance

management and accountability regulations in a decentralised governance system must be carefully designed to ensure they achieve their objectives without restricting public entity operations or providing perverse incentives. Thus, it is important to ask such questions, not only in light of the central role played by local government with regards to public service delivery but because findings can improve the regulatory framework to be more effective within a decentralised government context.

Chapter Two: The Research Question and Study Outline

2.1 Research Question

The specific question this thesis will attempt to answer is as follows:

To what extent does financial compliance, as represented by municipal audit outcomes, explain or influence the service delivery performance of a municipality?

This thesis will assess this question for the audit years 2007/2008 and 2011/2012 as these coincide with census and community survey data collected during the same time periods by Statistics South Africa.

2.2 Primary Objective

The main objective of this thesis is to establish whether a relationship exists between the two relevant variables – municipal audit outcomes and service delivery performance - and if so, to assess the strength of such a relationship.

If a positive relationship is found in the data, the thesis will then form the foundation for further research to identify constraints to service delivery that explain the challenges municipalities are facing in their daily operations.

If a negative link is found, this thesis will elaborate on areas of the municipal audit system that could possibly be adapted in response to this relation.

If no link is found, then this thesis will provide justification for considering whether the time and resources spent on municipal audits are warranted. In such a case, more support for service delivery or a move towards performance-based auditing might be a better use of government resources. Striking the balance between providing sufficient oversight and corruption prevention mechanisms, whilst still allowing enough room for municipalities to function optimally and use their discretion in decision making, is key to achieving an effective performance management system in line with NPM ideals.

2.3 Outline of the study

This thesis will proceed as follows:

Chapter three presents an overview of the South African municipal system, how it came to be in its present form and the rise of New Public Management concepts. Chapter four outlines service delivery by local governments in modern day South Africa, contrasting their legislated duties against their historical performance trends. Chapter five takes a closer look at the municipal financial system and its legislative design, as well as trends in municipal audit outcomes between 2007 and 2011.

In chapter six, the factors needed for successful decentralisation are explained and the link between this and an effective municipal audit system explored. Chapter six also presents the findings from an online survey conducted with municipal managers and executive staff situated in various South African provinces, highlighting their varying opinions around the extent to which municipal audit outcomes reflect municipal service delivery.

Chapter seven begins to outline the data work and empirical strategy of this thesis, clarifying its hypothesis and data sources. Chapter eight describes the balanced scorecard approach and its outcomes, whilst chapter nine proceeds with principal component analysis, grouping the municipalities into four quadrants based on their service delivery performance. These groupings are also used to graphically compare movements in service delivery levels to changes in audit outcomes, as difference-in-difference empirical techniques are not suitable to the dataset.

Chapter ten conducts Wilcoxon Rank Sum and Kruskal-Wallis H tests to highlight characteristics that differ across municipalities with varying levels of service delivery and audit performance. Chapter eleven continues the analysis with Ordinary Least Squares (OLS) regressions followed by chapter twelve, which conducts fixed effects regressions to account for the missing variables not captured in the OLS regressions. Finally, chapter thirteen concludes with policy recommendations.

Chapter Three: A brief history of South Africa's local governance system

3.1 From Centralisation to Decentralisation: The Rise of New Public Management.

Prior to the 1970s, the world was enamoured with centralised systems of governance. This was influenced by the success that centralised nations enjoyed during the Second World War and their subsequent economic prosperity after embracing Keynesian economic principles, which were particularly suitable to centralised governments (Siddle & Koelble, 2013). There was major support for government intervention and subsidisation, and many foreign aid donors or foundations were in favour of working with one group of people over many individuals (Siddle & Koelble, 2013).

Several factors arose though that challenged the idea of centralised governance systems. With growing populations and their increasing demands, central governments began to struggle with a lack of operational capacity and slow economic growth rates. Corruption levels rose, which served to reduce trust and support for central authorities (Siddle & Koelble, 2013).

Thus, from the 1980s onwards, globally the field of public administration has increasingly been dealing with NPM and the concept of decentralisation. Although entirely separate concepts, NPM became very popular at the same time as decentralisation began to be widely adopted - thus they are often grouped together. NPM can be described as an 'administrative doctrine or management approach,' which attempts to infuse private sector efficiencies and technological improvements into local government, making the system run more effectively and in more a responsive, business-like and market-based manner (Siddle & Koelble, 2013). It is based on principles such as 'efficiency, quality, flexibility, competition and management-by-contract (Siddle & Koelble, 2013).

The United Nations defines decentralisation as 'the process through which powers, functions, responsibilities and resources are transferred from central to local government and/or other decentralised entities' (Siddle & Koelble, 2013). Its

popularity can be attributed to its applicability to a wide range of topics, including 'state reform, more effective service delivery and greater levels of democratisation through increased opportunities for citizen participation' (Siddle & Koelble, 2013). Decentralisation is meant to promote democracy, public participation and efficiency whilst reducing corruption, improving communication between the public and private sector and preventing conflict (Siddle & Koelble, 2013).

It is worthwhile noting that there are various types and degrees of decentralisation. Power and responsibilities can be decentralised with regard to administration, financial and political duties. These refer to the ability to govern over policy and service delivery decisions, revenues and expenses and election and political activities respectively (Siddle & Koelble, 2013). Decentralisation and the transfer of power from one government entity to another can also occur to three different extents – deconcentration, delegation and devolution (Siddle & Koelble, 2013). Each respectively involves more transfer of power than the former:

- **Deconcentration:** whilst the national government is still responsible for the design and legislating of policy, retaining its power and authority, deconcentration involves appointing provincial or local government entities to be responsible for the implementation and execution of said policies or programs. There is no change in terms of the powers of provincial or local government, they merely become implementing arms for national government initiatives. Deconcentration is thus mostly administration decentralisation (Siddle & Koelble, 2013).
- **Delegation:** conducted via contractual agreements, delegation involves a greater transfer of responsibility to entities lower down in the government hierarchy. They are accountable to the central government organisation but have more autonomy over their actions and decisions (Siddle & Koelble, 2013).
- **Devolution:** this is the greatest degree of decentralisation and involves government entities having autonomy over decision-making, implementation and execution responsibilities in 'arms-length relationships' (Siddle & Koelble, 2013). Devolution thus requires a significant amount of financial and operating resources

> to also be transferred from central government outwards, in order to allow such a decentralised system to operate effectively. This dependence is an important accountability mechanism between the different levels of government (Siddle & Koelble, 2013).

The history of South African local government is essentially the story of its conversion from a centralised, racially-discriminate entity to a multi-sphered, inclusive organisation that has embraced NPM and devolution as a model for service delivery. It has been argued that the global movement away from centralised systems of governance heavily influenced South Africa's adoption of a decentralised approach. Furthermore, the concept of decentralisation spoke to the ANC's goal of increasing public participation to reunite the country and aligned with its Reconstruction and Development Plan (RDP), which relies a great deal on local municipalities. (Siddle & Koelble, 2013).

3.2 From Apartheid to Freedom: The Birth of South Africa's Democratic Municipalities

South African local government, as we know it today, is a result of much political deliberation and numerous pieces of legislation intended to carefully guide its transformation and arrangement from the end of the Apartheid era through to its current form. Although South African local governments have been in fluctuation ever since the Dutch settlers first established municipalities in the Cape of Good Hope in 1652, the theme of decentralisation has run as a common thread throughout all transition periods (Venter et al., 2007).

In 1836, British colonialists founded their own version of municipal governance in the Cape, passing the South African Act in 1910 (Venter et al., 2007). The act introduced the Westminster system to the country, where the parliament was the highest governing organ and could exert its power over any local entity that provincial councils established, such as town councils and boards (Craythorne, 2006). During this time, there were 'two forms of governance, with a democratic and relatively

decentralised system for white South Africans and a much more centralised system for black South Africans' (Siddle & Koelble, 2013).

In 1961 the country brought in a new constitution – the Republic of South Africa Constitution Act 32. This removed its status as a constitutional monarchy and made it a republic, whilst also establishing the hierarchy of provincial governments over local entities (Craythorne, 2006). Consequently, local government had little influence over their own operations, receiving their powers and responsibilities through ordinances drawn up by provincial governing bodies (Hadenius, 2003).

Furthermore, Apartheid policies lead to the formation of racially demarcated homelands and 'Bantustans,' which were treated as separate entities from the then whites-only republic of South Africa (Siddle & Koelble, 2013). Each racial group had its own form of governance, with only the white municipalities having access to adequate funds and truly democratically representing the views of its constituencies (Hadenius, 2003).

The Republic of South Africa Constitution Act 110 of 1983 further complicated matters through its introduction of 'a system of own and general affairs' (Craythorne, 2006). Own affairs were racially specific issues that only applied to or affected certain population groups, whilst all other matters were classed as general issues (Craythorne, 2006). The constitution removed black representation entirely from parliament.

3.3 From 1994 to 2016: What Local Government Looks Like Today

This all changed drastically when the early 1990s brought about South Africa's transition to democracy, setting the country on a lengthy path of development and reformation that has brought it to its current state. Although the ANC and anti-apartheid activists were in favour of a more centralised government to ensure maximum transformation and prevent any vestiges of apartheid remaining in remote parts of the system, they were ultimately convinced that a decentralised approach would be best (Siddle & Koelble, 2013). The formation and design of South African

local government evolved has continuously from 1994 as the country moves through various transition and growth stages. Ultimately, a series of constitutional and legislative reforms has 'assured the existence of local government as a sphere of government in its own right, with full constitutional protection' (Siddle & Koelble, 2013).

South Africa's final constitution (1996) entrenched this by building on the foundation laid by the Interim Constitution, which was in power from the first municipal elections in 1995/1996 until the local government elections in 2000. Notably, the Interim Constitution was the first in South Africa's history to abolish the Westminster system of governance, where parliament was the absolute sovereign ruling body in the land (Craythorne, 2006). It unified the country into 'one sovereign state' wherein the constitution is 'the supreme law of the Republic and any law inconsistent with its provisions shall be of no force and effect' (Craythorne, 2006).

The final constitution (1996) carries these changes over into its regime and provides for 'a three-sphere system of government in which the spheres are distinctive, interdependent and interrelated,' with intergovernmental relations being based on 'the principle of cooperative governance' (Hadenius, 2003). Local government is thus not meant to be subservient to provincial or national government but rather operate on an equal level, despite its continued reliance on national government for financial grants and equitable shares of revenue. In contrast to the apartheid regime, provincial government may now only involve itself in the local government sphere should the municipalities 'fail to fulfil an executive obligation' (Hadenius, 2003).

These change are in line with a decentralised system which, as previously mentioned, South Africa has always actually had in one form or another. By making local government a sphere within itself, although interrelated with provincial and national government structures, the final constitution has really cemented this trend into South African politics and public administration. There has not just been a 'redistribution of

authority, resources and accountability' but it has been prescribed by the highest law of the land (Siddle & Koelble, 2013).

However, a decentralised system that has not been properly adapted to the context in which it will operate and that lacks sufficient resources and support mechanisms will not be successful. Unfortunately, as will later be discussed, it could be said that South Africa's system of governance has fallen victim to such a fate and is in need of some form of intervention. This is highlighted in the analysis of historical service delivery trends presented in the next chapter.

Chapter Four: Local Government Service Delivery in Modern Day South Africa

Section 152 in chapter 7 of the final constitution (1996), entitled 'Objects of local government,' lays out the duties of municipalities in South Africa. These include:

- "providing democratic and accountable government for local communities;
- ensuring the provision of services to communities in a sustainable manner;
- promoting social and economic development;
- promoting a safe and healthy environment; and
- encouraging the involvement of communities and community organisations in the matters of local government." (The Constitution, 1996)

With regards to local municipalities' duty to serve to their communities, the Fourth Schedule of the Constitution (1996) sets out their general responsibilities regarding essential services including the provision of the following:

- Electricity
- Sewage & Sanitation facilities
- Parks and recreational areas
- Abattoirs and Fresh Food Markets
- Economic Development & Local Tourism
- Refuse removal & Nature Conservation
- Clean drinking water
- Storm water systems
- Firefighting services
- Basic shelter, public transport and roads
- Municipal health services (Gov.za , 2014).

4.1 The White Paper on Local Government

The 1998 White Paper on Local Government further outlines the responsibilities of South African municipalities, constructively shaping their purpose and structure to provide a contextual framework for their operations (Siddle & Koelble, 2013). It also cemented NPM principles into South Africa's system of governance, emphasising

aspects such as performance management, decentralisation of operational management responsibility and public-private partnerships (Siddle & Koelble, 2013). What the paper fails to do though, as will later be discussed, is stipulate how such development tools should be introduced and applied in practice.

One of the main themes emerging from the White Paper was that of a developmental local government, one that is 'committed to working with citizens and groups within the community to find sustainable ways to meet their social, economic and materials needs and improve the quality of their lives' (Siddle & Koelble, 2013). The new system envisages local government as a change agent in South African society, promoting economic development, fostering democracy, redistributing resources to those in need and working to build world-class, integrated and sustainable living environments (Siddle & Koelble, 2013). Increasingly being used as the implementation and executional arm for national government's policies and initiatives, local governments are now responsible for bringing the Bill of Human Rights to life and delivering on its promises to South African citizens (Siddle & Koelble, 2013).

The White Paper was also concerned with overhauling the existing administrative systems of municipalities in order to streamline their operations and facilitate innovative methods of service delivery (Siddle & Koelble, 2013). In support, the Local Government Municipal Structures Act 117 of 1998 was legislated. This act not only formalises the formation of the actual municipal entities, but it divides them into different categories, assigns each category its powers and responsibilities and outlines the voting process or electoral system to be used at the local government level (Siddle & Koelble, 2013).

The three categories are metropolitan, district and local municipalities. Whilst metropolitan municipalities are situated in large, urban areas, local municipalities are clustered in groups that fall under the jurisdiction of district municipalities. These are usually situated in smaller towns and rural areas (Siddle & Koelble, 2013). Metropolitan municipalities have 'exclusive municipal executive and legislative authority' over their jurisdictions whilst local and district municipalities normally

share this authority (Siddle & Koelble, 2013). As of 2016, there are 8 metropolitan, 44 district and 226 local municipalities in South Africa.

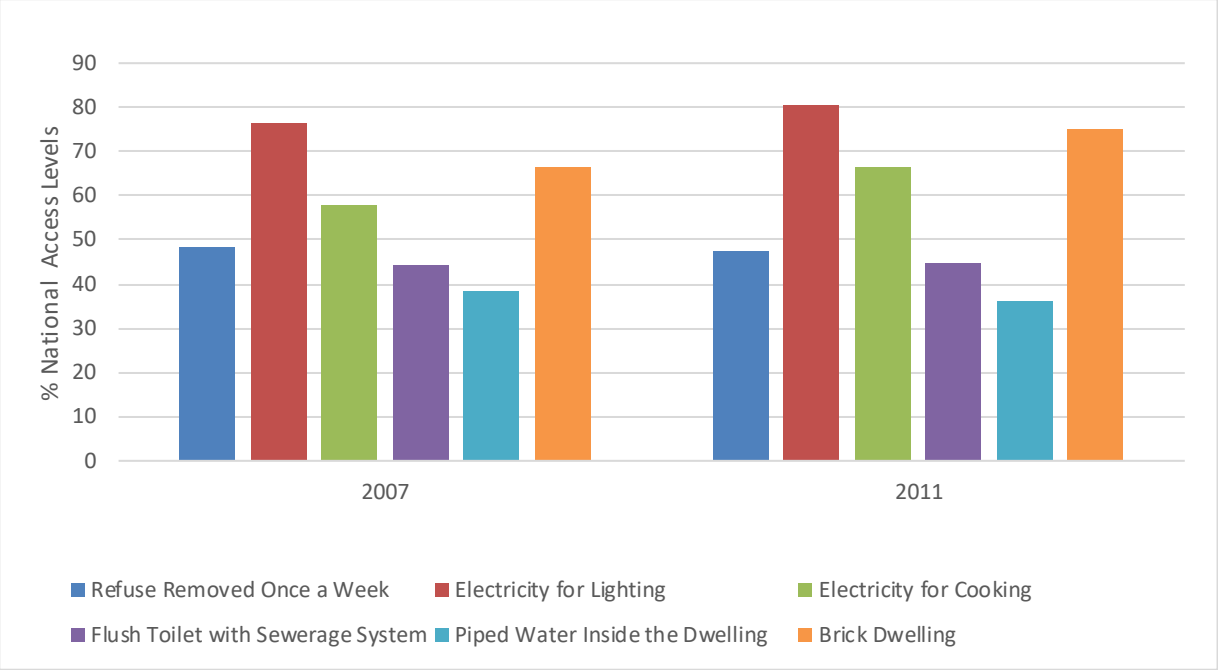
In addition, the Municipal Infrastructure Investment Framework further breaks down local and district municipalities into five more categories:

- B1: local municipalities with the largest budgets, which are also known as 'secondary cities'
- B2: local municipalities with large towns at their core
- B3: Local municipalities with small towns and relatively small populations
- B4: local municipalities that are mainly rural with communal land tenure
- C1: district municipalities that are not water service authorities
- C2: district municipalities that are water service authorities (Siddle & Koelble, 2013).

4.2 Service Delivery and Historical Municipal Audit Trends

To assess the effectiveness of these pieces of legislation and municipal performance in relation to them, this thesis now presents an examination of essential service delivery indicators across different contexts. These indicators are represented in figure one, which demonstrates that apart from improvements in access to electricity for lighting and cooking, across South Africa there was very little movement either way for the other service delivery indicators.

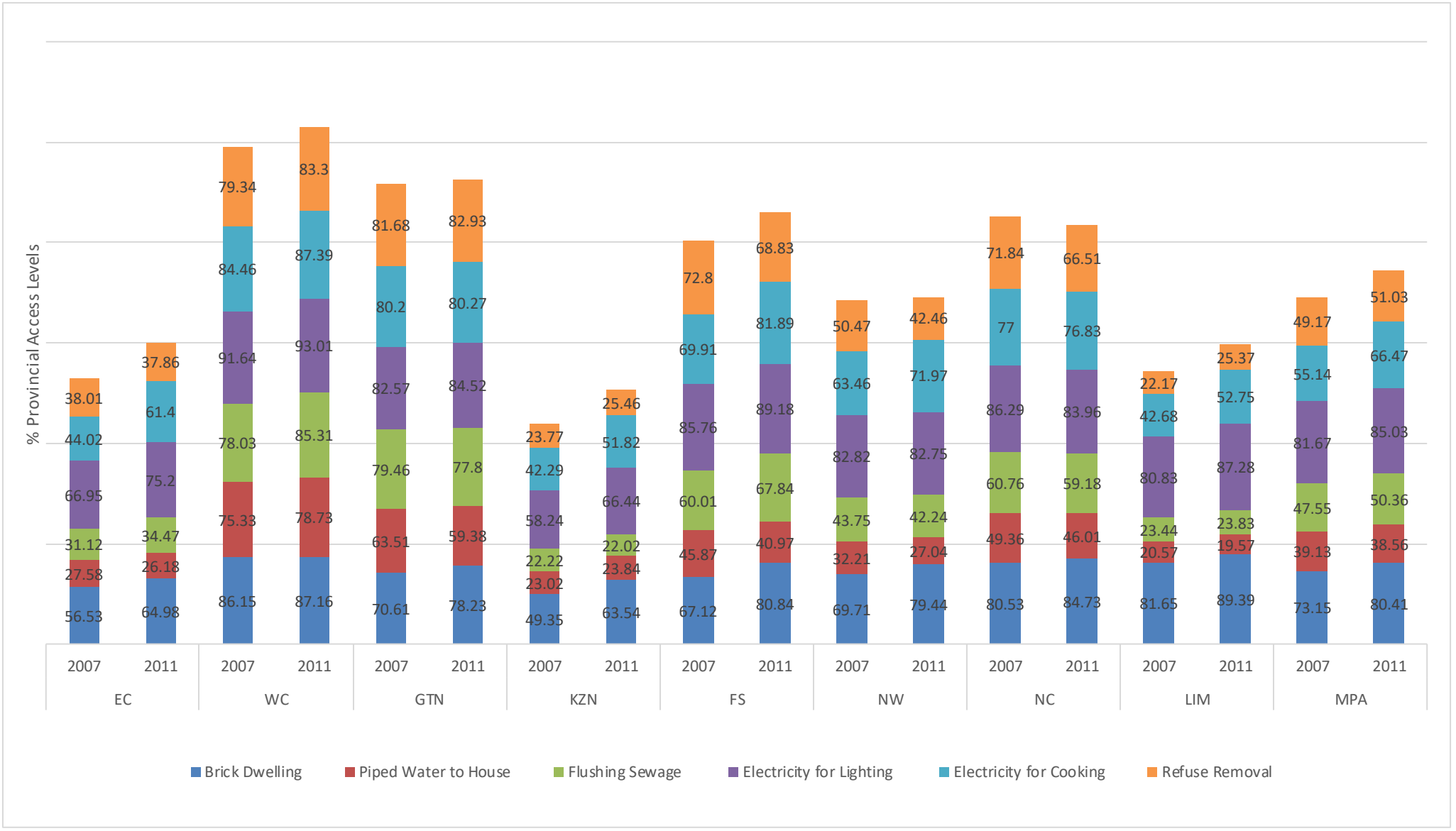
Figure 1: National Levels of Service Delivery in 2007 and 2011 (%)



Source: Statistics South Africa, 2011 & 2007

These averages can be further broken down into specific categories that provide a more useful lens for analysis. For example, figure two demonstrates levels of service delivery across the nine South African provinces. It is clear that the variation in access to piped water in dwellings, flushing sewage systems and weekly refuse removal fluctuates far more across provinces than the relatively similar levels of access to brick dwellings and electricity. Residents of the Western Cape, Gauteng, Free State and Northern Cape have higher levels of access to service delivery than the residents in other provinces. In addition, there does not appear to be a major increase in access to services in any of the provinces – between 2007 and 2011 there is a slight general upwards trend, however it is not remarkable.

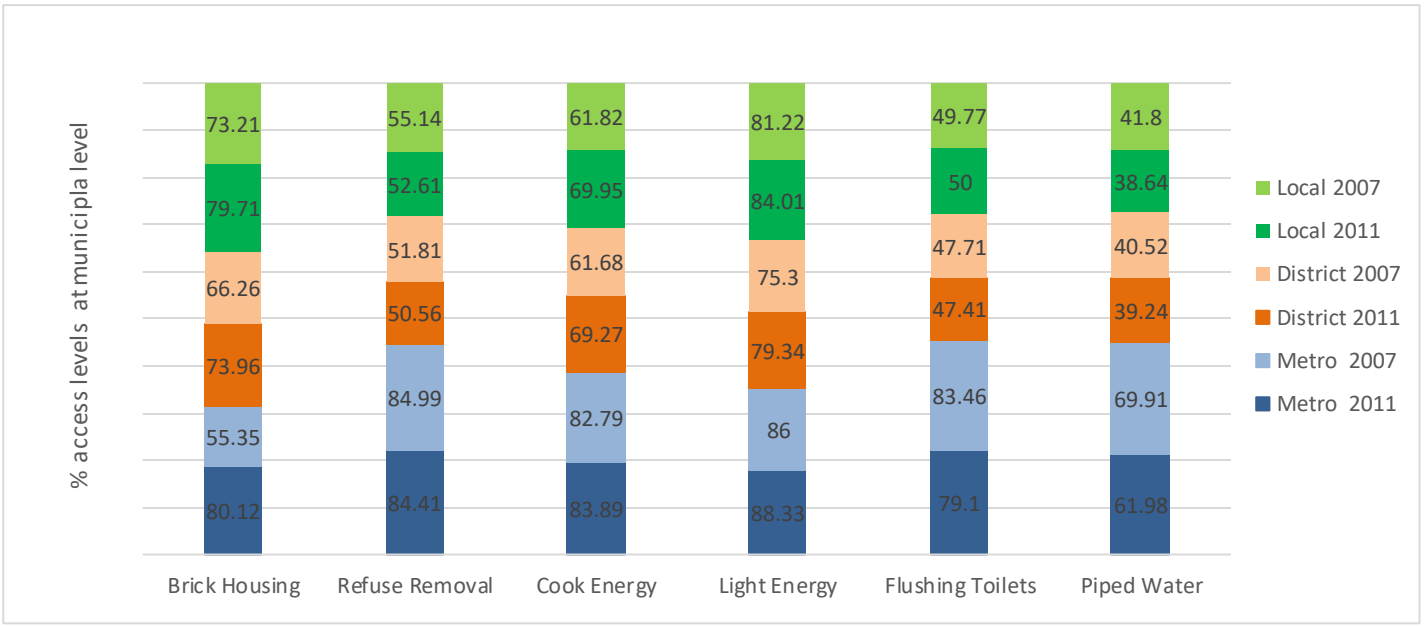
Figure 2: Access to Municipal Services across Provinces (%)



Source: Statistics South Africa Census 2011 & Community Survey 2007

Figure Three conducts the same analysis across the three different types of municipalities – metropolitan, district and local municipalities. It appears that, for each of the seven service delivery indicators (excecpt for brick housing), metropolitan municipalities deliver a higher percentage of services than local or district municipalities. This is likely a reflection of their larger resource base, having more financial and staff capacity than smaller municipalities. However, the gap is bigger with respect to weekly refuse removal, flushing sewage systems and piped water to dwellings than it is across brick dwellings and electricity provision. Whilst district and local municipalities increased their levels of service delivery across most of the indicators, it is interesting to note that metropolitan municipalities demonstrate a decline in provision of access to flushing sewage systems and piped water levels between 2007 and 2011. This contrasts strongly against their large increase in the number of brick dwellings to which their residents have access.

Figure 3: Services available across different types of Municipalities (%)

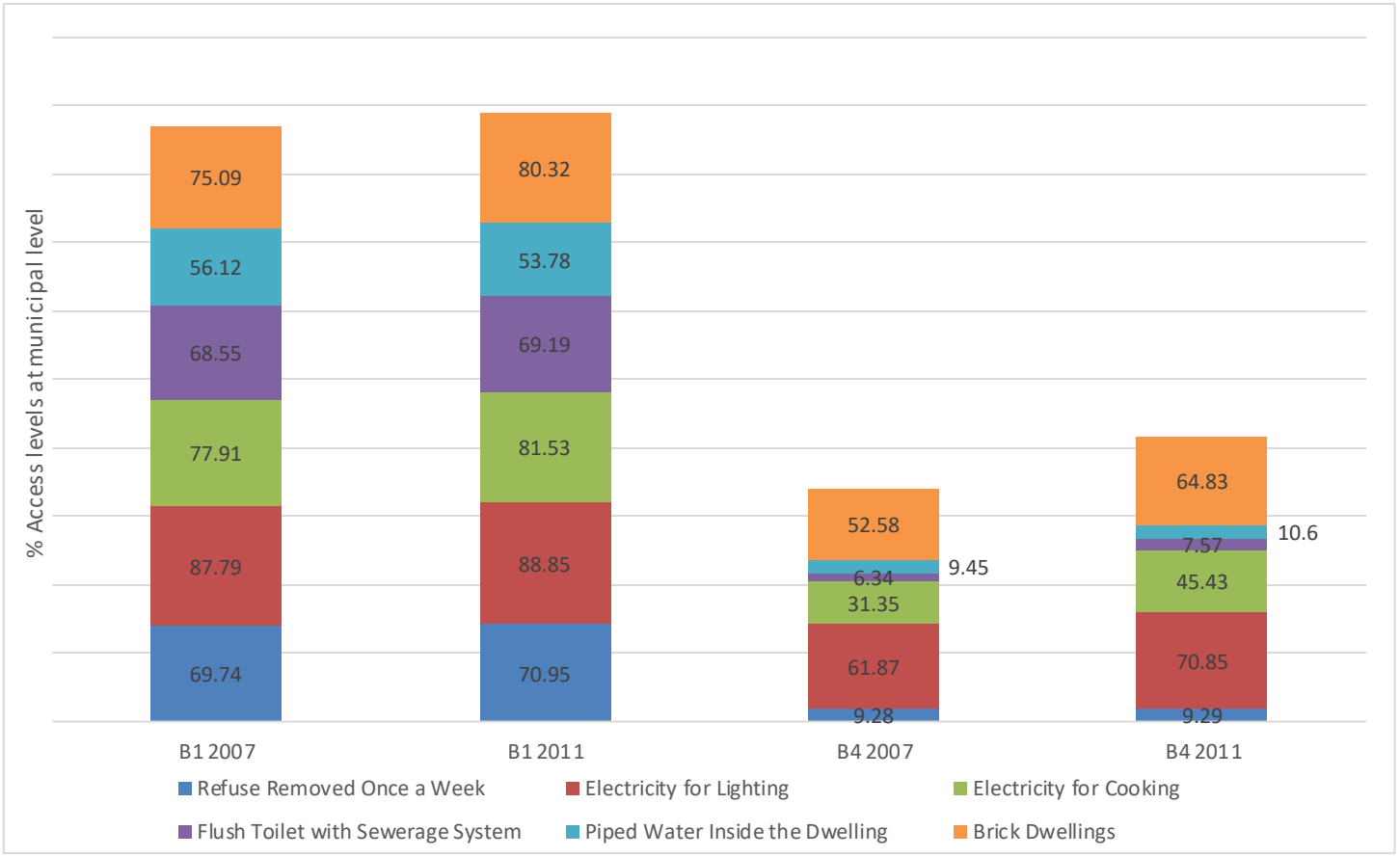


Source: Statistics South Africa Census 2011 & Community Survey 2007

Generalising these categories further, the same analysis can be run on different categories derived from the Municipal Infrastructure Investment Framework described earlier. The results in figure four compare a B1 local municipality to a B4

local municipality, where B1 municipalities are classified as 'municipalities with the largest budgets, known as secondary cities' and B4 municipalities are 'local municipalities that are mainly rural with communal land tenure' (Siddle & Koelble, 2013):

Figure 4: Levels of Service Delivery across Municipal Categories (%)



Source: Statistics South Africa Census 2011 & Community Survey 2007

The contrast in overall access to service levels between the B1 and B4 municipalities is starkly represented in figure four. For example, while 69% of people in B1 municipalities had access to flushing toilets in 2011, only 7.5% of people has similar access in B4 municipalities. Thus, despite overall increases in the amount of services being delivered, particularly in the areas of electricity and housing, very large levels of inequality remain between different types of municipalities. This is indicative of the varying contexts and resources in which and with which municipalities operate.

In summary, between 2007 and 2011, there has only been a slight improvement in access to essential services. It is clear that municipalities in South Africa have to deliver public services in vastly varying contexts and across the three types of organisations, metropolitan municipalities provide much higher levels of services to its residents than district and local municipalities. This is particularly true in terms of weekly refuse removal, piped water and flushed sewage systems, whilst access to brick dwellings and electricity is far more equitable across the three municipal levels. Should it be the case that financial compliance influences municipal operations, one would expect to see similar trends occurring in the municipal audit outcomes. Furthermore, the design of an effective auditing system would have to take account of the differences in municipal working environments.

Chapter Five: South African Local Government Finance

In terms of the local government finance system, the White Paper on Local Government (1998) sought to align it with the following principles:

- "Revenue adequacy and certainty
- Sustainable and effective use of resources
- Accountability, transparency and good governance
- Equity and redistribution
- Macroeconomic management and development investment"

To aid it in achieving these development objectives, the White Paper (1998) subsequently highlighted four specific areas of municipal finance that required reorganisation:

- Local revenue instruments and policies
- National-local intergovernmental transfers
- Gearing in private investments
- Budgeting, accounting and financial reporting systems

This thesis is mostly concerned with this last point - that of budgeting, accounting and financial reporting systems. In a decentralised system of governance such as South Africa's, it is important to have strong financial regulations and performance management systems to ensure stability, transparency and reliability. Corruption prevention is an additional imperative in need of checks and balances. Thus, even from as early as 1803, South Africa has had a 'rudimentary form of audits' in place (Craythorne, 2006), introduced to the Cape by the Dutch but retained in later legislation relating to the country's British Colonies. The Cape Municipal Ordinance of 1836 and the Ordinance 1 of 1840 set the now widespread precedent of government activities being audited on a regular basis in South Africa (Craythorne, 2006).

However, the White Paper identified financial reporting and monitoring systems as being an area in need of address due to the prevalence in South Africa of 'unrealistic budgeting, poor credit control, a lack of budgetary and financial discipline, and a lack of user-friendly and accessible information on the budget process' (Siddle & Koelble, 2013). Consequently, the White Paper recommended Generally Accepted Accounting Practices be adopted by South African local government together with numerous pieces of legislation design to provide additional financial frameworks and guidance. These included the Intergovernmental Fiscal Relations Act 97 of 1997, the Financial and Fiscal Commission Act 99 of 1997, the Local Government Municipal Property Rates Act 6 of 2004, the Municipal Fiscal Powers and Functions Act 12 of 2007 and most importantly for this thesis, the Local Government Municipal Financial Management Act (MFMA) 56 of 2003.

5.1 Financial Management and the Audit System in Local Government

As set out in the Local Government Municipal Systems Act 32 of 2000 and the MFMA, the financial management of municipalities and local government is entrusted to an accounting officer and chief financial officer. These officials are supported by the municipal mayor and their respective managers (Craythorne, 2006).

In particular, the MFMA establishes a rigorous annual auditing process with which all municipalities must comply. Firstly, every municipality or municipal entity has to set up an internal audit team, whose responsibility it is to institute internal checks and balances that make certain no fraud or misconduct occurs during daily operations (Craythorne, 2006). The team is tasked with the job of formulating strategies pertaining to issues such as risk, performance and loss management (Craythorne, 2006). The MFMA also makes provision for an audit committee in each municipality or municipal entity. Acting as a source of advice, this committee is comprised of three or more people, who are mostly external to the organisation and provide support and guidance on financial or administrative issues submitted to it by municipal staff (Craythorne, 2006).

The roles of each of these various stakeholders are all interfaced with the Auditor General (AG) due to section 188, chapter nine of South Africa's constitution. This clause mandates the establishment of an independent, unbiased and nonpartisan AG which is meant to 'act without fear, favour or prejudice.' It is subject only to the constitution and accountable solely to the National Treasury (AGSA, 2015; Craythorne, 2006).

The duties of the AG are further legislated in the Public Audit Act No 35 of 2004. It is the AG's task to 'produce audit reports on all government departments, public entities, municipalities and public/constitutional institutions or accounting entity' (AGSA, 2015). It must also fulfil the requirements of both the Public Finance Management Act and the MFMA, 'auditing and reporting on the accounts, financial statements and financial management' of all the entities listed therein (Craythorne, 2006).

Consequently, in order to facilitate the auditing process, by the 31st August every year local municipalities across South Africa are required to produce annual financial statements for the AG to examine. The outcome of the AG's assessment is then recorded in each municipality's annual operational report, which is to be made publically available each year. The municipal financial reports, compiled by the municipalities accounting officer and financial team, must consequently include:

- Information on the financial position, performance and liquidity of the entity
- How it performed against its budgeted and expected objectives
- How it managed its revenues, expenditures, assets and liabilities
- The various business activities it undertook
- The receipt and expenditure of any intergovernmental transfers and allocations (Craythorne, 2006).

These reports must also be 'free from material misstatements,' meaning that 'incorrect or omitted information' is not permitted (AGSA, 2012). Once submitted, the AG will

then assess them to determine the state of financial affairs at each municipality and express an 'opinion' reflecting whether they feel that the public expenditure has been adequate and appropriate. There are three main sections that the AG investigates and on which they base their opinion:

- Whether the financial statements have been accurately and truthfully presented, with no major mistakes, and whether the information contained therein is useful and reliable for users (AGSA, 2015).
- Whether the entity's performance with regards to predetermined service delivery objectives has been accurately and truthfully presented. Predetermined objectives are the performance targets that municipalities set on an annual basis and which are meant to be used as instruments supporting service delivery. The AG will assess the extent to which the municipal entity has achieved its stated goals by comparing the information in the financial statements to the predetermined objectives. This has been a part of the auditing process since 2005, however it was only in 2009 that the AG included a separate outcome based solely on predetermined objectives (AGSA, 2015).
- Whether the entity has complied with financial rules and regulations (AGSA, 2015a). This section of the audit checks how well municipal entities have abided by the financial duties and obligations placed upon them by the many pieces of legislation referred to earlier, such as the MFMA and the Municipal Structures and Systems Acts. This is also where municipal entities 'disclose any unauthorised, irregular as well as fruitless and wasteful expenditure incurred' (AGSA, 2015).

More specific examples of factors examined by the auditor general include the quality of submitted financial statements, the quality of annual performance reports, supply chain and human resource management, information technology controls and financial health (AGSA, 2012a). Although the core sections have remained the same, it should be noted that the sophistication and thoroughness of the audit reports has been improving over the years. Between 2007 and 2011, the audit reports have become

more comprehensive in terms of factors examined and appear to be focusing more on service delivery performance than solely on financial compliance.

There are five possible audit opinions that the AG can give:

- A clean audit – the municipality achieved positive outcomes on all three of the criteria listed above. Not only are the financial statements free of mistakes, but the entity has also complied with all rules and regulations whilst accurately representing its performance with regards to predetermined objectives. A clean audit is also recorded as an 'unqualified with no findings' outcome (AGSA, 2015).
- Financially unqualified audit with findings – whilst the statements are accurately represented with no major mistakes, the AG has found a few concerns regarding predetermined objectives or compliance which result in findings being raised (AGSA, 2015).
- Qualified audit with findings – the financial statements have quantifiable and clearly identifiable mistakes which jeopardise its validity and reliability (AGSA, 2015).
- Adverse audit with findings - the financial statements are marred by significant mistakes and misstatements that are not quantifiable (AGSA, 2015).
- Disclaimer audit – this is the worst possible outcome. The financial statements lack sufficient information, to a significant degree, for the AG to form an opinion on its contents (AGSA, 2015).

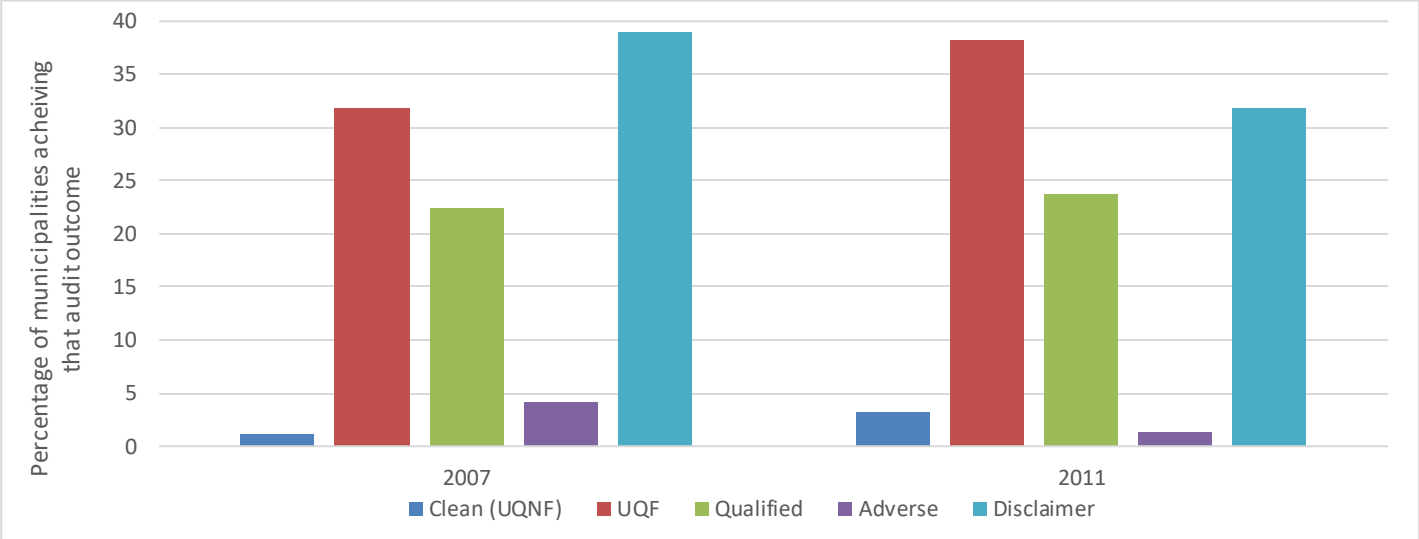
5.2 Performance of South Africa's municipal audit system

South Africa is the only country in the world to adopt the idea of a 'clean audit' outcome (Zille, 2015). In international accounting standards, there are only three audit outcome categories – unqualified, qualified and disclaimer – and financial statements free of major misstatements would normally earn them the status of a 'financially unqualified' audit (AGSA, 2015).

South Africa, however, has introduced an extra auditing standard, requiring municipalities to also meet compliance requirements and predetermined objectives before they can achieve a 'clean' audit. These extra regulations have significantly contributed to the generally poor national audit results – 299 of the 338 municipalities audited in 2012/2013 were not awarded clean audit outcomes due to findings around their predetermined objectives (Hugo, 2013).

Figure five shows that there have been improvements in audit outcomes across the board, including a 7.9% decrease in the percentage of Disclaimer audits and a 6.39% increase in Unqualified audits. However, despite an increase of 2.13%, the number of municipalities achieving a clean audit is still very low and a significant amount receive Qualified outcomes.

Figure 5: National Audit Outcomes for 2007 and 2011 (% of Municipalities)

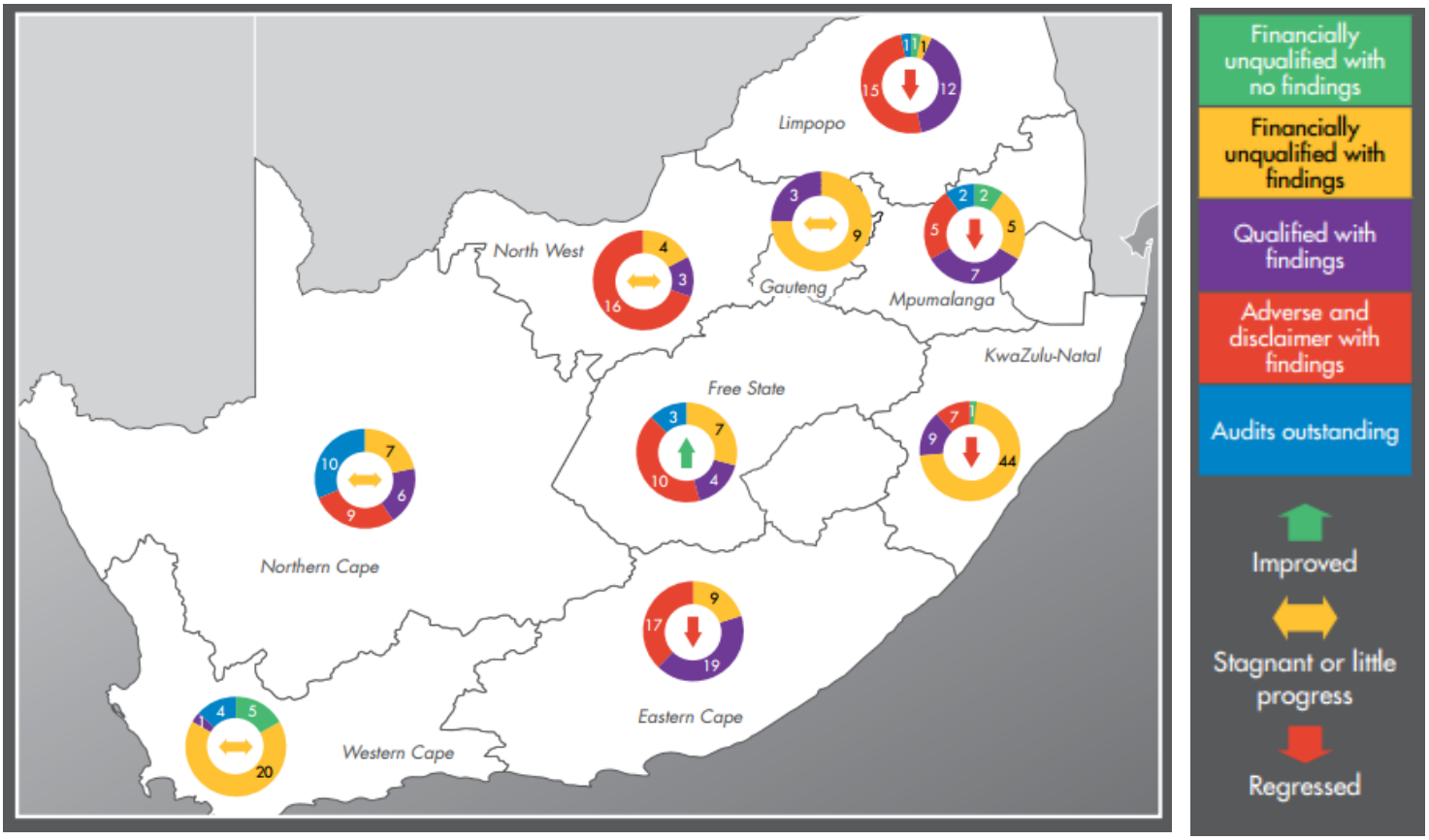


Source: Auditor General South Africa MFMA Reports, 2007/08 & 2011/12

As with the service delivery graphs displayed in figure five, the national audit outcomes can be examined at a provincial level and further broken down into type and tier of municipality. Figure six demonstrates the results achieved in different parts of the country, revealing that the Western Cape was awarded the most clean audits, followed by Gauteng and KwaZulu-Natal with significant numbers of financially

unqualified outcomes. On the other hand, the Eastern Cape, Free State and Limpopo had the most adverse or disclaimer audit results.

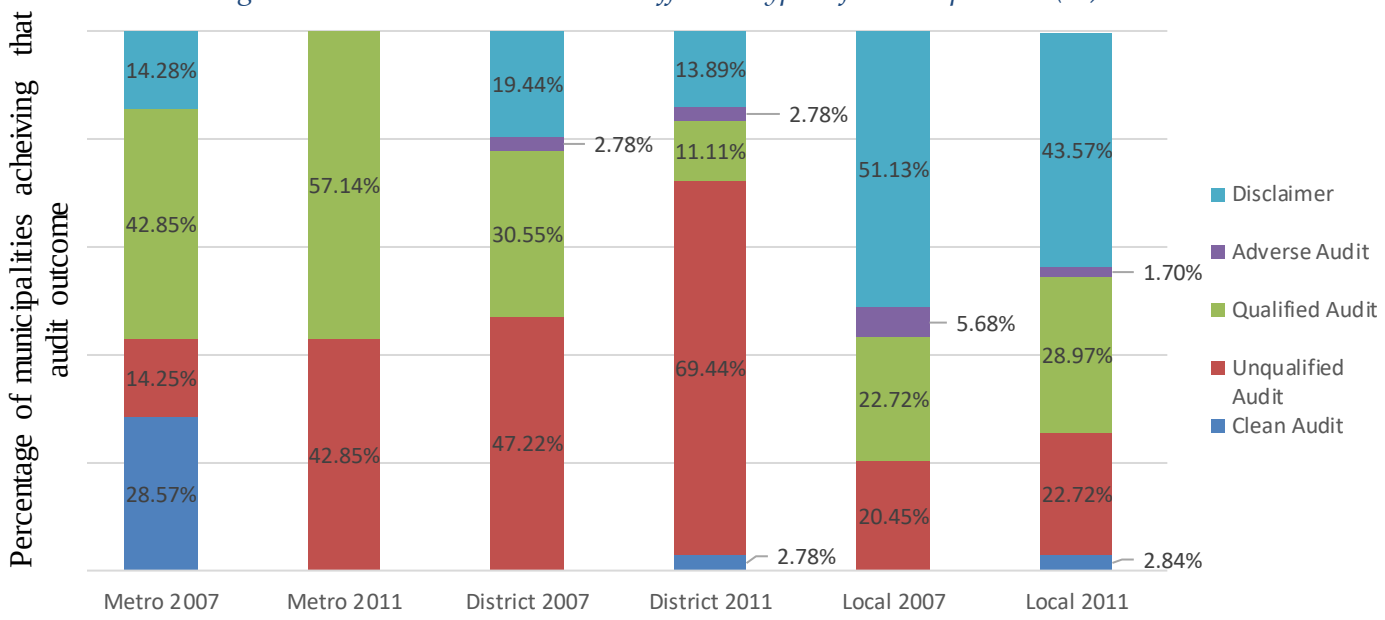
Figure 6: Municipal Audit Outcomes across Provinces in 2011



Source: Auditor General South Africa MFMA Reports

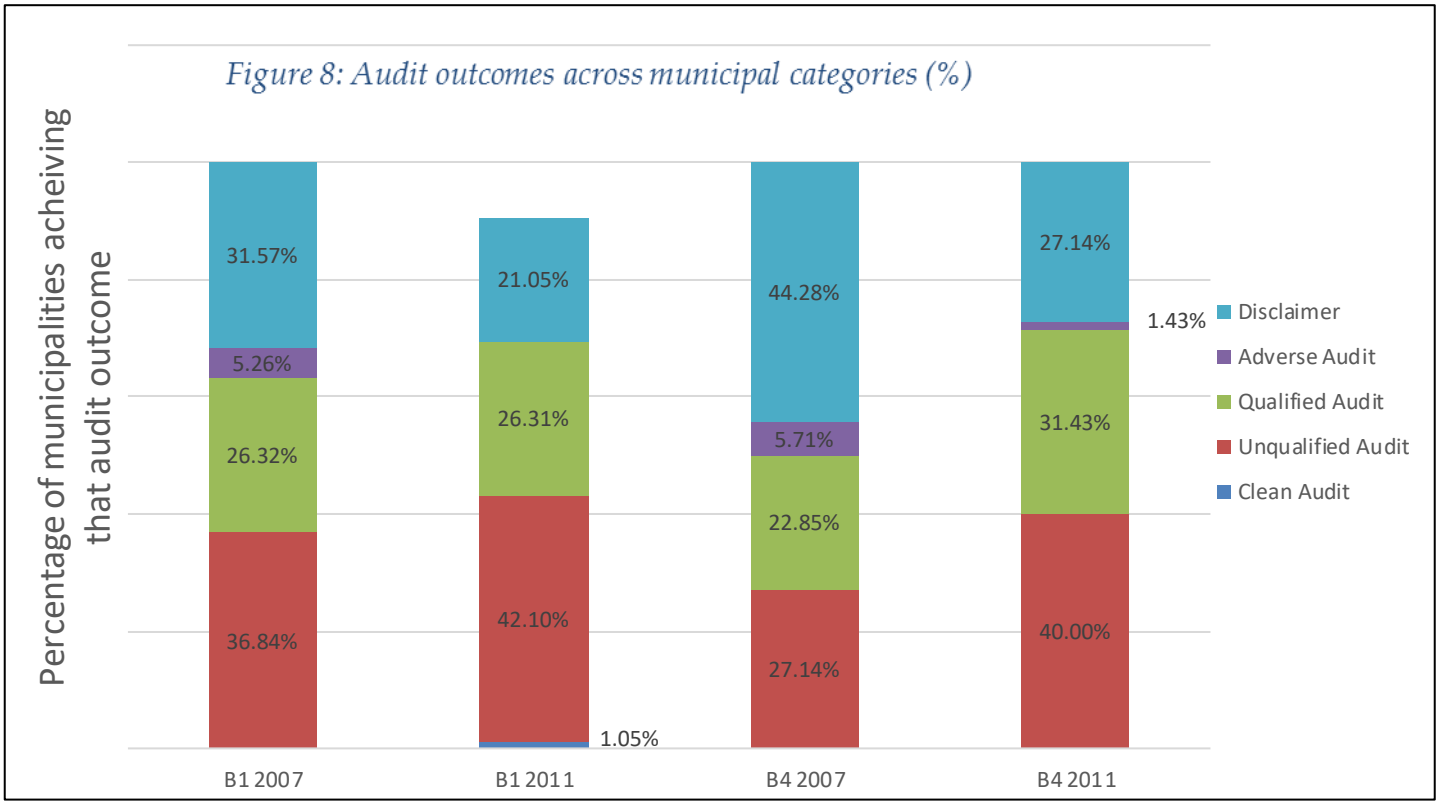
With regards to the different levels of municipalities shown in figure seven, better audit outcomes are achieved in metropolitan municipalities as opposed to local municipalities. Between 2007 and 2011, there was a decrease in Disclaimers of approximately 7% and there were none achieved by metropolitan municipalities in 2011. Across the board, there was an increase in Qualified and Unqualified audit outcomes, with small growth in clean audits in district and local municipalities. On the other hand, there was a large decrease in clean audits in metropolitan municipalities between 2007 and 2011 – a fall of 28.57%.

Figure 7: Audit outcomes across different types of municipalities (%)



Source: Auditor General South Africa MFMA Reports

Looking one level lower, at the difference in audit outcome between B1 and B4 outcomes, it becomes clear that both categories of municipalities experienced an increase in its number of unqualified audits and a decrease in its number of disclaimers. This is shown in figure eight. There was also a ubiquitous drop in adverse audit outcomes. Ultimately, there does not appear to be a noteworthy difference in the audit outcomes being achieved by the two categories of municipalities.



Source: Auditor General South Africa MFMA Reports

Interestingly, similar issues were highlighted in both the South African Auditor-General's 2007 and 2011 MFMA audit reports as being causes behind the poor audit outcomes. A significant factor at play is the capacity levels of local governments to meet audit requirements, which is linked to a lack of skilled staff and high vacancy rates. Senior positions such as Chief Financial Officers are often not filled in South African municipalities. As a result, in 2011 73% of the municipalities that were audited had to hire external consultants to assist with the audit process. Their high fee bills constrained limited municipal finances even further – in 2014/2015 this amounted to a figure of R892-million (Dlamini & Henderson, 2016). The issue of governance and poor leadership was also flagged, with politics and slow response times posing numerous challenges in the day-to-day operation of municipalities. Furthermore, there are few consequences for poor staff performance, which does not incentivise staff to perform well.

Chapter Six: The theory behind successful decentralisation and the role of municipal audits

6.1 What is needed for successful decentralisation?

The weaknesses in municipalities hinder the effective operation of South Africa's decentralised governance system. They also indicate that the system has been poorly adapted to and implemented in the South African municipal environment. According to Olowu and Wunsch (2004) simply passing legislation or imitating the political processes of another country is not sufficient to ensure a decentralised system of local government that operates effectively.

Manor (1999) contests that, for decentralisation of power to be successful, regulations need to strike a careful balance between not being too simple and avoiding onerous, unnecessary complexity. Furthermore, decentralisation of power cannot occur in isolation – financial decentralisation must simultaneously occur and entities to which responsibility is devolved must be adequately equipped to perform their duties. To this end, Manor (1999) is concerned that developing countries such as South Africa might struggle to adopt global 'best practice' governance systems as they lack the necessary 'skills and resources needed to implement and maintain complex arrangements.'

Unfortunately, his concerns might be justified, with local government recently being described as being in a state of 'paralysis and dysfunction' by the Minister of Cooperative Governance and Traditional Affairs (Siddle & Koelble, 2013). Inheriting a racially divided country besieged by financial inequality and overwhelming poverty, the odds were stacked against local municipalities in South Africa from the very start of the country's democracy. Despite being delegated a very long and complex list of responsibilities from National and Provincial government, local municipalities have not always been provided with the necessary operational and financial support. Siddle and Koelble (2013) outline some of these missing factors as being:

- Limited funding and social capital
- Lack of strong leadership
- Lack of skilled human resources
- Feeble institutional design

These last two points are, in their opinion, the most concerning factors. They see these as 'serious impediments to addressing the issues of economic development and service delivery,' whilst 'the failure of local government is to be found in the demands placed by a complex system on institutions that have limited ability and little inclination to meet those demands' (Siddle & Koelble, 2013).

Thus, the argument is not that the concept of decentralisation itself is flawed or should not have occurred. Rather, trying to implement a decentralised system and its associated checks and balances without providing the necessary supporting resources and contextualising it to these operational important factors is not likely to result in success (Siddle & Koelble, 2013). South Africa's municipal auditing regulations – meant to capture a snapshot of the state of local government performance and financial management – is a prime part of the MFMA against which to test this argument.

6.2 How do municipal audit outcomes relate to decentralisation?

In a decentralised system of governance, without sufficient revenue and good financial controls, municipalities will not have the means to provide services and fulfil their duties. As Venter et al (2007) contend, 'management of municipal funds (including their control and safeguarding) is the fulcrum around which municipal service delivery revolves.' The municipal audit system is thus intended to ensure that local governments manage their finances properly and perform adequately in terms of their predetermined service delivery objectives.

Consequently, there must then be a link between the municipal audit outcomes and a municipality's service delivery performance. If this is not the case, then municipal

audits are potentially an indication that the checks and balances of decentralised system of local governance has been poorly implemented in South Africa. Alternatively, the generally poor audit outcomes might suggest that local municipalities need more operational support to carry out their legislated duties, as the devolution of responsibilities has not been matched with equal distribution of capacity and financial support. The next section of this chapter explores these possible relations and their consequences further.

6.3 A closer look at the link between municipal audits and service delivery

Clean audits are promoted as an imperative for municipal managers to achieve, with a significant amount of municipal financial and human resources dedicated towards them. They are expected to be correlated with strong levels of service delivery, as they indicate a municipality has capable management and thus the ability to meet its performance obligations. In the words of Aadnesgaard and Willows (2016), 'a direct correlation suggests that a municipality's internal structure and financial reporting permeate into its outer spheres of performance and service delivery.'

Assuming that this is the case, the emphasis COGTA and the AG places upon achieving clean audits would then be valid, as better financial governance should assist municipalities to improve their operations. South Africa's dismal audit outcomes could thus be representative of poor financial administration impeding service delivery across the country. They may also perhaps hint that municipalities have not been sufficiently capacitated to handle the amount of responsibility devolved to them within a decentralised system. Attracting and retaining qualified staff has often been a challenge for local government, with '1 in 3 budgeted posts nationally vacant' (MDB, 2012). This is a particular struggle for rural municipalities, as B4 municipalities (Local municipalities which are mainly rural with communal tenure and with, at most, one or two small towns in their area) have up to 50% of their funded posts vacant (MDB,2012). There is also a significant skills divide between managerial level staff and technical service managers in local municipalities, of whom less than

50% do not have tertiary education despite being directly responsible for service delivery functions (MDB, 2012).

Furthermore, there may be low or no correlation between the audits and service delivery because, as the AG's website states, 'the audit does not provide assurance that service delivery has been achieved, only that the annual performance report is useful and reliable' (AGSA, 2015). Barry Wheeler, an executive employee of the AG, further explains that 'to achieve a clean audit means one has got the financial statements correct, with no fault in the basics of accounting' but this 'does not mean there are no internal control weaknesses' (Masombuka, 2015). Thus, as long as a municipality's financial records are all in order, complying with the regulations and accurately reflecting the state of affairs in its constituency, it can achieve a clean outcome even if the state of affairs is poor and service delivery is unsatisfactory.

This also speaks to the cases where audit outcomes appear to be negatively correlated with service delivery levels. An example is the Msinga municipality, where positive audit outcomes have been achieved despite service delivery protests frequently occurring amongst their constituents (Lund, 2014). It is possible that the municipal audit system actually results in perverse incentives, limiting service delivery. For example, if a municipality sets a pre-determined objective to build 12km of roads during a certain calendar year, failure to realise that goal will result in a finding made by the auditor-general, regardless of whether 1km or 11.9kms of roads were built. Thus, Zille (2015) points out that the potential for auditors to make findings around pre-determined objectives leads to municipal departments avoiding "stretch targets" and setting "the bar a little lower" than normal. As one municipal manager bluntly stated, 'the easiest way for a municipality to obtain a clean audit is for it to do as little as possible, in which case there will be no findings for the AG to make' (McCartney, 2015).

Nonetheless, even if municipal audits are more indicators of how well a municipality complies with Generally Recognised Accounting Practices (GRAP) rather than how

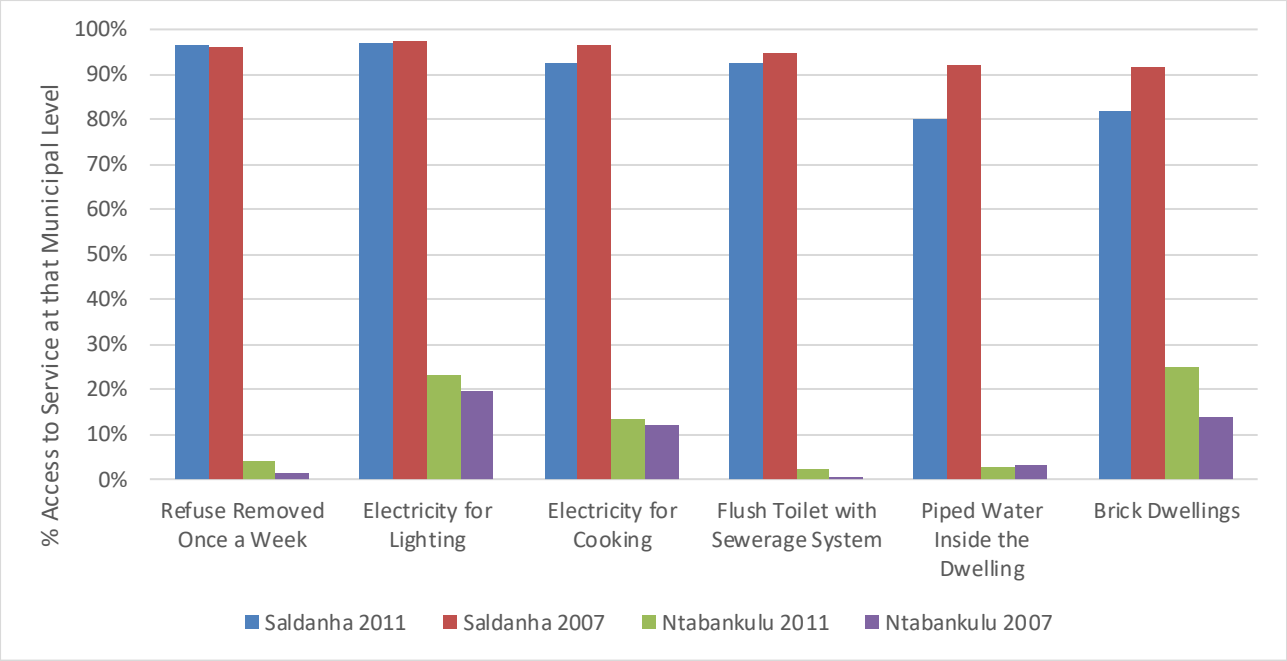
well it is operating as a service-orientated, public entity (Lund, 2014), the costs and design of the audit system can still be questioned. The emphasis on compliance often leads to many situations in which municipalities are caught between a regulation and reality, unable to take rational action due to restrictive red tape (Zille, 2015). Often these difficulties revolve around contracting and procurement regulations. For example, local municipalities are required to fill senior management vacancies with 90 days of the positions becoming available. (Zille, 2015). However, the stipulated vetting processes are very seldom completed within 90 days – leaving local municipalities with the choice of either complying with all the hiring processes regardless of how long it takes, or hiring a candidate within the allocated 90 days but neglecting some of the vetting procedures.

Additionally, if no link to service delivery exists, can the amount of resources spent and emphasis placed on the audits be justified? This question is especially pertinent in light of the roughly 120 time-consuming regulations with which municipalities must comply and the huge expense that the annual audits present to municipalities (Hugo, 2013). For the Western Cape government alone, this amounts to approximately R100-million in annual fees. Furthermore, the Capacity Assessment conducted by the MDB (2012) found that C1, B4 and C2 municipalities spend 48.4%, 70% and 41% of their budgets respectively on governance and administration tasks, which would include municipal audit activities. Over and above the fact that this represents a significant amount of duplication between local and district municipalities (MDB, 2012), these figures substantiate the argument that the municipal audit system is unnecessarily onerous with limited impact upon service delivery performance. Aadnesgaard and Willow (2016) agree, stating that such disconnect to service delivery would 'put forward the issue that perhaps evaluating municipalities on audit outcomes and holding municipalities accountable on these results is not effective in determining and improving the success of that municipality.'

6.3.1 A Cursory Glance at the Data

In an attempt to uncover which of the above scenarios actually characterise the relationship between municipal audit outcomes and service delivery performance, this thesis now moves to examine the available data empirically. It begins with a simplistic, non-parametric comparison of outcomes across a traditionally well-performing local municipality, Saldanha Bay in the Western Cape, and a usually under-performing local municipality, Ntabankulu in the Eastern Cape. Geographically, this contrast in performance holds true as most of the weakest municipalities are located in the Eastern Cape or Kwa-Zulu Natal whilst the strongest ones are in the Western Cape (BusinessTech.co.za, 2014; BusinessTech.co.za, 2016). This does little to reveal useful answers.

Figure 9: Differences in service delivery between the Saldanha and Ntabankulu Municipalities



Source: StatsSA Census 2011 & Community Survey 2007

Table 1: Differences in audit outcomes between the Saldanha and Ntabankulu Municipalities

Audit Outcomes	2007	2011
Saldanha Municipality	Disclaimer	Unqualified with Findings
Ntabankulu municipality	Disclaimer	Qualified with findings

Source: Auditor General South Africa MFMA Reports

As is evident from figure nine and table one, there were larger improvements in service delivery in the Ntabankulu municipality than there were in Saldanha. In fact, there were declines in numerous categories in the Western Cape municipality. However, it is obvious that on the whole, there are far higher levels of service delivery levels in Saldanha than in Ntabankulu municipality, whose growth comes off a much lower base. In terms of audit outcomes, both municipalities improved from their 2007 Disclaimer results, although from this there doesn't seem to be a clear link between the movement in this and in service delivery.

Likewise, previous figures showed that on the whole, there is relatively acceptable levels of service delivery in South Africa but very few positive municipal audit outcomes (AGSA, 2012a). Whilst the Northern Cape was amongst the best performing provinces in terms of service delivery, it had many outstanding or disclaimer audits. Alternatively, KwaZulu-Natal has some of the lowest levels of service delivery and yet also achieved many strong audit results. The Free State was the only province to improve both in terms of service delivery and audit performance, but not one of its municipalities achieved a clean audit (AGSA, 2012a). Thus, the variability in service delivery levels is not matched by the variability in possible audit outcomes, of which there are only five – making it difficult to see whether there is any relation between the two just by examining output graphs.

6.4 A survey of municipal employees' opinions

In order to gain some sense of municipal employees' perceptions of and working experience with the local government audit system, an online survey was conducted.

Although having been sent out to all 278 municipalities in South Africa, the poor quality database of municipal contact details and often apathetic attitude of municipal employees towards research questionnaires saw the survey achieve a very low response rate (5%). 18 staff members, mostly municipal managers or financial officers, responded from 14 different municipalities. The respondents came from six different provinces: KwaZulu-Natal, Western Cape, Northern Cape, Eastern Cape, Gauteng and Mpumalanga. One respondent chose to remain anonymous. Furthermore, 15 out of the 18 respondents stated that they have direct involvement with the municipal audit system.

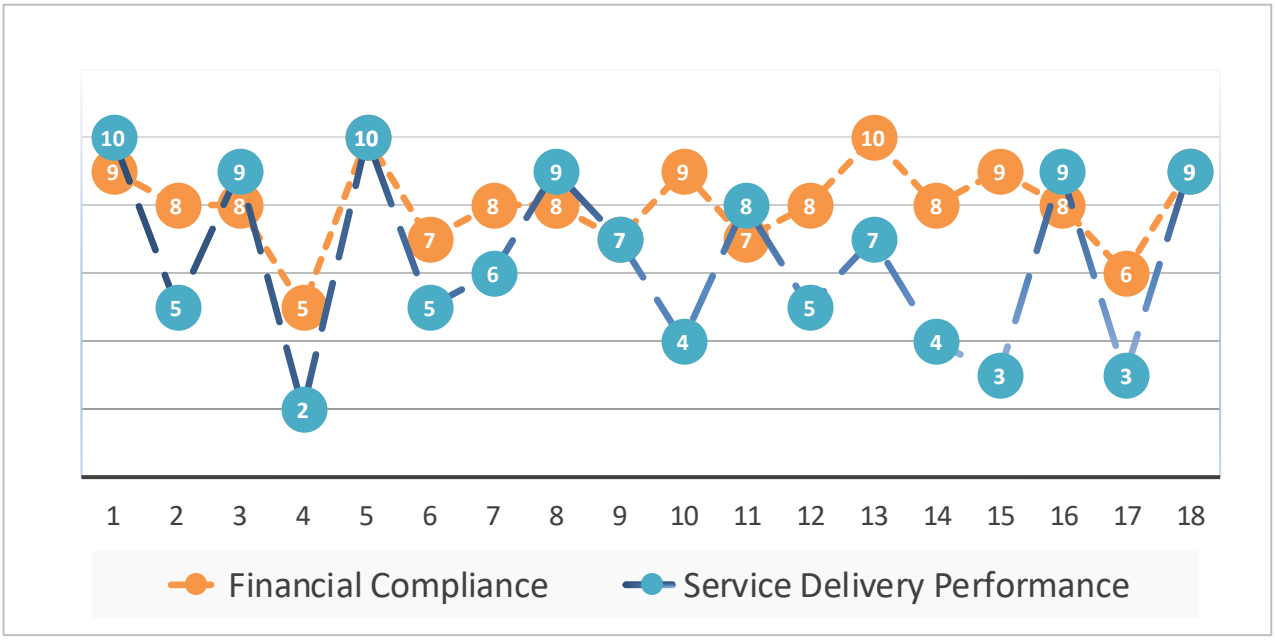
Despite the poor response rate, the insights provided by those who did respond are still useful for this paper, in that they shed light on the human element of municipal audits from those directly involved with local government daily activities. However, they are limited in their representivity of municipal employees' views and thus should not be taken as robust trends. The survey participants were asked to answer two questions where they had to rank the effectiveness of the municipal audit system on a scale of one to ten, with ten representing complete accuracy. The two questions were as follows:

- How effective are municipal audits at capturing financial compliance?
- To what extent does financial compliance reflect service delivery performance? (I.e. does strong financial compliance equate to good service delivery performance?)

Figure ten represents the individual results of the survey, with each respondent's answer to the two questions contrasted against one another. As shown, the orange line (short dashes) represents the ratings given in terms of the municipal audits' representation of financial compliance. Aside from two outliers, the audits consistently scored 7 out of 10 or more. This indicates that most of the respondents perceive the audits to strongly represent the financial compliance of a municipality.

On the other hand, there is far more variability in the blue line (longer dashes). This line represents the extent to which financial compliance, and by extension, local government audits, are a reflection of the level of service delivery being achieved by a municipality. Whilst some perceive there to be a strong link between the two variables, others are of the opinion that the link is very weak – with the lowest rating being 2 out of 10. It is thus clear that there does not seem to be shared agreement around the strength of the representativeness of municipal audits with regards to service delivery.

Figure 10: Individual Respondent Survey Results



The responses have also been grouped to create a clearer picture of general trends. Figures eleven and twelve show that whilst on average, the employees rated municipal audits approximately 8 out of 10 for their representation of municipal financial compliance, there was a much greater spread of rankings in terms of their link to service delivery levels. For example, in figure eleven, seven respondents gave municipal audits and their ability to represent financial compliance a score of 8/10. However, in figure twelve, which demonstrates scores given to municipal audits for their strength as proxies of service delivery performance, four respondents indicated they perceived there to be a strong link between the two (9/10) and seven respondents felt there was a weak link, ranking the relation between a 3/10 to 5/10.

Figure 11: Number of Votes for Financial Compliance Representation

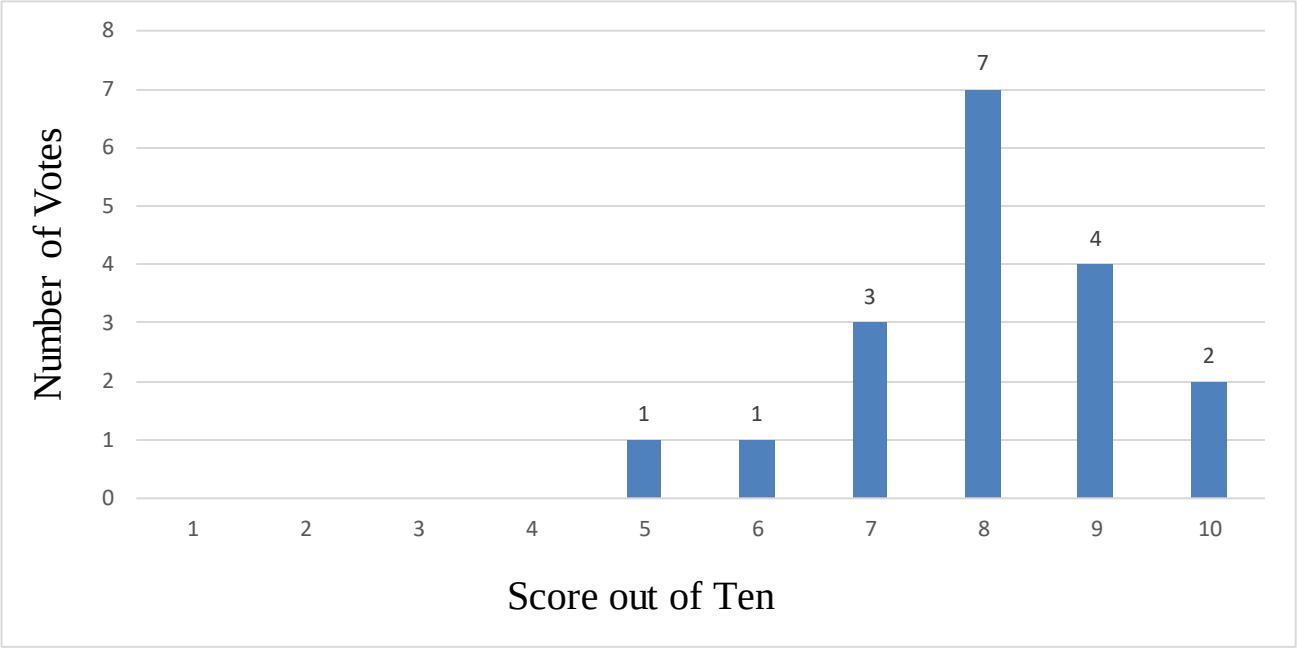
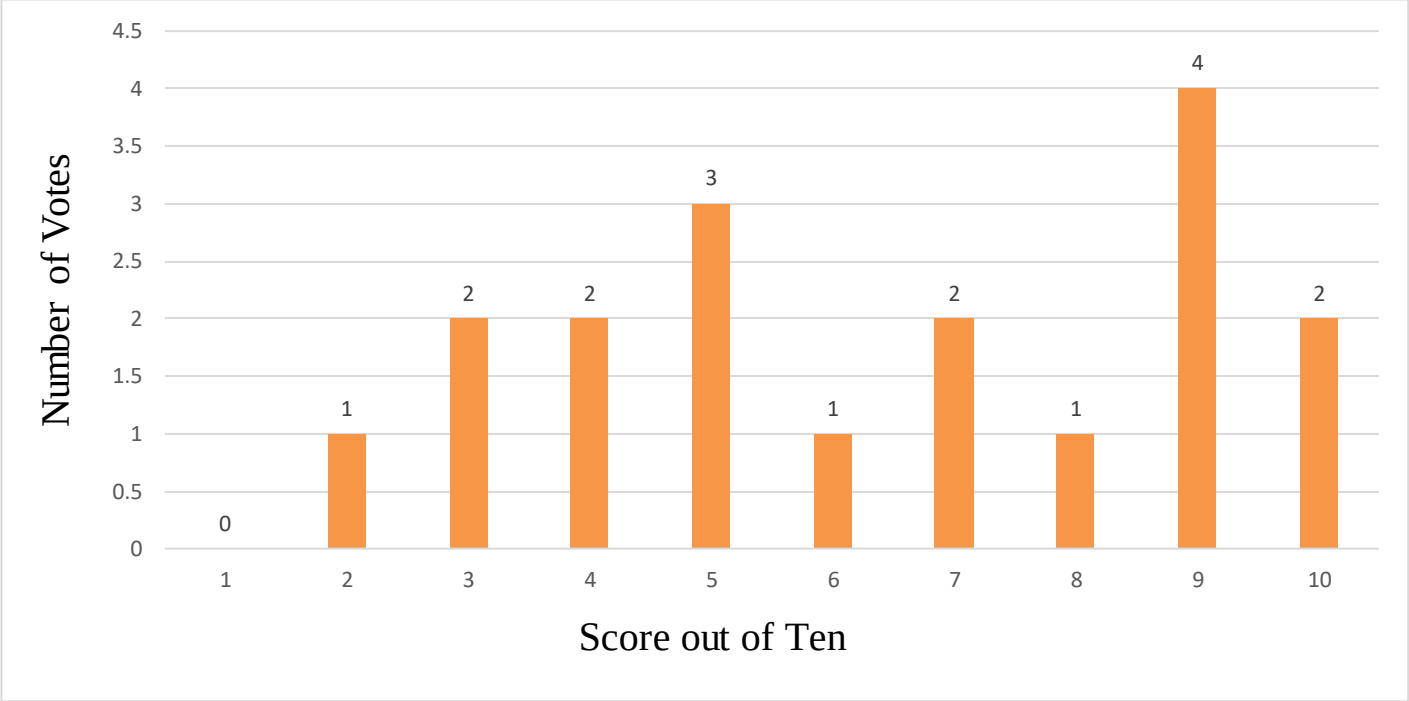
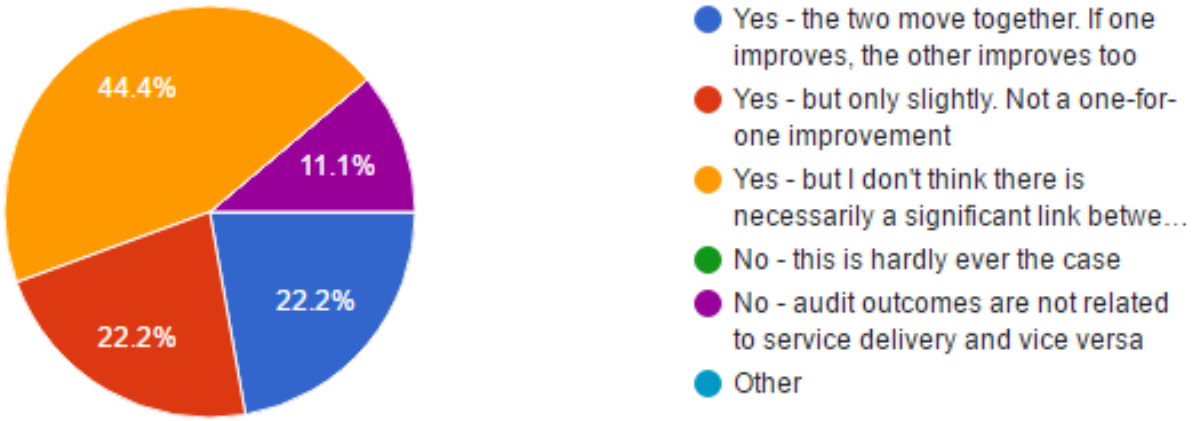


Figure 12: Number of Votes for Service Delivery Performance Representation



Respondents were further asked to clarify whether they thought the two indicators moved in the same direction. That is, whether changes in audit outcomes over a period of time are correlated to changes in service delivery performance. Again, the results were mixed, as shown in figure thriteen:

Figure 13: If your audit outcomes improve over a period of time, is there normally a correlated improvement in service delivery performance too?



However, a clear majority did emerge with 8 out of the 18 respondents indicating that although the two seemed to move with one another, they did not think there was necessarily a significant link between them. Four respondents agreed, stating that the two would move in the same direction but only slightly as opposed to a one-for-one change. Whilst four people thought that the two variables were strongly correlated, two people were of the opinion that there was no relation between audit outcomes and service delivery at all.

These responses indicate that there seems to be general agreement that municipal audits strongly capture the financial compliance and management capacity of a municipality. On the other hand, there is no clear agreement amongst respondents as to how this links with service delivery.

To explore the idea that municipal audits may be impeding service delivery and to get a sense of how municipal employees view the system, respondents were asked the following two questions:

- Do you think that the current audit system impinges upon service delivery? If so, why?

- Is getting a clean audit worth the effort it takes? (I.e. do you think that time and those resources could be better spent elsewhere?)

In response to the first question, the overwhelming majority of respondents (thirteen out of eighteen) indicated that they did not think the audit system was a hindrance to service delivery in any way. They indicated that the audits are quite separate from service delivery – measuring only issues of financial compliance. These answers seem to suggest that the audits do capture financial compliance capacity but that their impact upon service delivery is quite limited, affecting only the targets set and not a municipality's capacity to actually meet them.

This reasoning was echoed by the four respondents that indicated they did think the municipal audit system impinged upon service delivery. Issues cited include the MFMA over regulating municipal operations, placing too much focus on compliance, too little emphasis on service performance and leading to a diversion of resources away from service delivery to administrative tasks.

A similar narrative is found in the answers to the second question, which was whether the amount of resources a clean audit requires is worthwhile. The vast majority of respondents indicated that they viewed clean audits as being a necessary goal to strive towards. Whilst achieving a clean audit is a difficult task that requires a significant amount of work, no one is of the view that the audit system should be removed or is not necessary. On the contrary, there was a ubiquitous expression of appreciation for role audits play to curb corruption and 'lead to better knowledge and control within the organisation.'

However, equally as prevalent was the feeling that, whilst a well-designed and effective municipal audit system is very much a necessity, the current system in place can be improved in numerous ways. Some relevant comments from the survey include:

"Clean audits are important, because we must be able to manage the finance of the tax payer correctly but yes, some of the resources spent on new procedures and advisory consultants could be spent better on real hard core service delivery."

"Clean audits have some value as far as compliance and the correctness of the financials are concerned. The audits conducted on achievement of performance is limited as far as measuring actual delivery on ground level is concerned. The effort and cost needed to get and maintain a clean audit (which focuses more on compliance) does not correlate with actual delivery of service which is the core function of a municipality."

"A clean audit is based on fair financial statements, compliance to laws and regulations and the correct reporting of performance achievements. It indicates sound financial administration, risk management and good governance and does give some assurance to the public regarding the spending of their tax money. But the current audits by the Auditor-General concentrates very little on actual service delivery on the ground i.e. measuring actual performance."

When asked about the biggest barrier municipalities face in terms of achieving clean audits, two groups of challenges emerged. Firstly, municipal employees indicated that they struggled to source and fund the level of skilled staff able to adequately prepare the quality of financial statements needed to achieve a clean audit. Municipalities often have to hire in expensive, external experts to assist with auditing preparations. Secondly, they face challenges relating to the complexity and multiplicity of regulations which limit municipal operations and make it hard to avoid findings being made by the Auditor-General for poor compliance. One municipal manager stated that municipalities have over 100 prescripts to adhere to and they often struggle to keep up with all of them.

In addition to the interference of politicians in municipal operations, almost all respondents highlighted financial constraints as being the biggest deterrent to delivering services. As was outlined earlier, although a significant amount of responsibility has been delegated to the local government tier during South Africa's move to a post-apartheid, decentralized system of governance, this has not necessarily

been followed by adequate financial decentralization. Municipalities are facing increasing demand for services from growing citizen populations yet fewer residents are able to pay their rates in constricted financial climates.

It is thus difficult to make conclusive statements about the link between municipal audits and service delivery in South Africa, as the variety of opinions outlined earlier demonstrate. Whilst the evidence presented thus far seems to suggest that the audits are effective at capturing a municipality's financial management capacity, they appear to have limited externalities that positively benefit service delivery performance. Some of the biggest constraints facing municipalities are limited finances and a complex plethora of regulations – neither of which the audit system is assisting.

Chapter Seven: An empirical framework for analysing the relationship between municipal audit outcomes and levels of service delivery

7.1 Distilling the Research Question

As discussed, effective local government operations are crucial for economic development and growth in South Africa. It is thus surprising that there does not appear to a larger body of empirical work assessing the validity of the assumption that clean audits, as reflections of financial compliance and effective management capacity, improve a municipality's ability to deliver public services. Currently, it seems that the degree to which the benefits of robust financial management spill over into other parts of a municipality's operations is unknown. Nor is it known whether the current municipal audit system is effectively designed and implemented to achieve its objectives.

Hence, the key research question this thesis will examine is the following:

To what extent does financial compliance, as represented by municipal audit outcomes, explain or influence the service delivery performance of a municipality?

This thesis aims to assess firstly, whether a link between those two variables exists and if so, how strong the relationship is. Secondary questions that can arise from this include whether positive audit outcomes can only be achieved at the expense of service delivery targets, whether the benefits associated with positive audit outcomes lead to improved service delivery and whether the audit system itself needs to be adapted.

7.2 Distilling the Hypothesis

This thesis has three hypotheses around the relation between municipal audits and service delivery.

H_0: Local government audit outcomes are positively related to service delivery levels in each municipality.

In this case, financial discipline impacts positively on service delivery. Thus, more support should be given to municipalities to improve financial management, revenue generation and in turn, service delivery capacity.

H_1: Local government audit outcomes are negatively related to service delivery levels in each municipality.

In this case, the design of the audit system should be altered and perhaps focused more towards performance auditing. It should not perversely incentivise the financial management team to limit their service delivery activities.

H_2: Local government audit outcomes are not related to service delivery levels in each municipality.

In this case, responsible management of funds is not enough to improve municipal service delivery, and strong financial capacity does not have positive externalities on other aspects of municipal operations. This might call for a combined solution of both making appropriate adjustments to the municipal audit system and better capacitating municipalities to improve service delivery.

7.3 Empirical Strategy

Although no single publication has examined the questions posed in their entirety, there are various papers that attempt to answer different aspects. This thesis has thus combined these different methodologies with OLS and fixed effects regressions to more holistically explore the relationship between municipal audit outcomes and service delivery levels.

Firstly, following the approach taken by Aadnesgaard and Willows (2016), this thesis constructs a balanced scorecard against which to measure service delivery performance and test for correlation with municipal audit outcomes. Whilst Aadnesgaard and Willows (2016) applied their methodology to 2013 data only, this thesis analyses data from 2007 and 2011. These years were chosen as they coincide with the Statistics SA 2007 community survey and 2011 nationwide census.

To overcome the problems associated with a balanced scorecard, this thesis then adopts a similar approach to Krugell et. al (2009), who create principal components from the available service delivery data. They use these principal components to run various graphical analyses and parametric tests, such as one-way ANOVAs, to identify characteristics that differ across municipalities that improved their service delivery performance between 2001 and 2007 and those that saw worsening performance. This thesis conducts similar analysis however instead of ANOVAs, it applies non-parametric Krushkal-Wallis and Wilcoxon Rank Sum tests, whilst also including a variable that Krugell et al (2009) did not examine – the audit outcomes.

Following this analysis, to explore the explanatory power of municipal audit outcomes in relation to service delivery in a municipality – that is, to assess the degree to which the benefits associated with financial compliance spills over into other areas of municipal performance – this thesis conducted OLS regressions. Although satisfying the assumptions behind an OLS regression, endogeneity issues led to the final analysis taking the form of fixed effects regressions.

7.4 Data Description

The data used in this thesis was collected at a nationwide level – covering all 8 metropolitan, 44 district and 226 local municipalities in South Africa. The unit of observation is a single municipality. As the analysis is looking at changes between the years 2007 and 2011, the collected data was organised into a panel dataset, with each variable having a data point from both years for each observation. Given that the data

covers the entire population and is not a sample, no weights were needed during the analysis.

The South African household and population statistics were sourced from Statistics South Africa, specifically the 2007 Community Survey and 2011 nationwide Census. Although there is room for human error in its collection, it is one of the most reliable sources of such data available, being regulated by the Statistics Act of 1999.

The Municipal Demarcation board supplied the data regarding a municipality's prior homeland or republic status, whilst the Independent Electoral Commission provided the voting data. Finally, data reflecting municipal finances was collected from the South African National Treasury's website which hosts annual municipal financial records.

The municipal audit outcomes are sourced from the 2007/2008 and 2011/2012 annual audit reports prepared by the South African Auditor General, an independent regulator tasked with assessing financial and operational compliance levels of South African municipalities.

7.5 Data Limitations

As with all survey data, there are often issues regarding data collection, processing and editing techniques. For example, although it has no significant impact upon the quality of the data captured, it is noted that the census 2011 has a larger than expected undercount, due to a number of people not being able to participate in the survey (Schultz, 2013).

Furthermore, a significant limitation of the data obtained from Statistics SA's sources is that it was only available in count form and not at an individual level. For example, instead of recording the language of each individual living in a municipality, the available data aggregated the number of people in a municipality that spoke a certain language at the time of data collection. This means that instead of being able to

include, for example, a categorical variable indicating the different languages spoken in a municipality, this thesis had to include discrete variables indicating the percentage of each municipality's population that speaks a specific language.

It is noted that both the population and household data and the municipal audit outcomes are outdated by a number of years. However, it was not possible to analyse more recent data as the nationwide censuses are conducted every ten years, meaning the next batch of statistics will only be available in 2021. 2011 and 2007 were thus the latest two periods of time for which both municipal audit data and population data were available. This might influence the relevance of results found in this thesis, as the municipal audit system has changed significantly over the years and is increasingly focusing on issues of performance.

However, the outcomes determined by mandatory audits still assess criteria that are very compliance orientated and disjointed from service delivery performance. Audit reports from more recent years may include more information drawn from municipal performance reports and internal control mechanisms, but they have not yet reached a stage where these factors influence the ultimate audit outcome in the same manner as compliance issues.

Finally, measuring performance is often difficult due to the nature of the impact being hard to capture quantitatively. Thus, not all relevant variables have been included in this thesis due to limited availability or the factors being hard to capture. Observable variables – such as numbers of staff – and intangible factors – such as managerial style, honesty and motivation levels – were not available to be included in this dataset. Hence it is possible that important factors in the audit outcome – service delivery relationship are not being captured by this thesis.

7.6 Data Manipulation

As the data used in this thesis comes from a few different sources, it was necessary to first merge each separate database into one main databased before any analysis could

be conducted. This was done by using the municipal code as the common, identifying variable upon which to merge each dataset.

Between 2007 and 2011, various municipal boarder changes took place, resulting in the formation of new municipal regions that did not exist in the 2007 Community Survey. Thus, numerous municipalities were dropped from the dataset or municipal codes altered to ensure the data conforms to the latest 2011 municipal boundaries. The changes made are described in table one of the appendix.

7.6.1 Outliers and Missing data

Although not part of the OLS assumptions, outlying and missing data points are also able to bias results. To deal with this, points of outlying and leveraged observations were identified by plotting both sets on a horizontal and vertical axis respectively and highlighting the extreme values. These were points were then correlated against points of influence, and those that fell into all three categories were removed from the OLS regressions. These removed observations are listed in table two and three of the appendix.

Missing data was not an issue with this dataset. However, it was noted that not all the observations were being included in the OLS regressions as Stata only includes observations which have data for all the selected variables. It is important that the missing observations are excluded randomly and there are no underlying trends in the missing data that could bias the results. This paper thus checked whether the missing values are related to the dependent variable, the results of which ultimately lead to variables being removed from the regression if their missing data points significantly impacted upon the dependent variable. Therefore, the final regression specifications do not include any variables with data that is not missing at random.

Chapter Eight: A preliminary analysis of the relationship between municipal audit outcomes and levels of service delivery using the balanced scorecard approach

8.1 What is a balanced scorecard?

As a starting point, it must first be established whether there is in fact a link between municipal audit outcomes and service delivery indicators. Aadnesgaard and Willows (2016) examine this exact question by adapting traditional corporate scorecards to suitably evaluate municipal service delivery. The purpose of using a scorecard is to create a categorical ranking of service delivery performance which can then be used to test for correlation against the categorical municipal audit outcomes.

They define these balanced score cards as "strategic management systems that link performance measurement to strategy using a multidimensional set of financial and nonfinancial performance metrics," and point out that they "are becoming more widely accepted in evaluating corporate performance due to sustainability being dependent on a rounded approach to business" (Aadnesgaard & Willows, 2016 ; Epstein & Wisner, 2001 (2)). Aadnesgaard and Willows (2016) chose to adapt the specific balanced scorecard of Severn Trent Water Ltd, a British water, waste and utility systems service provider, which they felt closely resembled the core operations of a typical South African municipality. Severn Trent's scorecard focused on the following elements:

- Health
- Education
- Housing quality

8.2 Creating a balanced scorecard for municipal service delivery

Aadnesgaard and Willows (2016) thus adapt this scorecard to examine municipal service delivery, according to selected municipal duties outlined in Schedule Four of the Constitution (1996) which they deem to be 'essential.' Weighted around the median levels of service delivery, they give each indicator a score out of five and then

average these scores out to produce an overall service delivery rating. Consequently, the ratings are correlated against municipal audit outcomes to assess whether there is a relationship between the two variables.

As outlined earlier, Schedule Four of the South African Constitution lists approximately 15 areas of municipal responsibility and Section 152 in chapter 7 charges municipalities with the duty to provide services to their communities in a sustainable manner (Constitution of the Republic of South Africa No 108, 1996). Only a selection of these areas of responsibility have been used as service delivery indicators in this thesis, in line with available data and work done by Aadnesgaard & Willows (2016) and Krugell et al (2009).

Aadnesgaard and Willows (2016) selected their variables according to 'fundamental service provisions so as to not skew data in light of minor service provisions.' Their decision as to what services should be classified as fundamental was informed by Maslow's hierarchy of needs, with emphasis placed on 'physiological needs' such as 'shelter, sanitation, refuse removal, lighting and access to water' (Aadnesgaard and Willows, 2016). The variables selected to represent municipal service delivery in this thesis are thus the following:

- Percentage of households in brick dwellings
- Percentage of households with access to electricity for cooking, heating and lighting
- Percentage of households with access to weekly refuse removal
- Percentage of households that have access to internal piped water
- Percentage of households that have a flushing sewage system

These variables were also used by Krugell et al (2009) and Le Roux Booysen (2003). Furthermore, they lend themselves to being used in a comparison across municipalities as these are common core responsibilities where as others, such as ensuring public health and safety, are undertaken by a limited number of

municipalities or managed by higher levels of government (Aadnesgaard and Willows, 2016). Aadnesgaard and Willows (2016) also included unemployment rates as an indication of economic development and to account for the effect that employment has upon access to services levels. Higher employment rates are indicative of higher levels of income in an area, which enables residents to purchase basic services themselves or enables municipalities to provide more services due to a stable flow of income via rates payments (Aadnesgaard and Willows, 2016).

The following table lays out the weighting used for each indicator to create the overall service delivery score for each municipality:

Table 2: Service Delivery Indicator Weightings

Service Delivery Indicator	**Average Level of Service Provided Nationally**	**Weightings used 2011 (Based on % of municipal population receiving that service)[1]**	**Weightings used 2007 (Based on % of municipal population receiving that service)**
Piped Water Inside Dwelling	2011: 36.26 % 2007: 38.22 %	5: 70-100 4: 50-70 3: 30-50 2: 20-30 1: 10-20 0: 0- 10	5: 75-100 4: 45-70 3: 35-45 2: 25-35 1: 15-25 0: 0-15

[1] The middle weighting was determined according to the average national levels of access to a specific service delivery indicator – hence a middle percentage band, based on this national average score, was allocated to a rating of 'three.' The rest of the ratings were evenly allocated to access bands above and below the average. In other words, taking piped water as an example, in 2011, on average 36.26% of South Africans had access to piped water within their homes. Hence, any municipality in which 30%-50% of the constituency had access to piped household water then received a rating of three for that service delivery indicator. If less than 30% has access, they got a score of 0,1 or 2 and if more than 50% had access, they got a score of 4 or 5. The scores for each service delivery indicator were averaged out to produce the overall score.

Electricity for Cooking	2011: 66.47% 2007: 58.30 %	5: 80-100 4: 70- 80 3: 60-70 2: 40-60 1: 20-40 0 :0-20	5: 80-100 4: 65-80 3: 55-65 2: 40-55 1: 30-40 0: 0-30
Electricity for Lighting	2011: 80.32% 2007: 76.27 %	5: 90-100 4: 85-90 3: 75-85 2: 50-75 1: 20-50 0: 0-20	5: 90-100 4: 80-90 3: 70-80 2: 50-70 1: 30-50 0: 0-50
Flushing Toilet System	2011: 44.71% 2007: 44.52 %	5: 70-100 4: 50-70 3: 40-50 2: 30-40 1: 20-30 0: 0-20	5: 80-100 4: 60-80 3: 40-60 2: 30-40 1: 20-30 0: 0-20
Refuse Removed Weekly	2011: 47.58% 2007: 48.61	5: 75-100 4: 55-75 3: 45-55 2: 35-45 1: 20-35 0: 0-20	5: 80-100 4: 60-80 3: 40-60 2: 30-40 1: 20-30 0; 0-20
Employment Rates	2011: 21.45% 2007: 35.84 %	5: > 50 4: 30-50 3: 20-30 2: 15-20 1: 10-15 0: 0-10	5: > 55 4: 40-55 3: 30-40 2: 15-20 1: 10-15 0: 0-10

Brick Dwellings	2011: 76.11% 2007: 68.04%	5: 90 -100 4: 80 - 90 3: 70 - 80 2: 50 - 70 1: 25 - 50 0: 0 – 25	5: 85 – 100 4: 75 -85 3: 65 -75 2: 50 - 65 1: 25 -50 0: 0 – 25

It should be noted that whilst the majority of variables listed in table two were standalone variables in the Stats SA database, Brick Dwellings is the sum of a few relevant housing variables, namely:

- House or brick structure on a separate stand or yard
- Flat in block of flats
- Town/Cluster/Semi-detached house
- House/Flat/room in backyard
- Room/flatlet not in backyard but on a shared property
- Servants Quarters/Granny Flat

According to the weightings as per the last two columns in table two, each service delivery indicator was given a score out of five. These were then averaged over all the indicators to produce a service delivery score for each municipality.

8.3 Examining the service delivery and audit outcome scores

Figure 14 contrasts each municipality's service delivery score against its audit score for both 2007 and 2011. The audit results achieved by the municipalities are captured in a categorical variable, where a one represents the worst possible outcome (Disclaimer) and a five represents the best possible outcome (Unqualified with No Findings).

In a case of perfect correlation, a municipality should receive roughly the same score for both performance metrics (each out of five), which would see the orange (bottom) and blue (top) lines in figure fourteen each contribute 50% towards the total

municipality's score (out of ten), as represented on the y axis. In other words, the lines in the figure fourteen should all be meeting in the middle of the graph. Whilst this is the case in a number of them, it is also clear to see many points where one score is much higher than another, leading to the spikes and troughs visible across municipalities in both years. Hence, there appears to be a significant amount of variation between the two scores and no clear relation in one direction or another.

Figure 14: Service Delivery & Audit Outcome Scores across Municipalities in 2007 and 2011

Source: Statistics SA, 2007 & 2011; Auditor General Reports 2007 & 2011

8.4 Testing relationships between the scores

To assess the relationship between the two variables, chi-squared tests were run. A chi-squared test is used when one is looking for correlation between two categorical variables, and wanting to assess whether their distributions are different from one another (Wooldridge, 2015). The test uses the null hypothesis that the two variables are independent whilst the alternative hypothesis is that they are related. It produces a Pearson Chi-Squared statistic and a p-value, which indicates whether one can reject the null hypothesis depending on its relation to a set level of significance, which is usually set at 5%.

It is also important to note that the chi-squared test assumes that the expected value of each cell in a correlation table is greater than five. As this is not the case with the data above in its current form, this thesis collapsed the variables into just two categories each to satisfy this assumption. The service delivery variable was turned into a dummy variable – with a one given to municipalities delivering more than median levels of services (those achieving a 4 or 5) and a zero given to the others. The same approach was applied to the audit outcome variables, where a one was given to municipalities achieving an unqualified with findings or clean audit and a zero was given to all the others.

A further assumption of the chi-squared test is that the groups of data being tested are independent from one another in the sense that they are not matched pairs capturing changes before and after a treatment. The data used by this thesis meets this assumption.

8.4.1 Results from the Chi-squared test

Table 3: Chi-Squared Test of Independence

	2007	**2011**
Pearson chi-squared statistic	1.0760	2.5128
P-value	0.300	0.113

According to the p-values in table three, in both 2007 and 2011, the null hypothesis cannot be rejected (at the 10% significant level) and there does not appear to be a statistically significant relationship between the audit outcomes and level of service delivery. Due to various possible errors in the construction of the variables however, these results may not be robust.

The same analysis is thus repeated using Cramer's V test. This allows for the testing of correlation in tables that have more than two columns and more than two rows, as was the case in the original data (Wooldridge, 2015). This test is also useful as it provides extra information, not only indicating whether there is a relationship between variables but also showing how strong the relationship is. It produces a test statistic between zero and one, with one indicating a strong relationship and a zero indicating no relationship. The results from Cramer's V were the following (table 4):

Table 4 Cramer's V Test

	2007	**2011**
Cramer's V chi-squared statistic	0.1720	0.2424

Cramer's V produces the same results as the pearson chi-squared correlation in table three. It indicates that there is a weak relationship between the audit outcomes and municipal levels of service delivery, although the relationship is stronger in 2011 than it is in 2007. Once more though, these results cannot be taken as entirely accurate as

there are several points of potential error in the formation of the variables. For example, the choice of ranking categories for service delivery across municipalities was done fairly subjectively and is perhaps not an accurate reflection of the true situation. Furthermore, using averages to represent the levels of service delivery has obvious flaws, capturing a mere snapshot of the situation and excluding many of the municipalities that fall outside of the mid region. The aggregation of information results in less accurate information. The next chapter thus conducts more robust forms of analysis.

Chapter Nine: Assessing the significance of municipal audit outcomes in terms of changes in service delivery using principal component analysis

The service delivery variable thus needs to be improved in order to undertake more robust analysis. Krugell et. al (2009) offer one way to do this in their paper examining the progress of service delivery across municipalities in South Africa. They employ a non-parametric econometric tool called principal component analysis (PCA) – a method that creates indexes representing a weighted linear combination of several variables so as to maximise their variance (Jolliffe, 2002). PCA is a suitable method to create an aggregated service delivery variable as it reduces points of data into a single component that can be used to represent the combined information of the group.

This thesis thus follows a similar method to the work of Krugell et al (2009) and first checks for correlation between the variables – they must be related but not exactly. Drawing once more on data from the Stats SA Community Survey and Census for 2007 and 2011 for all local municipalities in South Africa, a correlation test was run on the same service delivery indicators used earlier in this paper:

- Piped Water Inside Dwelling
- Electricity for Cooking
- Electricity for Lighting
- Electricity for Heating
- Flushing Toilet System
- Refuse Removed Weekly
- Brick Dwellings

Krugell et al (2009) highlighted correlation values of 0.9 or higher, removing those variables from the principal component calculation. Similarly, this thesis found that for both 2007 and 2011, 'Refuse Removed Weekly' was highly correlated (correlation value greater than 0.9) with 'Flushing Toilet System.' In 2007, The 'Flushing Toilet System' was also highly correlated with 'Piped Water Inside Dwelling,' as was

'Electricity for Cooking' with 'Electricity for Heating' (both pairs have correlation values greater than 0.9). Hence, a correlation value of 0.9 was set as the cut off, resulting in the 'Flushing Toilet System' and 'Electricity for Heating' variables being dropped from the formation of the principal component. The final variables used in the PCA analysis were the following:

- Piped Water Inside Dwelling
- Electricity for Cooking
- Electricity for Lighting
- Refuse Removed Weekly
- Brick Dwellings

9.1 Preliminary Tests

The next step in the analysis, as per Krugell et al (2009), is to test the appropriateness of PCA, given the chosen variables. There are two tests that can be used to do this – Bartlett's sphericity test and the KMO Measure of Sampling Adequacy. Both check similar aspects in slightly different ways, with the main aim being to assess whether it is apt to summarise the variables into a single principal component.

Bartlett's sphericity test essentially evaluates the similarity between the correlation matrix and the identity matrix of the variables. If these two matrices are the same, PCA is not suitable as it means there are no extra variables that can be represented by another. In other words, if there is a high level of correlation between the two, but they are not exactly the same, then one variable can be used as representative summary of the others. Should the two matrices mirror each other, then the variables cannot be reduced into a single component as each holds unique information requiring individual representation. The output from this test can be found in table four of the appendix, which returned significant results, meaning the null hypothesis that the correlation matrix is the same as the identity matrix can be rejected.

As mentioned, the KMO Measure of Sampling Adequacy also assesses whether PCA is suitable however, it does so by checking whether the correlation between two variables is influenced by partial correlation from other variables or common variance. Strong patterns of correlation are desirable, as this makes the summation of the variables into principal components more effective and reliable (Krugell et al., 2009). The test produces a statistic between zero and one, with a value closer to one being preferable as this indicates higher levels of correlation between variables. This output is included in table five of the appendix, where the test returns a statistic of 0.805 and 0.77 in 2007 and 2011 respectively. This is comparable to the results of the Krugell et al (2009) thesis, which found KMO statistics of 0.805 and 0.820 in 2001 and 2007 respectively. Hence, the evidence indicates that PCA is an appropriate analysis to run.

9.2 Creating the Principal Components

The next step was to actually create the principal components. Bentzen and Nielsen (2014) describe this process as new variables being created "from weighted sums of the original variables" where "the weights and the components are respectively referred to as loadings (eigenvectors) and scores (eigenvalues)."

Each principal component represents a linear combination of the underlying variables, weighted in such a manner that the total variance captured by each component is maximised. These weightings are displayed in table six of the appendix and are called eigenvectors. Eigenvectors provide an indication of the component meanings, depending on which variables are more heavily weighted.

The amount of variance each component captures is represented by a number called an 'eigenvalue.' As the first component does not always capture enough variance, it is common for more than one component to be retained for the prediction of principal component scores. For example, as demonstrated in table seven of the appendix, this thesis' first component captures 78% and 74% in 2007 and 2011 respectively, whilst the second component captures 13% and 15% respectively. The variance captured by the rest of the components is negligible. Thus, before progressing to predict principal

component scores, it must first be decided how many variables will be retained in this calculation.

9.3 Selecting Components to be Retained

As outlined by Bentzen and Nielsen (2014) but also found in various econometric texts – there are four different ways to decide on which components to keep.

Firstly, one can follow the interpretability criterion, which sets out various guidelines for assessing components. These refer to the minimum number of variables that need to be significant for inclusion into components, what their loading structure should look like and what they should be measuring (Jolliffe,2002).

Secondly, the Kaiser criterion can be followed, which states that only components with an eigenvalue greater than one should be retained. With the point of principal component analysis being to reliably reduce a group of variables into a single representative component, it only makes sense to retain components that have eigenvalues greater than one – those that capture more variance than a single variable represents (Jolliffe, 2002).

Thirdly, components can be chosen according to the amount of variance they capture, with a minimum amount being set as a threshold. This is normally set at 70-80% of the variance (Bentzen & Nielsen, 2014). Lastly, components can be chosen according to the scree test, which plots out the size of each component's eigenvalues. In most scree tests, there is a break or 'elbow' in the graph that is used as the cut-off point for component selection. Larger components that appear before the break are retained whilst the smaller ones after the break are not (Bentzen & Nielsen, 2014).

It is recommended that all four tests are applied, which in the case of this thesis led to only the first component being retained for both 2007 and 2011. The first component captures a significant amount of the variance in both 2007 and 2011, as shown in table four. It is also located before the 'elbow' in the scree test (Figure One and Two in the

appendix) and is the only component to have an eigenvalue greater than one across both years.

9.4 Rotating and Interpreting Components

Before predicting final principal component scores from the retained components, it is customary to rotate them for ease of interpretation. Rotation results in the variance being equally spread across the retained components and transforms the patterns of the variable weightings into a simple structure (Bentzen & Nielsen, 2014). A simple structure refers to the way in which the component rotation matrix is organised, including certain characteristics such as each variable having at least one zero weighting and only a small amount of variables having positive weightings in more than one coloum (Jolliffe, 2002). This assists with interpreting the components, as their meaning depends on the spread of weights across their variables and a simple structure makes this weighting spread easier to see.

However, in the case where just one component is retained, as has occurred in this paper, rotation is not necessary and the meaning of the single component can be derived from its original eigenvectors. Therefore, looking at the spread of eigenvectors in table seven of the appendix, it is clear that equal weighting has been placed on all five of the underlying variables. The result is a 'mixed' component which can be interpreted as capturing a measure of overall service delivery levels within a municipality, without a specific focus on any one type of service. The service delivery principal component scores used in further analysis in this paper have been predicted from this single, retained component.

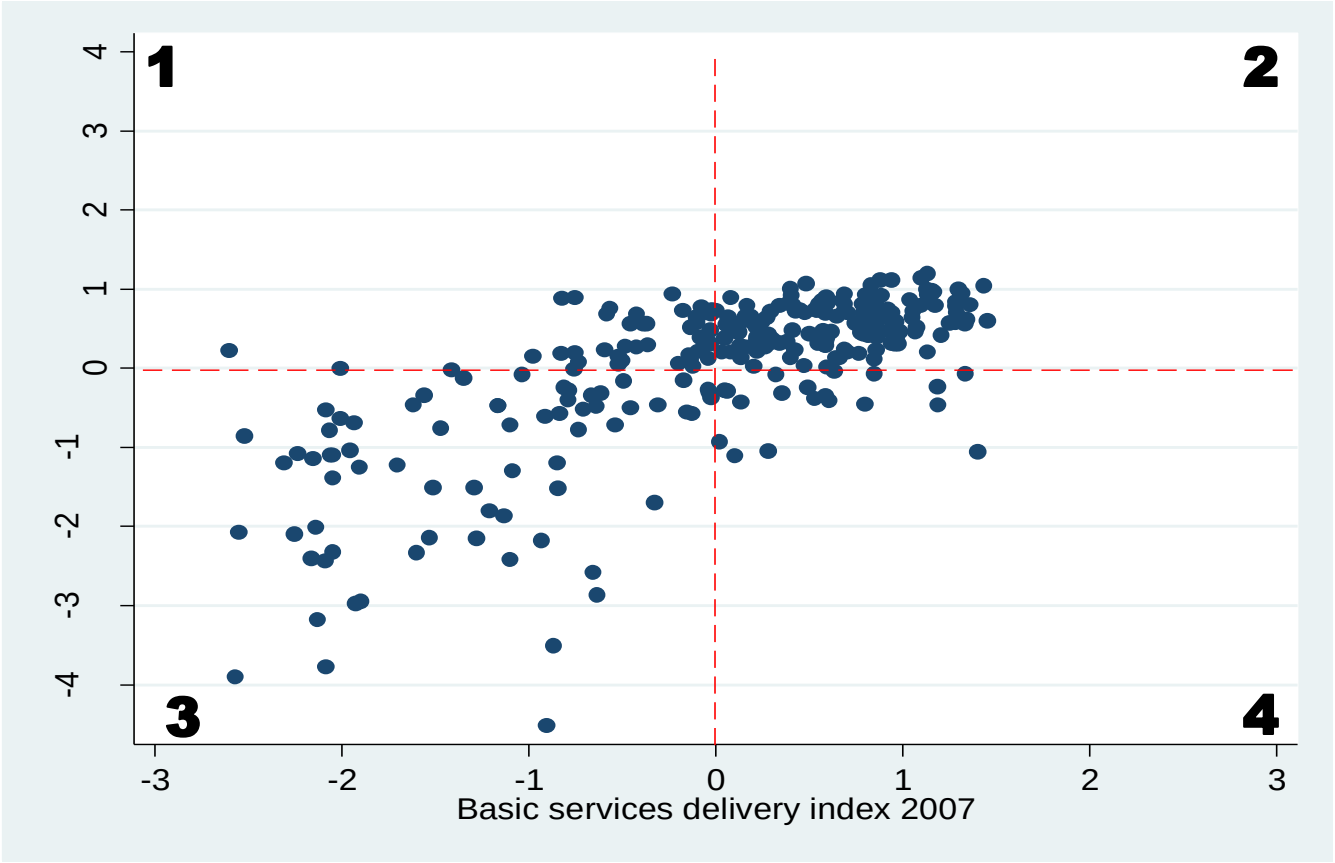
9.5 Grouping Local Municipalities according to Service Delivery Principal Component Scores

In line with Krugell et al (2009)'s work, the predicted service delivery principal component scores are displayed in figure fifteen. Each plotted observation represents a municipality, with the vertical axis showing its service delivery score for 2011 whilst

it's score for 2007 is plotted against the horizontal axis. The individual scores can be found in tables eight to eleven in the appendix.

Given the layout of the scores on the graph, quadrant one includes the municipalities that delivered improved levels of services between 2007 and 2011, as their scores changed from negative to positive over that period of time. Conversely, quadrant four displays those entities that saw levels of service delivery decline, with their scores changing from positive to negative between 2007 and 2011. The municipalities situated in quadrants two and three are those that performed consistently positively (quadrant two) or consistently negatively (quadrant three) during this same period of time.

Figure 15: Scatter Plot of Principal Component Service Delivery Indexes



The evident trend of the graph seems to indicate a general upwards movement of municipalities towards quadrant two and an overall improvement in municipal service delivery. Indeed, the majority of municipalities are clustered in this quadrant,

consistently achieving positive service delivery scores. Furthermore, the wide spread of municipalities in quadrant three is a noticeable change from the graph produced by Krugell et al (2009), which has a fairly equal distribution of municipalities across the 2nd and 3rd quadrant, and scores greater than negative two for both years.

9.6 Correlated movements – Do municipal audit outcomes and levels of service delivery change in conjunction with one another in local municipalities?

Restricting the analysis now to examine local municipalities alone – not only to avoid outlying metropolitan municipal data skewing the results, but also to more closely examine the group with the worst municipal performance and most variance in outcomes – table five displays the municipal groupings according to service delivery scores across 2007 and 2011:

Table 5: Categorisation of Local Municipalities according to Service Delivery Indexes[2]

Service Delivery Scores	**Number of local Municipalities**	**Percentage of local Municipalities**	**Approx. Percentage of SA Population (2011)**
Consistently Negative	61	26.87%	17.23%
Worsening	20	8.81%	3.37%
Consistently Positive	118	51.98%	34.55%
Improving	28	12.33%	6.97%
Total Local Municipalities	**227**	**100%**	**61.91%**

[2] It should be noted that table six does simplify the changes in service delivery somewhat, as even those municipalities that consistently scored positively or negatively with respect to service delivery, often experienced movements in these scores. Examining the absolute movements, between 2007 and 2011, 120 local municipalities experienced declining service delivery scores whilst 105 local municipalities experienced improved service delivery scores. These numbers differ to those displayed in table seven.

Trends displayed in table five support figure fifteen, with the majority of local municipalities not seeing many changes in terms of service delivery and a handful improving or declining in terms of their performance. The largest grouping of municipalities falls in the 'consistently positive' category, affecting approximately 34.55% of the entire South African population, which is marginally greater than half the amount of people living in local municipal jurisdictions. Furthermore, the second largest group – the local municipalities that consistently scored negatively in terms of service delivery – accounts for 26.87% of the municipalities in the sample and is home to 17.23% of the South African population. On the whole, roughly 20% of the South African population lives in municipal jurisdictions that have negative or worsening service delivery scores, whilst about 40% of South Africans are part of municipal areas that improved or scored consistently positively. The last two groups, the municipalities that experienced changes in service delivery scores, represent roughly 21% of South Africa's local municipalities but account for just 10% of the country's population.

To contextualise this information with respect to this thesis' hypothesis, it should be compared to changes in local municipal audit outcomes, as displayed in table seven. In keeping with the evidence presented in this thesis thus far, table six shows that trends in audit outcomes changes do not seem to mirror the service delivery score patterns.

Table 6: Categorisation of Local Municipalities according to changes in Audit Outcomes between 2007 and 2011

Audit Outcomes	**Number of local Municipalities**	**Percentage of local Municipalities**	**Approximate Percentage of SA Population (2011)**
Consistently Negative	51	22.47%	13.07%
Worsening	41	18.06%	12.57%
Consistently Positive	63	27.75%	16.57%
Improving	73	32.16%	19.79%
Total Local Municipalities	**227**	**100%**	**62.00%**

Firstly, table six has a more even distribution of municipalities across the four categories. It appears that far more local municipalities are achieving consistently positive or consistently negative service delivery scores than consistently positive or negative audit outcomes. It would thus seem that whilst the majority of local municipalities are experiencing few changes in service delivery, more movement is taking place in terms of municipal audit outcomes.

In contrast to the 12.33% of local municipalities experiencing improved service delivery levels, 32.16% achieved improved audit outcomes between 2007 and 2011. In addition, a far greater portion of the South African population (19.79%) live in a municipal area that achieved strengthening audit outcomes compared to the percentage of South Africans (6.97%) that experienced improved levels of service delivery. Conversely, 18.06% of local municipalities, accounting for 12.57% of South Africans, achieved weakening audit outcomes in comparison to the 8.81% that had worse levels of service delivery in 2011 than in 2007 (accounting for 3.37% of the population). Furthermore, table six shows that although there may still be very few municipalities achieving clean audit outcomes, a significant amount are either scoring consistently positively or are improving in terms of the outcomes they achieve.

It is still unclear though whether these movements across the two variables are related to one another. The following graphs attempt to explore this further and assess whether service delivery and municipal audit outcomes move in correlation with one another.

Figure 16: Audit outcome movements across municipalities with improved and weakened service delivery

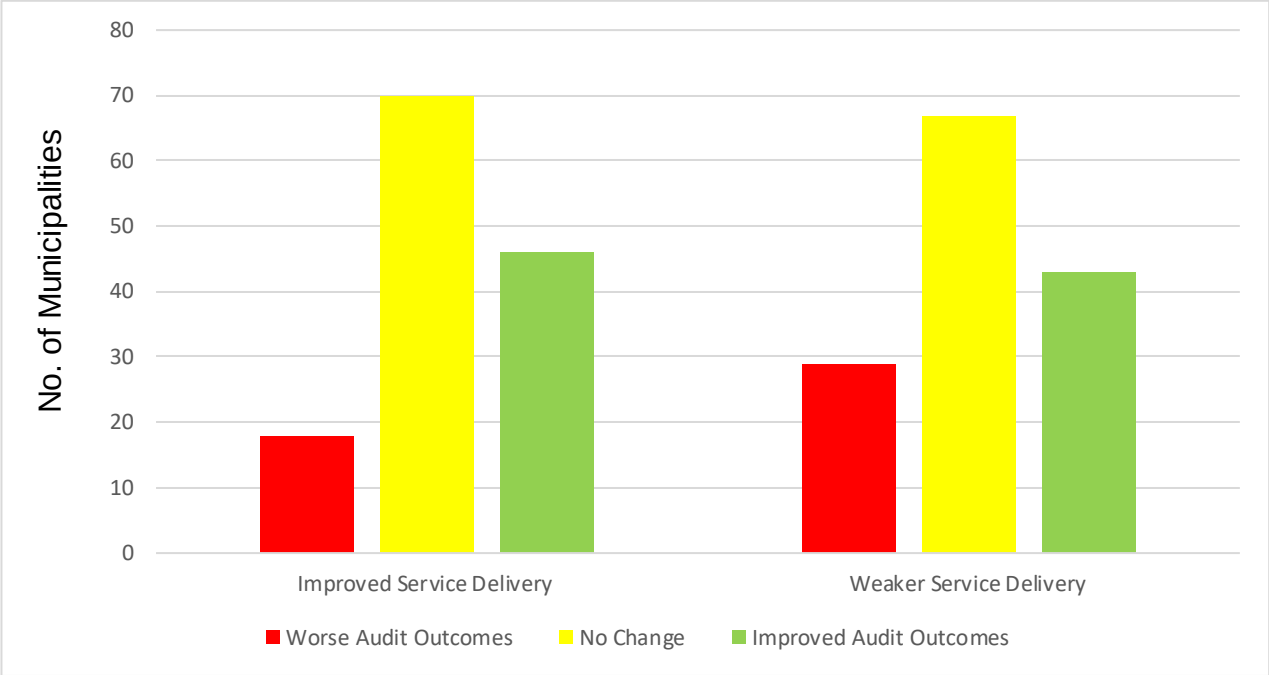


Figure 17: Changes in Service Delivery across municipalities with improved and weakened audit outcomes

Whilst 34.3% of municipalities that improved in terms of service delivery also achieved improved municipal audit outcomes, 13.4% of them received worse audit outcomes and 52.2% of them saw no change in their audit results. Of the municipalities that had deteriorated service delivery performance, 30.9% had improving audit outcomes, 20.8% had worse audit outcomes and 48.2% had no change.

With regards to municipalities that had improved audit outcomes between 2007 and 2011, 51.6% also improved in terms of service delivery whilst 48.3% experienced declining levels of service delivery. On the other hand, for the municipalities that had worse audit outcomes in 2011 compared to 2007, 38.2% had improved levels of service delivery and 61.7% had worse levels.

These figures make it clear that when a municipality improves or declines in terms of service delivery performance, there is no similar movement in audit outcomes. In fact, the bar graphs in figure sixteen look almost identical for both groups of municipality service delivery scores, with the majority group in both being no change in audit outcomes. On the other hand, there does seem to be a slightly closer correlation when the data is examined from a different perspective. As figure seventeen shows, municipalities achieving improved audit outcomes had greater numbers of improved service delivery scores whilst those that achieved worse audit outcomes had more municipalities with declining service delivery scores.

Although the graphical analysis is very rudimentary and it's difficult to make a conclusive statement from these trends about directional movements, the numbers do not appear to indicate that the two variables move in the same direction or by the same amount, and perhaps provide preliminary evidence of the disconnect between municipal audit outcomes and levels of service delivery. Further analysis must be conducted to assess whether there is a correlation between the two variables, and whether changes in service delivery are linked to any corresponding changes in audit outcomes.

9.7 Why not use a difference-in-difference regression?

A difference-in-difference regression would be an ideal extension of the basic analysis already conducted to assess whether the two variables move in conjunction with one another. However, such regressions are founded on the assumption that an intervention is applied at random to a treatment group, the effect of which can then be compared to a control group.

Whilst it is possible to separate municipalities out into treatment and control groups according to which of them experienced improving audit outcomes between 2007 and 2011, the random intervention assumption would not hold because the change in audit outcomes did not happen arbitrarily. Rather, improved or worsened outcomes are a result of changes in municipal capacity, management and operations. These are functions of the larger ecosystem within which the municipalities operate, and are not distributed randomly across entities nor are these effects easily quantifiable. Furthermore, whilst there are clearly factors at play in the proposed treatment group that lead to their improved outcomes, these were not necessarily only applied or available to that group specifically.

The effects captured in a difference-in-difference regression would thus not be able to isolate the real reasons behind changes in some municipality not being seen in others, and it would be a better idea to conduct further research to identify these factors than attempt to highlight them via a difference-in-difference analysis.

Chapter Ten: Do audit outcomes make a difference? Identifying differing characteristics between the different municipal groupings

10.1 Test for differences between groups – the start of an empirical analysis

This thesis will now move to more empirical methods of assessing the relationship between municipal audit outcomes and service delivery scores – specifically whether the municipal audit outcomes differ across the municipal groupings in figure sixteen and seventeen. Of particular interest to the hypothesis of in question are the municipalities situated in quadrant one and four of figure fifteen – those that improved their scores from one year to the next (quadrant one) or worsened (quadrant four). Krugell et al (2009) focused on these two groups of municipalities and ran a series of one-way analysis of variance tests (ANOVAs) to "examine the differences in the characteristics of those places that provided below average delivery and those that improved delivery." ANOVAs identify the factors that differentiate municipalities performing well in terms of service delivery from those that perform poorly. However, as ANOVA tests are parametric and this dataset is non-normal and heteroscedastic, a non-parametric alternative – the Kruskal-Wallis H test - is applied instead.

The Municipal Capacity Assessment conducted by the MDB in 2010/2011 highlights three 'interdependent but distinct' factors that have a significant impact upon local government performance. These include "the context in which a municipality finds itself, representative of the socio-geographic and legacy factors that constrain the ability of a municipality to perform; the capacity and resources that it employs and the leadership behaviours of councillors and heads of the executive." The set of factors chosen for examination are meant to capture these distinct characteristics of municipalities' operating environments that impact upon its ability to provide services. The dependent variables thus all relate to education and ages levels, employment and population density rates of a municipality. For the purposes of this thesis' research question, the audit outcomes from the 2011 audit have also been

included to assess whether these differ between strong and poorly performing municipalities.

The municipal groupings used in this test are the same as those presented in table six, and are once again restricted to only include local municipalities. District and Metropolitan municipalities are thus not included in the following tests. The initial analysis is conducted across all four groups of local municipalities, as reflected in table six, and tests the null hypothesis that the included variables do not differ across the different groupings of municipal performance in terms of service delivery scores.

However, as the results in table eleven of the appendix show, this null hypothesis is rejected for most of the included variables. The average value for the gender, education and income levels and population density variables all differ across the groupings of municipalities, classified according to service delivery performance. Conversely, the number of households in each local municipality and the percentage of elderly people are not significant at a probability level of $p < 0.10$. This means that these factors do not differ across the four groups of local municipalities and appear to have no relation to service delivery capacity of municipalities.

These results will be taken into account when selecting control variables in the regression run later in this thesis, as they provide insight into the context of different municipal operating environments. To gain a better understanding of the dynamics between them and municipal service delivery performance, it must first be determined whether these trends apply equally to all four groupings of municipalities.

10.2 Wilcoxon Rank Sum Test analysis

As the specific interest of this thesis is on those municipalities that either improved or deteriorated in terms of their service delivery, an independent group t-test will be conducted. It is more suitable than ANOVAs, as it allows for differences in the mean of the dependent variable to be assessed across these two particular groups. To deal

with the non-normality of the data and the audit outcomes, a non-parametric version of the t-test is conducted – namely, the Wilcoxon Rank Sum Test.

The output from the Wilcoxon Rank Sum Test is displayed in table seven and eight. It has been applied twice – first to the consistently strong and weak municipalities and then to the improving and worsening groups of municipalities. It is again testing the null hypothesis that there is no difference in the dependent variable across the two groups of municipalities.

Table 7: Results from Wilcoxon Rank Sum test for municipalities that consistently scored positively or negatively in terms of service delivery performance

Characteristic Dependent Variable	**Rank Sum**	**Expected Sum**	**Z Stat**	**Prob > |z|**
Sex ratio (%)				
Strong	11411.5	10354.5	-3.313	0.0009
Weak	4164.5	5221.5		
Audit outcomes in 2011				
Strong	9738.5	10620	2.823	0.0048
Weak	6371.5	5490		
% Female Headed households				
Strong	7959.5	10354.5	7.506	0.0000
Weak	7616.5	5221.5		
% Working age				
Strong	12798.5	10354.5	-7.660	0.0000
Weak	2777.5	5221.5		
% Youth				
Strong	7793	10354.5	8.028	0.0000
Weak	7783	5221.5		
% Elderly				
Strong	10831.5	10354.5	-1.495	0.1348
Weak	4744.5	5221.5		

% No schooling				
Strong	11388.5	10354.5	-3.241	0.0012
Weak	4187.5	5221.5		
% Higher education				
Strong	10839	10354.5	-1.519	0.1288
Weak	4797	5221.5		
% Matric				
Strong	11180.50	10354.5	-2.589	0.0096
Weak	4395.5	5221.5		
% of population 2011				
Strong	10133	10620	1.482	0.1383
Weak	5977	5490		
% of population 2007				
Strong	9898	10620	2.197	0.0280
Weak	6212	5490		
Population Density (persons per km^2)				
Strong	9159.5	10354.5	3.746	0.0002
Weak	6416.5	5221.5		
No of households				
Strong	10398.5	10354.5	-0.138	0.8903
Weak	5177.5	5221.5		
Growth rate (of people from 2001-2011)				
Strong	11796.5	10354.5	-4.519	0.0000
Weak	3779.5	5221.5		
No of agricultural households				
Strong	8907	10354.5	4.536	0.0000
Weak	6669	5221.5		
Average household size (People)				
Strong	8041	10354.5	7.267	0.0000
Weak	7535	5221.5		

% Formal dwelling				
Strong	13732.5	10354.5	-10.587	0.0000
Weak	1843.5	5221.5		
% Housing owned / Paying off				
Strong	9911	10354.5		0.1645
Weak	5665	5221.5	1.390	
Mean annual household income (R)				
Strong	12981	10620	-7.185	0.0000
Weak	3129	5490		
Dependency ratio (%)				
Strong	7909	10354.5	7.664	0.0000
Weak	7667	5221.5		
Unemployment rate				
Strong	8684.5	10354.5	5.234	0.0000
Weak	6891.5	5221.5		
Youth unemployment rate				
Strong	8870.5	10354.5	4.651	0.0000
Weak	6705.5	5221.5		

All the factors listed in table seven differ across the two groups of municipalities that had consistently strong or poor service delivery performance, apart from five. These were the percentage of houses owned or being paid off, the number of households in each local municipality, the percentage of people aged twenty or above with higher education, and the percentage of the population in 2011 and the percentage of elderly people living in each municipality. These five factors were all insignificant at a probability level of $p < 0.05$, indicating that the population density and number of

older or tertiary educated citizens do not impact, if at all, upon a municipality's operations in the same way as the other significant factors.

Table eight extends the analysis to the groups of municipalities that worsened or improved their service delivery, assessing whether the same significant characteristics are found.

Table 8: Results from Wilcoxon Rank Sum Test for municipalities that scored better or worse in terms of service delivery performance

Characteristic Dependent Variable	**Rank Sum**	**Expected Sum**	**Z Stat**	**Prob > |z|**
Sex ratio (%)				
Worsened	450.5	490	-0.826	0.4088
Improved	725.5	686		
Audit outcomes in 2011				
Worsened	427.5	490	-1.398	0.1622
Improved	748.5	686		
% Female Headed households				
Worsened	397.5	490	-1.935	0.0530
Improved	778.5	686		
% Working age				
Worsened	554	490	1.339	0.1807
Improved	622	686		
% Youth				
Worsened	445	490	-0.941	0.3466
Improved	731	686		
% Elderly				
Worsened	427	490	-1.319	0.1873
Improved	749	686		
% No schooling				

Worsened	484	490	-0.125	0.9001
Improved	692	686		
% Higher education				
Worsened	559.5	490	1.455	0.1458
Improved	616.5	686		
% Matric				
Worsened	458	490	-0.669	0.5033
Improved	718	686		
% of population 2011				
Worsened	409	490	-1.694	0.0903
Improved	767	686		
% of population 2007				
Worsened	376	490	-2.384	0.0171
Improved	800	686		
Population Density (persons per km^2)				
Worsened	393	490	-2.029	0.0424
Improved	783	686		
No of households				
Worsened	399	490	-1.903	0.0570
Improved	777	686		
Growth rate (of people from 2001-2011)				
Worsened	618	490	2.677	0.0074
Improved	558	686		
No of agricultural households				
Worsened	363	490	-2.656	0.0079
Improved	813	686		
Average household size (People)				
Worsened	493	490	0.063	0.9497
Improved	683	686		
% Formal dwelling				

Worsened	662	490	3.597	0.0003
Improved	514	686		
% Housing owned / Paying off				
Worsened	383.5	490	-2.227	0.0259
Improved	732.5	686		
Mean annual household income (R)				
Worsened	598	490	2.259	0.0239
Improved	578	686		
Dependency ratio (%)				
Worsened	426.5	490	-1.328	0.1842
Improved	749.5	686		
Unemployment rate				
Worsened	357	490	-2.782	0.0054
Improved	819	686		
Youth unemployment rate				
Worsened	361.5	490	-2.687	0.0072
Improved	814.5	686		

Interestingly, table eight demonstrates that many of the municipal characteristics that were significant in table seven become insignificant when assessed across only municipalities that achieved worse or improved service delivery scores. A clear trend in this preliminary evidence is that the municipalities scoring consistently positively or negatively in terms of service delivery operate in very different contexts. However, when examining which of these contextual factors are related to service delivery, it appears that a municipality's capacity to provide public services is mainly affected by regional wealth and population density levels, as well as the extent to which an area is urbanised.

Of most significance to the hypothesis of this thesis is the fact that audit outcomes appear to differ between municipalities with consistently poor or strong service delivery performance, but do not change for those municipalities that experienced

variations in their service delivery scores. These results are not only in line with trends displayed in figure sixteen but reflect a potential disconnect between the audit outcomes and service delivery performance in municipalities.

Delving deeper into table eight, the results show that the gender distribution, age and education profiles – whilst different for the municipal groupings in table seven – do not change across the municipal groupings in table eight. The percentage of residents with higher education was in fact insignificant in both tables. The factors that do change in table eight, and thus appear to be related to changes in service delivery scores, include citizen income levels, unemployment rates, the level of demand for services (as measured by the number of houses and people in a municipal region) and the type of housing available.

This provides supporting evidence for the theory that municipal service delivery is largely a function of the amount of revenue each local government can generate, which in turn depends on the wealth and employment levels of its constituents. For example, it is interesting that the percentage of female headed households is significant in both tables. As greater levels of female headed households in an area are linked to higher levels of poverty (Rogan, 2014; Magongo, 2016), this result reinforces the theory that municipal rates revenues are a significant determining factor of service delivery.

Furthermore, the type of housing available in a municipality also impacts upon service delivery, as it is easier for municipalities to provide brick houses with, for instance, running water and electricity than it is to service informal shacks or sparse agricultural areas. Finally, greater levels of population density are representative of urban areas, in which there are greater levels of service delivery demand and residents are likely to have more disposable income, enabling them to pay for higher quality services (Mahabir, 2012).

Hence, the preliminary evidence from tables seven and eight suggest that whilst audit outcomes do reflect service delivery performance in some cases, in others there is a disconnect between the two variables, particularly in scenarios where levels of service delivery fluctuated between 2007 and 2011. This might be due to the fact that levels of service delivery are more a function of municipal income levels and demand for public services than they are related to the performance management effect of the audits.

In other words, municipal audit outcomes are often reflections of a municipality's performance in terms of delivering public services. However, their impact upon service delivery appears to be limited and the relationship between the two variables becomes even weaker in cases where municipalities are lacking key operational resources. Thus, the results of tables seven and eight serve as early evidence that good financial management does not "permeate into the outer spheres of performance and service delivery" (Aadnesgaard & Willows, 2016) in municipalities, as service delivery is more determined by other factors such as municipal revenue or staff capacity. This is problematic in light of the cost and resources demanded by the current audit system.

10.3 A review of the evidence

In summary of the results thus far, numerous graphs and visual analyses of numerical changes in the data have revealed what appears to be a distinct disconnect between the municipal audit outcomes and service delivery scores. This is compounded by feedback from the survey of municipal officials, who were largely of the opinion that whilst the audit outcomes were reflective of financial compliance within an organisation and influenced the setting of service delivery targets, the audits themselves had very little influence over the achievement of these targets or actual operational performance.

Furthermore, the Chi Squared and Cramer's V tests conducted in chapter eight corroborate these findings, demonstrating evidence of a very weak relationship existing between municipal audit outcomes and service delivery scores. Finally, results from chapter nine and ten suggest that whilst the audits do sometimes reflect

service delivery performance, factors such as financial and human resources have a greater impact upon changes in municipal operations than the effect of the audits.

Chapter Eleven: The explanatory power of municipal audit outcomes – an analysis of key service delivery determinants using ordinary least squares regressions

11.1 Empirical description

Having thus far not found evidence of a strong relationship between the two variables of interest, this thesis now moves to examine the explanatory power of municipal audit outcomes with regards to municipal service delivery performance via an ordinary least squares (OLS) regression. Whilst the earlier, preliminary tests were of value – as was highlighted at the end of each test's discussion, there were numerous potential weaknesses and flaws in the methodologies that rendered their results slightly questionable.

Hence this paper will now move to test for a relationship between the two variables of interested via OLS regressions, as they are a more robust method of assessing correlation between variables than the previous methods applied in this thesis. The results will not only be more trustworthy but may also reveal new, different information – such as the direction of relationships between variables – that previous methods of testing for correlation were unable to uncover.

OLS is an estimation technique that attempts to predict service delivery from the audit outcomes by fitting a regression line to the available data in such a manner that the estimates are as similar as possible to the observed data. The aim of the regression is to highlight important municipal characteristics that impact upon service delivery and in particular, to assess the explanatory power of municipal audits in relation to service delivery. This thesis will conduct two OLS regressions, one for each of the chosen years. The generic form of the OLS regression equation is as follows:

$$Y_{it} = B_{ot} + B_1 x_{it1} + B_2 x_{it2} + \ldots.. + B_n X_{itn} + u_{it} \qquad t = 2007, 2011 \qquad (1)$$

Y_{it} represents the dependent variable – in this case, service delivery performance – whilst $x_{it1}, x_{it2}, \ldots.., x_{itn}$ are the independent variables which are meant to capture the

effect of municipal characteristics upon service delivery and explain the variation in Y_{it}. Whilst B_{ot} is the constant, intercept term, B_1- B_n are the coefficients being estimated by the regression that explain each independent variable's contribution towards explaining Y_{it}. Finally, u_{it} is the error term and this captures any unexplained variance in Y_{it} not accounted for by the independent variables. The error term captures for example, measurement inaccuracy or omitted variables. The subscripts are used as identifiers, where i is used to signal specific variables and t represents the time period of the variable, either 2007 or 2011.

In light of the research question, the dependent variable reflects service delivery performance (as measured by the principal component scores) across municipalities whilst the main independent variable is the audit outcomes. The control or independent variables are attempting to isolate the impact of the audit outcomes upon service delivery by capturing characteristics that reflect a municipality's operating environment and their ability to deliver public services.

In terms of the factors influencing municipal service delivery, Managa (2012) highlighted institutional, financial, political and social resources. Furthermore, Kanyane (2013) contends that "the existence of a local municipality with poor service delivery is, amongst others, a direct consequence or manifestation of municipal capacity constraints, financial viability problems, service delivery protests, convoluted political processes, corruption and poor planning as well as monitoring and evaluation challenges." This information, together with the output in table six to eight, influenced the selection of control variables, as explained in the next section.

11.2 Dependent variable

Service Delivery

For both the 2007 and 2011 regression, the dependent variable takes the form of the service delivery principal components described in chapter nine. As described, these

components provide each municipality with a service delivery score, based on a summation of the following variables:

- Piped Water Inside Dwelling
- Electricity for Cooking
- Electricity for Lighting
- Refuse Removed Weekly
- Brick Dwellings

As previously mentioned, because there is equal weighting placed on all five of the underlying variables, the dependent variable is called a 'mixed' component and can be interpreted as capturing a measure of overall service delivery levels within a municipality, with no specific focus on any one type of service. The interpretation is limited to showing how changes in control variables will impact the overall levels of access to services, whether it increases or decreases the level of services being delivered, but this impact cannot be further quantified in the same manner that regression coefficients are normally interpreted.

11.3 Independent variables

11.3.1 Key variable of interest:

Audit Outcomes

For both years, the municipal audit outcomes are included as independent variables and are the main focus of the regression. This data was taken from the 2007/2008 and 2011/2012 annual reports of the South African's Auditor-General. The audit outcome variable, as explained in chapter 8, is a categorical variable where five represents the best possible outcome (Clean Audit) and one represents the worst (Disclaimer). When included as a categorical variable in regressions, this variable is interpreted in relation to its base case, which is the worst audit outcome – Disclaimer.

The purpose of municipal audits is to ensure financial compliance and adequate handling of public finances; thus stronger audit outcomes are expected to be linked to better performing municipalities, both in terms of financial management and service

delivery. However, this is the exact assumption being tested in this thesis. The coefficient and significance of the audit outcomes variable will thus provide key information in relation to the research question.

As per the hypotheses laid out, one of three possible findings are possible: the audit outcomes are positively related to the service delivery variable, are negatively related or have no relation at all.

11.3.2 Municipal Financial Capacity Variables

A significant factor determining the quantity and quality of services municipalities in South Africa are able to provide is the amount of revenue each collects. There are two main sources of municipal revenue in South Africa, that which is given to them by the state via inter-governmental transfers and the money that they collect themselves from property rates, service levies and fines. Using data from National Treasury, this thesis collected numerous proxy variables intended to capture the influence of financial resources upon service delivery.

Municipal Revenue, Financial Ratios and Spending Indicators

In terms of financial resources, of relevance is not only how much money the municipalities have to spend but the manner in which they spend and manage their finances. This thesis has three variables in this regard. Firstly, there is the absolute amount of operating revenue available to each municipality. Secondly, the National Treasury makes a host of financial ratios available, as indicators of the health of a municipality's finances. These include ratios of the following:

- Creditors to Operating Expenditure
- Debtors to Service Charges
- Infrastructure expenditure to Capital expenditure
- Borrowing to Capital Revenue
- Employee Costs to Own Revenue
- Employee Costs to Operating Expenditure
- Own Revenue to Operating Revenue

- Borrowing to PPE

Finally, as a proxy for the quality of municipal financial management, this thesis has the percentage of municipal income and expenditure over or underspent in relation to budgeted figures. It is expected that the larger amounts of revenue a municipality has, the healthier it's ratios and the closer its actual expenditure is to its budget, the more services it can provide to its community.

Distribution of Household Income, Household Goods and Unemployment levels

As municipalities source the majority of their income from rates and service levies charged to the public, the levels of income in the municipal area will affect not only how much it can charge for its services but also the likelihood of individuals actually being able to pay their rates and fines. In addition, as is the case with the education variable, the levels of income in an area could also be an indication of how accountable the public will hold the municipality, to ensure it delivers adequate services. This thesis has collected three variables in this regard: the income brackets in a municipality, the unemployment rates and the level of household goods owned by families in a municipal area.

With respect to levels of household income, this thesis used work by Visagie (2013) which determines the South African middle class to be households earning between R5 600 and R40 000 per month after tax. The lower and upper classes thus fit around these figures. However, as the data collected by Statistics South Africa does not match these exact income brackets, this thesis matched Visagie's (2013) work as best as possible and defined the following variables:

- Lower Class: No income to R4 800
- Middle Class: R4 800 to R38 200
- Upper Class: All income brackets above R38 200 a month

These variables represent the percentage of each municipality's population that falls into the respective categories. The wealth levels in an area are also linked to

unemployment rates, variables for which have been included to represent the percentage of people in a municipality that are not in employment.

11.3.3. Household Goods

Furthermore, the amount of household goods the average family owns can be used as a proxy for affluence levels in a municipal area. To this end, a household asset index has been constructed using principal component analysis. The following variables have been included in the construction of the asset index:

- Percentage of households with a cell phone
- Percentage of households with internet access
- Percentage of households with a radio
- Percentage of households with a fridge
- Percentage of households with a landline
- Percentage of households with a television
- Percentage of households with a computer

It is expected that the wealthier a municipal area, the higher amount of disposable income which will increase demand for public services. (Mahabir, 2012) Consequently, municipalities in wealthier areas will be able to generate higher levels of own source revenue. As this is also likely to come with greater levels of public accountability, municipalities in wealthier areas of South Africa are expected to have better service delivery.

It is expected that the higher the percentage of people classified as upper class in a municipality, the larger the amount of household goods own by the average family and the lower the unemployment rates in an area – the greater levels of wealth a municipality will be able to access. This, in turn, should increase the amount of services it can provide to its public.

11.3.4 Municipal Political Landscape Variables

Political Dominance

The political economy and impact of political players upon municipal operations is an influence that must be taken into account when trying to explain service delivery performance. There is a prevailing theory in political economy literature that in areas with high levels of electoral competition, government officials often attempt to win votes through effective public service delivery (Kroth, 2014). Work by van Gass (2015) and Kroth (2014) explores the application of such theory to the South African context and produces mixed findings. Kroth (2014) highlights that, in pre-election years, larger equitable revenue shares are transferred to local municipalities that boast higher levels of voter support for the national party.

van Gass (2015) finds supporting evidence for the dominant trajectory theory explained earlier, contending that there is a negative relationship between levels of electoral fractionalisation and service delivery in two particular African cities. His findings don't hold though when contrasting different parts of those two locations, leaving the exact relationship slightly uncertain. Furthermore, politics can often have a negative effect upon service delivery with councillors voting along party lines, interfering with delivery operations and being appointed due to political connections as opposed to merit.

To account for these effects, a political dominance variable was created to indicate the levels of political competition in a municipality. Using data sources from the South African Independent Electoral Commission, the categorical variable reflects zero if the majority party had less than 50% of votes in a municipality (base category), one if the party had more than 50% of the votes and two if the majority party had more than 75% of the vote. There was a significant shift in terms of the number of municipalities where the majority had over 50% of the vote between 2007 and 2011, as displayed in table nine:

Table 9: Grouping of municipalities according to differences in distribution of political party votes for 2007 and 2011

	2007		2011	
Less than 50% majority	16 municipalities	5.86%	19 municipalities	6.96%
Over 50% majority	109 municipalities	39.93%	139 municipalities	50.92%
Over 75% majority	148 municipalities	54.21%	115 municipalities	42.12%

The expected relationship between the political dominance variable and service delivery performance is unknown. Political dominance could lead to increased corruption activity in light of lower accountability levels, or it could lead to improved service delivery as the dominant party has less barriers to overcome from opposition parties. The dominant party may also improve performance in a bid to retain political control. Hence, the expected sign of the political variance is currently unknown and will be revealed through the regression analysis, depending on which political economy theory prevails.

11.3.5 Municipal Community Demographic Variables

The demographics of a municipality affect its service delivery, not only through population earning capacity and accountability levels, but also in terms of the type and amount of services demanded. These variables are intended to account for such effects.

Race

Given the legacy of apartheid and the high levels of poverty in South Africa, inequality is still split along population groups (Van den Berg & Louw, 2003). This means that the racial composition of a municipality's constituency will impact upon its ability to delivery services, as Africans are more likely to be less wealthy than Whites. Race can thus be extended as a proxy not only for the wealth levels of an area but the type of infrastructure available.

The spatial legacy of apartheid sees Black South Africans generally living in underdeveloped areas whilst the majority of White South Africans live in well-established areas. The less infrastructure available, the harder it is for municipalities to deliver services such as electricity and piped water to dwellings. It is thus expected that levels of service delivery will be lower in areas with greater share of Black South Africans. The variable represents the percentage of each municipality's population that is of the Black South African population group.

Age

The age profile of a municipality's population is important because it reflects their earning capacity and gives an indication as to the type of services being required. For example, in a municipality with a large contingent of elderly people, there is likely to be lower levels of income as they are above the age of retirement, whilst there might also be a high demand for community health services. On the other hand, municipalities with a predominantly young population might be limited in its own-source revenue generation as many of these youth will still be at school. Furthermore, municipalities with large proportions of both elderly and young people together with fewer working aged adults is reflective of the profiles of poorer areas, particularly those situated in rural regions.

The age variables included in the regression split into three categories: the percentage of people aged 0 to 15 years (young), the percentage aged 16 to 65 years (working) and the percentage of those aged 66 years and above (elderly). It is expected that the larger the percentage of a municipality's population falling into the working class, the more own-source revenue a municipality can generate and thus it can provide a greater level of public services.

Education

The average education levels in a municipality are expected to influence municipal operations in two possible ways. Firstly, it is likely that municipal staff will be drawn from the skills pool in its area, thus the more educated its population the higher the

likelihood of it having skilled individuals as employees. Secondly, and most importantly, education levels are positively related to income levels (Mincer, 1974). The higher an individual's education, the more money they are able to earn, feeding back once more into a municipality's source of own revenue through rates collections. It is thus expected that the more people with post-secondary schooling education levels in a municipality, the wealthier that area and the more services a municipality will deliver.

Education was split into four different categories, representing the percentage of people in each municipality with no schooling, primary school, secondary school and tertiary school.

Number of People

Another fairly obvious factor influencing municipal service delivery is the number of people in each municipal area. The more there are, the higher the population density and the greater level of services demanded (Mahabir, 2012). One can easily imagine the difference in service delivery demand place on an urban metropolitan municipality in comparison to that required of a rural, local municipality.

This has been captured via a variable that represents the percentage of population residing in each municipal area.

Homeland status

Due to the passing of the Black Homeland Citizenship Act 26 of 1970 and the National States Citizenship Act of 1970, during Apartheid all Black South Africans were stripped of their nationality, required to relocate and reside in one of the ten self-governing territories (Noble & Wright, 2013). These territories were known as 'homelands' and were intended to each be home to a different ethnic group.

The historical lack of investment into these areas and prevalence of poverty amongst their residents has left a legacy that prevails until more recent times and long after the

homelands were abolished. Noble and Wright (2013) find that "the areas in South Africa with the highest levels of deprivation [are] mainly to be found in rural former homeland Areas," and that across "the domains of income, employment, education, and living environment, former homelands are more deprived on average than 'the rest of South Africa.'

Hence, if a municipality is situated in an area that was previously a homeland or part thereof, they will have a very different set of circumstances in which to deliver services than one situated in an area that was previously part of the republic of South Africa. For example, prior homeland areas are more likely to be rural areas with poor infrastructure. It is expected that a municipality situated in a region that was previously part of a republic will have stronger levels of service delivery.

The homeland variable in this thesis is a categorical variable that is coded one if the municipality was previously part of a homeland, two if it was previously part of both a homeland and the republic, and a three if it was previously part of the republic.

Gender

Numerous studies highlight the "feminisation of poverty," which refers to the phenomenon of poverty adversely affecting females, with women often being up to 30% poorer than men (Rogan, 2014; Pheko, 2011). The 2014 tax statistics produced by the South African Revenue Services further show that, on average, females earn amounts that are 33% lower than male salaries (South African Revenue Services, 2014:9; Grant, 2015). Thus, as the predominant gender in poor areas is female, a municipality that has more women and female-headed households in its region is likely to have less own-source revenue than those with more male residents. Service delivery is therefore likely to be weaker in these regions.

The gender variable in this thesis represents the percentage of females residing in each municipality.

11.4 OLS Regression Results

From the outlined list of variables, the dependent variable used in the OLS regressions are the service delivery principal components from 2007 and 2011, whilst the main independent variable of interest is the audit outcomes. The service delivery principal component represents overall levels of service delivery in each municipality, with all five indicators of service delivery being equally weighted. A regression was constructed for each year at a national level, incorporating all South Africa municipalities apart from those that were classified as outliers. A combination of the control variables that maximised the explanatory power of the model was retained.[3] Test results of the OLS assumptions have been included in table thirteen of the appendix. The regression results are displayed in table ten.

Table 10: OLS regression output for 2007 and 2011 [4]

Independent Variables[5]	Dependent Variable: Service Delivery Levels (PCA)[6]	
	2011	**2007**
MAIN VARIABLE OF INTEREST:		
Audit Outcome (Base Category: Disclaimer)		
Adverse	-0.1118	-0.0177
	(0.1635)	(0.1989)
Qualified with Findings	0.0020	0.0704
	(0.0758)	(0.1140)
Unqualified with Findings	-0.0980	-0.1406

[3] Variables that were excluded due to high variance inflation factors are listed in table two of the appendix.
[4] The summary statistics for all variables included in the regression, as well as comments on the results from OLS assumption tests, can be found in part two of the appendix.
[5] It should be noted that, as many of these variables are representing percentages and are not categorical variables, those expected to be negatively related to the dependent variable can either have a negative sign or a smaller impact on service delivery than its counterparts e.g. the coefficient upon % Lower-class should either be negative or smaller than %Middle and %Upper-class.
[6] The formation of these principal component scores are outlined in Chapter 9 and the individual municipal scores can be found in tables eight to eleven in the appendix.

	(0.1008)	(0.1046)
Unqualified with No Findings	-0.1527	0.2930
	(0.1629)	(0.3278)
MUNICIPAL FINANCE CONTROLS		
% Under budgeted income	-0.0000	-0.0005
	(0.0029)	(0.0013)
% Under budgeted expenditure	-0.0009	-0.0062**
	(0.0027)	(0.0028)
% Over budgeted expenditure	-0.0017	-0.0023
	(0.0015)	(0.0066)
% Over budgeted income	0.0011	-0.0005
	(0.0016)	(0.0013)
Own Source Revenue to Operating Revenue	-0.0021	0.0055**
	(0.0029)	(0.0023)
Salary Costs to Operating Expenditure	0.0092**	-0.0011
	(0.0037)	(0.0047)
Salary Costs to Own Source Revenue	-0.0013	-0.0000**
	(0.0013)	(0.0000)
Capital Revenue Transfer Subsidy to Capital Revenue	7.99e-06	
	(0.0012)	
Borrowing to Capital Revenue	-0.0017	-0.0012
	(0.0022)	(0.0022)
Borrowing to PPE	0.0000	
	(0.0002)	
Infrastructure Expenditure to Capital Expenditure	0.0020	-0.0014
	(0.0015)	(0.0013)
Debtors to Service Charges	-0.0002***	
	(0.0000)	
Creditors to Operating Expenses	0.0017	0.0042
	(0.0016)	(0.0067)

Total Wasted Expenditure	2.24e-08	
	(9.12e-08)	
SOCIO-ECONOMIC CONTROLS		
% Urban Area	0.0000	
	(0.0018)	
% Farm Areas	0.0089**	
	(0.0043)	
% Lower-class	0.0732*	0.0173
	(0.0392)	(0.0522)
% Middleclass		0.0036
		(0.0173)
% Upper-class		0.0291
		(0.0331)
Unemployment Rates	-0.0298	-0.0085
	(0.0245)	(0.0106)
Household Goods	0.9668***	0.3507***
	(0.0621)	(0.0606)
Political Dominance (Base Category: Majority Party < 50% votes)		
Majority party > 50% votes	0.0901	0.0545
	(0.1280)	(0.1637)
Majority party > 75% votes	0.3415**	0.0965
	(0.1352)	(0.1910)
% Whites	0.0340*	-0.0335***
	(0.0198)	(0.0098)
% Youth		-0.0148***
		(0.0198)
% Elderly	-0.0558**	0.0548*
	(0.0274)	(0.0325)
% No Schooling	-0.0264*	0.0324*

	(0.0156)	(0.0187)
% Primary Education		-0.0751***
		(0.0127)
% Secondary Education		0.0158**
		(0.0076)
% Tertiary Education	-0.1002**	0.1160**
	(0.0408)	(0.0501)
% People in Area	0.1450*	-0.0745
	(0.0800)	(0.0577)
Homeland Status (Base Category: Previous Homeland)		
Previous Partial Homeland/Partial Republic	-0.6712***	0.4182
	(0.2427)	(0.3457)
Previous Republic	-0.7325***	0.7055*
	(0.2661)	(0.3653)
% Females	0.0422	0.0477
	(0.0318)	(0.0319)
Constant	-1.4487	-2.1963
	(1.6851)	(1.6711)
Number of Observations	171	266
R-Squared	0.8573	0.6177

Note: Standard Errors are in Brackets; *** p < 0.01; ** p < 0.05; *p < 0.10

Table ten's regressions display an interesting assortment of results that are, in some cases, contrary to what would have been expected or to the trends that have thus far been highlighted. Although there are certain issues that affect the robustness of these results, these OLS regressions do offer some useful, preliminary insights into the relationship between municipal audit outcomes and service delivery performance. In this regard, all the audit outcomes are insignificant in both 2007 and 2011, once more indicating their weak correlation to service delivery performance in South African local government and reinforcing the findings of this thesis thus far.

On the whole, most of the significant coefficients are all very tiny, rendering their impact upon the service delivery score negligible. This is particularly true for the municipal financial control variables. A scattering of these variables are positively or negatively significant at a probability level of $p < 0.05$ or $p < 0.01$. However, not one of these variables are greater than 0.01 – effectively negating their correlation with the service delivery principal component dependent variable. This may be initial evidence that the overall levels of municipal revenue (highlighted as being significant in the previous chapter) might be more influential on municipal service delivery capacity than the way in which costs and incomes relate to one another.

Turning to the results of the socio-economic controls – whilst unemployment rates and percentage of female residents are insignificant, the percentage of farming areas and lower income class earners are both significant in 2011. Furthermore, the race, age and education variables are all significant for both 2007 and 2011. Unexpectedly, many the signs on these significant variables are opposite in 2007 to 2011, making their interpretation difficult. For example, whilst the percentage of elderly and uneducated citizens are negatively related to service delivery scores in 2011, as would be expected; in 2007 these variables are positively related to the dependent variable. Whilst there is no obvious reason for these changes in the signs, movements in the significant variables will effectively have no impact upon municipal service delivery performance due to their very small coefficients.

In contrast, the Household Goods asset index is significant in both 2007 and 2011 at a probability level of $p < 0.01$, with the 2011 result being the largest, positive coefficient out of all included variables. Whilst slightly smaller, the 2007 variable is also positive and significant. As the household goods asset can be used as a proxy for household wealth levels in a municipality – with more goods owned by an average household indicating higher wealth levels – these results indicate that municipal service delivery appears to be positively associated with wealth levels amongst its constituents, more so than with the audit outcomes.

Another interesting result pertains to the Homeland variable, which provides an indication of not only how much investment was made into an area's infrastructure, but can be used as an indication of its average wealth, education and urbanisation levels. In 2011, both the Previous Partial Homeland/Republic variable as well as the Previous Republic variable are significant at a probability level of $p < 0.05$ whilst in 2007, the Previous Republic variable is significant at a probability level of $p < 0.10$. Both have sizeable coefficients, particularly in comparison to the other results. These should be interpreted in relation to the base case variable, Previous Homeland, and it would be expected that, as in 2007, if a municipality is part of an area previously deemed a 'Republic,' it should have better quality and levels of infrastructure, leading to greater service delivery performance. However, in 2011, tentative evidence suggests that, in comparison to areas that were previously part of a Homeland, those that were either partially part of a Republic or fully part of a previous republic have lower levels of service delivery. Further research would need to be done to verify these results and uncover the reasons behind these apparent changes.

Finally, the regression output suggests that in 2011, the prevailing political economy theory is one in which political dominance allows a municipality to forge ahead with service delivery, unencumbered by objections from opposition parties. The regression suggests that in municipalities where the ruling political party holds more than 75% of the voter support, such support positively increases service delivery scores – significant at a probability level of $p < 0.05$.

In summary, while the OLS results suggest no significant relationships between municipal audit outcomes and service delivery performance, various socio-economic and financial variables do appear to be significantly related to the dependent variable, albeit with very small effect sizes. Of interest is the relatively large, positive coefficient on the Household Goods variable, suggesting strong relations between regional wealth levels and service delivery, as well as the significant Homeland and Majority

Political Party variables. Wealth, political influence and operational context thus seem to have a greater impact upon service delivery than municipal audit outcomes.

11.5 Presence of Endogeneity and Model Misspecification

Unfortunately, as mentioned in chapter seven, there are a host of factors influencing municipal service delivery for which comprehensive data was not available or easily accessible. These include variables such as capturing the capacity of municipal staff – particularly their qualifications and work experience, the extent of corruption and number of service delivery protests taking place in a municipality, the amount each receives in intergovernmental transfers, per capita expenditure and the levels of public participation in municipal operations.

These may render the results of this thesis slightly biased, as the effect of the included variables may be overestimated due to important variables not being included in the regression. To try account for this, the data was manipulated from a wide dataset to a long panel, upon which fixed effects regressions were run. Chapter twelve elaborates more around the outputs from these regressions.

Chapter Twelve: Accounting for time invariant factors affecting the relationship between municipal audit outcomes and service delivery via fixed effects regressions

As outlined in chapter eleven, the omission of numerous, potentially influential variables from the OLS regressions in table twelve may bias the results. However, this thesis benefits from the fact that it's data can be organised into a panel dataset, which allows for two sources of variation to be examined: the variation occurring as a result of differences between observations and that which is a result of differences within observations across time.

In other words, a panel dataset will allow for the variation in service delivery performance to be broken down into two parts – the service delivery variation that is due to differences between municipalities and the variation that stems from differences within municipalities during the time period 2007 to 2011. This thesis is specifically interested in the within variation, to understand whether differences in audit outcomes overtime within a municipality are correlated with changes in service delivery performance in the same organisation.

Fixed effects regressions are suitable empirical techniques to be used with panel datasets as they account for any unobserved, time-invariant variables and isolate on those effects that change across the years. Fixed effects regressions thus allow for a more robust assessment of the relationship between service delivery levels and municipal audit outcomes, accounting for the unobserved variables omitted from the OLS regressions in table twelve.

It should be noted that fixed effects regressions are only suitable in data with significant amounts of within-group variance. Should few changes take place within a municipality between 2007 and 2011, the regressions will not return useful results. This is not a problem for this thesis as the main focus is analysing the relationship between the municipal audit outcomes and service delivery performance, both of

which variables changed between 2007 and 2011. Furthermore, the majority of any significant time-invariant variables should have been captured in the OLS regression output in table twelve.

12.1 What does a fixed effects regression do?

A fixed effects regression captures the variation within observations across time, by examining the relationship between the dependent and independent variables for each observation and controlling for any unobserved, correlated effects. It does this by de-meaning the data to isolate the within-subject variation. As this dataset only covers two periods of time, the de-meaning effect is the same as if the data had been differenced. As they were present in both periods, de-meaning or differencing excludes any uncaptured, constant effects from the analysis, such as municipal staff capacity or levels of public accountability. A fixed or random effects regression thus focuses solely on time-variant factors, such as the audit outcomes, and it further assumes that any excluded effects are correlated with the included independent variables.

12.2 Empirical Description: Fixed versus Random Effects Regressions

An alternative to a fixed effects regression is a random effects regression, and before any analysis is run – the appropriate empirical technique must be determined. Consider the following regression:

$$Y_{it} = B_o + B_n X_{itn} + u_{it} \qquad t = 2007, 2011 \quad (2)$$

where

$$u_{it} = \alpha_{it} + \eta_{it} \qquad (3)$$

η_{it} is the normal un-observed, random error term produced in OLS regressions (assumed to be uncorrelated with the independent variables). However, α_{it} is known as an individual specific effect and captures the unobserved, time-invariant effects for each municipality. The difference between a fixed effects and random effects regression is whether or not α_{it} is allowed to be correlated with the independent

variables. Whilst the random effects regression does not allow for any correlation, the fixed effects regression does not require α_{it} to be uncorrelated with the $X_{itn.}$

To determine which of the two types of regressions is most appropriate, if any, a series of tests was run. This is important to rule out the possibility that alternative methods aren't more suitable forms of analysis than fixed effects. As shown in table thirteen and fourteen in the appendix, the various tests demonstrate that fixed or random effects regressions are better suited to the data than alternative empirical techniques, such as Pooled OLS.

To decide between a random or fixed effects regression, a Hausman test was run, which rejected the null hypothesis that a random effects regression is the more appropriate empirical tool out of the two. The test output is in table fifteen of the appendix. Thus, a fixed effects regression is best suited to the current dataset and the other assumptions tested in relation to these regressions are included in the appendix.

12.3 Interpretation of the dependent service delivery variable

Although a fixed effects regression will provide important information as to how each included control variable contributes to the prediction of the dependent service delivery component – the nature of the principal component renders interpretation of the beta coefficients produced by the regression difficult to interpret. This is because the principal component, whilst representing overall service delivery levels in each municipality, has no exact meaning in itself.

To ascribe meaning, the weightings placed upon each underlying variable in the principal component analysis must be considered. As previously mentioned, because there is equal weighting placed on all five of the underlying variables, the dependent variable is called a 'mixed' component. It can be interpreted as capturing a measure of overall service delivery levels within a municipality, with no specific focus on any one type of service. Thus, the interpretation is limited to showing how changes in control variables will impact the overall levels of access to services, whether it

increases or decreases the level of services being delivered, but this impact cannot be further quantified in the same manner that regression coefficients are normally interpreted.

12.4 Data Description

The same data used for the OLS regressions was applied here again, except it was transformed from a wide dataset to long, whereby each variable has two values for each observation, one for 2007 and one for 2011. This allows for the differencing to take place. It is a strongly balanced dataset, meaning that there are no missing values and each municipality has the same number of observations. The variables available for inclusion in this regression follow the same logic outlined earlier.

12.5 Results of Fixed Effects Regression with Robust, Clustered Standard Errors

Following on from the information already outlined and using the OLS regressions as a guide, the following output was produced from a fixed effects regression with clustered, robust standard errors assessing the impact of time-variant changes upon municipal service delivery. Whilst initially conducted at a national level, the regression was repeated several times to assess whether the same results were produced when municipal types, categories and provincial locations were accounted for.

Table 11: Results from Fixed Effects Regressions across Municipal Classes and Types

Independent Variables	Dependent Variable: Service Delivery Levels (PCA)			
	Nationally Representative Regression (1)	**Municipal Class: Small Towns (B3) (2)**	**Municipal Class: Mostly rural towns (B4) (3)**	**Municipal Type: Local Municipalities (4)**
MAIN VARIABLE OF INTEREST				
Audit Outcome (Base Category: Disclaimer)				
Adverse	-0.1063	0.0945	-0.8866**	-0.0392
	(0.1938)	(0.2608)	(0.4413)	(0.2045)
Qualified with Findings	0.0193	0.0451	-0.3432	-0.0023
	(0.0938)	(0.1066)	(0.2208)	(0.0973)
Unqualified with Findings	0.1656	0.1145	04117	0.2507**
	(0.1141)	(0.1699)	(0.3342)	(0.1268)
Unqualified with No Findings	0.2242	0.4951**	Omitted	0.4985**
	(0.1725)	(0.2213)		(0.2077)
FINANCIAL CONTROLS				
Infrastructure Expenditure to Capital Expenditure	-0.0003	-0.0022	0.0109**	-0.0004
	(0.0013)	(0.0017)	(0.0050)	(0.0013)
Borrowing to Capital Revenue	0.0011	0.0014	0.0035	0.0005
	(0.0017)	(0.0026)	(0.0086)	(0.0018)
Debtors to Service Charges	-03.30e-06	-0.0001	-0.0000	0.0000
	(0.0001)	(0.0003)	(0.0000)	(0.0000)

Creditors to Operating Expenses	0.0021 (0.0021)	0.0056* (0.0031)	-0.0108** (0.0051)	0.0024 (0.0023)
Staff Costs to Own Revenue	-0.0006 (0.0007)	0.0093** (0.0040)	0.0009 (0.0009)	0.0014* (0.0007)
Staff Costs to Operating Expenditure	-0.0014 (0.0066)	0.0058 (0.0087)	-0.0824*** (0.0102)	-0.0004 (0.0072)
% Under budgeted expenditure	0.0006 (0.0027)	-0.0030 (0.0039)	-0.0018 (0.0073)	-0.0011 (0.0025)
% Over budgeted expenditure	0.0018** (0.0009)	0.0006 (0.0016)	0.0019 (0.0037)	0.0022** (0.0009)
% Under budgeted income	-0.0049 (0.0031)	-0.0019 (0.0038)	0.0019 (0.0051)	-0.0064** (0.0030)
% Over budgeted income	-0.0017 (0.0010)	0.0014 (0.0014)	-0.0025*** (0.0007)	-0.0020** (0.0009)
SOCIO-ECONOMIC CONTROLS				
Political Dominance (Base Category: Majority Party < 50% votes)				
Majority party > 50% votes	0.1100 (0.1561)	0.2349 (0.1957)	-0.0386 (0.4626)	0.1583 (0.1577)
Majority party > 75% votes	0.1674 (0.1927)	-0.0124 (0.2341)	0.8655 (0.6252)	0.1983 (0.2096)
% Lower Class	-0.0738** (0.0366)	0.1019* (0.0537)	0.1579 (0.1613)	0.1048*** (0.0360)
% Middle Class	0.0177 (0.0153)	0.0232 (0.0313)	-0.0668 (0.0557)	0.0141 (0.0162)

% Upper Class	-0.0143	-0.0666*	0.0740	-0.0389
	(0.0278)	(0.0394)	(0.2537)	(0.0317)
Unemployment Rates	0.0027	-0.0006	0.0345	-0.0014
	(0.0092)	(0.0104)	(0.0293)	(0.0097)
Household Goods	0.1854***	0.2897***	0.6883***	0.2778***
	(0.0528)	(0.1016)	(0.2235)	(0.0612)
% White	0.0212	0.0110	0.2925	0.0173
	(0.0133)	(0.0234)	(0.2249)	(0.0183)
% Youth	0.0388	0.1167***	-0.1226	0.0585**
	(0.0283)	(0.0378)	(0.1106)	(0.0264)
% Elderly	-0.0595	-0.0134	0.4594*	-0.0297
	(0.0496)	(0.0653)	(0.2309)	(0.0552)
% No Schooling	0.0459	-0.0677*	0.0228	0.0243
	(0.0346)	(0.0370)	(0.0833)	(0.0339)
% Primary Education	-0.0538***	-0.0437*	0.1121**	-0.0493**
	(0.0203)	(0.0259)	(0.0436)	(0.0189)
% Secondary Education	0.0154*	0.0134	-0.0147	0.0111
	(0.0092)	(0.0151)	(0.0459)	(0.0100)
% Tertiary Education	-0.0157	-0.0140	-0.8903***	-0.0388
	(0.0336)	(0.0603)	(0.1735)	(0.0352)
% People in Area	-0.3684	6.4215	-20.1215**	1.6724
	(0.6232)	(5.8602)	(8.1259)	(3.3024)
% Females	0.0343	-0.0375	0.2738*	0.0141
	(0.0294)	(0.0412)	(0.1421)	(0.0330)
Constant	-2.7834**	-1.5952	-10.3495	-2.5491
	(1.3851)	(2.2389)	(9.2945)	(1.535)
Number of Observations	445	193	102	384
Number of Groups	245	106	57	209
Corr (u_i, Xb)	-0.0978	-0.7146	-0.9346	-0.4104

Rho	0.7685	0.8477	0.9748	0.8321
Prob > F	0.0000	0.0000	0.0000	0.0000

Note: *** p < 0.01; ** p < 0.05; *p < 0.10

Table eleven's output displays a host of results that are not only quite different from the output produced by the OLS regressions, but do not display many cohesive trends. Few variables are significant across all four levels of analysis and for the vast majority, the coefficient sizes are very small, if not negligible. This could indicate that there are other influences impacting upon service delivery that are not being captured by the variables in these regressions. It also highlights that there is a large variation in the working conditions of different types of local municipalities, rendering it hard to find conclusive results across them all.

With regards to the audit outcomes, whilst the results for the National Regression mirror those in table ten's OLS results - when focusing in on different groupings of municipalities the Clean Audit outcome becomes positively significant for both local municipalities and those classed as B3 entities. Furthermore, the Unqualified with No Findings variable is also positively significant for Local Municipalities and for those classified as B4 municipalities, achieving an Adverse audit outcome will negatively impact upon service delivery in relation to achieving a Disclaimer. Although not ubiquitous, these results suggest that the top echelons of the audit system do appear have a positive impact upon municipal operations of certain entities which should, in turn, improve service delivery performance.

However, when compared with the percentage of residents living in an area, the variable for which is significant for rural municipalities classed as B4, it is clear that the effects of the audit outcome variables are negligible. The coefficients produced for the population density variable indicate that the percentage of the overall population residing in a municipal area has a significant and sizeable negative effect on the levels of service delivery. In other words, the more people living in one area, the greater

demand for public services and the poorer the service delivery performance of municipalities, at both a national and local level. This is typical of over populated, poorer regions.

However, the effects of levels of demand for public services upon municipal operations cannot be looked at in isolation. If high levels of demand are accompanied by high amounts of disposable income – as occurs in wealthier areas of South Africa – the end result could be improved municipal service delivery performance. Higher disposable income enables citizens to demand more and better quality amenities, as well as reliably service their rates accounts (Mahabir, 2012). Thus, it is not surprising that the % People variable is significant for B4 municipalities, as these rural entities are often underfinanced, lacking in staff and would struggle to deal with high levels of population density and demand for public services. The regressions include numerous variables acting as proxies for regional wealth levels and their coefficients are expected to demonstrate this income effect upon municipal performance.

For example, as with the OLS regressions, the level of household goods owned in a region is a proxy for wealth levels of a municipality's residents. They are also a significant determinant of demand for public services, as electronic items need electricity and water to function. Furthermore, it is likely that residents who can afford multiple household goods live in more formal housing structures than those living in dwellings such as shacks. As was earlier stated, greater percentages of formal dwellings in an area are expected to be positively correlated with delivery as it is easier for municipalities to service such structures. Thus, it makes sense that the Household Goods variable is significant and positive at a probability level of $p < 0.01$ for all four regressions, notwithstanding their relatively small coefficient size.

Another proxy for area wealth levels are the education variables. In light of the distorted returns to schooling in South Africa increasing disposable income levels (Keswell & Poswell, 2004), one would expect the education variables to be positively correlated with the service delivery dependent variable. This is indeed the case with

the secondary education variable, which is positive and significant for the nationally representative regression. Furthermore, the No Schooling variable is significantly negative for B3 municipalities whilst the Primary Education variable is significant across all four regressions, and negative for three of the four.

This is to be expected, given that the returns to education in South Africa become exponential from secondary schooling onwards, with lower forms of education being highly correlated to unemployment and poverty (Keswell & Poswell, 2004). The tertiary education variable is unexpectedly negative for the B4 Municipal Class. The insignificance of the variable across the other regressions suggest that the link between higher levels of education, greater income and more sources of own municipal revenue generation might not be that strong – indeed it appears to be operating in reverse in rural areas, where one would not expect there to be a high percentage of tertiary educated residents. Residential education levels are thus perhaps not the strongest driver of demand and payment for public services, with limited influence over municipal operations.

The age and income class variables also produced results that are counterintuitive. The age variables provide insight as to the type of demand placed upon municipalities, as elderly and youthful residents are often associated with lower levels of income and rates payment capacity, greater reliance upon government subsidies and higher levels of demand for free public services. The income variables are a direct measure of a region's wealth levels, and the higher percentage of residents that are classed as lower income class earners, the poorer service delivery in such areas is expected to be.

The results show varying support for these theory. It holds at a national level, as the lower income class variable is significant and negative in the nationally representative regression. However, the variable is positively significant for the local and B3 municipalities. In addition, the percentage of Upper Income residents variable is significantly negative, although small, for B3 municipalities whilst the percentage of

young and elderly citizens are both positive and significant for regressions two, three and four.

A possible explanation for this could be that many of the people falling into lower income brackets are likely to be reliant upon state grants and unable to pay rates. Likewise, with youth or elderly people, neither of which are typically significant income earners. Hence, the potential for municipalities with high proportions of young, old or poor residents to raise their own revenue is limited, resulting in them receiving higher intergovernmental financial transfers than wealthier entities (Section 214 (2), South African Constitution; National Treasury, 2011). Hence, for certain municipalities, having poorer citizens might actually assist with their service delivery capacity.

As South Africa's income inequality is so sharply split along racial lines (Mahabir, 2012), the racial variables convey wealth information too however, interestingly, none of these were significant in the regression output. Inequality is also highly linked with gender in South Africa (Rogan, 2014; Magongo, 2016), and one would expect to see a negative coefficient upon a significant Percentage of Female Headed Households as the more prevalent they are, the poorer a region is expected to be. The results however returned a positive result.

Lastly, various municipal financial variables are significant, indicating that financial governance is a relevant aspect influencing service delivery performance. However, the varying results across the four regressions and opposing signs render the results difficult to interpret in terms of understanding the directional impact of each indicator, although their small coefficients suggest it is limited either way.

From these results, it thus appears that the null hypothesis of audit outcomes being positively related to service delivery cannot be rejected, as the municipal audit outcomes, particularly the Clean audit outcome, do appear to be significant. However, their impact on or relation to service delivery is not as strong as factors such

as the levels of demand for public services and the ability of residents to pay for services. This may suggest that whilst a clean audit outcome is a worthwhile goal for municipalities to pursue, their ability to deliver public services is more a function of income and socio-economic factors than administrative capacity, and simply having robust financial management is not enough to ensure effective public service delivery in a constrained financial environment.

This thesis will now examine whether the same outcomes are produced when the regressions are run in different provincial locations. The provinces are grouped according to proximity (regression 2 and 3) as well as historical audit outcomes – regression 1 grouped the Eastern Cape and KwaZulu-Natal as these provinces traditionally score the weakest audit results whilst the two metros, the Western Cape and Gauteng, were grouped as they have the strongest audit outcomes.

Table 12: Results from Fixed Effects Regressions across Provincial Groupings

Independent Variables	Dependent Variable: Service Delivery Levels (PCA)			
	Municipal Province: Eastern Cape and KwaZulu-Natal (1)	**Municipal Province: Limpopo, North West & Mpumalanga (2)**	**Municipal Province: Northern Cape and Free State (3)**	**Municipal Province: Western Cape and Gauteng (4)**
MAIN VARIABLE OF INTEREST				
Audit Outcome (Base Category: Disclaimer)				
Adverse	-0.1373	-0.0888	Omitted	-0.5471
	(0.3039)	(0.2115)		(0.3779)
Qualified with Findings	0.2925	0.1854	0.0895	0.2376
	(0.2442)	(0.1333)	(0.1352)	(0.2569)
Unqualified with Findings	0.4925*	0.0431	0.0044	0.5332***
	(0.2678)	(0.1861)	(0.1498)	(0.1826)
Unqualified with No Findings	0.8611**	0.0975	Omitted	0.7139**
	(0.3897)	(0.3296)		(0.3012)
FINANCIAL CONTROLS				
Infrastructure Expenditure to Capital Expenditure	0.0024	-0.0055**	-0.0023	-0.0017
	(0.0025)	(0.0025)	(0.0020)	(0.0015)
Borrowing to Capital Revenue	0.0033	-0.0062	-0.0019	0.0109***
	(0.0035)	(0.0047)	(0.0024)	(0.0033)
Debtors to Service Charges	-0.0000	-0.0003**	0.0001	-0.0000
	(0.0001)	(0.0001)	(0.0005)	(0.0006)

Creditors to Operating Expenses	-0.0037 (0.0044)	0.0039** (0.0015)	0.0042 (0.0044)	0.0110** (0.0050)
Staff Costs to Own Revenue	0.0007 (0.0011)	-0.0024*** (0.0007)	0.0109** (0.0043)	-0.0016 (0.0026)
Staff Costs to Operating Expenditure	-0.0062 (0.0118)	0.0165** (0.0076)	0.0021 (0.0125)	0.0187 (0.0135)
% Under budgeted expenditure	-0.0028 (0.0054)	-0.0020 (0.0035)	-0.0051 (0.0064)	-0.0002 (0.0035)
% Over budgeted expenditure	0.0016 (0.0013)	-0.0065 (0.0048)	-0.0018 (0.0048)	-0.2178*** (0.0548)
% Under budgeted income	-0.0072 (0.0057)	0.0012 (0.0031)	0.0009 (0.0079)	0.0069 (0.0063)
% Over budgeted income	-0.0019* (0.0011)	0.0027* (0.0014)	-0.0024 (0.0024)	0.2336*** (0.0592)
SOCIO-ECONOMIC CONTROLS				
Political Dominance (Base Category: Majority Party < 50% votes)				
Majority party > 50% votes	-0.0411 (0.4110)	Omitted	0.3877 (0.3233)	-0.0566 (0.1273)
Majority party > 75% votes	0.4268 (0.3465)	-0.4805*** (0.1461)	0.6434* (0.3399)	0.1024 (0.4203)
% Lower Class	-0.0216 (0.1186)	-0.0511 (0.0477)	0.2264*** (0.0619)	0.1316*** (0.0313)
% Middle Class	0.0334 (0.0578)	0.0119 (0.0240)	0.0231 (0.0273)	-0.0170 (0.0317)

% Upper Class	-0.1195	0.0064	-0.0373	0.0389
	(0.1187)	(0.0347)	(0.0371)	(0.0401)
Unemployment Rates	-0.0100	-0.0206*	0.0153	0.0779***
	(0.0157)	(0.0116)	(0.0109)	(0.0125)
Household Goods	0.2142	0.3304***	0.3310***	0.0377
	(0.1549)	(0.1109)	(0.0927)	(0.0906)
% White	0.0266	-0.0009	-0.0532*	0.0456***
	(0.0858)	(0.0229)	(0.0281)	(0.0165)
% Youth	0.0199	0.1861***	0.0291	0.0429
	(0.0724)	(0.0436)	(0.0434)	(0.0327)
% Elderly	-0.2161	0.1549	0.2107	-0.1843***
	(0.1573)	(0.0957)	(0.1290)	(0.0422)
% No Schooling	0.0970	-0.0084	0.0054	0.0260
	(0.1004)	(0.0354)	(0.0415)	(0.0514)
% Primary Education	-0.1097**	-0.0848***	-0.0891**	-0.0036
	(0.0537)	(0.0315)	(0.0361)	(0.0245)
% Secondary Education	0.04556	0.0170	0.0536***	-0.0111
	(0.0280)	(0.0218)	(0.0162)	(0.0106)
% Tertiary Education	0.1058	0.0068	-0.1595**	0.0093
	(0.1353)	(0.0586)	(0.0623)	(0.0366)
% People in Area	-1.5203	7.3476***	-7.4832*	0.9837*
	(1.0383)	(2.4426)	(4.0787)	(0.5195)
% Females	0.0111	-0.1195**	-0.0494	0.0313
	(0.1053)	(0.0537)	(0.0465)	(0.0498)
Constant	0.0489	-1.0206	0.2375	-4.5458*
	(4.1912)	(2.0707)	(2.5039)	(2.4355)
Number of Observations	166	110	93	76
Number of Groups	92	63	50	40
corr (u_i, Xb)	-0.5663	-0.9861	-0.9572	-0.9713

Rho	0.8044	0.9895	0.9713	0.9869
Prob > F	0.0000	0.0000	0.0000	Omitted

Note: *** p < 0.01; ** p < 0.05; *p < 0.10

Table twelve's output allows for the analysis of the results across geographic locations to determine whether the impact of the audit outcomes and socio-economic variables differ depending on where the municipalities are situated. It appears, given the inconsistent spread of significant variables, that very few trends are applicable across the entire country.

With regards to the audit outcome variables, the Unqualified with Findings and Clean audit outcomes are positive and significant for both regression one – the Eastern Cape and KwaZulu-Natal – and regression four – the Western Cape and Gauteng. No significant audit results were produced for regressions three and four. Interestingly the significant results occurred in regions that typically achieve the weakest (regression one) and strongest (regression four) audit outcomes. As KwaZulu-Natal and the Eastern Cape are home to some of the poorest municipalities in South Africa and Western Cape and Gauteng some of the wealthiest (BusinessTech.co.za, 2016a), these results reinforce the link between regional income levels and audit outcomes. The effectiveness of the municipal audit system thus appears to differ depending on an entity's location.

With reference to municipal financial controls, a host of different variables are significant across the four regressions – often with contrasting signs, indicating that financial management does not have ubiquitous application across South Africa. However the sizes of the coefficients are so small that their impact upon service delivery is in effect negligible. Two interesting exceptions to note are the variables capturing the percentage by which municipalities exceeded their budgeted expenditure or budgeted income. Both significant and greater than zero for the Western Cape and Gauteng, exceeding budgeted expenditure seems to have a

negative impact upon service delivery whilst exceeding budgeted income is positively related to the dependent variable.

The opposite signs on the significant Political Dominance variables in regression two and three indicate that the prevailing economic theory is dependent upon which region of the country is being examined. Whereas political dominance has a positive impact upon service delivery in Limpopo, North West & Mpumalanga, in the Free State and Northen Cape, political dominance is negatively related to service delivery. This once more highlights that municipalities across the provinces operate in very different contexts, with few trends holding across the entire country.

The variation in trends is also relevant to the Household Goods variable, which have up until table twelve been positive and significant for all regressions. Table twelve though reveals that the impact of regional wealth levels, as proxied by the percentage of household goods owned, are only significant in the regions captured by regressions two and three. There is no clear reason why the proxy would not be significant for regressions one and four too, as the audit outcome variable indicates that a wealth effect is at play. There are perhaps other financial factors in these areas that are more significantly related to the dependent variable but which have not been included in these regressions.

Another interesting trend to note is that the primary education variable is significant and negatively related to service delivery for all but regression four. This is in line with the extorted returns to South Africa education theory outlined earlier (Keswell & Poswell, 2004) and demonstrates that primary education is a factor that, for the most part, has the same effect upon municipal performance across the country. Although significant, the positive secondary education variable has a near zero coefficient and the significant tertiary education variable shows a negative relationship with service delivery. This unusual trend has presented itself in a few of the results outlined earlier, suggesting that tertiary education has a different dynamic with service delivery in

rural areas to what is expected. Further research could be done to explain and verify this particular result.

Furthermore, the percentage of female residents is significant for the second regression and negative. This is to be expected, as the average female South African is up to 30% poorer than her male counterpart thus in areas with high numbers of women citizens, the municipalities are likely to collect lower rates income and deliver fewer services (Rogan, 2014). Limpopo, North West and Mpumalanga are typically resource constrained provinces, providing further support for this theory.

Finally, the population density variable is significant for all but regression one, and demonstrates once more that socio-economic factors do not necessarily impact upon municipal operations in the same way across different locations. Whilst the number of people in an area are positively related to service delivery in regressions two and four, it is negatively related in regression three. Still one of the largest variables out of all the results, this variable appears to interact with regional wealth levels and other socio-economic factors and can't be looked at in insolation.

12.6 The Relation between Municipal Audit Outcomes and Service Delivery

The results presented in tables ten to twelve highlight numerous important trends. Firstly, and most important for this thesis' hypothesis, is the audit outcomes variables. It does appear that in some local municipalities, particularly those in KwaZulu -Natal, Eastern Cape, Western Cape and Gauteng - a Clean Audit outcome is associated with higher levels of service delivery in comparison to a Disclaimer. However, this was not a very prevalent trend and when compared with the coefficient size of other significant variables, it becomes clear that the impact of the audit outcomes upon service delivery is quite small.

Secondly, it is clear that very few variables are significant across municipal types, classes and locations. Even the Household Goods variable which proxied regional wealth levels – a consistently positive and significant variable for all of the regressions

in table ten and eleven – became insignificant when examined across provinces. Other variables, such as the percentage of people living in a municipal area, interact with associated socio-economic factors which also means that their impact upon service delivery differs from location to location. Thus, there is a vast amount of variability within the municipal operating system

From these results, it thus appears that the null hypothesis of audit outcomes being positively related to service delivery cannot be rejected, as the municipal audit outcomes, particularly the Clean audit outcome, do appear to be significant. However, their impact on or relation to service delivery is not as strong as factors such as the levels of demand for public services and the ability of residents to pay for services. This may suggest that whilst a clean audit outcome is a worthwhile goal for municipalities to pursue, their ability to deliver public services is more a function of income and socio-economic factors than administrative capacity, and simply having robust financial management is not enough to ensure effective public service delivery in a constrained financial environment.

Chapter Thirteen: Policy Recommendations and Conclusion

In conclusion, this thesis has found evidence to suggest that a positive but weak relationship exists between municipal audit outcomes and service delivery performance only in some cases, rendering financial compliance limited in terms of its impact on municipal operations. Ledger (2016) agrees with this statement, contending that "adopting the audit outcome as some kind of proxy for municipal efficiency" is a "very serious error" and that the relationship between municipal financial governance, audit outcomes and service delivery "is not simply causal." Ledger (2016) has further found that "a good audit outcome often suggests that municipality in question has thrown considerable resources at the problem.

Municipal financial audits ensure transparency and prevent corruption. They assist local governments to set performance targets and account for actions taken towards fulfilling them. However, the audits have very little impact upon an entity's ability to actually achieve their goals. Whilst a clean audit outcome is a worthwhile goal for municipalities to pursue, their ability to deliver public services is more a function of financial and socio-economic factors than administrative capacity or regulation compliance. These performance determining factors include the wealth levels of municipal residents, the extent of urbanisation or sophistication of available infrastructure and the amount of demand for public goods.

Thus, good financial governance does not appear to be sufficient to assist municipalities that are struggling to perform their legislated duties. There are consequently grounds to contend that the amount of emphasis placed upon financial compliance in South African legislation and by the Auditor-General might not be the most helpful approach in terms of improving municipal performance, as the existing auditing framework appears to produce limited benefits that spill over into other areas of municipal operations.

Indeed, whilst South Africa's municipal auditing framework is part of a plethora of compliance regulations intended to keep decentralised power in check, from the findings of this thesis it can be said that these regulations have failed to achieve their over-arching goal of encouraging strong municipal operations. The regulations appear to be disconnected from municipal operational performance. This is likely less a reflection of a failed system of decentralisation and more of a need for the audit system itself to be adjusted so that there is a stronger correlation between the two outcomes.

An obvious flaw in the design of the auditing system is that the regulations have not been adequately contextualised to South Africa's local government sphere. The fact that few variables were significant across all the different municipal groupings highlights just how diverse the operational contexts of municipalities across South Africa can be. In light of this, the country's one-size-fits-all auditing regulations seem incongruous. The capacity of a metropolitan municipality differs vastly from a rural local municipality, yet they are required to meet the same onerous auditing criteria. A tiered or differentiated auditing system should be developed to account for such differences, and the exorbitant costs of the audits to local municipalities – often involving high consultant fees – should also be addressed.

Furthermore, the public auditing regulations need to move away from being compliance focused towards more value based auditing methods that look beyond tick boxes and examine the underlying, structural issues affecting municipal operational performance. As Zille (2015) contends, the auditing system needs to become more 'nuanced,' geared towards "'value for money' auditing, which determines whether the choices made provide the best value for public money in the given circumstances.'

To achieve this, the municipal auditing system needs to be more effective in holding municipal managers and staff accountable for their actions without hemming them in or not allowing for the use of their initiative. According to the World Development

Report (WDR) of 2004, 'failures in service delivery are squarely failures in accountability relationships' (Mundial, 2004; Joshi, 2013). Currently, South African municipal employees face negative performance incentives, resulting from the focus upon compliance and penalisation for not achieving ambitious service delivery objectives.

As emphasised by Joshi (2013), transparency and accountability mechanisms like the public sector audits do not account for the " the underlying political context that really governs the incentives different actors have to act on the demand for good governance" and have not explored "the extent to which information or accountability is likely to make a difference. "The audit regulations need to be adjusted so that staff take full accountability and are motivated to perform to the best of their abilities.

Two suggestions for adaption include introducing penalisations for poor municipal and employee performance (there is currently very little in this regard) and perhaps introducing more community-based accountability mechanisms whereby the local residents hold their public servants responsible. Social audits and public hearings, which have been experimented with in India and produced very positive results, could be included in South African regulations (Joshi, 2013).

Adding to the current work burden of municipal employees is the fact that local governments have been handed responsibilities without being sufficiently equipped to perform them, particularly in terms of limited finances. As Joshi (2013) argues "accountability and transparency initiatives without corresponding support for increasing the capacity to respond can lead to inaction and frustration on the part of providers" (Gaventa and Barrett, 2010).

In a recent report by PARI (2016) examining the regulation difficulties experienced by 60 of the worst performing municipalities in the 2013/2014 audit outcomes, a host of common operational issues were found across the following categories: leadership, governance and oversight, basic administration, capacity, inter-governmental support

and audit specific issues. Many of these are never addressed sufficiently by the auditing process as they required deeper, structural interventions and are too often chalked up to leadership failures "rather than a more nuanced approach that takes sufficient cognition of the importance of building robust and sustainable institutions" (Ledger, 2016). As the report contends, effective administration is a structural issue from which the audit outcomes flow and "there needs to be a greater focus on the operational efficiency and effectiveness of all municipalities, rather than simply focusing getting all municipalities to achieve a clean audit" (PARI, 2016; Ledger, 2016)

Hence, this thesis concludes that South Africa's municipal audit system is a flawed regulation in the country's decentralised governance model and one that is failing to achieve its objectives of improving municipal performance. Besides not being adequately contextualised or supported, the auditing regulations fail to strike an effective balance between complexity and simplicity, rendering them unable to keep decentralised power in check without unnecessarily restraining municipal employees or focusing on superficial governance issues. Further research should be conducted into how this balance can be achieved and adaptations made to the current regulations so as to improve the supportive role they play to South African municipalities.

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Appendix

1. Tables

Table 1: Changes to Municipal Codes

Mun Code	Action Taken	Reason
Altered Municipal Codes		
EC125	Changed to BUF	EC125 changed from a local municipality to the metropolitan municipality, Buffalo City in 2011.
FS172	Changed to MAN	FS172 changed from a local municipality to the metropolitan municipality, Mangaung in 2011.
EC151	Changed to EC443	The code of this municipality was changed between 2007 and 2011.
EC152	Changed to EC444	The code of this municipality was changed between 2007 and 2011.
FS171	Changed to FS164	The code of this municipality was changed between 2007 and 2011.
FS173	Changed to FS196	The code of this municipality was changed between 2007 and 2011.
DC20/FS196	Changed to DC20	This municipality had a name change and become a district municipality.
Absorbed Municipal Areas		
NW391	Dropped from dataset	

NW395 NW397		These two municipalities were separate in 2007 but then merged together to form a new municipality, NW397, in 2011. All three were dropped.
NW405	Dropped from dataset	This municipality was absorbed into two other municipal areas, NW401 and NW402.
DC46 GT462 GT461	Dropped from dataset	These municipalities were all incorporated into the Tshwane Metropolitan Municipality.
GT484	Dropped from dataset	In 2007, this municipality was a part of the North West Province but in 2011, it was back in the Gauteng Province.
DC17	Dropped from dataset	In 2011, this municipality was incorporated into Mangaung.

Table 2: Variables excluded due to high VIF values

2007	**2011**
% Black	% Black
% Coloured	% Coloured
% Indian	% Indian
% working aged	% Working Aged
Total Number of Staff	Total Number of Staff
% Middle Class	% Middle Class

	% Upper Class
	%Tribal/Traditional area
	% Primary School
	% Secondary School
	% Youth
	% Over budgeted income
	% Over budgeted expenditure

Table 3: Outlying Municipalities removed from OLS regression

2007	**2011**
DC9	DC27
KZN244	DC15
KZN274	EC141
	EC441
	EC154
	KZN285

Table 4: Bartlett's Sphericity Test

	2007	**2011**
Chi-square	1368.969	1199.946
Degrees of freedom	10	10
p-value	0.000	0.000

Table 5: KMO Measure of Sampling Adequacy

	2007	**2011**
KMO Statistic	0.805	0.77

Table 6: PCA Eigenvectors

2011	**Component One**	**Component Two**	**Component Three**	**Component Four**	**Component Five**
Brick Dwellings	0.4049	0.5624	0.6863	-0.2177	-0.0366
Piped Water Inside Dwelling	0.4522	-0.4683	0.2526	0.5115	-0.5007
Electricity for Cooking	0.4349	0.4960	-0.4830	0.5295	0.2260
Electricity for Lighting	0.4820	-0.0377	-0.4713	-0.6196	-0.4002
Refuse Removed Weekly	0.4584	-0.4657	0.0985	-0.1632	0.7326

2007	**Component One**	**Component Two**	**Component Three**	**Component Four**	**Component Five**
Brick Dwellings	0.4073	0.6270	0.6348	0.1077	-0.1622
Piped Water Inside Dwelling	0.4550	-0.4130	0.3289	-0.5348	0.4778
Electricity for Cooking	0.4371	0.4698	-0.6351	0.0025	0.4299

Electricity for Lighting	0.4806	-0.1558	-0.2916	-0.3178	-0.7474
Refuse Removed Weekly	0.4528	-0.4373	0.0212	0.7755	0.0443

Table 7: Variance captured by principal components

	2007 Eigenvalue	**2007 Percentage of variance**	**2011 Eigenvalue**	**2011 Percentage of variance**
Component One	3.90665	0.7813	3.69604	0.7392
Component Two	0.642862	0.1286	0.739921	0.1480
Component Three	0.236446	0.0473	0.326153	0.0652
Component Four	0.12633	0.0253	0.133351	0.0267
Component Five	0.0877119	0.0175	0.104532	0.0209

Service Delivery Principal Component Scores

Table 8: Consistently Weak Municipalities

Municipal Code	**2011**	**2007**
KZN271	-4.514643	-0.9086426
EC444	-3.89666	-2.574112
KZN244	-3.769976	-2.092293
KZN272	-3.499238	-0.8716362
KZN294	-3.181668	-2.132886
KZN211	-2.967129	-1.931426
KZN293	-2.93853	-1.903229
DC27	-2.864517	-0.6387326
KZN273	-2.578562	-0.6606766
KZN286	-2.439109	-2.098297
EC441	-2.421703	-1.104154
EC442	-2.398729	-2.170867
DC44	-2.332602	-1.604079
EC141	-2.322904	-2.053031
KZN253	-2.174111	-0.9345497
DC24	-2.146401	-1.283733
KZN213	-2.138337	-1.533922
EC121	-2.094056	-2.260714
KZN431	-2.079005	-2.5599
EC137	-2.012192	-2.145422

KZN242	-1.863664	-1.138641	KZN223	-0.5734695	-0.1305775
KZN434	-1.808211	-1.217279	KZN263	-0.5617373	-0.1600721
KZN274	-1.69983	-0.3330373	EC156	-0.5272942	-2.093678
KZN233	-1.51372	-0.8497332	KZN221	-0.5215073	-0.7089083
KZN284	-1.509741	-1.5198	KZN262	-0.5008816	-0.4589967
KZN245	-1.50432	-1.297114	KZN234	-0.4860702	-0.6429737
EC443	-1.389945	-2.05499	EC157	-0.4778373	-1.167574
EC122	-1.295052	-1.090122	MP312	-0.4711301	-0.3160199
KZN283	-1.250018	-1.908616	KZN266	-0.4708281	-1.620663
DC43	-1.226653	-1.708233	NW397	-0.4480096	
KZN261	-1.200699	-0.8518611	DC23	-0.4001895	-0.7926658
EC153	-1.19561	-2.314932	FS195	-0.369189	-0.0294396
KZN265	-1.140818	-2.15907	KZN235	-0.3386779	-1.566904
EC135	-1.098425	-2.066398	KZN432	-0.3379303	-0.669434
GT483	-1.097569	-2.054615	DC28	-0.3123473	-0.6191516
KZN435	-1.083978	-2.243247	NC092	-0.304651	-0.0390654
KZN226	-1.03291	-1.961193	DC13	-0.2771176	-0.7900742
EC154	-0.8557932	-2.529561	LIM341	-0.2657901	-0.0409692
KZN285	-0.7791973	-2.069184	LIM361	-0.2394519	-0.8137509
DC14	-0.7763277	-0.7372625	NW374	-0.1572223	-0.4963429
KZN236	-0.7597228	-1.475968	MP323	-0.1540377	-0.1771453
DC26	-0.7217838	-1.103116	EC136	-0.1249234	-1.353036
DC12	-0.7164054	-0.541168	EC138	-0.0829692	-1.038969
DC15	-0.6937757	-1.938865	KZN215	-0.0275456	-1.417493
EC155	-0.6385947	-2.015201	EC123	-0.012423	-0.7637694
DC29	-0.6110601	-0.919505	KZN214	-0.0025588	-2.013216
DC21	-0.5778591	-0.8398693			

Table 9: Worsened Municipalities

Municipal Code	**2011**	**2007**			
NC084	-1.112944	0.0986259	KZN275	-1.043174	0.2770641
NC066	-1.054866	1.398907	MP303	-0.9258329	0.0179631
			NC074	-0.4629597	1.189161
			NW382	-0.4543595	0.796213

NW384	-0.43224	0.1295832	NC065	-0.2362512	1.184283
MP302	-0.3876063	0.525647	KZN241	-0.0820871	0.3219208
NC076	-0.3528734	0.5835286	GT422	-0.069037	0.8479332
LIM475	-0.3164361	0.3512736	WC051	-0.0666754	1.332096
NW401	-0.2905706	0.0566975	EC106	-0.0393084	0.632788
KZN212	-0.275965	0.0447842			
NW392	-0.2452971	0.4882671			

Table 10: Improving Municipalities

Municipal Code	**2011**	**2007**	DC22	0.392965	-0.0854
KZN254	0.023348	-0.12381	NC082	0.483323	-0.03391
NW372	0.044311	-0.52504	NC453	0.515003	-0.1388
EC142	0.054007	-0.20287	DC40	0.56481	-0.37461
KZN227	0.077906	-0.73652	FS191	0.564876	-0.46291
DC48	0.089893	-0.50379	MP305	0.565987	-0.39157
NC451	0.097485	-0.13717	WC048	0.577559	-0.10728
KZN232	0.121835	-0.04115	DC20	0.646239	-0.10693
EC124	0.14305	-0.98341	KZN292	0.674604	-0.09095
KZN291	0.145744	-0.5244	NW403	0.678579	-0.02818
NW404	0.168461	-0.14745	MP307	0.680675	-0.42639
NW373	0.181402	-0.83316	FS185	0.683176	-0.58558
MP306	0.191173	-0.75973	DC18	0.724119	-0.17997
DC30	0.206529	-0.09859	WC044	0.728798	-0.00477
KZN224	0.219699	-2.60824	FS184	0.734987	-0.02658
KZN281	0.230471	-0.59931	EC126	0.75539	-0.56855
DC37	0.264187	-0.42529	NC086	0.772868	-0.08221
MP321	0.270854	-0.48614	FS181	0.881444	-0.82545
FS205	0.279815	-0.05988	FS201	0.88637	-0.76042
FS193	0.295011	-0.36669	WC047	0.935675	-0.2355
MP311	0.30849	-0.03376			

Table 11: Consistently Strong Municipalities

Municipal Code	2011	2007
NW393	0.029743	0.471095
BUF	0.039893	----------
NW385	0.109218	0.846673
EKU	0.125407	0.129875
NC078	0.126411	0.658749
DC39	0.129602	0.641325
NC094	0.131812	0.396286
LIM354	0.180647	0.766502
DC9	0.200621	0.700396
LIM342	0.201555	0.080238
MP324	0.203498	1.132297
LIM365	0.203748	0.031762
NC085	0.212805	0.217708
MP314	0.223996	0.419527
NW381	0.227563	0.856223
DC25	0.235472	0.688558
FS182	0.265559	0.159071
GT482	0.284312	0.12696
NW383	0.287012	0.584801
FS192	0.304055	0.577404
NC071	0.305548	0.974028
NC091	0.309288	0.953763
NC093	0.316163	0.543146
LIM366	0.316202	0.280921
LIM362	0.318388	0.33614
DC7	0.323247	0.936119
MP304	0.333774	0.378499
WC045	0.335696	0.955794
LIM364	0.342284	0.583412
KZN222	0.350757	0.214987
KZN216	0.361177	0.302084
DC31	0.366156	0.244216
GT481	0.37779	0.042704
DC47	0.381676	0.588555
NW396	0.394083	0.216475
NC077	0.397614	0.968163
LIM333	0.401686	0.859882
EC105	0.405163	0.85245
WC052	0.415152	1.202916
FS204	0.416075	0.55922
DC6	0.419522	0.810884
DC8	0.427645	0.276174
DC36	0.436182	0.49633
NC072	0.436958	0.787138
EC108	0.448957	0.84928
EC102	0.450714	0.77455
DC45	0.451947	0.117213
EC109	0.459392	1.064413
KZN252	0.465684	0.985778
DC34	0.466568	0.6188
DC19	0.46686	0.118106
LIM343	0.46934	0.568917
DC10	0.472577	0.927465
DC35	0.482991	0.938937
NC064	0.484481	0.405589
MP301	0.487959	0.080997
LIM351	0.520908	1.070234
EC132	0.523433	0.210593
NC075	0.528712	0.953334
WC025	0.544796	0.826498
EC127	0.552509	0.051662

EC103	0.560248	1.331732
NW394	0.560529	0.798101
TSH	0.5609	0.114884
DC33	0.572292	0.744515
WC011	0.573343	1.249407
WC012	0.580624	1.283445
DC32	0.582102	0.855026
WC031	0.593235	0.963309
FS194	0.594313	0.247069
LIM331	0.59454	0.183288
EC107	0.60204	1.448644
DC5	0.61671	1.340577
LIM344	0.618829	0.860464
EC104	0.625897	0.928449
LIM471	0.632588	1.048077
NC067	0.633899	0.26731
WC041	0.638041	1.301529
FS163	0.642274	0.063127
ETH	0.650528	0.180546
GT423	0.654692	0.643084
NW375	0.656009	0.154521
MP322	0.673571	0.864232
WC032	0.6854	0.79649
LIM473	0.686557	0.583361
NMA	0.692846	0.78638
EC144	0.695444	1.284652
NW402	0.695893	0.475588
DC42	0.697898	0.69889
LIM335	0.699686	0.937126
LIM332	0.711714	0.856709
JHB	0.715366	0.424394
LIM334	0.71651	1.054202
MP313	0.717826	0.28977
EC134	0.724422	0.686924
FS196	0.728215	0.539037
DC4	0.732034	0.449859
LIM472	0.73641	0.431727
NC083	0.737792	0.530544
NC452	0.7399	0.530839
DC3	0.739906	0.920615
MAN	0.755401	
LIM474	0.763804	1.067771
EC133	0.775794	1.281808
LIM367	0.784279	1.091501
KZN225	0.789677	0.33813
FS183	0.789734	0.163409
LIM355	0.792412	1.169211
FS203	0.797313	0.406991
WC053	0.797996	1.358576
GT421	0.808117	0.686297
DC16	0.808168	0.546757
EC128	0.809468	0.783495
NW371	0.812227	0.385771
MP315	0.817003	0.596469
NC073	0.837216	1.281879
FS162	0.838896	0.852325
FS161	0.849424	0.565958
DC2	0.850513	0.675691
WC024	0.860151	1.036042
WC022	0.889882	0.078631
KZN282	0.89686	0.588522
NC062	0.912529	0.879025
FS164	0.918182	0.402735
WC043	0.920383	0.799216
MP325	0.927917	1.129496
CPT	0.932095	0.688345
WC034	0.932485	1.14675
EC101	0.938985	1.3113

WC026	0.945839	1.30898	LIM353	1.051685	0.830382
DC1	0.960801	1.161039	NC061	1.067024	0.478316
LIM352	0.975806	1.154362	MP316	1.115114	0.87566
WC042	0.994178	1.296579	WC033	1.115505	0.935209
WC013	0.996072	1.125371	WC014	1.137313	1.095155
WC023	1.00289	0.398688	WC015	1.191497	1.132064
EC131	1.045276	1.434404			

Table 12: Results from Kruskal-Wallis H test for characteristics that differ between municipal groupings [7]

Characteristic Dependent Variable	**Chi-Squared Statistic**	**Df**	**Probability**
Sex ratio (%)	12.150	3	0.0069
Audit outcomes in 2011	10.121	3	0.0176
% Female Headed households	67.939	3	0.0001
% Working age	65.849	3	0.0001
% Youth	69.758	3	0.0001
% Elderly	5.111	3	0.1638
% No schooling	16.027	3	0.0011
% Higher education	7.689	3	0.0529
% Matric	8.495	3	0.0368
% of population 2011	7.297	3	0.0630
% of population 2007	13.114	3	0.0044
Population Density (persons per km2)	22.913	3	0.0001
No of households	3.720	3	0.2933
Growth rate (of people from 2001-2011)	30.034	3	0.0001

[7] Where the probability statistic with or without ties differed, the figure for 'with ties' has been recorded.

No of agricultural households	28.690	3	0.0001
Average household size (People)	56.960	3	0.0001
% Formal dwelling	142.396	3	0.0001
% Housing owned / Paying off	9.948	3	0.0190
Mean annual household income (R)	58.943	3	0.0001
Dependency ratio (%)	65.926	3	0.0001
Unemployment rate	38.578	3	0.0001
Youth unemployment rate	32.543	3	0.0001

Table 13: Output from Fixed Effects F-Test

F Test that all u_i = 0	F(244, 170) = 1.92	Prob > F = 0.0000

Table 14: Output from Fixed Effects F-Test Breusch-Pagan Lagrange multiplier test

Test: Var(u) = 0	Chibar2(01) = 2.04
	Prob > chibar2 = 0.0768

Table 15: Output from Hausman Test

Test – Ho: Difference in coefficients not systematic	Chi2 (29) = (b-B)′[(v_b – B_B)^(-1)(b-B)
	= 85.50
	Prob > chi2 = 0.0000

2. Summary Statistics of OLS Regression Variables

Regression Assumption Testing

The data used in tables 12 – 14 was drawn from the 2007 Statistics South Africa National Community Survey, the 2011 National Census database and is nationally representative. Thus, there is no need to include weights in the regression - all the municipalities in South Africa have been included in the data.

Furthermore, it would not be correct to assume that the service delivery scores are independent from one municipality to the next, as it is likely that municipalities within certain geographic areas are similar to one another. The standard errors produced by the OLS regressions are thus clustered at the municipal level, to account for neighbouring municipalities having similar operating environments and similar performance track records.

In addition, for both 2007 and 2011, homoscedasticity is ensured through the use of robust standard errors in the regression analysis. Although the 2011 errors do not appear to be normally distributed and there is evidence of heteroscedasticity in the data, the non-normality does not bias the OLS estimates. In both 2007 and 2011, only variables that had a variance inflation factor of less than ten, as appears standard in the literature, were retained in the regressions to ensure moderate collinearity. The rejected variables are listed in table two of the appendix.

Service Delivery Variables

Variable	No. Observations	Mean	Std. Deviation	Minimum	Maximum
Service Delivery 2011	273	0.0129544	0.9805277	-4.514309	1.191544

Service Delivery 2007	272	0.0155669	0.9937112	-2.794544	1.334116

Audit Outcomes

Variable	**No. Observations**	**Mean**	**Std. Deviation**	**Minimum**	**Maximum**
Audit Outcome 2011	273	2.813187	1.330458	1	5
Audit Outcome 2007	273	2.516484	1.32312	1	5

Audit Outcome	**2011 Number**	**2011 Percentage**	**2007 Number**	**2007 Percentage**
Disclaimer	86	31.5%	107	39.19%
Adverse with Findings	4	1.47%	12	4.40%
Qualified with Findings	67	24.57%	63	23.08%
Unqualified with Findings	107	39.19%	88	32.23%
Unqualified with No Findings	9	3.30%	3	1.10%

Financial Ratios

Variable	No. Observations	Mean	Std. Deviation	Minimum	Maximum
2011					
Own Source Revenue to Operating Revenue	261	60.988	24.933	1.822	100
Staff Costs to Operating Expenditure	260	33.592	9.168	0	67.038
Creditors to Operating Expenditure	260	12.898	18.405	-2.373	130.632
Debtors to Service Charges	226	126.903	599.7549	-766.44360	8288.239
Infrastructure expenditure to Capital expenditure	245	69.676	29.823	0	100
Borrowing to Capital Revenue	245	6.812	14.647	0	70.801
Employee Costs to Own Revenue	261	98.707	256.163	0	2820.306
Borrowing to PPE	219	69.568	545.068	0	5540.308
2007					
Own Source Revenue to Operating Revenue	271	48.383	27.664	0.256	95.923
Staff Costs to Operating Expenditure	271	48.383	27.664	0.256	95.923

Borrowing to Capital Revenue	270	6.318	16.914	0	100
Employee Costs to Own Revenue	271	195.092	1232.477	20.262	20231.48
Infrastructure expenditure to Capital expenditure	270	47.137	36.277	0	100
Borrowing to PPE	219	69.568	545.068	0	5540.308
Debtors to Service Charges	236	650.753	4888.918	0	72158.33
Creditors to Operating Expenditure	271	3.531	6.676	-9.265	61.129

Income Classes

Variable	**No. Observations**	**Mean**	**Std. Deviation**	**Minimum**	**Maximum**
2011					
Percentage of Lower class income	273	18.202	4.043	7.267	27.047
Percentage of Middle class income	273	51.949	9.189	30.154	67.296
Percentage of Upper class income	273	29.967	10.914	12.268	56.504
2007					
Percentage of Lower class income	272	8.490	3.857	0.461	26.010

Percentage of Middle class income	272	54.387	10.536	22.038	76.758
Percentage of Upper class income	272	19.950	7.442	5.933	43.251

Employment Rates

Variable	No. Observations	Mean	Std. Deviation	Minimum	Maximum
2011					
Percentage of Unemployed	273	9.081	2.491	2.177	15.201
Percentage of Employed	273	21.465	9.537	4.218	44.901
Percentage of Not Economically Active	273	65.267	8.957	45.457	83.366
2007					
Percentage of Unemployed	273	18.410	5.621	4.45	35.6
Percentage of Employed	273	35.731	12.971	8.18	66.82
Percentage of Not Economically Active	273	41.987	12.289	20.55	75.37

Household Goods

Variable	No. Observations	Mean	Std. Deviation	Minimum	Maximum
Household Goods Score 2011	273	0.033	0.968	-3.096	1.622
Household Goods Score	273	0.032	0.981	-2.605	1.903

Political Dominance

Variable	No. Observations	Mean	Std. Deviation	Minimum	Maximum
Political Dominance 2011	273	1.351	0.607	0	2
Political Dominance 2007	273	1.483	0.607	0	2

Political Dominance	2011 Number	2011 Percentage	2007 Number	2007 Percentage
Majority Party Dominance < 50%	19	6.96%	16	5.86%
Majority Party Dominance > 50%	139	50.92%	109	39.9%
Majority Party Dominance > 75%	115	42.12%	148	54.21%

Race

Variable	No. Observations	Mean	Std. Deviation	Minimum	Maximum
2011					
Percentage Black	273	75.592%	30.135%	2.778%	99.71%
Percentage Coloured	273	15.96%	26.743%	0.033%	90.361%
Percentage Indian	273	0.912%	2.051%	0.065%	16.655%
Percentage White	273	7.07%	6.683%	0.050%	41.632%

2007					
Percentage Black	273	74.092%	32.127	0.63%	100%
Percentage Coloured	273	17.506%	28.874	0	96.97%
Percentage Indian	273	0.788%	2.147	0	18.68%
Percent White	273	7.612%	7.268	0	35.18%

Age

Variable	**No. Observations**	**Mean**	**Std. Deviation**	**Minimum**	**Maximum**
2011					
Percentage of Population classified as Youth	273	31.647%	5.173	21.134%	44.168%
Percentage of Population classified as Working Age	273	62.385%	5.323	50.630%	76.441%
Percentage of Population classified as Elderly	273	5.967%	1.591	2.181%	12.873%
2007					
Percentage of Population classified as Youth	273	32.876%	5.749	21.714%	47.761%
Percentage of Population classified as Working Age	273	61.115%	6.065	46.464%	76.117%
Percentage of Population classified as Elderly	273	6.004%	1.755	1.702%	13.194%

Education

Variable	No. Observations	Mean	Std. Deviation	Minimum	Maximum
2011					
Percentage of Population with No Schooling	273	8.015%	3.295	2.106%	19.317%
Percentage of Population with Primary Schooling	273	27.137%	4.866	14.977%	40.786%
Percentage of Population with Secondary Schooling	273	47.088%	5.960	31.489%	59.477%
Percentage of Population with Tertiary Schooling	273	3.76%	1.843	0.940%	12.633%
Percentage of Population with Postgrad Education	273	0.147%	0.085	0.014%	0.469%
Percentage of Population with Other Education	273	0.464%	0.386	0.063%	2.965%
2007					
Percentage of Population with No Schooling	273	9.344%	4.294	2.289%	29.352%
Percentage of Population with Primary Schooling	273	26.350%	7.691	7.341%	64.551%
Percentage of Population with Secondary Schooling	273	42.574%	9.716	11.727%	90.612%
Percentage of Population with Tertiary Schooling	273	2.177%	1.054	0.586%	6.169%
Percentage of Population with Postgrad Education	273	0.223%	0.314	0.002%	2.702%

No People

Variable	No. Observations	Mean	Std. Deviation	Minimum	Maximum
Percentage of Population 2011	273	0.359%	0.644	0.008%	5.322%
Percentage of Population 2007	273	0.361%	0.631	0.006%	4.924%

Homeland Status

Variable	No. Observations	Mean	Std. Deviation	Minimum	Maximum
Homeland Status	273	2.340	0.546	0	3

Homeland Status	Number	Percentage
Previous homeland	7	2.56%
Previous partial homeland/republic	163	59.71%
Previous Republic	102	37.36%

Gender

Variable	No. Observations	Mean	Std. Deviation	Minimum	Maximum
2011					
Percentage Male	273	48.44%	2.189	43.442%	58.517%
Percentage Female	273	51.606%	2.27	41.482%	61.816%

2007					
Percentage Male	273	48.019%	2.512	42.75%	57.5%
Percentage Female	273	51.980%	2.512	42.5%	57.25%

3. Fixed Effect Regression Assumptions

The data used for the fixed effects regression in table 13 and 14 was also tested to check whether time fixed effects were needed. However, the null hypothesis that all the year dummy variables are zero could not be rejected at a probability level of $p < 0.10$ and thus no time fixed effects need to be added to the regression.

This thesis is also making the assumption that the unobserved effects influencing municipal service delivery are time-invariant. In the case of some effects, such as number and capacity of staff, this may not be entirely true, leaving the thesis' findings vulnerable to biasedness. However, this will be more muted than the bias present in OLS regressions with missing data and thus the fixed effects regression will provide a better estimate of the relationship between municipal service delivery and audit outcomes.

As usual, homoscedasticity is an important assumption when running fixed effects regressions, and a test of the data reveals that the null hypothesis of constant variance is rejected at a probability level of $p < 0.000$. Thus, the fixed effects regression will be run with robust standard errors.

As the panel is a micro dataset only covering a timespan of a few years, cross-sectional dependence and serial correlation should not be major problems plaguing the data. It is, however, likely that the data will be correlated within a municipality across the years, hence the standard errors will be clustered at the municipal level.

4. Figures

Figure 1: Scree plot for 2011 Principal Component Analysis

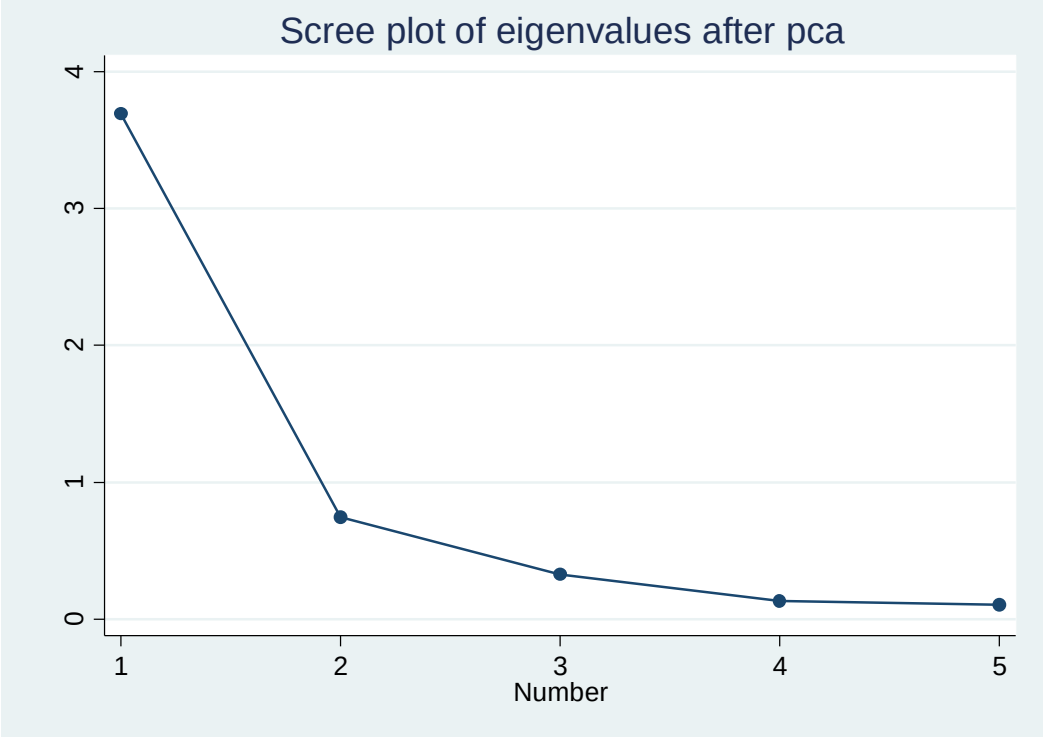

Figure 2: Scree plot for 2007 Principal Component Analysis