TOKYO METROPOLITAN UNIVERSITY

東京都立大学

Financial Sustainability and Local Government Reform

財政の持続可能性と地方自治体改革

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Financial Sustainability and Local Government Reform

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Declaration

I certify that the substance of this thesis has not already been submitted for any degree and is not currently being submitted for any other degree or qualification.

I certify that any help in preparing this thesis, and all sources used, have been acknowledged in this thesis.

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ABSTRACT

Increased financial pressure is being placed on local governments, exacerbated by events such as the 2008 subprime mortgage crisis and the more recent Covid-19 pandemic. As greater numbers of local governments internationally display symptoms of fiscal stress, well-documented cases of financial collapse – including the United States City of Detroit and Australian Central Darling and Central Coast councils – have become more common. Given the potentially grave consequences which financial collapse can have on the wider community, ensuring the financial sustainability of local government has become paramount.

A local government is considered to be financially sustainable if it can conduct its operations in such a way that it meets the needs of the present generation without compromising the ability of future generations to meet their own needs. To ensure local governments can continue to operate in the long term, national and state (provincial) governments worldwide have implemented various reforms targeted at improving financial sustainability. In Australia amalgamation (the consolidation of smaller local governments into a larger entity) has been the principal policy instrument employed.

To ensure efforts aimed at improving local government financial sustainability are indeed efficacious, several key studies must be undertaken. First, the determinants of financial sustainability must be identified, in order to provide targeted support. Although existing literature has analysed the effects of size, resident deprivation, and external operating environment, many non-conventional factors (in particular internal factors) have received much less scholarly attention.

Following the identification of the determinants of sustainability, the success (or failure) of previous reforms programs must be critically evaluated. This will ensure policymakers understand the efficacy of previous reform instruments and improve future reforms. To

facilitate the learning process, both the outcomes of the reforms and the processes which have generated these outcomes should ideally be examined. However, whilst isolated studies have been conducted on the outcomes of previous merger programs more needs to be done in an Australian context, particularly with respect to the recent 2016 NSW local government amalgamations. Given the highly contested nature of the selection process and the legal challenges that resulted in the state government abandoning the remaining amalgamations the program offers a natural experiment to test the efficacy of structural reform on financial sustainability.

Once the efficacy of previous reforms has been ascertained, an analysis of alternative reform instruments should be conducted. This will enable local government authorities to identify if other alternatives exist which may represent a more efficacious, less expensive, or less disruptive means of addressing financial sustainability problems. Compared to studies of the determinants of sustainability and the impact of previous reform programs, the corpus of scholarly literature in the area of alternative reforms is noticeably smaller.

This thesis aims to address these gaps in the academic literature and satisfy the needs of various political and local government stakeholders. To do so we conducted seven analyses, through three key themes relating to (i) the association between non-conventional factors and local government operational expenditure per assessment, (ii) the success of the 2008 Queensland local government amalgamations and the more recent 2016 NSW 'Fit For the Future' reforms, and (iii) the impact of alternative reform instruments on local government expenditure and financial management practices.

Results suggest the importance of non-conventional factors – political structures (i.e. the direct election of a mayor) and budget accuracy – to technical efficiency and hence financial sustainability. Moreover, evaluations of the large-scale forced amalgamations in Queensland

and NSW cast doubt on the efficacy of amalgamations to address financial sustainability concerns. In addition, a commonly endorsed alternative to amalgamation (shared services) was also found to be wanting, whilst a non-conventional internal governance reform instrument (central audit requirements) holds promise.

In sum, it was found that conventional approaches such as amalgamation and shared service arrangements are unlikely to secure efficiency gains and hence achieve the desired improvements in financial sustainability. Indeed, it appears that such approaches have generally led to a further deterioration in the financial performance of affected local governments. The results emphasise the importance of conducting econometric analysis *prior* to implementation of reform, and the need to challenge commonly held preconceptions about financial sustainability and reform. Rather, future attention may need to be focused on non-conventional approaches, given that some of the less well recognised possibilities (such as political structure, budgetary reform, and accounting reform) may present a more valuable means for addressing financial sustainability concerns.

Financial Sustainability and Local Government Reform

Chapter 1: Introduction

1.1 The Purpose of Local Government in Australia

Local government is the third tier of government in Australia and lies beneath the Federal (National) and State government systems respectively. With the exception of the Australian Capital Territory (ACT) each state and territory in Australia has its own local government system (see Table 1.1; Drew and Dollery, 2015a). Moreover, local governments in Australia are commonly described as "creatures of statute" (Drew, 2020). This label is applied because there is no recognition of local governments in the Australian Constitution. Rather, the primary roles and functions are determined by the relevant state or territory legislation. For example, the responsibilities of local governments in New South Wales (NSW) are provided by the Local Government Act 1993 (NSW Government, 1993) and associated regulations (for example the New South Wales Local Government (General) Regulation 2005) whilst local governments in Queensland are governed by the Local Government Act 2009 (Queensland Government, 2009). Typically, the local government in the state capital is recognised in a separate specific piece of legislation, such as the City of Sydney Act (1988) (NSW Government, 1988).

Table 1.1 Number and Classification of Local Governments by State and Territory

Local Government Group	NSW	VIC	QLD	WA	SA	TAS	NT
URBAN							
Metropolitan	25	23	1	22	16	1	1
Regional Town/City	37	22	27	8	9	5	2
Metropolitan Fringe	9	10	3	8	6	4	1
RURAL							
Significant Growth	0	0	0	3	0	0	0
Rural	15	1	3	65	21	6	0
Large Rural	42	23	8	9	16	13	1
Remote	0	0	35	23	1	0	12
Total	128	79	77	138	69	29	17

Local governments in Australia are controlled by an executive body lead by a general manager or CEO, elected councillors and a mayor (Ryan and Lawrie, 2018). Although the roles and responsibilities of local government representatives are also largely dependent on the relevant state legislation, local governments generally have some discretion with regard to organisational structure. Examples of this include decisions relating to the executive positions assigned, and whether the council body is led by a directly elected mayor (i.e. elected by residents within the local government area) or an indirectly elected mayor (i.e. selected from within the ranks of the elected councillors). Exceptions include capital city local governments, as well as local governments in Queensland, Victoria and Tasmania which are required to conduct direct elections for mayors[1] (Drew, 2020; Drew, Kortt and Dollery, 2014). Whilst the roles and powers of the executive and council body are largely the same regardless of election method, directly elected mayors serve four-year terms (similar to the elected councillors), whilst indirectly elected mayors typically serve one- or two-year terms (Drew, Kortt and Dollery, 2014).

[1] A further exception is local governments currently under administration such as Central Darling Shire or Armidale Regional Council. In these cases, the council is (temporarily) led by an external administrator.

Local government revenue in Australia is primarily generated from three sources. The first (and largest) source of revenue is property taxes, which are commonly referred to as 'rates' in Australia (Drew and Dollery, 2015a). This is followed by fees and charges levied on the sale of specific goods and services. Examples include *inter alia* water and sewerage charges (where applicable), childcare fees, parking permits and fines, entrance fees for recreational areas (such as pools and stadiums) and revenue from inspections or applications. The final main source of revenue is intergovernmental grants from the Federal government to address vertical and horizontal fiscal imbalance (comprising general purpose grants and road grants), as well as smaller special purpose grants funded by State governments. A graphic description of local government revenue sources has been provided in Figure 1.1.

Although these funding categories are largely similar for all Australian local governments, local government revenue is not centrally controlled or managed. Each state and territory has its own grants commission responsible for the allocation of intergovernmental grants[2]. In addition, the regulation of some local government revenue is imposed at a state (or territory) level. Examples of revenue regulation include taxation limitation 'rate capping' regimes which operating in NSW, Victoria, and for pastoral leases in the Northern territory, as well as selected fee regulation that occurs in all jurisdictions.

[2] This allocation of Federal money by State Government Grant Commissions occurs because the Constitution can be interpreted to suggest that the Federal government does not have the powers to pass money directly to local government.

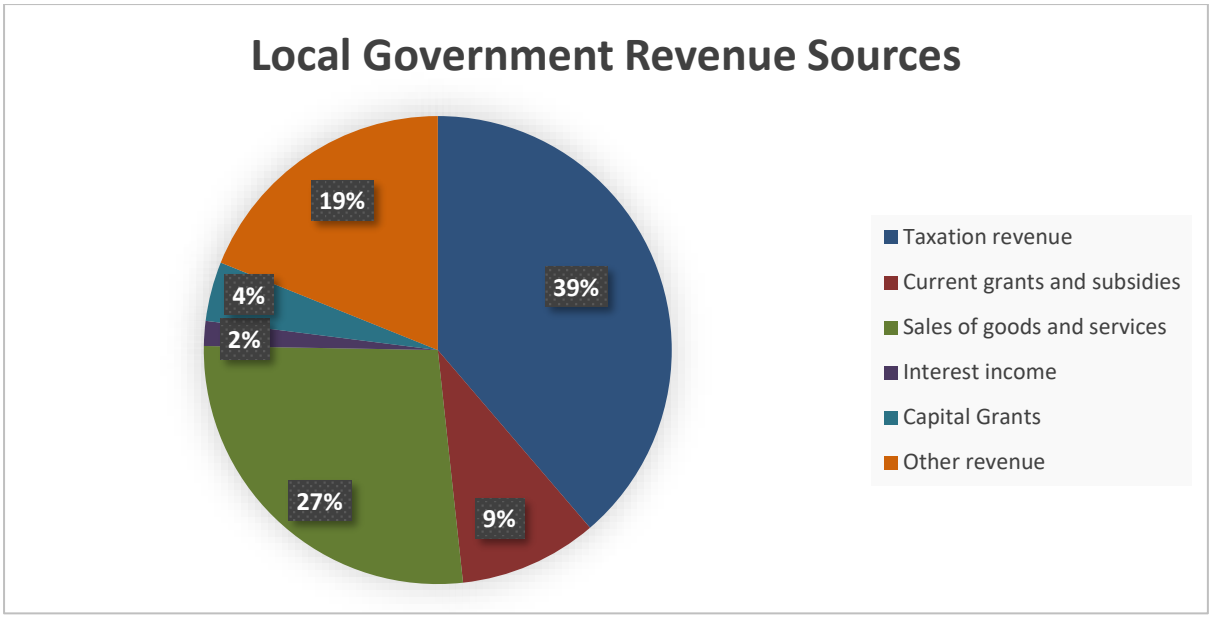

Figure 1.1: Local Government Revenue Sources, 2017-18

Data sourced from the Australian Bureau of Statistics, Government Finance Statistics, Australia, 2017-18, ABS cat. no. 5512.0. ABS (2019).

Despite differences in the structure of local governments between the states and territories, Australian local governments generally provide similar core services to residents (although substantial inter-jurisdictional variation may exist). Examples of these 'core services' include (i) solid waste collection and management (although the sorting system chosen and collection frequency can differ substantially); (ii) the maintenance of local roads (including footpaths and bridges); (iii) the provision of cultural and recreational facilities (such as playgrounds, local libraries and pools); (iv) planning and development functions, and; (v) health-related regulatory functions (mainly limited to food and water inspections, restaurant inspections and immunisation awareness programs) (DIRD, 2005).

Although water provision and sewerage may also be considered core services provided by local government in Australia, the provision of these services has increasingly been corporatized into regional water authorities or providers (particularly in metropolitan areas). Moreover, responsibilities for provision of water and wastewater does vary between states

even for similar categories of local governments (for instance whilst regional local governments in NSW provide water services, the same is not true in Victoria) (Dollery and Drew, 2018).

A breakdown of local government expenditure by functional service area has been provided in Figure 1.2:

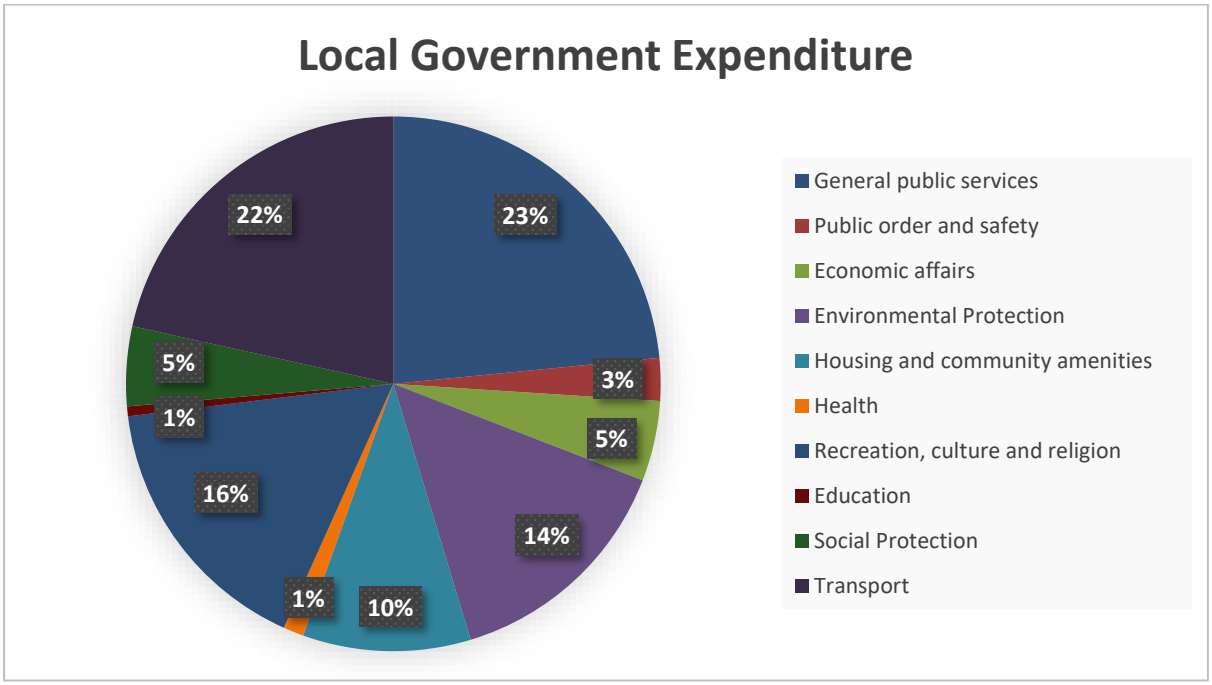

Figure 1.2: Local Government Expenditure by Purpose, 2017-18

Data sourced from the Australian Bureau of Statistics, Government Finance Statistics, Australia, 2017-18, ABS cat. no. 5512.0. ABS (2019).

This predominant 'services to properties' remit differentiates Australian local government from local government systems in Japan, the United Kingdom and North America which provide a wider range of 'services to people' including public housing, health, education and emergency services (Grant and Drew, 2017; Andrews et al., 2003). Functions of a 'services to people' nature are typically the responsibility of state and federal government systems in Australia. However, the remit of Australian local government has expanded somewhat in

recent years, particularly for local governments which operate in rural and remote environments (where it is sometimes necessary to do so to correct market failure). Evidence of this may be seen in the increased numbers of local governments operating childcare and aged care facilities, stockyards, golf courses, aquatic centres and aerodromes in rural areas (Drew 2020; DIRD, 2005).

1.2 Challenges Facing Local Government in Australia and Internationally

There are several important challenges confronting local governments and regulators alike which have arisen or gained momentum since the turn of the millennium. Examples include meeting the disparate needs of an increasingly diverse community, achieving equality in service provision, encouraging democratic participation by residents, and reducing corruption in the sector. However, the most important challenge facing local governments in Australia, and indeed internationally, is financial sustainability (Drew, 2020). A local government is financially sustainable if it can continue to operate over the long run without the need for substantive financial corrections. Put differently, Chapman (2008, p.115) defined a financially sustainable organisation (such as local government) as one that can:

> *"meet the needs of the present generation without compromising the ability of future generations to meet their own needs"*

An organisation which does not fulfill the above criteria is said to be experiencing fiscal stress. For local government this would occur if, even after accounting for the growth in revenue over time (due to an expanding tax base), it is unable to meet its present *and* future financial commitments without financial corrections. These corrections might be achieved through increases to revenue, reductions in expenditure, or a combination of the two (Boyne,

1988). Scholars have argued that the level of fiscal stress is deemed as 'moderate' when a correction of up to 10 percent in the value of revenue and/or expenditures (referred to as nett expenditure) is required, 'high' if a correction of up to 30 percent is required, and 'severe' if a correction exceeding 30 percent is required (Boyne, 1988).

Since the 1970s an increasing number of local governments, both in Australia and abroad, have been identified as suffering from fiscal stress. There are several potential factors which may have contributed to this undesirable situation (noting that the factors are not mutually exclusive). The first relates to internal operations, namely poor internal management, or financial control. If decision-makers do not exert sufficient fiscal restraint and instead engaging in excessive spending, this can reduce or potentially threaten financial sustainability. Typically, most of this excessive spending occurs on community 'wants' (discretionary services or programs) rather than 'needs', suggesting that often local governments themselves may be able to take an active role in reducing fiscal stress (see Drew, 2020).

However, additional factors external to the operations of the local government also exist, which can limit the ability of the local government to respond to these problems independently. A key example is the existence of taxation limitations (for instance the 'rate capping' regimes in Australia). Taxation limitations act to restrict the ability of a local government to respond to increased expenditure requirements by raising the level of taxation revenue collected (Dollery and Drew, 2016). Similarly, cost shifting by higher tiers of government (state and national) may also contribute to fiscal stress. This typically occurs when local governments are forced to take on unfunded mandates (Dollery, Crase and Johnson, 2006). Examples include *inter alia* (i) withdrawal of funding for programs following commencement, (ii) transfer of assets (which require additional maintenance) without financial support, and/or (iii) granting of rate concessions to particular groups of rate

payers (for instance the elderly) without appropriate compensation (Drew, 2020). A final factor which may explain the increased prevalence of fiscal stress in the local government sector relates to unfavourable community demographic, socioeconomic or environmental characteristics. Local governments which serve small population sizes, low density areas, or communities with a low socioeconomic status may have more limited revenue raising abilities. At the same time, the unit costs of production and associated expenditure requirements may be higher, hindering their ability to become financially sustainable (see Boyne, 1988).

Although fiscal stress certainly cannot be considered a recent or rare event, the number of local governments experiencing acute fiscal distress does appear to have accelerated in the years following the Global Financial Crisis (Usang and Salim, 2016). Moreover, the severity of fiscal stress experienced by individual local governments has also been rising, evident through the unprecedented financial failures such as Central Darling Shire in Australia in 2014, the US City of Detroit in 2013, and the more recent bankruptcies of the US cities of Perla and Fairfield in 2019 and 2020 respectively (Drew and Campbell, 2016; Chapman et al. 2020).

Ensuring continued financial sustainability and avoiding fiscal stress is important given the potentially severe ramifications for local government residents, communities, representatives, and employees alike. This is because the financial corrections necessary to avoid financial default or collapse can result in significant reductions in the availability and level of services previously enjoyed by residents within the local government area. This was the case for residents in Central Darling shire, which faced the possibility of the cessation of essential ‘non-core services’ following administration. These ‘non-core services’ included the provision of post offices, aged care, cemeteries, community buses, and waste management (Drew and Campbell, 2016). Moreover, financial collapse can result in substantial losses in

employment, particularly for local government employees. Again, evidence of this can be observed through the reductions in staff numbers in Central Darling by approximately one fifth (Drew and Campbell, 2016). In areas where the local government is one of the largest (and most generous) employers, this may have significant implications for the local community (Drew, 2020). Finally, financial collapse can result in a loss of political representation. Following the collapse of Central-Darling Shire, the removal of elected councillors and subsequent appointment of an administrator saw residents deprived of political representation. Indeed, despite the appointment occurring over seven years ago elected representation has still not been reinstated (with the period of administration extended until at least 2024; Gooch, 2019). It is for these reasons that a high importance is placed on assuring the financial sustainability of local government operations and preventing local government default. To do this policymakers internationally have targeted fiscal consolidation of local government operations (that is, a reduction in the size of local government budget deficits; Fatás and Summers, 2018). Although financial sustainability could alternatively be achieved by increasing local government revenue (via increasing taxation collection, grant funding or revenue received from associated fees and charges) it is generally not a politically palatable option. It is important to recognise that although fiscal consolidation is generally the target of many recent local government policy interventions internationally, this is only done to achieve the policy-makers primary objective, ensuring financially sustainable local government and avoiding financial collapse.

1.3 Local Government Reforms

1.3.1 Definition of Local Government Reform

In order to avoid the potential consequences associated with financial collapse and ensure a 'basic' level of services for residents, governments worldwide have implemented various local government reform programs with the explicit aim of improving the financial sustainability. Evidence of this, in an Australian context, can be seen through the 2008 Queensland amalgamations. This reform program was developed in response to concerns about financial sustainability, substantiated by the 'failure' of a 'significant number' of Queensland local governments to comply with the QTC's financial sustainability indicators (QTC, 2008, p. 30). More recent evidence can also be found in the NSW Fit For the Future (FFTF) reform program. In this instance, the reforms were justified based on assertions that 'the financial sustainability of many councils – and their capacity to deliver services communities need – had declined, and a significant number were near crisis point' (ILGRP, 2013b, p. 7).

The dominant reform instrument employed by policymakers in Australia since the 1990s to target financial sustainability improvements, has been structural reform through amalgamation. It has been argued that amalgamation allows for the improvement of financial sustainability through the achievement of economies of scale and hence efficiency in production. Evidence of this kind of reasoning can be found in the policy documents and statements tendered by reform architects. For instance, the *Final Report* of the Independent Local Government Review Panel (ILGRP, 2013b, p. 71-72) commented that 'amalgamations offer the surest way to achieve efficiency and economies of scale' and that 'increased scale and capacity will enable councils to remain sustainable'.

However, before further analysing the theorised association between reform, economies of scale, efficiency, and financial sustainability, it is first useful to gain a wholistic understanding of the concept of local government reform and the various types of reform instruments available to policymakers.

Local government reform refers to any changes in the operation, structure, finance, governance, or general functioning of a local authority. Thus, the concept of reform extends well beyond the limited scope of amalgamations. To more accurately differentiate, Garcea and LeSage (2005) defined five main categories of local government reforms: (i) jurisdictional reforms, involving changes to the authority and autonomy of authorities through amendments to legislation, such as amendments to the local government Acts; (ii) functional reforms, through altering the number or type of functions (services) performed by local government, for instance the establishment of water authorities or shared service arrangements; (iii) financial reforms, involving changes to the financial or budgetary processes, for instance through taxation and expenditure limitations (TELs); (iv) internal governance and management reforms, modifying the management or administration processes within a local government, such as the changes to political structures and internal audits; and (v) structural reforms, involving changes to boundaries, numbers and types of local government, for instance through amalgamation. A summary of these reform instruments has been provided in Table 1.2. Given that structural reform through amalgamation has been the preferred policy instrument to target financial sustainability improvements in Australia, this thesis will primarily focus on the impacts of recent amalgamation programs. However, alternatives to amalgamation (namely shared service arrangements and centralised auditing) will also be examined.

Table 1.2: Categories of Local Government Reform

Type	Description	Example
Jurisdictional	Altering power of local governments (authority and autonomy)	Increasing or restricting ability to make by-laws
Functional	Altering functions performed by governments	Establishment of water authorities; devolution of functions to local government
Financial	Altering financial or budgetary position of governments	TELs, balanced budget legislation
Internal Governance and Management	Modifying the management or administration process within local government	Requiring direct election of leadership, internal audits, centralised auditing
Structural	Altering the boundary, number and types of local governments	Amalgamation

It is important to recognise that reform can, and has, been undertaken for reasons beside financial sustainability. These include the need for improved accountability, responsiveness, and effectiveness, and the desire for 'global cities' (IPART, 2015). However, an analysis of all objectives of reforms would not be feasible within the constraints of a single thesis. Consequently, these supplementary objectives of reform have been left as an interesting avenue for future research.

1.3.2 Reform, Economies of Scale and Financial Sustainability

Structural reform (through amalgamation) is expected to improve financial sustainability through the achievement of economies of scale and greater technical efficiency in production. Economies of scale occur when the unit cost of production falls as the number of units produced rises (between production level 0 and Q_1 - see point A, Figure 1.3 for a graphical

illustration). Economies of scale may arise due to the ability of larger organisations to achieve greater purchasing power, attract and retain more qualified or specialised staff, and employ more sophisticated or advanced inputs (such as machinery) (Andrews and Boyne, 2009).

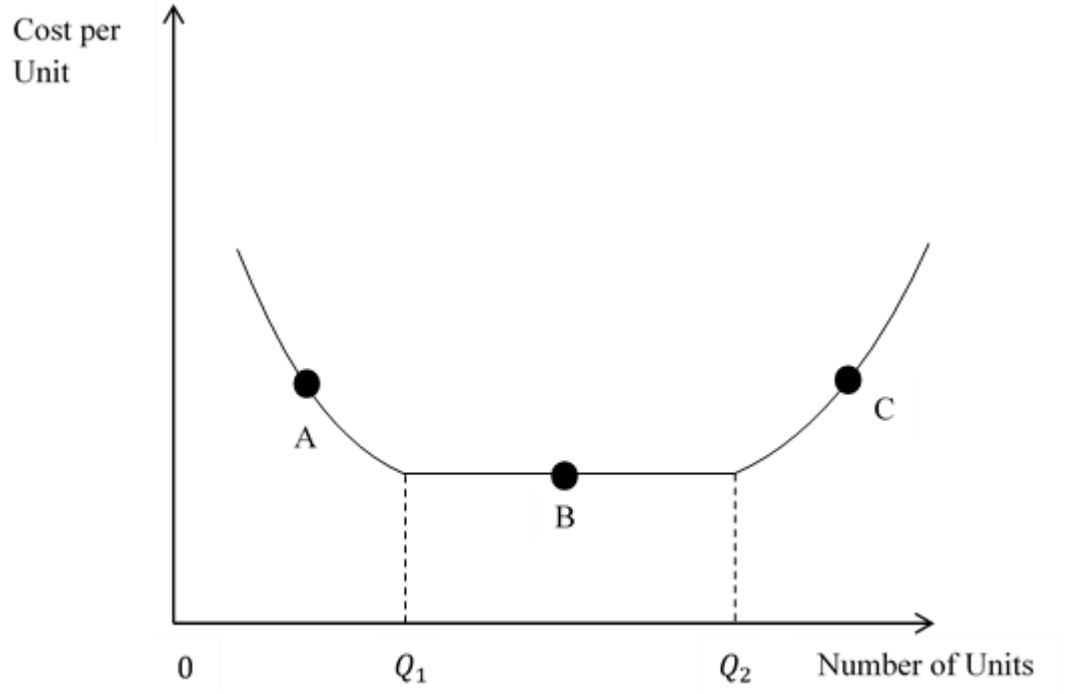

Figure 1.3: Economies of Scale in Local Government Service Provision

However, a key source of economies of scale is the achievement of technical efficiency in production. Technical efficiency can be defined as the ability to produce a given level of outputs using minimal levels of inputs (in an input-orientation) or the ability to maximise the outputs produced for a given level of inputs (Coelli et al., 2005). For local governments, which typically have a greater discretion over the inputs employed to produce a determinant level of goods and services for residents, an input-orientation is more commonly used to measure technical efficiency (see Figure 1.4).

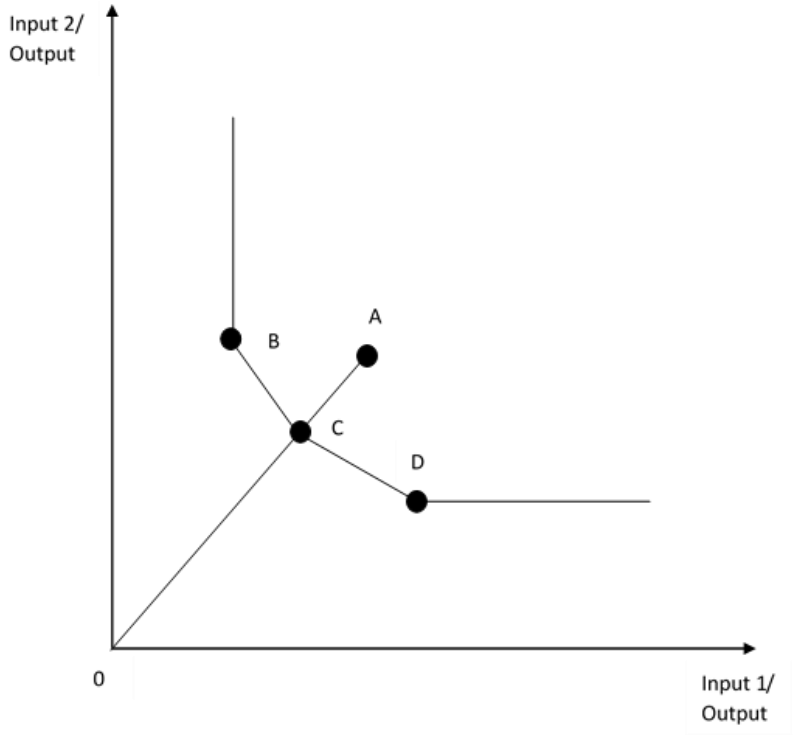

Figure 1.4: Technical Efficiency-Input Orientation[3]

Through the use of these two economic concepts – technical efficiency and economies of scale – the purported theoretical link between amalgamation and financial sustainability can be understood. By increasing the size of local government (amalgamating smaller local governments into a larger entity), public policymakers attempt to improve the technical efficiency of affected entities. This would reduce the ratio of volume of inputs required to produce the new level of outputs (under an input orientation), thus lowering unit cost (assuming that there are no supplementary changes in output quality (which is often not the case)). Thus, it is thought that through capturing economies of scale, local governments may be able to reduce required expenditure levels and hence become financially sustainable.

[3] Whilst points B, C and D are technically efficient – as they lie on the efficiency frontier – point A is technically inefficient as inputs could be reduced (Figure 1.4).

However, while the concepts of economies of scale and technical efficiency are often cited in the reform documents tendered by public policymakers (see Andrews and Entwistle, 2013), less attention is paid to the important matter of diseconomies of scale. Once the initial economies of scale have been exhausted, neo-classical economic theory predicts that production will enter a relatively lengthy domain of constant returns to scale, whereby costs do not change as output increases (from Q_1 to Q_2 – point B, Figure 1.3). If output is expanded even further then diseconomies of scale may emerge, whereby unit costs *increase* in response to output expansion (beyond Q_2- point C, Figure 1.3). Diseconomies of scale may arise as a result of increased complexity in the production process associated with greater size, reduced transparency, and exhaustion of existing capacity. If the amalgamation of local governments causes entities to enter the domain of diseconomies of scale, then increases to size will only have served to raise unit costs, and harm efforts to improve financial sustainability.

Moreover, it is important to recognise that not all services provided by local governments have the potential for economies of scale. As scholars such as Fahey, Drew and Dollery (2016) have shown, the unit costs of many functions provided by local governments are independent of output size (represented by Figure 1.5 below) and thus efforts to lower costs by increasing local government size will be largely ineffective for such services.

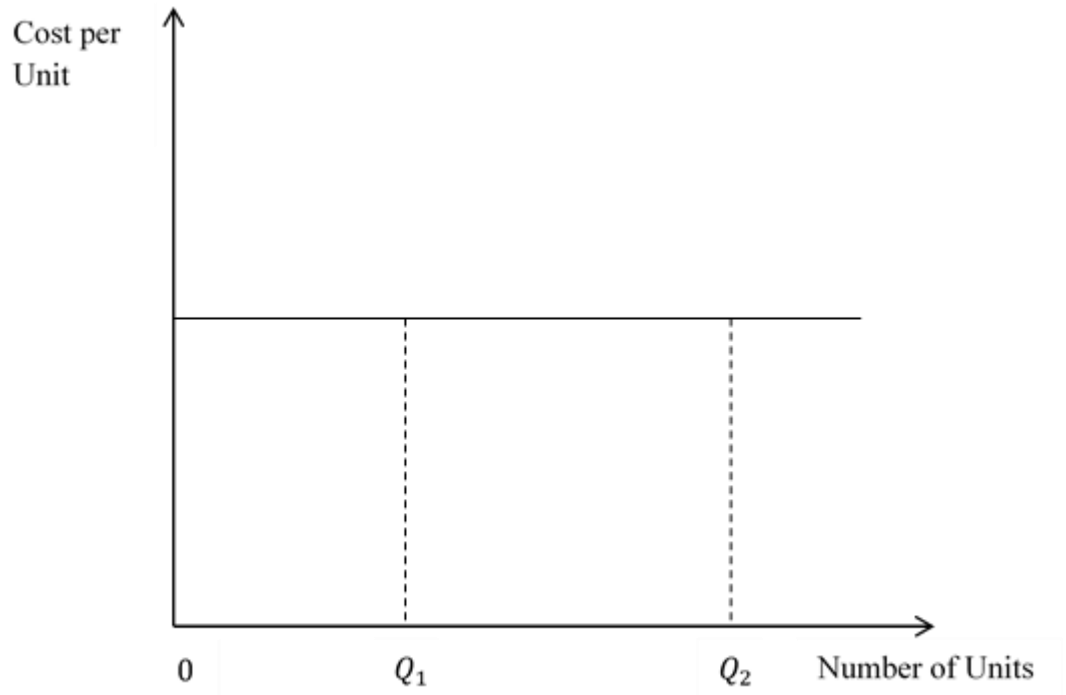

Figure 1.5: No Economies of Scale in Local Government Service Provision

Thus, although amalgamations have been undertaken with the objective of securing 'cost savings' resulting from the realisation of economies of scale, it may indeed be the case that reforms have had a negligible effect on unit costs or potentially worsened matters as a result of increasing the unit cost of production. Moreover, even if savings from economies of scale are achieved, they may not be sufficiently large to outweigh the substantial costs associated with amalgamations (see Drew, 2020). In this thesis a study is made of the two most recent amalgamation programs in Australia, the Queensland amalgamations and NSW FFTF reforms[4]. By examining the outcomes for the affected local governments, the impact of the reforms on the technical efficiency levels, unit expenditure and hence financial sustainability

[4] Note that only amalgamations which actually occurred are considered. Thus, while the proposed Greater Perth Region amalgamations (2012) occurred more recently than the Queensland amalgamations (2008), as the former proposal was defeated it will not be considered

can be identified. Given the random nature of the selection processes used to identify which local governments would be subject to the reforms (due to a lack of relatively poorer financial performance, and a reliance on an arbitrary minimum population threshold of 10,000 residents), these programs present a natural experiment to measure the association between structural reform through amalgamation and financial sustainability. This is further supported by randomness introduced in the design of the reforms as a result of changes to the local governments selected to undergo reform as the policies progressed, and the ability of a subset of originally targeted local governments to escape amalgamation by way of legal action.

1.4 Recent Amalgamation Episodes in Australia

1.4.1 2008 Queensland Amalgamations

The Queensland reform process began in 2005 with the Size, Shape and Sustainability (SSS) program conducted by the Local Government Association of Queensland (LGAQ), endorsed (and partly funded) by the Queensland Treasury Corporation (QTC) (LGAQ, 2005; QTC, 2008). The SSS initiative was developed in response to concerns about the financial sustainability and long-term financial capacity of local governments within the state (LGRC, 2007). These concerns were substantiated by a review undertaken by the QTC which found that almost half of the local governments surveyed could be classified as being in a 'weak', 'very weak' or 'distressed' financial state, noting that a 'significant number' had failed to satisfy the benchmarks for many of the QTC's financial sustainability indicators (QTC 2008). This was further supported by reports prepared by consultants, and the Queensland Auditor-General which cast doubt over the continued financial viability of many Queensland local

governments and identified financial control problems within the sector (QAO, 2008). The SSS program was initially created to help identify local governments which were at risk of financial sustainability problems based on a range of indicators derived from the QTC (De Souza *et al*. 2014). Reform would then be considered under a voluntary basis as a means of improving efficiency and financial sustainability (LGRC, 2007).

However, this program was abruptly ended by the (then) Beatie government in April 2007, with the creation of a seven-member Local Government Reform Commission (LGRC). The purpose of the Commission was noticeably changed from that of the SSS program, with an increased focus on the desirability of structural reform through amalgamation and a shift from voluntary implementation to involuntary (forced) adoption (LGRC, 2007). Moreover, in contrast with the SSS program, the speed of the LGRC was striking. The completion of its *Final Report* in July 2007 – a mere 3 months after the creation of the Commission – significantly constrained community consultation and input into the process. The recommendations made by the LGRC for the amalgamation of over half of the local governments in Queensland were adopted in August 2007 with the passing of the Local Government (Reform Implementation) Act 2007 (Queensland Government, 2007). The amalgamations were officially conducted in March 2008, with the total number of local governments in Queensland falling from 157 to 73 (although this number would subsequently rise following four de-amalgamations).

The LGRC justified the need for reform through forced amalgamation by emphasising the potential financial benefits which could be attained. These included the achievement of economies of scale, the elimination of the sub-optimal use of resources, and the ability for larger local governments to 'generate cost efficient and effective services' (LGRC, 2007, 5). Moreover, the rapid speed of implementation was argued to be necessary in order to ensure

that the benefits from amalgamation could be realised as quickly as possible, which the Commission asserted would require two to three years to materialise (LGRC, 2007).

However, limited empirical evidence was provided to support these claims. Rather, the Commission instead chose to refer to the outcomes of previous isolated Queensland amalgamations (Cairns, Ipswich, Mackay, Warwick and Cooloola; Drew, Kortt and Dollery, 2016). This was in stark contrast to the bulk of the scholarly literature which questioned the success of previous large-scale amalgamation programs (see Dollery and Crase, 2004; Sancton, 2000; Allan, 2003) and challenged many of the theoretical foundations upon which the stated benefits were based (Drew et al., 2014; Fahey *et al*., 2016).

Although it is desirable to test whether these benefits were actually achieved, the key impacts arising from the reforms can also clearly be seen through the events which followed the actual amalgamations. It has been suggested that the lack of community consultation, supporting empirical evidence and rapid implementation engendered widespread public and academic dissatisfaction following the amalgamations. In particular the reforms were criticised as being too 'sudden and drastic' in the scholarly literature (Drew and Dollery, 2014a, p.214). This type of discontent was seen as a key contributing factor in the defeat of the incumbent Australian Labour (ALP) government at the 2012 Queensland state election which ushered in rule by the former opposition Liberal National party (LNP) who had campaigned on a de-amalgamation platform.

Following the election of the (then) Newman (LNP) Government in 2012, a Boundaries Commission was established to consider the viability of de-amalgamation. Local governments were invited to submit proposals detailing the ability of the de-amalgamated entities to remain financially viable and demonstrating strong community support for de-amalgamation. Although 19 local governments submitted proposals, only 5 were examined

by the Commission, and just 4 ((Noosa, Douglas, Livingstone and Mareeba) were allowed to proceed (De Souza *et al*. 2014). Following confirmation of community support via successful referenda in March 2013, the Queensland government enacted the *Local Government (De-amalgamation Implementation) Regulation 2013* (Queensland Government, 2013). The de-amalgamations were officially executed on the 1st of January 2014, raising the number of local governments in Queensland to 77. The timeline of these events has been summarised in Figure 1.6:

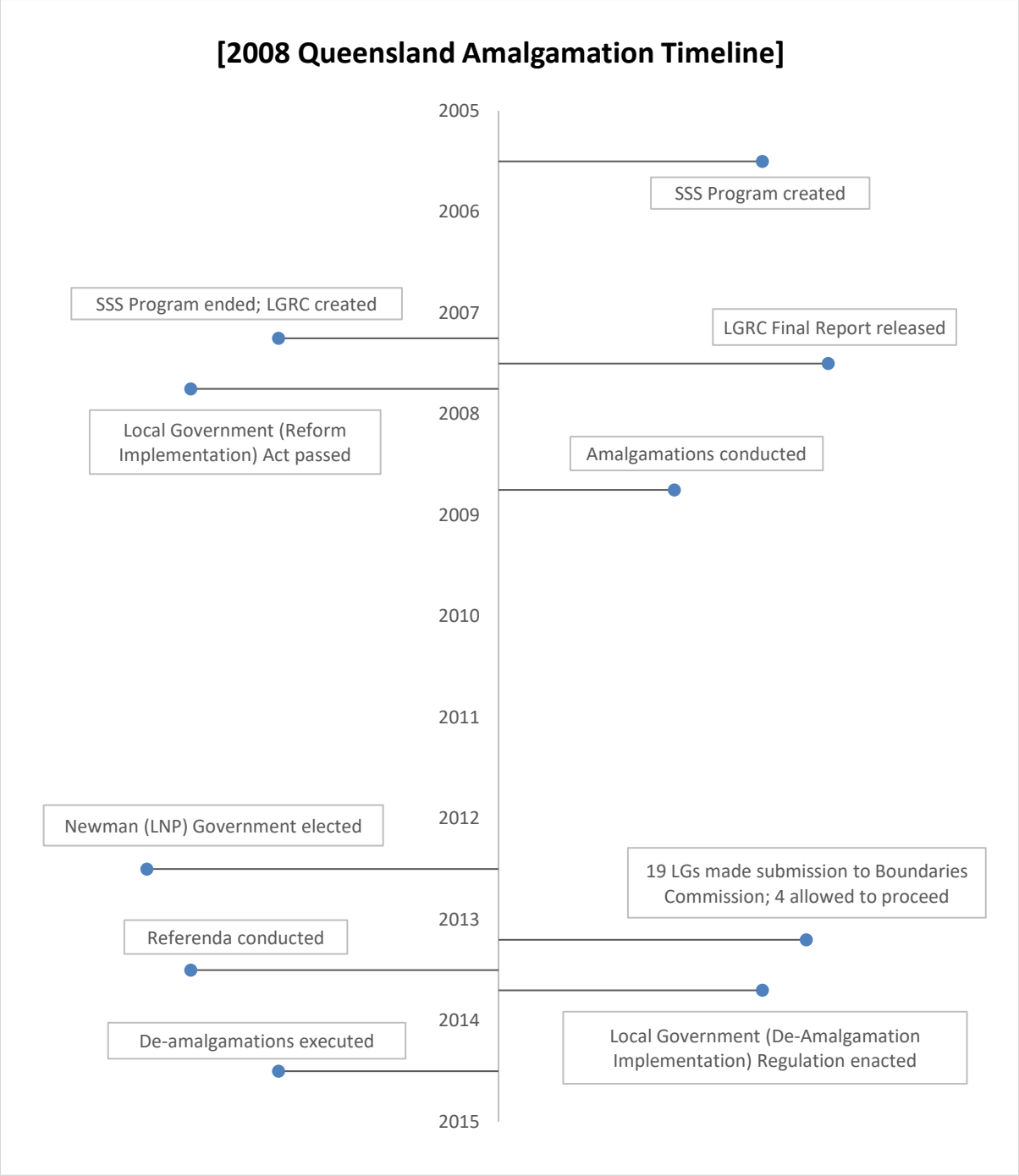

Figure 1.6: Timeline of the 2008 Queensland Amalgamation Process

The monetary costs of the reform process have been well documented. As studies such as Drew and Dollery (2014b) estimate, the average amalgamation cost for each individual local government created was approximately $8.1 million. Moreover, to a lesser extent the de-

amalgamation costs have also been identified[5], although it should be noted that the recorded costs of de-amalgamation have differed markedly depending on the source selected. For instance, the QTC estimated that the de-amalgamations would require one-off costs of $7.3 million on average, with the Sunshine Coast Regional Council de-amalgamation alone costing ratepayers in excess of $11 million. This is in contrast with the substantially lower costs recorded by the Queensland Audit Office (QAO) in the order of $3.73 million per de-amalgamation, representing almost a 66% cost reduction for Sunshine Coast (Drew and Dollery, 2014a; QAO, 2014). However, by comparison, the outcomes of the reform process on the efficiency or financial sustainability of the affected local governments have not yet been sufficiently examined. This is particularly concerning given the inability to determine if the reforms were successful achieve their intended purpose.

1.4.2 2016 NSW 'Fit For the Future' Reforms

The NSW FFTF reforms began in 2011, with the '*Destination 2036*' workshop (Drew and Dollery, 2014c). From this workshop the Independent Local Government Review Panel (ILGRP) was created to 'investigate and identify options for governance models, structural arrangements, and voluntary boundary changes' for local governments in NSW (NSW Government, 2012). However, this role changed in 2013 with the release of the *Future Directions for NSW Local Government: Twenty Essential Steps* (ILGRP, 2013a) which proposed the use of structural change through forced amalgamations, particularly in the Greater Sydney region (Drew and Dollery, 2014c). As financial sustainability underpinned the Fit For the Future reform proposals, financial sustainability reports were developed for

[5] This relative difficulty is due to the hidden costs of de-amalgamation which may be hard to identify and quantify, such as costs associated with the division of assets, labour, and liabilities within the newly de-amalgamated local governments, hindering measurement efforts.

each local government by the NSW Treasury Corporation (TCorp), primarily relying on the existing metrics employed by its Queensland counterpart (QTC) (Drew and Dollery, 2014c). In particular, the *Financial Sustainability of the New South Wales Local Government Sector report* (TCorp, 2013) utilised 10 measures of financial sustainability (coving areas of financial flexibility, liquidity, debt servicing, and asset renewal and capital works), to construct financial sustainability ratings (FSR) for each local government ranging from "distressed" to "very strong" (Grant and Drew, 2017). These ratings were used extensively by the ILGRP in their interim and final reports (*Revitalising Local Government*) (ILGRP, 2013a; ILGRP, 2013b).

The NSW state government responded to these reports in September 2014, after a change to the NSW Premier and a NSW Cabinet reshuffle, with the 'Fit For the Future' policy package (Drew and Dollery, 2016a). This package required NSW local governments to prepare reports for the NSW Government regarding their 'fitness' for the future based on a subset of seven of the ratios previously employed by TCorp. Notably these ratios were subordinate to a new arbitrary 'scale and capacity' metric[6]. These submissions were then assessed by the NSW Independent Pricing and Regulatory Tribunal (IPART) with the assistance of Ernst & Young and a South Australian local government expert Mr John Comrie. Local governments deemed 'fit' were rewarded with access to debt facilities and greater autonomy with respect to some revenue streams, whilst those deemed 'unfit' (or unsustainable) were made the subject of various Ministerial amalgamation proposals (Drew and Dollery, 2016a). Over 63 percent of local government self-assessments were deemed to be 'unfit' in NSW, with a vast majority failing on the arbitrary OLG 'scale and capacity' criterion (Grant and Drew, 2017).

[6] A key component of this metric for non-metropolitan councils was the requirement to have an expected population about or exceeding 10,000 in 2036 as a 'rule of thumb', without any justification for the benchmark selected (see ILGRP, 2015, p.29)

Local governments (particularly those deemed unfit) were provided with an opportunity to propose ‘voluntary’ amalgamations to the Office of Local Government (OLG) by 18 November 2015. The Minister responded to a lack of voluntary amalgamation proposals by developing detailed and extensive plans for amalgamation exactly one month later (Drew and Grant, 2017a). Of the forced amalgamations originally proposed by the Minister, nineteen amalgamations were executed in May 2016, with an additional amalgamation being conducted in September 2016 (LGNSW, 2017). However, due to a combination of various Court challenges by affected local governments, as well as the resignation and replacement of the former State Premier, five of the local governments originally proposed escaped forced amalgamations. Consequently, the Fit For the Future reforms resulted in the creation of twenty new local governments, yielding a new total of 128 local governments for NSW. The events involved in the NSW FFTF reforms have been summarised in Figure 1.7:

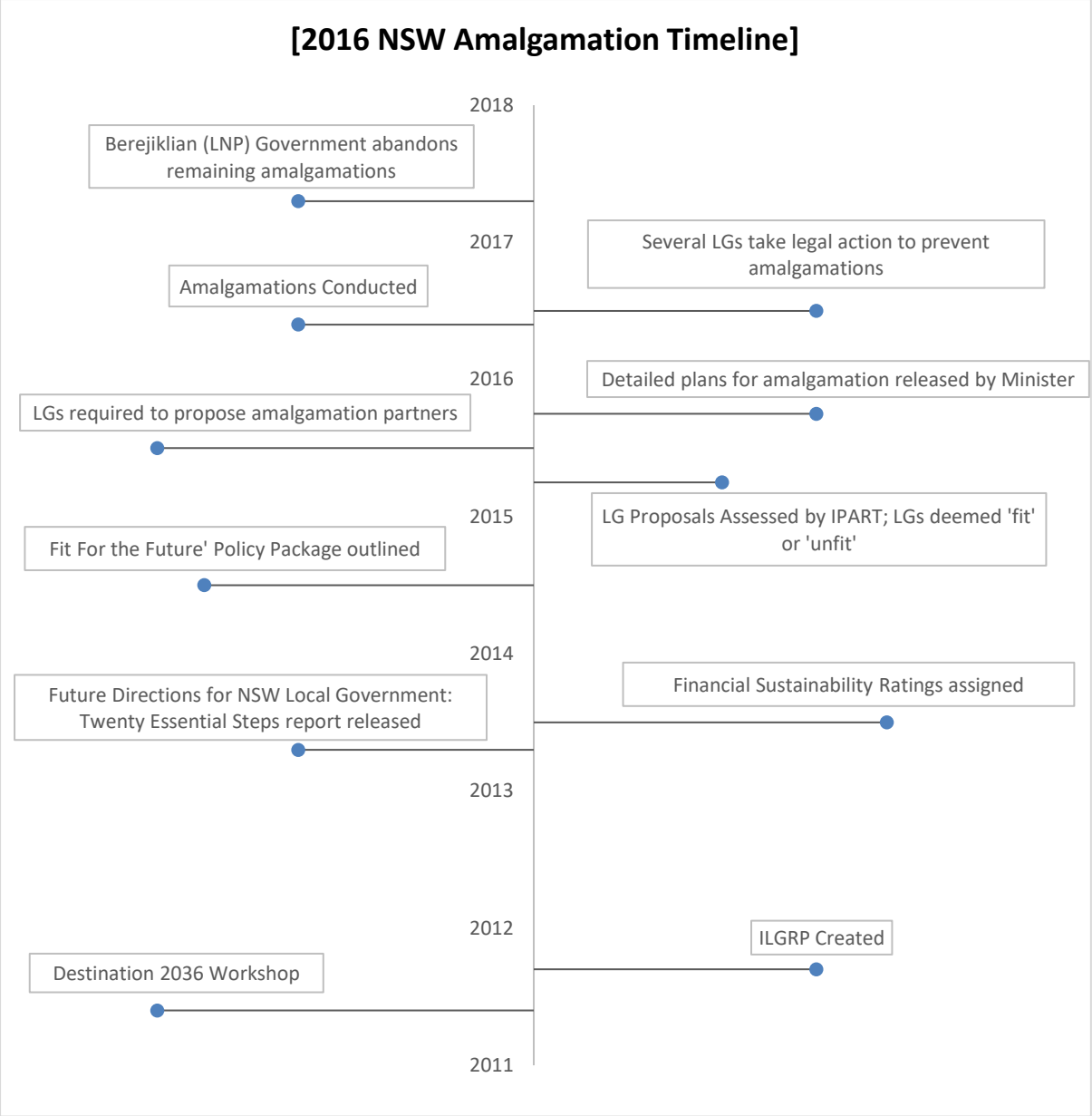

Figure 1.7: Timeline of the 2016 NSW Fit For the Future Amalgamation Process

Given that the 2016 NSW FFTF reforms are much more recent than the 2008 Queensland amalgamation program, the number of studies examining the outcomes arising from the NSW amalgamations are comparatively smaller. Existing literature surrounding the FFTF program has mainly been conducted *ex ante*, with studies evaluating the design of the amalgamations, typically in a critical manner. Literature in this area has previously raised concerns regarding the democratic legitimacy of the reforms, the process of 'selling' the reforms, as well as problems with the metrics employed (see Drew and Dollery, 2016a; 2015b; 2019).

Consequently, considerable scope still exists to analyse the outcomes of the reforms *ex post*. In similar vein to the Queensland work, empirical analyses are necessary to determine if the reforms have indeed been able to achieve their intended purpose, the improvement of financial sustainability.

However, before analyses can be undertaken to address the gaps in the literature on reform programs and financial sustainability in the local government sector, it is important to conduct a thorough examination and discussion of the relevant literature. This is important in order to gain an understanding of the insights which may be garnered from previous studies, the theoretical foundations upon which the claims of *both* proponents and opponents of reforms rest, and the methodology which is commonly employed in the empirical literature.

Chapter 2- Existing Literature Analysing Financial Sustainability and Local Government Reform

2.1 Overview

Studies surrounding the financial sustainability of local governments, the processes involved in local government reform, and its impacts have been referred to extensively in this thesis. Therefore, a discussion of the relevant literature is certainly warranted. The literature related to local government reform and financial sustainability can typically be divided into four categories, which can be combined to reveal a step-by-step guideline which should be followed to maximise the likelihood of improving financial sustainability through reform (see Figure 2.1).

The four categories can be summarised as follows: (i) the **determinants** of financial sustainability must first be identified, so that policymakers and local governments alike know which areas to target in reforms; (ii) the **processes** of previous reform programs must then be critically analysed, to identify any problems relating to the design and implementation of previous reforms which may have potentially reduced efficacy (such as weakness in supporting empirical evidence or insufficient community consultation). Given that amalgamation has been the predominant reform instrument in Australia, literature surrounding the processes of amalgamation programs will be analysed in this thesis; (iii) the **outcomes** of previous reforms must be measured to determine if they have been efficacious in achieving their intended purpose – the improvement of efficiency and financial sustainability – or if further action is needed. Similar to the preceding point, studies examining the outcomes of the amalgamation programs will be discussed; and (iv) the efficacy of **alternative** reform instruments should be analysed (regardless of whether previous reforms were successful or not) to determine if they represent a more effective, less

disruptive, or less expensive option. As the processes and outcomes of previous amalgamation programs will be discussed in the preceding sections, alternatives to amalgamation will be considered.

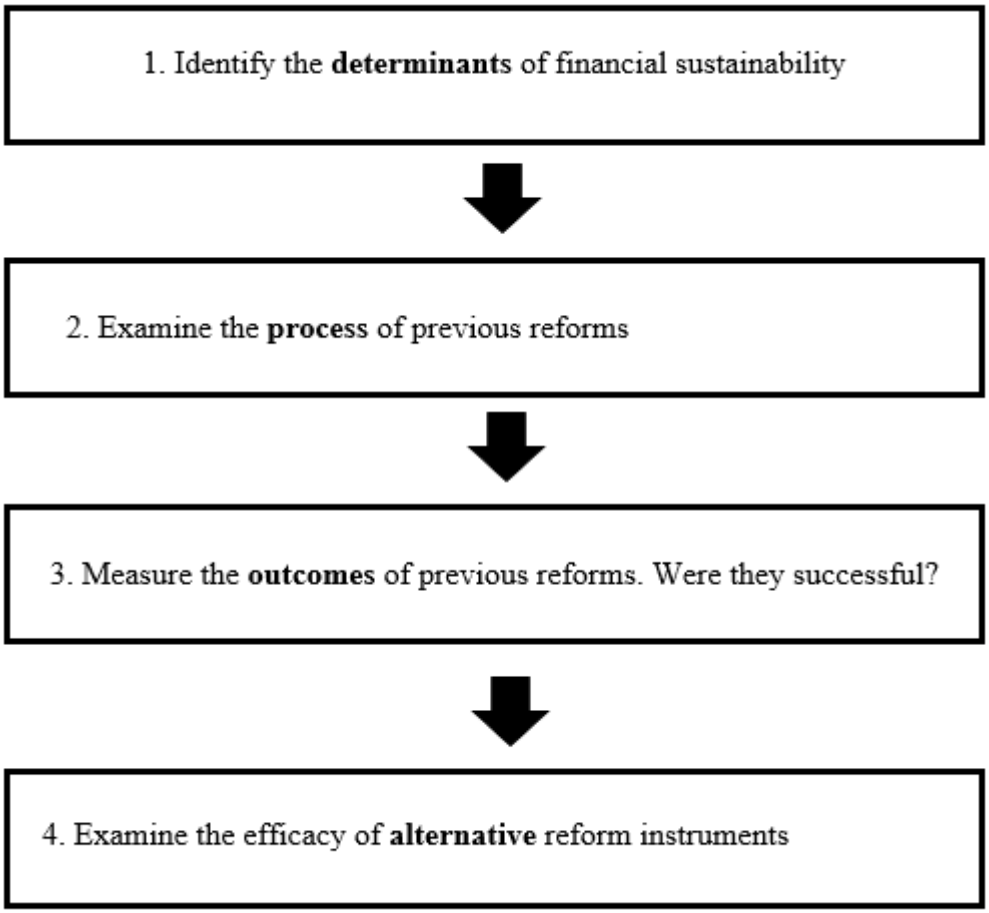

Figure 2.1: Financial Sustainability and the Reform Process

2.2 Determinants of Financial Sustainability

The first category of relevant literature involves studies identifying the internal and external determinants of financial sustainability. To target improvements in financial sustainability, it

is important for policymakers and scholars alike to first identify the factors which can potentially aid or threaten local government efforts to become financially sustainable. Without this knowledge reform architects may be unaware of potential avenues through which sustainability may be improved or may mistakenly target factors which do not have the potential to garner significant improvements in financial sustainability. If these determinants can be identified, it may be possible for reform architects to design targeted policy instruments and thus maximise the likelihood that sustainability problems can be addressed.

With regard to the external factors (factors beyond local government control), local government size – represented by the resident population served – was the most frequently examined. However, the results have been largely inconclusive (see Dollery, Grant and Kortt, 2012). For instance, whilst Boyne (1996) observed a negative relationship between the size of the population and technical efficiency levels, Andrews and Boyne (2009) observed a positive relationship between size and administration costs. Conversely, Drew, Kortt, and Dollery (2014) were unable to identify a significant association between population size and total expenditure once the effects of population growth and economies of density were controlled for (see also Ladd; 1992). Similarly, with regard to the optimal size for local government to maximise sustainability outcomes, Dollery et al. (2009; 2012) were unable to obtain a conclusive result. Rather these scholars recognised that the optimal level will likely vary based on the service examined and the methodology applied. This lack of consensus is particularly concerning given that the central premise of amalgamation reform is to generate improvements in financial sustainability via increasing the size of local government authorities.

In addition to population size, several other notable factors have also been thoroughly examined by the extant literature. Contrary to the expectations of policymakers, the regulatory environment – in particular the frequency of regulatory oversight – was found to

negatively affect financial performance (Boyne, 1990). Similarly, the local government revenue allocation system has been identified to be associated with poorer financial performance. Whilst Boyne (1990) concluded that increasing local government revenue (via the use of intergovernmental matching grants) could potentially hinder financial sustainability efforts as a result of increased spending, Dollery and Drew (2016) found that external controls aimed at limiting revenue increases (via taxation limitations) did not improve matters, leading to lower efficiency and sustainability. Finally, studies have identified the potentially detrimental effect which the local government's operating environment (including the homogeneity of the resident population, economic conditions, and population demographics) has on financial sustainability. A seminal paper by Andrews et al. (2004) concluded that relative resident deprivation between local government areas may (at least partially) explain some of the relatively poorer financial outcomes observed for disadvantaged local governments.

However, whilst many of these conventional determinants of financial performance (size, external regulation, and resident deprivation) have been thoroughly examined in the literature, many non-conventional factors have not been sufficiently analysed. One such area which holds considerable promise is the local government political structure. Extant American, Australian, and European literature has highlighted the significance of local government fragmentation (represented by the number of wards) and the level of unit expenditure, potentially reducing sustainability (see Drew and Dollery, 2017; Bradbury and Stephenson, 2003; Baqir, 2002; Pettersson-Lidbom, 2012). Moreover, although the scholarly evidence has been mixed, the mayoral structure (city manager or strong mayor) has also been previously identified as a significant determinant of expenditure in the American literature (see Holcombe and Williams, 2009; Bradbury and Stephenson, 2003). Given that the effect of mayoral structures in the Australian local government system has not yet been identified, an

analysis of mayoral election and financial performance may provide valuable insights for policymakers.

There is a relatively smaller corpus of research on internal factors (factors within local government control) although several important contributions were identified. The first is the strategy imposed by an organisation (prospector, defender and reactor). Local governments which adopted a prospector strategy were demonstrated to have superior financial performance, whilst a reactor strategy was associated with significantly poorer financial outcomes (Andrews, Boyne, and Walker, 2006). The second is the decision-making style adopted by the local government executives. As prior research indicates, a logical incremental strategic decision-making style was found to enhance financial sustainability (Andrews, Beynon, and Genc, 2017), although this has been contested by Andrews et al. (2012). Conversely, a lack of decision-making style was found to lower financial performance outcomes (Andrews, Beynon, and Genc, 2017). Finally, studies examining citizen engagement practices indicated a significant positive association between residents' understanding of local government and financial performance, although increased resident engagement typically had the opposite effect (particularly in deprived regions) (Andrews, Cowell and Downe, 2008).

In general, most of the conventional literature on internal factors has examined the effect of managerial attributes on financial performance, typically employing qualitative data (obtained from surveys or in-depth interviews). By contrast, quantitative analyses (utilising financial data) are relatively scarce. This scarcity is even more pronounced when examining the literature on non-conventional internal factors such as the level of financial control, or the quality of internal planning. Given this gap in the literature, a quantitative analysis examining the non-conventional internal determinants of financial sustainability may provide valuable insights for policymakers and the improvement of financial sustainability. For this purpose,

the association between the quality of internal budget practices (represented by the degree of budget accuracy) and financial performance has been selected.

The internal and external factors which have previously been identified as significant determinants of financial sustainability by the extant literature has been summarised in Table 2.1:

Table 2.1: Internal and External Determinants of Local Government Financial Sustainability

External Factors		Internal Factors	
Factor	Literature	Factor	Literature
Size	Boyne (1996) Andrews and Boyne (2009) Drew, Kortt and Dollery (2014) Ladd (1992)	Organisational strategy	Andrews, Boyne, and Walker (2006) Andrews, Beynon, and Genc (2017) Andrews *et al*. (2008) Andrews *et al*. (2012)
Regulatory oversight	Boyne (1990)	Decision-making style	Andrews, Beynon, and Genc (2017) Andrews *et al*. (2009)
Revenue controls- rates	Dollery and Drew (2016)	Citizen engagement	Andrews, Cowell and Downe, (2008)
Revenue controls- grants	Boyne (1990)		
Resident deprivation	Andrews *et al*. (2005)		
Representation-ward structure	Drew and Dollery (2017)		
Mayoral structure	Holcombe and Williams, (2009) Bradbury and Stephenson (2003)		

2.3 Process of Local Government Reform

The second category of literature examine the processes involved in local government reform. This research is important to enhancing sustainability as it can provide greater certainty that: (i) the local governments targeted in reforms are suitable (usually as those with inferior performance), (ii) reforms are conducted with little disruption (to maximise its impact on performance and achieve success), and (iii) that the improvements or reductions in performance achieved following the reforms are attributable to the reforms themselves, and not to external influences or factors.

In general, the extant literature relating to the reform processes is fairly critical, highlighting problems related to the use of empirical evidence and performance measures (see Table 2.2 for a summary). Examples of this include criticism relating to a lack of evidence in local government reform planning (Drew, Kortt, and Dollery, 2017; Kortt, Dollery and Drew, 2017; Drew and Dollery, 2014c), limited supporting evidence (relying on individual cases of reforms, or small scale reforms) (Bell, Dollery and Drew, 2016; Drew and Dollery, 2014c), errors in the data or calculations employed, or use of data prone to manipulation (Dollery and Drew, 2015b), and choice of benchmarks (Drew and Dollery, 2015b).

However despite these criticisms, studies in this category also provide guidance for the improvement of reform processes. Examples include studies outlining the desirable attributes of performance measures and benchmarks (Boyne and Law, 2005; Drew, 2020; Drew and Dollery, 2015b; Dollery and Robotti, 2008) and suggestions to enhance the reliability and accuracy of data (Drew and Dollery, 2015c).

This category is particularly important for addressing the issue of financial sustainability in Australia as it can shed light on limitations or weaknesses in the processes of recent reforms which might have potentially reduced efficacy. Although much has already been done on the

processes of the two most recent reforms from a political perspective (see, for instance, Drew et al., 2017; Drew and Dollery, 2016a, Dollery and Drew, 2017), a detailed examination of the programmatic processes of the reforms has not yet been undertaken. Moreover, the majority of extant literature on the Australian amalgamation programs has largely been undertaken *ex ante* (preceding the reforms). While this can be useful in identifying potential problems in the design of the reform, such studies can only provide limited insight into the implementation process. To critically analyse the implementation process, additional *ex post* analysis (conducted after the reforms) is required. Consequently, an *ex post* analysis of the processes of the Queensland and NSW amalgamation programs may provide valuable insights for policymakers and potentially improve the efficacy of future reform programs. This will be combined with an analysis of the outcomes of the reforms (a common practice in *ex post* literature) which will be outlined hereafter.

Table 2.2: Literature on the Reform Process

Author	Reform	Fault Identified or Recommendation Made
Drew, Kortt, and Dollery (2017)	NSW-Fit for the Future	Local governments selected for amalgamation would exceed scale
Kortt, Dollery and Drew (2016)	New Zealand-Hawke's Bay	No empirical evidence of scale economies and cost savings
Drew and Dollery (2014c)	Greater Sydney proposed mergers (precursor to FFTF)	Insufficient analysis completed, results indicate no relationship between size and sustainability ratios
Bell, Dollery and Drew (2016)	2004 NSW amalgamations	Incomplete empirical evidence based on a limited number of local governments
Drew and Dollery (2014b)	Proposed Perth Amalgamations	Lack of empirical evidence of scale economies
Dollery and Drew (2017)	NSW-Fit for the Future	Empirical analysis completed by hired consultants may be subject to moral hazard and manipulation
Drew and Dollery (2016a)	NSW-Fit for the Future	FFTF program contains errors, relies on unreliable data, and neglects important factors potentially as a result of excessive speed in completion
Drew and Dollery (2015b)	Utilises ratios commonly relied upon in amalgamation programs; no specific amalgamation program	Flaws in benchmarking system, which may be unsuitable across all local governments and subject to unintended consequences; recommended empirical method for allocating benchmarks

Boyne and Law (2005)	Examined measures used in the UK Local Public Service Agreements (APSA)	Provides a framework for measuring outcomes and analysed which ones used met the conditions
Drew and Dollery (2015c)	NSW-Fit for the Future	Unreliability of financial ratios when based on inconsistent accounting data; suggestions to improve

2.4 Outcomes of Local Government Reform

The third category of relevant literature on financial sustainability examined within the thesis relates to the outcomes of the reforms with respect to sustainability and financial performance. These can be separated based on either direct cost and revenue changes, or financial sustainability impacts proxied by efficiency. The majority of academic literature in this category attempts to determine if the stated objectives of reform programs are met. Notably this is largely an academic undertaking given the reluctance of policymakers and reform architects to conduct such analysis (Drew, 2020).

One potential explanation may be due to the fact that, similar to the literature on the reform processes, studies of outcomes generally depict reforms in a negative manner. This is mainly due to findings that the reforms typically led to higher spending and thus reduced sustainability, refuting the claims made by policymakers. A key example includes the study undertaken by Andrews (2013, p. 136) which concluded that "the savings that have been made are not substantial enough to outweigh the disruptive costs of amalgamation" and that consequently "amalgamation appears to have weakened the financial sustainability of the amalgamated counties" in England and Wales. These findings were mirrored in studies by Feiock (2004), Lawrence and Schiff (2011), Leland and Thurmaier (2010), and Jonsson

(1983) that indicated that structural reforms through amalgamations typically led to increased expenditures, and unrealised efficiency gains (see Table 2.3). Moreover, even in studies which did not obtain evidence of significantly higher costs (see Bell et al., 2016; Reese, 2004; Blom-Hansen et al., 2016) the inability to identify significant improvements in performance has been used to challenge the efficacy of reform through amalgamation.

A key feature of studies in this category is the inclusion of supplementary analysis (typically examining the processes of the reforms) to ascertain the *reasons* behind the outcomes observed. Potential causes which have previously been raised in the literature include the potential for cost savings from amalgamation (such as administrative cost savings) to be offset by higher expenditure in other functional areas (Allers and Geertsema, 2016; Andrews, 2015). Similar justifications which have been raised include (i) the unlikely nature of labour-intensive services to generate economies of scale (see Blom-Hansen et al., 2016); (ii) the inability for local government managers to implement necessary cost saving measures following amalgamation, particularly those involving staff redundancies (Gaffney and Marlowe, 2014); (iii) the tendency for upwards-harmonisation of services and wages following reform (Drew, 2020; Bird and Vaillancourt, 2006); and (iv) limited evidence of a significant association between the financial measures (financial indicators) and local government size (Drew and Dollery, 2014c).

However, despite the fact that sufficient time has passed since the 2008 Queensland amalgamation program, it is surprising that a detailed analysis of the efficiency and financial sustainability outcomes of the reforms has not yet been conducted. A similar deficiency in studies on the financial outcomes of the 2016 NSW amalgamations also exists, however in this instance the need to allow sufficient time for the purported outcomes to materialise has hindered earlier efforts. Given the importance of such studies to enable policymakers to

identify if sustainability improvements have indeed been achieved, and to improve future reform programs, an analysis of amalgamation outcomes is crucial.

Table 2.3: Outcomes of Local Government Mergers

Literature	Conclusions/ Observations
Bell, Dollery and Drew (2016)	Amalgamated local governments did not have superior performance on financial sustainability ratings (FSR)
Andrews (2013)	Expenditure per capita of amalgamated local governments was £229 higher following amalgamation; costs of restructuring were not yet recouped
Andrews (2015)	Although administrative economies were realised following consolidation, the fiscal health of the consolidated governments has weakened
Feiock (2004)	Decentralised government results in greater efficiency than consolidated government
Lawrence and Schiff (2011)	Six of Eight articles analysed showed evidence of decreases in efficiency following amalgamation
Reese (2004)	Although there were gains from the amalgamations in Ottawa, these have been offset by countervailing forces. Cost reductions from staff savings but cost increases from increased demand and new service responsibilities.
Leland and Thurmaier (2010)	Although there are usually labour expenditure reductions following consolidation, expenditures can rapidly increase when a county council is forced to provide urban services following consolidation
Allers and Geertsema (2016)	No significant difference in spending or taxation following amalgamation. Reduced spending on administration activities is being offset by increased costs elsewhere
Drew and Dollery (2015a)	Examines the costs of de-amalgamation in terms of the division of assets and liabilities previously harmonised; The amalgamation of local governments with vastly different economic and community profiles will likely foster discontent, leading to de-amalgamation
Drew and Dollery (2014c)	Only two financial sustainability ratios used in the FFTF amalgamations (FSRs) - own source and asset renewal ratios – were associated with population size
Gaffney and Marlowe (2014)	Although cost reductions were observed, expected savings in staff costs did not materialise due to a reticence of managers to conduct necessary redundancies

2.5 Alternative Instruments of Local Government Reform

The final category of relevant literature relates to the efficacy of alternative measures of reform to increase financial sustainability. Given the focus on structural reform through amalgamation in the thesis, alternatives to amalgamation will be examined. Generally, this category receives less attention compared to the literature on structural reform. This is disappointing given that alternative policy instruments may provide more effective, less disruptive, or cheaper alternatives to amalgamation for addressing financial sustainability concerns. This is due to their ability to target local government finances directly (for instance through financial reforms), internal financial practices (through internal governance and management reforms) and individual service responsibilities (through legislative and functional reforms; see Drew et al. 2014).

Existing literature related to this category includes the evaluation of the governance and management reforms with a predominant focus on performance management initiatives including Comprehensive Performing Assessment (Game, 2006), and Best Value Indicators (Boyne, Martin and Walker, 2004). Additional studies exist scrutinising financial reforms including reforms to the grant allocation system (Johansson 2003; Drew and Campbell, 2016), and functional reforms through shared service arrangements (Dollery, et al., 2016). This relevant literature has been summarised in Table 2.4.

In the existing scholarly literature, shared service arrangements represent the most commonly advocated alternative for targeting efficiency gains, and hence financial sustainability improvements (Dollery et al., 2012). This is typically in contrast with the policy documents which suggest that shared services offer "short to medium-term savings, but … can be very difficult to gain the full benefit over the long haul" (MLGRP. 2012, p.121). Given that sufficient empirical evidence has not yet been collected to support the statements made by

both proponents and opponents, an opportunity exists to examine the outcomes for local governments which utilise shared service arrangements and thus support the debate currently being undertaken in the academic and political spheres. In addition, the recent implementation of internal governance and management reforms in Australia through the use of central audit requirements (see ILGRP, 2013b) also provides a valuable opportunity to evaluate its effectiveness as a non-conventional policy instrument for improving financial management decisions.

Consequently, empirical analyses examining the association between shared service arrangements and local government efficiency, and the impact of central auditing on financial practice (via the manipulation of depreciation accruals) may provide valuable evidence regarding their efficacy. These results can then be applied by policymakers to aid the selection of the future reform instruments.

Table 2.4: Alternatives to Structural Reform

Literature	Reform Instrument	Findings
Game (2006)	Comprehensive Performing Assessment	The history of CPA is presented, and the challenges relating to the need for continual improvement of the benchmark to ensure all local governments do not easily exceed the target are clear
Boyne, Martin and Walker (2004)	Best Value Indicators	Although the regime may create organisational change, the link between these indicators and organisational performance is not straightforward
Johansson (2003)	Discretionary Grant Funding	Examines the propensity to use grants for political purposes, but also to counteract the effects of deprivation (which may hinder sustainability)
Drew and Campbell (2016)	Grant Allocations	Examines how the relative deprivation and inequitable allocation of grants to Central Darling shire played a part in the financial troubles experienced.
Dollery, Kortt, and Drew, 2016	Shared Service Arrangements	Suggests that shared services offer a less disruptive alternative to amalgamation, but high establishment costs may hinder the success of shared services for smaller authorities.

2.6 Outline of the Thesis

To contribute to the existing literature and academic knowledge presented above, the body of the thesis consists of seven chapters reflecting the seven main analyses which were undertaken. These analyses were selected to address the aforementioned gaps in the literature

and have been ordered in such a way as to provide an engaging narrative about how financial sustainability challenges might be resolved – providing valuable information for academics and policymakers alike within the four-step framework.

Chapter 3 of the thesis provides an example of the examination of the internal and external factors which affect sustainability. Specifically, the chapter examines the effect of the mode of mayoral election on financial sustainability. The study empirically estimates the association between the type of mayoral system employed (i.e. direct election, where the mayor is elected by the constituents within a local government area in periodic elections, or indirect election where the mayor is selected from within the ranks of elected councillors) and unit expenditure[7].

The empirical examination was supplemented with a discussion of the relevant merits associated with directly elected mayors which have been argued by proponents to justify implementation, as well as a discussion of the problems of direct election often cited by opponents. This was required to provide a more holistic understanding of the justifications for or against direct election beyond mere pecuniary outcomes. NSW was an ideal milieu for this analysis, compared to other Australian local government systems, because the form of mayoral election is largely voluntary, rather than imposed or mandated (with the exception of the City of Sydney and (until 2020) Central Darling).

Chapter 4 of the thesis is related to the previous chapter as it examines internal factors which may aid or threaten sustainability. Specifically, this chapter explores the importance of the budgeting process and the accuracy of budget estimates created with respect to financial sustainability. A six-year panel of all NSW local governments was employed to test the

[7] That is, the total operating expenditure divided by the total number of properties receiving local government services (including residential, business, farming, and mining properties).

association between budget inaccuracy (disaggregated into revenue and expenditure accuracy) and the changes in expenditure per assessment (controlling for past performance). In contrast to previous studies from the literature, this analysis used data obtained from accounting records, and hence employs a quantitative approach. In a similar vein to Chapter 3, this analysis was used to determine if deficiencies in the budgeting process (the inaccuracy of the budget estimates obtained) had a significant impact on local government expenditure levels, which might potentially threaten the long-run financial sustainability of local government authorities.

Chapters 5 and 6 are dedicated to examining both the processes and outcomes of recent reform programs through amalgamation. In particular, an emphasis is placed on determining the success (or failure) of individual interventions to achieve financial sustainability improvements and the reasons why the observed outcomes were obtained. Through this, the efficacy of previous reforms programs can be identified.

For Chapter 5 the focus is on the 2008 Queensland amalgamations. Specifically, the Chapter examines the impact of the reforms on the efficiency of the targeted local governments. In contrast to the first two analyses, this study does not use regression. Rather non-parametric methodologies including intertemporal data envelopment analysis (DEA) and analysis of variance (ANOVA) testing are employed to measure efficiency and identify significant differences in individual components. For this purpose, eleven years of panel data over the period 2003 to 2013 was collected[8], providing a sufficient window preceding and following the amalgamations. The long panel was required to provide insights into the performance environment of local governments prior to the reform, and to allow for sufficient time for any

[8] Although this has since been further extended to encompass the financial years until 2019-20 (see appendix 2).

gains (or losses) from the amalgamation to be realised (which the LGRC stated would take 2 to 3 years; LGRC, 2007).

Chapter 6 supplements the insights gained from the preceding analysis, with an in-depth analysis of the outcomes arising from the 2016 NSW amalgamation programme, *Fit For the Future*. This additional analysis was important to identify if any lessons resulting from the 2008 Queensland amalgamations had been learned. Difference in difference (DID) analyses of the total operating expenditure of affected local governments were employed to measure the outcomes of the reforms. Similar DID analyses of the disaggregated elements of total expenditure – staff expenditure, materials and contracts expenditure and 'other' expenditure accounting items – were used to determine if the processes proposed by amalgamation architects to achieve greater financial sustainability had indeed been realised. This approach of also examining the process elements is unique to the scholarly literature and allowed for a better understanding of the cause of amalgamation shortcomings.

Chapter 7 also provides an analysis of the NSW *Fit For the Future* reform programme, however unlike the previous chapter, the focus is restricted to the outcomes of the reforms. This focus allowed for a more detailed theoretical discussion to address the gap in the extant literature regarding the identification of policy success. In this Chapter considerable time is devoted to developing a robust theory, based on the behavioural economics framework commonly applied to macroeconomic policy decision-making and outcomes. Following this, econometric estimations were conducted using instrumental variable (IV) modelling. By taking into account the interaction between local government targets and the instruments available to local government managers and policymakers alike to achieve these targets, Chapter 7 provides a number of important lessons for the development of future decision-making and policy intervention.

Chapter 8 focuses on alternatives to local government amalgamation which are often proposed when amalgamation plans are deemed unsatisfactory. One prominent alternative proposed in both the scholarly and grey literatures is shared services (Drew, 2020). Thus, in Chapter 8 econometric analysis was employed to determine if shared service arrangements are indeed viable alternatives for enhancing financial sustainability. This was achieved through an examination of whether local governments which have shared service arrangements achieve higher efficiency levels compared to local governments without such arrangements. For this purpose, a five-year panel of data from South Australian local governments was employed to both diversify the jurisdictional focus of the thesis and also harness the greater level of financial and non-financial information about the shared service arrangements available for South Australian local governments. In the first stage of the analysis Tobit regression was used to estimate the association between efficiency and the presence of *any* shared service arrangement (represented by an indicator term). To better understand the potential of specific shared service arrangements, additional regressions were then conducted on disaggregated service categories (such as joint waste management, transport, or ownership of machinery). This allowed for a better appreciation of the viability of shared services arrangements for targeting cost savings in individual functional areas and hence garnering financial sustainability improvements.

Finally, Chapter 9 focuses on an alternative internal governance and management reform which has recently been incorporated as a key part of the wider New South Wales 2016 reform programme, namely central audit requirements. In Chapter 9 the impact of central auditing on the unexpected depreciation expenses is scrutinised to identify if the reforms can be considered an effective deterrent for accounting data manipulation and the improvement of internal management practices. To achieve this a seven-year panel of NSW local government data was collected, representing a three-year period preceding central auditing as well as the

full four-financial years following the reforms. Given that the absolute value of unexpected depreciation was employed as the regressand in the models estimated, Tobit regression was used to account for inherent censoring at zero. Supplementary analysis was also conducted, incorporating individual year dummies and audit costs in order to ascertain the temporal impacts of the reforms and to identify if the concerns raised by critics of central auditing indeed had substance. Through this is possible to evaluate the viability of central audit arrangements as an alternative public policy instrument to target improved financial management practices and hence sustainability.

The positioning of each chapter of the thesis in relation to the central theme of financial sustainability and reform, as well as the step-by step framework outlined above has been summarised in Figure 2.2:

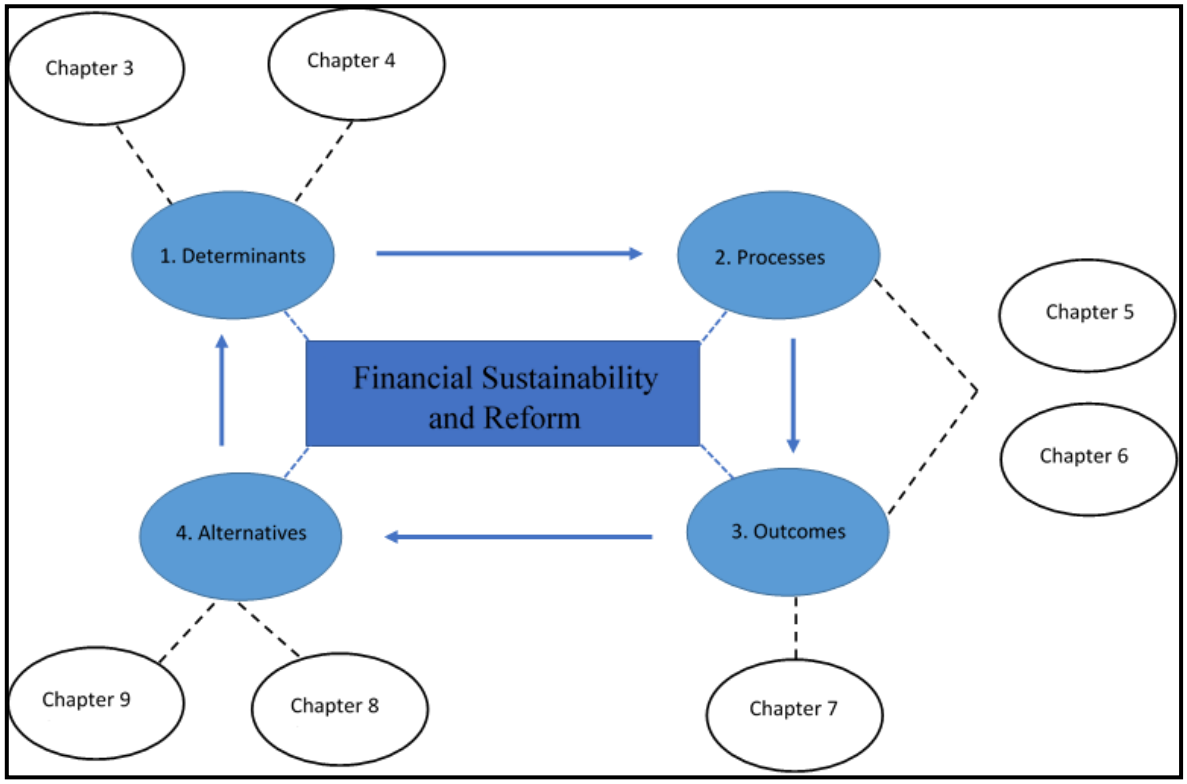

Figure 2.2: Scope of Thesis and Position of Chapters Within Research Framework

The conclusion of this thesis in Chapter 10 provides a summary of the results obtained and the implications which can be drawn out. This summing up of the separate findings provides an overall assessment of the new information which has been obtained about the improvement of financial sustainability through local government reform. In essence it allows key stakeholders – local government officials, policymakers, and academics alike – to better understand the determinants of financial sustainability, what must be done to improve the process of reform, and what the outcomes of previous reforms have revealed, and the viability of alternative reform instruments. Chapter 10 also sheds light on the areas which will require further examination to ensure optimal responses to financial sustainability problems in the future.

2.7 Methodology

All of the empirical work in this thesis makes use of publicly available financial data sourced from the annual reports and audited financial statements of individual local governments. Additional financial data has been obtained from individual local government agencies including the relevant state Grants Commission, the Office of Local Government, and the state Treasury Corporations. The demographic and economic control variables for individual local governments were generated based on data sourced from the Australian Bureau of Statistics (ABS) *National Regional Profile*.

With the exception of Chapter 5, regression analysis employing ordinary least squares (OLS), Difference-in-Difference (DID), propensity score modelling, local projection methods, synthetic control methods, Instrumental Variable (IV) regression, Tobit and random effects (RE) methodologies were employed to determine the significance of associations observed. Appropriate tests were used to determine the type of model required (such as the Hausman

test), and to investigate whether potential problems such as non-normality or multicollinearity required mitigation. Where necessary robustness analysis was conducted to confirm the validity of results against alternative model specifications.

For studies which measure the efficiency of local government (Chapters 5 and 8), data envelopment analysis (DEA) methodology was employed, rather than stochastic frontier analysis (SFA) or regression approaches. This decision was made in cognisance of the benefits associated with DEA, namely the absence of an *a priori* functional reform, the capacity to incorporate multiple inputs and outputs in the estimation of the frontier as well as the ability to provide point estimates of efficiency (Drew, Kortt, and Dollery, 2017).

The choice of variables employed in each analysis was determined with reference to relevant literature, theory, and the specific context of the work. For example, the variables used to measure efficiency for Chapter 4 were chosen with reference to the suggestion by Da Cruz and Marques (2014) that studies examining local government efficiency should include a measure of labour input and other expenditure (mainly material expenses and other expense), whilst recognising that "the output varied…. in a national context". Moreover, adaptation was made to account for the unique nature of Australian local government, such as the use of household (and property assessment) values, rather than population figures as a proxy for local government output (Drew and Dollery, 2014d). Control variables for the regression analyses similarly drawn from the literature (see Drew and Dollery, 2014d) and relevant theory and typically included measures of:

(a) population size and density- to account for the potential economies of scale and density in production);
(b) resident diversity- including the percentage of children (under 15), elderly (over 65), the proportion of residents from Aboriginal and Torres Strait Island descent

(indigenous residents) and the proportion from non-English speaking backgrounds, to account for differing needs and service preferences;

(c) socioeconomic status- measured through average wage, and the proportion of individuals receiving government assistance such as the Aged Pension, Carer Payment, Disability Support Pension and Newstart (job-seeker) Allowance, to account for the reliance on public services and ability to pay; and

(d) The location of the local government – to account for the well-documented disadvantage which rural local governments have compared to their urban counterparts.

A description of the model applied to answer each individual research question, as well as the justification for the selection and robustness testing can be found in the relevant methodology section of each individual analysis. The presentation of the individual analyses will be provided hereafter.

Chapter 3- The Price of Populism: The Association Between Directly Elected Mayors and Unit Expenditure in Local Government

3.1 Introduction

Directly elected Mayors (DEM) have become fashionable (Elcock, 2008). Those who support the innovation, imported from the Americas, point to the transformational potential that might be realised from strong leadership supported by an electoral mandate. By contrast, opponents of the innovation cite the potential for abuse of power given over to just a single pair of populist hands. Political scientists (understandably) focus on the concordance between DEM structure and political philosophy, while economists *assume* an increase in operational efficiency and suppose that enhanced efficiency will contribute to more sustainable local government sectors (for an example of the former see Grant, Dollery and Kortt, 2016; for the latter see Grant, Dollery and Gow, 2011).

It is somewhat surprising that limited robust empirical evidence has been put forward to support the contention that DEMs might indeed enhance efficiency, much less the assertion of a causal link between efficiency and sustainability. In the rhetoric of economics, efficiency is generally taken to refer to technical efficiency (also referred to as productive or x-efficiency): The optimal use of inputs to produce a given set of outputs (Andrews and Entwistle, 2013) (typically proxied by the minimisation of expenditure per person (or per assessment)). This is by no means the only type of efficiency studied by economists, nor is it necessarily the most relevant kind with respect to government (allocative – matching demand for specific services with supply – and dynamic efficiency – change in efficiency over time with emphasis on resourcing for future efficiency – would seem at least as important for

democratic government), however it is the subject of a claim that has been made in the literature, and therefore an important avenue for inquiry.

It is not at all obvious that the qualities attributed to DEMs, would translate into improved technical efficiency. For instance, greater community engagement – in the absence of a subsidiarity approach to government – is likely to resolve into higher standards of service and higher quality of local government goods and hence will appear to reduce technical efficiency (Drew and Grant, 2017b). This potential is particularly problematic when one considers that taxation limitations, which operate in many local government jurisdictions, are likely to give rise to fiscal illusion (Grant and Drew, 2017). In similar vein, other purported benefits of DEMs, such as enhanced ability to 'make decisions quickly', 'make an impact on the physical, economic and social well-being of their communities' and 'cleaning up particular areas' could also easily resolve into higher unit costs – that is, *prima facie* reduced levels of technical efficiency (Elcock, 2008: 805).

Whether or not DEMs have a higher pecuniary cost associated with them would seem an important matter to investigate in view of the emerging evidence of financial sustainability crises for local government in developed economies (Drew and Grant, 2017b). However, the presence of a statistically significant elevated cost need not necessarily spell the end for this 'fashion'. For one thing, the cost may be relatively modest with respect to total local government budgets – in which case remedial prescriptions may not be deemed urgent. Alternatively, the pecuniary implications may be considered good value in view of the other purported benefits of DEMs (and measures may be taken to increase revenue to cover the additional cost). What is problematic however, is if DEMs involve additional expenditure that is not identified – in this case the financial sustainability of local governments might well be diminished (without conscious attention being drawn to the fact) and this may, in time, lead to the need for significant corrective measures.

We take advantage of an ideal natural experiment to estimate the additional expenditure attributable to DEMs. We are able to do so because local governments in New South Wales (NSW) Australia have been free to decide whether they will adopt the DEM model – and currently only a quarter of the local government cohort have taken it up. Thus, by recourse to a five year panel of data – including appropriate control variables – we are able to analyse the effect that DEM has on spending. Specifically, we seek to answer the research question: What effect do DEM have on local government unit expenditures?

The balance of this journal article is organised as follows. First, we review the literature on DEMs with a view to identifying the major advantages and disadvantages of the model and the likely pecuniary implications of same. This is an important task to carry out so that value-for-money judgements might be made. Next we outline the empirical methodology and the data sources employed. Thereafter we discuss the results of our estimations with reference to the aforementioned literature. The article concludes by outlining the importance of our findings for public policy formulation.

3.2 Directly Elected Mayors in the Literature

There is both a political (normative) and pecuniary empirical strand of DEM literature. We first review the political arguments for and against DEM, before turning our attention to the extant empirical literature.

3.2.1 Political Arguments Regarding Directly Elected Mayors

Only a quarter of local governments in New South Wales have DEMs despite the fact that the option has been available to local governments for many decades (see the Local Government

Act (1993) (NSW)). Except for the capital city of Sydney (which must have a DEM under the City of Sydney Act (1988)) the default position for local governments in NSW is that the elected Councillors are responsible for selecting the Mayor from within their ranks for a term of two years (prior to 2016 Councillors elected the Mayor for a period of just twelve months).

For voters to be given the opportunity to directly elect a Mayor the legislation requires that a plebiscite be carried in the affirmative at the previous local government election (which ordinarily occur every four years in NSW (Grant and Drew, 2017)). Notably, the powers and roles of the Mayor (whether directly elected or elected by the Councillors) are the same for all local governments outside of the City of Sydney and include *inter alia*: to be the leader of the local government and the community; to be the spokesperson of the governing body; to preside over meetings and ensure good conduct of same; to ensure strategic documents are produced in a timely fashion; to promote partnerships between local government and stakeholders; to carry out ceremonial functions; to lead performance appraisals of the General Manager (in conjunction with other Councillors), and to represent the local government at regional forums and to higher tiers of government. Given that the legislated functions of the Mayor are not dependent on the route by which the person arrives in the top job, there is no *prima facie* compelling reason to believe that the practice of DEMs will be significantly different to that of their non-DEM elected peers.

However, proponents of the DEM model would suggest otherwise and it seems that the main rationale for believing in significantly different practice may be due to the *outlook* engendered as a consequence of the mode of election (Copus, 2004). A DEM owes their position to the wider constituency of the local government area and can therefore be expected to focus on pleasing voters, (assuming that the Mayor wishes to remain in their position). Thus, a DEM might be expected to be engaged with the community more and respond more effectively to community needs (Grant and Drew, 2017). Moreover, in being elected by the

wider body of voters a Mayor receives a personal mandate, particularly for matters which were clearly articulated during campaigning and this may prove important when trying to convince Councillors to accept a particular policy direction (Copus, 2004). It is also asserted that a DEM has a higher personal profile which brings greater influence in stakeholder negotiations (including negotiations with business and higher tiers of government), helps to provide a focal point for stakeholders wishing to engage with the local government, and thus results in more projects getting off of the ground (Grant et al., 2016; Elcock, 2008). This higher personal profile also means that the DEM may be able to gain some freedom from the party political machine – if a Mayor does not depend on their party colleagues for the position (or even pre-selection), it may be possible for the Mayor to build issue by issue coalitions and deviate from party positions (Bochel and Bochel, 2010; Copus, 2004).

Many of the underlying mechanisms which are said to give rise to perceived advantages of the DEM are also cited by opponents of the model. For instance, if Mayors owe their position to the voters rather than the body of Councillors some believe that this may weaken both the power and relevancy of the Council body (that is, a DEM does not *need* to please the body of Councillors to remain in their position; Bochel and Bochel, 2010; Elcock, 2008). Moreover, the higher profile of the DEM is said to give an unfair advantage to the Mayor, over both his Councillor colleagues (the Mayor is seen to be in a better position to take credit for the outcomes of the elected Council body), and also party political candidates (wishing to run for Mayoral office, but who may not be known outside of the political party machine; Copus, 2004). Indeed, it has been noted that a DEM may not even need to belong to a political party, or have any political experience – all that would seem to be required (at least for the initial rise to office) is a high public profile – thus, the fear of celebrity Mayors (from the arts, or sporting arenas) is a recurring theme in the literature (Copus, 2004; Grant and Drew, 2017). Somewhat related are the fears that a DEM with extremist views may arise, or that wealthy

individuals may buy their way to Office (Grant and Drew, 2017). The view that DEMs represent an inadvisable concentration of power and patronage into a single person – and that this may result in abuse of power and corruption – are also perennial objections to the model (see, Copus, 2004; Grant and Drew, 2017). Indeed, some have also speculated that the job description may prove daunting to potential candidates and thus dissuade otherwise high calibre candidates from pursuing Office (Grant et al., 2016). The last major objection to a DEM is the potential for gridlock, if the Mayor comes from a political party other than the party that holds the majority of local government seats (Grant and Drew, 2017; Copus, 2004). Notably many of these 'nightmare scenarios' do not require a DEM model to be in operation for their manifestation (for instance, corruption and abuse of power occurred long before the advent of DEMs in NSW; Grant and Drew, 2017).

3.2.2 Empirical Evidence on Directly Elected Mayors

The extant literature on the pecuniary impact of the different mayoral forms hails mostly from America and has been somewhat mixed and inconclusive. These studies can be separated into three categories: (i) those which detect reduced expenditure levels, (ii) those which conclude no significant differences between the two mayoral models, and (iii) others which observe increased expenditure levels in local governments which employ a DEM model.

Analyses in the first category emphasise the restrictions on policy or program implementation that may be created when additional power is invested in a single individual (in this instance the DEM). For instance, Coate and Knight (2011) suggest that projects are less likely to come to fruition under a DEM model, because it is necessary for the project to gain the support of both the DEM and a majority of the council (they argue that projects under the indirectly elected mayor model only require the majority support of the council). Thus, according to

Coate and Knight (2011), some projects which have the support of a majority of elected councillors may not be implemented if the Mayor is reluctant to support or approve the policy. As a result local governments which employ a DEM structure may experience a relatively lower rate of project approval, and hence lower project-related expense. We note that this argument tends to run counter to the narrative in the political strand of literature, and that it is not supported by evidence of lower policy approval rates at DEM local governments. However, multiple analyses in an American context have identified significantly lower municipal expenditure in local governments with a DEM form including Deno and Mehay, (1987), Clark (1968), Sherbenou (1961), and most recently Coate and Knight (2011) who identified expenditure reductions in the order of $70 to $150 per capita.

Analyses in the second category – which fail to find evidence of statistically significant differences in expenditure for local governments with DEM – base their arguments on the median voter hypothesis. The hypothesis suggests that a DEM who wishes to maximise their chances of re-election will attempt to adhere to the preferences of the median (or typical) voter. Similarly, it is argued that an indirectly elected Mayor – chosen by democratically elected Councillors – would try to satisfy the preferences of the typical Councillor (who each also attempt to satisfy the preferences of their voters). Thus, it has been argued that both approaches attempt to satisfy the median voter, but that in the case of the non-DEM, the median voter's preferences are mediated by Councillors. As a result of the assertion that DEM is merely an unmediated version of the median voter hypothesis it has been argued that expenditure patterns between the two local government forms will not be materially different (Deno and Mehay, 1987). This argument runs counter to the political strand of DEM research, but studies have demonstrated a lack of statistical significance between the two local government models (see, MacDonald (2008), Deno and Mehay (1987), Farnham (1990), Hayes and Chang (1990) and Morgan and Pelissero (1980)).

The analyses in the remaining category suggest that local governments employing DEM structures may have statistically higher expenditure levels compared to their non-DEM counterparts. The theoretical basis employed by scholars to explain this outcome is consistent with the political strand of the extant literature and revolves around the political motives of DEMs. Specifically, it is argued that a DEM will focus on pleasing voters, (in order to maximise their chances of re-election). Thus, a DEM might be expected to prioritise community engagement and respond more effectively to community needs (Grant and Drew, 2017). It is claimed that this desire to please the wider constituent base, and convert spending into political capital, is likely to result in a greater volume of municipal services or projects. The individual calibre, experience and personality of the Mayors elected to office under DEM has also been employed to explain associations between DEM and higher unit expenditure. Specifically it has been suggested that DEM attracts candidates with a high personal or community profile, who may not be constrained by the political or professional experience and networks typically found in indirectly elected counterparts (Deno and Mehay, 1987). The idea that DEM might attract higher profile unconstrained candidates who are keen to please the wider voter base (and hence need to satisfy a greater diversity of wants) is consistent with much of the political strand of the DEM literature (see, for example, Copus, 2004). Studies which have provided support to the notion of relatively higher expenditure of DEM local governments include Booms (1966) and Lineberry and Fowler (1967).

3.2.3 Combining Political and Empirical Perspectives to Make Predictions in the Antipodes

Our hypothesis is that DEM will be associated with additional unit expenditure owing principally to the different type of candidate and outlook engendered as a consequence of being directly elected by the local government constituent base (see, Grant and Drew 2017). As noted in both strands of literature DEM's owe their position to the diverse local

government constituent base and are therefore likely to be keen to generate political capital through spending aimed at pleasing these voters (DEM are also more likely to hear constituent's 'voice' (in the Hirschman sense)). Moreover, the personal profile of the DEM is likely to gain greater attention from stakeholders (including potential partners from business and higher tiers of governments), resulting in more projects getting off of the ground. Additionally, a DEM holding little allegiance to the party machine (hence allowing for coalitions to be built on an issue by issue basis), might be expected to have more proposals passed by council (with a concomitant increase to expenditure).

We reject the idea that that a DEM structure – certainly in the Australian system of local government – means that there are additional hurdles placed before projects. That is, in the Australian system there is nothing preventing a Councillor or Councillors from proposing and advocating for a project (executive power is invested in the Council body in Australia, not merely in the Mayor). Moreover, the idea that gridlock in a fractious council might reduce project approval and hence expenditure seems to have little potential as an explanation given the relatively low levels of political party affiliation amongst local government elected representatives in Australia (see, Grant and Drew, 2017 and also the statistics provided in our discussion of variables in the following section). We also do not think that the median voter hypothesis applies similarly to both directly and indirectly elected Mayors in Australia. Essentially non-DEM represents a two-round preference revelation system (voters reveal their preferences for a candidate who then reveals their preference in council) and there is a large literature that demonstrates how the Condorcet winner may be defeated in multiple rounds of voting that seems applicable here (Riker, 1986). Furthermore, for non-DEM to truly be a mediated version of the median voter hypothesis it would require Councillors to faithfully reflect the typical view of their constituents and eschew political strategy such as logrolling (Riker, 1986).

For all these reasons we predict an association between DEM and higher unit expenditure in Australia, that may differ somewhat to the experience in jurisdictions abroad. We emphasise that higher spending is not necessarily a bad thing – indeed it may bring considerable benefits for local communities – however, it is critical that regulatory authorities, local governments and academics are aware of the higher spending, so that they can suggest and put in place measures to mitigate same. We now outline the empirical strategy employed to test our prediction.

3.3 Empirical Strategy

In order to determine if the direct (DEM) or indirect (non-DEM) election of a local government Mayor has a significant impact on the expenditure incurred by the local governments, data from the 152 'general purpose' NSW local governments over the period 2012 to 2016 was collected.

As the analysis uses panel data, a multiple regression model employing either fixed effects or random effects was preferred to conventional ordinary least squares (OLS) regression techniques. Whilst both models provide relatively good estimates on average (Drew and Dollery, 2016b) the models differ in that the former accounts for the differences between local governments through the use of individual intercept terms, whilst the latter incorporates these differences into the composite error term (μ). In general, the fixed effects model can always be used to estimate the empirical relationship between the regressor and regressand albeit at the cost of inefficiency in the model through larger variances, and the inability to incorporate time-invariant variables. The random effects model, although it is the more efficient alternative and can incorporate time-invariant variables (especially important in this case given that DEM status is close to time invariant), can produce inconsistent results if the

composite error term is correlated with the explanatory variables (Drew and Dollery, 2016b). To determine if this correlation exists, a Hausman test was conducted (Kennedy, 2003). Upon obtaining favourable results (p=0.1563>0.05), a random effects model was employed. The final model specification has been presented below:

$$E_{it} = \alpha_{it} + \beta_1 M_{it} + \beta_2 X_{it} + \mu_{it} \qquad i=1\ldots152 \qquad t=1\ldots5$$

in which E is the local government operational expenditure per assessment, M is a dummy variable where a value of 0 is assigned to local governments which have non-DEM and a value of 1 is assigned to local governments with DEMs, X is a vector of control variables which can influence local government expenditure (see Table 3.1 below for the variables employed) and μ is an independently and identically distributed random error term. The subscripts *(i, t)* are used to identify the i^{th} local government and t^{th} year. Natural log transformation were required to control for skewness in several of the variables (see Table 3.1).

Following the estimation of our initial random effects models, to confirm the reliability and robustness of the results obtained, supplementary models employing more sophisticated sampling techniques were conducted. In particular, the propensity score matching models first developed by Rosenbaum and Rubin (1983) and later refined by Abadie and Imbens (2006; 2011;2012) and Imbens and Rubin (2015) were selected for this purpose. This is due to their benefits of these models to eliminate potential sample or selection bias which may be present in the random effects estimates. The propensity score matching models achieve this by using the covariate factors which may influence the probability of treatment (in our case the likelihood that the local government will operate under direct or indirect election) and selecting a control group of councils which most closely displays identical characteristics to our treated (DEM) councils with relation to these variables. We note that this has been a

commonly applied econometric technique in the recent local government literature to address sample bias (see Huang and Goa (2018) and Kauder (2016)).

The descriptive statistics for the variables employed in our models have been provided in Table 3.1:

Table 3.1: Variables Employed in Regressions, New South Wales, 2012-16

Variable	Mean	Standard Deviation
Dependent Variable		
Operational Expenditure per assess (ln)	1.147	0.375
Control Variables		
No. assessments (ln)	9.259	1.184
Population Density (ln)	2.966	3.317
Proportion of Aboriginal and Torres Strait Islanders (ln)	1.034	1.212
Proportion of Non-English Speaking Persons (ln)	1.566	1.204
Median Wage (ln)	10.704	0.156
Length of Roads (km)	961.884	631.290
Financial Assistance Grants per assessment (ln)	5.883	1.048
Persons under 15 years of age (%)	19.278	2.484
Persons on Aged Pension (%)	11.98	4.102
Persons on Disability Support Pension (%)	4.253	1.882
Persons on Newstart Allowance (%)	3.114	1.499
Assessment Growth (%)	0.714	1.671

Data for operational expenditure was obtained from the individual audited local government financial statements. The data relating to the proportion of ATSI and NESB persons, the median wage, the percentage of individuals under 15, and the percentage of persons receiving the aged pension, disability support pension and Newstart allowance has been collected from the Australian Bureau of Statistics (ABS) *National Regional Profile* (ABS, 2017a) and the ABS (2017b) *Data by Region*. The length of roads maintained by individual local governments and the quantum of financial assistance grants (which are Federal funds

allocated to local governments according to a formula) was obtained from the Local Government Grants Commission's (2016) annual report whilst assessment data was compiled from the Office of Local Government's (2016) *Your Council* Reports. The assessment growth and population density variables were calculated manually. To determine the municipalities with a DEM model, the mayoral election data for individual local governments was obtained from the Electoral Commission NSW (ECNSW, 2017).

The control variables selected are largely consistent with the existing (predominantly American) empirical literature, although a number of changes have been made to account for the unique nature of the Australian local government system, and we detail these main differences below.

Number of assessments, rather than population values, have been used in this analysis to reflect the role of Australian local government. Local government in Australia provides a relatively limited range of 'services to properties' (through functions such as waste collection and disposal, water and sewer provision) which stands in contrast to the 'services to individuals' remit (police, welfare and educational services) typically provided by local governments in the United Kingdom, and North America[9] (Drew and Dollery, 2014b; Stevens, 2012). Thus, to control for varying output and size of local government in NSW, which may result in differing expenditure patterns, it is the number of assessments rather than population which has be employed. The inclusion of a quadratic term in the model is used to account for the potential for economies and diseconomies of scale in service provision (see Drew and Dollery, 2014b). Population density and assessment growth have been included in the regression as the former has long been recognised to result in significantly lower

[9] It might be noted that the role of Australian local government has been expanding in recent decades to include more functions provided directly to individuals (and certain functions typically provided by state governments) such as aged care and public libraries: However, services to property still dominate expenditure (Grant and Drew 2017).

infrastructure costs, whereas the latter has been seen to increase demand for labour intensive services whilst potentially exhausting the infrastructure capacity (Ladd, 1992).

In line with other empirical analyses on DEMs, we also controlled for the heterogeneity of local government populations. Thus variables reflecting the ethnicity of the resident population, measured in terms of the proportion of Aboriginal and Torres Strait Islanders (the native people of Australia) and residents from a foreign background (measured through the proportion non-English speaking background individuals), were included. Differences in the age profile of the resident population were also represented through the proportion of individuals under 15 and proportion of persons receiving the aged pension. These variables are similar to the extant literature – with appropriate cultural changes (for instance, the American literature has variables for 'blacks' and 'Hispanic' demographics which are not present in significant concentrations in Australia) – and reflect the drivers of demand for local government goods such as playgrounds, libraries, indigenous cultural centres and senior citizen clubs (Drew, Dollery and Kortt, 2015). We also included a variable for the proportion of disabled residents (those receiving a disability support pension) due to the fact that provision of home care for disabled persons is an emerging local government service in Australia (Grant and Drew, 2017).

In common with existing analyse median wage and proportion of persons receiving Newstart allowance (a payment provided to unemployed persons) were included in our models to account for the socioeconomic status of local government residents which may influence demand for services (as public services are considered normal goods; MacDonald 2008). The Newstart variable was used in lieu of an unemployment rate due to data limitations, at the local government level, in Australia. Unavailability of data, mostly explains the absence of variables for median house price, and owner-occupier ratio (included in studies from America) although it should also be noted that the variables have less relevance to NSW

where local government taxation is capped and based on unimproved land value (not capital improved value; see Deno and Mehay, 1987; Grant and Drew, 2017).

Length of roads maintained by local governments (in kms) are an important determinant of expenditure in Australia (accounting for approximately a quarter of total spending; Drew and Dollery, 2014b) and have thus been included in our models. Formula-based intergovernmental grants have also been included (similar to some studies from abroad) due to the fact that they are a relatively predictable and stable source of revenue and hence a determinant of expenditure (Booms, 1966; non-formula based intergovernmental grant data was not available). Median intergovernmental grants as a proportion of expenditure over the period 20122016 were 2.89%, 5.77%, and 14.15% for urban, regional and rural local governments respectively, which reflects a high level of spatial dependency. To achieve the purposes of this analysis, and in line with existing theoretical frameworks, a dummy variable was included in the regressions to allow for identification of associations with unit expenditure for DEM (assigned a binary value of 1), and non-DEM local governments (assigned a binary value of 0).

It will be noted that variables relating to political affiliation of Councillors and Mayors, and fragmentation of councils, have not been included in this analysis despite their use in studies abroad. This is due to the fact that Australian local government, unlike its American and European counterparts, is largely free from party politics. Thus in the recent 2016 New South Wales local government elections only 6% of mayoral candidates and just 11% of councillor candidates declared affiliations with the two major political parties in Australia (the Australian Labor Party, and the Liberal Party of Australia; ECNSW, 2017). Moreover, there wasn't a single instance where the political affiliation of the Mayor differed to the political affiliation of the majority of Councillors which might have set up the conditions for gridlock

(ECNSW, 2017). Thus, whilst variables reflecting political affiliations may be important for analyses in the context of Europe or America, they are largely irrelevant for Australia.

After obtaining initial results based on regressions of all NSW local governments, we then ran additional stratified models based on whether the local government operated in an urban, regional or rural environment (using the Department of Infrastructure and Regional Development (DIRD) (2016) *Australian Classification of Local Government* codes). This is necessary due to the substantial differences which can exist between local governments as a result of their location and the associated characteristics and municipal responsibilities (see Table 3.2). For instance, regional and rural local governments, unlike their urban counterparts, are typically required to provide a greater range of services (such as the provision of airport, childcare and livestock exchange facilities) to address areas of market failure. Moreover, rural local governments (and to a lesser extent regional local governments) generally cover a wider area with a smaller population and have more limited revenue raising capacity (for example few rural local governments can hope to levy parking fees because demand for street parking is weak (this is an important source of revenue for many urban local governments)). Thus, through stratification one can disentangle otherwise confounding factors.

Table 3.2: Median Differences between Urban, Regional and Rural Local Governments

Indicator	Urban	Rural	Regional
Number of Assessments	35,664	4,331	25,088
Population Density	2652.9	1.70	34.6
Length of Roads (km)	301	1,135	962
Proportion of Aboriginal and Torres Strait Islanders (%)	0.6	5.0	3.6
Proportion of Non-English Speaking Persons (%)	28.5	2.0	3.7
Median Wage ($)	50,500	40,909	43,905
Financial Assistance Grants per Assessment ($)	103.77	939.11	262.67
Assessment Growth	0.66%	0.33%	0.76%

3.4 Discussion

The results from our empirical analysis of the effect of DEMs on operational expenditure have been provided in Table 3.3[10]. Overall the results suggest that local governments with DEMs have expenditures (per assessment) which are eight percent larger, on average, than their indirectly elected counterparts, *ceteris paribus* (significant at the 6% level). However, as we noted earlier stratification is required in view of the fact that the three categories of local governments have very different characteristics (and hence different demands for expenditure).

[10] Due to spatial limitations, and for simplicity of discussion, we only report on the variables relevant to our research question. A complete set of results is available from the authors upon request.

Table 3.3: Effect of Directly Elected Mayors on Operating Expenditure, New South Wales 2012-2016

	Entire State	Urban	Rural	Regional
Mayor	0.0800+ (0.0438)	0.1348** (0.0516)	0.1346+ (0.0829)	-0.0516 (0.0995)
No. of assessments (ln)	-0.7977** (0.2929)	-0.5348 (0.9233)	-1.5488 (0.9613)	4.3698 (4.2122)
No. of assessments squared (ln)	0.0322* (0.0149)	0.0268 (0.0468)	0.0690 (0.0571)	-0.2088 (0.2009)
Controls	Yes	Yes	Yes	Yes
N	152	43	82	27
Years	5	5	5	5
No. DEM	38	13	17	8
Coefficient of Determination	0.6412	0.5070	0.5268	0.6301

+ p<0.1 *p<0.05 **p<0.01

When the regression was stratified (into urban, rural and regional categories) the size of the coefficient increased markedly. Our results suggest that DEMs have a statistically significant association with increased operational expenditure for both urban and rural local governments in the order of thirteen and a half percent, *ceteris paribus*. Moreover, the urban result is statistically significant at the 1% level, although the rural result is only significant at the 10% level (the regional local government group was not statistically significant).

Our results from the regression analyses are broadly consistent with Booms (1966) and Lineberry and Fowler (1967), and hence the third category of empirical literature on the effect of DEMs (that suggests increased unit expenditures associated with DEMs). We consider three of the prominent arguments used to explain higher unit expenditure in DEM local governments: The potential for greater political capitalisation (resulting in a higher volume, wider range and higher quality of services and hence greater expenditure), greater effectiveness in getting developments off of the ground (and therefore more expenditure to

accommodate same), and better advocacy with higher tiers of government (and hence more partnerships with other tiers of government with concomitant increases to non-formula based grant money to partly fund projects).

Although the significantly higher spending by DEMs is not completely unexpected, or undocumented, what is surprising, is the magnitude of the coefficients – especially when one considers that the mean operating surplus for NSW local governments is just 9.7%. Moreover, the very similar coefficients are intriguing (the difference in the statistical significance for the two cohorts is probably mostly down to the relative number of DEM local governments in each group). Despite the similar coefficient size, it is not unreasonable to suspect that there might be different drivers for the observed increase in operational spending for urban and rural local governments respectively.

We can explore the relative likelihood of two of the potential drivers a little by considering some additional data. For instance, the room for discretionary spending (to facilitate political capitalisation) would appear greatest for urban local governments given that their mean operating surplus is generally superior to rural local governments (an average of 15% for the former and just 7% for the later). Moreover, urban local governments generally have greater flexibility in raising own source revenue in areas which are not regulated – for instance, few rural local governments can tap into lucrative metred parking because the demand for street carparking is relatively muted in low population density areas – and greater revenue flexibility would seem to create more room for discretionary spending, all other factors being equal. In similar vein, potential demand for developments in urban areas is likely to far outstrip demand in rural local governments: Actual development application data seems to confirm this (in 2016 the average value of development applications in urban local governments was over 30 times that of rural peers ($555,539 for urban and $17,147 for rural;

OLG, 2016))[11]. Unfortunately it is difficult to get suitable data on the quantum of nonformula grants awarded to local governments, from state and federal government, which might result from superior advocacy by DEMs (grant data is confounded by *inter alia* transfers to cover pensioner discounts, Roads and Maritime Services work, and rural fire service payments).

The fact that budgetary space for political capitalisation and value of development approvals are both relatively higher in urban local government areas than they are in rural areas seems to suggest that the most likely explanations for the observed increase to expenditure in DEM local governments are either:

(i) significantly dominated by projects in partnership with higher tiers of government (funded through non-formula grants) arising from better advocacy for both types of local government areas (which would mean that political capitalisation and getting developments off of the ground (which both seem more likely for urban local governments) comprise a relatively small part of the additional costs), or

(ii) stronger contributions from political capitalisation and getting developments off of the ground in urban local governments (where it seems more likely) being mitigated by relatively stronger advocacy outcomes for rural local governments (where data availability is currently insufficient to clarify matters).

Without additional data it is hard to determine which explanation is most accurate – however, the principle of parsimony would suggest the first explanation (domination by non-formula grant outcomes from improved advocacy) as being the most likely cause.

[11] It might be noted that development applications do not just refer to houses and shops – items such as garages, swimming pools, house extensions and decks are also included in the data – hence the relatively small average values (particularly for rural local governments).

The slightly negative result for regional local governments is not statistically significant. Despite our efforts to make the category as homogenous as possible, there is still a good deal of variation between observations. Moreover, the very high rate of growth for this cohort (see Table 3.2) tends to confound any association that might be present.

To guarantee the reliability of the results above and hence the policy implications which may be obtained, the repetition of our analysis using alternative empirical techniques is important. The results of the models based on propensity score matching techniques have been presented in Table 3.4. As it is necessary to decide and specify how many non-DEM local governments will be matched to a single DEM local government based on the observed propensity score, we have elected to provide the results using a single and multiple (two) matches. We note that overlap restrictions (particularly for the regional model) prevent the estimation of models with a higher number of matches.

Table 3.4: Robustness Analysis of the Effect of DEMs on Operating Expenditure; Propensity Score Matching Estimators

	Entire State	**Urban**	**Rural**	**Regional**
	1 Match			
Mayor	0.1164**	0.1275**	0.0922*	-0.1083+
	(0.0280)	(0.0356)	(0.0367)	(0.0626)
	2 Matches			
Mayor	0.1335**	0.1397**	0.0873*	-0.1358*
	(0.0237)	(0.0345)	(0.0338)	(0.0569)

+ p<0.1 *p<0.05 **p<0.01
(Abadie-Imbens robust standard errors provided in parentheses)

From Table 3.4 it is apparent that the statistically significant, positive coefficients for the entire state model and the models stratified into urban and rural councils are maintained, supporting the robustness of earlier results. When the entire state is considered, both the value and significance of the DEM coefficient increases markedly. Compared with earlier results DEMs are now associated with an approximate 11% to 13% increase in operational

expenditure (based on the number of matches specified) significant at the 1% level (compared with the previous 10% level). In a similar manner the significance of the rural local government coefficient also increases, although the magnitude declines slightly from 13% (Table 3.3) to approximately 9%. Thus, it is possible to conclude, with a reasonable level of confidence that there is indeed a statistically significant association between local governments with DEMs and increased unit operating expenditure levels.

Notably, in Table 3.4 the regional model also becomes statistically significant at the 10% level (and 5% level if two matching local governments are selected). This suggests that the considerable heterogeneity within this cohort could be biasing earlier results (noting that this is isolated to regional councils) and thus that it may be possible for these local governments to achieve operational expenditure savings by operating under a DEM model. However, given the inconsistency and insignificance of earlier results, and the considerable differences which can exist between local governments in the cohort a more detailed examination of regional local governments will almost certainly be necessary before general statements can be made regarding these entities. Instead, we will restrict the policy implications hereafter to the urban and rural local government case.

3.5 Public Policy Implications and Conclusion

This analysis has taken the first strides towards answering an important question relating to DEMs which seems to have hitherto largely escaped the attention of academics in the Antipodes: Is there a fiscal implication associated with the method by which the Mayor arrives in the top job? Our empirical evidence based on a five year panel of NSW local government data suggests that there is indeed a cost – moreover, that the cost is quite substantial. Specifically, we produced empirical evidence of an association in the order of an additional thirteen and a half percent expenditure for both urban and rural local governments,

statistically significant at the 1% and 10% levels respectively (increasing to 5% for the latter when compared to other local governments with similar covariate characteristics), *ceteris paribus*. To explore which of the explanations gleaned from the extant literature best explained the results we also provided some additional data on budgetary space for discretionary spending and value of development approvals. This led us to propose that the associations between DEM and increased spending might be explained by either: (i) high levels of non-formula grant related spending arising from advocacy with higher tiers of government or (ii) high levels of political capitalisation and getting projects off of the ground in urban local governments matched by relatively stronger advocacy outcomes in rural areas.

If the advocacy explanation for increased expenditure holds true for both types of local government or just rural local governments then this suggests at least two important public policy implications. First, it would seem to beg some questions regarding the accountability and transparency of non-formula grant allocations (suggesting inequity and the potential for pork-barrelling – see, for example Bradbury and Stephenson (2003)). Second, it poses some problems for the advocates of DEM, for clearly one of the big advantages of DEM will dissipate in proportion to the number of local governments that employ the model (if we consider, as seems likely, that there is a fixed pool of money available for nonformula grant based partnerships between tiers of government). Otherwise, stated if all local governments have a DEM, and the total quantum of funds available for partnerships remains constant, then the relative advantage of the model (with respect to advocacy resolving as funding for partnerships) tends towards zero. Given that the principle of parsimony suggests this explanation for the observed additional operating expenditure at urban and rural local governments, this is an important question to investigate further (when suitable data becomes available).

If instead our second explanation for the observed increase in operational expenditure is correct – that DEMs result in increased operational expenditure in urban local governments as a result of giving voters what they want and also getting projects off of the ground – then it may indeed suggest that DEMs improve allocative efficiency for urban residents. However, this explanation may raise further questions regarding political propriety and prudence – especially in the absence of increased revenue – and underlines the importance of an oversight function for elected Councillors (Copus, 2004).

Irrespective of the cause of the observed DEM effect the research also has important public policy implications in relation to local government financial sustainability. As we note, the mean increase to (per assessment) operational expenditure is rather large and is certainly sufficient to put financial sustainability at risk if changes are made to how Mayors are elected without complementary (mitigating) changes being made to revenue structures. This is particularly important in the case of NSW local government because of the extant taxation limitations – not only is it difficult for local governments to react appropriately by increasing revenue, but there could also be long-standing fiscal illusion to overcome, whereby residents don't appreciate that increased spending should resolve into increased fees and taxes (NSW has been operating tax limitations since 1977 (Abelson and Joyeux, 2015)). If this all occurs *unnoticed*, then recent history tells us that a disruptive reckoning will occur at a later time – probably when unfunded asset renewals and maintenance reach a critical level (see Drew and Campbell (2016) for an account of the disruption to local community when Central Darling Shire was placed into a seven year period of financial administration). If it is *noticed* and measures are taken to ensure that the additional expenditure is mitigated through increases to revenue then there is no financial sustainability issue. Public policy measures may be for the regulatory authority to take DEM status into account when determining the rate of taxation limitations (an exemption from the peg or a higher peg for DEM local governments), to

introduce balanced budget legislation (to force local governments to ensure that additional spending is matched by additional revenue), and to ensure that partnerships with higher tiers of government to roll-out projects are fully funded (in terms of both initial capital costs and ongoing expenditure associated with the project).

We reiterate that the additional spending is no bad thing – indeed it might bring considerable benefits to the community (for instance through greater capacity to respond to community needs (see Copus, 2004))– however, it is critical that citizens and their elected representatives are aware of the additional cost associated with DEM, particularly in the transition phase, and take appropriate measures to mitigate same.

There are similar implications and policy recommendations for international jurisdictions, particularly if a similar magnitude of increased spending are found to be associated with DEM. Specifically, regulatory authorities need to ensure that citizens and elected representatives are aware of the response, and take appropriate measures to mitigate additional expenditure. Moreover, it is important that the potential for reducing marginal benefit of expanding DEM local governments is taken into account by jurisdictions with optional DEM which are considering expanding uptake of the model.

In sum, this study has introduced a new and important angle to the DEM debate (especially in Australia) and one which is worthy of further investigation – and we thus commend same to our peers.

Chapter 4- The Association Between Budget Inaccuracy and Efficiency in Local Government

4.1 Introduction

Budgeting is the process of planning, executing, monitoring, and auditing financial programs, with an emphasis on providing for future needs (Mikesell, 2007). In local government, this involves the allocation of taxation revenue, grants, and other income to fund a wide range of public goods and services to residents (Drew, 2020). The budget process is critical for addressing the major challenge facing most local governments: how to allocate limited resources among competing goods and services to meet the needs of residents in an efficient and effective manner (Magner et al., 2000).

Budgets are developed by local governments to satisfy a few latent goals. The first relates to the need for transparency and accountability of local governments to residents and higher tiers of government. Local governments frequently have a legislated responsibility to provide stakeholders with budget information to enable interested parties to make judgements regarding the performance of local government and to engender confidence with regard to the quality of stewardship (Ferry and Eckersley, 2015).

The second goal relates to the need to promote financial resilience. Budgets, when implemented effectively, are an important tool for developing the anticipatory capacity of local governments (Barbera et al., 2020). By using budgeting information local governments can increase their awareness of potential financial shocks or crises and can ensure that appropriate actions are taken (Ferry et al., 2017). Local government decision-makers who effectively employ information obtained as a result of the budget process should also be able to improve technical efficiency, creating buffers which may be used to enhance financial resilience.

However, inaccurate budgets might also potentially pose a threat to financial resilience. If actual results are unfavorable when compared with budget projections (for instance if actual revenue is lower than budgeted, or if actual expenditure exceeds budgeted) local governments may become more financially vulnerable, weakening their capacity to respond to and recover from unexpected financial shocks. For instance, the fiscal problems faced by the cities of Detroit and Boston were partly attributed to inaccurate budgeting of expected revenues (Modlin, 2010).

Given the importance placed on financial resilience and related performance measures (such as technical efficiency) by regulators and the potential consequences (such as forced administration and amalgamation) for local governments which achieve poor performance, deviations from budget ought to be of particular concern to practitioners. It is therefore important to determine the nature, cause, and consequences of deviations from budget projections. Indeed, as we will see in the subsequent analysis, understanding the cause of budget inaccuracy may prove to be an important factor in determining an appropriate response.

This paper aims to answer two important questions: (i) to what extent does inaccuracy exist in local government budget estimates (also referred to as budget appropriations) when compared to the actual results achieved, and (ii) does the presence of inaccuracy create any negative consequences for local government technical efficiency? To achieve these objectives we employ the economic concept of technical efficiency (the ratio of inputs required to produce a level of outputs), proxied by the operational expenditure per property tax assessment (that is, the total expenditure excluding depreciation expenses divided by the number of taxable properties in a local government area). Like all proxies, this measure is an imperfect representation of local government technical efficiency, largely due to the inability to account for the quality of goods and services produced (this problem is addressed in later

sections), and the fact that not all goods and services are highly correlated with property levels. However, this proxy was selected in cognizance of the remit of Australian local government which is principally orientated towards providing goods and services to households (such as public roads, waste collection and water provision), rather than individuals (welfare, education and emergency service functions are the responsibility of state and Federal governments in Australia; Drew, 2020) and the lack of sufficiently accurate disaggregated output data at the local government level. Indeed, there is wide agreement in the extant literature that operational expenditure per household is the most suitable proxy, which explains its widespread use (see, for example, Drew et al. 2018; Drew, 2020). Moreover, we conducted additional analyses, employing different proxies, and found that our results were robust under alternate specifications (results can be obtained from the corresponding author).

The remainder of this paper is as follows. In the next section we explore the theoretical link between budgeting, technical efficiency, and financial resilience in greater detail. We then outline our empirical strategy. Thereafter we discuss the results of our regressions on a six-year panel of data of Australian (New South Wales) local governments. We conclude the paper with a brief consideration of the implications of our findings both for local government practitioners and scholars alike.

4.2 The Association between Budgeting, Technical Efficiency and Financial Resilience

There is a strong theoretical basis to support the proposition that budget information can influence a local government's anticipatory capacity, technical efficiency and hence financial resilience. A local government is considered to have financial resilience if it has the capacity

to anticipate potential shocks to its financial position, and to respond to and absorb the effect of these shocks if they occur (Barbera et al., 2017; Steccolini et al., 2017). In order for local governments to become financially resilient, strong anticipatory and coping capacities are needed. Anticipatory capacities involve both the development of tools to identify potential shocks, and the management of financial vulnerabilities to protect against shocks (Barbera et al., 2019). In a similar vein, coping capacities refer to the ability to manage financial shocks when they occur and the adaption or transformation of internal processes in response to financial shocks (Steccolini et al., 2017, Barbera et al., 2020). Thus, whilst the former incorporates proactive measures, the latter is focused on the development of reactive capabilities.

Budgets are principally employed by local governments as an anticipatory tool. This is due to the ability of budgetary systems to forecast future revenues and expenditures, providing a better understanding of the expectant financial conditions faced by the local government (Ferry et al., 2017). Indeed, the use of budgeting by local governments for anticipatory purposes has been well developed in the extant literature (Barbera et al., 2020; Ferry and Eckersley, 2020; Gorina et al., 2018).

An alternative use of budgeting, which has not been subject to as much scholarly attention, relates to its potential to improve financial resilience through a reduction to financial vulnerability. This is due to the potential for budget information to improve technical efficiency, generating efficiency savings which may then be used as a buffer against financial shocks (Rose and Smith, 2011; Barbera et al., 2020). These technical efficiency gains are possible because budget information facilitates better understanding of the resource requirements for production alternatives under consideration, available resources, and prescribed responses which can be applied if circumstances change (such as changes in material prices and delays) (Drew and Dollery, 2016). This information can be used by local

government decision makers to achieve technically efficient production by selecting an optimal mix of inputs or optimal production levels (Beckett and Doamekpor, 2011). Thus, through the effective use of budget information, local governments may be able to achieve greater levels of technically efficiency, enabling them to address their financial vulnerability and hence improve financial resilience.

This benefit may be negated, however, if inaccuracy exists in the budgeting process as a result of either unintentional or deliberate errors. Unintentional errors include the use of poor-quality methodology or data (Högye, 2002), unpredictability in revenue sources, or unexpected economic conditions (Chung, 2018). Due to their unexpected nature, the effect of such factors cannot typically be anticipated in advance and can result in either under-estimation or over-estimation of budget estimates. Deliberate distortions are the result of conscious decisions by individuals (budget practitioners or other local government decision-makers) to intentionally under- or over-estimate budget figures. This practice is commonly referred to as the 'gaming' of budget estimates (Rose and Smith, 2011). It may be done in order to provide an additional budget cushion (budget slack) to guard against unforeseeable events, or to make actual results appear superior to original estimates in an attempt to improve public image (Rodgers and Joyce, 1996). Indeed, as one local government budget official indicated "I am a hero when there is more money than I predicted and a villain when there is less. Let me tell you, it is much better to be a hero than a villain" (Rodgers and Joyce, 1996, p.49). This type of inaccuracy would typically manifest in the under-estimation of revenues, and/or over-estimation of expenditures. If inaccuracy of this kind produces financially unfavourable results or technically inefficient production, it is likely to reduce financial resilience. Notably, despite extensive research into the existence and sources of budget inaccuracy, the impact of local government budget inaccuracy on technical efficiency and hence financial resilience has not been sufficiently examined.

In this paper we address this gap in the literature. Given that the analysis employs a measure of budget *in*accuracy (i.e. deviations from the budget) – as it is generally more strongly linked to the financial resilience issues facing modern local governments, and therefore tends to be a greater focus for local government regulators (compared to accurate budgeting) – it is important first to explain the reasons for why we might suspect a link between budget inaccuracy and technical efficiency. In general, inaccuracy can either be positive or negative, with the former referred to as under-estimation (budget lower than actual result), whilst the latter is termed over-estimation (budget higher than actual result).

In the case of income inaccuracy, if local governments under-estimate income may be seen as a benefit (at least in terms of financial resilience) as a higher level of income is collected than budgeted. However, this additional income may have detrimental implications for local government technical efficiency. This is because potentially rushed planning (owing to the failure to predict that additional funds would be forthcoming twelve months earlier) may give rise to an inefficient level of production. This is particularly important where funds need to be spent within a certain time period (for instance before the end of the financial year), or if these funds are mandated for particular projects (which may prevent them from being allocated to their most technically efficient use; Jordan, 2003).

Over-estimation of income may also serve to diminish technical efficiency levels. This is because the failure to secure income that was previously anticipated usually means that local governments must make decisions (sometimes immediate) regarding the provision (or cessation) of ongoing or new goods or services (Jordan, 2003) often with detrimental impacts for the technical efficiency of the local government. Given that both under- and over-estimation of income have the potential to negatively affect technical efficiency, it is hypothesized that *any* inaccuracy in income estimates can result in lower technical efficiency, regardless of sign. Thus, the first propositions we will examine are:

H1: Income under-estimation is negatively associated with technical efficiency.

H2: Income over-estimation is negatively associated with technical efficiency.

The effects of expenditure inaccuracy on technical efficiency is relatively clearer. Increases in expenditure beyond budgeted levels result from unexpected increases in output or quality (which would require additional inputs and hence additional expenditure) or unexpected increases in other factors (material costs, material usage etc). If the increase in expenditure is not associated with increases in output levels or quality (which can both potentially be incorporated into technical efficiency scores[12]), a reduction in technical efficiency will result. The converse is also true: A reduction in expenditure without a corresponding reduction in output or quality will improve technical efficiency. For this type of inaccuracy, the effect on technical efficiency will largely depend on the sign of the inaccuracy and the source of deviations in expenditure. We posit that the over-estimation of expenditure will be associated with higher technical efficiency levels whilst the under-estimation of expenditure will be associated with lower technical efficiency. Thus the third and fourth propositions which will be examined are:

H3: Expenditure under-estimation is negatively associated with technical efficiency

H4: Expenditure over-estimation is positively associated with technical efficiency.

[12] The proxy selected cannot directly control for quality, however we later provide analysis which suggests changes in quality were unlikely to prove material to our study.

4.3 Empirical Methodology

To test the association between budget inaccuracy and technical efficiency, we employed a six-year panel of NSW local government data. Local government in Australia is a "creature of statute" in that the responsibilities and functions of local government are largely determined by the respective state and territory local government Acts. Indeed, quality standards are mandated for some goods and services such as water and wastewater (Drew et al., 2018). Core functions which have been identified include the maintenance and provision of public roads, water and wastewater systems, waste management and provision of public recreational areas (such as public parks and aquatic centres) (Drew, 2020).

As a requirement of the *Code of Practice and Financial Reporting* (OLG, 2019), local governments in NSW must prepare detailed annual budgets for the income and cash flow financial statements, as well as a capital budget. These budgets are required to be prepared on an accrual basis prior to the commencement of the financial year (July 1st), and form part of the audited financial statements (although the budgets themselves are not required to be audited). Explanations for material deviations between the budget predictions and actual results (defined as a deviation of 10% or more (OLG, 2019)) must be provided in the *Notes to the Financial Statements*.

To determine if budget inaccuracy has a statistically significant association with technical efficiency (proxied by expenditure per assessment), a conventional ordinary least squares (OLS) model was employed.

The model employed in our analysis can be specified thus:

$$\boldsymbol{O} = \alpha + \beta_1 \boldsymbol{I} + \beta_2 \boldsymbol{E} + \beta_3 \boldsymbol{X} + \boldsymbol{\beta_4 O}(lagged) + \mu \qquad (1)$$

Where **O** is the operational expenditure (excluding depreciation expenses) per property assessment, **I** is the degree of income inaccuracy, **E** is the degree of expenditure inaccuracy, **X** is a vector of control variables, $\boldsymbol{O}(lagged)$ is the operational expenditure per property assessment in the previous year, and μ is an independent and identically distributed error term. The formula used to calculate the measures of inaccuracy is presented below:

$$Income\ inaccuracy = \frac{(actual\ total\ income - budgeted\ total\ income)}{actual\ total\ income} * 100\%$$

$$Expenditure\ inaccuracy = \frac{(actual\ total\ expenditure - budgeted\ total\ expenditure)}{actual\ total\ expenditure} * 100\%$$

The control variables selected (**X**) for the analysis mostly conform to theoretical expectations and the extant literature. The number of rateable assessments (predominantly residences and commercial properties) and its quadratic term were included in the model to account for the potential economies (or diseconomies) of scale in local government goods and service production (whereby average total expenditure decreases as production levels rise (or increases in the case of diseconomies of scale; Drew et al., 2014). Assessments, rather than population, was selected due to the fact that local governments in Australia predominantly provide goods and services at the household level, rather than to individuals (Drew, 2020). Notably public goods and services which are more commonly provided at the individual level (such as education, health, and welfare) are the responsibilities of state and federal governments in Australia. Population density was included to account for the potential presence of economies of density (whereby expenses may be expected to fall as the population density rises; Drew, 2020).The proportion of residents under 15 years of age, residents receiving the aged pension, indigenous residents (Aboriginal or Torres Strait

Islander (ATSI) descent), and foreign residents (individuals from a non-English speaking background (NESB)) were included in the model due to evidence of a difference in the quantity and type of goods and services demanded by residents within these demographic groups. Examples of this include the provision of goods such as recreational infrastructure tailored towards children (for example, playgrounds) or aged care facilities and services (such as home nursing) provided for the elderly. The number of individuals receiving a carer's pension, disability pension, or Newstart allowance (a federal welfare payment to individuals actively seeking employment), and the median income received by residents have been incorporated into the analysis due to the well-established link between socioeconomic disadvantage, intergovernmental grant funding (which may be partly determined by the relative socioeconomic disadvantage), demand for local government goods and services, and hence local government technical efficiency (see, for example, Andrews, 2004).

An indicator variable representing whether a local government is urban or rural was included to account for the difference in the quantity and quality of goods and service provision (with the latter typically providing a restricted range of goods and services). This was needed to account for differences in expenditure and maintenance requirements which may affect technical efficiency (Drew, 2020). Similarly, the length of sealed and unsealed roads were chosen due to the differences in the maintenance costs for each type of road structure (sealed roads typically require more expensive maintenance). The level of intergovernmental grants to local government was included due to the well-documented occurrence of the 'flypaper effect' in Australian local government (whereby increases in grant funding raise municipal expenditure by a higher magnitude than an equivalent increase in own-source revenue; Dollery and Worthington, 1995).

Finally, to account for differences in local government performance over the period under analysis, indicator variables representing individual years were applied, whilst a lagged term

of the dependent variable (operational expenditure per assessment) was included to account for the inherently dynamic nature of local government expenditure (that is, present spending decisions are heavily influenced by the decisions made in the past as a result of the ongoing nature of most local government goods and services; Barnett et al., 1991).

The inclusion of a lagged term of the dependent variable slightly changes the interpretation of the models presented hereafter. This is because the current level of expenditure per assessment consists of the previous year's expenditure per assessment level, plus an annual change (Δ) (see model (1*) below). Thus, if a lagged term is included, the remaining explanatory variable coefficients represent the effects of these variables on the annual change in expenditure per assessment, rather than the total level. We note that this specification is consistent with existing literature on budget accuracy (see Barnett et al. 1991). This specification (and differences between the calculation of the budget estimates and the time when the actual spending is conducted) it is possible to avoid any endogeneity problems which might otherwise arise in a static model.

$$\boldsymbol{O} = \boldsymbol{\beta_4 O}(lagged) + \Delta \qquad (where\ \Delta = \alpha + \beta_1 \boldsymbol{I} + \beta_2 \boldsymbol{E} + \beta_3 \boldsymbol{X} + \mu) \qquad (1^*)$$

Where necessary natural log transformations have been applied to correct for skewed distributions. Descriptive statistics for the variables employed are presented in Table 4.1:

Table 4.1: Descriptive Statistics of Variables Employed, 2013-2018

Variable	Definition	Mean	Standard Deviation
Operational Expenditure per Assessment (ln)	Total expenditure less depreciation per assessment (in thousand dollars)	1.194	0.379
Income Inaccuracy	Difference between actual and budgeted total income (%)	8.433	12.740
Expenditure Inaccuracy	Difference between actual and budgeted total expenditure (%)	2.840	9.009
Lagged Operational Expenditure per Assessment (ln)	Operational expenditure per assessment in the previous year	1.167	0.375
Assessments	Number of properties liable for local government taxation (in thousands)	22.598	27.179
Assessments squared	Assessments squared (in thousands)	1249.41	2872.63
Population Density (ln)	Total population divided by the local government area	2.755	3.211
Under 15 (ln)	Proportion of persons under 15 years of age	2.946	0.149
Aged (ln)	Proportion of persons on an aged pension	2.439	0.372
DSP	Proportion of persons receiving a disability support pension	4.267	1.844
Newstart (ln)	Proportion of persons receiving Newstart (unemployment) benefits	1.078	0.558
Carers (ln)	Proportion of persons receiving a carers pension	0.084	0.687
ATSI	Proportion of indigenous persons	6.120	7.952
NESB (ln)	Proportion of persons speaking a language other than English at home	1.532	1.111
Grants ($000)	Financial assistance grant per assessment (in thousands)	5487.24	3639.90
Median Wage (ln)	Median wage of employees	10.650	0.175
Sealed	Kilometres of sealed roads	519.655	305.520
Unsealed	Kilometres of graded dirt roads	639.705	638.867
Metro	Indicator variable whereby 1 is assigned to urban local governments and 0 to rural local governments	0.540	0.498

Data was sourced from the Australian Bureau of Statistics (ABS) *National Regional Profile* (ABS, 2018) , the NSW Local Government Grants Commission's (LGGC) *Annual Report* (LGGC, 2018), the Office of Local Government's *Your Council Report* (OLG, 2018), and the audited financial statements produced by NSW local governments.

4.4 Results and Discussions

Our analysis was undertaken in four stages. In the first stage, the magnitude, sign, and significance of inaccuracy was examined to confirm its nature. The second stage involved the regression of budget inaccuracy (and other control variables) on technical efficiency (proxied by expenditure per assessment) to determine if a statistically significant association existed. The third stage provided additional analysis of this result through the stratification of inaccuracy into under- and over-estimation, to see if the results obtained in the second stage are conditional on the sign of the inaccuracy. The causes or sources of inaccuracy were investigated in the fourth stage, to determine if the inaccuracy was due to the actions of local government practitioners or arose from forces beyond their control.

An analysis of rudimentary measures of central tendency and spread (Table 4.2) revealed that income and expenditure are typically under-estimated (that is, the budgeted levels are below the actual results obtained) by 9.02% and 2.30% respectively. Furthermore, this systematic under-estimation was statistically significant ($p=0.000<0.05$) for both income and expenditure inaccuracy. Whilst this may indicate strategic manipulation or gaming of budget estimates by decision-makers, further work would be required to disentangle the precise motivations involved (which is always a difficult thing to do when the acts in question might be considered unethical, because those gaming the situation may not feel comfortable admitting to their behaviour; Drew, 2018).

Table 4.2: The Variation of Income, Expenditure and Nett Inaccuracy

	Income Inaccuracy	Expenditure Inaccuracy	Nett Inaccuracy
Median	9.02	2.30	55.65
Average	8.43	2.84	-45.08
Standard Deviation	12.74	9.01	1522.19
Minimum	-63.01	-70.89	-26675
Maximum	50.40	68.99	7596.77
Percentage of local governments within 10% inaccuracy	50%	81%	6%

In terms of the nett budget inaccuracy, a median under-estimation of 55% was observed suggesting a favourable outcome as the actual nett results are higher than budgeted levels. However, it must be noted that this measure was subject to substantial variation (see Table 4.2). This is particularly evident when the average value of nett inaccuracy is also considered which suggests an over-estimation of approximately 45%. It is largely due to this variation that nett budget inaccuracy yielded insignificant results from a statistical perspective ($p=0.42>0.05$) despite the large median and average inaccuracy values. This substantial variation is likely to confound results, reducing its usefulness and thus necessitating its exclusion from the subsequent analysis.

The results of the second-stage regressions are summarized in Tables 4.3 and 4.4. Given that testing revealed the presence of heteroskedasticity, robust standard errors were needed (White, 1980). In total five regressions were conducted – the first employed the full sample of observations over the six-year panel (Model 1) to determine the overall association between inaccuracy and technical efficiency. Following this, stratification was conducted to determine if the association differed based on whether an under-estimation (UE) or over-estimation (OE) had occurred for both income and expenditure. Hence Models 2 and 3 stratify local governments into those which have under- and over-estimated income respectively, whilst Models 4 and 5 stratify by the under- and over-estimation of expenditure.

For both the overall and stratified results the control variables selected largely conform to prior expectations. The inclusion of a dynamic term (lagged operational expenditure per assessment) yielded a highly significant and positive result, confirming that current performance is highly dependent on past performance (explaining between 60% and 83% of the current level of operational expenditure per assessment).

As noted earlier, the remaining coefficients essentially represent the effects of the variables on the annual change in technical efficiency, rather than the overall level of efficiency. Given the proxy employed, changes in expenditure per assessment might be disaggregated into changes in technical efficiency (excluding quality changes), and changes in output quality (although data is not sufficient to clearly separate these two factors). While both can occur in any given year, it can be shown that the former is likely to dominate. This is because, whilst the level and composition of local government goods and services does fluctuate over time, the quality of local government goods and services in Australia tends not to be as responsive. In Australia, the special schedules to the audited financial statements provide data on the cost to bring assets up to a satisfactory standard (a quality assessment quantified in dollars and included on Special Schedule 7). Examining the data on cost to bring roads (the single largest item of expenditure for Australian local governments) up to a satisfactory standard, we find that it has remained almost unchanged over the period of analysis ($p=0.56$). Similarly, insufficient evidence was found to suggest that unsealed roads had been upgraded to sealed roads ($p=0.94$). This suggests little change in the quality of roads over the period 2013 to 2018. Moreover, for goods and services such as water provision and health-related functions, quality standards are mandated by legislation and thus cannot be readily changed (Drew et al., 2018). In addition, it bears emphasising that for the variables of interest– budget inaccuracy– changes in quality would likely already be incorporated into the budget estimates during the planning process (unexpected changes in quality are even less likely

barring natural disasters) further reducing the likelihood that budget inaccuracy would affect expenditure per assessment through quality changes. Thus, whilst it is not impossible for improvements or deterioration in quality to have affected our estimates, it is on the balance of probability unlikely.

With regard to the remaining unexplained components of the change in technical efficiency, a significantly positive result for the proportion of ATSI residents, and significantly negative result for the proportion of DSP recipients were observed. This suggests that, whilst the former group was associated with higher growth in expenditures (thus *prima facie* lowering technical efficiency), the latter group was associated with a lower growth in expenditures (increasing relative technical efficiency). This might be explained by noting that concentrations of indigenous people are typically associated with greater spending on both cultural facilities (such as Aboriginal cultural centres and art galleries) as well as culture and heritage programs (see LGNSW, 2019). Moreover, DSP recipients typically receive goods and services directly from the State and Federal government (for example mental health support, community transport and specialized equipment; NDIA, 2019), reducing the financial burden on local governments (see Drew, 2020). The negative values of the population density coefficients in the model suggest the presence of economies of density for NSW local governments (whereby expenditures per assessment fall as density increases), however insufficient evidence for the existence of economies of scale was found, with the coefficients for both assessment and assessment squared insignificant in all but one of the models.

With regard to the variables of principal interest in Table 4.3, the overall results for expenditure inaccuracy provided support for the extant theory, whilst the result for income inaccuracy challenged it. A statistically significant positive association was observed for expenditure inaccuracy, indicating that the growth in the level of operational expenditure per

assessment might be expected to increase as the magnitude of expenditure inaccuracy increases. The coefficient of 0.0061 suggests that for every 1% increase in expenditure inaccuracy, the level of operational expenditure per assessment will rise by 0.61%, which can be interpreted as a decline in technical efficiency. Given the substantial values which expenditure inaccuracy can take (almost 70% above budget projections in one case), the magnitude of this association is concerning. This is because the potential decline in technical efficiency illustrated by the results may be sufficiently large to eliminate any savings which could be obtained through technically efficient production, diminishing the prospects of a local government remaining resilient in the face of shocks. By way of contrast, for income inaccuracy a statistically significant negative result was observed. This suggests that increases in the level of income inaccuracy will act to *reduce* local government expenditure per assessment, thus *increasing* technical efficiency levels (and potentially increasing resilience). Compared to expenditure accuracy, the magnitude of the coefficient for income inaccuracy is lower, indicating a reduction of only 0.11% for every 1% increase in income inaccuracy. While there may be concerns surrounding the inclusion of both forms of inaccuracy in the same model, we note that supplementary testing did not indicate the presence of multicollinearity between these measures. Evidence of this may be seen by the fact that the reported variance inflation factor (VIF) of 4.80 is well below the commonly accepted level of 10.

Table 4.3: Technical Efficiency and Budget Inaccuracy Overall Results, NSW Local Government, 2013-2018

	Model 1
Income Inaccuracy	-0.0011*
	(0.0006)
Expenditure Inaccuracy	0.0061**
	(0.0018)
Lagged Operational Expenditure per Assessment (ln)	0.7663**
	(0.0534)
Assessments	-0.0015
	(0.0010)
Assessments squared	0.000008
	(0.000005)
Population Density (ln)	-0.0124*
	(0.0052)
Under 15 (ln)	-0.0661
	(0.0409)
Aged (ln)	-0.0188
	(0.0270)
DSP	-0.0139+
	(0.0085)
Newstart (ln)	0.0410
	(0.0317)
Carers (ln)	-0.0288
	(0.0219)
ATSI	0.0044**
	(0.0014)
NESB (ln)	0.0062
	(0.0120)
Grants	0.000006
	(0.000004)
Median Wage (ln)	-0.0436
	(0.0683)
Sealed	-0.00003
	(0.00005)
Unsealed	0.000009
	(0.00002)
Metro	-0.0018
	(0.0215)
N	744
Coefficient of Determination	0.8908

+p < 0.10, *p < 0.05, **p < 0.01.

Robust standard errors in parentheses.

Table 4.4: Technical Efficiency and Budget Inaccuracy Stratified Results, NSW Local Government, 2013-2018

	Model 2 (Income: UE)	Model 3 (Income: OE)	Model 4 (Expenditure: UE)	Model 5 (Expenditure: OE)
Income Inaccuracy	-0.0008	-0.0013	-0.0011	-0.0004
	(0.0006)	(0.0022)	(0.0007)	(0.0006)
Expenditure Inaccuracy	0.0049**	0.0084*	0.0085**	0.0015
	(0.0012)	(0.0037)	(0.0033)	(0.0016)
Lagged Operational Expenditure per Assessment (ln)	0.7665**	0.7148**	0.8330**	0.6041**
	(0.0649)	(0.0786)	(0.0372)	(0.1106)
Assessments	-0.0017+	-0.0054	-0.0006	-0.0027
	(0.0010)	(0.0062)	(0.0013)	(0.0018)
Assessments squared	0.00001+	0.00002	0.000005	0.00001
	(0.000006)	(0.00005)	(0.000007)	(0.000008)
Population Density (ln)	-0.0112*	-0.0073	-0.0092+	-0.0203*
	(0.0056)	(0.0116)	(0.0065)	(0.0096)
Under 15 (ln)	-0.0658	0.2791	-0.0714	0.0143
	(0.0423)	(0.2237)	(0.0459)	(0.0814)
Aged (ln)	0.0077	-0.1087	0.0228	-0.1150+
	(0.0275)	(0.1087)	(0.0307)	(0.0606)
DSP	-0.0059	-0.0291	-0.0127+	-0.0107
	(0.0090)	(0.0216)	(0.0081)	(0.0158)
Newstart (ln)	0.0530+	-0.0318	0.0006	0.1122*
	(0.0323)	(0.1031)	(0.0300)	(0.0551)
Carers (ln)	-0.0471+	0.0287	-0.0153	-0.0720
	(0.0253)	(0.0636)	(0.0202)	(0.0486)
ATSI	0.0042**	0.0025	0.0044**	0.0049*
	(0.0015)	(0.0048)	(0.0016)	(0.0024)
NESB (ln)	0.0107	-0.0201	0.0174	-0.0095
	(0.0119)	(0.0329)	(0.0145)	(0.0262)
Grants	0.000004	0.00002	-0.0000001	0.00001+
	(0.000004)	(0.00002)	(0.000005)	(0.000007)
Median Wage (ln)	-0.0381	-0.1193	-0.0374	-0.1407
	(0.0714)	(0.229)	(0.0711)	(0.1657)
Sealed	-0.00004	-0.0018	0.00001	-0.0001
	(0.00005)	(0.0001)	(0.00006)	(0.0001)
Unsealed	0.000003	-0.00001	-0.000009	-0.00001
	(0.00002)	(0.00004)	(0.00002)	(0.00002)
Metro	0.0022	0.0071	-0.0146	0.0256
	(0.0210)	(0.0636)	(0.0243)	(0.0415)
N	623	121	479	265
Coefficient of Determination	0.9005	0.8688	0.9095	0.8741

+p < 0.10, *p < 0.05, **p < 0.01.

Robust standard errors in parentheses.

Whilst this outcome *prima facia* seems counter-intuitive, a greater understanding can be obtained through an examination of the stratified results with supplementary data analysis. When the income inaccuracy was stratified into those local governments which under-estimated income (Model 2) and those which over-estimated income (Model 3), the significance of the income inaccuracy term disappeared altogether. This suggests that income inaccuracy alone is unlikely to significantly affect the performance of local government. When expenditure inaccuracy was stratified (Table 4.4, Models 4 and 5), a positive result was again observed, but only for local governments in which expenditure was under-estimated (Model 4). This is an important result, as it suggests that inaccuracy had a greater effect on local government performance when conditions were unfavourable (that is when actual expenditure levels exceed budget projections) compared to favourable conditions. This suggests that inaccuracy was more likely to threaten the ability of a local government to optimise technical efficiency and hence resilience, rather than improving matters.

To ensure that our various empirical estimations (in Tables 4.3 and 4.4) were robust under alternate specifications, we also ran a data envelopment analysis (DEA) whereby we were able to replace our single proxy for technical efficiency (operational expenditure per assessment) with a much more disaggregated collection of four proxies (number of residential, farm and business assessments plus total length of roads). We then re-ran our regressions using the DEA scores thus obtained and found that the statistical significance, sign, and size of the various coefficients remained virtually unchanged (results available from the corresponding author). This confirms that the proxy we employed for our analysis was not only in keeping with the extant literature, but also very robust.

In order to determine which of the potential sources of inaccuracy gave rise to this outcome, a supplementary analysis of local governments with expenditure under-estimation was undertaken, with a summary of the results provided in Table 4.5. From Table 4.5 we can see

that, in the sample of local government observations with budgeted expenditures exceeding 10% (108 in total), evidence of significant under-estimation of income was found to exist for operational grants, income from fees and charges, and interest income (with weak evidence of under-estimation of taxes) whilst significant under-estimation of material expenses, nett losses on disposal of assets, depreciation, employee and other expenses was found. From a review of the explanatory *Notes to the Financial Statements* (wherein local governments detail the reasons for material variations), a common explanation seems to be the receipt of an additional (but unanticipated) grant from higher tiers of government, which enabled the local government to undertake additional community-based projects. Other common justifications included: (i) additional work requested by other government agencies (with the most common being the state road authority, the Roads and Maritime Service (RMS)), with payment received as service fee or charge revenue, (ii) higher than expected use of fee-based local government goods or services by the community and (iii) inaccurate valuations of local government assets leading to substantial corrections when revaluation occurred (see Drew 2018), and large losses when sold. It should be noted that significantly higher interest revenue generally occurred as an indirect result of this additional income (funds were invested until required), rather than being a separate cause in itself, whilst substantial variation in the 'other expenses' category and a lack of explanation for this variation prevents conclusions from being made.

Table 4.5: Sources of Budget Inaccuracy (% of total income/ total expenditure)

Variable	Inaccuracy (%)
Income	
Operating grants	5.75**
Income from fees and charges	4.56**
Capital grants	1.01
Other income	0.83**
Interest revenue	0.32**
Rates	0.26+
Nett gain on sale of assets	-0.11
Expenses	
Material expenses	6.57 **
Nett loss on disposal of assets	2.86 **
Depreciation	2.82 **
Employee expenses	1.99 **
Other expenses	1.92**
Borrowing costs	0.06

+p < 0.10, *p < 0.05, **p < 0.01.

Therefore Table 4.5 suggests that unintentional errors may be responsible for most deviations, primarily driven by factors largely beyond the control of local governments, rather than deliberate actions by decision-makers. Whilst depreciation and losses on disposal of assets may result from gaming of budget estimates (see Rose and Smith, 2011), it may also be a consequence of poor-quality methodology or data. However further analysis is required to conclusively determine the sources of inaccuracy.

In sum, these results provide evidence for a negative association between expenditure under-estimation and technical efficiency, thus confirming proposition H3 (there is insufficient evidence to support H4). With regard to income, insufficient evidence was found to support either H1 or H2 when a stratified model was employed.

4.5 Policy Implications and Concluding Remarks

These results have a number of implications for local government budget practitioners, decision-makers, and regulators alike. In order for budgets to be employed as effective anticipatory tools for local governments to increase their financial resilience (Rose and Smith, 2011; Barbera et al., 2020), budget estimates need to be accurate. Thus, the first public policy implication relates to the need for the significant quantum of intergovernmental grants to be determined in a more reliable and predictable manner. Unexpected receipt of grant revenue was the principal driver of budget inaccuracy. Thus, unexpected grant allocations have the potential to reduce technical efficiency outcomes for local governments – perhaps because spending or production decisions may need to be made within a relatively short time frame (usually within the same financial year) and allocation of the funds to the best-use may thus not be possible (if grant funding is tied to a particular project). Unpredictability in grant allocations also raises questions regarding fairness within the grant system and the potential for grants to be distorted through pork-barrelling and lobbying (Drew, 2020). A more predictable grant allocation system would provide budget practitioners with greater certainty regarding future income levels and would support local government decision makers in optimising technical efficiency.

A similar argument can be made for the need for greater predictability in the process of sub-contracting between local government and agencies of higher tiers of government. Following unexpected grant revenue, the second most important driver of inaccuracy was income received for contracted goods and services (such as road maintenance and construction on behalf of the RMS). Whilst it is largely the case that the work is fully funded by the agency in question, the need to complete the project within strict time constraints with little warning may result in the use of inefficient production processes (such as contracted labour rather

than in-house production), thus detracting from the technical efficiency level which the local government might have otherwise have obtained. Our evidence suggests that improvements to the predictability of contracted works are likely to enhance technical efficiency for local government. This recommendation is important to ensure that subcontracted work does not interfere with attempts by budget practitioners to improve financial resilience through optimising technical efficiency.

The final public policy implication relates to the regulation and improvement of the budgeting process by local government authorities. As we noted previously, to ensure budgets are effective as an anticipatory tool, estimates need to be relatively accurate. In cases where inaccuracy exists, care must be taken to address the underlying causes of inaccuracy and to develop methods to avoid inaccuracy in the future. However, whilst the public disclosure of budget inaccuracy is mandated in NSW (once it exceeds a certain threshold, in this instance 10%; OLG, 2019) the improvement of the budget estimation process has been given relatively scant attention. In particular, it appears that little has been done to address the intentional manipulation (gaming) of budget estimates. This is important to rectify given our evidence in Table 4.2 which suggests the possibility of systematic and deliberate underestimation of revenue to contrive favourable nett results. In light of the results from our econometric evidence and the magnitude of underestimation (9.02%, see Table 4.2) it would seem that the apparently arbitrary benchmark of 10% is rather large and may need to be revised down by local government regulators. Moreover, as suggested by the literature (see Modlin, 2010; Melitski, and Manoharan, 2014), it might be prudent to respond to possible gaming by including budget accuracy as a performance indicator for local government (ensuring that factors beyond the direct control of local governments are accounted for) thus motivating practitioners to improve accuracy over time, as well as deterring would-be gamers.

The potential for budget inaccuracy to affect both technical efficiency, and hence resilience, has hitherto largely escaped notice in the scholarly literature. Our results suggest that inaccuracy – in particular the under-estimation of expenditure – has the potential to reduce local government technical efficiency and could thus pose a serious risk to resilience. Now that the association has been identified, practitioners and regulators are encouraged to implement remedial measures to address this imposing problem.

Future studies should attempt to build on the insights obtained above and address some of the inherent limitations. If detailed information on the compositional elements of budget inaccuracy (using individual accounting items) can be obtained, it may be possible to better identify the specific budget determinants of technical efficiency. This will be valuable for providing more targeted policy recommendations. Similarly, if researchers can obtain disaggregated output data, they may be able to better mitigate limitations associated with the use of proxies and thus isolate the effects of quality from technical efficiency. This might be particularly important for future studies applied to local government systems where quality is more dynamic. In addition, the augmentation of this research using qualitative methodologies (such as interviews with budget practitioners) may enable scholars to confirm the existence and extent of intentional manipulation or gaming of budget estimates, which may provide regulators with additional impetus to embark on some of the measures to improve accuracy that we discussed earlier. Finally, the replication of this research in other jurisdictions will help scholars to better understand the extent to which these problems occur abroad.

In sum, whilst budgets have been identified as an important anticipatory tool for the purpose of promoting resilience (Barbera et al., 2020; Ferry and Eckersley, 2020; Ferry et al., 2017), our analysis suggests that budget inaccuracy is associated with significant reductions in technical efficiency, potentially threatening resilience. We therefore urge both practitioners

and scholars alike to devote more attention to this important tool in the local government armamentarium.

Chapter 5- Do Municipal Mergers Improve Technical Efficiency? An Empirical Analysis of the 2008 Queensland Municipal Merger Program

5.1 Introduction

Amalgamation has been a key tool employed by local government reform architects to address concerns regarding financial sustainability, effectiveness, and capacity. In fact, all jurisdictions in Australia have experienced structural reform, with the exception of Western Australia. This has resulted in the number of local governments in Australia being reduced from 1067 in 1910 to around 561 today (there is still some uncertainty regarding proposed amalgamations in New South Wales, which are currently the subject of legal contest; Drew and Grant 2017c). Indeed, by international standards the size of local government in Australia is relatively large with an average population of 41527 compared to an Organisation for Economic Co-Operation and Development (OECD 2013) average of 27244 for the comparable period.

There are some clear benefits that might be expected to arise from amalgamation, and these have been considered in the literature. For example, the increased scale that results from amalgamation should allow for greater specialisation of staff and may also assist in mitigating the problems that some small rural local governments would otherwise have in recruiting suitably skilled staff (Drew and Grant 2017c). In addition, changes to boundaries, which reflect current work, recreation, and education patterns of activity (rather than historical practice), are likely to facilitate more effective regional planning and infrastructure provision, and reduce inter-jurisdictional spill-overs (where residents of one local government benefit from the expenditures of their neighbouring local government) (Oates 1999). It has also been asserted that amalgamated entities can better advocate and partner with higher tiers of government to provide services for local communities – and certainly it is

the case that some projects to be delivered in partnership with state and federal governments often require a broader regional focus (Drew and Grant 2017c).

However, amalgamations have also proved to be emotive and politically contested matters. Generally, opposition to amalgamation revolves around assertions that amalgamation will result in a community losing its identity and capacity to control development and that some sections of the community may become politically disenfranchised (Drew and Grant 2017c). In addition, where amalgamation is compulsory, complaints regarding the process, lack of consultation and inability to have a political voice in the matter (via referendum) are also invariably raised (Drew et al. 2017). However, local government in Australia is not a party to the Constitution and it has thus been generally held that local governments can be amalgamated by state governments subject to the provisions found in state Local Government Acts and the common law principle of procedural fairness, therefore, suggesting that these sorts of criticisms about process, whilst being normatively relevant, largely lack legal (and often political) relevance (Grant and Drew 2017).

Many of the claims for and against amalgamation have not been subjected to rigorous empirical examination – and, indeed, claims of effectiveness and the like would seem difficult to assess in any event. However, one species of claim – which we have not yet mentioned – has been used by both amalgamation proponents *and* its opponents: Claims relating to technical efficiency (the optimal conversion of inputs into outputs). Proponents of local government amalgamation generally assert that larger local governments can capture economies of scale (where long-run average total costs might be expected to fall as output increases) as a result of lower procurement costs, lower staff costs (principally as an outcome of specialisation) and greater use of excess capacity (Drew and Grant 2017c). However, opponents of amalgamation point to the evidence of diseconomies of scale (the opposite of economies of scale) arising from greater difficulties in co-ordinating large numbers of staff

and lower levels of transparency (Boyne 1998; Drew et al. 2016). The question of changes to technical efficiency is thus an important avenue of scholarly inquiry and one which should ideally be conducted on a long panel of data comparing merged and unmerged local governments subsequent to a wide-scale amalgamation programme. Accordingly, this analysis sets out to address this gap in the empirical literature with an examination of the technical efficiency of local governments for the 4 years either side of the 2008 Queensland amalgamations that reduced the number of local authorities from 157 to 73. We emphasise that this empirical analysis only answers the specific (economic) question relating to the outcomes in technical efficiency following the Queensland amalgamations and that it is thus not, in itself, a suitable foundation for making wider judgements on the efficacy of amalgamation programs as a whole.

In the next section, we briefly outline the Queensland amalgamation process with emphasis on the claims made regarding technical efficiency by its architects. Thereafter, we examine the methods commonly employed in the academic literature to estimate technical efficiency and explain why intertemporal data envelopment analysis (DEA) is best suited for the present purpose. We then briefly outline the methodology employed in our analysis, including the specific constraints included to ensure that local government size is accounted for and that the most suitable proxies available are used to estimate local government output. We then present our empirical results along with the results of statistical tests for significance. The chapter concludes with some observations relating to the saliency of empirical work for amalgamation architects concerned with the question of technical efficiency.

5.2 Queensland Amalgamation Process

The Queensland local government sector presently consists of 77 local governments. These local governments provide a wide range of services to their constituents including waste management and disposal, water provision, maintenance of local roads, planning and development approvals, and the provision of community facilities such as libraries, swimming pools and parks. These local governments serve an average of 79,664 constituents, ranging from 291 individuals (Diamantina) to 1,110,331 individuals (Brisbane) (ABS 2013).

The process of structural reform through compulsory local government consolidation in Queensland began in 2005 with the introduction of the *Size, Shape and Sustainability* (SSS) program conducted by the Local Government Association of Queensland (LGAQ 2005), endorsed and partly funded by the Queensland Treasury Corporation (QTC 2008). The SSS program was created in response to concerns regarding the financial sustainability of Queensland local governments, substantiated by the 'failure' of a 'significant number' of these local governments to comply with the QTC's financial sustainability indicators (QTC 2008: 30). The SSS program sought to examine the operational efficiency and financial sustainability of the local governments in Queensland to assist the LGAQ in identifying those local governments that were not sustainable or efficient compared to a range of indicators, and then to make recommendations on appropriate policy responses (De Souza et al. 2014).

However, on 17 April 2007, the (then) Beattie Government abruptly ended the SSS program and instead established a seven-member Local Government Reform Commission (LGRC) (Drew et al. 2016) to investigate (1) the desirability of compulsory local government consolidation, (2) alternatives to amalgamation, and (3) a model for structural reform in Queensland local government (LGRC 2007).

In its *Final Report* released on 27 July 2007 –a relatively brief 3 months after the establishment of the Commission – the LGRC recommended the merger of over half of all local governments in Queensland (Drew et al. 2016). The Commission justified its recommendation by citing the potential benefits of local government amalgamation, including economies of scale, better regional planning and advocacy, increased administrative and technical capacity and the elimination of the sub-optimal use of resources (LGRC 2007). In particular, the Commission noted that 'local governments which are small in size and under-resourced will struggle to develop and retain the skills and experience needed to ... generate cost efficient and effective services' (LGRC 2007:5). However, in its *Final Report,* the LGRC did not provide empirical analyses of relative municipal efficiency or scale to support its recommendations, rather relying on the outcomes of previous Queensland mergers and the normative assumption that 'big' is 'better' in local government (Drew et al. 2016, 2017). The recommendations for amalgamation were implemented by the Queensland Government on 10 August 2007, with the municipal mergers officially commencing in March 2008 (QTC 2009). As a consequence, the number of local governments in Queensland was reduced from 157 to 73 (excluding the Brisbane City Council).

The Queensland process has been criticised in the scholarly literature as being too 'sudden and drastic' (Drew and Dollery 2014a:214), limiting public consultation, which some scholars contend contributed to widespread public discontent over the mergers (Drew and Grant 2017c). However, the Beattie Government justified the pace of the merger process by contending that it was necessary to 'ensure that the benefits of reforms flow to Queensland communities as quickly as possible' (LGRC 2007:75). The LGRC suggested that it would take between 2 and 3 years for these benefits to become evident (LGRC 2007). Critics of the reforms argued that rapid implementation of the forced mergers and consequent lack of

consultation was designed primarily to restrict opposition to the program and to ensure its swift implementation (although it would seem an eminently suitable heresthetic; Riker 1986).

A key outcome arising from the forced mergers of Queensland local governments was the subsequent de-amalgamation of four local governments starting in 2013. It has been suggested that the de-mergers arose due to the dissatisfaction among the communities of consolidated local governments, and the inefficiencies and diseconomies of scale created by the amalgamations (Drew and Dollery 2014a; Drew and Grant 2017c).

The de-amalgamation platform of the (then) opposition Liberal/National Party (LNP) was a significant factor in its rise to power in the March 2012 Queensland election (when the LNP won 78 out of the 89 Parliamentary seats). Three months later – on 29 June 2012 –a Queensland Boundaries Commissioner was appointed by the incoming Newman Government to investigate possible de-amalgamation of municipalities (Drew and Dollery 2014a). Nineteen local governments submitted proposals for de-amalgamation. However, only five were examined by the Boundaries Commissioner and just four local governments were allowed to proceed with de-amalgamation (Noosa, Douglas, Livingstone and Mareeba) (De Souza et al. 2014). Referenda were conducted for each of the four local governments on 9 March 2013. De-amalgamation was proclaimed shortly thereafter (ECQ 2013), following majority votes by local communities in favour of de-amalgamation (Drew and Dollery 2014a).

The merger process involved substantial costs, including an average of $8.1 million per local government to amalgamate (Drew and Dollery 2014b). Subsequent de-merger costs were in the order of $11 million for the Sunshine Coast Regional Council alone (Drew and Dollery 2014a).

5.3 Local Government Efficiency Measurement

Efforts to estimate public sector efficiency can be classified into two main strands. First, Worthington (2000), Fogarty and Mugera (2013), Drew et al. (2016), and others have analysed of the efficiency of local authorities. This method of inquiry has been utilised to (1) compare the relative efficiencies of municipalities and make inferences regarding the optimal size of these local governments, (2) identify which local governments in particular are relatively technically inefficient, (3) evaluate the impact of local government mergers, and (4) determine the impact of environmental factors on the efficiency of local governments. In the majority of these analyses, the technical efficiency of municipalities (i.e. the ability of municipality to provide a fixed level of services using minimal inputs or to provide the greatest level of services with fixed resources) has been utilised.

The second strand focuses on the measurement of efficiency and scale of the specific services provided by municipalities. Scholars have examined library services (Worthington 1999), planning and regulatory services (Worthington and Dollery 2000), domestic waste services (Worthington and Dollery 2001) and water provision (Byrnes et al. 2009). These studies have shed light on the areas in which the potential for economies of scale exists and those functions that do not appear to offer scale economies. In both of these strands multiple linear regression, stochastic frontier analysis (SFA) and DEA are commonly utilised. Although multiple linear regression and SFA are econometric techniques in that the use the parametric relationship between a decision-making unit's (DMU's) inputs and outputs, and a chosen functional form to construct an efficiency frontier, DEA is a non-parametric technique that uses the linear programming to construct a piecewise frontier of efficient input/output combinations. In both techniques, the efficiency or inefficiency of an individual DMU (in this instance, an individual local government) is measured by the ratio of the distance of the

observed result to the frontier (see Coelli et al. 2005 for a more comprehensive description of these techniques).

In the Australian studies, Drew et al. (2016) and Drew and Dollery (2014b) have employed multiple linear regression in the estimation of scale economies in the Queensland and Western Australian local government systems, respectively, whereas Worthington (2000) has used SFA in addition to DEA to measure the cost efficiency of local governments in New South Wales.

In the determination of municipal efficiency, the latter technique, DEA, has a number of benefits that make it a more desirable technique for this analysis. Unlike multiple regression analysis or SFA, DEA requires no a priori assumptions relating to the statistical relationship between variables and the resulting functional form. Furthermore, DEA facilitates the examination of multiple outputs in the determination of the technical efficiency or scale economies (contrasting with multiple regression analysis and SFA that employs a single proxy for output as the dependent variable). This is particularly relevant given the heterogeneous range of services provided by local governments, which must be included to give a holistic and accurate determination of efficiency. Finally, DEA can be used to provide a point estimate of the relative efficiency of particular local governments rather than merely an average function or upper bound for which inefficiency will occur (see Drew et al. 2016). Although it is recognised that DEA has limitations, such as its inability to account for stochastic factors in the model (unlike SFA) which may influence the efficiency scores obtained[13], sensitivity to outliers and the inability to conduct hypothesis tests or construct confidence intervals to gauge the robustness of the model[14], these advantages and the ability

[13] Although this can be mitigated through stratification according to environmental influences or second-stage regression analysis

[14] Although, again this can be overcome through re-specification of alternative models.

to mitigate these limitations make DEA – rather than SFA or multiple regression – a more desirable technique to measure the efficiency of Queensland municipalities.

Although DEA has been used extensively in international studies of municipal efficiency (see, for instance, Da Cruz and Marques 2014), its application in an Australian local government context has been more limited, albeit increasing in recent years. A key application of DEA in Australian academic analyses of municipal amalgamation can be seen through Drew et al. (2017), who examined the proposed amalgamations of New South Wales local governments in terms of returns to scale and found that merging local governments that presently exceed optimal scale would create entities with greater diseconomies of scale.

Cross-sectional DEA, SFA and multiple regression have been the most commonly employed techniques. This involves the measurement of the relative or absolute efficiency of the selected local authorities at a particular point in time, as shown by Worthington (2000) and Drew and Dollery (2014b). However, the utilisation of panel DEA to measure the efficiency of municipalities over time has been rarely used. As a result, the empirical literature available on this methodology, particularly in an Australian context is limited. The examination by Drew and Dollery (2015d) can thus be considered an outlier in this regard. This is due to its use of panel DEA to examine the impact of competitive federalism on the efficiency of Australian state governments.

Although Bell et al. (2016) compared the sustainability performance of merged and unmerged in New South Wales – amalgamated in 2004 – using 2014 data, to date no empirical work has been undertaken to provide a comparison of the technical efficiency of amalgamated local governments compared with their non-merged counterparts both prior to and after forced mergers. The present analysis thus seeks to fill this gap in the empirical literature on local government.

5.4 Empirical Methodology

To measure the technical efficiency of merged and unmerged local governments over time, intertemporal DEA has been employed. Global inter-temporal DEA examines the efficiency of an individual local government in each period as a separate DMU, thereby enabling not only a comparison of the technical efficiency between local governments, but also of an individual local government over time (Drew and Dollery 2015d). However, this technique assumes constant technology and regulatory conditions, which are unlikely to be valid over a 9-year period (Drew and Dollery 2015d). By way of contrast, locally inter-temporal DEA is founded on a series of short overlapping windows of time (in the present case 2 years) and thus does not require the implausible assumption implicit in global inter-temporal studies. We have therefore elected to employ locally inter-temporal DEA to evaluate the efficiency outcomes arising from the 2008 Queensland amalgamations. The first window analysed was for 2003–2004, the next window 2004–2005 and this frame shift was repeated until all data were exhausted. Pecuniary data were set in 2013-dollar equivalents (using the ABS (2013) CPI values). Once all the window analysis was completed, the arithmetic mean for each year was calculated (consistent with Cooper et al. 2007). A major criticism against the use of local inter-temporal DEA relates to the inclusion of the boundary years (in this study 2003 and 2013) since they have only undergone a single analysis. We have overcome this limitation by omitting these two boundary years from the analysis and hence we only report results for the period 2004 to 2012 inclusive. A variable returns to scale (VRS) model (as opposed to a constant returns to scale model) has been employed because it is unrealistic to assume that all local governments are operating at optimal scale. VRS ensures that ‘an inefficient firm is only “benchmarked” against firms of a similar size’ (Coelli et al. 2005:172). Thus, the VRS

model largely mitigates the effect of local government size on this analysis. The VRS algorithm is presented below:

$$min_{\theta,\lambda}\theta,$$
$$s.t. \ -q_i + Q\lambda \geq 0$$
$$\theta x_i - X\lambda \geq 0$$
$$I1'\lambda = 1$$
$$\lambda \geq 0$$

Where q_i is a vector of outputs and x_i is a vector of inputs, θ is a scalar (representing the efficiency scores for each local government), λ is a vector of constants, and $I1'$ is a vector of ones. The subscript *i* is used to denote the *i*-th local government and the inequality constraints ensure non-negative weights (Coelli et al. 2005).

In the calculation of efficiency scores, an input or output orientation can be imposed. Although the former measures the proportional reduction in inputs holding output constant, the latter holds inputs fixed and it measures the proportional increase in outputs possible (Drew et al. 2017). In general, local governments do not have a large degree of freedom in terms of the inputs chosen or outputs produced due to the legislative constraints placed on services local governments must produce and the standards at which these services must be provided. However, almost all Australian municipalities are seen to have discretion over the selection of inputs in production. Accordingly, an input orientation is most suitable to compute the efficiency scores of the Queensland local governments, this will ensure that a local government's efficiency is determined by its ability to minimise the inputs (staff and operational expenditure) involved with providing a fixed service level.

The data employed in our analysis were sourced from the Department of Infrastructure, Local Government and Planning's (DILGP) *Local Government Comparative Reports* (DILGP 2013), the Australian Bureau of Statistics' (ABS 2013) *National Regional Profile* (2003–2013), the Queensland Local Government Grant Commission's *Annual Report* (QLGGC 2013) and the audited financial statements produced by each individual local government. The DILGP report and individual audited financial statements contain financial information for the 57 Queensland local governments (and the 123 local governments prior to the 2008 mergers)[15]. These documents have been used to construct the staff and operational expenditure input data for all amalgamated and non-amalgamated local governments for the period between 2003 and 2013. The ABS *National Regional Profile (2009–2013)* contains extensive data on the 57 Queensland local governments, including information relating to population size, number of households, and number of employing businesses within each local government's jurisdiction. The values of these variables prior to 2009 have been obtained from various previous issues of the ABS *National Regional Profile*. The data relating to the length of roads (sealed and unsealed) maintained by each local government for the period spanning 2003–2013 have been obtained from the QLGGC's annual reports.

With respect to the choice of inputs and outputs in the specification of the model, we have examined the arguments introduced by leading scholars in their empirical analyses of local government efficiency. For example, Da Cruz and Marques (2014) undertook a comprehensive study of the specifications commonly utilised within existing empirical literature and thus were able to summarise the key relevant inputs to be considered within a DEA. These inputs include (1) a measure of labour input (either through the number of full time equivalent (FTE) employees or the direct dollar expenditure on staff within a

[15] Excluding Aboriginal and Torres Strait Islander land councils.

municipality), (2) a measure of total expenditure by the local governments and (3) additional categorical measures of expenditure depending on the overall purpose of the analysis. It must be noted that Da Cruz and Marques (2014) arrived at the conclusion that the outputs examined within a DEA varied in a national context as a result of the differing responsibilities assigned to local governments in different countries, although measures of population size, population density and number of properties receiving services were frequently cited.

Drew et al. (2017) have augmented this argument by outlining the advantages of utilising certain inputs and outputs within a DEA compared to alternatives in an Australian context. This was achieved through the specification of five separate DEA models that differed principally in terms of the inputs and outputs chosen. Key recommendations included the use of staff expenditure (in Australian dollars) rather than the FTE numbers because it allows for the consideration of the differing skill levels and experience of local government employees, which affects the remuneration they receive, and a measure of spending on operational expenditure, rather than a measure of total expenditure[16]. Drew and Dollery (2014d) also justify the use of households and employing businesses as a proxy of a local government's output, rather than the population within the local government boundaries. This is because local governments within Australia principally supply 'services to property' including waste and water management rather than 'services to people' such as police, education and fire services. Furthermore, the use of households and businesses results in measures that are not as volatile and thus less likely to overestimate output and more accurately reflect local government expenditure (Drew and Dollery 2014d).

[16] This decision is mainly due to debate related with including depreciation expenditure due to the inconsistency of depreciation practices and the potential for manipulation (Drew and Dollery 2015c).

It must be noted that household figures are not collected by the ABS during intercensal periods. However, this limitation has been overcome by adding the new dwelling approval figures to the most recent census figure for that period (Drew and Dollery 2014d). Although this method may be subject to error arising from the destruction of dwellings and the failure of approved dwellings to be constructed, this error is considered to be 'relatively insignificant' in regard to its effect on the validity of the estimates obtained Drew and Dollery (2014d). Finally, a measure of the roads maintained by local governments should be included as an output, because it represents the single largest expenditure category for Australian local governments (Drew and Dollery 2014b).

Although an ideal model might employ the individual or weighted results of each specific service provided and function undertaken by local governments or utilised by residents, at present this disaggregated data are not collected by all local governments and made publicly available (for instance Queensland local governments do not uniformly collect data on the amount of waste collected, water treated or disaggregated outcomes or expenditure for functions such as planning, development and social welfare programs). Moreover, Nunamaker's rule sets an upper limit on the number of outputs that can be accommodated in DEA (the maximum sum of inputs and outputs is given to be one third of the number of DMUs; see Cooper et al. 2007). For all these reasons, the use of proxies for local government output is standard practice in the corpus of scholarly literature (Boyne 1995). When interpreting results, one should remain cognisant of the fact that proxies are not precise measures of service output – although they are probably a good reflection of minimum service need. However, in this study because we are interested in changes to technical efficiency over overlapping windows of time, how closely the proxies reflect actual services is not near as important as the assumption that the association between proxy and actual service output for a given DMU does not alter significantly overtime (a reasonable

assumption). Thus, in a locally intertemporal DEA, the perennial problem facing all economists (the need to use proxies) takes on far less importance then would occur, in say, a cross-section DEA.

For these reasons that we have chosen staff and operational expenditure as the inputs in the measurement of efficiency of the Queensland local governments, with the number of households, employing businesses and the length of roads as the chosen outputs (see Model X next). Table 5.1 summarises the key central tendency measures of the inputs and outputs used in the analysis.

Table 5.1: Inputs and outputs for data envelopment analysis of Queensland local governments 2003–2013

	Definition	**Mean (standard deviation)**
Inputs		
Operational Expenditure	Total expenditure less staff costs, depreciation and borrowing costs in thousands of dollars	57,404.17 (131,686.70)
Staff	Total staff expenditure in thousands of dollars	44,909.89 (99,589.51)
Outputs		
Business	Number of employing businesses in the jurisdiction	2,555.09 (6,114.39)
Households	Number of households in the jurisdiction	24,676.14 (54,539.58)
Roads	Total length of roads in the jurisdiction in kilometers	2605.82 (1523.51)

Model X: Staff expenditure ($000) + Operational expenditure ($000) = Roads (km) + Households + Businesses

5.5 Results

There are two approaches that might be adopted to comparing the performance of the amalgamated and non-amalgamated cohorts of Queensland local governments. The first approach examines the typical performance of the respective cohorts. Table 5.2 presents measures of central tendency (mean and median) and spread (standard deviation and inter-quartile range, respectively) for the relative technical efficiency of merged and unmerged local governments[17]. We also present a graphical depiction of the median result for the period 2004–2012 inclusive with notations regarding important explanatory events. The other approach to comparing amalgamated and non-amalgamated cohorts is to conduct parametric or non-parametric tests to determine whether statistically significant differences exist between the two treatment groups. This has been achieved through ANOVA[18] and Mann–Whitney tests. The p-values for these tests are included in the last column of Table 5.2.

[17] Notably there were no zero weights for any of the DMUs that might have distorted our results (DEA allocates the most favourable weights to inputs and outputs for each DMU so as to maximise the efficiency scores; Cooper et al. 2007). Moreover, analysis of this kind which focus on changes over time employing overlapping temporal frames (for which weights, as expected, changed little from frame to frame for each DMU) largely sidelines potential criticisms regarding the allocation of weights (it is not appropriate to set arbitrary constraints on weights because doing so would likely prevent some DMU's from being assigned their most favourable efficiency score).

[18] As the data satisfy the normality assumption, the use of an ANOVA test is valid. However, to compare the robustness of results, the outcomes using both ANOVA and Mann– Whitney have been provided.

Table 5.2: Summary statistics for Queensland local governments 2004–2012

	Mean (standard deviation)		Median (interquartile range)		ANOVA results (Mann-Whitney)
Year	**Amalgamated**	**Non-Amalgamated**	**Amalgamated**	**Non-Amalgamated**	**p-value**
2004	0.876	0.834	0.893	0.884	0.278
	(0.124)	(0.159)	(0.151)	(0.305)	(0.596)
2005	0.848	0.834	0.886	0.878	0.719
	(0.136)	(0.153)	(0.201)	(0.274)	(0.976)
2006	0.816	0.825	0.828	0.869	0.847
	(0.147)	(0.165)	(0.253)	(0.278)	(0.728)
2007	0.760	0.755	0.786	0.737	0.929
	(0.189)	(0.182)	(0.303)	(0.286)	(0.920)
2008	0.742	0.740	0.748	0.720	0.968
	(0.213)	(0.194)	(0.408)	(0.235)	(0.984)
2009	0.773	0.761	0.743	0.781	0.790
	(0.151)	(0.172)	(0.210)	(0.216)	(0.992)
2010	0.785	0.786	0.799	0.794	0.968
	(0.134)	(0.155)	(0.177)	(0.265)	(0.984)
2011	0.763	0.819	0.750	0.849	0.159
	(0.153)	(0.133)	(0.147)	(0.208)	(0.180)
2012	0.747	0.821	0.740	0.818	0.082
	(0.168)	(0.132)	(0.178)	(0.202)	(0.080)

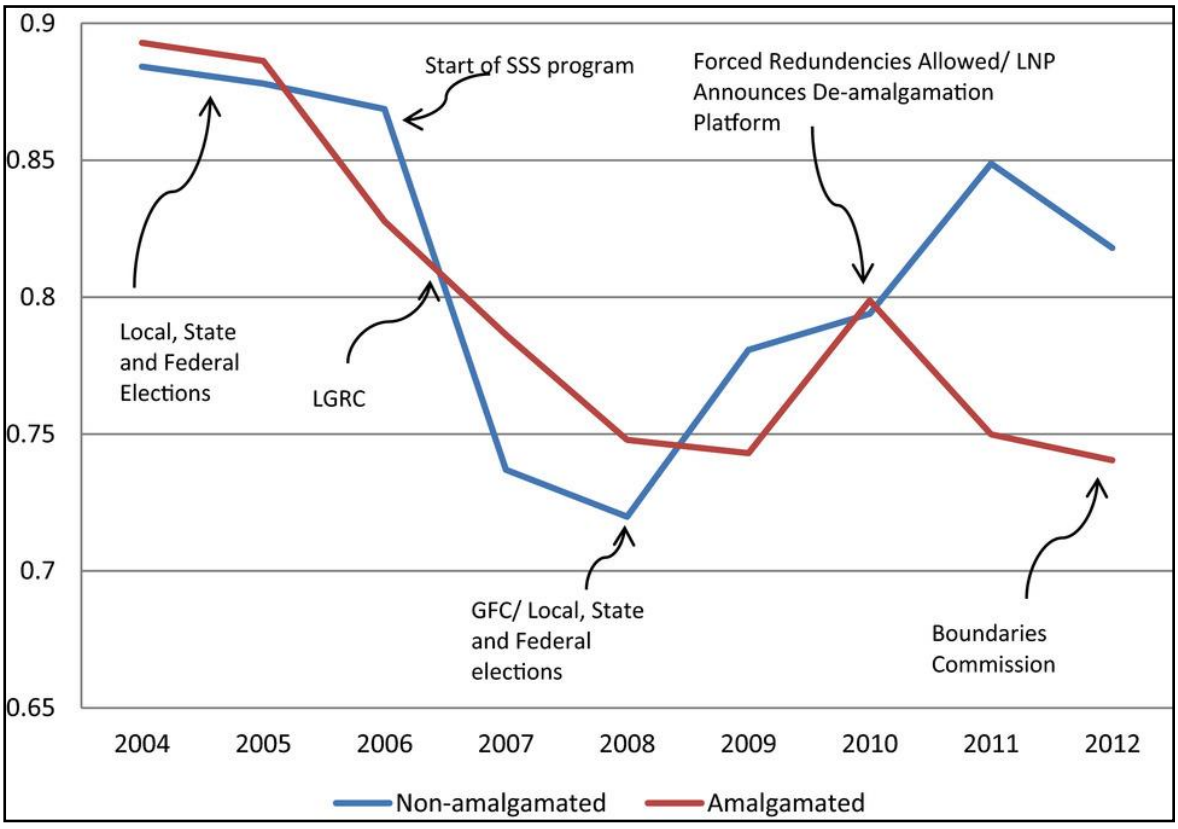

Figure 5.1: Median Efficiency of Queensland Local Governments 2004–2012

An examination of the measures of central tendency suggests that there was little difference between the typical relative technical efficiency of the amalgamated and non-amalgamated cohorts prior to the 2008 compulsory amalgamations. Indeed, if one considers the median result (in Table 5.2 and Figure 5.1) – which is the preferred measure of central tendency due to its inherent resistance to skewing – it is clear that the typical amalgamated local government had superior technical efficiency with respect to the typical non-amalgamated peer. However, there is no statistically significant difference between the two cohorts (the p-value for the 2008 ANOVA is 0.97 and 0.98 for Mann-Whitney). Thus, whilst a difference in typical performance exists, the spread of results within each of the two cohorts is sufficiently large as to prevent judgements regarding clear difference in the performance of the two cohorts.

This finding is not consistent with claims made by the LGRC (2007:12–13; 38) in its *Final Report* that the smaller size of the local governments scheduled for amalgamation prevented them from becoming efficient due to the inefficiencies generated from 'the duplication and sub-optimal use of assets' and the inability to 'retain the skills and experience needed'. However, it may be argued that the decline in efficiency of these local governments prior to 2007 may have been the catalyst for structural reform (although, it is important to recognise that this was shared by both the amalgamated and non-amalgamated cohorts). Indeed, there was no statistically significant difference between the two cohorts and the typical performance of amalgamated local governments (measured according to either the mean *or* median) was marginally higher than its non-amalgamated peer prior to the compulsory consolidation.

Following the amalgamations in 2008 the typical performance of both cohorts of local governments increased markedly and this may suggest a positive outcome from the structural

reforms. However, similar to the reduction in efficiency noted prior to consolidation, these gains were achieved by both amalgamated and non-amalgamated local governments, possibly indicating a common cause, such as the recovery following the global financial crisis, restructuring following the elections, or the increased scrutinization placed on the performance of Queensland local governments as a result of the amalgamations (a concept known as the Hawthorne effect, see Levitt and List 2011). Moreover, there was no statistically significant difference between the two cohorts over the period 2008 through to 2011 inclusive (2011: ANOVA, p=0.159; Mann–Whitney, p=0.180). It thus appears that prima facie, consolidation failed to yield the benefits proposed by the LGRC. Indeed, the typical relative technical efficiency of non-amalgamated local governments was far higher than the typical performance of amalgamated peers in 2011 (as measured by either mean or median), which appears inconsistent with the LGRC's (2007:41) assertion that 'the efficiencies and economies of scale would deliver a return to the community within two to three years'. The clear difference in typical performance of the two cohorts was translated into a statistically significant difference in the performance of the entire cohorts from 2012 (ANOVA, p = 0.082; Mann–Whitney, p = 0.080). This outcome appears to be consistent with work by Drew et al. (2017), which suggests that the process of amalgamation of local municipalities does not always result in an increase in efficiency of the merged local governments, but rather can result in a number of these newly created entities becoming relatively inefficient through greater diseconomies of scale.

To potentially determine the causes of the decline in the relative technical efficiency of merged local governments from 2010 onward, we have examined the relationship between the outputs produced by the local governments and the inputs required to produce these outputs. Table 5.3 provides a summary of the growth of each of these outputs and inputs specified in our DEA investigation (utilising a geometric rather than a simple arithmetic

growth rate and we present mean and median results for the two cohorts). There is little difference in the change in outputs between the two cohorts over the 3 years, with the notable exception of declines in the number of employing businesses (which exerted disproportionate downward pressure on the relative technical efficiency of the non-amalgamated cohort). The major points of difference can be found in the inputs employed by the respective cohorts.

Table 5.3: Compound average and median percentage change in outputs and inputs for amalgamated and non-amalgamated local governments 2010–2012

Average

	Household		Business		Roads		Staff Expenditure		Operational Expenditure	
Year	**A**	**NA**	**A**	**NA**	**A**	**NA**	**A**	**NA**	**A**	**NA**
2010-2011	1.76	2.02	−0.40	−4.73	−0.56	3.12	3.45	0.08	31.57	33.72
2011- 2012	2.14	1.92	−1.01	−0.34	0.18	−2.81	4.88	4.29	20.52	20.56
2010- 2012	1.95	1.97	−0.72	−2.69	−0.22	−0.04	3.93	1.93	21.51	16.53

Median

	Household		Business		Roads		Staff Expenditure		Operational Expenditure	
Year	**A**	**NA**	**A**	**NA**	**A**	**NA**	**A**	**NA**	**A**	**NA**
2010-2011	1.69	0.73	−0.78	−3.23	0	0	4.23	−0.45	22.48	5.09
2011- 2012	1.95	0.94	−1.00	−0.62	0	0	3.67	3.03	18.11	6.40
2010- 2012	1.86	0.87	−0.72	−2.03	0.05	0	3.13	2.14	15.39	−0.77

Note: NA, non-amalgamated; A, amalgamated.

Staff expenditure rose at just over twice the rate for amalgamated local governments as it did for the non-amalgamated cohort (around 1.5 times the rate using the median result). This is a surprising outcome given that much of the economies forecast by the LGRC were predicated on savings in staff expenditure (LGRC 2007). Hence, it was expected that amalgamated local governments would realise significant efficiency gains when the moratorium on forced redundancies expired in 2011. The fact that merged municipalities appear to have largely failed to contain labour costs put the burden of enhanced efficiency onto operational expenditure.

However, as Table 5.3 indicates, amalgamated local governments were also unable to contain operational expenditure (the median result for the amalgamated cohort is substantially larger than the non-amalgamated cohort). Part of the reason for this unexpected result might lie in the fact that larger municipalities, unlike their smaller counterparts, often exhibit less transparency in regard to the functions of the local government including expenditure and general operating decisions (Boyne 1995; Drew and Grant 2017c). Consequently, these merged entities can increase expenditure with relatively less fear of public rebuke that smaller local governments may face. This is supported by Boyne (1998: 252) who concluded that the 'consolidated and concentrated (entities) tend to be associated with higher spending' whilst lower spending is generally seen as a feature of 'fragmented and de-concentrated local government systems'. A further putative reason for the increase in operational expenditure might lie with the rise in public expectation pursuant to the Queensland Government's promises of 'stronger councils, better use of rates, and better roads and infrastructure' (DLGPSR 2007).

These outcomes in terms of relatively higher increases in staff and operational expenditure for amalgamated local governments can serve to reduce the technical efficiency of these local governments (given that the DEA had an input orientation – that is, the analyses measure the

minimum inputs required to produce a set of outputs considered to be fixed). However, this is highly unlikely to be the sole cause of the decline in technical efficiency. Thus, further analysis must be undertaken to determine the potential impact of external factors, such as the deterioration in economic conditions stemming from the global recession following 2008 or the impact which factor productivity may have played over the period of analysis. For this purpose, we collected additional data related to these factors and conducted supplementary analysis. The results of this have been presented in Figures 5.2, 5.3, and Table 5.4.

From the figures we can see that both economic growth and total factor productivity (sometimes referred to as multifactor productivity in Australia) were relatively volatile between 2004 and 2012. Given the influence of the global financial crisis and resulting decline in international economic activity, which did not fully materialise in the Australian economy until 2009, and the strong demand for Australian steel and iron ore from China during this period (see Regan and Kebede, 2012) such results are hardly surprising. When compared with the efficiency scores which seem to reveal a similar trend in terms of an initial decline and subsequent recovery there appears to be a *prima facie* association between these factors and efficiency. However, when the correlation between the efficiency scores and these factors is tested, although the correlation coefficients have the signs which would be expected by economic theory (that is, both GDP growth and TFP are anticipated to result in higher technical efficiency) the results are not statistically significant. One potential explanation for this relates to our decision to employ local rather than global analysis and the short overlapping windows (of only two years) selected, which largely acts to eliminate any potential impact which these factors may have on technical efficiency. This is particularly the case for productivity changes which would likely exert a greater influence in a global analysis. Another potential explanation with particular relevance for the TFP indicator relates to a lack of change over the period analysed. Indeed, hypothesis testing of TFP

between 2004 and 2012 failed to find evidence of a significant increase in productivity (p=0.6643). It is possible that if a longer panel is analysed, or if a panel is selected which did not contain such a substantial economic boom and resultant downturn, that significant changes in the indicators might occur that would have a material impact on efficiency and thus need to be controlled for. However, in this present analysis that does not appear to be the case.

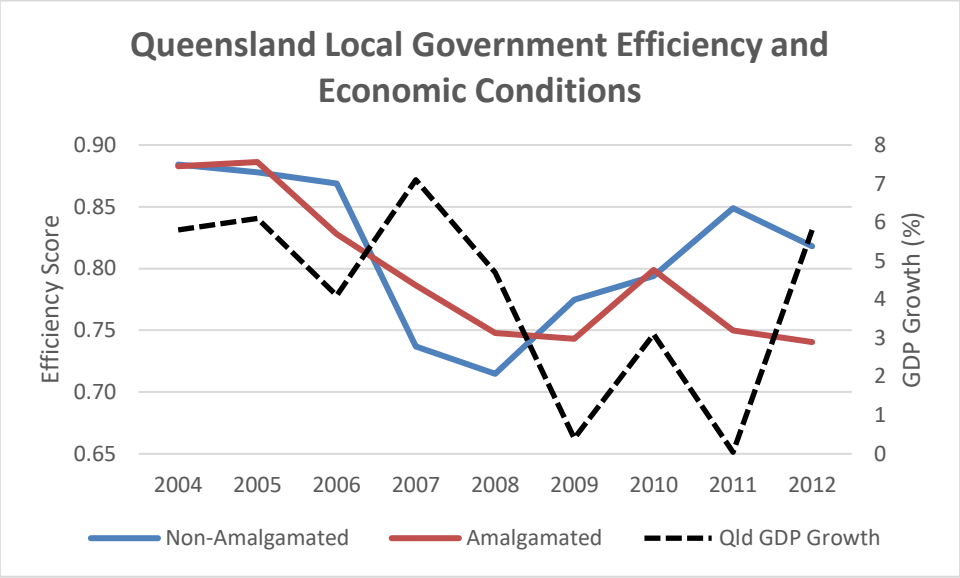

Figure 5.2: Changes in Efficiency Relative to Economic (GDP) Growth, 2004-12

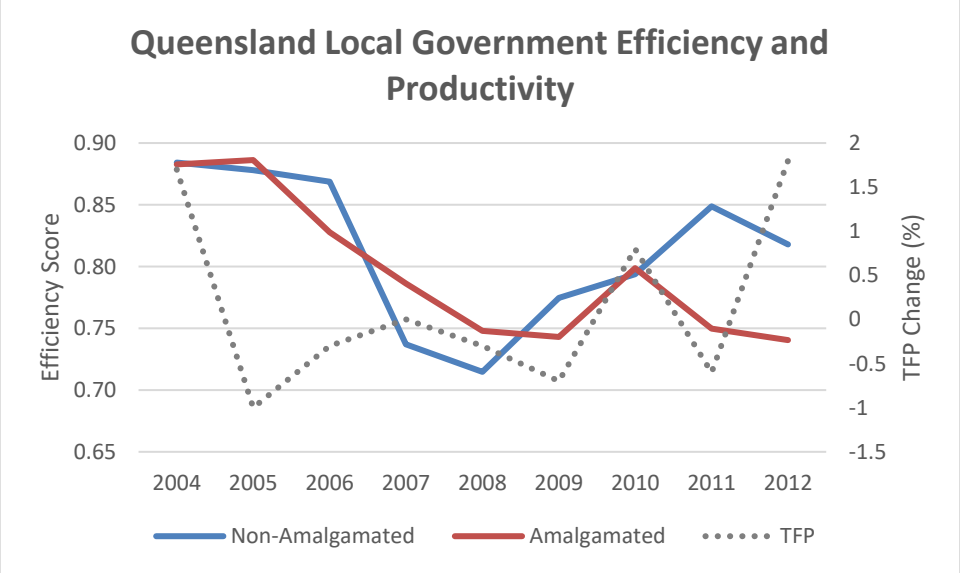

Figure 5.3: Changes in Efficiency Relative to Total Factor Productivity, 2004-12

Table 5.4 Correlation Between Efficiency and External Factors

	Average Efficiency	Median Efficiency	GDP Growth (%)	TFP
Average Efficiency	1.0000			
Median Efficiency	0.9695** (0.000)	1.0000		
GDP Growth (%)	0.2318 (0.5484)	0.3329 (0.3814)	1.0000	
TFP	0.1928 (0.6193)	0.1404 (0.7187)	0.3830 (0.3089)	1.0000

(p-values in parentheses)

5.6 Conclusion

Our evidence suggests that the predicted improvements to technical efficiency for Queensland amalgamated local governments may have largely failed to come to pass. However, we again emphasise that this was but one of the benefits outlined in the LGRC (2007) report. This finding is important as it suggests that the assumptions about improved efficiency, which had been made in the case of the Queensland amalgamations (and also appealed to in more recent business cases for amalgamations in New South Wales, South Australia and Tasmania), are not borne out by the evidence to date (see, for instance, Drew and Grant 2017c). However, it would be wrong to interpret this as suggesting that there is no case for amalgamation – rather, the evidence presented here suggests that potential savings may not necessarily be the best foundation on which to premise municipal amalgamations.

Generally, the projected savings from amalgamations are strongly predicated on reduced staff expenditure once any moratorium on redundancy has expired (Dollery and Drew 2017). Yet, our evidence suggests that these savings largely failed to materialise. In the absence of such

savings from staff expenditure (especially where outputs are largely non-discretionary), improvements to technical efficiency must then largely depend on reduced operational expenditure. However, this also appears to have largely failed to materialise.

However, it is possible that careful planning that measures trends in efficiency *prior* to amalgamation – and seeks to find merger partners that will result in near optimal scale – could produce quite different outcomes in terms of technical efficiency (see, Drew et al. 2017 for an example of this kind of analysis or Drew and Grant 2017c). This would require inter-temporal efficiency analysis similar to what has been conducted here but also analysis of scale (which can be derived from DEA). That is, technical efficiency arising from putative amalgamations can be modelled ex ante and it would seem prudent to do so if architects seek to sell amalgamations on the basis of efficiency improvements (see Drew et al. 2017).

It has been suggested in the literature that shared services provide an efficacious alternative to amalgamation, given that available empirical evidence suggests that efficiency is likely to be function specific. However, comprehensive robust empirical work to precisely measure efficiency by function is still to be done in an Australian context. Moreover, for most Australian state and territory jurisdictions, consistent reporting of functional level data is not available. Future efforts might be profitably directed to improving the consistency of functional reporting in Australian local government, which will allow for the measurement of the scale effect on efficiency for each function. However, before shared services can be unequivocally recommended, it would also seem necessary to demonstrate that savings from sharing services (which benefit from increased scale) are not eroded or exceeded by the cost of administering the said shared services. There are also some administrative and legislative frameworks that would seem to require attention in order for shared service arrangements to be conducted fairly and effectively (Grant and Drew 2017).

Finally, it is important for the scholarly community to subject other purported benefits from amalgamation to close scrutiny, such as capacity to partner with higher tiers of government, attract higher quality staff and advocate for regional communities, in order that a balanced appraisal of amalgamation, which goes beyond economic arguments regarding technical efficiency, can be made.

Chapter 6- Do Amalgamations Make a Difference? What we can learn from Evaluating the Policy Success of a Large Scale Forced Amalgamation of Local Government

6.1 Introduction

Structural reform involves changes to the number, size or types of local authorities, most commonly through the amalgamation (also known as 'mergers', 'consolidations' or 'unifications') of smaller local governments into larger entities (Drew, 2020). There have been many justifications articulated for the use of structural reform, including more coherent regional planning, increased specialisation, greater capacity and a desire for international status (i.e. the creation of 'global cities') (KPMG, 2015). However, the most prominent motivation has been the pursuit of improvements to financial sustainability, especially in response to concerns of deteriorating finances in many local government systems internationally (see, for example, Thompson and Whitley, 2017; Andrews, 2013, Bruno et al., 2017; Bolívar et al., 2016; Miyazaki, 2020; Drew, 2020).

It is often argued by reform architects that structural reform through amalgamation improves financial sustainability due to its purported ability to increase efficiency through the exploitation of economies of scale, thus lowering the unit cost of production (IPART, 2015). Notably, projected savings are commonly expected to occur principally in the area of staff expenditure, as a result of the 'rationalisation' of executive, governance, and back-office functions (Drew et al., 2019; IPART, 2015). The potential for savings in material costs, due to greater purchasing power and the removal of unnecessary duplication in procurement functions, have also been canvassed (KPMG, 2016).

These arguments typically contrast with the extant literature on structural reforms, which in general casts doubt on the efficacy of amalgamation to generate cost savings and

improvements to financial sustainability. For instance, studies of reform programs undertaken *ex ante* have challenged the theoretical motivations for amalgamation, finding insufficient evidence of a link between size and unit costs, or questioning the materiality of potential savings (see Drew et al., 2014; Ladd, 1992; Drew, 2020). Other studies have identified weaknesses with the design and implementation of the reform program, such as problems relating to the empirical methodology and evidence tendered (Gregory and Lonti, 2008; McQuestin et al., 2018; Dollery and Drew, 2017), and the speed at which the reforms were implemented (Drew and Dollery, 2016a; Drew and Dollery, 2018).

Doubt regarding the efficacy of amalgamation may also be found in the *ex post* literature. Studies undertaken on individual city and county amalgamation episodes in the United States have identified significantly higher expenditure following reform (Maher, 2015; Selden and Campbell, 2000; Gaffney and Marlowe, 2014; Feiock 2004). This is supported by comparable findings in studies undertaken in other jurisdictions such as Australia (see McQuestin et al., 2018; Dollery et al., 2012), the United Kingdom (Andrews, 2013) and Japan (Miyazaki, 2017). *Ex post* studies have also challenged the purported processes for generating savings, with evidence of significant increases to staff and material costs following reform (McQuestin et al., 2018; Selden and Campbell, 2000).

However, in contrast to *ex ante* studies, there is considerably more disagreement in the *ex post* literature regarding the efficacy and success of previous amalgamation programs (see Dollery et al., 2012). Whilst the aforementioned studies have found evidence of higher costs following reform, others have found no statistically significant evidence of cost reductions or improvements to financial health (Blom-Hansen et al., 2016; Faulk and Grassmueck, 2012). Moreover, another group of studies has identified cost reductions (although the authors often recognised cost savings in some service categories were offset by higher expenditure in others; Andrews, 2015; Meares et al., 2018; Reingewertz, 2012).

One explanation for the mixed results observed in the extant *ex post* literature may relate to the different approaches used to define and measure public policy success. As tendered by McConnell (2010, p.349) 'some case studies define a programme's success according to the value judgements of the author being the standard…. others focus on standards such as goal achievement and benefits to key sectoral interests.' This has resulted in a multitude of dimensions being applied to the study of policy outcomes – often with inconsistent findings (McConnell, 2010).

Inconsistency in the definition and measurement of success is concerning given the importance of *ex post* analyses to the learning process (Bovens and 't Hart, 2016; Howlett, 2012). Otherwise stated, if policymakers do not know whether the reform program was successful in achieving its objects, they cannot reasonably be expected to assess the suitability of this type of intervention for future applications, nor improve the efficacy of future reform programs (McConnell, 2010; Howlett, 2012). To avoid potential confusion and ensure cohesion in the *ex post* literature on structural reforms, a comprehensive theory is thus desirable and one prominent candidate may be found in the policy success framework developed by Bovens and 't Hart (2016). This framework differentiates programmatic from political policy success respectively, and places greater emphasis on the processes employed to meet the objectives stated by reform architects.

In cognisance of the policy success framework, our paper supplements the extant *ex post* literature by employing a number of difference-in-difference analyses designed to comprehensively assess the outcomes from a recent large scale forced amalgamation program. Similar to other extant analyses (see, for example, Andrews, 2013; Reingewertz, 2012; Maher, 2015), we begin by examining the impact of structural reform on the total expenditure of affected local governments to gauge the overall success of the program. However, we also extend this analysis by carefully examining the processes that were

expected to generate success – specifically reductions to employee, material, and other expenses respectively.

The remainder of the paper is set out as follows. In the next section we further explicate on the policy success framework and its relevance for our analysis. Thereafter, we outline the empirical model, followed by a presentation and discussion of results. The paper concludes with an enumeration of important lessons for policymaking and scholarly analysis.

6.2 A Framework for Measuring Policy Success

6.2.1 *Policy Success*

One of the first tasks of conducting an *ex post* analysis of structural reform is to determine what constitutes success. However, it is likely that definitions of success employed by politicians will differ from those within the wider community, or from local government employees who face the possibility of unemployment as a result of the reform.

To address these problems, in their seminal work *Understanding Policy Fiascos,* Bovens and ‘t Hart (1996) raised the idea that policy success could either be determined from a programmatic lens or a political lens. As they refined in later articles, programmatic evaluations ‘pertain to the world of facts and social balance sheets, observable costs and benefits, original intentions and eventual outcomes’ whilst the political dimension ‘pertains to the world of impressions, lived experiences, stories, counter-frames, heroes and villains’ (Bovens and ‘t Hart, 2016, p.656). Thus, whilst the former relies largely on objective evaluations of success against criteria promoted by the reform architects themselves, the latter involves more subjective assessments, evoking the emotions and impressions of a range of stakeholders to determine success.

This policy success framework was further developed by McConnell (2010) and Marsh and McConnell (2010) who argued for the inclusion of a third dimension to measure success – process. Unlike programmatic and political evaluations, this proposed dimension was said to focus on the '*means* by which societies could and should make collective choices in the public interest' [Emphasis added] (McConnell, 2010, p.349). We argue that process might be defined even more broadly to also encompass the means, or process, through which the desired outcome might be achieved. Moreover, as Bovens (2010) later suggested, process can itself be evaluated under a programmatic or political lens, rather than as a separate dimension. In this way a clear distinction can be made between the outcomes obtained through reforms, and the processes which led to these outcomes. Otherwise stated, whilst it is important to be able to evaluate whether a policy achieved its intended purpose (outcomes) it is equally important to identify why this result has been produced (processes).

In order to evaluate the success of a structural reform program, scholars must first decide which lens they will apply to measure success. Because the respective lenses represent fundamentally different outlooks it is important to focus on just one and hence avoid potential conflation. In the extant literature much work has already been done evaluating local government reforms from a political perspective (see, Savitch et al., 2010; Drew et al., 2019; Miyazaki, 2020) including the amalgamation program under consideration (Drew et al., 2019; Drew, 2019; Dollery and Drew, 2017; Drew and Dollery, 2016a). By contrast, no empirical *ex post* programmatic evaluation has been made of the forced amalgamation under consideration, nor is there any extant rigorous evaluation of programmatic process of amalgamation in the corpus of scholarly literature. Accordingly, we have elected to focus on the gaps in the literature by employing a programmatic lens.

To do this, we need to know what the intended outcomes of the structural reforms were and how these outcomes were expected to be achieved. This is a task to which we now turn our attention.

6.2.2 *Context*

This study examines the forced amalgamation programme conducted in 2016 by the New South Wales state government. Australian local government provides a much more limited remit compared to its international counterparts, focusing principally on the provision of 'services to properties' including refuse management, road maintenance and the provision of water and wastewater services whilst 'services to individuals' such as education, health, and law and order are typically a state or federal responsibility (Dollery et al., 2012). Recent expansion in the remit, resulting from cost-shifting by higher tiers of government and increased provision of discretionary services (such as recreational facilities and cultural festivals), has led to a deterioration in Australian local government financial sustainability (Drew, 2020).

Financial sustainability concerns were highlighted in the 2011 *Destination 2036* workshops which saw the creation of an Independent Local Government Review Panel (ILGRP) tasked with identifying options for reform. The interim report *Future Directions for Local Government* and final report *Revitalising Local Government* produced by the panel emphasised that the current number of local governments in New South Wales (NSW) was not sustainable and recommended extensive compulsory amalgamations (Drew and Dollery, 2016a; 2018). These reports were heavily reliant upon a review conducted by the state treasury corporation (TCorp, 2013). However, the literature has criticised the evidence tendered, citing flaws in the assumptions, data, and methodology employed (Drew, 2018).

The NSW state government responded to the recommendations made by the ILGRP in 2014, requiring local governments to undertake a self-assessment of their financial sustainability. Unsustainable local governments were initially required to submit voluntary amalgamation plans; although eventually the programme shifted to a forced amalgamation regime (Gerathy, 2015). This change in approach was particularly noteworthy given the earlier commitment by the state government against forced amalgamations and was generally seen as a major cause of the public discontent and controversy surrounding the reforms (Drew and Dollery, 2018).

The submissions were assessed by the Independent Pricing & Regulatory Tribunal (IPART) which declared that many local governments were in a parlous state. IPART's finding that two-thirds of local governments were unsustainable ('not fit for the future'), according to a range of financial and scale metrics, were used to argue for forced amalgamations (IPART, 2015). However, considerable doubts were also raised about the data and methodology employed by IPART (see Drew and Dollery, 2016a).

Initially a reduction in the number of local governments from 152 to 112 was intended. However, a subset of local governments pursued legal action to challenge the policy, eventually resulting in a decision by the state government to abandon the remaining amalgamations (Knaus, 2017). Consequently, 14 local governments originally selected for amalgamation were able to remain as independent entities, bringing the total number down to 128. The amalgamations formally took effect on the 12 of May 2016, resulting in the creation of 19 new entities[19] (LGNSW, 2020).

[19] Another amalgamation was undertaken in September 2016 bringing this total to 20. However due to differences in the timing of the treatment this local government will be excluded from the analysis.

6.2.3 *Intended Outcome and Processes*

Given the financial sustainability concerns outlined above, the primary objective of FFTF was to generate reductions in local government expenditures in order to improve financial sustainability. Evidence of this can be seen in the claims that the 'savings generated by the proposed measures… will lead to improved operating results for affected councils' which will 'pave the way for stronger, greater capacity and more sustainable local governments' (KPMG, 2015, p.3; 8). Consequently, under the programmatic lens, success may be determined by whether these expected savings in unit expenditure (intended outcomes) did indeed arise.

Moreover, for the purposes of learning, and to achieve a greater understanding of *why* reforms are successful or not, the processes of the reforms should also be examined. Reform architects identified three main processes which were expected to lead to reductions in unit expenditure. The first of these processes was a reduction in employee numbers (and hence employee expenses) within the local government, mainly through rationalisation in executive and middle management positions (see KPMG, 2016). Notably, these redundancies were commonly justified as being needed for the 'removal of duplicated activities' of local governments (EY, 2015). The second process was a renegotiation of arrangements with material suppliers and contractors (IPART, 2015; KPMG, 2016). Indeed, it was argued that the greater size of amalgamated local governments would lead to increased purchasing power and the savings from this process were expected to be reflected in the 'materials and contracts' expenditure accounting item (see KPMG, 2016). The final process was savings arising from the achievement of economies of scale in administrative or 'back-office' functions commonly recorded as 'other' income (including general office expenses, utilities, Councillor and Mayoral fees etc).

Evidence of these processes can also be found in the policy documents tendered during the reforms, which identify 'potential for FTE reductions, savings in materials and contracts and expenses classified as "other" in the financial accounts of the councils' (EY, 2015, p.38). Moreover, it was suggested that 'for some local government functions, notably infrastructure and back-office functions, increased scale can and does bring efficiencies and cost savings' (EY, 2015, p.18). Thus, to obtain a more comprehensive understanding of the programmatic success of the reforms, we also analysed the processes which were expected to generate savings.

In the next section we will introduce the data and empirical methods which we employed to test whether these expected processes and outcomes were indeed realised.

6.3 Empirical Methodology

To examine the success of the structural reform program, difference-in-difference (DID) analysis was employed. DID is an econometric technique most commonly used in relation to natural or quasi-experiments to measure the effect of a given event or policy change (referred to as a treatment). In essence, it measures the *average causal effect* of *treatment* on the *treated* (Angrist and Pische, 2009). This is achieved through a comparison of the results obtained by the group which underwent treatment to a control group, after controlling for the pre-treatment differences between the two cohorts (see Figure 6.1).

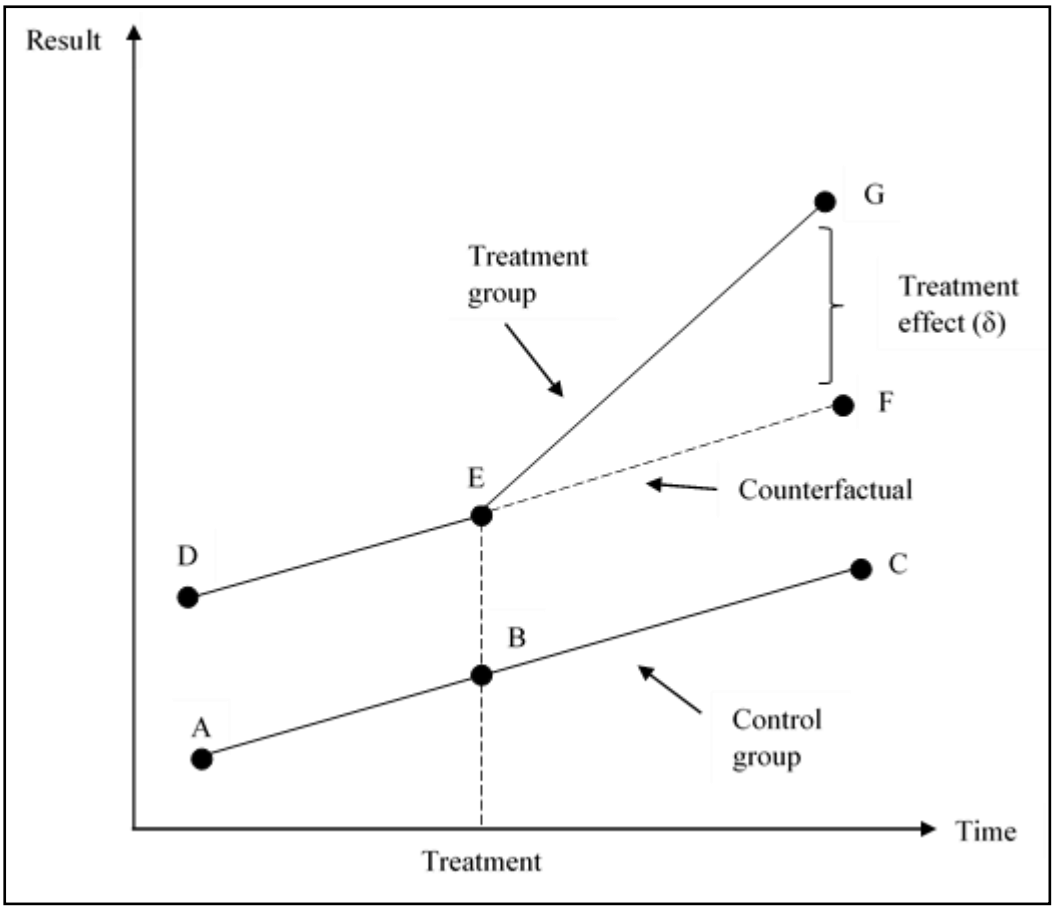

Figure 6.1 Difference-in-Difference Estimation

To ensure the reliability of the estimators obtained, DID analysis requires several key conditions or assumptions to be met. The most important of these is that the variable under analysis is not correlated with the criteria for treatment (Reingewertz, 2012). That is, the estimated treatment effect must not be biased by differences between treatment and control groups resulting from self-selection or assignment into these groups. One method to eliminate this selection bias is random assignment – although for structural reform programs this is often not possible because the reforms are designed to target a particular problem (such as financial sustainability), and thus the local governments selected should be those with relatively poorer performance. However, as we will show below, this was not a relevant concern for our study given that the amalgamated group selected did not experience significantly poorer performance compared to the control groups.

If this condition cannot be met, then a second assumption is required, referred to as the common-trend assumption. This assumption states that, in the absence of treatment (referred to as the counterfactual), the *trends* in the results achieved by the treatment group should mirror those of the control group (line EF, Figure 6.1). Although it is also beneficial for the two groups to have similar *levels* of performance prior to reform, we reiterate is not mandatory as the DID estimator controls for pre-treatment differences in level. If the counterfactual cannot be directly observed, it is common to examine the trends which existed *prior* to treatment commencing, and to select a control group which experienced a similar trend to that of the treatment group prior to the commencement of treatment (see Card and Kruger, 1994; Reingewertz, 2012).

For the purposes of this DID analysis, the nineteen new local government entities created by the amalgamation reforms represent the treatment group. To minimise potential selection bias, we first employed the local governments that were also initially selected by policymakers for treatment (as they were deemed to be facing similar (unfavourable) financial conditions) as a control group. In addition, to ensure even higher standards of robustness of the DID estimates obtained, a second and third control group were also selected and compared. The second group consisted of local governments with similar pre-reform financial performance and community characteristics from the wider cohort of local governments in the state (Reingewertz, 2012). Similarity with the treatment group was assured by employing matching estimators developed by Abadie et al. (2004) and Abadie and Imbens, (2006). The third control group was constructed using the synthetic control method previously developed by Abadie and Gardeazabal (2003) and applied by scholars such as Abadie (2021), Zeng et al. (2021), Bifulco et al. (2017), and Kreif et al. (2015). Similar to the matching estimator approach the synthetic control method also uses data obtained from the wider state cohort. However this is used to construct a synthetic counterfactual for the

amalgamated local government (Abadie et al., 2010). The actual results can then be compared to this synthetic counterfactual to identify if the reforms created any material difference in operational expenditure.

Thus, the basic DID for this analysis can be specified as:

$$Y_i = \beta_0 + \beta_1 \cdot period_i + \beta_2 \cdot treated_i + \delta \cdot period_i \cdot treated_i + \gamma X_i + \varepsilon_i$$

In which **Y** is the variable of interest (variables representing the outcomes or processes of the reforms), **period** is an indicator variable representing the years following the amalgamations (2017 to 2019 inclusive), **treated** is an indicator variable for the amalgamated local government group, **δ** is the DID estimator, **X** is a vector of control variables and **ε** is an independent and identically distributed error term.

In order to enable a comparison before and after the reform, data for the amalgamated entities in the pre-amalgamation years was aggregated[20]. Notably, this approach was also employed in recent analyses of local government reform (see, for instance, Reingewertz, 2012).

The control variables included account for the pre-treatment differences between the treatment and control groups, and largely conform to the extant literature and relevant theory (economies of scale and the flypaper effect). Local government size and density were included to account for potential economies of scale and density in production (Drew et al., 2014). Variables representing resident deprivation (under 15, aged, ATSI, NESB, median wage, DSP, newstart and carers) were employed to control for differences in service utilisation between these constituents (for instance the greater utilisation of recreational facilities by children) and reflect the link between socioeconomic disadvantage and local

[20] For three of these entities (two from the treatment group and one control) the local government areas were split, with some suburbs becoming stand-alone entities whilst others were incorporated into the amalgamated entity, complicating an aggregation of pre-amalgamation data. As a result, these entities have been excluded from the analysis.

government expenditure (see McQuestin and Drew, 2019). The length of sealed and unsealed roads was included to account for differences in service quality, which can result in different maintenance schedules and hence expenditure requirements. The total intergovernmental grants received by local governments were included in response to the documented link between intergovernmental funding and expenditure (known as the 'flypaper' effect; Dollery and Worthington, 2005). Finally, an indicator variable representing the location of the local government – whether it is assigned as urban or rural according to the local government classification scheme (OLG, 2018) – was employed in response to the substantial differences that exist between these local governments (particularly with respect to non-discretionary services).

Where necessary natural logarithmic transformations were used to correct for skewed distributions. The definition of the variables employed have been provided in Table 6.1. In Table 6.2 we provide summary statistics for all local governments within NSW, as well as disaggregated metrics for amalgamated local governments, the control group (those which avoided amalgamation), and the remaining local governments (i.e. those not considered for amalgamation):

Table 6.1: Definitions of Variables Employed

Variable	Description
Variables of Interest (Y)	
Totexp per assess (ln)	Total operational expenditure per property assessment ($000)
Staff exp per assess (ln)	Staff expenditure less depreciation expenses per property assessment ($000)
Mat exp per assess (ln)	Materials expenditure per property assessment ($000)
Other exp per assess (ln)	Other expenditure per property assessment ($000)
Exogenous Control Variables	
Assess (ln)	Number of taxable properties in the local government area
Density (ln)	Number of residents divided by the local government area
Under 15	Proportion of residents under 15 years of age
Aged (ln)	Proportion of residents receiving aged pension
ATSI (ln)	Proportion of Aboriginal and Torres Strait Islander residents
NESB (ln)	Proportion of residents from a non-English speaking background
Median wage (ln)	Median employee income received by residents
DSP (ln)	Proportion of residents receiving a disability support pension
Newstart (ln)	Proportion of residents receiving a Newstart (unemployment) allowance
Carers (ln)	Proportion of residents receiving a carers pension
Sealed (ln)	Length of sealed roads
Unsealed	Length of unsealed (graded dirt) roads
Total Grants (ln)	Financial assistance grants received
Metropolitan	Indicator variable where: urban local government = 1, rural local government = 0

Table 6.2: Summary Statistics of Variables Employed (standard errors in parentheses)

Variable	Entire State	Amalgamated	Avoided Amalgamation	Not Considered For Amalgamation
Totexp per assess (ln)	1.51 (0.01)	1.47 (0.03)	1.07 (0.02)	1.58 (0.02)
Staff exp per assess (ln)	0.48 (0.01)	0.40 (0.03)	0.14 (0.02)	0.54 (0.02)
Mat exp per assess (ln)	0.13 (0.02)	0.08 (0.04)	-0.21 (0.02)	0.18 (0.02)
Other exp per assess (ln)	-0.69 (0.01)	-0.68 (0.03)	-0.87 (0.04)	-0.67 (0.02)
Assess (ln)	9.38 (0.04)	9.91 (0.12)	10.05 (0.07)	9.20 (0.05)
Density (ln)	2.76 (0.12)	2.82 (0.31)	8.23 (0.05)	1.99 (0.11)
Under 15	19.16 (0.09)	18.65 (0.17)	16.55 (0.25)	19.62 (0.10)
Aged (ln)	2.44 (0.01)	2.52 (0.03)	1.75 (0.03)	2.52 (0.01)
ATSI (ln)	1.25 (0.04)	0.98 (0.09)	-1.15 (0.07)	1.63 (0.03)
NESB (ln)	1.56 (0.04)	1.78 (0.11)	3.33 (0.06)	1.27 (0.04)
Median wage (ln)	10.68 (0.01)	10.67 (0.01)	10.95 (0.02)	10.64 (0.01)
DSP (ln)	1.31 (0.02)	1.26 (0.04)	0.14 (0.05)	1.48 (0.01)
Newstart (ln)	1.07 (0.02)	1.01 (0.04)	-0.10 (0.05)	1.25 (0.02)
Carers (ln)	0.10 (0.03)	0.06 (0.06)	-1.33 (0.08)	0.31 (0.02)
Sealed (ln)	6.05 (0.03)	6.59 (0.04)	4.97 (0.06)	6.10 (0.03)
Unsealed	637.84 (23.37)	851.96 (65.87)	0.00 (0.00)	687.32 (26.29)
Total Grants (ln)	15.36 (0.02)	15.81 (0.05)	14.30 (0.07)	15.42 (0.02)

Metropolitan	0.54 (0.02)	0.59 (0.05)	1.00 (0.00)	0.47 (0.02)

Data was sourced from publicly available information released by the Australian Bureau of Statistics (ABS, 2020), NSW Local Government Grants Commission (LGGC, 2019), the Office of Local Government (OLG, 2020), and the audited financial statements prepared by each local government.

6.4 Results

In order to support the use of a DID estimator we conducted preliminary testing to ensure the validity of the common trend assumption and address potential concerns regarding selection-bias. A visual analysis of the trend (see Figure 6.2) reveals that the two groups of local governments did indeed exhibit similar (largely constant) trends in unit cost expenditure prior to structural reform. This was further supported by an inability to reject the null hypothesis of equality in pre-treatment trends ($p=0.6284$). Moreover, testing also revealed that the amalgamated local governments did not experience significantly poorer performance prior to reform when compared to either the non-amalgamated cohort ($p=0.1017$) or the local governments selected by the matching estimators ($p=0.8043$)[21]. Supplementary regression diagnostic testing did not identify problems related to heteroskedasticity, multicollinearity or normality, within the models tested.

[21] Similar insignificant results were also found for the staff expenditures, material expenditures and other expenditures (results available upon request).

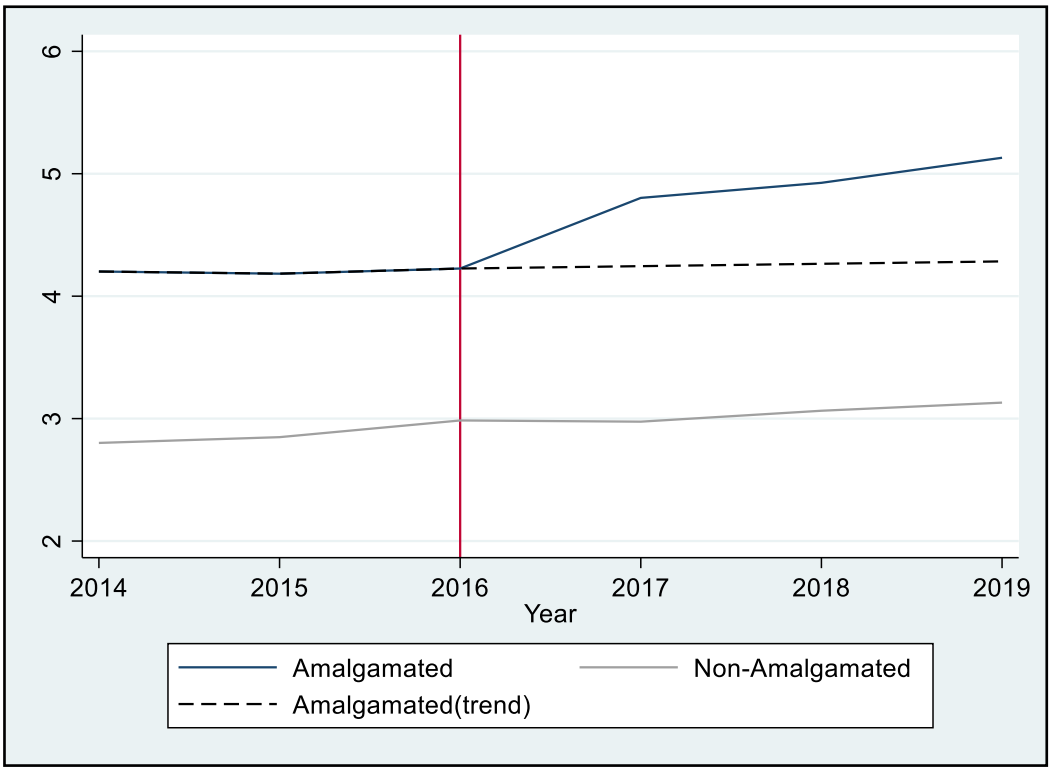

Figure 6.2 Trends in Total Expenditure per Assessment ($000)

The results of the DID on the key outcomes of the reforms – total operating expenditure per assessment –are provided in Table 6.3. The signs and significance of the control variables largely followed expectations with local governments facing greater resident deprivation (higher proportions of children, indigenous residents and unemployed persons, and lower median wages) or receiving higher levels of intergovernmental grants being associated with higher spending. Moreover, larger local governments (in terms of the number of property assessments) typically experienced lower total unit operating expenses due to increasing returns to scale, *ceteris paribus*.

With regard to the variable of interest (the treatment effect), results from the basic model (employing the non-amalgamated cohort as the control group; Model 1) indicate that the reforms were associated with a highly significant *increase* in total operating expenditure per

assessment of 11.2% on average. Consequently, from a programmatic perspective, it appears *prima facie*, that the amalgamations were not only unsuccessful in achieving reductions to unit cost, but indeed led to a further deterioration to financial performance.

Moreover, when an interaction term (DID*Metropolitan) was included to determine if the effects of the reforms differed between urban and rural local governments, the treatment effect jumped to 17.4% and a significant negative sign was observed for the interaction term. This is also important as it indicates that the unsuccessful outcomes were significantly larger for rural local governments compared with their urban counterparts (however it is noteworthy that the reforms still led to higher spending, on average, for both types of local governments). Potential explanations for this result may include the greater heterogeneity that often occurs between neighbouring rural local communities, the substantial and unavoidable travelling expense to service distant rural communities, as well as the relatively greater scope and resources available for urban local governments to take full advantage of new structures (see Drew, 2020 for a comprehensive account of the reasons why rural amalgamations often fail to deliver). Further analysis will be required to render conclusive judgements and identify any other latent factors which may also have affected efficacy.

To ensure that the results obtained were not biased as a consequence of the specification selected, models employing alternative specifications and control groups were also examined. For example, the addition of a quadratic term to control for potential economies of scale did not yield significantly different results (the treatment effect remained highly significant; results available from the corresponding author). Similarly, Models 3 and 4 re-estimated the treatment effect by employing alternative control groups selected from the total state cohort of local governments. Model 3 employed the nearest neighbour matching technique developed by Abadie et al. (2004) whilst Model 4 utilised the propensity score matching technique developed by Abadie and Imbens (2006). Although the magnitude of the treatment

effect declined slightly (to approximately 9% and 10% respectively), the result remained highly statistically significant, supporting the robustness of earlier models and hence our conclusion regarding the inability of the reforms to achieve programmatic success.

As an alternative method of confirming that the results were not subject to selection bias a synthetic control group was also constructed, utilising data obtained from the amalgamated councils and wider state cohort (see Abadie and Gardeazabal, 2003 for a detailed description of the methodology). By comparing the actual results obtained to the synthetic counterfactual the impact of the amalgamations can also be measured and the robustness of the DID estimates verified. A description of the local governments which were used to construct the synthetic controls and associated weights are provided in Table 6.4 whilst the results from the hypothesis tests are provided in Table 6.5. The supplementary tests confirm the conclusions obtained from the DID models. While there was no significant difference in unit expenditure between the amalgamated and synthetic local governments prior to the amalgamations ($p=0.1261>0.05$) which is to be expected in a synthetic control model, the period following the reforms saw the actual level of spending increase markedly when compared to the synthetic counterfactual. As a result the actual spending ($1,504 per property assessment) was greater than the synthetic level that would be expected in the absence of reform ($1,423 per property assessment) at the highest level of statistical significance ($p=0.0009<0.01$). Again this supports the earlier conclusions reached that the reforms were associated with significant increases in operational expenditure.

Table 6.3 Difference-in-Difference Regression Results: Outcomes

Independent Variables	Basic Model (1)	Model with Urban Interaction Term (2)	Nearest-Neighbour Matching (3)	Propensity-Score Matching (4)
DID	0.112**	0.167**	0.086**	0.097*
	(0.041)	(0.053)	(0.028)	(0.049)
DID* Metropolitan	-	-0.086+	-	-
		(0.053)		
Period	0.052	0.049		
	(0.034)	(0.034)		
Treated	-0.016	0.006		
	(0.051)	(0.053)		
Assess	-0.215**	-0.205**		
	(0.078)	(0.079)		
Median Wage	-0.341*	-0.365*		
	(0.152)	(0.152)		
Total Grants	0.417**	0.400**		
	(0.096)	(0.096)		
Metropolitan	-0.055	-0.012		
	(0.063)	(0.069)		
Controls	Y	Y	Y	Y
n	128	128	128	128
Coefficient of Determination	0.87	0.88		

Note: +p < 0.10, *p < 0.05, **p < 0.01

Table 6.4: Local Governments Used to Make Synthetic Controls

Amalgamated local government	Non-Amalgamated reference group	Weights
Armidale Regional Council	Byron	0.159
	Carrathool	0.081
	Central Darling	0.122
	Coonamble	0.005
	Kempsey	0.028
	Singleton	0.052
	Sydney	0.006
	Tamworth	0.336
	Wagga Wagga	0.210
Bayside Council	Burwood	0.035
	Canada Bay	0.310
	Fairfield	0.274
	Lake Macquarie	0.207
	Randwick	0.167
	Shellharbour	0.008
Canterbury-Bankstown Council	Blacktown	0.066
	Fairfield	0.707
	Ku-ring-gai	0.012
	Sutherland	0.215
Central Coast Council	Blacktown	0.043
	Lake Macquarie	0.894
	Shoalhaven	0.063
Cootamundra-Gundagai Regional Council	Berrigan	0.144
	Cobar	0.035
	Cowra	0.309
	Greater Hume	0.016
	Gwydir	0.102
	Lake Macquarie	0.090
	Shoalhaven	0.025
	Temora	0.177
	Weddin	0.070
	Yass Valley	0.033
Dubbo Regional Council	Blacktown	0.066
	Brewarrina	0.051
	Moree Plains	0.078
	Narromine	0.115
	Tamworth	0.691
Edward River Council	Clarence	0.033
	Forbes	0.092
	Glenn Innes	0.058
	Hay	0.087
	Lockhart	0.078
	Muswellbrook	0.126
	Tenterfield	0.086
	Upper Lachlan	0.439
Federation Council	Berrigan	0.455

	Fairfield	0.073
	Port Macquarie	0.044
	Upper Lachlan	0.428
Georges River Council	Burwood	0.186
	Canada Bay	0.117
	Fairfield	0.029
	Ku-ring-gai	0.100
	Sutherland	0.280
	Sydney	0.026
Hilltops Council	Berrigan	0.023
	Bland	0.412
	Greater Hume	0.211
	Inverell	0.009
	Lake Macquarie	0.034
	Shoalhaven	0.235
	Upper Lachlan	0.074
	Wollongong	0.002
Inner West Council	Blacktown	0.224
	Fairfield	0.073
	Newcastle	0.220
	North Sydney	0.244
	Randwick	0.219
	Sydney	0.020
MidCoast Council	Clarence	0.425
	Shoalhaven	0.575
Murray River Council	Berrigan	0.324
	Bland	0.475
	Lachlan	0.007
	Port Macquarie	0.152
	Upper Lachlan	0.042
Murrumbidgee Council	Carrathool	0.391
	Coonamble	0.076
	Junee	0.227
	Narromine	0.160
	Weddin	0.147
Northern Beaches Council	Ku-ring-gai	0.356
	Sutherland	0.591
	Sydney	0.053
Queanbeyan-Palerang Regional Council	Cobar	0.199
	North Sydney	0.280
	Singleton	0.133
	Sutherland	0.020
	Wagga Wagga	0.368
Snowy Monaro Regional Council	Bega	0.312
	Bland	0.241
	Carrathool	0.117
	Ku-ring-gai	0.189
	Tamworth	0.141
Snowy Valleys Council	Berrigan	0.229
	Cobar	0.145

	Greater Hume	0.129
	Hay	0.075
	Muswellbrook	0.148
	Shoalhaven	0.221
	Temora	0.028
	Upper Lachlan	0.011
	Weddin	0.014

Table 6.5: Hypothesis Testing of Difference Between Actual Unit Expenditure and Synthetic Counterfactual

	Mean (standard error)		Difference (standard error)
Period	**Actual Results**	**Synthetic Control**	
Before amalgamation	1.372	1.335	0.037
	(0.044)	(0.041)	(0.024)
After amalgamation	1.504	1.423	0.081**
	(0.052)	(0.043)	(0.023)

As the literature suggests, the first potential explanation for the unsuccessful outcomes observed relates to an inability to achieve savings resulting from economies of scale. As scholars have previously identified, evidence of economies of scale in service provision is mixed and is particularly unlikely for labour-intensive functions (Blom-Hansen et al., 2016; Drew et al., 2014; Seldon and Campbell, 2000). Moreover, for capital-intensive services, where stronger support for economies of scale exists, scholars such as Drew (2020) have argued that the magnitude of potential savings may not be sufficient to compensate for the initial costs of the amalgamations.

Additional explanations relate to the inability and reluctance of policymakers to implement the changes required to generate cost savings. This is particularly relevant to employee rationalisation. There are often legislative constraints on the termination of employees, and these were in operation following the reforms (NSW Government, 1993). Moreover, local

government decision-makers are often reluctant to dismiss staff who they know as people rather than mere numbers, and often wish to avoid community discontent which might be expected in response to a reduction in local employment opportunities (especially in rural areas; Drew, 2020). Indeed, as one official recounted ‘none of the elected officials could stomach laying off staff in the name of consolidation’ (Gaffney and Marlowe, 2014, p.202).

Other potential causes for the lack of success that have been proposed in the literature include the tendency for upwards harmonisation of service levels and wages following amalgamation (Drew, 2020; Bird and Vaillancourt, 2006), and the acceleration of spending immediately preceding and following amalgamation (Blom-Hansen et al., 2016; Drew, 2020). To try to isolate where things might have gone wrong, we conducted a number of additional DIDs to test the processes proposed by the reform architects.

Savings were expected to arise from a rationalisation of staff (reducing staff costs), more favourable renegotiation with suppliers of materials and contracts, as well as efficiencies in back-office functions (classified as ‘other’ expenses). We therefore conducted further DID regressions to test each of these accounting line items. The common trend assumption for each variable was again tested and supported, both visually (see Figures 6.3, 6.4 and 6.5) and empirically (the null hypothesis of equality of pre-treatment trends could not be rejected in all cases) confirming the validity of the DID estimator. The results of the DID estimation are provided in Table 6.6.

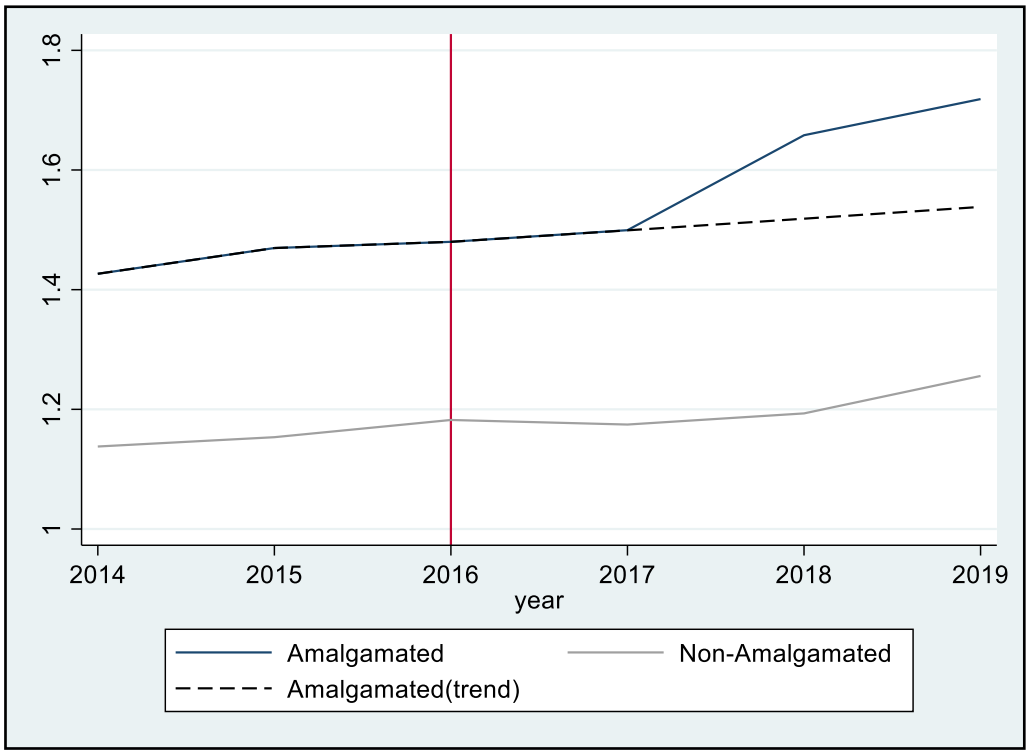

Figure 6.3: Trends in Staff Expenditure per Assessment ($000)

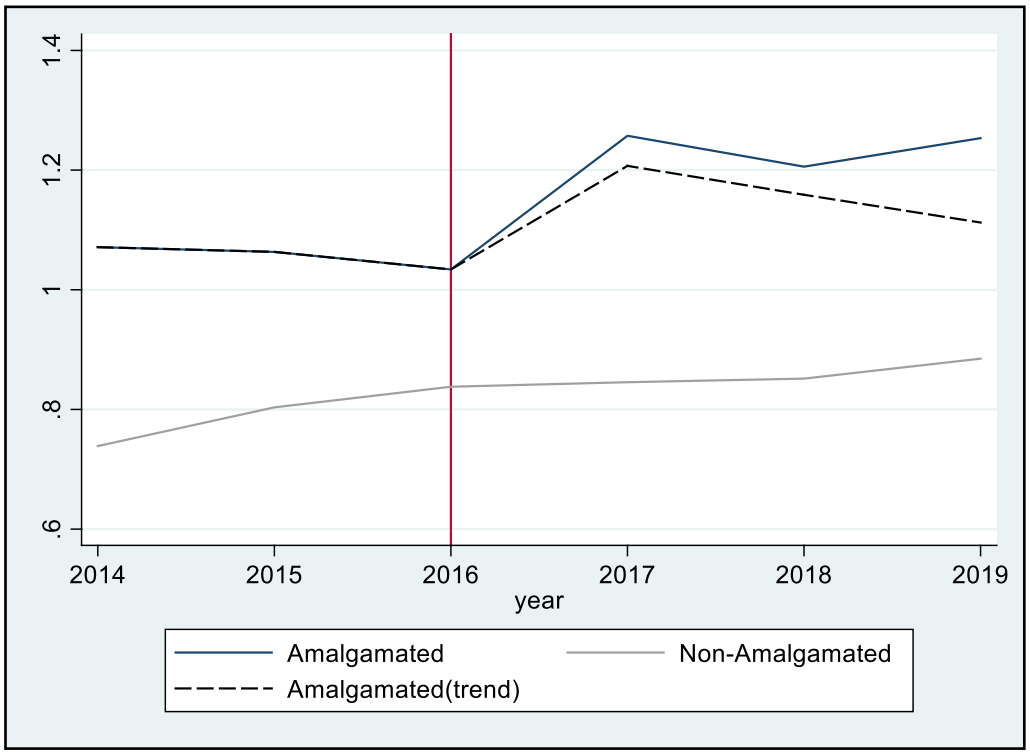

Figure 6.4: Trends in Materials and Contracts Expenditure per Assessment ($000)

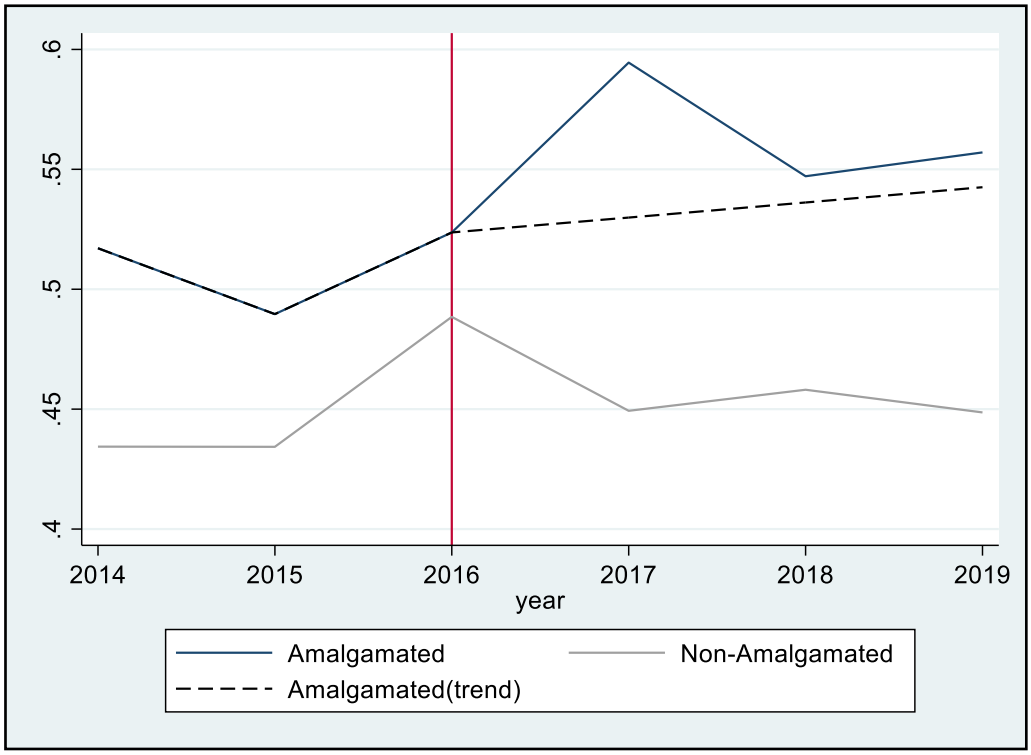

Figure 6.5: Trends in Other Expenditure per Assessment ($000)

Table 6.6. Difference-in-Difference Regression Results: Processes

Independent Variables	Staff Expenditure (5)	Materials and Contracts Expenditure (6)	Other Expenditure (7)
DID	0.152**	0.059	0.133
	(0.057)	(0.071)	(0.105)
DID*	-0.030	0.014	-0.066
Metropolitan	(0.057)	(0.070)	(0.104)
Period	-0.012	0.058	0.090
	(0.036)	(0.045)	(0.067)
Treated	0.158**	-0.037	0.044
	(0.057)	(0.070)	(0.103)

Assess	-0.217**	0.015	-0.281+
	(0.084)	(0.104)	(0.154)
Median Wage	-0.628**	0.418*	-1.606**
	(0.164)	(0.203)	(0.300)
Total Grants	0.725**	-0.255**	0.378*
	(0.103)	(0.128)	(0.189)
Metropolitan	-0.144+	-0.127	0.416**
	(0.074)	(0.091)	(0.135)
Controls	Y	Y	Y
n	180	180	180
Coefficient of Determination	0.78	0.77	0.57

Model 5 presents the results of the DID estimation on staff expenditure. From these results we can see that the structural reforms were associated with a statistically significant *increase* in staff expenditure per assessment of approximately 15.2%, contrary to the expectations of the reform architects. For the other two processes – materials and contracts expenditure (Model 6) and other expenditure (Model 7) – a *positive* treatment effect was also observed (again indicating higher expenditure in the order of 5.9% and 13.3% respectively), however this was not statistically significant[22]. It can therefore be deduced that higher staff expenditure arising from the reforms was the key determinant of the higher total unit expenditure outcome observed. In addition, expected savings in material and contract expenditure and other expenditure respectively, failed to materialise.

Thus, the results of this supplementary analysis provide support for the suggestion in the literature that unsuccessful outcomes occur because of either an inability or reluctance to rationalise staff. Indeed, if we examine the numbers of FTE staff, we see no significant differences between pre- and post-amalgamation levels (p=0.9788). In addition to the failure to rationalise staff, the significant *increase* in staff expenditure also suggests that higher salary payments were being provided to existing staff following the reforms. Potential explanations include the upwards harmonisation of wages following amalgamation which has been previously observed in the literature (Drew, 2020; Bird and Vaillancourt, 2006). Other possibilities include salary increases resulting from an increase in responsibility, as well as a greater reliance on the use of casual labour rather than full-time labour during the transition period (see Gaffney and Marlowe, 2014; Drew 2020; Seldon and Campbell 2000).

[22] The validity of these models was also testing through the use of matching estimators, with identical results obtained. These results are available from the corresponding author upon request.

The results of these supplementary analyses provide valuable knowledge for future policy reform architects. This is especially so given that the bulk of the projected cost savings were *assumed* to arise from reductions to staff expenditure (KPMG, 2016). As our analysis reveals, these assumptions are largely illusory (potentially worsening matters for local governments), and hence future structural reform programmes based upon such assumptions should be viewed with some scepticism.

6.5 Conclusion

This analysis has demonstrated that the amalgamations were not successful in achieving stated program objectives, and indeed resulted in higher operational expenditure per assessment (likely hindering the ability of amalgamated local governments to become financially sustainable). Moreover, an investigation of the reform processes suggests that this can be principally attributed to greater staff expenditure following amalgamation, although a failure to also realise expected savings in materials and other expenditures did not aid matters.

Our results highlight the importance of conducting *ex post* studies of local government reforms. In the absence of studies such as ours, policymakers might have remained unaware that the anticipated savings did not occur and that matters have indeed deteriorated for a number of the amalgamated local governments. The importance of our work is further highlighted by the fact that a detailed report on the projected savings from the reforms has still not been released by the reform architects, despite concerted efforts (Drew and Dollery, 2016a).

Now that these unsatisfactory outcomes have been identified, policymakers may need to reconsider the efficacy of amalgamations, or at least introduce policy refinements to ensure that the desired savings are actually realised. Moreover, through the dissemination of the results obtained from *ex post* analyses of this kind, communities which have experienced a deterioration to financial outcomes can now hold policy-makers accountable for these outcomes and potentially seek remedies.

The analysis has also revealed the benefits of a coherent framework for measuring the success of local government reform programs. This is particularly important given both the previous disagreements in the amalgamation literature, as well as the fact that this specific reform has been previously labelled 'successful' based on a narrow qualitative examination of only three of the amalgamated entities (AONSW, 2019a). Through the application of the policy success framework developed by Bovens and 't Hart (1996) and refined by McConnell (2010) and Marsh and McConnell (2010) we were able to develop robust quantifiable measures of success and conduct an objective analysis of the structural reform program. This method we employed can be adapted and applied to other jurisdictions and reforms thus helping to address some of the contention and ambiguity which surround some programmes.

The results of our analysis suggest a number of fruitful avenues for future research. For example, future work should examine in more detail the reasons *why* the unsatisfactory outcomes occurred (we have proposed just a few possibilities above). For this purpose, scholars may need to further examine both the *processes* and *politics* involved in the reforms. Knowledge of this kind may also prove to be important for the learning process, and thus allow policymakers to address shortcomings and achieve more successful outcomes in the future. In addition, future studies may consider applying the policy success framework to other local government reform instruments, in order to determine if they represent more effective alternatives for addressing financial sustainability concerns.

In sum, we have found that amalgamations did indeed make a difference – but it seems one quite contrary to the intent of the policy architects.

Chapter 7- Searching for a Deeper Understanding of Local Government Amalgamation Outcomes

7.1 Introduction

The implementation of local government amalgamations (also referred to as mergers or consolidations) to arrest waning financial sustainability remains a highly controversial public policy intervention (Dollery et al., 2020). Much of the resistance to local government amalgamation stems from the lack of community input into the design of amalgamation programs (McQuestin, et al., 2018) as well as fears concerning reductions in community representation and local identity in the newly created entity (Terlouw, 2018; Soguel and Silberstein, 2015). From an internal perspective local government employees also fear a loss of employment (although this is often protected by legislative provisions against termination; see Garlatti et al., 2020) and an inability for disparate (and often geographically distant) regions to merge into a single unified community (Spicer, 2016).

These potential disadvantages of amalgamation are often justified by the ability of larger local governments to achieve economies of scale, and thus take advantage of the associated cost savings and financial sustainability benefits. In neo-classical economics, it is recognised that for some functions, increased output can result in reduced average total costs (unit cost) [23]. This reduction in unit cost is expected to occur as a result of *inter alia* increased specialisation, better use of excess capacity in capital intensive equipment, as well as greater purchasing power (Fahey et al., 2016).

[23] Although, it is important to recognise that once the output expands beyond the optimal scale production, it will then enter a relatively long domain of constant returns to scale (no change in unit cost as output increases) and diseconomies of scale (increases to unit cost) which could further threaten financial sustainability (McQuestin et al., 2020). In addition, it has been previously recognised in the empirical literature that for certain functions economies of scale may be non-existent, and hence changes to the scale of production through amalgamation would have no material impact on unit costs.

However, the evidence regarding the efficacy of amalgamation in the extant literature is mixed and inconclusive (Tavaris, 2018; Dollery et al., 2020). For instance, Drew et al. (2016) and McQuestin et al. (2017) both found that local government amalgamations in the Australian local government jurisdiction of Queensland resulted in reduced efficiency. By way of contrast Reingewertz (2012) found that mergers in Israel resulted in a substantial fall in costs in the order of nine percent. Moreover, studies in continental Europe of Danish (Blom-Hansen et al., 2016), German (Blesse and Baskaran, 2016), and Dutch (Allers and Geertseema, 2016) local government merger programs have generally found no nett reduction in expenditure (although all studies listed found evidence of savings in administrative functions arising from the reforms). Indeed, the inconclusive nature of the empirical evidence regarding the efficacy of local government consolidation is further demonstrated by a review of American city-county consolidations by Martin and Schiff (2011) which determined that only approximately one-quarter of extant studies find evidence of improved efficiency.

This inconsistency is concerning given the inability of policymakers to determine if amalgamation reforms will be able to effectively improve performance *ex-ante* and the potentially severe consequences that may be imposed the affected local governments if the reforms are not conducted based on robust supporting evidence or practice. Evidence of these problems in an Australian context can be seen in the financial solvency problems currently being faced by the recently amalgamated Cootamundra-Gundagai Regional Council, Inner West Council, Armidale Regional Council and Central Coast Council in the New South Wales local government jurisdiction (Arundale, 2020; Vince, 2020, Ferguson et al., 2020)

Thus, in order to support informed policy decision making, it is imperative that the ability of reform programs to improve the outcomes obtained for affected local governments is indeed scrutinised, and that the reasons behind the outcomes observed can be understood *before* future policy interventions are considered, let alone implemented. In the previous chapter the

inability of the recent NSW Fit For the Future (FFTF) reforms to improve local government performance via a reduction in unit operational expenditures were identified. Rather, through the use of novel difference-in-difference analysis supplemented by additional models employing nearest-neighbour, propensity score and synthetic control testing, the significant increase in spending attributable to the reforms was made evident. In addition, the reform processes (or a failure to complete the processes necessary to generate savings) which led to these disappointing outcomes were discussed, utilising data on the composite elements of operational expenditure: namely staff expenditure, material and contracts expenses and other expenditure items.

In this chapter, a greater level of attention will be paid to the outcomes which are being targeted by policymakers, namely improvements to the financial sustainability ratios which are commonly used to justify the need for reform, and which have been previously used to determine which local governments in particular will be selected for intervention (although we note this is not always the case[24]). Through the use of the behavioural economics theory, and in particular a thorough discussion of the objectives or targets which local governments aim to achieve and the instruments available to both policymakers and local governments to achieve these targets, we can gain a greater understanding of the outcomes from past policy interventions, and the role which local governments and policymakers might be able to play in supporting financial sustainability in the future. The next section will provide a discussion of the behavioural economics literature more commonly founded in the macroeconomic policy discourse, adapting the theory to account for the unique features of the local government sector. Thereafter we then outline the context for our investigation along with the empirical methodology that we employ in response to our research aims. Thereafter we

[24] In the NSW FFTF reforms an additional metric, an arbitrary population target of 10,000 was also used which resulted in a number of otherwise financially sustainable, or 'fit', local governments being selected for amalgamation (see IPART, 2015).

consider our empirical results, concluding with a discussion of the importance of our approach for a more complete appreciation of local government reform programs.

7.2 Behavioural Economics, Financial Sustainability Targets and Local Government Instruments

The effect of local government decision-making and public policy reform on performance outcomes can be understood by employing the theoretical reasoning posited in the behavioural economics literature. Although this theory is more commonly used to explain monetary policy decisions and the impact of monetary policy on key economic indicators (see Svennson, 2003; Fender, 2012; Duarte, 2019) it can be readily adapted to the local government sector. In order to achieve this, we will first outline the key components upon which the behavioural economic framework is based, drawing on the relevant literature.

7.2.1 Targets and Objective Function of Local Government

The first key component of the behavioural economics model is that local government entities have several key objectives which they aim to achieve. In an Australian context, the most important of these objectives relates to the maximisation of key financial performance indicators (or the minimisation of performance indicators which measure negative outcomes)[25]. This is because it is these indicators which are used by higher levels of government to scrutinize the performance of the local government sector as a whole (AONSW, 2019). In addition, these indicators are also used to determine whether policy intervention is necessary, and to decide which local governments need to undergo reform based on relatively poorer financial performance levels (for example refer to the TCorp

[25] Although it is recognised that there are other (non-pecuniary) objectives which local government authorities deem important, such as ensuring representativeness in marginalised communities, ensuring equity in service provision and local stewardship. However, these goals are beyond the scope of this thesis (see Ryan et al., 2018 for a discussion of these factors).

(2013) policy documents). In NSW (the jurisdiction of interest of this analysis) the financial sustainability ratios previously developed by the Queensland Treasury Corporation (QTC) have been selected to represent the objective targets for local governments in the State, given that they formed the cornerstone of the 2016 Fit For the Future reform process and continue to be scrutinised in the post-reform performance evaluation regime (TCorp, 2013). These key ratios include the own-source revenue ratio, operating performance ratio, debt service ratio, building and asset renewal ratio, infrastructure backlog ratio and the asset maintenance ratio (see the next section (7.3) for individual definitions of each).

Thus, with reference to these financial ratios, the key target of local government operational decisions in NSW, and the corresponding objective function can be described by equations 7.1 and 7.2 below:

$$Max \ FS_t \qquad (7.1)$$

$$\text{where} \quad FS_t = F(Opex_t, L_t, x_t) \qquad (7.2)$$

In which $\boldsymbol{FS_t}$ is the value of each of the six key financial sustainability ratios in period *t* (noting that 7.1 would be written as a minimisation objective for the infrastructure backlog ratio given that a greater value indicates poorer financial performance). As 7.2 indicates, the optimisation of these ratios can be represented as a function of several factors which have a direct effect on local government finances.

The first factor is the current level of unit operational expenditure, $\boldsymbol{Opex_t}$, which is often used to represent underlying operational performance of the local government with regards to service production and provision. Thus, it represents the key internal decisions undertaken and external policies which influence local government operations and hence the ability of the local government to achieve its financial ratio targets. This measure was selected rather than the total level of expenditure in cognisance of the fact that depreciation expenses are

often excluded from financial sustainability metrics as they represent a sunk cost to the municipality (that is they represent the impact of past, rather than current, decision-making).

The second factor, $\boldsymbol{L_t}$, includes all local government characteristics which have been previously identified by the literature to influence financial performance (see Drew, Kortt and Dollery, 2017). This is often due to their direct effect on the cost of service provision or on the revenue-raising capabilities of the local government (wherever possible). Common factors include the size of the local government, density of resident populations, and intergovernmental grant reliance.

The final factor, $\boldsymbol{x_t}$ was selected to represent the external characteristics of the wider resident population or the local government area which have a direct material impact on the local government finances. The most common example previously employed in the literature includes the wealth of the wider resident population which can affect both capacity to pay, and resident groups which are provided with direct taxation concessions such as the elderly (Alonso and Andrews, 2019).

If we assume a quadratic form for the relationship between the factors which affect financial performance and the financial sustainability ratios which may be obtained under the objective (see Svennson, 2003 for a justification of this approach), we can rewrite equation 7.2 as follows:

$$FS_t = \gamma(Opex_t - Opex^*)^2 + \delta(L_t - L^*)^2 + \varphi(x_t - x^*)^2 + \varepsilon_t \quad (7.3)$$

Where $\boldsymbol{Opex^*}$, $\boldsymbol{L^*}$ and $\boldsymbol{x^*}$ respectively represent the combinations of optimal operating expenditure levels, local government characteristics and resident characteristics which would enable a local government to achieve the highest possible level of financial performance and thus maximise the financial sustainability ratios. The coefficients $\boldsymbol{\gamma}$, $\boldsymbol{\delta}$, and $\boldsymbol{\varphi}$ are needed for account for the fact that each of these factors exerts a different impact on financial

sustainability, both in terms of the direction and the magnitude of the influence. Finally, the included error term ε_t has been incorporated in the model to recognise the potential external exogenous shocks to the local government which (at least temporarily) may be expected to bolster or hinder financial performance. Examples may include natural disasters, such as bushfires or flooding, unexpected downturns in local economic conditions, or (more recently) the sudden and unexpected lockdowns in local government areas as a result of the coronavirus pandemic (Nguyen, 2021).

7.2.2 Instruments Employed to Achieve the Objective Function

The key second component of the behavioural economics literature relates to the existence of an instrument which may be used by local governments and policymakers to achieve the aforementioned objective function. Given equations 7.2 and 7.3, the instrument will be derived from one of the key variables which exert an influence over the financial sustainability ratios. In general, local governments do not have a high degree of autonomy over their individual characteristics ($\boldsymbol{L}$) (it would be difficult for a local government to alter its size or resident density independently) or the characteristics of the local resident population ($\boldsymbol{x}$). Thus, these two factors, rather than being used as instruments by local governments, instead largely represent an external constraints on financial performance.

In comparison, local governments and policymakers have a much greater propensity to influence operational performance. That is, local government executives are more easily able to select production decisions which will enable them to achieve the most desirable financial sustainability outcomes while interested policymakers can more easily influence local government decision-making via reform. As a result it is the first factor, the level of unit operational expenditure ($\boldsymbol{Opex}$) as a reflection of these internal processes and decisions that is more likely to be associated with an instrument for improving performance compared with

the other alternatives. It is important to recognise that although operational spending is a desirable performance attribute and a medium through which the target objective may be achieved, it is not an objective by itself. This is because, although local government and policymakers seek to ensure that public services are produced in as little cost as possible, this is done with the higher purpose of improving financial sustainability. Evidence may be seen through the fact that prior reform programs are almost invariably initially founded based on waning financial sustainability in the sector (Drew, 2020) and that whilst the reform documents mention the benefits which may be achieved in from cost savings, this was only necessary to 'generate sufficient funds over the long term to provide the agreed level and scope of services and infrastructure for communities' (IPART, 2015, p.31).

Consequently, if we consider that the determinants of unit expenditure and financial sustainability can be defined as follows, the applicable instrument becomes evident:

$$Opex_t = \beta_0 + \beta_1 Services_t + \beta_2 R_t + \beta_3 z_t + \mu_t \qquad (7.4a)$$

$$Opex_t = \beta_0 + \beta_1 WS_t + \beta_2 Q_t + \beta_3 R_t + \beta_4 z_t + \mu_t \qquad (7.4b)$$

$$FS_t = \gamma([\beta_0 + \beta_1 WS_t + \beta_2 Q_t + \beta_3 R_t + \beta_4 z_t + \mu_t] - Opex^*)^2 + \delta(L_t - L^*)^2 + \varphi(x_t - x^*)^2 + \varepsilon_t \qquad (7.5)$$

Otherwise stated, from equations 7.4a and 7.4b we can see that the decisions made by both local government management regarding service provision, $\boldsymbol{Services_t}$, and the influence which policymakers may have on these decisions via reform (including extant taxation or spending limitations, regulation surrounding the pricing or provision of local government services, or (more recently) structural reform programs), $\boldsymbol{R_t}$, are expected to have a significant influence on unit operational expenditure levels obtained. In this way, these variables represent the instruments for local governments and public policymakers respectively to achieve the aforementioned financial sustainability targets. Given that the level of service quality ($\boldsymbol{Q_t}$; utilising local roads as the largest asset maintained by local

governments) and the provision of water and sewer services in-house or outsourcing to a third-party agency ($\boldsymbol{WS}_t$) represents the largest material decisions available to local governments in NSW (Dollery, 2009) we have elected to use these measures as our local government instruments in the econometric regressions. In addition, as the 2016 amalgamation program represents the most recent large-scale policy reform in the state, this has been selected to represent the public policy instrument.

However, there exists factors, $\boldsymbol{z_t}$, (in addition to the two instruments outlined) which also indirectly affect local government finances through their impact on unit expenditure levels. These factors predominantly include resident characteristics which can affect the demand for public programs and services without directly affecting the revenue-raising capacity of local governments. In a similar manner, there may also be random supply shocks $\boldsymbol{\mu_t}$, such as disruptions in the availability of key inputs, administrative delays, or new innovations in technology which may influence performance. Given that both of these factors could potentially cause an endogenous relationship between unit expenditure and the financial sustainability targets, they will need to be controlled for prior to the estimation of the financial sustainability equation (7.5). To do so, we will employ IV modelling which will be outlined in the later sections.

By utilising these components of behavioural economics, the relationship between the instruments and targets and thus the impact of reform programs on financial outcomes can be understood and empirically examined. The instruments utilised by policymakers in terms of the reform programs conducted are expected to create a material change in the level of operational expenditure obtained. It is then anticipated that these changes to operational expenditure will translate into material improvements in the financial sustainability ratios (see equations 7.3 and 7.5), enabling the local government to achieve its targeted improvements to financial sustainability.

In addition, the ability of local governments to simultaneously contribute to the achievement of these targets is also evident. Through their own internal decision-making relating to service provision and quality (i.e. the local government instrument) local government managers may also contribute to significant reductions in operational expenditure and through this create the necessary improvements in the financial sustainability ratios necessary to achieve their target. These hypothesised relationships which we will test in this analysis are summarised in the hypotheses below:

H_1: the local government instrument is negatively associated with operational expenditure per assessment ($\beta_1 < 0$ and/or $\beta_2 < 0$ – equation 7.4b)

H_2: the public policy instrument is negatively associated with operational expenditure per assessment ($\beta_3 < 0$ – equation 7.4b)

H_3: operational expenditure is positive associated with the financial sustainability ratios ($\gamma > 0$ – equation 7.5)[26]

Through the use of IV regression analysis, we will be able to ascertain the impact which local government and public policy instruments have on financial sustainability outcomes, via their effect on the operational expenditure. By doing so it may be possible to identify why we have observed the outcomes arising from municipal reform programs and thus support informed future policy decision-making. Thus, in the next section to test the insights which may be garnered from the behavioural economics literature (namely the use of instruments to achieve specified targets) we next outline the specifics of our IV model and the variables employed.

[26] And negatively associated in the case of the infrastructure backlog ratio

7.3 Econometric Model Employed to Test the Behavioural Economic Framework

In order to test the effectiveness of local government and public policy instruments on achieving the objective of improving the financial sustainability ratios we employed regression modelling techniques. Given that a number of potential factors exist which may influence financial sustainability through the level of unit operational expenditure which may be obtained, we have elected to employ an IV model, rather than conventional ordinary least squares (OLS) models which can be subject to bias as a result of endogeneity.

The method for conducting IV estimation is simple but intuitive. In the first-stage of the analysis the potentially endogenous variable (in our case $\boldsymbol{Opex_t}$) is regressed against the other included exogenous controls (the $\boldsymbol{L}$ and $\boldsymbol{x}$ variables outlined above), the relevant local government and public policy variables of interest as well as a number of additional variables (labelled **z** below) which are expected to influence the financial sustainability ratios only through their impact on unit operational expenditure. Through this, the reduced form equation of unit operational expenditure may be obtained:

$$Opex_t = \beta_0 + \beta_1 WS_t + \beta_2 Q_t + \beta_3 R_t + \beta_4 z_t + \delta_1 L_t + \delta_2 x_t + \mu_t$$

The projected value of operational expenditure per property assessment is then calculated for use in the second stage of the analysis:

$$\widehat{Opex}_t = \beta_0 + +\beta_1 WS_t + \beta_2 Q_t + \beta_3 R_t + \beta_4 z_t + \delta_1 L_t + \delta_2 x_t$$

This projected value is then used in place of the original operational expenditure per property assessment variable in the second-stage of the regression which employs the financial sustainability ratios as the dependent variable. This is commonly referred to as the second stage regression or structural model.

$$FS_t = \beta_0 + \gamma \widehat{Opex}_t + \delta L_{K,t} + \varphi x_{M,t} + \varepsilon_t$$

Notably, as there are six individual financial ratios, we will estimate six structural models in the following section. The same reduced form model can be applied to each structural model, there is no need to estimate more than one reduced form model.

The variables selected for our reduced form and structural model have been based on theoretical evidence and the past literature. Unit expenditure is expressed in per property terms to accord with the nature of Australian local government services that tend to be orientated more towards 'services to property' rather than 'services to people' (Drew, 2020). For the period prior to the amalgamation, we combined the entities that would be ultimately amalgamated consistent with Reingewertz (2012) and Blom-Hansen et al. (2016). We also added time indicator variables in line with much of the extant work, notwithstanding the fact that it only attenuated the results very slightly. Robust standard errors were employed, clustered at the local government level.

With regard to the local government characteristics ($\boldsymbol{L}$) the size of the local government (and its quadratic term) were necessary to account for the potential economies of scale in service production which may affect financial performance (Drew et al., 2014). In a similar manner population density (number of persons per square meter of local government area) was included to control for economies of density, whereby costs tend to decrease as the density of municipal residents rises. The total value of intergovernmental grant funding was also selected to account for the flypaper effect in local government funding whereby the sources of local government revenue may have disparate effects on the local government financial decisions (Dollery and Worthington, 1995). That is, typically funding obtained from higher tiers of government will create a greater level of spending than an equivalent amount of own-sourced income.

The exogenous resident characteristics ($\boldsymbol{x}$) include the percentage of aged, Aboriginal and Torres Strait Islander residents, residents with a disability (and thus receiving a Disability Support Pension (DSP)) and their carers (those receiving a Carer's pension), unemployed (those receiving the Federal Newstart Allowance) and the median wage of residents within the local government area. These variables are all important to control for their potential impact on local government financial performance as a result of concessions applied to taxation collection, and the financial capacity to pay for local government goods and services (which is typically reduced in areas with more resident disadvantage; Andrews et al., 2005).

The key variables in the reduced form equation are expected to only impact financial performance via their effect on unit operational expenditure. The variables chosen for this purpose include the instruments[27] or decision-making tools available to local governments to achieve their objectives which includes an indicator variable representing whether a local government provides water and sewer services (whereby a value of zero indicates the service is outsourced), and the relative length of sealed and unsealed roads maintained by the municipality to represent service quality decisions. In a similar manner an indicator variable to represent the amalgamated local governments was also needed to account for the instruments available to policymakers. Other community variables which do not directly affect finances including the percentage of children (under 15 years of age) and foreign residents (those from a non-English speaking background). We note that each of these variables are common practice in empirical studies of local government efficiency and financial performance (see Drew et al., 2014; Drew et al., 2016; Martin, and Schiff, 2011)

[27] It is important to recognise that there is a difference between the 'instruments' (decisions and policy options available to local governments and policymakers) from the behavioural economics theory and the 'instruments' used in the IV model to control for endogeneity.

Appropriate log transformations (guided by empirical diagnostics) were applied where indicated to correct for skewed distributions. A definition of all key variables employed, and central tendency measures are provided in Table 7.1, whilst the definition of the financial ratios which will be used as dependent variables in the second stage regression and their associated benchmarks are provided in Table 7.2:

Table 7.1: Summary Statistics of Variables Employed

Variable	Description	Average (Standard Errors)
Dependent Variables: Reduced form and Structural Models		
Tot exp per assess (ln)	Total expenditure per property assessment ($000)	1.53 (0.01)
Own Source Revenue	Proportion of total revenue not obtained from intergovernmental grants	72.05 (1.07)
Operating Performance	Net operating result per dollar of operating revenue	1.16 (0.59)
Debt Service	Ability to service debt relative to current debt levels	15.39 (1.35)
Building and Asset Renewal	Amount spent on asset renewals relative to loss in value arising from depreciation, amortization, and impairment	101.08 (3.08)
Infrastructure Backlog	Relative cost to bring assets to a satisfactory condition	4.25 (0.41)
Asset Maintenance	Amount spent on asset maintenance relative to the required level	97.98 (1.18)
Exogenous Control		
Assess (ln)	Number of taxable properties in the local government area	9.39 (0.04)
Assess squared (ln)	Squared value of property assessments	88.17 (8.07)
Density (log)	Number of residents divided by the local government area	1.20 (0.05)
Total Grants (ln)	Financial assistance grants received	15.37 (0.02)
Aged (ln)	Proportion of residents receiving aged pension	2.43 (0.01)
ATSI (ln)	Proportion of Aboriginal and Torres Strait Islander Residents	1.26 (0.04)
DSP (ln)	Proportion of residents receiving a disability support pension	1.29 (0.02)
Newstart (ln)	Proportion of residents receiving a Newstart (unemployment) allowance	1.06 (0.02)
Carers (ln)	Proportion of residents receiving a carers pension	0.11 (0.02)
Median wage (ln)	Median employee income received by residents	10.69 (0.01)
Instruments		
Water/Sewer	Indicator variable where the conduct of a water or sewer business = 1, otherwise 0.	0.69 (0.02)
Sealed (ln)	Length of sealed roads	6.05 (0.02)
Unsealed	Length of unsealed (graded dirt) roads	636.95 (21.62)

Under 15	Proportion of residents under 15 years of age	19.14 (0.09)
NESB (ln)	Proportion of residents from a non-English speaking background	1.57 (0.04)
Amalgamation	Indicator variable where amalgamated local governments=1, otherwise 0	

Table 7.2: TCorp Financial Sustainability Ratios

Criteria	Definition	Benchmark
Own Source Revenue	Rates, utilities and charges / total operating revenue ‡.	Greater than 60% average over 3 years
Operating Performance	(Operating revenue † - operating expenses) / operating revenue †.	Greater or equal to break-even over 3 years
Debt Service	Operating result before capital excluding interest and depreciation / principal repayments plus borrowing costs	Greater than 0% but less than or equal to 20% average over 3 years
Building and Asset Renewal	Asset renewals / depreciation, amortisation and impairment of building and infrastructure assets.	Greater than 100% averaged over 3 years
Infrastructure Backlog	Estimated cost to bring assets to a satisfactory condition / total WDV of infrastructure assets.	Less than 2%
Asset Maintenance	Actual asset maintenance / required asset maintenance.	Greater than 100% average over 3 years

† Revenue excludes capital grants and contributions
‡ Revenue includes capital grants and contributions
WDV = written down value
***Source*:** Adapted from IPART (2015)

7.4 Presentation of Results and Discussion

The results arising from the analysis have been presented in Tables 7.3 and 7.4. Table 7.3 contains the results from the reduced form model (the model utilising operational expenditure per property assessment as the dependent variable), whilst the structural model for each financial sustainability ratio is given in Table 7.4. Prior to estimation the presence of endogeneity was tested, with weak evidence found to support the use of an IV estimator at the 10% significance level ($p=0.087<0.10$). Robustness testing was conducted using OLS regression to confirm the reliability of the results obtained with no material deviation from the preferred IV models.

In addition, preliminary testing was also conducted to ensure that the instruments tested were indeed relevant and satisfied the exclusion assumption. That is, they are strongly correlated with the endogenous variable, unit operational expenditure, and only affect the financial sustainability ratios through operational expenditure. While it may be argued that the amalgamations were conducted with the direct aim of improving financial sustainability, prior evidence in the literature has repeatedly proven that the local governments selected did not display poorer financial performance compared to the non-amalgamated cohort (Dollery and Drew, 2017), whilst the policy documents only outline the benefits to sustainability as a result of more efficient production and the minimisation of operational expenditure (see IPART, 2015).

Table 7.3: Reduced Form Model for Total Operational Expenditure per Assessment, 2014-2020.

Operational Expenditure per Assessment	
Instruments	
Water/Sewer	0.114
	(0.198)
Sealed (ln)	-0.185
	(0.157)
Unsealed	-0.0002*
	(0.0001)
U15	0.016
	(0.013)
NESB	-0.004
	(0.004)
Amalgamation	0.130**
	(0.052)
Exogenous Controls	
Assess (ln)	0.383
	(0.413)
Assess squared (ln)	-0.034
	(0.023)
Density (ln)	0.083
	(0.123)
Total Grants (ln)	0.400*
	(0.191)
Aged (ln)	-0.175
	(0.148)
ATSI (ln)	0.066
	(0.045)
DSP (ln)	0.057
	(0.149)
Newstart (ln)	0.080
	(0.134)
Carers (ln)	-0.204
	(0.155)
Med Wage (ln)	-0.628+
	(0.367)

Year Indicator Variables	
2015	0.046**
	(0.018)
2016	0.099**
	(0.030)
2017	0.103+
	(0.057)
2018	0.132*
	(0.067)
2019	0.173*
	(0.075)
2020	0.260**
	(0.086)
n	128
Coefficient of Determination	0.7908

+p < .10, *p < .05, **p < .01. Clustered robust standard errors in parentheses

Table 7.4: Structural Model for Financial Sustainability Ratios, 2014-2020.

	Own Source	**Operating Performance**	**Debt Service**	**Building and Infrastructure Renewal**	**Infrastructure Backlog**	**Asset Maintenance**
Opex per	12.094+	-17.354	-51.227	-62.801	-10.32**	23.330
assess (ln)	(6.874)	(11.421)	(34.100)	(69.163)	(4.213)	(34.818)
Assess (ln)	-1.356	2.507	-93.64**	-47.559	4.732	9.273
	(2.591)	(1.506)	(37.638)	(95.419)	(7.534)	(58.512)
Assess squared	0.728	-0.510	3.530+	2.247	-0.228	-1.308
(ln)	(1.109)	(0.740)	(2.004)	(5.261)	(0.400)	(3.281)
Density (ln)	3.477	2.674	4.084	-6.787	-0.482	21.197+
	(4.282)	(2.517)	(11.369)	(19.223)	(2.622)	(14.310)
Total Grants	-11.314+	8.992*	16.801	-18.978	-1.544	14.400
(ln)	(6.736)	(4.688)	(17.305)	(40.943)	(4.235)	(22.356)
Aged (ln)	6.880	-1.591	-26.68**	20.456	2.857	20.785+
	(6.098)	(4.021)	(8.846)	(36.693)	(3.139)	(13.056)
ATSI (ln)	2.537	0.278	-5.855	-1.602	-0.265	13.187+
	(2.126)	(1.968)	(3.902)	(11.023)	(1.040)	(7.013)
DSP (ln)	3.512	-4.173	15.607	-38.289	3.356	-5.086
	(6.839)	(5.764)	(14.023)	(43.411)	(3.789)	(20.992)

Newstart (ln)	-2.802	8.408+	5.226	79.492*	4.806	-25.253
	(5.549)	(5.208)	(18.198)	(32.811)	(4.204)	(20.898)
Carers (ln)	-4.890	-4.765	1.660	-39.289+	-6.944*	-7.057
	(4.673)	(5.077)	(15.507)	(24.221)	(3.050)	(11.979)
Med Wage (ln)	-8.601	8.398	30.106+	35.908	-13.750	-14.634
	(15.823)	(9.128)	(18.574)	(81.610)	(9.298)	(41.869)
Year Indicator Variables						
2015	-1.227	5.746**	1.232	8.507	-4.685**	7.380*
	(1.214)	(1.136)	(1.257)	(8.116)	(1.759)	(2.969)
2016	-3.622*	13.177**	5.205+	32.243*	-3.004+	7.149+
	(1.820)	(2.162)	(3.127)	(13.606)	(1.609)	(4.286)
2017	-10.79**	13.153**	16.190*	27.750	-1.700	8.984+
	(2.249)	(2.765)	(6.656)	(17.731)	(2.004)	(5.023)
2018	-3.671+	8.050**	15.200*	30.846	-1.298	1.614
	(2.281)	(2.414)	(7.536)	(25.466)	(1.899)	(6.869)
2019	-6.332*	8.655**	18.149*	39.379	0.152	0.789
	(2.555)	(3.263)	(8.923)	(27.698)	(1.914)	(8.473)
2020	-8.150*	5.103	18.031	39.606	1.449	1.051
	(3.681)	(4.358)	(11.554)	(32.247)	(2.298)	(11.807)
n	128	128	128	128	128	128
Coefficient of Determination	0.7269	0.3887	0.2386	0.1995	0.1568	0.1400

+p < .10, *p < .05, **p < .01. Clustered robust standard errors in parentheses

From these tables a number of key findings for the Australian local government sector and the development of future policy interventions can be understood. The first of these relates to the reduced form model (Table 7.3). By examining the instruments selected it is apparent that decisions relating to service production, namely the provision of water and sewer services internally does not have a significant impact on the level of operational expenditure achieved. Indeed, although the water/sewer dummy was positively associated with the level of operational expenditure, this was not significant at any of the commonly selected levels. In comparison, it appears that decisions relating to the quality of local government services, by proxy of the quality of local roads maintained by the municipality does appear to have a material impact on operational expenditure levels. In particular local governments which

maintain greater levels of unsealed (graded dirt) roads compared to roads constructed from asphalt or concrete (referred to as sealed roads in Australia) are associated with significant reductions in operational expenditure per assessment, *ceteris paribus*. Thus, it may be inferred that by taking a prudent approach with regard to service quality (assuming there exist no mandates for certain services which might prevent a local government from doing so, such as health inspection functions or immunisation programs), that local government decision makers may be able to reduce their operational expenditure. Consequently, it appears we have limited evidence to support the first hypotheses (H_1) at least with regard to the service quality coefficient (β_2).

The second key finding, again from the reduced form model, relates to the efficacy of the public policy instrument on unit operational expenditure levels. From Table 7.3 it is evident that the structural reform program via amalgamation was significantly associated with increased operational expenditure levels *ceteris paribus*. Again, this confirms the disappointing results observed in Chapter 6 and further questions the use of amalgamation for improving the financial situation facing local governments. However, although the results may not be ideal for local governments and residents within a municipal area, they confirm that the instruments available to public policymakers, similar to local governments, can indeed have a statistically significant impact on local government practice. Given this finding it may be possible to select an alternative reform instrument which may lead to more favourable outcomes. Thus although the second hypothesis (H_2) was not strictly supported by our results given the direction of the sign of the relationship, the significance of the policy coefficient (β_3) provides promise for other alternative instruments.

However, the most important finding can be found by analysing the results from the structural model in Table 7.4. This is because, contrary to the expectations of local government management, academics, and policymakers alike, after controlling for

endogenous factors and other exogenous covariates there appears to be no statistically significant association between operational efficiency per assessment and five of the six financial sustainability ratios. Indeed, the only ratio which demonstrated any material association was the infrastructure backlog ratio, whereby a 1% increase in unit operational expenditure is expected to result in a reduction in the backlog ratio of 10 percentage points. It is important to note that this ratio measures the value of the backlog relative to the carrying amount of assets held by the local government, so a reduction indicates an improvement in financial performance and hence sustainability. Although a positive relationship was also observed for the own-source ratio, the coefficient was only significant at the 10% level, and thus may not be considered sufficiently strong or convincing evidence by itself. Although all other ratios had the *prima facia* expected sign, they were not statistically significant. The results thus lead to a rejection of the third hypothesis (H_3) raised earlier, with the exception of the infrastructure backlog ratio which is supported. They also largely mirror earlier findings by Drew, Dollery and Kortt (2016) which found a lack of statistical association between efficiency and financial sustainability. Although this seems to suggest that the decision makers within local government are myoptic and bounded rational given that they are much more responsive to operational expenditure per assessment rather than the financial ratio targets (which would be the greater focus of a rational decision maker; see Hommes, 2013) further research would be necessary before this could be stated in a conclusive manner.

This is an important revelation as it provides an explanation for why earlier reform programs in Australia and other international jurisdictions have been largely unable to ensure financially viable local government and further supports the findings found in the earlier analyses contained within this thesis. That is, although the instruments available to local governments and public policymakers do have an impact on local government spending, they are not sufficient by themselves to create any material change in the financial sustainability

ratios through the reduction in operational expenditure levels. Otherwise stated, although the local government and policy instruments are effective at altering operational expenditure levels (although it should be noted that amalgamation as an instrument has previously deteriorated matters), that is not sufficient by itself to achieve the intended target of local government, an improvement in financial sustainability. This should be of particular concern to policymakers given that similar structural reform programs through amalgamation are currently being debated in Western Australia (Keenan, 2020).

7.5 Public Policy Implications and Conclusion

The results arising from our analysis have created a number of implications for local governments and the development of future public policy initiatives not only in the Australian economy, but also in other international jurisdictions. Firstly, given the lack of a significant association between operational expenditure and five of the six key financial sustainability reform targets, architects and local government management alike will need to consider an alternative intermediary for improving financial performance. Given the significance of many of the resident demographic controls, addressing the factors that generate relative disadvantage, such as a lack of educational or employment opportunities, or a lack of sufficient support from alternative institutions such as higher levels of government or private companies may provide a more efficacious alternative. In addition, given the significance of the financial assistance grant variable, improvements to the grant allocation system by way of legislative reform may also enable policymakers to support local governments in achieving their targeted maximisation of financial sustainability. However, similar to structural reform instruments and local service decisions it is important that robust

empirical analysis is undertaken *before* implementation to ensure that the instrument is indeed effective, and that any negative consequences which could potentially be encountered are identified.

The second implication relates to the effectiveness of local government instruments in addition to those available to policymakers. This is because whilst service provision and quality decisions do not appear to have a substantial impact on financial sustainability, the results highlight the important role which local government management can have on performance outcomes obtained. Unfortunately, in the design of previous public policy interventions this crucial role which local government can play has been often overlooked. As a result, there may be benefits which can be gained from the inclusion of local governments in the design and implementation of future reform initiatives (see Allers and Geertseema, 2016; Garlatti et al., 2020).

The final implication relates to the need for decision makers to consider the use of different instruments to achieve different targets. This is because, as previously stated, whilst unit operational expenditure did not have a significant effect on the majority of financial sustainability ratios, it was significantly associated with the infrastructure backlog ratio (and weakly associated with the own-source revenue ratio). Thus, it may be possible that the instruments available to local governments and politicians may only affect certain facets of financial performance whilst leaving others essentially unaffected. In this case a package of policy instruments may be necessary (rather than a single reform program) so that all aspects of financial sustainability may be improved. However, similar to the points above it is important for robust analysis to be undertaken beforehand to identify the effects of any interaction between individual policy instruments.

Although this research has been innovative in its application of behavioural economic theory and IV estimation to determine the impact of local government and policy instruments and thus provide valuable information relating to the outcomes arising from reform it also contains a number of limitations which will need to be addressed in future analyses. The first of these relates to the need to use proxies to represent the instruments available to local government decisionmakers. This is largely because such information is likely to be qualitative in nature and may be better elicited through the use of qualitative techniques such as in-depth interviews or questionnaires. The use of such techniques in future analyses of local government financial sustainability and reform outcomes is thus warranted. The second limitation relates to the use of a relatively short panel. This has arisen mainly due to a need to synthesise data arising from a variety of different sources, in this instance the audited financial statements of local governments, the Australian Bureau of Statistics (ABS), and the NSW Local Government Grants Commission. If a longer panel can be obtained it may be possible to better model the dynamic effects of local government and public policy instruments on financial sustainability, and consequently presents an interesting avenue for future research. The final limitation relates to the use of a single local government jurisdiction. Given that the service provision arrangements and public policy programs undertaken can vary substantially by jurisdiction in Australia (so too does the availability of the data required to undertake analysis), the inclusion of multiple jurisdictions is largely unfeasible in an Australian context. In other countries internationally with greater uniformity of local government systems, the repetition of this research incorporating several jurisdictions (states, regions, provinces etc) may provide valuable insights for academics, local governments, and public policymakers alike.

Chapter 8- Is a Problem Shared a Problem Halved? Shared Services and Municipal Efficiency

8.1 Introduction

Shared services are increasingly being seen as an efficacious means of securing efficiencies in the production of municipal goods and services. In America fiscal pressures arising from taxation limitations, in particular, combined with concerns regarding equity and difficulties prosecuting consolidations have largely been the impetus for municipalities to embark on co-operative arrangements (Feiock, 2007). In Europe, fiscal austerity has been the main motivation for municipalities entering into shared service arrangements even though there are relatively fewer barriers to consolidation (Bel and Warner, 2014). By way of contrast shared services in the Antipodes mainly arise in response to higher-tier government threats of consolidation designed to address waning financial sustainability (Dollery et al., 2016). Indeed, in response to a belief in the efficacy of shared services, some higher-tier governments have provided substantial financial and legislative support to facilitate cooperative ventures. It is therefore important that we have a comprehensive understanding of the efficiency outcomes that might be expected.

However, the extant empirical evidence on shared services is rather mixed and inconclusive (Aldag and Warner, 2018). Moreover, evidence is largely restricted to an analysis of the nett pecuniary outcomes for the specific service produced co-operatively (often solid waste disposal, and generally employing only a single year of data) or on case-studies of shared services in a single municipality (see, for example Conway et al. 2011; KPMG, 2015b). We seek to broaden the evidential base by considering the effect of shared service production on the efficiency of an entire jurisdiction of municipalities over a five year panel of data. As we will explain below, there are a number of costs that are largely exogenous to the specific shared service being produced that might reasonably be expected to affect efficiency of the

municipality as a whole. Analyses that do not look beyond the shared service in question might reasonably be expected to overlook these exogenous costs and thus produce a more favourable view of the efficiency implications arising from shared services than might be strictly warranted.

The main reason put forward for considering shared service provision of municipal goods and services relates to the potential for fragmented municipalities to achieve optimal output size for specific functions and hence capture economies of scale (Kwon and Feiock, 2010; Bel and Warner, 2014). However, there are other reasons for pursuing shared services, apart from the hope of securing efficiencies (although the promise of efficiencies are the most cited and prominent reason; Feiock, 2007). For instance, shared services are often pursued by municipalities purely as a means to escape amalgamations (the argument generally proceeds along the lines that shared services can capture efficiencies relating to scale without the loss of identity and disruption associated with amalgamation; Conway et al., 2011). In addition, shared services may be pursued in order to augment limited managerial and technical expertise (Bel and Warner, 2014; Dollery et al., 2016), reduce professional isolation (Conway et al., 2011), facilitate co-ordination of regional infrastructure planning (Kim and Warner, 2016), promote innovation (Carr and Hawkins, 2013) and improve service quality (Aldag and Warner, 2018). Moreover, shared production of municipal goods and services can provide an efficacious path to internalising externalities (whereby benefits or costs imposed on municipal neighbours as a result of municipalities operating in isolation become distributed to partner municipalities in the event that the relevant service is shared; see Kwon and Feiock, 2010). Shared services might also be pursued in order that political representatives can secure benefits (such as additional or improved services) for defined constituent groups and take credit for same, which explains why shared services are more common where mayors are directly elected (see, Dollery et al., 2016).

This analysis addresses an important gap in the scholarly literature by providing a robust assessment of the association between the efficiency of an entire municipality and whether or not the municipality was involved in at least one shared service arrangement. We also investigate the association between specific categories of shared services and municipal efficiency, by employing an exhaustive eight-part typology in a sequent set of analyses. To achieve our objective of understanding the effect of shared services on municipal efficiency we first construct a theoretical framework to describe the benefits and costs of shared services, drawing largely from the transaction cost theory approach which is the dominant framework in this field. Particular attention is paid to exogenous costs arising from shared services that might be otherwise overlooked by analyses restricted to only the service shared (rather than the entire municipality). Following this we outline our empirical methodology and data sources employed to investigate the two propositions developed in the earlier section. Thereafter we present the results arising from our second stage regressions of a five-year panel of efficiency data (2012 to 2016 inclusive) based on the entire cohort of 68 general purpose municipalities which comprise the jurisdiction of South Australia. In order to verify the robustness of the results arising from our initial models, and to gain further information relating to the dynamic impacts of shared service arrangements the initial regressions are then supplemented through the use of local projection modelling. We conclude our analysis with a discussion of the public policy implications arising from our study.

8.2 The Conditions Required for Efficient Shared Services

Nett efficiency of shared services is equal to the difference between production benefits and the transaction and agency costs associated with managing the co-operative venture (Kwon and Feiock, 2010). Production benefits are mostly attributable to economies of scale which refer to the case whereby long-run average total costs fall as output increases. It should be

noted that not all municipal services exhibit economies of scale, and even when total average costs are responsive to output size this association generally only holds over relatively short domains (Fahey et al., 2016). Once economies of scale have been fully exhausted (that is, when average total costs cease to decrease with increased output and hence efficiency is first maximised) production generally enters a relatively lengthy domain of constant returns whereby there is no change to average total costs as output increases (and there is therefore no change to efficiency for the particular service in question). If output is expanded even further, then diseconomies of scale emerge – average total costs begin to increase as output increases – and relative inefficiency sets in. Figure 8.1 provides a graphical depiction of the association between average total costs and output for services which exhibit scale economies. Clearly production benefits arising from shared services will be maximised where output is increased from a point to the left of the output level at which efficiency is first maximised to an output level that is less than the point at which diseconomies of scale set in. The first obstacle then in reaping nett efficiencies from entering into shared service arrangements is to select a service for which an association between average total cost and output size exists, and for which the combined production of partner municipalities will not incur significant diseconomies of scale.

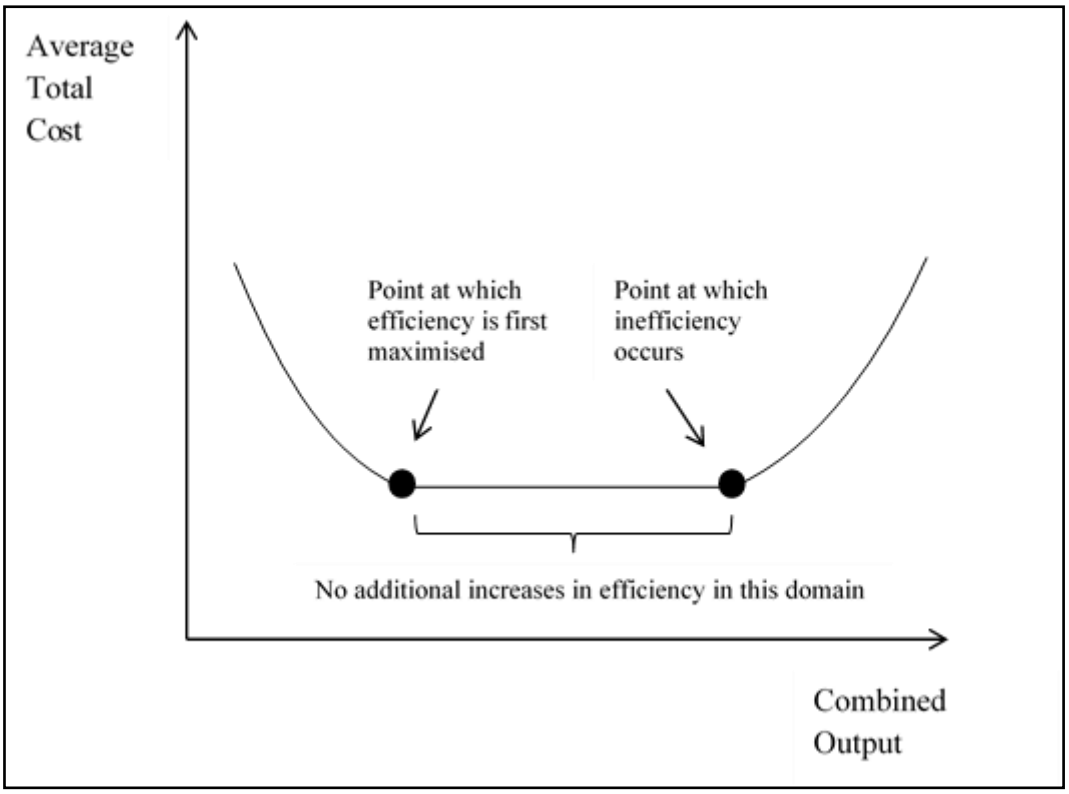

Figure 8.1: Potential Production (Scale) Efficiencies Arising from Shared Services

Even if economies of scale can be captured, the existence of transaction and agency costs directly associated with the co-operative arrangement may well consume the entire efficiencies generated, or indeed exceed the benefits and therefore generate nett inefficiency (Feiock, 2007). Transaction costs arise due to uncertainty regarding future events, information asymmetry and opportunistic behaviour of others, and occur in both shared and in-house production (but are more easily managed in the latter; Brown and Potoski, 2005). Transaction costs include information and co-ordination costs, negotiation and division costs, monitoring and enforcement costs, and defection costs.

Information and co-ordination costs include the expense of garnering information on prospective partners (their preferences and resources) and ensuring that all partners are kept informed regarding the performance of the shared venture (which might involve the expense of engaging staff to administer the enterprise (Dollery et al., 2016) along with costs

associated with meeting statutory and accounting standard requirements). Negotiation costs relate to the initial expense of coming to agreement regarding the quantity and quality of shared services to be produced and how the venture will be resourced. Division costs are the outcome of negotiations and refer to how the gross transaction surplus is distributed among shared service partners (see, Kwon and Feiock, 2010). There is some evidence to suggest that transaction surpluses are not always distributed evenly as a result of the bargaining process, and that bigger municipalities may use their relative power to obtain a disproportionate share of the gross savings arising from the venture (Carr and Hawkins, 2013). Moreover, the heterogeneity of different partners often means that relative division surpluses might differ substantially even if the gross transaction surplus is distributed evenly. This is because different partner municipalities are likely to have provided different standards of services and have had different unit costs for producing the service.

The performance of the shared service venture and the partners themselves must be monitored to ensure that commitments are kept and opportunistic behaviour does not occur. Moreover, if unsatisfactory behaviour is identified then enforcement costs are likely to be borne by the party seeking to correct unsatisfactory behaviour. Defection costs are the last component of transaction costs and are generally considered to refer to the cost incurred when a partner municipality to a shared service withdraws from the co-operative venture (Conway et al. 2011; Dollery et al. 2016; Carr and Hawkins, 2013). This cost occurs due to the change in service level output (reduced output may result in an increase to the long-run average total cost), potential need to renegotiate contracts, potential need to purchase new plant and equipment, and the loss of institutional learning or expertise (especially if the withdrawing municipal had contributed staff which they withdraw) that may accompany defection. There is also a contingent cost, that is often overlooked in the literature, associated with the mere threat of defection. If other members of a co-operative venture suspect that one

of the partners is disenchanted with the arrangements, and may therefore defect, then they may be more likely to bow to the potential defectors preferences (for instance, altering service levels) or even re-distribute the bargaining surplus. As a result the mere threat of defection might result in higher transaction costs.

Agency costs are ‘a cousin of transaction costs’, and refer to expense associated with information asymmetry and goal incongruence (Brown and Potoski, 2003, p. 446). In this regard, it is important to note that there are two levels of agency in operation with respect to shared services. First, municipal executives and elected representatives act as agents of municipal taxpayers. Second, representatives on the shared services board or committee act as agents for their municipalities. At each level of agency hierarchy it is possible that the agents will not faithfully represent the wishes of their principals (either as a result of incomplete knowledge of wishes, as a consequence of the heterogeneity of wishes, or due to disregard of the principal’s wishes).

Failure to accurately represent the wishes of principals at either level will erode the efficiency dividend that lies at the core of the Decentralisation Theorem (the theorem provides an efficiency rationale for provision of goods and services through municipal government; Oates, 1999). That is, decentralised government is more efficient largely as a result of services being tailored to the different tastes of municipal residents and taxpayers. If these different tastes are not communicated clearly and not reflected in the service levels actually provided by the cooperative venture, then the very source of efficiencies for decentralised government will be largely negated. An additional agency cost occurs when the agent is not wholly committed to the idea of shared services (perhaps the agent was compelled by their municipality to participate or perhaps the agent has changed due to sequent elections or staff movements) and this may give rise to the convoy problem (whereby the shared service

venture is hampered by the level of engagement of the least committed agent; see Dollery et al. 2016).

Figure 8.2 provides a summary of the nett efficiencies arising from shared services when analysis is restricted to the service itself, rather than the entire municipality (β is included as a weighting proportional to both the number and heterogeneity of shared service partners to respond to the literature that indicates that nett efficiency is likely to be eroded by multiple heterogeneous partners).

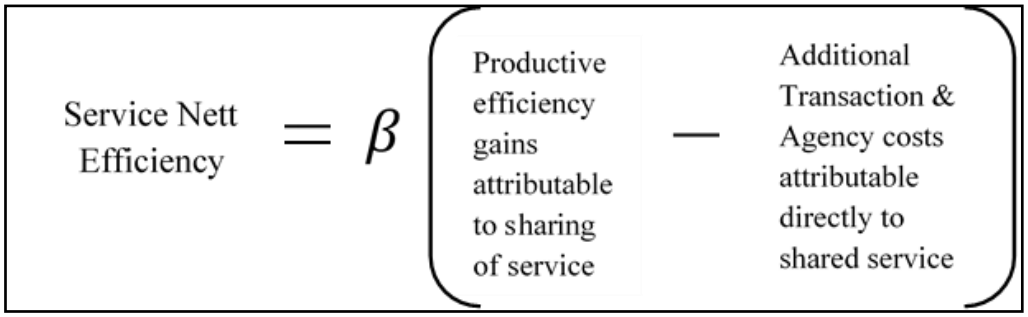

Figure 8.2: Nett Service Efficiency Arising from Shared Services

However, we believe that there are a number of exogenous costs that might be overlooked by analyses that do not examine nett efficiency at the level of the entire municipality. For instance, producing a service co-operatively may result in an erosion of extant economies of scope for the municipality. Economies of scope refer to the savings that may be realised when a single organisation uses the same factor inputs to produce two or more services. If a service is moved from a municipality to a shared service venture, extant economies of scope may be diminished thus reducing efficiency when considered at the level of the entire municipality. In similar vein, if staff and resources previously dedicated to produce a service that is moved to a co-operative venture, are not transferred to the venture, meaningfully redeployed, dismissed or sold, then this also will have a deleterious effect on municipal efficiency. It is

also possible that internal division between and within staff and elected representatives might result in further efficiency reductions that will be felt at the municipal level. Time taken to resolve differences between staff and representatives has a direct effect on efficiency, but there is also an indirect effect that arises from the diversion of organisational attention. Indeed, it is quite possible that there will be differences between and within staff and elected representative cohorts given that shared services has implications for the level of staffing, opportunities for staff advancement, control over service levels and ideology.

Another exogenous cost relates to residual costs associated with the service that are retained by the municipality that might escape notice in a service level analysis. In particular, complaints and inquiries are still likely to be directed to the municipality even after the service has been shifted to a co-operative venture (thus continuing to consume municipal resources). A final potential exogenous cost is the loss of skills that may generate further contingency costs and constrain future options for the municipality (Feiock, 2007).

When we also consider exogenous costs, which might otherwise be overlooked by analyses that are restricted to a particular service, nett efficiencies for the entire municipality can be depicted as follows:

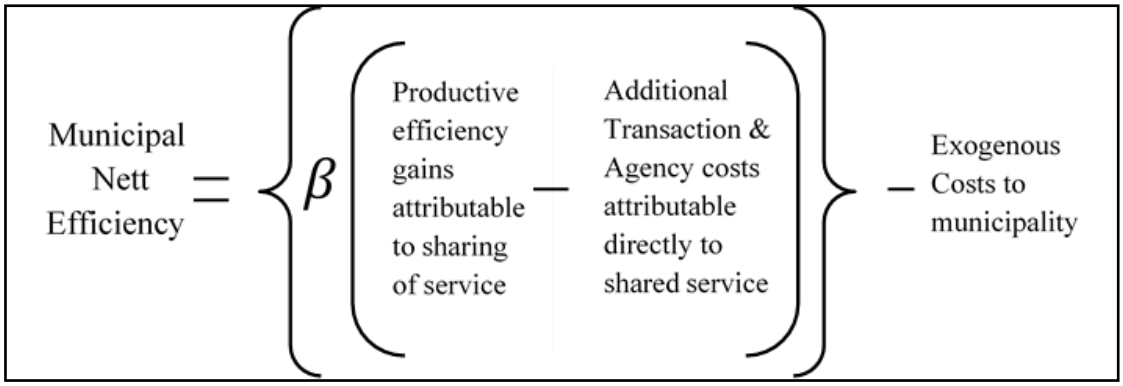

Figure 8.3: Nett Municipal Efficiency Arising from Shared Services

As represented in Figure 8.3 the difficulties in selecting a service amenable to production efficiencies in conjunction with significant transaction costs, agency costs and exogenous costs suggests the following proposition, which is the principal objective of our sequent empirical inquiry

Proposition 1: One might reasonably expect there to be a negative association between efficiency of an entire municipality and whether or not the municipality was involved in at least one shared service arrangement

The scholarly literature suggests that different types of services are likely to yield different efficiency outcomes (see, for example Brown and Potoski, 2005; Feiock, 2007). For instance, services that are amenable to measurement may make it less costly for municipalities to measure the performance of the co-operative venture (Brown and Potoski, 2003). However, services that require single-purpose specific assets and skills (which are difficult to redeploy) may increase the relative costs of establishing and operating a shared service (Brown and Potoski, 2005). In similar vein, heterogeneity of resident preferences between and within municipalities entering into co-operative ventures may also increase the costs, and hence reduce the efficiency, of shared services (Feiock 2007; Carr and Hawkins, 2013). To investigate the question of service specific effects in a little more detail we developed a second, subordinate proposition:

Proposition 2: One might reasonably expect different types of shared services to exert different effects on municipal efficiency in response to variation in barriers to measurability, degree of specificity, or heterogeneity of resident preferences.

We now outline the two-part empirical methodology that we employed to investigate the two propositions.

8.3 Empirical Methodology

To investigate the propositions developed earlier we conducted two-stage empirical analyses of relative technical efficiency for the 68 general purpose municipalities that constitute the jurisdiction of South Australia over five financial years (2012 to 2016 inclusive). It might be noted that municipal government in Australia has a relatively limited remit, compared to jurisdictions abroad, that is focussed on the provision of road infrastructure and services to properties (such as waste removal; see Grant and Drew, 2016 for a thorough account of Australian Local Government). Most services to people – police, health, education and welfare – are provided by state and federal government in Australia. In the first stage of our analysis we estimated the relative technical efficiency of each municipality for each year by employing data envelopment analysis (DEA). In the second stage we regressed the relative technical efficiency scores against control variables and indicators responding to whether or not the municipality was involved with shared services.

8.3.1 Data Envelopment Analysis

DEA measures the relative efficiency of the conversion of inputs into a specified set of outputs. DEA was selected to measure relative technical efficiency as it does not require *a priori* specification of functional form (which is often problematic to justify), and allows for the inclusion of multiple disaggregated outputs which, whilst not a perfect reflection of efficiency, is an improvement on other methodologies (such as unit cost analysis or stochastic frontier analysis (SFA); Drew *et al*. 2017). In the calculation of efficiency, an input-orientation was selected as the output of municipalities are generally considered to be fairly exogenous (Worthington and Dollery, 2001). DEA employs linear programming to first

establish an efficient frontier that represents municipalities which best minimise inputs for the level of output produced – these municipalities are assigned a relative technical efficiency score of 1.0. The input/output conversion of the remaining municipalities are then compared to the frontier and municipalities lying in the interior of the curve are assigned scores less than 1, based on their radial distance from comparable peers. Super efficiency scores were assigned to municipalities that had input/output conversion ratios exceeding their peers on the frontier and these municipalities were identified by imposing a constraint on the linear programme that prevented a municipality from using itself as a peer (Coelli *et al*. 2005).

Figure 8.4 provides a graphical depiction of DEA – in this diagram municipality A would be assigned a score of 1.0 (as it lies on the frontier), municipality B would be assigned a score less than one (because it lies on the interior of the frontier) and municipality C would be super-efficient (and hence be assigned a score greater than 1.0). To eliminate potential bias in the second stage regressions (which we detail in the next sub-section) a constant returns to scale (CRS) model was employed. It is important to note that no infeasible solutions were obtained upon utilisation of this method, and that all weightings obtained were non-zero. Moreover, to provide additional assurance regarding the validity of the results obtained, a supplementary model incorporating bootstrapped[28] efficiency scores was also estimated. Summary statistics for the efficiency scores obtained using both the super and bootstrapped methods have been presented in Table 8.1. Readers requiring a more detailed explanation of this increasingly common empirical technique are referred to the seminal work of Cooper et al. (2007).

[28] Bootstrapping is a re-sampling procedure that is designed principally to address sampling error (which is not strictly relevant here given that we had a census of municipalities) but has become rather de rigueur in DEA estimations.

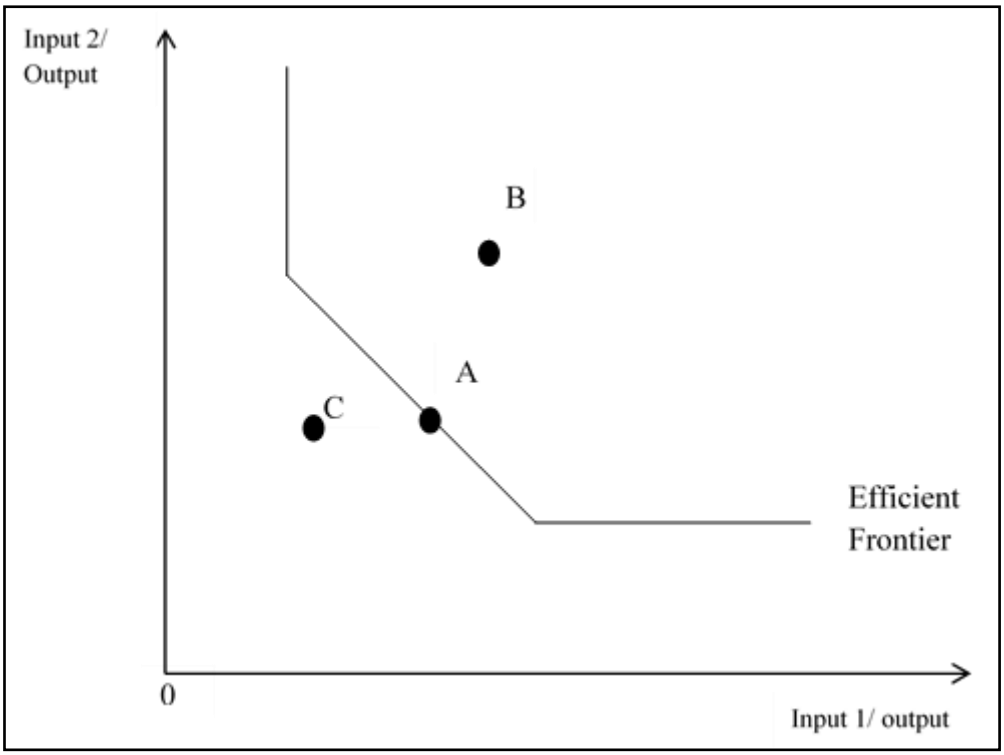

Figure 8.4: Input-Orientated DEA Model

Just like all empirical estimations our DEA employs proxies to measure output. Use of proxies is dictated by data availability and constraints on the number of outputs that can be accommodated by the technique (Nunamaker's (1985) rule restricts the total number of inputs and outputs – see also Cooper et al. 2007). We employed a total of five output proxies that respond closely to the remit of Australian municipalities – where the single largest cost is the provision of road infrastructure (approximately one-fifth of total municipal expenditure (SALGGC, 2015)) followed by services directed to properties (Grant and Drew, 2017). Proxies, of course, are not perfect representations of output, but we do note that our use of DEA has allowed us to include five times as many outputs as other techniques for estimating efficiency (for example, SFA) and that we also capture differences in quantity and quality of outputs through our controls employed in the second stage regressions (see below). The inputs to our DEA were staff and operational expenditure (which are pretty standard inputs

for most DEAs), and our outputs were sealed roads, unsealed roads (generally graded dirt), number of business assessments, number or residential assessments, and other (principally farm and vacant lots) assessments (see Table 8.1). It is important to disaggregate the various types of roads and assessments to capture the different costs and services associated with them (for instance, farm properties do not receive rubbish collection, and unsealed roads generally require more frequent, but less expensive, maintenance). Our DEA specification is consistent with a host of studies performed in the Antipodes and readers can consult Drew et al. (2017) for an in-depth analysis that confirms our proxy selections as the most appropriate case. However, due to the fact that this technique, nor any other technique, can incorporate a complete rendering of every municipal output (were the data even available) readers should remain cognisant of this potential limitation when considering the evidence (in the same manner that readers should be aware of the limitation involving the necessary use of proxies in most empirical work within the corpus of scholarly literature).

Table 8.1: Variables Employed in Data Envelopment and Second-Stage Regression Analyses

Variable	Definition	Mean	Standard Deviation
Data Envelopment Analysis			
Staff Expenses	Annual staff costs (in $000)	10,201.41	12,493.56
Operational Expenses	Total expenditure less staff costs, depreciation and borrowing costs (in $000)	11,837.16	13,679.19
Sealed Roads	Length of sealed (bitumen) roads (in kilometres)	267.689	225.271
Unsealed Roads	Length of unsealed (graded dirt) roads (in kilometres)	833.656	839.280
Business Assessments	Number of businesses with a municipal area	732.465	878.077
Residential Assessments	Number of rateable residential properties within a municipal area	10,036.02	14,053.46
Other Assessments	Total assessments less residential and business assessments. Generally farming and vacant properties	2,231.253	1,509.801
Second-Stage Regression			
Super Efficiency	Constant returns to scale super-efficiency score for each year	0.876	0.270
Bootstrapped Efficiency	Constant returns to scale bootstrapped score for each year	0.826	0.176
Population (ln)	Population size for each municipal area	9.219	1.389
Population squared (ln)	Population size term squared	86.919	25.872
Population density (ln)	Population size divided by the area of the municipal	-1.893	3.188
Under 15	Proportion of persons under 15 years of age	17.863	2.867

Aged (ln)	Proportion of persons on an aged pension	7.134	1.383
Newstart (ln)	Proportion of persons receiving Newstart (unemployment) allowance	5.698	1.479
NESB (ln)	Proportion of persons speaking a language other than English at home	1.489	1.057
ATSI (ln)	Proportion of indigenous persons	0.468	0.881
Median Wage ($'000)	Median wage of wage earners in the municipal area	38.867	8.292
Grants	Financial assistance grant per person	343.533	409.507
Shared Services	Average number of shared services per municipality	0.75	0.89

8.3.2 Second Stage Regression

Second-stage regressions were conducted to determine whether there were statistically significant associations between municipal efficiency estimates and the use of shared services. About a third of municipalities operated at least one shared service during the five financial years of analysis. In total we conducted four regressions – the first two regressions (Models 1 and 2) measured the association between municipal efficiency and the use of at least one shared service arrangement (later disaggregated into eight categories). Thus Models 1 and 2 respond to the first proposition developed earlier. The next two models (3 and 4) replace the single dummy variable for shared services with eight dummy variables, representing the different categories to which all shared service arrangements observed could be classified to, in order to shed some light on our second proposition.

Table 8.2. Shared Service Classifications[29].

Shared Service Type	Definition	Example
Waste	Collection of solid waste	Rubbish bin collections
Water	Water provision and/or stormwater management	Delivering drinking water to households
Health	Community health protection	Restaurant health inspections
Flood	Floodplain management and infrastructure maintenance	Levee repair, river debris removal
Transport	Community transport services	Community buses
Cemetery	Operation of cemeteries	Digging and maintaining burial plots
Equipment	Joint ownership of equipment required to perform municipal functions	Sharing of road maintenance machinery
Procurement	Sourcing of goods, partners and suppliers	Negotiation of service contracts

Although the efficiency scores obtained under a super-efficiency approach are not bounded by an upper limit (evident through the fact that the scores obtained can exceed a value of 1), they still contain a lower bound (as the efficiency scores cannot be negative). Furthermore, for the supplementary model (Model 4) employing bootstrapped efficiency scores, both an upper and lower limit exist (as the efficiency score obtained must lie between 0 and 1). Consequently, to account for the censoring inherent in the efficiency scores obtained, a tobit model is generally employed. Due to an unfavourable Hausman test result, indicating the

[29] Note that the shared service categories presented above may be comprised of several homogeneous sub-categories (for instance health shared services incorporates the sharing of health inspection, immunisation, provision of healthcare-related information) which cannot be separately tested due to insufficient sample sizes. Also note that this is an exhaustive list of the shared service arrangements undertaken by local governments in South Australia).

presence of endogenity, random effects tobit was not used. We therefore conducted a time fixed effects tobit (to account for the individual level differences in a fixed slope, rather than error term)[30]. The model employed can be expressed as:

$$\boldsymbol{E}_{it} = \alpha_{it} + \beta_1 \boldsymbol{X}_{it} + \beta_2 \boldsymbol{S}_{it} + \mu_{it} \qquad i=1\ldots68 \;\; t=1\ldots5$$

Where **E** is the super efficiency score (and bootstrapped efficiency in Model 4), **S** is a binary variable coded 1 if the municipality operates under at least one shared service arrangement (note that this coding system was also applied in models that subsequently disaggregated shared services into eight individual categories), and 0 otherwise (if they do not have a shared service arrangement), **X** is a vector of control variables which are expected to influence municipal efficiency (the full list is provided below and in Table 1), and μ is an independent and identically distributed error term. For the second stage regression – employed to answer our research question regarding the efficiency effects of shared services – the controls selected included the population size (as a proxy for municipal size), population density, the demographics of the residents served (measured through the proportion of residents under the age of 15, the proportion receiving the aged pension, and the proportion of individuals from an Aboriginal or Torres Strait Islander background, or from a non-English speaking background), the socio-economic status of residents (through the median wage received, and the proportion of unemployed residents receiving a Newstart allowance) and the federal assistance grant revenue received by a municipality. The authors experimented with different specifications and found no material difference for the variable of interest (shared services). In particular, the inclusion of grants did not affect the statistical significance or sign of the shared services dummy, nor did the use of variable returns to scale efficiency scores (or bootstrapped scores).

[30] The variable of interest was close to time-invariant thus fixed-effects panel regressions were not indicated

The population variables were selected to account for the potential presence of economies (and diseconomies) of scale in municipal service provision (see Kwon and Feiock, 2010), which can serve to increase (or decrease) the efficiency of an individual municipality (note to achieve this, and account for the non-linear relationship between costs and output, a quadratic term was included for Models 2, 3, and 4). Similarly, to account for potential economies of density (whereby the average cost decreases as population density increases; Holcombe and Williams, 2008)) the variable of population density was included. Measures of population demographics and socio-economic status were included due to strong evidence in existing literature on the effect which deprivation has in influencing the demands of residents for quantity and quality of services, and hence relative technical efficiency estimates (see Andrews, 2004). In an analogous reasoning, the urbanity of the municipality was controlled for in response to the well-documented evidence of different service levels and unit costs which are incurred in rural and urban areas respectively[31] - specifically, persons in rural areas generally receive less services (for instance waste collection may not be available) and lower quality services (culverts rather than drain infrastructure; see Grant and Drew, 2017). Finally, the inclusion of data relating to federal assistance grants is justified due to the previously observed impacts on raising municipal spending (known as the flypaper effect), potentially serving to lower municipal efficiency (Dollery and Worthington, 1995). Variables have been transformed into logarithms where necessary to account for skewed distributions. Summary measures for the variables employed in this analysis are presented in Table 8.1.

In the supplementary models employing the local projection method developed by Jordá (2005) and further refined by Jordá and Taylor (2016), the shared service indicator(s) of interest and control variables will remain the same. However, the dependent variable is

[31] Note that the urban local government category is used as the reference category

replaced by the difference between the current period's efficiency and the projected efficiency score *h* periods ahead. In this way the dynamic evolution of the impact of shared service arrangements over time can be measured. Thus, the local projection equation estimated for this analysis can be defined as follows:

$$\boldsymbol{E_{i,t+h}} - \boldsymbol{E_{i,t}} = \alpha_{it} + \beta_1 \boldsymbol{X}_{it} + \beta_2 \boldsymbol{S}_{it} + \mu_{i,t+h} \qquad \text{for all h} > 0$$

Data for the analysis was sourced from the respective audited financial statements obtained from municipalities, the Australian Bureau of Statistics (ABS) *National Regional Profile* (ABS, 2017b), and the South Australian Local Government Grants Commission *Annual Reports* (see, for example, SALGGC, 2015)[32] The various reports were combined to provide full and consistent strongly-balanced panels of data (that is, the ABS (2017b) report goes back to 2012 and this data was augmented with the relevant data from other sources to produce a single consistent database for analysis). The data relating to the shared service arrangements undertaken by municipalities was obtained from the Note 19 (although this number may occasionally vary) of the *Notes to and Forming Part of the Financial Statements* examining Joint Ventures and Interests in Other Entities, supplemented by the appendices to the annual reports relating to annual reports of regional entities and subsidiaries. If a municipality did not operate under shared service arrangements, this information will not be present in the annual report (although memberships of municipal associations may be provided).

[32] Note that the 2016 grant data is an estimate contained within the SALGGC report.

8.4 Association Between Relative Technical Efficiency and Shared Services

To investigate the two propositions developed from theory we ran a total of four second-stage regressions and four local projection models. The first two models were directed at determining whether a statistically significant association existed between the provision of at least one shared service and relative technical efficiency (TE), with appropriate controls. The third model examined the association between the eight different types of shared services provided by the 68 South Australian municipalities (over the period 2012 to 2016 inclusive) and relative TE and was designed to cast further light on Proposition 2. This analysis was then repeated in Model 4, in order to provided additional assurance regarding our results (we also re-ran the regressions using OLS and found no real difference in the regressors of interest). The results of the second-stage regressions are summarised in Table 8.3.

Table 8.3: Second Stage Regressions of South Australian Municipal Efficiency, 2012-2016.

	Model 1 Super Efficiency	**Model 2 Super Efficiency**	**Model 3 Super Efficiency – By Shared Service Type**	**Model 4 Bootstrapped Efficiency**
Population (ln)	-0.1753*	-0.7545**	-0.8326**	-0.2738**
	(0.0744)	(0.1533)	(0.1611)	(0.0855)
Population squared (ln)		0.0336**	0.0410**	0.0163**
		(0.0078)	(0.0087)	(0.0046)
Population Density (ln)	0.0574**	0.0444**	0.0498**	0.0377**
	(0.0165)	(0.0164)	(0.0170)	(0.0090)
Under 15	0.0246**	0.0260**	0.0225**	0.0108**
	(0.0054)	(0.0053)	(0.0058)	(0.0031)
Aged (ln)	0.2756**	0.2364**	0.1795**	0.1539**
	(0.0483)	(0.0479)	(0.0512)	(0.0272)

Newstart (ln)	-0.1787**	-0.1113*	-0.0969+	-0.1282**
	(0.0551)	(0.0559)	(0.0582)	(0.0309)
NESB (ln)	0.0428+	0.0401+	0.0068	-0.0179
	(0.0224)	(0.0219)	(0.0243)	(0.0129)
ATSI (ln)	-0.0671*	-0.0728**	-0.0606*	-0.0309*
	(0.0264)	(0.0257)	(0.0259)	(0.0137)
Median Wage	-0.0077*	-0.0064*	-0.0065*	-0.0058**
($'000)	(0.0029)	(0.0028)	(0.0028)	(0.0015)
Financial	0.00002	0.0000	0.0000	0.0000
Assistance	(0.00001)	(0.0000)	(0.0000)	(0.0000)
Grant				
Shared Services	-0.0677*	-0.0847**		
	(0.0331)	(0.0324)		
Shared Waste			-0.0816*	-0.0531*
			(0.0426)	(0.0226)
Shared Water			-0.0726	-0.0427
			(0.0674)	(0.0357)
Shared Health			0.1031	0.0390
			(0.0711)	(0.0377)
Shared Flood			-0.0925*	-0.0758**
			(0.0470)	(0.0249)
Shared			0.0493	-0.0263
Transport			(0.0606)	(0.0321)
Shared			-0.0863	-0.0264
Cemetery			(0.0827)	(0.0438)
Shared			0.0738	0.0135
Equipment			(0.0539)	(0.0286)
Shared			-0.1197+	-0.0825*
Procurement			(0.0662)	(0.0351)
Rural	0.1584**	0.1858**	0.1942**	0.2430**
	(0.0547)	(0.0537)	(0.0553)	(0.0293)
n	340	340	340	340

Coefficient of Determination (pseudo)	1.962	2.206	2.362	1.453

+p < 0.10, *p < 0.05, **p < 0.01.

Standard errors in parentheses.

In Model 1 we ran our second-stage regression with a linear term to measure the effect of population size, and employed a single dummy variable to control for whether or not the municipality participated in at least one formal shared service arrangements. All of the regressors had signs consistent with what we might expect given the extant literature: That is, efficiency was positively associated with population density (economies of density, where a 1% increase in density was associated with an increase in relative TE of 0.0006), distribution of age cohorts (a one unit increase in the proportion of residents under 15 was associated with an increase in relative TE of 0.025 and a 1% increase in persons receiving an aged pension was associated with an increase in relative TE of 0.0028), and proportion of persons speaking a language other than English at home (where a 1% increase in the proportion of NESB persons was associated with an increase in relative TE of 0.0004). Moreover, statistically significant negative associations were found for median wage (an increase of $1,000 in the median income was associated with a decrease of relative TE in the order of 0.008), proportion of indigenous persons (a 1% increase was associated with a 0.00067 decrease of relative TE), proportion of persons receiving Newstart welfare benefits (a 1% increase in the proportion of Newstart recipients was associated with a 0.0018 decrease in relative TE) and population size (a 1% increase in population was associated with a decrease in relative TE of 0.0018). Rural municipalities were more efficient than urban municipalities (which are the reference category), *ceteris paribus*. In general, the control variables only had relatively small associations with relative TE (given that super-efficiency scores were distributed at an

average of 0.876) but their statistical significance confirms their importance to a robust analysis of the association between shared services and relative TE.

Notably the dummy variable for shared services in Model 1 was statistically significant at the 5% level and suggests that, holding all other factors constant, there is a negative association between the provision of at least one shared service arrangement and technical efficiency scores in the order of 0.0677 (recall that the super-efficiency score did not require transformation and that the response might be interpreted in terms of the average of the distribution which was 0.876). It thus seems there is empirical evidence to support the assertion made in Proposition 1 based on the results of our analysis. However, without additional information or data relating to the mechanisms by shared service arrangements influence the efficiency of production compared to separate provision it would be difficult to state (in any conclusive manner) that shared service arrangements alone are responsible for the lower levels of efficiency observed. Whilst we have theorised in section 8.2 above how this *might* eventuate, additional detailed quantitative and qualitative analysis would almost undoubtedly be required to elicit factors which would be difficult to model through purely pecuniary measures.

However, there is a good deal of literature to suggest that u-shaped production functions might be more appropriate for second stage regression analyses (we note that under the constant returns to scale efficiency specification there is no size constraint regarding which peers municipalities are benchmarked to and hence a quadratic specification is more plausible). When we added the higher order population term (Model 2) we found that most regressors attenuated slightly. Moreover, the population coefficients suggest a local *minima* at around 75,183 – that is, efficiency is expected to reduce for populations up to this point, then recover (at least in part) for larger population sizes.

In Model 2 our main regressor of interest was statistically significant at the 1% level, and suggested slightly higher reductions in relative TE in the order of 0.0847, *ceteris paribus*. That is, a more comprehensive analysis of the association between municipal efficiency and the provision of at least one shared service suggests that participation in co-operative ventures has a highly significant negative association with relative TE, further supporting the plausibility of Proposition 1. To gain a greater understanding of why this is the case we examined the returns to scale of local governments which participated in shared service arrangements. Approximately two-thirds of local governments in this category operated in the region of decreasing returns to scale, indicating that further increases to input levels would result in a less-than-equivalent increase in production (see Coelli et al., 2005). This would serve to raise per unit costs (creating diseconomies of scale) and thus reduce efficiency. Indeed in every shared service arrangement in the jurisdiction under analysis at least one partner already operated with diseconomies of scale (it was common to observe a smaller local government which could take advantage of increasing returns to scale operating with a larger local government with decreasing returns to scale) potentially explaining the unfavourable results obtained. Again, it is worth emphasising that these results do not conclusively prove that shared service arrangements result in reduced technical efficiency, however they do suggest that the local governments which do operate under such arrangements have typically displayed lower efficiency levels compared to local governments without. Whilst this may be the result of incurring diseconomies of scale, further analysis will be required before conclusive statements can be made.

Proposition 2 suggests that different shared services might be associated with different effects on municipal efficiency in response to variations in measurability, specificity and heterogeneity of resident preferences. To investigate this proposition further, in Model 3 we replaced our single shared service dummy variable with the exhaustive list of eight different

shared service types (that is, all shared services in operation in South Australian municipal government over the period of analysis were assigned to one of eight categories) and found that three of the shared services had statistically significant coefficients. Specifically, shared services for waste collection, flood mitigation works, and procurement had statistically significant and relatively responsive coefficients (reductions in efficiency in the order of 0.0816, 0.0925, and 0.1197 respectively), *ceteris paribus*. These results serve to confirm that different types of shared service arrangements might be expected to exert different effects on municipal efficiency. Moreover, there were a few positive associations (shared health and shared equipment) that, whilst not statistically significant, do hint at the possibility that some types of arrangements might have beneficial effects on municipal efficiency. Unfortunately there was no obvious pattern between the magnitude of associations and the characteristics of the three services (see Table 8.4). Thus whilst we have been able to show that the efficiency outcomes associated with different shared services do vary, we haven't been able to cast much light on the importance of measurability, specificity and homogeneity which have been proposed in the literature to be predictors of success in shared service arrangements (see, Brown and Potoski, 2005; Carr and Hawkins, 2013; Feiock, 2007), and this is therefore an important area for future scholarly work.

Table 8.4: Expected Characteristics of Statistically Significant Shared Services

Service Type	Significant Association	Measurability	Specificity	Homogeneity of Preferences
Waste	-0.0816	High	High (rubbish trucks and refuse tips are very specific assets)	Medium (different types of recycling occur in different municipalities)
Flood Mitigation	-0.0925	Low (flood events are unpredictable)	High (assets such as levy banks cannot be redeployed)	High (tolerance for flooding would generally be low)
Procurement	-0.1197	Medium (comparison against historical cost data loses relevance over time)	Low (few assets employed and staff would be re-deployable)	Relatively high

Following the estimation of our second-stage regressions we conducted local projection modelling to confirm the robustness of our results and to identify the dynamic impact of shared service arrangements on efficiency. The results of this supplementary analysis are provided in Table 8.5 (noting that only the coefficients for the shares service indicators are presented to minimise the space required to present the supplementary results). Based on the results from the Table it is also possible to plot the impulse response function for shared services, which we have done in Figures 8.5 and 8.6. Given that the disaggregated services would require eight individual figures to be presented (or sixteen if the bootstrapped coefficients are also of interest) we have elected to omit the presentation of these functions. We note that they do not differ considerably from the Figures 8.5 and 8.6.

Table 8.5 Supplementary Regression Using Local Projection Modelling

	(1) Year 1	(2) Year 2	(3) Year 3	(4) Year 4	Original Results
Linear Model					
Shared Services	-0.089 (0.079)	-0.094 (0.060)	-0.072+ (0.047)	-0.062* (0.039)	-0.068* (0.033)
Quadratic Model					
Shared Services	-0.110 (0.077)	-0.114 (0.059)	-0.094* (0.046)	-0.083* (0.038)	-0.085** (0.032)
Disaggregated Model					
Shared Waste	-0.104 (0.103)	-0.106 (0.078)	-0.094+ (0.061)	-0.079+ (0.051)	-0.082* (0.043)
Shared Water	-0.194 (0.199)	-0.147 (0.142)	-0.136 (0.110)	-0.132 (0.091)	-0.073 (0.067)
Shared Health	0.063 (0.162)	0.070 (0.126)	0.079 (0.098)	0.084 (0.082)	0.103 (0.071)
Shared Flood	-0.101 (0.109)	-0.100 (0.083)	-0.087+ (0.065)	-0.089+ (0.055)	-0.093* (0.047)
Shared Transport	-0.221 (0.142)	-0.041 (0.109)	0.005 (0.084)	0.019 (0.071)	0.049 (0.061)
Shared Cemetery	-0.078 (0.185)	-0.086 (0.144)	-0.095 (0.114)	-0.088 (0.095)	-0.086 (0.083)
Shared Equipment	0.103 (0.121)	0.079 (0.093)	0.087 (0.073)	0.109 (0.061)	0.074 (0.054)
Shared Procurement	-0.077 (0.279)	-0.117 (0.122)	-0.104 (0.092)	-0.094+ (0.077)	-0.120+ (0.066)
Bootstrapped Model					
Shared Waste	-0.084 (0.051)	-0.083* (0.036)	-0.068* (0.030)	-0.058* (0.026)	-0.053* (0.023)
Shared Water	-0.100 (0.098)	-0.071 (0.065)	-0.072 (0.054)	-0.069 (0.047)	-0.043 (0.036)
Shared Health	0.053 (0.080)	0.047 (0.058)	0.036 (0.049)	0.036 (0.042)	0.039 (0.038)
Shared Flood	-0.088 (0.054)	-0.095* (0.038)	-0.078* (0.032)	-0.075** (0.028)	-0.076** (0.025)
Shared Transport	-0.003 (0.070)	-0.008 (0.050)	-0.003 (0.041)	-0.030 (0.036)	-0.026 (0.032)
Shared Cemetery	0.002 (0.091)	-0.012 (0.066)	-0.028 (0.056)	-0.024 (0.049)	-0.026 (0.044)
Shared Equipment	0.022 (0.060)	0.010 (0.042)	0.018 (0.035)	0.030 (0.031)	0.014 (0.029)
Shared Procurement	-0.040 (0.138)	-0.074 (0.056)	-0.067+ (0.045)	-0.067* (0.039)	-0.083* (0.035)

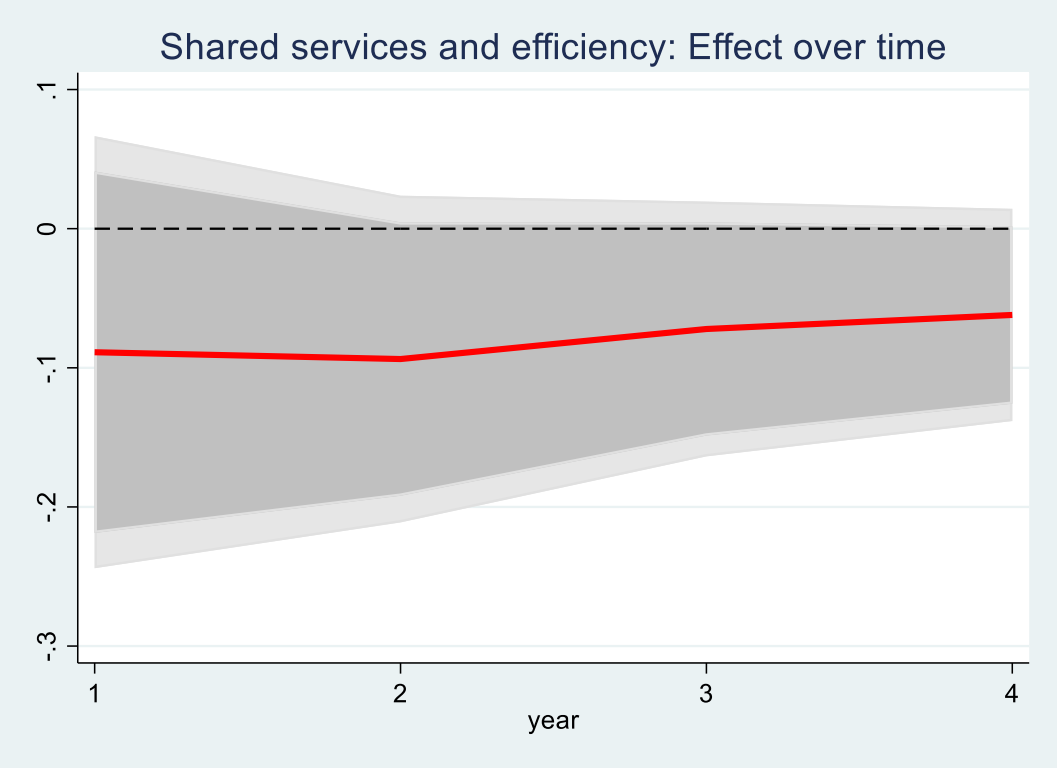

Figure 8.5 Evolution of Impacts from Shared Service Arrangements

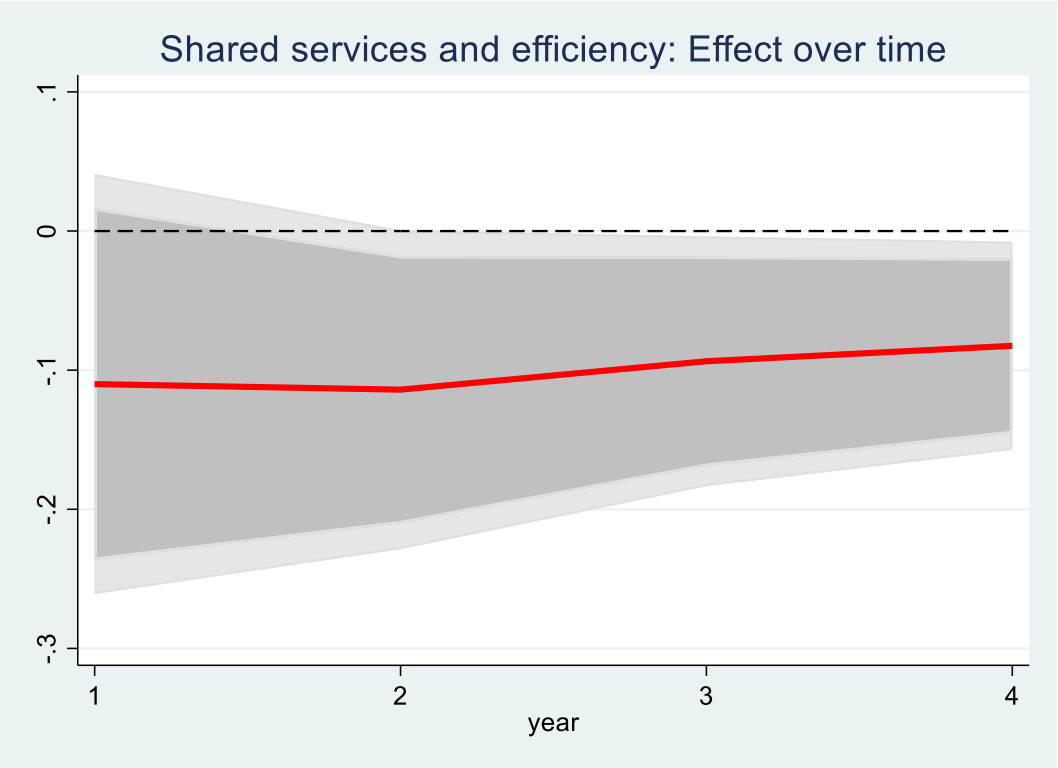

Figure 8.6 Evolution of Impacts from Shared Service Arrangements, Quadratic Model

From Table 8.5, and Figures 8.5 and 8.6 we can see the evolution of the impact of shared services over time. Year 1 examines the period between the base year 2012 and the following year 2013, Year 2 examines differences between the base period 2012 and the period two years 2014 and so on. In both the initial linear and quadratic models (correlating to Model 1 and Model 2 in Table 8.3 above) we can see that while there is no significant association between the presence of any shared service arrangement in the first few years of the panel, as the length of time extends (and simultaneously the number of years the shared service arrangement has been operating), then the negative association with efficiency becomes stronger. In particular it appears that typically from the third year onwards that the relatively lower efficiency levels become sufficiently significant. However, it is also important to recognise that conversely the magnitude of the coefficient actually improves over time. That is, whilst the negative value of the shared services coefficient is largest in the initial years of the panel (although it is not statistically significant, most likely due to the large spread in efficiency outcomes in the initial years) this begins to decline as time progresses. This fact can clearly be seen in the upward slope of the impulse response function in both Figures. Thus, it may be possible that over a sufficiently long period of time, perhaps encompassing decades, that the use of shared service arrangements may deliver benefits to the partner local governments in the form of efficiency gains. However, if the purpose of such arrangements is to address pressing financial sustainability concerns these potential time requirements may reduce the viability of shared service arrangements as a policy option.

8.5 Public Policy Implications and Conclusion

Despite being oft lauded as a panacea for waning municipal efficiency our evidence suggests that local governments with shared services are associated with relatively lower technical

efficiency, after controlling for local government and community characteristics. Although we note that it is still too early to conclude that the arrangements themselves are solely responsible. To achieve this further analysis (analysing both detailed quantitative production data and qualitative decision-making and behavioural features) will be necessary. However, despite these results there still remain a number of good reasons to contemplate shared services including *inter alia* potential improvement to service levels, access to expertise that might otherwise be difficult to attract, more effective regional planning, and internalisation of externalities. We simply draw attention to the fact that the first proposition derived from theory and our robust empirical evidence runs counter to many arguments made in the literature and public policy debate supporting the use of shared services as an alternative method (to more commonly applied amalgamation programs) for enhancing efficiency.

However, the evidence that we tender should not be interpreted to suggest that there is no possibility of shared services enhancing municipal efficiency. As we noted in the formulation of our propositions selecting shared services that are amendable to economies of scale, ensuring that the total output of partners does not incur diseconomies of scale, prioritising arrangements that select a small group of largely homogenous partners, minimising transaction and agency costs, and paying close attention to exogenous costs (being prepared to make the hard decisions regarding rationalisation of staff and assets) might all be expected to increase the likelihood of nett increases to municipal efficiency. Furthermore, our analysis of disaggregated shared services suggests that different types of services may exert different effects on municipal efficiency. However, future scholarly work is required to provide more definitive guidance to practitioners regarding the results from our secondary proposition. In addition, as our supplementary analysis revealed the upwards trend over time may suggest that long-term arrangements may have a greater potential for generating cost savings and the improvement of technical efficiency. However, before such claims can be made it will be

important to conduct econometric analysis using a much longer panel of data. In international jurisdictions where such extensive data collection on shared services exists it would most certainly represent an interesting and insightful undertaking.

The literature has considered a number of contractual and institutional remedies that might be used to limit transaction costs, in particular (and hence maximise efficiency outcomes arising from co-operative arrangements), and these also deserve careful consideration by parties contemplating shared services. Three of the most prominent solutions are: (i) use of binding contracts or statutes (to prevent defection costs and aide enforcement of obligations; see, Dollery et al. 2016), (ii) use of adaptive agreements such as memoranda of understanding (that minimise upfront negotiation costs and allow parties the flexibility to respond to unpredictable events and opportunities sequent to the commencement of shared service arrangements; Carr and Hawkins, 2013), and (iii) mediated arrangements (whereby higher tiers of government, regulators or peak bodies offer to provide independent facilitation and hence reduce information and bargaining costs, disproportionate division costs and perhaps defection costs; see, Kwon and Feiock, 2010). Because the institutional remedies target specific costs associated with shared services it will be important for future research to try to tease out what kinds of transaction and agency costs have the greatest impact on municipal efficiency. This will be a difficult task to complete given the problems in quantifying some costs and obtaining sufficiently detailed data.

Future research might also extend our analysis of the dynamics of shared service effects on municipal efficiency or the forms of shared service arrangements. This is because there are good reasons to suppose that multiple experiences with shared services might result in better contract management that could help to optimise municipal efficiency outcomes or that the selection of certain partners may have a material impact on the outcomes achieved (for example based on homogeneity, location, relative need and experience etc) (Brown and

Potoski, 2005). Therefore, further guidance might be forthcoming for practitioners from a future study that examined the nett efficiency outcomes from multiple shared service arrangements or changes in shared service arrangements as new members enter or old members leave. In addition, a study that compares specific service level perceptions of savings with actual service level and municipality savings would (in combination with in-depth interviews) go some way towards explaining the reasons for apparent discordance between *perceptions* on shared services and actual outcomes.

In conclusion, this study set out to address an important gap in the scholarly literature – namely to broaden the evidential base to include analysis of the association between technical efficiency outcomes and the provision of shared services at the level of the entire municipality, to augment the extant service level studies. Our analysis of an entire jurisdiction over a five year panel of data provides evidence to suggest that and association between shared services and lower municipal efficiency may indeed exist, contrary to most prior assumptions in the literature and political debate. This much needed contribution to the scholarly evidence base should give many stakeholders cause to pause and reconsider the efficacy of shared service arrangements for municipal government. For instance, scholars now have a research agenda (including a number of recommendations for additional required work) upon which to focus future efforts. Municipal executives and decision makers can now no longer reasonably *assume* that shared service arrangements will necessarily bring about desired increases to efficiency. Moreover, by making reference to the theoretical framework we developed earlier municipal executives and decision makers have been presented with a useful tool for identifying the determinants of efficiency maximising shared service arrangements. In addition, regulatory authorities now have good reason to consider more carefully the design and support for shared service arrangements that might be considered in their particular jurisdiction.

We emphasise again that this evidence should not be construed as suggesting that shared services can't improve efficiency – rather the take-home message of this analysis is that arrangements must be very carefully designed if improvements in efficiency are the objective of co-operative ventures. Indeed, when it comes to co-operative ventures, our empirical evidence would seem to suggest that without very careful planning and execution that a problem shared may very well end up as a problem exacerbated.

Chapter 9- The Positives and Negatives of Central Auditing: Can Central Audit Requirements Reduce the Manipulation of Depreciation Accrual Data by Local Governments?

9.1 Introduction

Financial auditing of local government involves a systematic examination of accounting records and processes by an independent entity to ensure compliance with relevant regulations and thus verify that there are no material misstatements (de Fine Licht, 2019). The auditing process is generally seen as being necessary for two reasons. First, external stakeholders require assurance regarding the quality of financial stewardship. For local government, these stakeholders include *inter alia* higher levels of government, parliamentary representatives, regulatory agencies, as well as local residents (Mir *et al*., 2019). Specifically, auditing is used to ensure that local government executives act in a transparent and accountable manner, and that public resources are used in line with stakeholder expectations (Silvola and Vinnari, 2021). Second, there needs to be a credible deterrent to combat financial misconduct (Pilcher and Van der Zahn, 2010; Thomas and Purcell, 2019). Rigorous audits act to deter local government executives from manipulating accounting records to portray more favourable outcomes than might be strictly warranted (Sher-Hadar, 2020). Taken together, rigorous external audit should result in a more accurate representation of the true financial situation facing a given local government.

However, in recent years, the reliability of external audit reports procured by local governments has been increasingly questioned by stakeholders (Mali and Lim, 2018). Competition between external audit firms for local government business has led to concerns about the potential for a 'race-to-the-bottom' reduction in audit effort and quality (Mali and Lim, 2018). At the same time, it has been asserted that increased pressure on local

governments to achieve cost savings has resulted in a general decline in the appetite from local government executives for audit effort (ILGRP, 2013b).

These perceived vulnerabilities to the audit process are concerning given their pivotal role in ensuring reliability and deterring misconduct. Indeed, it has been suggested in the extant literature that insufficient oversight could explain some of the recent evidence regarding the manipulation of accrual data observed in the local government sector (see, for instance, Pilcher and Van der Zahn, 2010; Drew, 2018; Stalebrink, 2007). Although the impact of distortions may be negligible in the short-term, it can result in significant risk to financial sustainability in the medium- to long-term (see Rika and Jacobs, 2019; Drew and Dollery, 2015c). In addition, there is also the possibility of substantial reputational and legal costs should deliberate depreciation distortions be uncovered (Crawford and Stein, 2005).

Thus, it is prudent to ensure that auditing oversight is indeed sufficiently rigorous to achieve its aims. One method which has been advocated by local government regulators is to mandate the use of a centralized auditing system. Under this system all local governments are required to obtain audit services from a single provider, typically a regional or national audit institution (Sher-Hadar, 2020).

The use of a central auditor as opposed to a private audit firm is seen as desirable due to the greater level of independence and reliability which they are expected to deliver (Thomas and Purcell, 2019; de Fine Licht, 2019). This is mainly due to the heightened status of such authorities, but also reflects the beneficial effects of removing competition, thus avoiding price-driven reductions to quality (Sher-Hadar, 2020). Additional benefits such as greater expertise in public finance, greater scope to access financial records, and better knowledge of sectoral trends and standards have also been cited (Mali and Lim, 2018). However, whilst the implementation of a central auditor has been seen by external stakeholders as a positive, local

government executives have raised concerns regarding the potential to inflate audit cost burdens (ILGRP, 2013b).

Previous studies of local government audit practices have tended to focus on confirming the presence or extent of manipulation in externally audited financial statements (see Arcas and Martí, 2016; Drew, 2018; Pilcher and Van der Zahn, 2010). The relative benefits and limitations of additional internal audit effort have also been discussed (see Thomas and Purcell, 2019; Davies, 2009, West and Berman, 2003). However, the estimation of the impact of introducing central audit requirements has received far less scholarly attention. Indeed, there does not appear to be sufficient analysis in the extant corpus of scholarly literature to allow for an evaluation of both the claims made by proponents and opponents of central audit reform. This presents something of a conundrum for policymakers in search of efficacious remedies for the problem of unexpected accruals. Thus, this paper aims to address this gap in the literature by answering one important research question surrounding central auditing, namely – what impact does the introduction of central audit requirements have on the level of unexpected depreciation accruals? To answer this question, we examine the Australian local government system of New South Wales which presents a unique opportunity to conduct a natural experiment as a result of the recent implementation of central auditing requirements in 2017 (AONSW, 2018).

In order to understand the motives and mechanisms behind manipulation and also determine the impact of central auditing on local government accounting practice, we next provide a brief explanation of positive accounting theory, the near-zero balance literature and its relevance to our investigation. Following this, we outline the context, empirical methodology and data employed to provide answers to the aforementioned research question. Thereafter, the results arising from our empirical analysis are discussed. We conclude with a

consideration of the implications of our research for public policymaking and also highlight some promising avenues for future research into local government audit practices.

9.2 Positive Accounting Theory, Near-Zero Balances, and the Hypothesized Impact of Central Auditing

9.2.1 Motivations for Manipulation

To understand the expected impact of central auditing it is first necessary to identify the motivations underpinning the accounting practices selected by local governments. These motivations have been covered extensively by the extant literature, in particular the desire by local government decision-makers to achieve a near-zero-balance position (see Pilcher, 2014; Stalebrink, 2007). However, in order to understand this behaviour, it is first useful to explore the underlying theoretical arguments, which are derived from Positive Accounting Theory.

Positive Accounting Theory was first articulated in the 1960s and subsequently developed by Watts and Zimmerman over ensuing decades (1978; 1986; 1990). Whilst positive accounting theory was originally devised to explain private sector behaviour it can be readily adapted to the local government sector. The central premise of positive accounting theory is that accounting choices can be explained with reference to three key hypotheses – the bonus plan hypothesis, debt/equity hypothesis, and political cost hypothesis. Under the bonus plan hypothesis, an incentive exists for managers to select accounting methods which maximize the level of financial compensation received by senior management (Collin *et al*., 2009). The debt/equity hypothesis implies that managers of organisations with higher debt/equity ratios have a greater incentive to select accounting methods which ensure compliance with existing debt covenants. By way of contrast, the political cost hypothesis suggests an incentive for

managers, particularly those of larger firms, to select accounting practices which will minimize the likelihood of generating unwanted political attention or community discontent, and associated costs. For private firms this typically involves income decreasing practices to avoid criticisms surrounding monopoly profits (Watts and Zimmerman, 1978). Although all three are useful for explaining the accounting practices selected by private entities, it is the political cost hypothesis that is most relevant to local government. This is because the likelihood and consequences of attracting political attention are usually much higher for local governments compared to their private sector counterparts.

The matter of political costs has spawned considerable academic debate, which is reflected in the emerging literature surrounding local government income smoothing and near-zero-balance practices – the idea being that government managers will aim for near-zero operating results in order to avoid potential political costs (Pilcher and Van der Zahn, 2010; Peasnell *et al*., 2000). The reasoning for this in the literature proceeds as follows. Local governments which report surpluses deemed excessive by the community are at risk of being criticized for over-taxation (Stalebrink, 2007). They may also be subject to increased calls for discretionary programs or services, often with significant and ongoing expenses (Drew, 2018). Conversely, local governments which operate with large deficits may be subject to claims of financial mismanagement or frivolous spending (Pilcher and Van der Zahn, 2010). This can generate considerable community concern if residents fear future service reductions or increases to taxation (Arcas and Martí, 2016). Indeed, local governments which do not achieve financial performance benchmarks in line with stakeholder expectations are at greater risk of being subjected to political interference through regulation or reform (Stalebrink, 2007; Pilcher and Van der Zahn, 2010). Given the potential for such reforms to result in a loss of employment for local government executives, disruption to political cycles, as well as detrimental outcomes for the affected local community, it is probably not surprising that local

government decision-makers might go to considerable lengths to avoid this kind of political attention (see Drew, 2020; McQuestin *et al*., 2020). Thus, to avoid unwanted attention from either the community or regulators there appears to be an implicit incentive for local government managers to manipulate accounting practices with the goal of achieving near-zero balance outcomes (Pilcher, 2014). Evidence of this motivation can clearly be seen in the extant international accounting literature (see, for example, Stalebrink, 2007; Ballantine *et al*., 2007; Ferreira *et al*., 2013; Arcas and Martí, 2016; Oliveira *et al*., 2018; Drew, 2018).

However, there is a second type of political cost which has received far less scholarly attention– the political costs associated with detection. If the manipulation of accounting data is identified and exposed by regulators or other relevant stakeholders, this can result in additional scrutiny and regulatory action to prevent further misconduct, sometimes with severe penalties for the parties involved (Rika and Jacobs, 2019). Unsurprisingly, local government managers also wish to avoid this second set of political costs, and this might mean that managers will be disinclined to engage rigorous auditors or alternatively might minimize manipulation during periods where the practice is under scrutiny.

The combined effect of the two kinds of political costs salient to local government is the emergence of a trade-off between avoiding political costs through the manipulation of accrual data to achieve near-zero balance operating results on the one hand, and the desire to minimize political costs associated with detection of accounting manipulation on the other. If the potential political costs associated with the detection of accounting manipulation are smaller than the potential political costs associated with politically unpalatable operating results, then it would appear to be a rational decision for local governments to manage earnings.

9.2.2 Mechanisms of Manipulation

In addition to there being differences in the motivations giving rise to manipulation, there are also differences in how the manipulation might be carried out. Typically, there are a range of accrual accounting items which can potentially be employed to manipulate reported results, including employee entitlements, asset revaluations and write downs (Stalebrink, 2007). These accrual items are preferred as they are not tied to physical cash flows and are thus typically subject to greater managerial discretion (Vinnari and Näsi, 2008). In particular, depreciation accruals seem to be the most attractive vehicle for manipulating earnings and this tends to be the main instrument used by local governments (see Arcas and Martí, 2016).

There are several reasons for why this is the case. The first relates to the fact that local governments, unlike private corporations, do not typically possess large inventories or accounts receivable assets, limiting their usefulness. By way of contrast, the relatively large value of depreciable assets held by local governments means that relatively small changes to depreciation practices may be able to elicit rather material changes to operating results (Pilcher and Van der Zahn, 2010). In addition, the public nature of many of the depreciable assets held by local governments – such as public roads, footpaths, and bridges – typically means that there is no active market that can be used as a reference point to produce fair values. Rather valuations for public assets tend to be heavily reliant on profession judgement which provides a convincing cover for manipulation (Drew and Dollery, 2015c). This potential for manipulation founded on profession judgement is further facilitated by individual differences in the useful lives of depreciable public assets as a result of usage, topography, climate and soil substrate, among other determinants (Chakrabarti *et al*., 2002). Indeed, the length and uncertainty of the useful lives of many public assets held by local governments often means that the consequences of manipulation (including having to bring

forward scheduled replacement of assets, or large losses upon sale) may not be realized for decades – long after the decision-makers responsible have moved on. As a result, it appears that there is considerable scope for local government decision-makers to manipulate depreciation accruals which may explain why it is the preferred instrument for trying to engineer near-zero-balance operating results in a full accruals accounting system.

9.2.3 Hypothesized Impact of Central Auditing

The expected impact of central auditing on unexpected depreciation expenses can thus be understood with reference to the political costs of positive accounting theory as extended in the near-zero-balance literature (Pilcher, 2014; Stalebrink, 2007; Drew 2018). Central auditing increases the level of regulatory scrutiny of local government accounting practices. As a result, the probability that manipulation will be detected increases. If the cost of publishing politically unpalatable operating results remains constant, or perhaps even decreases, coincident with the implementation of central auditing, then the aforementioned trade-off is likely to shift in favour of reducing exposure to detection (the second type of political cost that we discussed earlier). In this situation, it would be reasonable to expect that rational decision makers would respond by reducing the management of earnings and thus the rates of unexpected depreciation might be expected to decrease significantly.

Otherwise stated, the key hypothesis which we will test in this analysis is:

H_1: The implementation of central auditing requirements is associated with a reduction in the magnitude of unexpected depreciation expenses.

However, whilst the positives of central auditing have been well documented (see Sher-Hadar, 2020; de Fine Licht, 2019; Thomas and Purcell, 2019), the negatives of central auditing have largely escaped scholarly attention. Indeed, there are a number of potential costs associated with the introduction of central auditing. The most notable of these is the likelihood of increased audit costs. Higher pecuniary costs come about through the effective elimination of a competitive market for audit services, which removes the incentives for price competition in order to secure local government business (Mali and Lim, 2018). Audit costs may also increase due to the relatively more intensive and rigorous audit effort associated with a central auditor (Lowensohn *et al*., 2007). Moreover, there is also the potential for the Central Audit Office to use the exercise as an opportunity to cost shift onto local government- that is, central auditors might attach a premium for their services as a way of offsetting some of their own overheads (Drew, 2020). In addition, some non-pecuniary costs have also been raised (see Mali and Lim, 2018; Sher-Hardar, 2019). One prominent example in the literature is the potential to standardize accounting practices in a way that neglects the unique circumstances facing individual local governments, thus adversely reducing local government discretion and flexibility (Thomas and Purcell, 2019). For instance, using the example of municipal roads, the variation in usage, topography and climate may necessitate differences in depreciation practices (AONSW, 2018). However, it is possible that these local factors may not be sufficiently taken into account by central auditors. This loss of local discretion could result in unrealistic assumptions being applied, potentially giving rise to significant costs. Additional non-pecuniary costs might also arise if local government decision-makers are obliged to revise long term plans in response to central auditors demanding changes to the key assumptions underpinning earlier estimates (McQuestin *et al*., 2020).

Given that the non-pecuniary costs might defy quantification and also require significant time to emerge, this analysis will just focus on the direct pecuniary impact associated with central audit fees. Thus, the second hypothesis examined may be stated as:

H_2: The implementation of central audit requirements is associated with a significant increase to the pecuniary audit costs for local governments.

In the next section we will introduce the contextual background, data and empirical methodology used to calculate unexpected depreciation required to test the above hypotheses.

9.3 Empirical Methodology

9.3.1 Context

The introduction of central auditing in Australia (New South Wales (NSW)) was first considered as early as 2005 following the adoption of the International Financial Reporting Standards (IFRS) in the local government sector (Pilcher, 2014). However, a lack of consensus between policymakers saw the recommendations abandoned in favour of alternative procedures, such as internal audit functions and audit committees (Thomas and Purcell, 2019). This changed in 2013 when a review of local government financial sustainability once again saw central auditing being advocated to supplement a wider structural reform programme being considered (*Fit For the Future*; ILGRP, 2013b). In 2016, as a component of the reform package, the relevant local government legislation (the Local Government Act (1993)) was amended to introduce mandatory central audit requirements for NSW local governments (AONSW, 2018). One of the arguments used to support the legislative change was the purported need to bring NSW in line with other Australian states

(Queensland, Victoria and Tasmania) which already operated central audit regimes (ILGRP, 2013b).

The 2016 reforms involved three key changes to the auditing system. First, all local governments in the state were required to submit their financial statements to the state auditor (the Auditor-General) on an annual basis (NSW Government, 1993; ILGRP, 2013b). Local governments were also required by statute to provide performance metrics and any other information requested by the Auditor-General. Second, the Auditor-General was required to undertake annual financial and performance audits of all local governments in NSW. Based on these audits the Auditor-General would then prepare a report on the sector-wide performance to be submitted to the state government (DPTI, 2019). Finally, the Auditor-General was required to communicate with the Minister regarding individual local governments which had failed to comply with any legislative requirements or provisions under the Act (NSW Government, 1993). Notably, although these legislative changes increased the regulatory oversight of the Auditor-General, it did not provide the Auditor-General with power to penalise local governments which were found to be using questionable accounting practices. Rather this role was retained by the Minister and her regulatory agencies.

9.3.2 Empirical Model and Data

Given that the changes in legislation were officially enacted in May 2016, it was not until the end of the following financial year (2016-17) that the first state-wide audit of financial statements could be conducted. Consequently, to ascertain the impact of the central auditing, the unexpected depreciation accruals for the three-year period preceding the 2016-17 financial year were compared with the full four financial years following the reforms. Moreover, there was an additional complication due to the forced amalgamation of forty-two

NSW local governments to create nineteen new entities in May 2016[33] – the literature has previously noted that including amalgamated local governments in analyses of unexpected depreciation might well confound results – both due to harmonisation of depreciations schedules as well as the high levels of write-downs that often follow mergers (Drew, 2020). In order to address these concerns, we have elected to omit these local governments from our analysis.

To identify the impact of central auditing on the manipulation of depreciation accruals, it is first important to identify what constitutes unexpected depreciation. For this purpose, we follow the approach used by scholars such as Marquart and Wiedman (2004), Pilcher and Van der Zahn (2010), and Drew (2018). The central premise of this method is that the rate of depreciation employed in a given financial year ought to be consistent with the rate employed in the previous financial year. From this, the expected component of depreciation (the rate that would be assumed given normal operating activities) can be calculated after accounting for increases to depreciable infrastructure, property, plant, and equipment (IPPE) (Arcas and Martí, 2016). By comparing this to the level of depreciation actually recorded in the local government's financial statements, the unexpected component can easily be calculated:

$$UDEP_{i,t} = \left[DEP_{i,t} - \left(DEP_{i,t-1} * \frac{Gross\ IPPE_{i,t}}{Gross\ IPPE_{i,t-1}}\right)\right] \qquad [1]$$

According to this mathematical formula a positive unexpected depreciation suggests the manipulation of depreciation accruals to increase expenditures (reduce surpluses or increase deficits), whilst a negative level of unexpected depreciation might be associated with practices used to reduce expenditure and hence boost financial performance. Moreover, in line with extant practices, the unexpected depreciation figures were deflated by the total value

[33] With a further amalgamation carried out in September 2016

of assets to enable better comparisons between local governments of different sizes (see Arcas and Martí, 2016).

It is important to note that consistent with recent important developments in the literature (see Drew, 2018), we have elected to remove the non-depreciable portion of IPPE from our calculation of unexpected depreciation. This is needed to avoid painting a false picture of the true level of manipulation, especially important given the substantial portfolio of non-depreciable items (such as land) managed by local governments in Australia. Indeed, around 18% of IPPE were non-depreciable assets on average which would have otherwise acted to either (i) understate the true degree of manipulation, or (ii) confounded the results where the proportion of non-depreciable assets was not constant over successive periods.

Following the calculation of unexpected depreciation, as well as rudimentary analysis of the magnitude and sign of same, regression analysis was employed to identify any significant associations with the introduction of central auditing. As we are interested in whether central auditing is associated in a significant reduction in any form of manipulation, the sign of the unexpected depreciation is not a key concern. Rather, the absolute value of unexpected depreciation was selected as the key regressand in the model. We note that this approach is consistent with extant studies examining unexpected accruals (see, for instance, Arcas and Martí, 2016; Ballantine *et al*., 2008; Pilcher and Van der Zahn, 2010). Consequently, to account for the inherent censoring in the regressor (at zero), a Tobit model was employed:

$$\boldsymbol{UD}_{it} = \alpha_{it} + \beta_1 \boldsymbol{CA}_{it} + \beta_2 \boldsymbol{X}_{it} + \mu_{it} \qquad i = 1 \ldots .106 \;\; t = 1 \ldots .7$$

In which $\mathbf{UD}_{it}$ is the absolute level of unexpected depreciation for local government *i* in financial year *t*, **CA** is an indicator variable assigned a value of one for each of the four financial years following the introduction of central auditing, **X** is a vector of control variables expected to influence the accounting practices (see below) and μ is an independent

and identically distributed error term. In supplementary models examining the impact of central auditing over time, the **CA** variable has been replaced by seven individual year dummies. To control for potential heteroskedasticity within the sample selected, cluster robust standard errors were employed.

The control variables (**X**) were selected for the analysis based on a combination of theoretical expectations and extant practice. In general, these controls can be classified into two distinct groups – internal controls and community stakeholder controls. These controls were necessary to account for the propensity and incentives (local political scrutiny) known to influence the local government decision-makers with respect to the manipulation of depreciation accruals.

The first control variable expected to influence accounting practice is the size of the local government. In our analysis this variable is represented by the number of property assessments within the local government area. This is important because the political cost hypothesis suggests that larger local governments typically receive greater political attention owing to the greater scale and visibility of their operations (Watts and Zimmerman, 1986). Following this, a control for the total operational income was included to reflect the near-zero-balance literature which suggests that operating results motivate manipulation (Pilcher, 2014). We excluded capital grants from the operating results and assigned it as a separate variable in order to account for the fact that capital income – although not included in conventional operating performance metrics – is typically used to increase the stock of depreciable assets, or extend the life or functionality of existing assets, affecting depreciation practice (Burga *et al*., 1991). The third internal variable included was the cash flows from operating activities, which were used to reflect evidence in the literature regarding the impact of current spending on accrual practice (Pilcher and Van der Zahn, 2010; McNichols, 2002).

Notably each of these financial variables has been deflated by the value of total assets for comparability.

The length of sealed and unsealed (graded dirt) road networks maintained by the local government have also been included in the model as separate regressors because they represent the largest category of depreciable assets for Australian local governments and are typically subject to the greatest level of professional judgement (due to the lack of an active market) and uncertainty (particularly for useful life), which are both important determinants for depreciation manipulation. Finally, variables representing location attributes (metropolitan or rural, as well as population density) were employed to control for the differences in asset portfolios, and the financial and human resources available to devote to accounting procedures[34] (Thomas and Purcell, 2019; AONSW, 2018).

In terms of the community stakeholder controls the percentage of indigenous residents (those who identify as Aboriginal or Torres Strait Islander (ATSI)), foreign residents (those from a Non-English Speaking Background (NESB)), and elderly residents (i.e. those receiving the aged pension) were selected. These controls were needed to account for the fact that certain resident groups place a relatively greater or lesser degree of political pressure on local government finances and accounting practices. Notably, the inclusion of stakeholder groups is common practice in the academic literature (Drew and Dollery, 2015c; Arcas and Martí, 2016).

A number of different models were run and the results (available from the corresponding author) confirm that the models reported in this paper were robust to alternate specification.

[34] Low density rural areas often struggle to attract suitable qualified professional staff (Drew, 2020).

Summary metrics and definitions of the variables used are provided in Table 9.1. We have indicated where logarithmic transformations have been employed to control for inherent skewness:

Table 9.1: Summary Statistics of Variables Employed

Variable	Definition	Average (Standard Error)
Variables of Interest		
UDep	Unexpected depreciation expenses as a percentage of total assets.	-0.025 (0.010)
ABSUDep	Absolute value of unexpected depreciation as a percentage of total assets.	0.154 (0.008)
AfterCA	Indicator variable representing the years following implementation of central auditing.	n.a.
Internal Controls		
Assessments (ln)	Number of total property assessments within the local government area, logged.	9.288 (0.042)
DLP	Total income excluding capital contributions deflated by total assets (expressed as a percentage).	8.041 (0.085)
DCG	Total capital grants and contributions deflated by total assets (expressed as a percentage).	1.428 (0.049)
CFO	Cash flow from operating activities deflated by total assets (expressed as a percentage).	3.025 (0.043)
Sealed	Length of sealed roads (kms).	481.35 (10.079)
Unsealed	Length of unsealed (graded dirt) roads (kms).	608.41 (22.991)
Metro	Indicator variable where metropolitan local governments = 1, otherwise 0.	0.528 (0.018)
Density (ln)	Population divided by the local government area, logged.	2.704 (0.118)
Community Stakeholder Controls		
ATSI (ln)	Percentage of the population that identify as Aboriginal or Torres Strait Islander, logged.	1.314 (0.044)
NESB (ln)	Percentage of the population from a non-English speaking background, logged.	1.513 (0.040)
Aged	Percentage of the population receiving an Aged pension.	12.065 (0.149)

All financial data has been sourced from the publicly available financial statements produced by each local government. This data has been supplemented with information released by the

Australian Bureau of Statistics (ABS, 2021), the Office of Local Government (OLG, 2021), and the NSW Local Government Grants Commission (LGGC, 2020).

9.4 Results

Our analysis was undertaken in three stages. In the first stage, analysis of variance (ANOVA) testing was undertaken on the untransformed unexpected depreciation values. This provided useful insights into the form, magnitude, and significance of manipulation prior to estimation. Following this, Tobit regression was applied to the absolute values of unexpected depreciation to facilitate the formation of *ceteris paribus* claims. Finally, in the third stage audit costs were examined to identify if the claims made by opponents, that central auditing is associated with significantly higher costs are indeed supported.

The results from the initial ANOVA testing of unexpected depreciation are provided in Table 9.2:

Table 9.2: ANOVA Testing of Unexpected Depreciation Before and After Central Auditing Introduction (% of total assets)

Summary of Unexpected Depreciation					
Period	**Average**	**Standard Deviation**			
Before CA (2014-2016)	-0.057**	0.314			
After CA (2017-2020)	0.000039	0.222			
Analysis of Variance (ANOVA)					
	SS	**df**	**MS**	**F**	**Prob>F**
Between	0.599	1	0.599	8.49**	0.0037
Within	52.209	740	0.071		
Total	52.808	741	0.071		

From Table 9.2, several key findings can be identified. First, prior to the implementation of central audit requirements the average local government had unexpected depreciation expenses of approximately -0.06% of total assets. Furthermore, this level of unexpected

depreciation was significantly different from zero at the highest level of statistical significance (p=0.0013), providing strong evidence to support arguments of manipulation. Notably, the negative sign indicates that the actual level of depreciation recorded is less than the amount that would be expected if consistent depreciation practices were applied. This suggests that decision-makers mostly manipulated depreciation accruals in order to bolster reported performance. Given the pressure on local governments to demonstrate strong financial performance in the context of boundary reform proposals[35], this behaviour is not surprising (Drew and Dollery, 2015c). Second, in the period following the implementation of central auditing, the magnitude of unexpected depreciation declined, and the sign changed, becoming slightly positive on average over the four-year period (at 0.00004% of total assets). Of particular note is the fact that this level of unexpected depreciation was no longer statistically significant (p=0.9971).

It thus seems as if matters have changed following the introduction of central auditing. To explore this perception further we conducted an ANOVA between the two relevant periods and found further evidence to support the contention that central auditing did indeed result in a significant reduction to the level of depreciation accrual manipulation by local government decision-makers ($p=0.0037<0.01$).

However, to make *ceteris paribus* claims regarding the effect of the introduction of central auditing it is necessary to control for various community and stakeholder characteristics known to be associated with depreciation manipulation. We thus conducted supplementary Tobit regression analysis. It is important to note that we used absolute values of unexpected depreciation in this empirical analysis to allow us to ascertain the impact of central auditing

[35] In particular, several of the ratios (operating ratio, buildings and infrastructure renewal ratio and capital expenditure ratio) used to determine which local governments would be subject to structural reform directly or indirectly included depreciation expenses giving local governments a greater incentive to adjust depreciation accruals.

on *any* form of manipulation. Thus a positive coefficient indicates an increase in unexpected depreciation, whereas a negative coefficient suggests the opposite. The results from the regressions are provided in Table 9.3. Whilst Model 1 includes only a single indicator variable to represent the implementation of central auditing, Model 2 builds on this result through the use of disaggregated year dummies to represent the individual financial years under analysis.

Table 9.3: Absolute Unexpected Depreciation and Central Auditing, New South Wales Local Government, 2014-2020

	Model 1 (Model with Single Indicator Variable)	Model 2 (Model with Disaggregated Year Dummies)
Internal Controls		
Assessments (ln)	-0.017	-0.017
	(0.020)	(0.020)
DLP	0.007+	0.008*
	(0.004)	(0.004)
DCG	0.010+	0.010*
	(0.006)	(0.005)
CFO	-0.011	-0.013
	(0.011)	(0.011)
Sealed	-0.0001	-0.0001
	(0.0001)	(0.0001)
Unsealed	0.0001	0.0001
	(0.0001)	(0.0001)
Metro	0.057*	0.057*
	(0.027)	(0.027)
Density (ln)	-0.007	-0.007
	(0.016)	(0.016)
Community Stakeholder Controls		
ATSI (ln)	0.008	0.008
	(0.014)	(0.013)
NESB (ln)	0.010	0.010
	(0.024)	(0.024)
Aged	0.0001	0.0001
	(0.003)	(0.003)
Variables of Interest		
AfterCA	-0.071**	
	(0.017)	
2014		0.048+
		(0.030)
2015		0.114**
		(0.028)
2016		0.076**
		(0.030)
2017		-0.009
		(0.019)
2018		0.021
		(0.032)
2019		0.023
		(0.023)
n	742	742
F-statistic (p-value)	4.10	3.45
	(0.00)	(0.00)

+p < 0.10, *p < 0.05, **p < 0.01.
Standard errors in parentheses.

The signs of the included control variables were consistent with the prior literature and theoretical expectations. A significant positive value for the operating result (DLP) supports the claims made in the near-zero balance literature that the magnitude of depreciation manipulation might be expected to increase in proportion to receipt of additional income. This result is consistent with the political cost hypothesis – specifically a desire to avoid potential criticism relating to over taxation or be subject to pressure for additional discretionary programs (Pilcher and Van der Zahn, 2010). A significant positive association was also found for the capital grants variable (DCG). In this instance it seems that the increase to the stock of depreciable assets provides new opportunities for manipulation. Notably, these results are consistent with earlier findings identified in the literature (see Pilcher, 2014).

In addition, the location of the local government was also found to be a significant determinant of unexpected depreciation. That is, local governments which operate in an urban area were associated with significantly higher levels of unexpected depreciation, *ceteris paribus*. Potential explanations for this outcome include relatively greater social, political and economic pressures faced by metropolitan governments compared to their rural counterparts (Thomas and Purcell, 2019).

With regard to the key variable of interest for Model 1 – the indicator variable for the years following central auditing implementation – the results support the earlier findings from the ANOVA test. Specifically, a statistically significant negative association was found, suggesting that the reforms resulted in a *decline* to the level of unexpected depreciation of approximately 0.07% of total assets for the average local government, *ceteris paribus*.

Moreover, it is notable that just like the ANOVA our result is significant at the highest level (1%), even after controlling for external factors.

In our second model which incorporates individual year variables, we also found relatively large and statistically significant reductions in the magnitude and significance of manipulation shortly after the introduction of central auditing. Furthermore, in later years both the relative size and statistical significance of the results levelled off. It thus appears that central auditing pays dividends almost immediately following its implementation, after which time good practices seem to be maintained.

Consistent with the arguments made by Watts and Zimmerman (1978; 1986) a desire for local government executives to avoid the increased political costs which could be incurred as a result of greater oversight is the likely cause. An examination of the annual reports tendered by the Auditor-General uncovered further evidence to support these claims. In the first year following implementation, the Auditor-General (AONSW, 2018, p. 10) repeatedly questioned the accounting practices used by local governments in the state, noting "considerable variability in the way councils reported the useful lives of similar assets" which could "affect the depreciation expense recognized in council's financial statements". In addition, the audit reports also highlighted potential deficiencies in the valuation of fair values for IPPE (AONSW, 2019b). The desire to avoid potential political intervention arising from these reports likely resulted in a change to accounting practice. As the Auditor General noted in the most recent annual report, there has been "improvements in … financial reporting and governance arrangements" within the sector, and an "increase in the consistency of practice and accountability" (AONSW, 2020, p. 1).

Thus, it appears that there is strong evidence to support the first hypothesis that a central audit system is indeed associated with a reduction in the magnitude of unexpected

depreciation expenses. This is promising for proponents of central auditing as it suggests that it may be an effective means to correct near-zero balance behaviours by local government decision-makers. The outcome for stakeholders is more accurate accounting information which ought to result in better decision making.

However, as opponents of central auditing have claimed, it is possible that these benefits might come with considerable costs – specifically hefty and permanent increases to the audit fees paid by local governments (see Pilcher, 2014; ILGRP, 2013b). Given the potential to offset some of the benefits accruing to stakeholders as a result of central auditing it is important to also investigate whether these claims have any basis in reality. In order to do so, additional financial data regarding audit costs was collected and tested and we present a summary of this in Table 9.4:

Table 9.4: ANOVA Testing of Total Audit Costs Before and After Central Auditing Introduction ($'000)

Summary of Unexpected Depreciation					
Period	**Average**	**Standard Deviation**			
Before CA (2014-2016)	66.134**	38.954			
After CA (2017-2020)	90.782**	50.992			
Analysis of Variance (ANOVA)					
	SS	**df**	**MS**	**F**	**Prob>F**
Between	100403.2	1	110403.2	51.68**	0.0000
Within	1580905.5	740	2136.4		
Total	1691308.7	741	2282.5		

It is clear from Table 9.4 that central auditing did indeed result in a significant increase to audit costs, supporting concerns raised by opponents. Specifically, in the period following central auditing, the average local government audit expense rose from $66,000 to over $90,000 per annum, representing an approximate 36% increase (significant at the 1% level). Given the financial pressures facing many local government surrounding waning financial

sustainability (see McQuestin *et al*., 2020), such increases in audit costs warrant serious consideration. However, these results do not necessarily suggest that central audit arrangements should be abandoned, but rather emphasise the importance of weighing up both the positives and the negatives of the policy intervention.

9.5 Policy Implications and Conclusion

As a result of our analysis it is now evident that the implementation of central auditing was indeed an effective means of reducing manipulation via unexpected depreciation, albeit at the expense of significant increases to audit costs. From our findings at least two key insights may be gleaned for the improvement of accounting practices in the local government sector. The first of these is the importance of accounting theory – in particular the near-zero-balance and political cost hypothesis – for not only understanding the incentives behind manipulation, but also the expected effect of policy responses. Our evidence supports the contention that local governments will respond to increased scrutiny by reforming their practice. Moreover, although the central auditor was not provided with any disciplinary authority to impose penalties on local governments with questionable accounting practices, the mere presence of potential political costs seems to have been enough to deter unhelpful behaviours (Rika and Jacobs, 2019). Thus, we see that through recourse to theory, policymakers can develop efficacious interventions by focussing on these drivers of behaviour.

The second implication from our study relates to the need for policymakers to ensure action is taken to minimise the costs arising for local governments as a result of policy intervention. As our results indicate, the concerns from local governments that central auditing would result in significant cost increases were indeed well-founded (despite policymakers initially suggesting otherwise; ILGRP, 2013b). In addition, although the benefits of central auditing were clearly conveyed in the tendered policy documents, it appears that little justification has

since been provided to explain why the costs might have increased so much. In the absence of a competitive market it is important that the central auditor is both focussed on keeping costs down a minimum, and also encouraged to fully disclose the basis for their costings (benchmarked to industry standards).

In order to facilitate further informed public policy making it will be important for future studies to consider questions regarding the desirability of highly uniform approaches to depreciation practice. It is possible that central auditing has resulted in too much standardisation of useful lives, recognition thresholds, capitalisation practice and the like, and thus may no longer adequately reflect the precise operating environment of local governments. Future studies on a longer panel of data should explore for correlations between the level of standardisation in practice and the frequency of accounting adjustments such as asset write-downs, losses or gains on sale of assets (which are the ultimate consequences of inappropriate practice; Marquardt and Wiedman, 2004). Moreover, longer panels could also be used to determine whether central audit agencies get captured over time, or whether local government decision-makers develop new methods to achieve their non-zero balance objectives in response to the constraints of central auditing (see the literature on reactive gaming; Taylor 2020).

In sum, we might expect that findings and insights generated by studies such as this will allow policymakers to both accentuate the positives, as well as minimise the negatives, of central audit practice.

Chapter 10- Summary of Research Findings, Policy Implications, Avenues for Future Research and Conclusion

10.1 Introduction

The seven analyses above, taken as a whole, provide a greater understanding of the determinants of financial sustainability, the efficacy of prior reform programs aimed at improving financial sustainability, as well as the viability of alternative instruments to structural reforms. From this, a number of important insights can be deduced and policy recommendations for the improvement to local government financial sustainability in the future can be made. However, before these insights and recommendations can be explored, it is first useful to summarise the key research findings.

10.2 Summary of Research Findings

10.2.1 Chapter 3- The Price of Populism: The Association Between Directly Elected Mayors and Unit Expenditure in Local Government

This Chapter examined the determinants of financial sustainability through an analysis of the association between the direct election of mayors and unit expenditure in local government. Results obtained indicate a statistically significant and materially higher level of expenditure for local governments with directly elected mayors, in the order of thirteen and a half percent across both rural and urban local governments with DEM models. The increased unit cost potentially results from transforming local government funds into a form of political capital (to please residents and increase chances of re-election) or alternatively through enhanced advocacy enabling the DEM to lobby higher levels of government for greater financial support through grant allocations. Whilst this may generate tangible benefits for the local

government residents, it may also pose a possible threat to financial sustainability if expenditures are not fully funded through increased revenue.

10.2.2 Chapter 4- Efficient Budgeting: The Association Between Budget Inaccuracy and Efficiency in Local Government

Chapter 4 also explored the determinants of local government financial sustainability, through an examination of the relationship between internal processes (budgeting) and technical efficiency levels. The results suggested a positive association between expenditure inaccuracy and unit cost (and hence a negative association with technical efficiency). That is, for every 1% increase in expenditure inaccuracy, *ceteris paribus*, expenditure per assessment was found to rise by approximately 0.61% on average (lowering technical efficiency). Supplementary testing revealed that unintentional errors resulting from factors largely beyond the control of local governments were primarily responsible for the deviations. In particular, both the receipt of additional (and unexpected) grants from higher tiers of government, as well as additional work mandated by a higher level of government reduced technical efficiency in a material sense. Similar to the previous chapter, while these additional grants and mandated work may result in benefits to local ratepayers, if sufficient remuneration is not received, a clear threat to financial sustainability can arise. It is also possible that intentional manipulation (such as the creation of budget slack) may have caused deviations in some cases, although poor quality of budget input data and methodology, might also be a valid explanation observed associations. The results from this study not only highlight the importance of accurate budgeting, but also bring to stark relief the interaction between external determinants of financial sustainability and internal processes.

10.2.3 Chapter 5- Do Municipal Mergers Improve Technical Efficiency? An Empirical Analysis of the 2008 Queensland Municipal Merger Program

Chapter 5 examined the efficacy of local government reforms for improving financial sustainability with reference to the 2008 Queensland amalgamation program. Empirical results confirm the failure of the reform program to achieve technical efficiency improvements – indeed, efficiency deteriorated further for amalgamated entities (thus potentially worsening their ability to achieve financial sustainability). Although the cohort of local governments selected for amalgamation experienced a decline in efficiency prior to amalgamation, this was also the case for the non-amalgamated cohort. Moreover, at the time of amalgamation the two cohorts had almost identical results in terms of technical efficiency (no statistically significant differences). Indeed, these results raise questions regarding why particular local governments were chosen for amalgamation in the first place. Whilst efficiency initially improved following amalgamation it quickly began to decline from 2010 onwards. Because the non-amalgamated cohort experienced efficiency improvements during this time, a statistically significant difference in efficiency levels emerged in favour of non-amalgamated local governments. ANOVA analysis revealed declining performance could be attributed to a failure to realise reductions in staff and capital expenditure following the reforms. These results are concerning, given a preference by policymakers to target financial sustainability improvements through amalgamation, and may suggest a need for policymakers to reconsider the application of such reform programs (although it should be recognised that amalgamation can, and has, been undertaken to achieve different objectives).

10.2.4 Chapter 6- Do Amalgamations Make a Difference? What we can Learn from Evaluating the Policy Success of a Large Scale Forced Amalgamation of Local Government

Chapter 6 provided a supplement to the results obtained in Chapter 5, by examining the efficacy of the more recent 2016 NSW *Fit For the Future* reforms, also aimed at improving financial sustainability. The results of this analysis also confirmed the failure of the forced amalgamation programme to achieve improvements in local government financial sustainability through reductions in unit cost. Indeed, as the difference-in-difference analysis indicated, the total operating expenditure for amalgamated entities instead rose by 11.2% (increasing to 17% when controls for the urbanity of the local government were included) following the amalgamations, potentially hindering the ability of these local governments to become sustainable. A closer examination of the processes of the reforms suggests that this disappointing result was primarily due to an inability to realise savings resulting from the rationalisation of staff numbers (and hence staff expenditure levels), although expected savings in materials and contracts expenses, and back-office functions (other expenditures) also did not materialise. Thus, according to the programmatic lens, by examining both the processes and outcomes involved with the amalgamations, the NSW *Fit For the Future* reforms cannot be considered successful. These results support the policy outcomes which were obtained in Chapter 5, and suggest a need for policymakers to consider methods to ensure that the desired processes can indeed be achieved if amalgamation will continue to be used as a preferred policy instrument.

10.2.5 Chapter 7- Searching for a Deeper Understanding of Public Policy Programmatic Outcomes: The Case of Local Government Amalgamation

Chapter 7 builds on the insights obtained in Chapter 6 by more closely examining the outcomes and inquiring into the reasons *why* the reform program was not successful, by

examining the relationship between local government targets and policy instruments, employing the behavioural economics framework. As the analysis demonstrates, the service quality decision instruments available to local governments are significantly associated with unit expenditure reductions, although service provision decisions only had a limited impact. Similarly, the instruments available to politicians and other reform architects could also have a significant influence on unit expenditure, although previous reforms have typically worsened matters. However, when the association between unit expenditure and the financial sustainability ratios is examined, with the exception of the infrastructure backlog ratio, no significant associations were identified. This suggests that local governments and policymakers will largely be unable to achieve their target improvements in financial sustainability (i.e. maximising the financial sustainability ratios) through reductions in unit expenditure alone. These results serve to support the conclusions reached in Chapter 6 which casts further doubt on the efficacy of structural reform. Now that this has been identified, policymakers may need to consider the use of alternative intermediaries for targeting financial sustainability improvements, or the use of alternative policy instruments. Likewise, higher tiers of government may need to consider the active role which managers and executives within local government can play in the design and implementation of future interventions given that internal decision making does appear to be effective.

10.2.6 Chapter 8- Is a Problem Shared a Problem Halved? Shared Services and Municipal Efficiency

Given the relative failure of previous structural reform programs to generate improvements in financial sustainability, Chapter 8 examined the viability of alternatives to local government amalgamation. Specifically, an empirical analysis was conducted to identify the main rival to amalgamation – shared services. Shared services are a much-lauded alternative to

amalgamation prominently discussed in both the scholarly and grey literatures, but rarely subjected to robust empirical estimations. The regressions conducted in Chapter 8 indicate that shared service arrangements are negatively associated with technical efficiency. On average, local governments which operated shared service arrangements had technical efficiency levels which were approximately 0.08 points lower (mean 0.876) compared with local governments that did not conduct shared services. Disaggregated results reveal that unfavourable outcomes are particularly likely for functions related to waste management, flood protection and procurement. The results suggest that shared service arrangements may not be suitable alternative reform instruments for policymakers to consider if financial sustainability improvements are the main target or objective. However, similar to amalgamation, it is important to recognise that shared service arrangements may be established for other reasons.

10.2.7 Chapter 9- The Positives and Negatives of Central Auditing: Can Central Audit Requirements Reduce the Manipulation of Depreciation Accrual Data by Local Governments?

Chapter 9 further extends the research conducted in Chapter 8 through the examination of another distinct alternative to amalgamation. In this instance the viability of internal governance and management reforms through the implementation of central audit arrangements was assessed. The introduction of central auditing (via the state Auditor-General's office) as part of the larger 2016 NSW *Fit For the Future* policy package provided a unique and valuable opportunity to identify and evaluate its efficacy. Using the approaches identified by the extant literature as well as accounting theory, the unexpected portion of depreciation expenses (i.e. the portion not explained by historical practice and natural increases in the stock of depreciable assets) was calculated. The results from ANOVA testing on these untransformed unexpected depreciation expenses, as well as Tobit regressions

conducted on the absolute value of unexpected depreciation revealed that central audit arrangements were indeed associated with a significant reduction in the manipulation of depreciation accrual data. The results thus seem to support the claims made by proponents that central auditing can indeed lead to improved financial accountability and stewardship, potentially avoiding any threats to financial sustainability resulting from manipulation. However, as supplementary analysis also indicated, these aforementioned benefits could only be obtained at the expense of significantly higher audit costs, potentially reducing its usefulness for addressing sustainability concerns. Consequently, although central auditing may indeed represent a promising alternative to amalgamation, additional testing will be required before being employed in other local government jurisdictions.

10.3 Policy Implications

From these results a number of important lessons for policymakers can be deduced. The most important of these is the need to ensure that the preconceived notions about local government financial sustainability which have permeated the local government sector are subject to robust empirical scrutiny *before* being utilised as a basis for decision making. This is important because as the analyses above reveal: (i) factors which had previously not been considered to have significant implications for financial sustainability (the method of mayoral election, and the internal budgeting process) are indeed associated with higher spending and lower technical efficiency; (ii) factors previously considered to be associated with financial sustainability, namely unit expenditure, are not significantly associated with a large majority of financial sustainability metrics (iii) amalgamations which have been widely considered by policymakers as an effective policy instrument to address waning financial sustainability have indeed led to a further deterioration in financial performance (for the cases examined);

(iv) shared service arrangements which had previously been lauded as a viable alternative to local government amalgamation are similarly unlikely to achieve successful outcomes; and (v) central auditing, which had previously not been considered for use as an effective mechanism for improving financial management and reporting practices, may indeed represent a promising alternative.

Had such analyses not been undertaken, local government reform architects may have continued to rely on these incorrect presumptions, leading to more ineffective policy interventions, and likely causing further deterioration to financial sustainability. Now that this evidence has been bought to light, reform architects can ensure that this evidence is taken into account in the design of future reform programmes.

The second policy implication relates to the need for decision-makers to give greater consideration to the internal factors and internal decision-making which affect finances when designing policies aimed at improving sustainability. As Chapters 4 and 7 indicated internal factors, such as budgeting and service quality decisions, can also have a significant effect on the financial performance of local government entities. Somewhat surprisingly these factors have been hitherto largely ignored in the design of previous reform programmes. Instead, there has been an overwhelming focus on external determinants, particularly the matter of local government size and associated economies of scale. This is surprising given the potential for internal processes to be more directly controlled by local government decision-makers, and for reforms targeting these areas to be relatively less disruptive to local governments staff and citizens (although this is not always the case). Thus, the prescription arising from this thesis is for a greater focus to be placed on internal processes within local governments. A higher reliance on reforms targeting these factors, in collaboration with local government authorities, may prove more efficacious as a remedy to existing financial

sustainability problems. However, similar to the preceding policy instruments robust empirical analysis should again be conducted prior to implementation.

The third major policy implication arising from these analyses relates to the need for greater financial discipline in the implementation of local government reform. This is because evidence from Queensland and NSW *Fit For the Future* reforms revealed a tendency for spending to accelerate immediately preceding and following the reforms. Moreover, the necessary processes needed to reduce local government spending following reform were largely not undertaken. These actions may be seen as key contributing factors for the failure of the reforms to achieve their intended improvements to financial sustainability. Future reform programs aimed at improving financial sustainability should involve greater controls to ensure that the reform administrators and local government decision-makers act in a manner consistent with the assumptions of reform architects. Without this discipline it is difficult to see how local government reform – regardless of the level of planning, expert advice and empirical evidence involved – can hope to achieve optimal financial sustainability outcomes. This recommendation is not restricted to amalgamation programs but should also apply to any reform instrument considered by policymakers.

The final major policy implication arising from this research relates to the need to consider non-conventional methods of local government reform to target sustainability improvements. As Chapters 5, 6 and 7 reveal, existing amalgamation programs have been largely unsuccessful in achieving this objective. Given the prominence of structural reform as the dominant policy instrument in Australia, and indeed across much of the globe, this is particularly concerning. However, as stated in Chapter 1 of this thesis, amalgamation is not the only policy instrument available to policymakers. Alternatives such as jurisdictional reforms, functional reforms, financial reforms, and internal governance and management reforms can all be further developed and employed. Indeed, as the results from Chapter 9

indicate one alternative, namely central audit arrangements, appears to hold promise due to its association with improved financial management practice. Through the use of this, and similar alternative methods of local government reform, it may be possible to achieve improvements to financial sustainability and hence greater policy success. However, as Chapter 8 reveals, caution should be given to the use of shared service arrangements given the evidence that it can also potentially lead to increased, rather than reduced, costs.

10.4 Avenues for Future Research

Although the analyses contained within this thesis have shed light on some previously unexplored facets of local government financial sustainability, they have also raised a number of avenues for further research.

The first avenue relates to the need for greater scholarly attention to be given to examining the internal determinants of financial sustainability. This thesis has highlighted just two factors, in the form of the internal budgeting processes (budget inaccuracy) and service quality decisions, identifying a significant association with financial performance. Other analyses may prove useful in shedding light on previously unconsidered internal factors, supplementing the extant scholarly literature which is primarily directed towards an identification of external determinants. Through the discovery of additional internal and external determinants of financial sustainability, it may be possible to implement alternative policy interventions which more effectively target financial performance and hence increase the likelihood of successful outcomes being realised.

The second avenue for future research relates to the need to consider and measure the efficacy of alternative policy interventions identified for improving financial sustainability. As suggested in the previous section such instruments may provide more viable alternatives

to amalgamation, however before these instruments are used in future reforms it is important to ensure that robust empirical analysis is undertaken. This should ensure that policymakers are aware of the efficacy of individual policy instruments, and any potential problems which may be encountered in the planning and implementation stages so that they may be addressed. Given that shared service arrangements do not appear to be a viable alternative, future research might instead focus on the desirability of legislative reforms, financial reforms, or other internal governance and management reforms, such as the changes to the legislation surrounding the collection of local government rates, or the use of bi-cameral sortition arrangements (for more information see Drew, 2020).

Finally, to supplement the empirical analyses contained above, some consideration might be given to the use of qualitative analysis of reform outcomes. This may be useful in uncovering the reasons behind the unsuccessful outcomes observed above which cannot be sufficiently identified through quantitative analysis. Examples may include potential problems related to community resistance to reforms, political opposition, and resistance to change which may have reduced the efficacy of individual reform programmes, but which can be difficult to elicit through the use of quantitative measures. Through the completion of supplementary qualitative analysis, it may be possible to identify these problems and ensure that they can be addressed in future reform programs. Analyses of this kind may also be important to ensure that the pursuit of financial sustainability does not lead to any negative consequences for other areas of local government performance such as representativeness, equity and autonomy which may not be sufficiently captured through quantitative metrics.

10.5 Conclusion

Concerns regarding the declining financial sustainability of local governments internationally have led to a greater reliance on reform programmes to improve financial sustainability. As this thesis has illustrated, in order to ensure that local government reform is indeed efficacious, it is important to have an understanding of the factors which can aid or hinder sustainability, the processes and outcomes of previous reform programs (and any problems encountered), and the potential of alternative reform instruments. Through the seven analyses contained within this thesis several factors which are significantly associated with local government expenditure and efficiency – including the mode of mayoral election and the internal budgeting process – the inability of recent Australian amalgamation programs and shared service arrangement alternatives to facilitate sustainability improvements, and potential viability of central audit arrangements have been identified. The next challenge for academics and policymakers alike will be to build on this knowledge base, to identify more comprehensive and efficacious methods by which financial sustainability improvements may be achieved.

If this extension to the reform 'toolkit' is achieved, then it may be possible for policymakers to be able to select more suitable policy instruments tailored to the specific problems identified and the unique nature of individual local governments. Moreover, if implemented in conjunction with sufficient and robust empirical analysis, detailed planning, and consultation with a range of industry experts and community representatives, it might be possible to achieve important improvements to financial position without jeopardising the capacity of local governments to provide the services communities currently require and will also need in the future.

Research Publications

McQuestin, D., and Drew, J. (2018). The Price of Populism: The Association between Directly Elected Mayors and Unit Expenditure in Local Government. *Lex Localis*, 16(4): 673-691.

McQuestin, D., Noguchi, M., and Drew, J. (2020). Efficient Budgeting: The Association between Budget Inaccuracy and Efficiency in Local Government. Submitted to *Public Money and Management*.

McQuestin, D., Drew, J., and Dollery, B. (2018). Do Municipal Mergers Improve Technical Efficiency? An Empirical Analysis of the 2008 Queensland Municipal Merger Program. *Australian Journal of Public Administration, 77*(3): 442-455.

McQuestin, D., Drew, J., and Miyazaki, M. (2020). Do amalgamations make a difference? What we can learn from evaluating the policy success of a large scale forced amalgamation of local government. Submitted to *Public Administration Quarterly.*

Drew, J., McQuestin, D., and Dollery, B. (2021). Searching for a Deeper Understanding of Local Government Amalgamation Outcomes. Submitted to *Local Government Studies*.

McQuestin, D., and Drew, J. (2019). Is a Problem Shared a Problem Halved? Shared Services and Municipal Efficiency. *Australian Journal of Public Administration*, 78(2): 265-280.

McQuestin, D., Noguchi, M., and Drew, J. (2021). The Positives and Negatives of Central Auditing: Can Central Audit Requirements Reduce the Manipulation of Depreciation Accrual Data by Local Governments? Submitted to *ABACUS*.

Appendix

McQuestin, D., and Noguchi, M. (2020). Worth the wait: The impact of government funding on hospital emergency waiting times. *Health Policy*, DOI: 10.1016/j.healthpol.2020.09.008

Reference List

Abadie, A. (2021). Using Synthetic Controls: Feasibility, Data Requirements, and Methodological Aspects. *Journal of Economic Literature, 59*(2): 391-425

Abadie, A., and Gardeazabal, J. (2003). The Economic Costs of Conflict: A Case Study of the Basque Country. *American Economic Review, 93*(1): 113–132.

Abadie, A., and Imbens, G. (2006). Large sample properties of matching estimators for average treatment effects. *Econometrica, 74*: 235-267.

Abadie, A., and Imbens, G. (2011). Bias-corrected matching estimators for average treatment effects. *Journal of Business and Economic Statistics, 29*: 1-11.

Abadie, A., and Imbens, G. (2012). *Matching on the estimated propensity score*. Harvard University and National Bureau of Economic Research. http://www.hks.harvard.edu/fs/aabadie/pscore.pdf.

Abadie, A., Diamond, A., and Hainmueller, J. (2010). Synthetic Control Methods for Comparative Case Studies: Estimating the Effect of California's Tobacco Control Program. *Journal of the American Statistical Association, 105*(490): 493-505

Abadie, A., Drukker, D., Herr, J., and Imbens, G. (2004). Implementing matching estimators for average treatment effects in Stata. *The Stata Journal, 4*(3): 290-311.

Abelson, P., and Joyeux, R. (2015). Smoke and mirrors—fallacies in the New South Wales government's views on local government financial capacity. *Public Money & Management, 35*(4): 315–320.

Access Economics. (2006). *Local Government Finances in Western Australia: Research Report for the Western Australian Local Government Association*. Perth, Australia: Access Economics.

Aldag, A, and Warner, M. (2018). Cooperation, Not Cost Savings: Explaining the Duration of Shared Service Agreements. *Local Government Studies*, *44*(3): 350-370.

Allan, P. (2003). Why Smaller Councils Make Sense. *Australian Journal of Public Administration, 62*(3): 74-81.

Allers, M., and Geertsema, J. (2016). The Effects of Local Government Amalgamation on Public Spending, Taxation and Service Levels: Evidence from 15 Years of Municipal Consolidation. *Journal of Regional Science, 56*(4): 659-682.

Alonso, J., and Andrews, R. (2019). Fiscal decentralisation and local government efficiency: Does relative deprivation matter? *Environment and Planning C: Politics and Space, 37*(2): 360-381

Andrews, R. (2004). Analysing Deprivation and Local Authority Performance: The Implications for CPA. *Public Money & Management, 24*(1): 19-26.

Andrews, R. (2013). Local Government Amalgamation and Financial Sustainability: The Case of England and Wales. *Public Finance and Management, 13*(2): 124-141.

Andrews, R. (2015). Vertical consolidation and financial sustainability: evidence from English local government. *Environment and Planning C: Government and Policy, 33*(6): 1518-1545.

Andrews, R., Beynon, M., and Genc, E. (2017). Strategy Implementation Style and Public Service Effectiveness, Efficiency, and Equity. *Administrative Sciences,7*(1): 4

Andrews, R., and Boyne, G. (2009). Size, Structure and Administrative Overheads: An Empirical Analysis of English Local Authorities. *Urban Studies, 46*(4): 739-759.

Andrews, R., Boyne, G., Law, J., and Walker, R. (2003). Myths, Measures and Modernisation: A Comparison of Local Authority Performance in England and Wales. *Local Government Studies, 29*(4): 54-75.

Andrews, R., Boyne, G., Law, J., and Walker, R. (2005). External Constraints on Local Service Standards: The Case of Comprehensive Performance Assessment in English Local Government. *Public Administration, 83*(3): 639-656

Andrews, R., Boyne, G., Law, J., and Walker, R. (2008). Organizational Strategy, External Regulation and Public Service Performance. *Public Administration, 86*(1): 185-203

Andrews, R., Boyne, G., Law, J., and Walker, R. (2009). Centralization, Organizational Strategy, and Public Service Performance. *Journal of Public Administration Research and Theory, 19*(1): 57-80.

Andrews, R., Boyne, G., Meier, K., O' Toole, L., and Walker, R. (2012). Vertical Strategic Alignment and Public Service Performance. *Public Administration, 90*(1): 77-98.

Andrews, R., Boyne, G., and Walker, R. (2006). Strategy Content and Organisational Performance: An Empirical Analysis. *Public Administration Review, 66*(1): 52-63.

Andrews, R., Cowell, R., and Downe, J. (2008). Support for Active Citizenship and Public Service Performance: An Empirical Analysis of English Local Authorities. *Policy & Politics, 36*(2): 225-243.

Andrews, R., and Entwistle, T. (2013). Four Faces of Public Service Efficiency: What, How, When and for Whom to Produce. *Public Management Review, 15*(2): 246-264.

Angrist, J., and Pischke, J. (2009). *Mostly Harmless Econometrics: An Empiricist's Companion*. Princeton, NJ: Princeton University Press.

Arcas, M. J., and Martí, C. (2016). Financial Performance Adjustment in English Local Governments. *Australian Accounting Review*, 26(2): 141-152.

Arundale, V. (2020, October 1). Armidale Regional Council reviewed a detailed financial report back in December. *The Armidale Express*. Retrieved from: https://www.armidaleexpress.com.au/story/6950154/the-case-of-the-missing-millions-was-uncovered-months-ago/

Audit Office of New South Wales (AONSW). (2018). *Report on Local Government 2017*. Sydney, Australia. Retrieved from: https://www.audit.nsw.gov.au/our-work/reports/report-on-local-government-2017.

Audit Office of New South Wales (AONSW). (2019a). *Workforce reform in three amalgamated councils*. Sydney, Australia: AONSW

Audit Office of New South Wales (AONSW). (2019b). *Report on Local Government 2018*. Sydney, Australia. Retrieved from: https://www.audit.nsw.gov.au/our-work/reports/local-government-2018.

Audit Office of New South Wales (AONSW). (2020). *Report on Local Government 2019.* Sydney, Australia. Retrieved from: https://www.audit.nsw.gov.au/our-work/reports/report-on-local-government-2019.

Australian Bureau of Statistics (ABS). (2013). *National regional profile (2007-2011)*. Canberra, Australia: ABS.

Australian Bureau of Statistics (ABS). (2017a). *National Regional Profile (2010-2014).* Canberra, Australia: ABS.

Australian Bureau of Statistics (ABS). (2017b). *National Regional Profile (2011-2016).* Canberra, Australia: ABS.

Australian Bureau of Statistics (ABS). (2018). *National Regional Profile (2012-2017).* Retrieved from: www.abs.gov.au

Australian Bureau of Statistics (ABS). (2019). *Government Finance Statistics*. Canberra: Australia: ABS.

Australian Bureau of Statistics (ABS). (2020). *National Regional Profile (2014-2019).* Retrieved from: www.abs.gov.au

Australian Bureau of Statistics (ABS). (2021). *Data by Region, 2014-19* (No.1410.0). Retrieved from: https://www.abs.gov.au/ausstats/abs@.nsf/mf/1410.0.

Baird, M. (2015). *Fit for the Future: $2 Billion Community Windfall by Merging Unfit Councils*. Sydney, Australia: NSW Government.

Baird, M. (2016). *19 New Councils Created in NSW Today*. Sydney, Australia: NSW Government.

Ballantine, J., Forker, J., and Greenwood, M. (2007). Earnings Management in English NHS Hospital Trusts. *Financial Accountability and Management*, *23*(4): 421-440.

Ballantine, J., Forker, J., and Greenwood, M. (2008). Public and Private Sector Auditors and Accruals Quality in English NHS Hospital Trusts. *The British Accounting Review, 40*(1): 28-47.

Baqir, R. (2002). Districting and Government Overspend. *Journal of Political Economy 110*(6): 1318–1354.

Barbera, C., Guarini, E., and Steccolini, I. (2020). How do governments cope with austerity? The roles of accounting in shaping governmental financial resilience. *Accounting Auditing and Accountability Journal, 33*(3): 529-558.

Barbera, C., Jones, M., Korac, S., Saliterer, I., and Steccolini, I. (2017). Governmental financial resilience under austerity in Austria, England and Italy: How do local governments cope with financial shocks? *Public Administration, 95*(3): 670-697.

Barbera, C., Jones, M., Korac, S., Saliterer, I., and Steccolini, I. (2019). Local government strategies in the face of shocks and crises: the role of anticipatory capacities and financial vulnerability. *International Review of Administrative Sciences*, 002085231984266-002085231984266

Barnett , R., Levaggi, R., and Smith, P. (1991). An incremental budgeting model of local public expenditure setting in the presence of piecewise linear budget constraints. *Applied Economics, 23*(5): 949-956.

Beckett, J., and Doamekpor, F. (2011). Variability and opportunities in flexible budgeting: A local government approach, *Public Finance and Management, 11*(2): 93-117.

Bel, G., and Warner, M. (2014). Inter-Municipal Cooperation and Costs: Expectations and Evidence. *Public Administration, 93*(1): 52-67.

Bell, B., Dollery, B., and Drew, J. (2016). Learning from Experience in NSW? *Economic Papers*, 35(2): 99-111.

Bifulco, R., Rubenstein , R., and Sohn, H. (2017). Using Synthetic Controls to Evaluate the Effect of Unique Interventions: The Case of Say Yes to Education. *Evaluation Review, 41*(6): 593–619.

Bird, R., Vaillancourt, F. (eds). (2006). *Perspectives on fiscal federalism*. WBI learning resources series. Washington, DC: World Bank.

Blesse, S., and Baskaran, T. (2016). Do Municipal Mergers Reduce Cost? Evidence from a German Federal State. *Regional Science and Urban Economics, 59*: 54-74.

Blom-Hansen, J., Houlberg, K., Serritzlew, S., and Treisman, D. (2016). Jurisdiction Size and Local Government Policy Expenditure: Assessing the Effect of Municipal Amalgamation. *American Political Science Review, 110*(4): 812-831.

Bochel, H., and Bochel, C. (2010). Local Political Leadership and the Modernisation of Local Government. *Local Government Studies, 36*(6): 723-737.

Bolívar, M., Navarro-Galera, A., Muñoz, L., and Subirés, M. (2016). Risk Factors and Drivers of Financial Sustainability in Local Government: An Empirical Study. *Local Government Studies, 42*(1): 29-51.

Booms, B. (1966). City Government Form and Public Expenditures. *National Tax Journal, 19*(2): 187-199.

Bovens, M. (2010). A Comment on Marsh and McConnell: Towards a Framework For Establishing Policy Success. *Public Administration, 88*(2): 584-585.

Bovens, M. and ‘t Hart, P. (1996). *Understanding Policy Fiascos*. Piscataway, NJ: Transaction Publishers.

Bovens, M., and ‘t Hart, P. (2016). Revisiting the Study of Policy Failures. *Journal of European Public Policy, 23*(5): 653-666.

Boyne, G. (1988). The Extent and Impact of Local Fiscal Stress. *Public Policy and Administration, 3*(1- 2): 15-26.

Boyne, G. (1990). Central Grants and Local Policy Variation. *Public Administration, 68*(2): 207-233.

Boyne, G. (1995). Population Size and Economies of Scale in Local Government. *Policy & Politics, 23*(3): 213–222.

Boyne, G. (1996). Scale, Performance and the New Public Management: An Empirical Analysis of Local Authority Services. *Journal of Management Services, 33*(6): 809-826.

Boyne, G. (1998). *Public Choice Theory and Local Government: A Comparative Analysis of the UK and USA.* Basingstoke, United Kingdom: Macmillan Press.

Boyne, G., and Law, J. (2005). Setting Public Service Outcome Targets: Lessons from Local Public Service Agreements. *Public Money & Management, 25*(4): 253-260.

Boyne, G., Martin, S., and Walker, R. (2004). Explicit Reforms, Implicit Theories and Public Service Improvement. *Public Management Review, 6*(2): 189-210. 20

Bradbury, J., and Stephenson, E. (2003). Local Government Structure and Public Expenditures. *Public Choice 115*(1-2): 185-198.

Brown, T., and Potoski, M. (2003). Transaction Costs and Institutional Explanations for Government Service Production Decisions. *Journal of Public Administration Research and Theory, 13*(4): 441-468.

Brown, T., and Potoski, M. (2005). Transaction Costs and Contracting: The Practitioner Perspective. *Public Performance & Management Review, 28*(3): 326-351.

Bruno, G., Genovese, A., and Piccolo, C. (2017). Territorial amalgamation decisions in local government: Models and a case study from Italy. *Socio-Economic Planning Sciences, 57*: 61-72.

Burga, B., McDonald, S., and Thomson, N. (1991). Grants Commission Assessment of Local Government Debt Servicing and Capital Expenditures. *Economic Analysis & Policy, 21*(1): 15-28.

Byrnes, J., Crase, L., Dollery, B., and Villano, R. (2009). An Analysis of the Relative Efficiency of Wastewater Utilities in Non-Metropolitan New South Wales and Victoria. *Australian and New Zealand Regional Science Association, 15*(2): 153–169.

Card, D., and Krueger, A. (1994). Minimum Wages and Employment: A Case Study of the Fast-Food Industry in New Jersey and Pennsylvania. *The American Economic Review, 84*(4): 772-793.

Carr, J., and Hawkins, C. (2013). The Costs of Cooperation: What the Research Tells Us About Managing the Risks of Service Collaborations in the U.S. *State and Government Review, 45*(4): 224-239.

Chakrabarti, S., Kodikara, J., and Pardo, L. (2002). Survey Results on Stabilisation Methods and Performance of Local Government Roads in Australia. *Road & Transport Research, 11*(3): 3–16.

Chapman, J. (2008). State and Local Fiscal Sustainability: The Challenges. *Public Administration Review, 68*(s1): S115-S131.

Chapman, J., Lu, A., and Timmerhoff, L. (2020). *By the Numbers: A Look at Municipal Bankruptcies Over the Past 20 Years*. Philadelphia, United States: Pew Charitable Trusts

Chung, I. (2018). Does the budget process matter for infrastructure spending? Capital budgeting in local government. *Public Money & Management, 39*(4): 1-8.

Clark, T. (1968). Community Structure, Decision-Making, Budget Expenditures, and Urban Renewal in 51 American Communities. *American Sociological Review, 33*(4): 576-593.

Coate, S., and Knight, B. (2011). Government Form and Public Spending: Theory and Evidence from U.S. Municipalities. *American Economic Journal: Economic Policy, 3*(3): 82–112.

Coelli, T., Rao, P., O'Donnell, C., and Battese, G. (2005). *An Introduction to Efficiency and Productivity Analysis*. New York, United States: Springer Science and Business Media, Inc.

Collin, S., Tagesson, T., Andersson, A., Cato, J., and Hansson, K. (2009). Explaining the choice of accounting standards in municipal corporations: Positive accounting theory

and institutional theory as competitive or concurrent theories. *Critical Perspectives on Accounting, 20*: 141-174.

Conway, M., Dollery, B., and Grant, B. (2011). Shared Service Models in Australian Local Government: The Fragmentation of the New England Strategic Alliance 5 Years On. *Australian Geographer*, *42*(2): 207-223.

Cooper, W., Seiford, L., and Tone, K. (2007). *Data Envelopment Analysis.* New York, United States: Springer.

Copus, C. (2004). Directly Elected mayors: A Tonic for Local Governance or Old Wine in New Bottles? *Local Government Studies*, *30*(4): 576-588.

Crawford, M., and Stein, W. (2005). Second Order' Change in UK Local Government: The Case of Risk Management. *The International Journal of Public Sector Management, 18*(4-5): 414-423.

Da Cruz, N. and Marques, R. (2014). Revisiting the Determinants of Local Government Performance. *Omega, 44*: 91–103.

Davies, M. (2009). Effective Working Relationships Between Audit Committees and Internal Audit- The Cornerstone of Corporate Governance in Local Authorities, A Welsh Perspective. *Journal of Management and Governance, 13*(1-2): 41-73.

Deno, K., and Mehay, S. (1987). Municipal Management Structure and Fiscal Performance: Do City Managers Make a Difference? *Southern Economic Journal*, *53*(3): 627–642.

Department of Infrastructure and Regional Development (DIRD). (2005). *Local Government National Report*, 2003-04. Canberra, Australia: DIRD.

Department of Infrastructure, Local Government and Planning (DILGP). (2013). *Local Government Comparative Reports (2003-2013)*. Brisbane, Australia: DILGP.

Department of Infrastructure and Regional Development (DIRD). (2016) *Local Government National Report*. Canberra, Australia: DIRD.

Department of Local Government, Planning, Sport and Recreation (DLGPSR). (2007). *Stronger Councils for a Growing Queensland*. Brisbane, Australia: DLGPSR.

Department of Planning, Transport and Infrastructure (DPTI). (2019). *Reforming Local Government in South Australia- Discussion Paper*. Government of South Australia: Adelaide, Australia.

de Fine Licht, J. (2019). The role of transparency in auditing. *Financial Accountability & Management, 35*: 233-245.

De Souza, S., Dollery, B., and Kortt, M. (2014). De-Amalgamation in Action: The Queensland Experience. *Public Management Review, 17*(10): 1403–1424.

Dollery, B. (2009). Water and Wastewater Services in Non-metropolitan New South Wales: A Critical Analysis of the Report of the Independent Inquiry. *Agenda: A Journal of Policy Analysis and Reform, 16*(2): 45-57.

Dollery, B., Akimov, A., and Byrnes, J. (2009). Shared services in Australian local government: Rationale, alternative models and empirical evidence. *Australian Journal of Public Administration, 68*: 208-219.

Dollery, B., and Crase, L. (2004). Is Bigger Local Government Better? An Evaluation of the Case for Australian Municipal Amalgamation Programs. *Urban Policy and Research, 22*(3): 265-276.

Dollery, B., and Drew, J. (2016). In Whose Interest? An Assessment of the New South Wales Government's Post-Amalgamation Rate Path Freeze Policy. *Journal of Australian Taxation, 18*(1): 143-162.

Dollery, B., and Drew, J. (2017). Hired Guns: Local Government Mergers in New South Wales and the KPMG Modelling Report. *Australian Accounting Review, 27*(3): 263-272.

Dollery, B., and Drew, J. (2018). Chalk and Cheese: A Comparative Analysis of Local Government Reform Processes in New South Wales and Victoria. *International Journal of Public Administration, 41*(11): 847-858.

Dollery, B., Grant, B., and Kortt, M. (2012). *Councils in Cooperation: Shared Services and Australian Local Government*. Sydney: The Federation Press.

Dollery, B., Kitching, H., McMillan, M., and Shah, A. (2020). *Local Public, Fiscal and Financial Governance: An International Perspective.* New York, NY: Palgrave McMillan.

Dollery, B., Kortt, M., and Drew, J. (2016). Fostering Shared Services in Local Government: A Common Service Model. *Australasian Journal of Regional Studies, 22*(2): 225-242

Dollery, B., and Robotti, L. (2008). *The Theory and Practice of Local Government Reform*. Cheltenham: Edward Elgar.

Dollery, B., Wallis, J., and Allan, P. (2006). The Debate That Had to Happen But Never Did: The Changing Role of Australian Local Government, *Australian Journal of Political Science, 41*(4): 553-567.

Dollery, B., and Worthington, A. (1995). State Expenditure and Fiscal Illusion in Australia: A Test of the Revenue Complexity, Revenue Elasticity and Flypaper Hypotheses. *Economic Analysis & Policy, 25*(2): 125-140.

Dollery, B., and Worthington, A. (1995). Federal Expenditure and Fiscal Illusion: A Test of the Flypaper Hypothesis in Australia. Publius, *25*(1): 23–34

Dollery, B., and Worthington, A. (2005). Federal expenditure and fiscal illusion: A test of the flypaper hypothesis in Australia. *Publius, 25*(1): 23-34.

Drew, J. (2018). Playing for keeps: local government distortion of depreciation accruals in response to high-stakes public policy-making. *Public Money & Management, 38*(1): 57-64.

Drew, J. (2019). How losers can turn into winners in disputatious public policy: a heuristic for prospective herestheticians. *Australian Journal of Political Science, 54*(1): 167-182.

Drew, J. (2020). *Reforming Local Government*. Berlin, Germany: Springer.

Drew, J., and Campbell, N. (2016). Autopsy of Municipal Failure: The Case of Central Darling Shire. *Australasian Journal of Regional Studies, 22*(1): 79-102.

Drew, J., and Dollery, B. (2014a). Separation Anxiety: An Empirical Evaluation of the Australian Sunshine Coast Regional Council De-Amalgamation. *Public Money & Management, 34*(3): 213-220.

Drew, J., and Dollery, B. (2014b). Would Bigger Councils Yield Scale Economies in the Greater Perth Metropolitan Region? A Critique of the Metropolitan Local

Government Review for Perth Local Government. *Australian Journal of Public Administration, 73*(1): 128-137.

Drew, J., and Dollery, B. (2014c). The Impact of Metropolitan Amalgamations in Sydney on Municipal Financial Sustainability. *Public Money & Management, 34*(4): 281-288.

Drew, J., and Dollery, B. (2014d). Keeping It In-House: Households Versus Population as Alternative Proxies for Local Government Output. *Australian Journal of Public Administration, 73*(2): 235-246.

Drew, J., and Dollery, B. (2015a). Breaking Up is Hard to Do: The Costs of De-Amalgamation of the Delatite Shire Council. *Public Finance & Management, 15*(1): 1-23.

Drew, J., and Dollery, B. (2015b). How High Should They Jump? An Empirical Method for Setting Municipal Financial Ratio Performance Benchmarks. *Australian Journal of Public Administration, 75*(1): 53-64. 21

Drew, J., and Dollery, B. (2015c). Inconsistent Depreciation Practice and Public Policymaking: Local Government Reform in New South Wales. *Australian Accounting Review, 25*(1): 28-37.

Drew, J., and Dollery, B. (2015d). The State of Things: The Dynamic Efficiency of Australian States and Territories. *Economic Papers, 34*(3): 165– 176.

Drew, J., and Dollery, B. (2016a). Less Haste, More Speed: The Fit for the Future Reform Program in New South Wales Local Government. *Australian Journal of Public Administration, 75*(1): 78-88.

Drew, J., and Dollery, B. (2016b). Does Size Still Matter? An Empirical Analysis of the Effectiveness of Victorian Local Authorities. *Local Government Studies, 42*(1): 15-28.

Drew, J. and Dollery, B. (2016c). Summary Execution: The impact of alternative summarization strategies on local governments. *Public Administration Quarterly, 40*(4): 814-841.

Drew, J., and Dollery, B. (2017a). The Price of Democracy? Political Representation Structure and Per Capita Expenditure in Victorian Local Government. *Urban Affairs Review, 53*(3): 522-538.

Drew, J., and Dollery, B. (2018). Chalk and Cheese: A Comparative Analysis of Local Government Reform Process in New South Wales and Victoria. *International Journal of Public Administration, 41*(11): 847-858.

Drew, J., Dollery, B., and Kortt, M. (2015). Can't Get No Satisfaction? The Association Between Community Satisfaction and Population Size for Victoria. *Australian Journal of Public Administration, 75*(1): 65-77.

Drew, J., Dollery, B., and Kortt, M. (2016). Peas in a Pod: Are Efficient Municipalities also Financially Sustainable? *Australian Accounting Review, 26*(2): 122-131.

Drew, J., and Grant, B. (2017a). Multiple Agents, Blame Games and Public Policy-Making: The Case of Local Government Reform in New South Wales. *Australian Journal of Political Science, 52*(1): 37-52.

Drew, J., and Grant, B. (2017b). Subsidiarity: More Than a Principle of Decentralisation – A View from Local Government. *Publius, 47*(4): 522-545.

Drew, J., and Grant, B. (2017c). Local Government Amalgamations. In B. Grant, and J. Drew (eds.), *Local Government in Australia: History, Theory and Public Policy* (pp. 357–372). Singapore: Springer Nature Singapore Pte. Ltd.

Drew, J., Grant, B., and Fisher, J. (2017). Re-evaluating Local Government Amalgamations: Utility Maximisation Meets the Principle of Double Effect. *Policy & Politics, 45*(3): 379– 394.

Drew, J., Kortt, M., and Dollery, B. (2014). Economies of Scale and Local Government Expenditure: Evidence From Australia. *Administration & Society, 46*(6): 632-653.

Drew, J., Kortt, M., and Dollery, B. (2015). What Determines Efficiency in Local Government? A DEA Analysis of NSW Local Government. *Economic Papers, 34*(4): 243-256.

Drew, J., Kortt, M., and Dollery, B. (2016). Did the Big Stick Work? An Empirical Assessment of Scale Economies and the Queensland Forced Amalgamation Program. *Local Government Studies, 42*(1): 1- 14.

Drew, J., Kortt, M., and Dollery, B. (2017). No Aladdin's Cave in New South Wales? Local Government Amalgamation, Scale Economies, and Data Envelopment Analysis Specification. *Administration & Society, 49*(10): 1450-1470.

Drew, J., McQuestin, D., and Dollery, B. (2019). Good to Share? The Pecuniary Implications of Moving to Shared Service Production for Local Government Services. *Public Administration, 97*(1): 132-146.

Drew, J., Razin, E., and Andrews, R. (2019). Rhetoric in municipal amalgamations: a comparative analysis. *Local Government Studies, 45*(5): 748-767.

Duarte, C. (2019). Alternative Monetary Targets, Instruments and Future Monetary Policy Frameworks. *Review of Political Economy, 31*(4): 582-601.

Elcock, H. (2008). Elected mayors: Lesson Drawing from Four Countries. *Public Administration, 8*(3): 795-811.

Electoral Commission New South Wales (ECNSW). (2017). *Results by Local Government Area.* Sydney, Australia: ECNSW.

Electoral Commission Queensland (ECQ). (2013). *Election Information and Results— De-Amalgamation Polls*. Brisbane, Australia: ECQ.

Ernst & Young (EY). (2015). *Fit for the Future: Review of Business Case Estimates of Merger Net Benefits for Sydney Metropolitan Councils*. London, UK: Ernst & Young.

Farnham, P. (1990). The Impact of Citizen Influence on Local Government Expenditure. *Public Choice, 64*(3): 201-212.

Fahey, G., Drew, J., and Dollery, B. (2016). Merger Myths: A Functional Analysis of Economies of Scale in New South Wales Municipalities. *Public Finance and Management, 16*(4): 362-382.

Fatás, A., and Summers, L. (2018). The permanent effects of fiscal consolidations. *Journal of International Economics, 112*: 238-250.

Faulk, D., and Grassmueck, G. (2012). City-County Consolidation and Local Government Expenditures. *State and Local Government Review, 44*(3): 196-205.

Feiock, R. (2004). ‘Do Consolidation Entrepreneurs Make a Deal with the Devil?’ in Carr, J., and Feiock, R. (eds.). *City- County Consolidation and its Alternatives Reshaping the Local Government Landscape*. New York, United States :Routledge.

Feiock, R. (2007). Rational Choice and Regional Governance. *Journal of Urban Affairs, 29*(1): 47-63.

Fender, J. (2012). *Monetary Policy*. Hoboken, NJ: Wiley.

Ferguson, A., Thompson, A., and Gorrey, M. (2020, October 31). 'Rates will have to rise': Council mergers in crisis as losses mount. *Sydney Morning Herald*. Retrieved from: https://www.smh.com.au/national/nsw/rates-will-have-to-rise-council-mergers-in-crisis-as-losses-mount-20201027-p56926.html

Ferreira, A., Carvalho, J., and Pinho, F. (2013). Earnings Management Around Zero. A Motivation to Local Politician Signalling Competence. *Public Management Review*, 15(5): 657-686.

Ferry, L. and Eckersley, P. (2015). Budgeting and governing for deficit reduction in the UK public sector: act three ‘accountability and audit arrangements’. *Public Money & Management, 35*(3): 203-221.

Ferry, L., and Eckersley, P. (2020). Hybridizing the institutional logics of performance improvement and budgetary stewardship in English and Welsh local government. *Public Policy and Administration, 35*(1): 45-64.

Ferry, L., Coombs, H., and Eckersley, P. (2017). Budgetary stewardship, innovation and working culture: Identifying the missing ingredient in English and Welsh local

authorities' recipes for austerity management. *Financial Accountability and Management, 33*(2): 220-243.

Fogarty, J. and Mugera, A. (2013). Local Government Efficiency: Evidence from Western Australia. *Australian Economic Review, 46*(3): 300– 311.

Gaffney, M., and Marlowe, J. (2014). Fiscal Implications of City-City Consolidations. *State and Local Government Review, 46*(3): 197-204.

Game, C. (2006). Comprehensive performance assessment in English local government. *International Journal of Productivity and Performance Management, 55*(6): 466–479.

Garcea, J., and LeSage, E. (2005). *Municipal reforms in Canada*. Toronto, Canada: Oxford University Press

Garlatti, A., Fedele, P., and Iacuzzi, S. (2020). Can amalgamations deliver? Barriers to local government mergers from an historical institutionalist perspective. *Public Money & Management,* DOI: 10.1080/09540962.2020.1800216

Gerathy, S. (2015). *Forced local government amalgamations, report finds most NSW councils 'not fit for future'*. Australian Broadcasting Corporation.

Gooch, D. (2019, October 4). *Central Darling Shire to remain under administration until 2024 marking a decade without elected councillors*. Australia: Australian Broadcasting Corporation (ABC).

Gorina, E., Maher, C., and Joffe, M. (2018). Local Financial Distress: Measurement and Prediction, *Public Budgeting & Finance, 38*(1): p.72-94.

Grant, B., and Drew, J. (2017). *Local Government in Australia*: History, Theory and Public Policy. Singapore: Springer Nature.

Grant, B., Dollery, B., and Gow, J. (2011). Local Democracy and Local Government Efficiency; The Case of Elected Executives in Australian Local Government. *Australian Journal of Political Science, 46*(1): 53-69.

Grant, B., Dollery, B., and Kortt, M. (2016). Recasting Leadership Reform in Australian Local Government: A Typology from Political Theory. *Local Government Studies, 42*(6): 1-21.

Gregory, R., and Lonti, Z. (2008). Chasing Shadows? Performance Measurement of Policy Advice in New Zealand Government Departments. *Public Administration, 86*(3): 837–856.

Hayes, K., and Chang, S. (1990). The Relative Efficiency of City Manager and Mayor-Council Forms of Government. *Southern Economic Journal, 57*(1): 167-177.

Högye M. (2002). Theoretical approaches to public budgeting, [in:] M. Högye (ed.), *Local government budgeting*, Open Society Institute

Holcombe, R., and Williams, D. (2008). The impact of population density on municipal government expenditures. *Public Finance Review*, 36(3): 359–373.

Holcombe, R., and Williams, D. (2009). Are There Economies of Scale in Municipal Government Expenditures? *Public Finance and Management, 9*(3): 416-438.

Hommes, C. (2013). *Behavioural rationality and heterogeneous expectations in complex economic systems*. Cambridge, New York: Cambridge University Press.

Howlett, M. (2012). The lessons of failure: learning and blame avoidance in public policymaking. *International Political Science Review, 33*(5): 539-555.

Huang, X., and Gao, Q. (2018). Does social insurance enrollment improve citizen assessment of local government performance? Evidence from China. *Social Science Research, 70*: 28-40.

Imbens, G., and Rubin, D. (2015). *Causal inference for statistics, social, and biomedical sciences: An introduction*. Cambridge, UK: Cambridge University Press.

Independent Local Government Review Panel (ILGRP). (2012). *Better, Stronger Local Government – The Case for Sustainable Change*. Sydney, Australia: ILGRP.

Independent Local Government Review Panel (ILGRP). (2013a). *Future Directions for NSW Local Government—Twenty Essential Steps*. Sydney, Australia: ILGRP.

Independent Local Government Review Panel (ILGRP). (2013b). *Revitalising Local Government*. Sydney, Australia: ILGRP.

Independent Pricing and Regulatory Tribunal (IPART). (2015). *Assessment of Council Fit For the Future Proposals*. Sydney, Australia: IPART.

Johansson, E. (2003). Intergovernmental grants as a tactical instrument: Empirical evidence from Swedish municipalities. *Journal of Public Economics, 87*: 883– 915.

Jonsson, E. (1983). Measures Taken by Municipalities Undergoing Amalgamation. *Scandinavian Political Studies 6*: 231–234.

Jordá, Ò. (2005). Estimation and Inference of Impulse Responses by Local Projections. *American Economic Review, 95*(1): 161-182.

Jordá, Ò., and Taylor, A. (2016). The Time for Austerity: Estimating the Average Treatment Effect of Fiscal Policy. *The Economic Journal, 126*: 219-255.

Jordan, M. (2003). Punctuations and Agendas: A New Look at Local Government Budget Expenditures. *Journal of Policy Analysis and Management, 22*(3): 345-360.

Kauder, B. (2016). Incorporation of municipalities and population growth: A propensity score matching approach. *Papers in Regional Science, 95*: 539-554.

Keenan, Z. (2020, August 8). Local Government Act review renews push for council amalgamations amid COVID-19 fallout. *ABC News*. Retrieved from: https://www.abc.net.au/news/2020-08-08/push-renewed-to-amalgamate-west-australian-local-governments/12535886

Kennedy, P. (2003). *A Guide to Econometrics, 5th Edition.* Cambridge, United Kingdom: MIT Press.

Kim, Y., and Warner, M. (2016). Pragmatic Municipalism: Local Government Service Delivery After the Great Recession. Public Administration, *94*(3): 789-805.

Knaus, C. (2017, 27th July). *NSW council amalgamations: plan to merge 14 Sydney councils abandoned*. The Guardian.

Kortt, M., Dollery, B., and Drew, J. (2016). Municipal Mergers in New Zealand: An Empirical Analysis of the Proposed Amalgamation of Hawke's Bay Councils. *Local Government Studies, 42*(2): 228-247.

KPMG. (2015a). *Local Government Reform: Merger Impacts and Analysis*. Amstelveen, Netherlands: KPMG.

KPMG. (2015b). *Shared Service Analysis: Final report 27 May 2015*. KPMG: Sydney.

KPMG. (2016). *Outline of the Financial Modelling Assumptions for Local Government Merger Proposals*. Amstelveen, Netherlands: KPMG.

Kreif, N., Grieve, R., Hangartner, D., Turner, A., Nikolova, S., and Sutton, M. (2015). Examination of the Synthetic Control Method for Evaluating Health Policies with Multiple Treated Units. *Health Economics, 25*(12): 1514-1528.

Kwon, S., and Feiock, R. (2010). Overcoming Barriers to Cooperation: Intergovernmental Service Agreements. *Public Administration Review*, November December 2010: 876-884.

Ladd, H. (1992). Population growth, density and the costs of providing public services, *Urban Studies*, 29(2): 273–295

Lawrence, M., and Schiff, J. (2011). City-county Consolidations: Promise versus Performance. *State and Local Government Review, 43*(2): 167-177.

Leland, S., and Thurmaier, K. (eds.) (2010) *City-County Consolidation: Promises Made, Promises Kept*? Georgetown University Press. Washington, D.C., United States: Georgetown University Press

Levitt, S., and List, J. (2011). Was there Really a Hawthorne Effect at the Hawthorne Plant? An Analysis of the Original Illumination Experiments. *American Economic Journal: Applied Economics, 3*(1): 224–238.

Lineberry, R., and Fowler, E. (1967). Reformism and Public Policies in American Cities. *American Political Science Review, 61*(3): 701-716.

Local Government Association of Queensland (LGAQ). (2005). *Size, Shape and Sustainability of Queensland Local Government*. Brisbane, Australia: LGAQ.

Local Government Grants Commission (LGGC). (2016) *Local Government Grants Commission - Annual Reports.* Nowra, Australia: LGGC.

Local Government Grants Commission (LGGC). (2018). *Local Government Grants Commission - Annual Reports*. Nowra, Australia: LGGC.

Local Government Grants Commission (LGGC). (2019). *Local Government Grants Commission - Annual Reports*. Nowra, Australia: LGGC.

Local Government NSW (LGNSW). (2017). *Reform- Fit For the Futu*re. Sydney, Australia: LGNSW.

Local Government NSW (LGNSW). (2020). *Overview of the amalgamation process*. Sydney, Australia. Sydney, Australia: LGNSW.

Local Government NSW (LGNSW). (2019). *Aboriginal Affairs*. Retrieved from: https://www.lgnsw.org.au/policy/aboriginal-affairs

Local Government Reform Commission (LGRC). (2007). *Report of the Local Government Reform Commission, Vol. 1*. Brisbane, Australia: LGRC.

Lowensohn, S., Johnson, L., Elder, R., and Davies, S. (2007). Auditor Specialisation, Perceived Audit Quality and Audit Fees in the Local Government Audit Market. *Journal of Accounting and Public Policy, 26*(6): 705-732.

Maher, C. (2015). A Longitudinal Analysis of the Effects of Service Consolidation on Local Government Expenditures. *Public Administration Quarterly, 39*(3): 393-425.

MacDonald, L. (2008). The Impact of Government Structure on Local Public Expenditures. *Public Choice, 136*: 457-473.

Magner, N., Johnson, G., Sobery, J., and Welker, R. (2000). Enhancing Procedural Justice in Local Government Budget and Tax Decision Making. *Journal of Applied Social Psychology, 30*(4): 798-815.

Mali, D., and Lim, H. (2018). Conservative Reporting and the Incremental Effect of Mandatory Audit Firm Rotation Policy: A Comparative Analysis of Audit Partner Rotation vs Audit Firm Rotation in South Korea. *Australian Accounting Review, 28*(3): 446-463.

Marquardt, C., and Wiedman, C. (2004). How are Earnings Managed? An Examination of Specific Accruals. *Contemporary Accounting Research, 21*(2): 461-491.

Marsh, D. and McConnell, A. (2010). Towards a Framework for Establishing Policy Success. *Public Administration, 88*(2): 564-583.

Martin, L., and Schiff, J. (2011). City-Country Consolidations: Promise Versus Performance. *State and Local Government Review, 43*(2): 167-177

McConnell, A. (2010). Policy Success, Policy Failure and Grey Areas In-Between. *Journal of Public Policy, 30*(3): 345-362.

McQuestin, D., and Drew, J. (2019). Is a Problem Shared a Problem Halved? Shared Services and Municipal Efficiency. *Australian Journal of Public Administration, 78*(2): 265-280.

McQuestin, D., Drew, J., and Dollery, B. (2018). Do Municipal Mergers Improve Technical Efficiency? An Empirical Analysis of the 2008 Queensland Municipal Merger Program. *Australian Journal of Public Administration, 77*(3): 442-455.

McQuestin, D., Drew, J., and Miyazaki, M. (2020). Do amalgamations make a difference? What we can learn from evaluating the policy success of a large scale forced amalgamation of local government. *Public Administration Quarterly,* In Print.

McNichols, M. (2002). Discussion of the Quality of Accruals and Earnings: The Role of Accrual Estimation Errors. *The Accounting Review, 77*: 61-69.

Meares, W., Hatcher, W., and Roberts, C. (2018). Merging during a time of fiscal crisis: A financial condition analysis of the Augusta-Richmond city-county consolidation. *Public Administration Quarterly, 42*(4): 516-545.

Melitski, J., and Manoharan, A. (2014). Performance Measurement, Accountability and Transparency of Budgets and Financial Reports. *Public Administration Quarterly, 38*(1): 38-70.

Metropolitan Local Government Review Panel (MLGRP). (2012). *Final Report of the Independent Panel*. Perth, Australia: MLGRP.

Midwinter, A and McVicar, M. (1993). Population size and functional efficiency in public library authorities: the statistical evidence. *Journal of Librarianship and Information Science, 25*: 187-201

Mikesell, J. (2007). Fiscal administration in local government: an overview. In Shah A. (2007) (ed.) *Local budgeting*. World Bank.

Mir, M., Harun, H., and Sutiyono, W. (2019). Evaluating the Implementation of a Mandatory Dual Reporting System: The Case of Indonesian Local Government. *Australian Accounting Review, 29*(1): 80-94.

Miyazaki, M. (2020). Fiscal Sustainability and Municipal Amalgamations in Japan. *Public Administration Quarterly*, in print.

Miyazaki, T. (2017). Examining the relationship between municipal consolidation and cost reduction: an instrumental variable approach. *Applied Economics, 50*(10): 1108-1121.

Modlin, S. (2010). Rationalizing the Local Government Decision-Making Process. *Public Performance & Management Review, 33*(4): 571-593.

Mora, R., and Reggio, I. (2012). *Treatment Effect Identification Using Alternative Parallel Assumptions*. WP 12-33. Madrid, Spain.

Morgan, D., and Pelissero, J. (1980). Urban Policy: Does Political Structure Matter? *American Political Science Review, 74*(4): 999-1006.

National Disability Insurance Agency (NDIA). (2019). *Supports funded by the NDIS*. Retrieved from: https://www.ndis.gov.au/understanding/supports-funded-ndis

Nguyen, K. (2021, June 25th). Four Sydney LGAs placed in lockdown as NSW records 22 new COVID-19 cases. *Australian Broadcasting Corporation (ABC)*.

NSW Government. (1988). *City of Sydney Act 1988*. Sydney, Australia: NSW Government.

NSW Government. (1993). *Local Government Act 1993*. Sydney, Australia: NSW Government.

NSW Government. (2012). *Destination 2036- Independent Local Government Review Panel*. Sydney, Australia: NSW Government.

NSW Government (2015). *Local Government Reform Merger Impacts and Analysis*. Sydney, Australia: NSW Government.

NSW Local Government Grants Commission (LGGC). (2021). *Annual Report 2019-20*. NSW Government, Nowra, Australia.

NSW Treasury Corporation (TCorp). (2013). *Financial Sustainability of the New South Wales Local Government Sector*. Sydney, Australia: TCorp.

Nunamaker, T. (1985). Using Data Envelopment Analysis to Measure the Efficiency of Non-profit Organisations: A Critical Evaluation. *Managerial and Decision Economics, 6*(1): 50–58

Oates, W. (1999). An Essay on Fiscal Federalism. *Journal of Economic Literature, 37*(3): 1120– 1149.

Oates, W. (2011). *Fiscal Federalism*. Edward Elgar: Cheltenham.

Office of Local Government (OLG). (2016). *Your Council Report*. Nowra, Australia: OLG.

Office of Local Government (OLG). (2018a). *Your Council Report*. Retrieved from: https://www.olg.nsw.gov.au.

Office of Local Government (OLG). (2018b). *Australian Classification of Local Governments and OLG Group Numbers*. Sydney, Australia: OLG.

Office of Local Government (OLG). (2019). *Local Government Code of Accounting Practice and Financial Reporting*. Retrieved from: https://www.olg.nsw.gov.au.

Office of Local Government (OLG). (2020). *Your Council Report*. Sydney, Australia: OLG.

Office of Local Government (OLG). (2021). *Your Council Report*. Sydney, Australia: OLG.

Oliveira, J., Azevedo, G., and Oliveira, B. (2018). Impairment Losses: The Impact of First-time Adoption of the Accounting Standardisation System in Portugal. *Australian Accounting Review, 28*(4): 556-576.

Organisation for Economic Co-Operation and Development (OECD). (2013). *OECD Council Size*. Paris, France: OECD.

Peasnell, K., Pope P., and Young, S. (2000). Accrual Management to Meet Earnings Targets: UK Evidence Pre- and Post-Cadbury. *British Accounting Review*, 32(4): 415–445.

Pettersson-Lidbom, P. (2012). Does the Size of the Legislature Affect the Size of Government? Evidence from Two Natural Experiments. *Journal of Public Economics 96*: 269–278.

Pilcher, R. (2014). Role of Internal Audit in Australian Local Government Governance: A Step in the Right Direction. *Financial Accountability & Management*, 302: 206-237.

Pilcher, R., and Van der Zahn, M. (2010). Local governments, unexpected depreciation, and financial performance adjustment. *Financial Accountability & Management*, *26*(3): 299-324.

Queensland Audit Office (OAQ). (2008). *Report to Parliament No. 2 for 2008: Results of 2006-07 Audits of Local Governments, including Aboriginal Shire and Torres Strait Island Councils*. Brisbane, Australia: QAO.

Queensland Audit Office (OAQ). (2014). *Results of audit: Local government entities 2012-13.* Brisbane, Australia: QAO.

Queensland Government. (2007). *Local Government (Reform Implementation) Act 2007*. Brisbane, Australia: Queensland Government.

Queensland Government. (2009). *Local Government Act 2009*. Brisbane, Australia: Queensland Government.

Queensland Government. (2013). *Local Government (De-amalgamation Implementation) Regulation 2013*. Brisbane, Australia: Queensland Government.

Queensland Local Government Grants Commission (QLGGC). (2013). *Grants Commission Reports Distribution of the Commonwealth Financial Assistance Grant in Queensland*. Brisbane, Australia: QLGGC.

Queensland Treasury Corporation (QTC). (2008). *Financial Sustainability in Queensland Local Government: Findings and Recommendations*. Brisbane, Australia: QTC.

Queensland Treasury Corporation (QTC). (2009). *Review of Local Government Amalgamation Costs Funding Submissions—Final Summary Report*. Brisbane, Australia: QTC.

Reese, L. (2004). Same Governance, Different Day: Does Metropolitan Reorganization Make a Difference? *Review of Policy Research, 21*(4): 595-611.

Regan, J., and Kebede, R. (2012, March 20). Australia's miners sees China iron ore demand flattening. *Reuters*. Retrieved from: https://www.reuters.com/article/us-bhp-ironore-idUSBRE82J02K20120320

Reingewertz, Y. (2012). Do municipal amalgamations work? Evidence from municipalities in Israel. *Journal of Urban Economics, 72*: 240-251.

Riker, W. (1986). *The Art of Political Manipulation*. New Haven, Connecticut: Yale University Press.

Rika, N., and Jacobs, K. (2019). Reputational risk and environmental performance auditing: A study in the Australian commonwealth public sector. *Financial Accountability & Management, 35*: 182-198.

Rodgers, R., and Joyce, P. (1996). The Effect of Underforecasting on the Accuracy of Revenue Forecasts by State Governments. *Public Administration Review, 56*(1): 48-56.

Rose, S., and Smith, D. (2011). Budget Slack, Institutions, and Transparency. *Public Administration Review, 72*(2): 187-195.

Rosenbaum, P., and Rubin, D. (1983). The Central Role of the Propensity Score in Observational Studies for Causal Effects. *Biometrica, 70*(1): 41-55.

Ryan, R., and Lawrie, A. (2018, November 1). Australia's system of local government. *Inner Voice Sydney*, 134. Retrieved from: https://innersydneyvoice.org.au/magazine/australias-system-of-local-government/

Ryan, M., Stoker, G., John, P., Moseley, A., James, O., Richardson, L., and Vannoni, M. (2018). How best to open up to local democracy? A randomised experiment to encourage contested elections and greater representativeness in English parish councils. *Local Government Studies, 44*(6): 766-787.

Sancton, A. (2000). *Merger Mania*. McGill-Queens University Press: Montreal

Savitch, H., Vogel, R., and Lin, Y. (2010). Beyond the Rhetoric – Lessons from Louisville's Consolidation. *American Review of Public Administration, 40*(1): 3-28.

Selden, S., and Campbell, R. (2000). The expenditure impacts of unification in a small Georgia county: A contingency perspective of city-county consolidation. *Public Administration Quarterly, 24*(2): 169-201.

Sherbenou, E. (1961). Class, Participation, and the Council-Manager Plan. *Public Administration Review, 21*(3): 131-135.

Sher-Hadar, N. (2020). Pick and Roll: Expanded roles for a state auditor. *Financial Accountability & Management, 36*:229-243.

Silvola, H., and Vinnari, E. (2021). The limits of institutional work: a field study on auditors' efforts to promote sustainability assurance in a trust society. *Accounting, Auditing & Accountability Journal,* 34(1): 1-30.

Soguel, N., and Silberstein, J. (2015). Welfare Loss with Municipal Amalgamations and the Willingness-to-Pay for the Municipality Name. *Local Government Studies, 41*(6): 977-996.

South Australian Local Government Grants Commission (SALGGC). (2015). *Annual Report 2014-15*. Government of South Australia: Adelaide

Spicer, Z. (2016). A Patchwork of Participation: Stewardship, Delegation and the Search for Community Representation in Post-Amalgamation Ontario. *Canadian Journal of Political Science, 49*(1): 129-150.

Stalebrink, O. (2007). An investigation of discretionary accruals and surplus-deficit management: Evidence from Swedish municipalities. *Financial Accountability & Management,* 23(4): 441-458.

Steccolini, I., Jones, M., and Saliterer, I. (2017). *Governmental Financial Resilience : International Perspectives on How Local Governments Face Austerity*. Bingly, UK: Emerald Publishing Limited

Stevens, A. (2012). *Local Government in Japan: A Variety of Taxes Funds Japan's Prefectures and Municipalities*. Retrieved from: http://www.citymayors.com/ government/jap_locgov.html

Svensson. L. (2003). What is Wrong with Taylor Rules? Using Judgement in Monetary Policy through Targeting Rules. *Journal of Economic Literature, XLI:* 426-477.

Tavaris, A. (2018). Municipal amalgamations and their effects: A literature review. *Miscellandea Geographica – Regional Studies in Development, 22*(1): 5-15.

Taylor, J. (2020). Public Officials' Gaming of Performance Measures and Targets: The Nexus between Motivation and Opportunity. *Public Performance & Management Review,* DOI: 10.1080/15309576.2020.1744454

Terlouw, C. (2018). Transforming identity discourses to promote local interests during municipal amalgamations. *GeoJournal, 83*(3): 525-543.

Thomas, K., and Purcell, A. (2019). Local Government Audit Committees: A Behaviour Framework for Effective Audit Committee Performance. *Australian Accounting Review, 29*(2): 418-437.

Thompson, P., and Whitley, J. (2017). The effect of school district and municipal government financial health information on local tax election outcomes: evidence from fiscal stress labels in Ohio. *Public Choice, 170*: 265-288.

Treasury Corporation of NSW (TCorp) (2013). *Financial Sustainability of the New South Wales Local Government Sector*. Sydney, Australia: TCorp.

Usang, O., and Salim, B. (2016). Political Interference and Local Government Performance in Nigeria: The Moderating Role of Internal Audit Quality. *International Journal of Economic Perspectives, 10*(4): 111-120

Vince, M. (2020, December 2). Central Coast Council's dire finances, including more than $565 million of debt, laid out in damning report. *ABC News*. Retrieved from:

https://www.abc.net.au/news/2020-12-02/central-coast-council-runs-up-565-million-in-debt/12944496

Vinnari, E., and Näsi, S. (2008). Creative Accrual Accounting in the Public Sector: "Milking" Water Utilities to Balance Municipal Budgets and Accounts. *Financial Accountability & Management*, 24(2): 97-116.

Watts, R., and Zimmerman, J. (1978). Towards a Positive Theory of the Determination of Accounting Standards. *The Accounting Review*, 53(1): 112-134.

Watts, R., and Zimmerman, J. (1986). *Positive Accounting Theory*. Prentice-Hall Inc: Englewood Cliffs, USA.

Watts, R., and Zimmerman, J. (1990). Positive Accounting Theory: A Ten Year Perspective. *The Accounting Review, 65*(1): 131-156.

West, J., and Berman, E. (2003). Audit Committees and Accountability in Local Government: A National Survey. *International Journal of Public Administration*, 25(4): 329-362.

White, H. (1980). A Heteroskedasticity-Consistent Covariance Matrix Estimator and a Direct Test for Heteroskedasticity. *Econometrica, 48*: 817-838.

Worthington, A. (1999). Performance Indicators and Efficiency Measurement in Public Libraries. *Australian Economic Review, 32*: 31– 42.

Worthington, A. (2000). Cost Efficiency in Local Government: A Comparative Analysis of Mathematical Programming and Econometric Approaches. *Financial Accountability and Management, 16*: 201–24.

Worthington, A., and Dollery, B. (2000). Measuring Efficiency in Local Governments' Planning and Regulatory Function. *Public Productivity and Management Review, 23*(4): 469–485.

Worthington, A., and Dollery, B. (2001). Measuring Efficiency in Local Government: An Analysis of New South Wales Municipalities' Domestic Waste Management Function. *Policy Studies Journal, 29*(2): 232–249.

Zeng, J., Zhao, R., and Dai, W. (2021). Extending synthetic control method for multiple treated units: an application to environmental intervention. *Economic Research, 34*: 331-330

Appendix

Appendix Item 1

Additional research work completed during the period of candidature:

McQuestin, D., and Noguchi, M. (2020). Worth the wait: The impact of government funding on hospital emergency waiting times. *Health Policy*, DOI: 10.1016/j.healthpol.2020.09.008

Appendix Item 2

Updated DEA Scores for the Queensland Amalgamation program with commentary.

Appendix Item 1

Worth the Wait: The Impact of Government Funding on Hospital Emergency Waiting Times

ABSTRACT

In the absence of a price mechanism, emergency department waiting times act as a rationing device to equate demand for treatment with available supply. Sustained increases to demand stemming from population growth, aging populations, and rising comorbidities has caused waiting times internationally to rise. This has resulted in increased calls for higher funding from governments and commitments from both state and national governments to address excessive waiting times. This paper aims to determine the effectiveness of government funding for improving the median waiting times for treatment and the proportion of patients seen within clinically recommended waiting times. For this purpose, an econometric analysis was conducted on a panel of data on Victorian local health networks over the period 2015 to 2018. This is supplemented with a discussion of the alternative measures which governments might take to both address demand for emergency treatment, and also ensure that waiting time reductions can be maintained over the long-term.

In hospital emergency departments, the absence of a formal price mechanism to equate the demand for treatment with the available supply means that waiting times act as a rationing device [1]. The prioritisation of patients is typically based on the severity of symptoms and the urgency of care required, and patients experience waiting times in a 'queue' where they must be physically present at the emergency department to receive treatment [2].

Temporary fluctuations in waiting times occur based on demand patterns such as time, day, or season (e.g. influenza season) [2, 3] or *a*typical events such as natural disasters, pandemics (such as the recent COVID-19 outbreak), staffing disruptions or other shocks [4]. However, it has been recognised that increased pressure is being placed on emergency departments resulting from *sustained* increases in presentations. These sustained increases largely stem from population growth, aging populations, and greater risk factors within the wider community (including greater incidence of comorbidities) [3, 5].

Without a corresponding increase to the capacity of emergency departments– via investment in additional physical or human resources [3, 6] – waiting times must inevitably increase until a new equilibrium is established, a trend which is currently being seen internationally [7].

Increased waiting times are concerning given the potential for deteriorations in health, reduced effectiveness of treatment, and increased likelihood of adverse health events (i.e. mortality and morbidity) [8]. Given these weighty potential implications, many health-related organizations consider the current level of government funding inadequate and have called on governments to raise the level of public funding. For example, the Australian Medical Association [9, p.3] commenting on wait times argued that:

We must force all Governments to address this, immediately. It will take time, funding, and planning but this is no excuse to delay significant activity in rectifying the situation. While we support efficient hospitals, we must deliver effective ones.

This sentiment has been increasingly recognised by governments at both the state and national level. Evidence can be seen through the promises made by politicians to provide additional funding to facilitate reductions in waiting times, and to ensure a higher percentage of patients are seen within clinically recommended waiting times:

"[emergency departments] are over-crowded and under-funded…. One in three patients with an urgent condition doesn't get seen within the recommended time… we will put in $500 million to upgrade Emergency Departments and to bring down waiting times, right across Australia" [10]

To achieve these commitments, policymakers must make informed decisions on the appropriate quantum of funding, as well as the optimal waiting time levels and the hospitals which should be targeted with additional support. However, before these decisions can be made it is important to have an understanding of whether government funding can create *material* reductions in waiting times, and the magnitude of reductions which might be expected. Although the literature has examined other factors which may influence waiting times – including external determinants (such as demand shocks and availability of substitutes) [4, 11-12], impact of non-financial government policy and internal policy changes [13-15] – the impact of funding has not yet been sufficiently identified.

To address this gap, and to support informed decision-making, an econometric analysis of the association between government funding and median waiting time for emergency treatment has been undertaken, using available data on Victorian local health networks (LHNs). This has been supplemented by an analysis of the association between funding and the percentage of patients seen within clinically recommended waiting times, which may represent a desirable target for policymakers given its importance as a key priority for LHNs (see the Statement of Priorities; [16]). Moreover, a discussion of the additional support which governments may provide to assist LHNs to maintain waiting time reductions over the long-

term has also been included. Thus, Section 2 outlines the data used in the econometric estimations, and the results are presented in Section 3. Finally, a discussion and concluding remarks are provided in Sections 4 and 5, respectively.

Methodology

To test the impact of funding on waiting times for emergency treatment, we employed a four-year panel of Victorian public LHN data. LHNs were selected for the analysis as they are the principal recipient of government funding in Australia, owing to the small size of many regional and rural hospitals which limits their administrative and financial capacity.

As panel data is available, the use of a fixed or random effects estimator is generally indicated. Given that the Hausman test did not indicate correlation between the explanatory variables and error term (p=0.867), a random effects model was employed:

$$\boldsymbol{T_{it}} = \alpha_{it} + \beta_1 \boldsymbol{G_{it}} + \beta_2 \boldsymbol{X_{it}} + \mu_{it} \qquad (1)$$

Where **T** is the median waiting time (in minutes) spent in the emergency department from arrival to departure, either through admission, discharge, or transfer to another hospital. **G** is the amount of grant funding received from federal and state governments. Notably this amount is restricted to the emergency department component of total grant funding and thus does not include additional funding associated in-patient treatment (which is determined separately based on diagnostic groups and a Weighted Inlier Equivalent Separations (WIES) system). **X** is a vector of control variables and μ is an independent and identically distributed error term. The *i* and *t* subscripts refers to the individual LHN and year, respectively. In supplementary models which examine the association between funding and the percentage of patients seen within clinically recommended waiting times (as a suitable policy target), the same specification is employed, however in these models **T** represents the percentage of patients seen on time.

One concern which has been raised in the literature [2, 6] relates to the potential for endogeneity between funding and waiting times or waiting time targets. If funding levels are themselves influenced by waiting times, measures related to waiting times (such as the percentage of patients seen on time), or a common unidentified factor, this can create bias in the estimators obtained. This is particularly important in systems which explicitly include a measure of waiting times in formula-based grant allocations. Emergency department funding in Victoria is determined by the number of presentations, national urgency related group (URG) and urgency disposition group (UDG) cost weights (cost weights assigned to emergency department presentations; with loadings for indigeneity and location) and the national efficient price, and thus does not directly account for waiting times or targets. Therefore, the potential for bias is small, albeit not be negated completely [17]. Accordingly, to ensure any potential bias is accounted for, an instrumental variable (IV) model was also employed. For this purpose, the average URG and UDG price weights applied to each LHN to determine funding levels were selected as instruments.

The control variables selected conform to the theoretical expectations and extant literature. The number of patients treated by triage category were included to account for the demand faced by EDs and clinical urgency which can reduce the waiting time for the patient (if they are given a higher triage category) whilst potentially raising the waiting times for patients with lower triage categories [18]. The number of full-time equivalent (FTE) staff, categorized into nurses and medical officers, and staff involved with administrative functions were also incorporated to account for available human resources. Similarly, the size of the hospital, represented by the number of beds available was employed to account for the capital resources [19]. As this variable is measured on an ordinal scale, four indicator variables were created (small (<100), medium (100-199), large (200-499), and very large (>500)).

In addition to hospital characteristics, community demographics and risk factors were required. The percentage of children (under 15) and elderly (over 65) were chosen due to the higher incidence of acute conditions in these age groups [8]. The percentage of indigenous residents (i.e. those who identify as Aboriginal or Torres Strait Islander (ATSI)) was used to account for the differences in funding arrangements (that is, ATSI status of patients is taken into account in determining funding amounts) [8]. To control for the residency status of patients and the ability to pay for additional medical services (i.e. transport to the hospital and required medication) – which may result in an increased willingness to utilize health services – the percentage of Australian citizens and median income (including government payments and allowances) were also employed.

Risk variables, including the percentage of daily smokers, excessive alcohol consumers (i.e. those that exceed the recommended guideline of 2 standard drinks per day on average), or overweight/obese persons (body mass index (BMI) above 25) were used to control for the increased likelihood of developing acute or chronic diseases (for example lung cancer, liver damage, and diabetes) [5]. Finally, indicator variables representing (i) whether the LHN is in an urban or rural area (urban= 1), (ii) individual years under analysis, and (iii) seasonal weights were included to account for patterns of demand. Where necessary natural log transformations were applied to correct for skewed variable distributions (based on results from standard econometric testing, including normality testing, ladder-of-powers testing, and quantile plot analysis). Descriptive statistics for the variables are presented in Table 1:

Table A.1: Variables Employed

Variable	Definition	Mean	Standard Deviation
Median Waiting Time (all patients)	Waiting time for treatment (in minutes)	165.82	34.47
Tri 1	Number of Triage 1 (resuscitation) patients	286.71	299.19
Tri 2	Number of Triage 2 (emergency) patients	6203.58	6790.77
Tri 3	Number of Triage 3 (urgent) patients	19883.68	19199.98
Tri 4	Number of Triage 4 (semi-urgent) patients	22277.62	17852.98
Tri 5	Number of Triage 5 (non-urgent) patients	4025.09	3018.42
Nurses and Medical Officers (ln)	Number of FTE nurses and medical officers	6.94	1.01
Admin (ln)	Number of FTE administration, allied, ancillary and support staff	6.86	0.93
Small	Hospitals with less than 100 beds	0.16	n/a
Medium	Hospitals with between 100 and 199 beds	0.21	n/a
Large	Hospitals with between 200 and 499 beds	0.25	n/a
Very Large	Hospitals with more than 500 beds	0.38	n/a
Under 15 (ln)	Percentage of residents under 15	2.83	0.24
Over 65	Percentage of residents over 65	16.66	4.54
ATSI (ln)	Percentage of Aboriginal and Torres Strait Islander residents	-0.07	0.84
Australian Citizens	Percentage of residents with Australian citizenship	84.40	9.66
Median Income ($)	Median income received by residents	42547.3	4936.81
Daily Smoker	Percentage of residents who smoke on a daily basis	12.45	3.05
Drinking (ln)	Percentage of residents who exceed the lifetime risk level of alcohol	4.04	0.14
Overweight	Percentage of residents with a BMI above 25	49.43	6.18
Total Grant ($10,000s)	Total grant funding from State and Federal governments	29.48	27.71
Urban	Location of the LHN: 1 if LHN is in an urban area; 0 otherwise	0.42	n/a

Data was sourced from the annual reports and accompanying financial statements of the respective LHNs, the AIHW *MyHospitals* databases, the AIHW *Australia's Health* reports, and the ABS *National Regional Profile* [5, 20-21].

Results

Table 2 reports the results of our regression of hospital attributes, community characteristics, and funding levels on median waiting time for treatment (full results presented in Table A1). Preliminary testing rejected the existence of underidentification and weak identification in the model ($p=0.0000$; $F=105.16>19.93$) and was unable to reject the null hypothesis in a test for possible overriding restrictions ($p=0.2876$). Thus, the relevance and validity of the instruments, and hence their use in the supplementary instrumental variable model, was supported. Moreover, testing revealed that the bias in the original (RE) estimates was significantly large and thus warranted mitigation through the use of an IV model – employing the URG and UDG cost weights.

Table A.2: Impact of Grant Funding on Median Waiting Times, Victorian LHNs, 2015-2018

	Model 1 (RE)	Model 2 (IV)
Total Grant ($10,000s)	-1.543** (0.523)	-2.311** (0.394)
Tri 1	0.080** (0.018)	0.092** (0.014)
Tri 2	-0.0005 (0.002)	-0.0009 (0.002)
Tri 3	0.003* (0.001)	0.004** (0.001)
Tri 4	-0.002** (0.0006)	-0.002** (0.0005)
Tri 5	0.005* (0.002)	0.006** (0.002)
Nurses and Medical Officers (ln)	-39.256+ (21.379)	-44.758** (15.805)
Admin (ln)	34.300* (14.802)	42.189** (11.518)
Overweight/Obese	1.104+ (0.640)	1.216** (0.491)
Controls	Yes	Yes
N	88	88
Coefficient of Determination (overall)	0.8348	0.8295

*+p < 0.10, *p < 0.05, **p < 0.01.*

Robust standard errors in parentheses.

With regard to the control variables, the impact of clinical urgency depends on two factors: (i) patient severity (more urgent patients are given priority and thus have lower individual waiting times), and (ii) assessment and treatment time which can affect waiting time for other patients. Thus, whilst triage 1 and 3 patients had relatively low individual waiting times, they

typically require lengthy treatments and greater staff attention, raising waiting times for other patients and hence the median waiting time. Conversely triage 4 and 5 patients – which are generally associated with lower treatment times – typically endure higher individual waiting times. For triage 4, the lower assessment and treatment time dominates, resulting in a negative association with median waiting time, whilst for triage 5 the higher individual waiting time dominates, creating a positive association. This result is consistent with previous evidence in the literature [22-23].

In terms of human resources, it is somewhat unsurprisingly to find that employing additional nurses and medical officers lowers the median waiting time, *ceteris paribus*. However, additional administration staff (holding numbers of medical staff constant), are associated with increased median waiting times. Given hospital budgets are largely fixed, this may be a result of directing resources away from medical activities in favour of administrative functions.

The size of the LHNs also has a significant effect. Compared to medium size LHNs (the reference category), large or very large LHNs are associated with significantly longer median waiting times. This is likely because these LHNs provide treatment to more complicated cases (commonly referred to them by smaller LHNs), that might be expected to consume considerable resources, increasing congestion and thus giving rise to longer waits for other patients [1].

For the community demographic and health risk factors, once patient severity is controlled for there is little evidence of statistically significant associations [1]. The exception is the percentage of overweight or obese individuals, where a significant positive association with median waiting time is found. One potential explanation is that overweight and obese patients can require additional or specialised resources for treatment which may take additional time

to procure and operate. Examples include additional staff for transportation, or medical equipment designed for patients with higher body weights such as stretchers, beds, wheelchairs or blood pressure cuffs [24]. Moreover, even for identical procedures (such as measuring vital signs) it has been recognised that a longer time is often required for overweight and obese patients [25].

Similarly, when the severity of the patients was accounted for, the year dummies and season weights were statistically insignificant. The exception is the 2016 year, which was statistically higher in certain models. One possible explanation may be the occurrence of a demand shock (an epidemic thunderstorm asthma event) during this period [26].

With regard to the principle variable of interest – grant funding – a highly significant negative association was identified. That is, higher levels of grant funding are associated with lower median wait times, after controlling for LHN, patient, and community characteristics. Moreover, regardless of the model employed (random-effects or IV), the coefficient for grant funding remained highly significant and negative in both models, supporting the robustness of the results obtained.

Given the size of the coefficient in the IV model, an additional $10,000 in grant funding might be expected to lower the median wait time by approximately 2.3 minutes on average, *ceteris paribus*. This is likely because additional funding might enable hospitals to increase their available supply of treatment, through the procurement of more specialised or experienced staff, more advanced procedural or information technology systems, and additional equipment [9]. Thus, the results suggest that federal or state governments might play an important role in reducing waiting times through the provision of higher levels of funding.

However, while the results indicate that funding can improve waiting times, they can only provide limited support for policymakers in determining an optimal grant quantums. To overcome this limitation a suitable target is needed, and the clinically recommended waiting time targets which have been advocated by policymakers and included as a priority for LHNs represent a promising avenue [16]. Consequently, we have expanded our initial analysis to examine the effect of funding on the percentage of patients seen within clinically recommended waiting times (see Table 3; full results in Table A3). As endogeneity was not found to exist in these supplementary models ($p>0.05$ for all models), IV estimation was not required. Whilst Model 3 includes the overall percentage of patients seen on time, Models 4-7 disaggregates this into individual triage categories (excluding triage 1 where all patients were seen immediately). It is important to note that the coefficients of these Models (3-7) have opposing signs to the earlier Models (1-2) because higher waiting times generally lead to less patients being seen on time.

In this model a positive coefficient was observed, indicating that higher levels of funding are associated with higher percentages of patients being seen on time (0.469 percentage points higher for every $10,000 in additional funding), *ceteris paribus*. While the effect on individual triages varied (ranging from 0.243 to 0.610 percentage points), the results remained significantly positive. Thus, it is reasonable to conclude that additional funding might ensure more LHNs meet the clinically recommended targets.

Table A.3: Impact of Grant Funding on the Percentage of Patients Seen on Time, Victorian LHNs, 2015-2018

	Model 3 (All Triage)	**Model 4 (Tri2)**	**Model 5 (Tri3)**	**Model 6 (Tri4)**	**Model 7 (Tri5)**
Target	n.a.	Within 10 minutes	Within 30 minutes	Within 60 minutes	Within 120 minutes
Total Grant ($10,000s)	0.469** (0.162)	0.482** (0.187)	0.610** (0.186)	0.357* (0.174)	0.243* (0.098)
Controls	Yes	Yes	Yes	Yes	Yes
N	88	88	88	88	88
Coefficient of Determination	0.7646	0.6606	0.7998	0.7400	0.7292

*+p < 0.10, *p < 0.05, **p < 0.01.*

Robust standard errors in parentheses.

These results provide useful guidance for policymakers in determining the precise quantum of funding required. However, some caution should be exercised given that the marginal effect of additional funding might diminish (that is the effect which additional funding has on waiting times and the proportion of patients seen on time might decrease as the magnitude of funding increases). Nevertheless, given the substantial cost of alternative projects to reduce waiting times and achieve clinical targets (such as the construction of a new $1.5 billion hospital at Footscray [27]) additional funding potentially presents a more cost-effective solution, providing better value for taxpayers.

Discussion

As our results suggest, increased government funding may be an effective solution to address excessive waiting times. However, as scholars such Sivey (2018) [2] have identified, simply targeting waiting time reductions through increased supply may not be sufficient. This is

because lower waiting times may actually result in greater numbers of patients seeking treatment (most notably from walkouts). To avoid a return to higher waiting times, demand for treatment must also be targeted. One possible avenue, suggested by the statistically significant association in our regressions, is the reduction of obesity in the community.

For governments, there is a role in supporting obesity reduction through 'health promotion' and 'disease prevention' activities. The former – health promotion – includes public awareness campaigns to increase health literacy [5], and policies to encourage healthy lifestyles or active forms of transport (i.e. walking or cycling) [28]. Conversely, the latter – disease prevention – includes measures such as restrictively high taxes on unhealthy products (such as fast food and soft drinks), or restrictions to supply and advertisement of unhealthy products (particularly when directed towards children [5]). By applying such measures, it may be possible for governments to reduce the prevalence of obesity in the wider community, and potentially reduce the demand for emergency treatment stemming from obesity-related problems.

Thus, through targeting reductions to demand for emergency treatment, in addition to increased funding, it might be possible for governments to achieve reductions in waiting times over the short- and long-run.

Conclusion

The absence of a price mechanism often means that waiting times must act as a rationing device. Rising waiting times for emergency treatment have resulted in calls for additional government funding to enable investment in capacity. As our results indicate, increased funding has the potential to create statistically significant reductions in ED waiting time and increase the percentage of patients seen within clinically recommended time limits.

The next step for policymakers will be to determine the appropriate quantum of funding (given budget constraints), the optimal waiting time levels or targets, the desired funding instrument (e.g. block funding or in-kind support), and the LHNs which have the greatest need. Although these are primarily political decisions, to facilitate informed decision-making and provide tailored support, additional detailed econometric examination of individual LHNs or hospitals may be necessary. This should ensure that public funds are used in the most efficacious manner to maximise the benefits obtained.

Consideration should also be given to the reduction of obesity in the wider community. We have outlined just a few possibilities above. Similarly, additional quantitative analysis (such as regression modelling and cost-benefit analysis) might be required to model the effects of potential policy instruments to target obesity, as well as the resources necessary for implementation, in order to select the most suitable approach.

Finally, the replication of this research on an inter-jurisdictional or international basis might prove fruitful. This will indicate whether the results and policy recommendations proposed above can be readily applied to other health systems, or if the significant differences in healthcare and waiting time management systems, both nationally and internationally, necessitate a different approach [29].

To improve the waiting time for emergency treatment and ensure that patients are able to access health interventions in a timely manner, a unified effort by medical professionals, LHNs, governments and scholars alike is needed.

References

[1] Johar, M., Savage, E., Stavrunova, O., Jones, G., and Keane, M. (2012). Geographic Differences in Hospital Waiting Times. *The Economic Record, 88*(281): 165-181.

[2] Sivey, P. (2018). Should I stay or should I go? Hospital emergency department waiting times and demand. *Health Economics, 27*(3): e30-e42.

[3] Gaughan., J., Kasteridis, P., Mason, A., and Street, A. (2020). Why are there long waits at English emergency departments? *European Journal of Health Economics, 21*(2): 209-218.

[4] Sivey, P., McAllister, R., Vally, H., Burgess, A., and Kelly, A. (2019). Anatomy of a demand shock: Quantitative analysis of crowding in hospital emergency departments in Victoria, Australia during the 2009 influenza pandemic. *PLoS One, 14*(9): e0222851.

[5] Australian Institute of Health and Welfare (AIHW). (2018). *Australia's Health*. Australia's health series no. 16. AUS 221. Canberra: AIHW.

[6] Martin, S., Rice, N., Jacobs, R., and Smith, P. (2007). The market for elective surgery: Joint estimation of supply and demand. *Journal of Health Economics, 26*(2): 263-285.

[7] Pines, J., Hilton, J., Weber, E., Alkemade, A., … Schull, M. (2011). International Perspectives on Emergency Department Crowding. *Academic Emergency Medicine, 18*(12): 1358-1370.

[8] Harriss, L., Thompson, F., Lawson, K., O'Loughlin, M., and McDermott, R. (2019). Preventable hospitalisations in regional Queensland: potential for primary health? *Australian Health Review, 43*: 371-381.

[9] Australian Medical Association (AMA). (2019). *Public Hospital Report Card: An AMA Analysis of Australia's Public Hospital System*

[10] Shorten, B. (2019, May 5th). *Australian Federal Election Speeches, 2019.* Parkes, Australia: Museum of Australian Democracy (MOAD).

[11] Stephens, A., and Broome, R. (2018). Impact of emergency department occupancy on waiting times, rates of admission and representation, and length of stay when hospitalised: A data linkage study. *Emergency Medicine Australasia, 31*(4): 555-561.

[12] Xu, Y., and Ho, V. (2020). Freestanding emergency departments in Texas do not alleviate congestion in hospital-based emergency departments. *The American Journal of Emergency Medicine, 38*(3): 471-476.

[13] Myers, M., and Sheehan, K. (2020). The Impact of Certificate of Need Laws on Emergency Department Wait Times. *The Journal of Private Enterprise, 35*(1): 59-75.

[14] Tabriz, A., Trogdon, J., and Fried, B. (2020). Association between adopting emergency department crowding interventions and emergency departments' core performance measures. *American Journal of Emergency Medicine, 38*: 258-265.

[15] Chen, Y., Meinecke, J., and Sivey, P. (2015). A Theory of Waiting Time Reporting and Quality Signaling. *Health Economics*, *25*(11): 1355-1371.

[16] Department of Health and Human Services (DHHS). (2020). *2019-20 Statement of Priorities*. Melbourne, Australia

[17] Independent Hospital Pricing Authority (IHPA). (2017). *Consultation Paper on the Pricing Framework for Australian Public Hospital Services 2018-19*. Sydney, Australia.

[18] Johar, M., Jones, G., and Savage, E. (2013). Emergency Admissions and Elective Surgery Waiting Times. *Health Economics*, *22*: 749-56.

[19] Naiker, U., FitzGerald, G., Dulhunty, J., and Rosemann, M. (2018). Time to wait: a systematic review of strategies that affect out-patient waiting times. *Australian Health Review, 42*: 286-93.

[20] Australian Institute of Health and Welfare (AIHW). (2018). *MyHospitals* [Database]. Canberra: AIHW. https://www.myhospitals.gov.au/about-the-data/download-data

[21] Australian Bureau of Statistics (ABS). (2019). *Data by Region 2013-18*. ABS cat. 1410.0. Canberra, Australia. https://www.abs.gov.au/ausstats/abs@.nsf/mf/1410.0

[22] Elkum, N., Fahim, M., Shoukri, M. and Al Madouj, A. (2009). Which patients wait longer to be seen and when? A waiting time study in the emergency department. *EMHJ - Eastern Mediterranean Health Journal, 15*(2), 416-24.

[23] Canadian Institute of Health Information (CIHI). (2012). *Health Care in Canada 2012: A Focus on Wait Times*. Ottawa, Canada.

[24] Singh, N., Arthur, H., Worster, A., Iacobellis, G., and Sharma, A. (2007). Emergency department equipment for obese patients: perceptions of adequacy. *Journal of Advanced Nursing, 59*(2): 140-5.

[25] Bambi, S., Dettori, I., and Ruggeri, M. (2013). Morbidly obese patients in emergency department: are we ready to face the challenge. *European Journal of Emergency Medicine, 20*(4): 293-4.

[26] Department of Health and Human Services (DHHS). (2017). *The November 2016 Victorian epidemic thunderstorm asthma event: an assessment of the health impacts*. Melbourne, Australia.

[27] Mikakos, J. (2019). *Building the Best Hospitals for Victorian Patients*. Minister for Health and Ambulance Services, Government of Victoria

[28] Swinburn, B. (2008). Obesity prevention: the role of policies, laws and regulations. *Australia & New Zealand Health Policy, 5*(12). DOI: 10.1186/1743-8462-5-12

[29] Viberg, N., Forsberg, B., Borowitz, M., and Molin, R. (2013). International comparisons of waiting times in health care- Limitations and prospects. *Health Policy, 112*(1-2): 53-61.

Appendix Item 2

In the original published manuscript *Do Municipal Mergers Improve Technical Efficiency? An Empirical Analysis of the 2008 Queensland Municipal Merger Program*, the most recent available financial data for use in the analysis encompassed the period ending 30th June 2013. However, as a result of the release of additional financial and demographic metrics, it is now possible to extend the panel to incorporate the 2003-2020 financial years inclusive. To ensure the results arising from the analysis are consistent with those presented in the original manuscript, the body of the thesis contains the original results, with the updated results being outlined and discussed below (see Table A.4 and Figure A.1):

Table A.4: Summary statistics for Queensland local governments 2004–2020

	Mean (standard deviation)		Median (interquartile range)		ANOVA results (Mann-Whitney)
Year	**Amalgamated**	**Non-Amalgamated**	**Amalgamated**	**Non-Amalgamated**	**p-value**
2004	0.876	0.834	0.893	0.884	0.278
	(0.124)	(0.159)	(0.151)	(0.305)	(0.596)
2005	0.848	0.834	0.886	0.878	0.719
	(0.136)	(0.153)	(0.201)	(0.274)	(0.976)
2006	0.816	0.825	0.828	0.869	0.847
	(0.147)	(0.165)	(0.253)	(0.278)	(0.728)
2007	0.760	0.755	0.786	0.737	0.929
	(0.189)	(0.182)	(0.303)	(0.286)	(0.920)
2008	0.742	0.740	0.748	0.720	0.968
	(0.213)	(0.194)	(0.408)	(0.235)	(0.984)
2009	0.773	0.761	0.743	0.781	0.790
	(0.151)	(0.172)	(0.210)	(0.216)	(0.992)
2010	0.785	0.786	0.799	0.794	0.968
	(0.134)	(0.155)	(0.177)	(0.265)	(0.984)
2011	0.763	0.819	0.750	0.849	0.159
	(0.153)	(0.133)	(0.147)	(0.208)	(0.180)
2012	0.747	0.821	0.740	0.818	0.082+
	(0.168)	(0.132)	(0.178)	(0.202)	(0.080+)
2013	0.745	0.800	0.731	0.779	0.190
	(0.154)	(0.158)	(0.282)	(0.193)	(0.210)
2014	0.738	0.815	0.733	0.812	0.076+
	(0.139)	(0.177)	(0.192)	(0.240)	(0.077+)
2015	0.759	0.826	0.734	0.871	0.157
	(0.169)	(0.184)	(0.285)	(0.218)	(0.289)
2016	0.766	0.855	0.757	0.883	0.045*
	(0.143)	(0.180)	(0.216)	(0.315)	(0.419*)

2017	0.732	0.830	0.695	0.853	0.040*
	(0.164)	(0.186)	(0.235)	(0.313)	(0.045*)
2018	0.733	0.812	0.696	0.863	0.101
	(0.166)	(0.191)	(0.314)	(0.321)	(0.130)
2019	0.724	0.774	0.671	0.744	0.315
	(0.171)	(0.193)	(0.270)	(0.311)	(0.222)
2020	0.708	0.730	0.671	0.738	0.657
	(0.165)	(0.195)	(0.239)	(0.300)	(0.587)

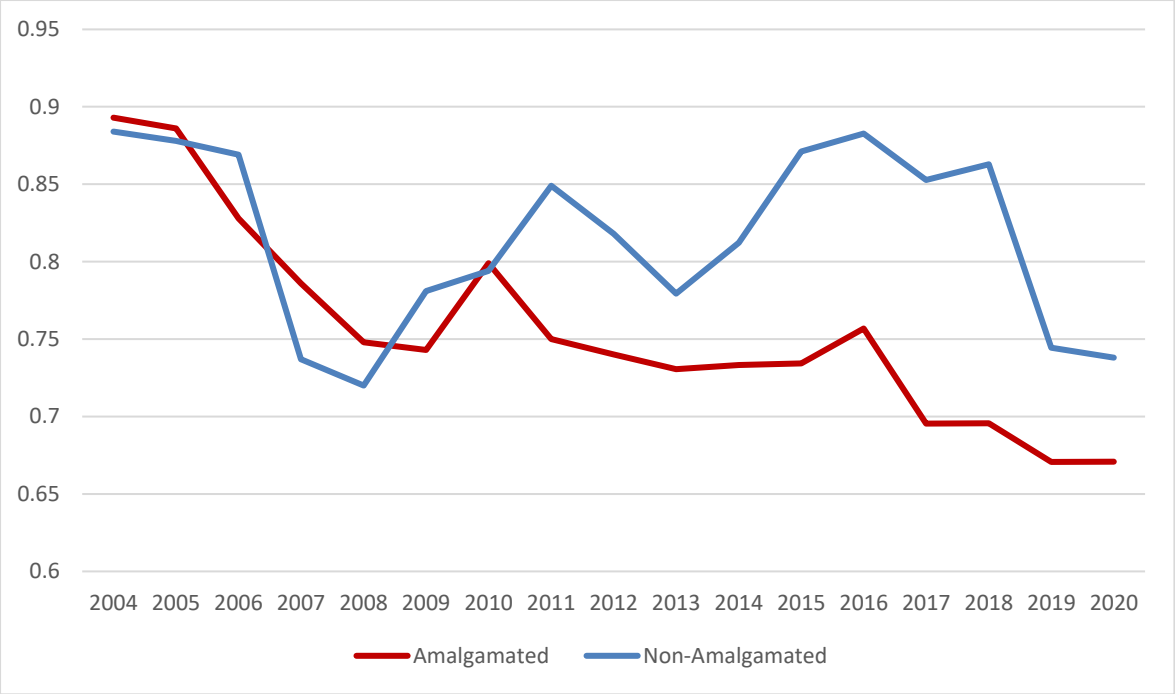

Figure A.1: Median Efficiency of Queensland Local Governments 2004–2020

From these updated results it is possible to identify two additional policy implications for the improvement of future reform programs. The first of these is the fact that, even with the extension of the panel, it is evident that the efficiency of the amalgamated cohort of local governments has not surpassed that of its non-amalgamated counterparts. Indeed, the gap (and the associated statistical significance) between the cohorts actually expanded further between 2013 and 2018. Although the last two financial years have seen a narrowing of this gap, we note that this is likely due to the greater impact which natural disasters

(predominantly tropical cyclones and associated flooding) had on individual non-amalgamated local governments (Queensland Government, 2020), necessitating greater levels of expenditure to fund recovery efforts. Consequently, these results serve to provide additional support to the assertations of opponents of amalgamation that the efficiency gains targeted by policymakers are unlikely to be realised over the medium- to long-term, reducing its utility as a policy instrument. Additional (qualitative) research will almost undoubtedly be required to identify the cause of this failure to realise efficiency gains, however as suggested in Chapter 6, a continued inability to conduct the necessary processes originally envisioned by the reform architects is likely to be a contributing factor.

The second implication relates to the marked increase in efficiency in the period between the 2013 and 2016 financial years. This is significant as it aligns with the greater focus on financial performance and amalgamation in NSW as part of the *Fit For the Future* Reforms. This may suggest that even though local governments in Queensland were not subject to the policy intervention, the mere presence of reform in a neighbouring jurisdiction during this period was sufficient to give Queensland local governments cause for concern, influencing operational decisions which would have an impact on efficiency levels. It is also noteworthy that this increase was much more pronounced for the non-amalgamated cohort, which may suggest that local governments which were not previously subject to recent policy intervention were much more concerned about the possibility of future structural changes compared with amalgamated councils. This is to be expected given that it is rather unlikely that the previously amalgamated entities would be subject to additional intervention compared with their non-amalgamated counterparts. Thus, it appears the mere presence of political attention on financial sustainability outcomes in other jurisdictions and associated possibility of future reform programs was sufficient to provide an incentive for local governments to pursue efficiency gains and hence greater financial sustainability outcomes.

Reference

Queensland Government. (2020). *Queensland Reconstruction Authority: Disaster Recovery Funding Arrangements (DRFA)*. Retrieved from: https://www.qra.qld.gov.au/activations.