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Financial Sustainability and Local Government Reform

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CERTIFICATE OF ORIGINAL AUTHORSHIP

I, Dana Kathleen McQuestin declare that this thesis, is submitted in fulfilment of the requirements for the award of Doctor of Philosophy, in the Faculty of Design, Architecture and Building at the University of Technology Sydney.

This thesis is wholly my own work unless otherwise referenced or acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis.

I certify that the work in this thesis has not previously been submitted for a degree nor has it been submitted as part of the requirements for a degree at any other academic institution except as fully acknowledged within the text. This thesis is the result of a Collaborative Doctoral Research Degree program with Tokyo Metropolitan University.

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ABSTRACT

Financial pressure is increasing for local governments, exacerbated by the 2008 subprime mortgage crisis and Covid-19 pandemic. Given the potentially grave consequences which financial stress or collapse can engender on the wider community, financial sustainability has become paramount. To ensure local governments can continue to operate in the long term, various reform programs targeting financial sustainability improvements have been employed. In Australia amalgamation is the preferred policy instrument.

To effectively target improvements in financial sustainability, the determinants of financial sustainability must first be identified. Although existing literature has analysed the effects of size, resident deprivation, and external operating environment, many non-conventional internal and external factors have received less scholarly attention.

Following this, the success of previous reforms programs must be critically evaluated. To facilitate the learning process, both the processes and outcomes of reforms should be examined. Although a sizable corpus of literature exists on municipal reform, more needs to be done in Australia, particularly with respect to the 2016 New South Wales (NSW) amalgamations.

Finally, alternative reform instruments should also be scrutinised. This will enable policymakers to identify if other alternatives exist which may represent a more efficacious, less expensive, or less disruptive solution.

This thesis aims to address these gaps in the literature and satisfy the needs of various local government stakeholders. To do so five analyses were conducted, through three key themes relating to (i) the association between non-conventional factors and local government expenditure, (ii) the success of the 2008 Queensland amalgamations and the more recent 2016 NSW 'Fit For the Future' reforms, and (iii) the efficacy of shared service arrangements as an alternative to amalgamations.

Results suggest the importance of non-conventional factors – political structures and budget accuracy – to financial performance. 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.

In sum, it was found that conventional reform instruments are unlikely to materially improve financial sustainability. Indeed, it appears that they have only further exacerbated matters. The results emphasise the importance of engaging with academics and the scholarly literature to ensure that the cost savings referred to in policy documents are actually achievable in practice. Moreover, future attention should carefully consider non-conventional approaches, given the significant associations identified.

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Financial Sustainability and Local Government Reform

CHAPTER 1- Introduction

Contextual Background

The Purpose and Structure of Local Government

Local governments are the key public administrative bodies for a designated geographic area or region within a nation, providing local political representation and facilitating the economic, social and cultural development of the communities which they serve (Thapa, 2020; Shah and Shah, 2006). They typically represent the lowest level of the government structure, and as such are often referred to as the level of government 'closest to the people' (Beer and Prance, 2012). In federal systems, such as Canada, Germany, the United States and Mexico, local governments are under the control of both the national and state/provincial governments respectively[1] (Commonwealth Governance, 2022; Haschke, 2013; Swift and Maciel, 2010; TWH, 2022). Whereas, in unitary systems such as New Zealand and the United Kingdom, local government is the responsibility of the central government (New Zealand Department of Immigration, 2020; Commonwealth Governance, 2022).

Australia falls into the former category, with local government representing the third tier of government, beneath the Federal and State governments, 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). Australian local governments are commonly described as "creatures of statute[2]" (Drew, 2020). This label is applied because there is no recognition of local government in the Australian Constitution. Although this is

[1] Although the responsibility for regulating and monitoring local governments is usually assigned to the latter.
[2] Similar terminology is also used in elsewhere, such as the labelling of US municipalities being 'creatures of the state' (see Kim, 2019b)

not the often the case internationally (see Twomey, 2013; Senato della Repubblica, 1947; Salami, 2021), Australia is by no means the only nation without Constitutional recognition – for instance neither the United States nor Canadian Constitutions mention local government (Forsey, 2016).

The result of this absence of Constitutional recognition is that the primary roles and functions of Australian local governments are determined by the relevant state or territory legislation in which the individual local government is based. 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

Note 1: NSW- New South Wales; VIC- Victoria; QLD- Queensland; WA- Western Australia; SA- South Australia; TAS- Tasmania; NT- Northern Territory

Note 2: The categories listed above are adapted from the Australian Classification of Local Government (ACLA) developed by the Australian Bureau of Statistics (ABS, 2016) and the Office of Local Government (OLG, 2020)

Given that Australia does not operate under a multi-tier structure of local government,[3] such as occurs in Europe and America (Leland and Turner, 2014), the structure of Australian local government and its organisational composition are relatively more straightforward. 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 (elected by residents within the local government area) or an indirectly elected mayor (selected from within the ranks of the elected councillors). Exceptions include capital city local governments, local governments under administration, and local governments in Queensland, Victoria and Tasmania which are required to conduct direct elections for mayors[4] (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). The local government structures in Australia are largely consistent with those used in other single-tier local government jurisdictions, although the titles used, and the timing of elections and terms may differ. In mutli-tier local government structures, it is common to have a president, prefect, executive or chairman lead the higher tier or local government, whilst a mayor resides over the lower tier. In addition, while a four-year term is most widely adopted

[3] In a multi-tier structure, the functions of local government are often split between two or more entities. The higher tier is often assigned functions relating to social care, emergency services, and education. The lower tier is often tasked with providing waste management and planning functions (DLUHC, 2016)

[4] 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.

internationally regardless of the structure of the local government, some countries choose to apply five or six-year terms for elected representatives. Indeed, nations with annual elections for mayoral positions, and positions extending to a ten-year period also exist (CEMR, 2016).

Similarities and differences can also be seen in the funding and service responsibilities of local government. Revenue is mainly collected by local governments in Australia 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. This is also largely the case for local governments internationally. For a vast majority of urban local governments overseas, property taxation and fee revenue similarly represent the key source of funds, notwithstanding the relatively smaller scope for collection (mostly limited to residential properties and businesses). Conversely for regional or rural local governments, or nations with limited taxation bases, the use of general purpose, local tax allocation, equalisation or deficit grants represents the principal source of revenue (Province of New Brunswick, 2021b).

Although these funding sources are largely similar across all Australian local government jurisdictions, local government revenue is not controlled by the Federal government. Each state and territory has its own grants commission responsible for the allocation of

intergovernmental grants[5]. 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. A graphic description of local government revenue sources has been provided in Figure 1.1.

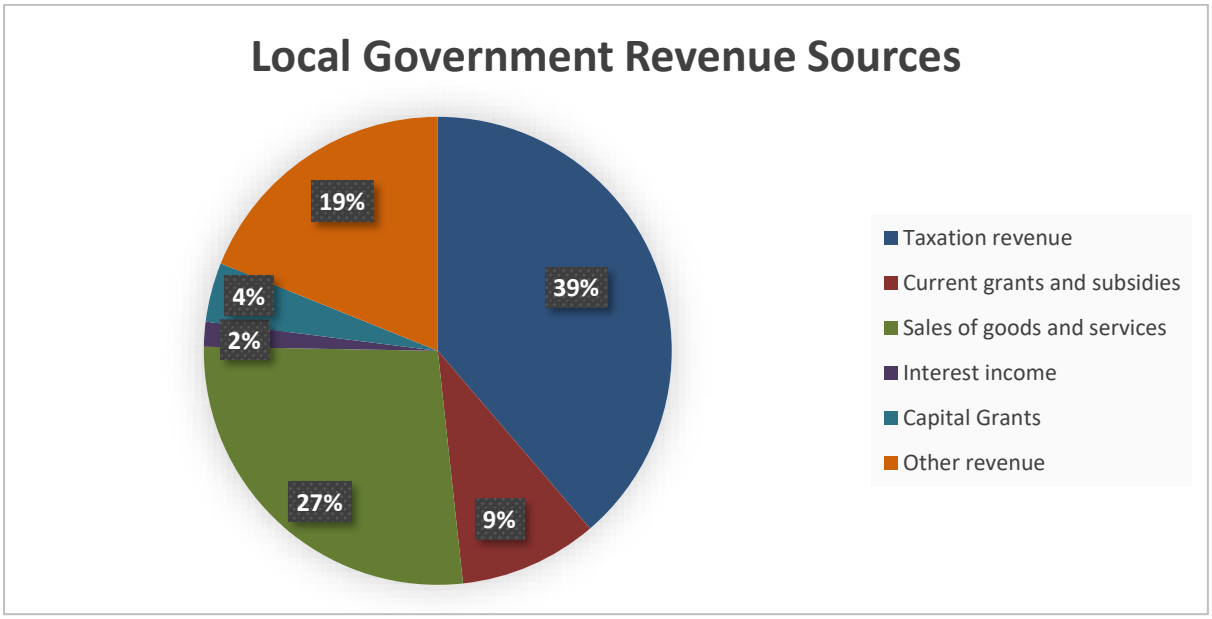

Figure 1.1: Local Government Revenue Sources, 2017-18

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 revenue collection and management between the states and territories, Australian local governments generally provide similar services to residents, although some inter-jurisdictional variation may exist. To account for this variation and enable comparison, the Organisation for Economic Cooperation and Development (OECD) has developed ten functional areas under the Classification of the Functions of Government

[5] 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.

(COFOG) by which all local government services can be categorised. A list of these functional areas and corresponding services has been provided listed in Table 1.2 :

Table 1.2 Australian local government services by functional area

Function	Examples of Local Government Services
General Public Services	Water supply; Sewerage services, election costs; members' fees and expenses; subscriptions to local authority associations; council meeting; general personnel services; legislative compliance; engineering works;
Public Order & Safety	Fire and emergency services levy; fire protection; beach control; control of domestic animals and livestock
Economic Affairs	Camping areas and caravan parks; mining, manufacturing and construction permits; building controls, quarries and pits; tourism promotion; sale yards and markets; real estate development; other business undertakings
Environmental Protection	Waste collection and management; pollution abatement; noxious plants and weeds; insect/vermin control; street cleaning; drainage
Housing and Community Amenities	Housing development and accommodation; public cemeteries; street lighting; town planning
Health	Immunisation; food control and inspections, health centres, public awareness programs
Recreation, Culture and Religion	Public libraries; museums; art galleries; community centres and halls, sporting grounds and venues, swimming pools; parks; gardens; playgrounds
Education	Family day care; childcare; educational grants and research
Social Protection	Migrant, Aboriginal and other community services; youth services; family day care; childcare
Transport	Maintenance of sealed and unsealed roads, bridges, footpaths, parking areas and aerodromes

Sourced from OECD (2011), Classification of the Functions of Government

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

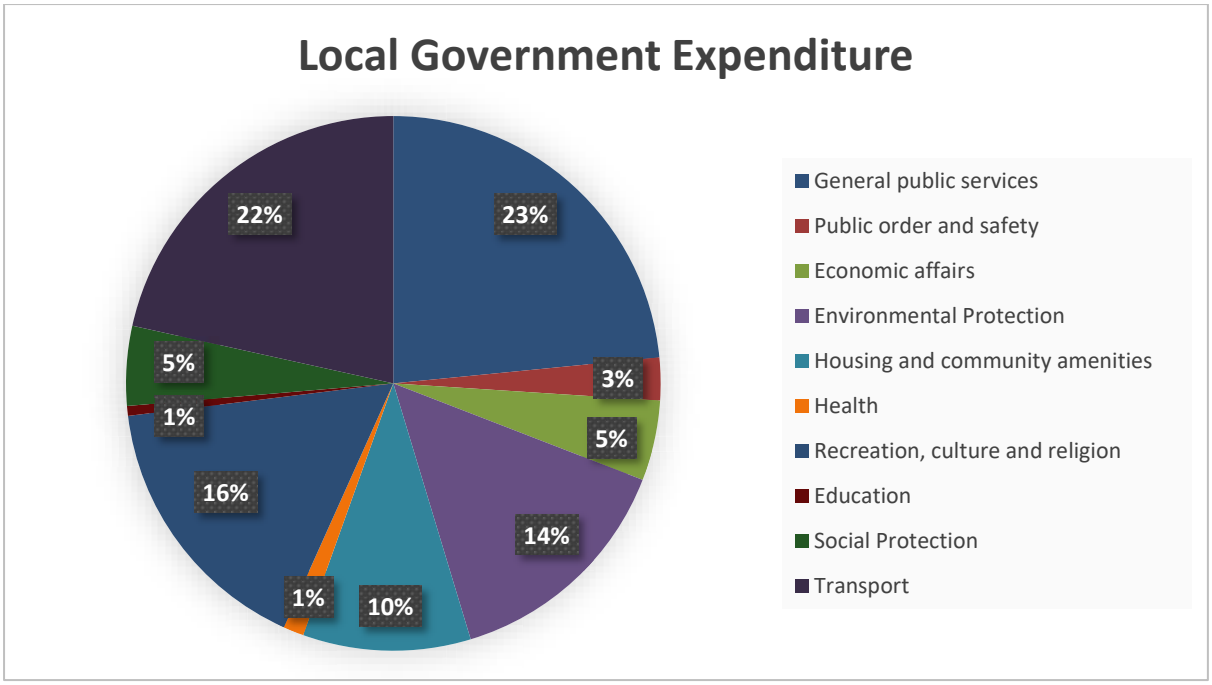

Figure 1.2: Local Government Expenditure by Purpose, 2017-18

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

From these functional areas a number of core services may be identified including(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 aquatic facilities); and (v) planning and development functions (DIRD, 2005). It is important to note that, unlike many of its counterparts overseas, the majority of local government spending is allocated to services which are provided mainly at the household level (termed services to properties; Drew and Dollery 2014d) rather than to individuals. This mainly arises because Australian local government is not responsible for education or welfare functions (see below).

Although water and sewerage service provision to properties may also be considered core services provided by local government in Australia, these services have 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).

This predominant 'services to properties' remit differentiates Australian local government from local government systems in other international jurisdictions. Although these local governments provide many of the core services listed above, their remit encompasses a wider range of responsibilities. For instance, local governments in Canada, the United States and Japan provide police and other emergency services (Province of New Brunswick, 2021a; Taylor, 2015; Noda, 2017). In many European nations local government also plays a much more active role in the development and implementation of social welfare policies through the provision of public housing and welfare support (CEMR, 2016). It is also common for local governments to provide educational services, however jurisdictional differences may arise between local governments which provide schooling at the pre-school and primary school levels only (for instance in France) and those which also support secondary schooling and vocational education (for example Turkey) (CEMR, 2016).

While these 'services to people' are delegated to the local government level overseas, in Australia they are typically the responsibility of state and federal governments. However, the remit of Australian local government has been expanding somewhat over recent years to also include a greater range of services, 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, and aerodromes in rural areas (Drew 2020; DIRD, 2005).

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). There are many different definitions of financial sustainability, and notions of what a 'financially sustainable local government' is. This can depend on the individual or organisation making the determination, the field of study applied to the task (the definition used by political scientists is almost certainly going to differ from that used by public finance specialists or economists; Andrews, 2013) and whether a long- or short-term view is applied. The definition which will be applied in this thesis aligns with the intended meaning in the policy documentation which suggests that local government is financially sustainable if it can continue to operate over the long run without the need for substantive financial corrections. It is relevant to note that this definition is largely consistent with empirical studies of local government in the academic literature (see, for example, Bolívar et al., 2016). 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. Similar to financial sustainability, the definitions and measurement of fiscal stress used can also vary substantially. Some studies or reports identify stress based on a local government's budgetary position and debt levels (Mackay, 2017; Warner et al., 2021). Others, particularly government agencies, rely on performance indicators and ratios (Chung and Williams, 2021; IPART, 2015). Scholars such as Warner et al. (2020; 2021) also use perceptions of fiscal stress based on environmental pressures and context.

In line with the earlier definition of financial sustainability employed, a local government would be considered to be suffering from fiscal stress 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 altering its financial performance levels. 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). Alternative measures of stress, such as the one used by the State of New York, considers a local government to be 'susceptible' to financial stress, experiencing 'moderate' stress or 'significant' stress based on a weighted ratio score of financial performance indicators (Chung and Williams, 2021).

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 engage

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 revenue controls – in particular taxation limitations[6] (see Blom-Hansen et al, 2014). Scholars such as Maher and Deller (2013) and more recently Wen et al. (2020) have identified the impact which the implementation of taxation and expenditure limitations (TELs) in the United States has made towards increased fiscal stress. This is because revenue controls, such as TELs 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). In Australia property tax limitations, referred to as 'rate capping' regimes, act to limit the amount by which property tax (rates) can rise between given years and hence the amount of rate revenue which can be collected. Local governments which require additional revenue beyond this limit (the cap) must apply to an independent regulatory agency (such as the Independent Pricing and Regulatory Tribunal in NSW; IPART, 2021) for a special rate variation.

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

[6] Although alternative forms of revenue control, such as legislating the value of fees and charges (i.e. statutory fees and charges) also exist.

particular groups of rate payers (for instance the elderly) without appropriate compensation (Drew, 2020). Indeed, unfunded mandates are seen to be a leading cause of the financial difficulties faced by local governments in the United States, and have consequently been referred to as a 'devolution of fiscal stress' or 'scalar dumping' in the literature (Kim, 2019a; Kim and Warner, 2018; TFLGCUM, 2015). Similarly, increased demand for services by residents has also contributed to a deteriorating financial position, particularly in countries where local governments are the key provider of social welfare services. As a key leader in England Local Government Association stated "the expense of meeting this [adult social care] demand is "stretching" local authorities to the "breaking point" (HCLGC, 2021, p.5). 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. Concurrently, 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 is by no means an uncommon phenomenon, with local governments internationally suffering from varying degrees of fiscal stress, the magnitude and severity of stress does appear to have risen in the years following the Global Financial Crisis (Usang and Salim, 2016). In particular, the number of local governments deemed to be suffering from 'severe' or 'significant' fiscal stress has certainly increased. It should be emphasised that local government insolvency or bankruptcy remains an relatively rare event, albeit one that is high-profile when it does occur (Kim and Warner, 2018). However, the number of local governments which have been faced with this undesirable situation continues to expand. Examples include the well-documented United States City of Detroit in 2013, and more

recent cities of Perla and Fairfield in 2019 and 2020 respectively (Chapman et al. 2020). Likewise, the decisions by the UK local governments Northamptonshire in 2018, Croydon in 2020 and Slough in 2021 to issue a section 114 notice[7] were the first seen since 2000 (HCLGC, 2021). From an Australian perspective the financial failure of the Central Darling Shire in 2014 represented the first case of local government financial failure in the nation (Drew and Campbell, 2016).

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 within the 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 eight years ago,

[7] Section 114 notices are issued when a local government cannot achieve a balanced budget and are thus under severe fiscal stress (BBC, 2020).

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.

Local Government Reforms

The Purpose of Local Government Reform

The need for intervention to prevent local government insolvency and financial collapse is presented in the documents tendered by policymakers to justify reform. Recent proposed reforms in England frequently refer to the detrimental impact of economic shocks such as Covid-19 (equating to an additional £6.9 billion in increased expenditure and a loss of £9.7 billion or 17.6% of revenue; HCLGC, 2021). Earlier initiatives also mention the ongoing impact of the global financial crisis (Jouen, 2015; TFLGCUM, 2015; ADB, 2013; ILGRP, 2013b).

Although financial sustainability concerns are often a major catalyst for intervention, they are not the sole justification for reform. Policy documents internationally often refer to the need to provide better ‘value for money’ (GovUK, 2021, p.8; LGRPWA, 2020, p.11) or to improve local service delivery (TFLGCUM, 2015, p.18; MMAH, 2001). Other justifications include the need to ‘achieve an optimal size’, ‘align communities with shared experiences’, ‘strengthen accountability’, 'improve strategic delivery’, ‘improve local representation’, and facilitate ‘greater collaboration between stakeholders’ (Jouen, 2015; Province of New Brunswick, 2021b; PSLGC, 2018; DLUHC, 2021; LGRC, 2007). However, financial motivations continue to dominate, with a bulk of policy documents explicitly referring to the potential for reform to generate savings through increased efficiency and the mitigation of

service and infrastructure duplication (for evidence see Welsh Government, 2017; TFLGCUM, 2015; Ministry of Local Government, 2009; Grone, 2019, QTC, 2009). These claims are often accompanied by estimates of financial savings produced by government agencies or external consultants. One such example is the forecast £438 million savings (over a 25-year period) cited in the 2014 Irish local government amalgamation documents based upon modelling conducted by PricewaterhouseCoopers (PWC) (Manley, 2019).

Evidence of the motivations and objectives in an Australian context can easily be seen through the 2008 Queensland amalgamations and 2016 New South Wales *Fit for the Future* (FFTF) reform programs. The reform program in Queensland 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). Likewise, for the FFTF reforms, the need for intervention was 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). Further it was claimed that approximately one-third of local governments in the state were 'at risk' due to weak revenues, infrastructure backlogs and declining populations (ILGRP, 2013b, p.13). The proposed reforms were forecast to yield savings in excess of $2 billion over a 20-year period based on government estimates and modelling by Ernest & Young (see IPART, 2015, p.39).

In order to achieve these desired improvements to financial sustainability the dominant reform instrument employed (at least in Australia) is structural reform through amalgamation. It has been argued that amalgamation allows for improvements in sustainability through the achievement of economies of scale and efficiency in production. 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.

The Definition and Categories of Local Government Reform

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 1.3. 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. Moreover, as shared service arrangements are the most commonly proposed alternative to amalgamation in the Australian scholarly and grey literature (Dollery et al. 2016), the impact of this reform instrument on financial sustainability will also be examined.

Table 1.3: 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	Altering the management or administration process within local government	Requiring direct election of leadership, internal audits
Structural	Altering the boundary, number and types of local governments	Amalgamation

Reform, Economies of Scale and Financial Sustainability

Structural reform (through amalgamation) is implemented to take advantage 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 to employ more sophisticated or advanced inputs (such as machinery) (Andrews and Boyne, 2009).

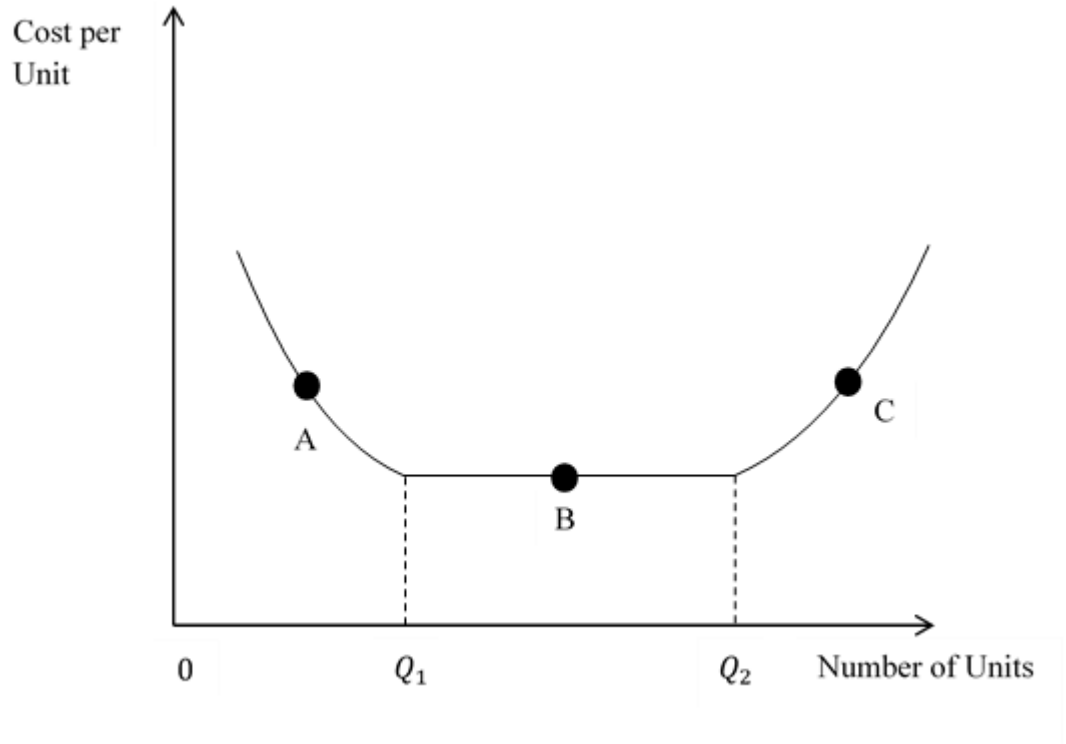

Figure 1.3: Economies of Scale in Local Government Service Provision

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).

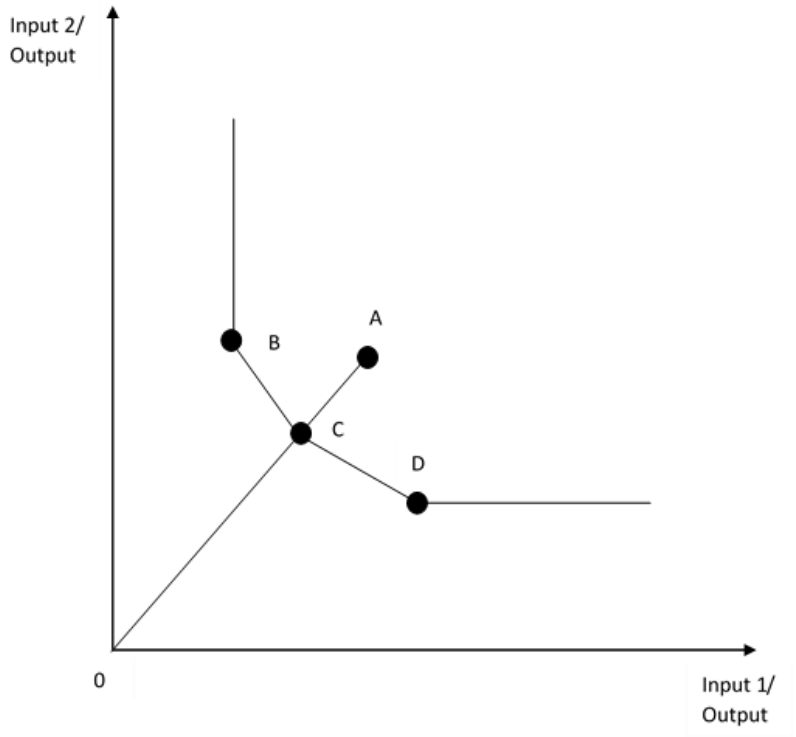

Figure 1.4: Technical Efficiency-Input Orientation[8]

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.

[8] 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.

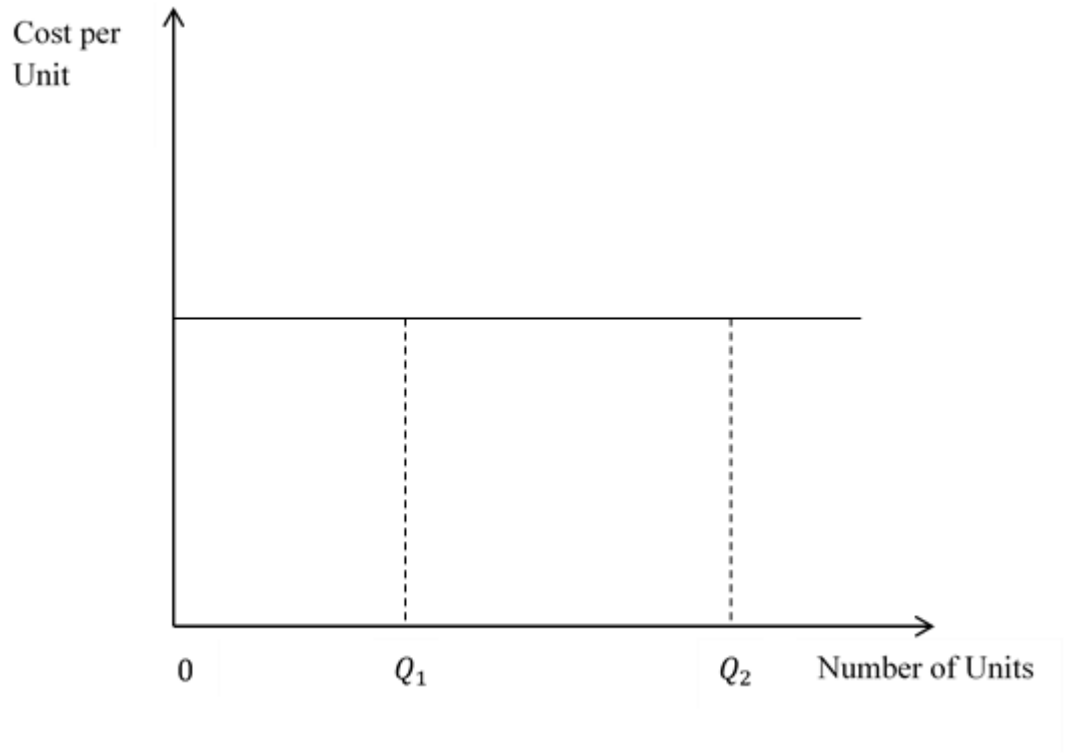

Figure 1.5: No Economies of Scale in Local Government Service Provision

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). Given this thesis is centred around Australian local government reform, a study is made of the two most recent amalgamation programs in Australia mentioned above, the Queensland amalgamations and NSW FFTF reforms[9]. By examining the outcomes for the affected local governments, the impact of the reforms on the

[9] 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

technical efficiency levels, unit expenditure and hence financial sustainability can be identified. A general overview of these reform programs is provided below.

Recent Amalgamation Episodes in Australia

The 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 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 possible (and 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:

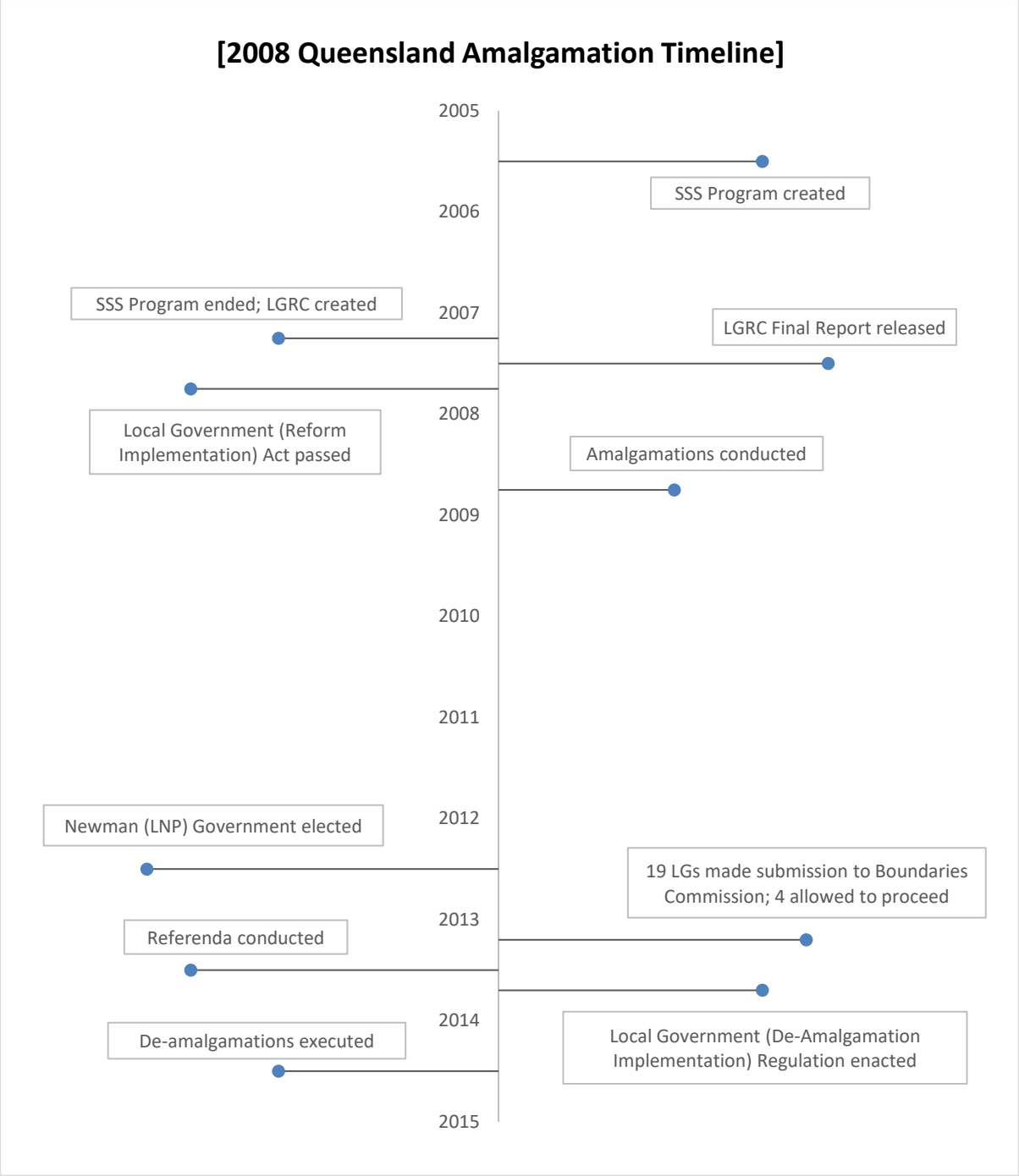

Figure 1.6: Timeline of the 2008 Queensland Amalgamation Process

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[10], 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 an almost 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 at achieving their intended purpose.

The 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

[10] 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[11]. 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 'scale and capacity' criterion (Grant and Drew, 2017).

[11] 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 new 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:

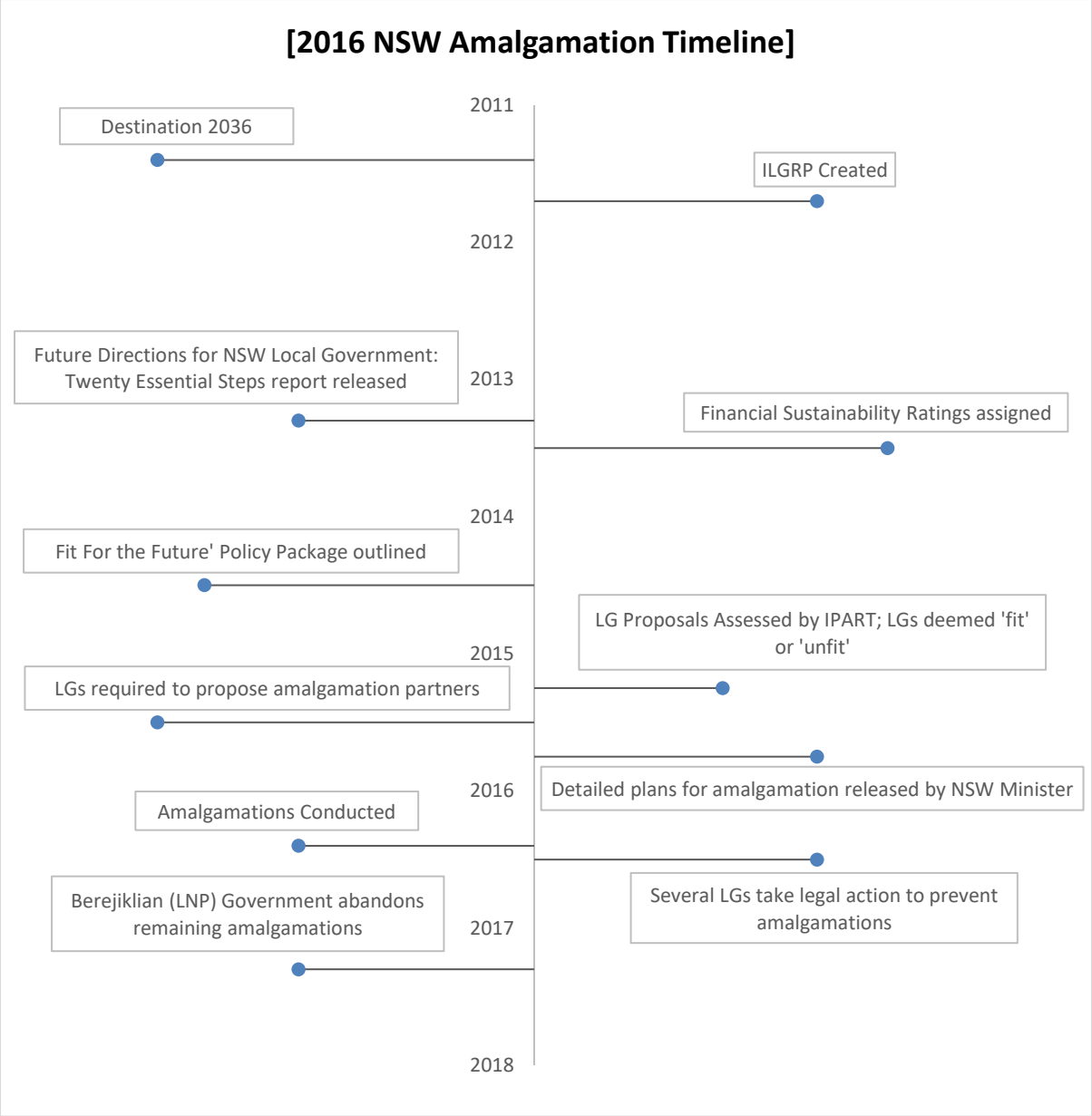

Figure 1.7: Timeline of the 2016 NSW Fit For the Future Amalgamation Process

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; Drew, 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 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. This is the task to which we now turn our attention.

Existing Analyses of Financial Sustainability and Municipal Reform

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. As such, a discussion and critique 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 1.8 below).

The four categories which comprise the four-step guideline 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 impact of previous amalgamation programs will be discussed in the preceding sections, alternatives to amalgamation will be considered.

It is important to emphasise that whilst these categories can be explored in isolation, there is substantial overlap between them. Thus, although the bulk of academic literature can be assigned to a single category without difficulty, it is not uncommon to find studies addressing multiple categories concurrently. This is particularly relevant for two of the chapters in this thesis, which provide an examination of *both* the processes and outcomes of the reforms, in order to give a more holistic critique of reform success.

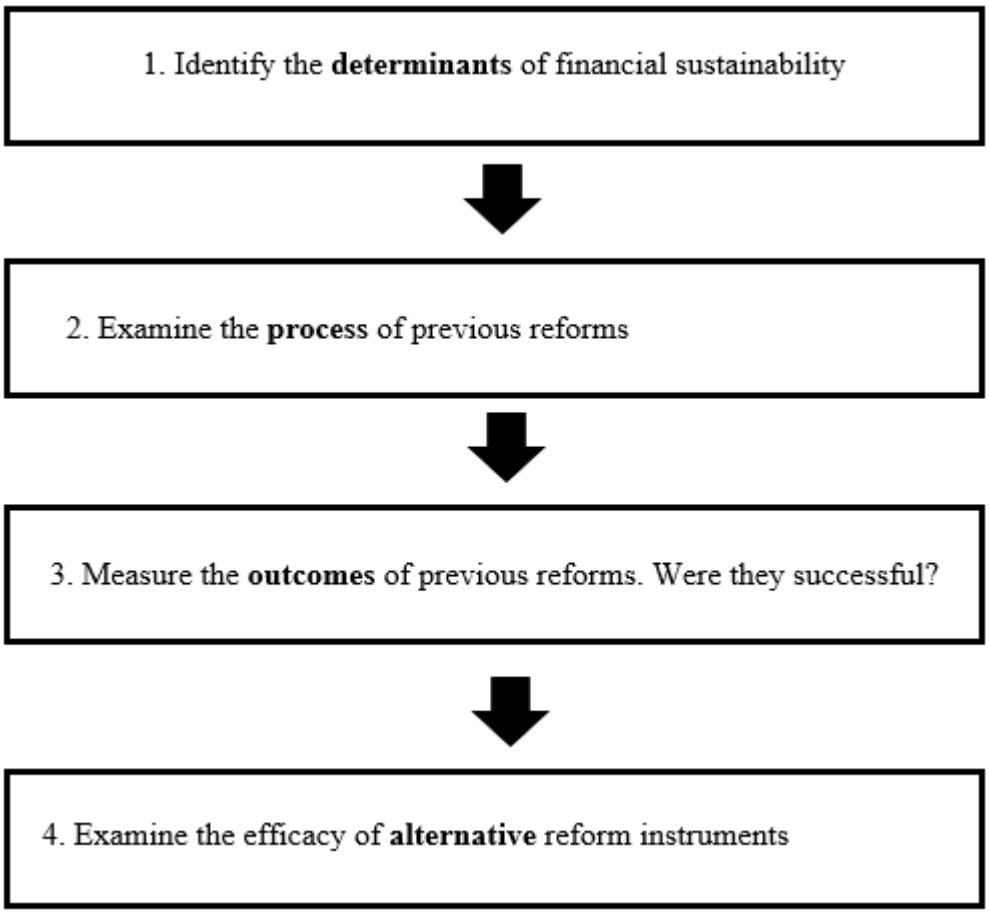

Figure 1.8: Improving Financial Sustainability through Reform

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 in the UK, Andrews and Boyne (2009) observed a positive relationship between size and administration costs for English local governments. Conversely, in an Australian context 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 for US municipalities). Similarly, with regard to the optimal size for local government to maximise sustainability outcomes, Australian studies by 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.

When interpreting these results, it is important to consider the research design selected and the unique characteristics of the jurisdiction analysed before generalised conclusions can be made. For example, it may be possible that studies employing a shorter panel of data or a single financial year such as Andrews and Boyne (2009) may reach differing conclusions than those studies employing a longer time period, or those which are based around theoretical discussions, like Dollery et al. (2009). Likewise, studies which omit small local

governments (typically those which serve small or dispersed populations), such as Ladd (1992), may not reach conclusions which are representative of all local governments in the jurisdiction. It may also be the case that the conclusions and policy recommendations made through studies conducted in one country will not be applicable to local governments elsewhere. Thus, the conclusions reached by Drew et al. (2014) that suggest an absence of economies of scale may not be applicable for English local governments, such as those studied by Andrews and Boyne (2009).

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 in England (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 in Australia, 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. This has been widely confirmed by authors such as Kim and Warner (2018) and Drew and Dollery (2014b) in American and Australian analyses

respectively, leading to almost all analyses of local government finances including controls for these factors.

Although these studies also tend to deviate based on the jurisdiction chosen and the range of analytical methods applied, the reliability of the conclusions obtained can easily be seen through the considerable volume of supporting literature. For instance, the analysis by Boyne (1990) was one of the forerunners of the literature on the 'flypaper effect' in local government[12], which has since been confirmed by scholars internationally (see Dollery and Worthington, 1996; Kaddor and Richard, 2014; Langer and Korzhenevych, 2019; Rios et al. 2021). A similar argument may be made for studies on the detrimental impact of taxation and expenditure limitations such as Dollery and Drew (2016) which has also been substantiated by scholars such as Wen et al. (2020), Blom-Hansen et al. (2014), Mullins (2004) Zhang and Hou (2019). Thus, it appears that, compared to the literature surrounding the effect of local government size, there is greater consensus on the impact of the regulation, revenue allocation and deprivation.

However, whilst many of these conventional determinants of financial performance have been thoroughly examined, many non-conventional factors have not been sufficiently analysed. For the purpose of this thesis conventional factors are those which more often directly impact local government finances (via revenue raising ability and service provision costs) and thus are frequently targeted in policy intervention, whilst non-conventional factors are those overlooked factors which may affect financial performance through indirect means (such as decision making). One such non-conventional factor which holds considerable promise is the local government political structure. Extant American, Australian, and

[12] A theory whereby intergovernmental grant revenue creates a relatively larger increase in spending compared with an equivalent amount of own-sourced revenue. The term was first used in a seminal paper by Courant et al. (1979).

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, 2017a; Bradbury and Stephenson, 2003; Baqir, 2002; Pettersson-Lidbom, 2012). As the majority of these studies employ advanced econometric techniques (such as the random effects modelling; see Drew and Dollery, 2017a), with appended supplementary analysis to ensure robustness of results to alternative specifications (such as those presented in Pettersson-Lidbom, 2012) it provides strong evidence to suggest that political structure might exert a significant influence on local government finances. 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). Consequently, 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.

In comparison, there is a relatively smaller corpus of research on internal factors (factors within local government control) although several important contributions were identified, particularly in the English literature. 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).

Although this literature has highlighted several promising internal factors which may affect financial performance and hence sustainability, there are also several limitations which have been noted which will undoubtedly need to be addressed before conclusive statements can be made. In general, most of the conventional literature on internal factors has typically employed qualitative data (obtained from surveys or in-depth interviews). The studies listed above were no exception with the requisite data collected from electronic surveys of local government managers (Andrews, Beynon, and Genc, 2017) or obtained via proxy (Andrews, et al. 2008). By contrast, quantitative analyses (utilising financial data) are relatively scarce. This is likely due to difficulties eliciting information about internal operations within local governments through financial data, possibly explaining the relatively smaller number of studies in this area. In a similar manner, the use of small samples or individual case studies (such as those used in the Indonesian study by Hasibuan (2020)) may limit the ability to generalise results to the wider local government cohort. Given this gap in the literature, a quantitative analysis examining the non-conventional internal determinants of financial sustainability across the entire sample of local governments in a jurisdiction may provide valuable insights for policymakers for 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.

Internal and external factors which have previously been identified as significant determinants of financial sustainability by the extant literature has been summarised in Table 1.4:

Table 1.4: 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) Hasibuan (2020)	Decision-making style	Andrews, Beynon, and Genc (2017) Andrews *et al*. (2009)
Revenue controls- rates	Dollery and Drew (2016) Wen et al. (2020) Blom-Hansen et al. (2014) Mullins (2004) Zhang and Hou (2019)	Citizen engagement	Andrews, Cowell and Downe, (2008)
Revenue controls- grants	Boyne (1990) Kaddor and Richard (2014) Langer and Korzhenevych (2019) Rios et al. (2021)		
Resident deprivation	Andrews *et al*. (2005) Kim and Warner (2018) Drew and Dollery (2014b)		

Representation-ward structure	Drew and Dollery (2017)	
Mayoral structure	Holcombe and Williams, (2009) Bradbury and Stephenson (2003)	

Process of Local Government Reform

The second category of literature examines 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 bulk of extant literature relating to the reform processes is fairly critical, highlighting problems related to the use of empirical evidence and performance measures (see Table 1.5 for a summary). Examples of this include criticisms relating to a lack of evidence in local government reform planning. For instance, Australian studies such as Drew, Kortt and Dollery (2017), Kortt *et al*. (2016), and Drew and Dollery (2014c) have calculated the expected impact of the reforms *ex ante*, finding that the evidence does not support the claims made in the policy documentation. Further problems highlighted include 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, use of data prone to manipulation (Drew and Dollery, 2015c), or choice of benchmarks (Drew and Dollery, 2015b).

Whilst evaluation of reform processes is undoubtedly useful, potential limitations may arise if studies such as some of those above need to base assumptions around reform designs which were subject to change (and which ultimately did[13]), employ proxies for variables such as local government output[14], or have limited access to current financial data or qualitative measures before implementation such as citizen views of reform (see Ryan *et al*., 2016). To address this the analyses in this category are often underpinned by strong theoretical motivations (see Drew and Dollery, 2015b) and employ extensive supplementary modelling to ensure robustness and reliability.

Despite these criticism of reform processes inherent within this category, studies also exist which provide guidance for the improvement of reform processes. Examples include English and Australian research 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). While these recommendations are also based on strong theoretical reasoning (see Drew, 2020) and lessons learned by successful policy initiatives elsewhere (Boyne and Law, 2005), their use by political leaders and policy implementors remains muted.

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

[13] Compare the originally proposed amalgamation partners cited in Drew et al. (2017) with those actually amalgamated to understand the changing dynamics of the reform design during implementation.
[14] Which is not uncommon in both the scholarly and grey literature due to the difficulty of sourcing and aggregating service outputs.

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 1.5: 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
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 (2016)	NSW-Fit for the Future	FFTF program design 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

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, although exceptions exist. 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 American and Swedish 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 1.6). 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 for examples from the European literature) 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, linking it to the earlier literature on reform processes. Potential causes which have previously been raised 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).

To reach these conclusions, the authors often used leading econometric techniques such as difference-in-difference (DID) analysis (for a detailed description see below, or refer to Angrist and Pischke (2008)). This is generally agreed to be the most suitable method to measure outcomes of local government reform in the literature (see Blom-Hansen et al., 2016; Allers and Geertsema, 2016). A potential criticism which might be raised about these studies relates to the decisions about the relevant control group to compare the amalgamated

local governments to, and the incorporation of local governments which were split and amalgamated into separate entities. To overcome this, scholars (such as Andrews, (2015) and Allers and Geertsema (2016)) have elected to present the results of the model under the preferred specification, and to compare with results obtained using alternative control groups. As the results and associated conclusions did not change materially, the results may be considered reasonably reliable. This reliability is further asserted through additional testing and corrective measures undertaken. For example, due to concerns about the potential interdependence of regressors, endogeneity, and omitted variable bias Blom-Hansen et al. (2016) and Allers and Geertsema (2016) conducted robustness testing incorporating spurious regression analysis, instrumental (IV) modelling and spatial interaction modelling.

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, and analysis of the amalgamation outcomes is crucial.

Table 1.6: 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.
Blom-Hansen et al. (2016)	Examines the impact of amalgamations in Denmark on different categories of spending. Findings reveal cost savings in some areas were offset by increased costs in others.
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

Alternative Instruments of Local Government Reform

The final category of relevant literature relates to the efficacy of alternative reform instruments to increase financial sustainability. Given the focus on structural reform through amalgamation in the thesis, alternatives to amalgamation will be examined. In general, 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. Potential reasons include their ability to directly target local government finances (for instance through financial reforms), and the ability to target individual areas of performance or individual service responsibilities (through managerial, legislative, and functional reforms; see Drew et al., 2014).

Existing literature related to this category includes the evaluation of the governance and management reform alternatives (including performance management) undertaken in the UK Comprehensive Performing Assessment (Game, 2006), and Best Value Indicators (Boyne, Martin and Walker, 2004). Similar studies in America and Australia focusing on financial reforms including reforms to the grant allocation system have also been undertaken (see Johansson 2003; Drew and Campbell, 2016). This relevant literature has been summarised in Table 1.7.

Given that many alternatives to amalgamation have not yet been implemented on a jurisdictional scale or are in the development stages of policymaking it is not uncommon for studies in this category to be based on theoretical discussion rather than empirical analysis.

Studies which use available data such as Game (2006) in England and Drew and Campbell (2016) in Australia, do so more for illustrative purposes, to point out flaws in the existing system or present suggestions for improving the viability of reform alternatives. Where empirical analysis is undertaken the focus appears to be on qualitative approaches or simple quantitative techniques. Examples include the use of hierarchical cluster analysis, qualitative comparative analysis, analysis of variance (ANOVA) or correlation coefficients in the English and Spanish studies by Taylor et al. (2021) and Brusca and Montesinos (2013) respectively. As there are limited cases of widespread implementation of these reforms, preventing some of the previous econometric methods such as DID analysis being reliably applied, the approaches used are understandable. One exception which, although voluntary, has been adopted by local governments in Australia is municipal cooperation through shared service arrangements.

In the existing scholarly literature, shared service arrangements represent a commonly advocated alternative for targeting efficiency gains, and hence financial sustainability improvements (Dollery et al., 2012). They are also seen as a potential means to reduce service costs and address fiscal pressures arising from reductions to intergovernmental support and increasing mandates (Kim, 2018). 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). The existing empirical literature on shared services has been mixed at best. Whilst studies such as Silvestre et al. (2019) in Brazil found evidence of cost savings in housing and sanitation cost categories, Elston and Dixon (2020) failed to identify a significant impact on expenditures for English local governments. Given that all three studies employ multiple regression analysis, adjusted for national differences and data availability, it is possible that the disparity may arise due to the nature of the jurisdiction in question, and the particular service shared.

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. Through such a study it may be possible to resolve the debate currently being undertaken in the academic and political spheres. Consequently, an empirical analysis of the association between shared service arrangements and local government efficiency has been conducted to uncover valuable evidence regarding its efficacy and thus inform future public policy decisions.

Table 1.7: 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.
Taylor et al. (2021)	Grant Allocation and 'Self-financing' models	Examines the detrimental impact which financial reform (through austerity measures) had on local governments.
Brusa and Montesinos (2013)	Performance Management	Most local governments that have introduced performance indicators do not use them for decision-making or accountability.
Silvestre et al. (2019)	Shared service arrangements (intermunicipal cooperation)	Intermunicipal cooperation led to reductions in expenditure associated with housing and sanitation services.
Dixon and Elston (2019)	Shared service arrangements (administration and tax services)	There were no significant financial benefits from either kind of collaboration
Elston and Ruth (2020)	Shared service arrangements	There was no relation between shared service arrangements for every service category and administrative intensity.

Based on an examination of the current financial situation facing local governments, the insights which may be gleaned from recent analyses, and the gaps which may be identified in the scholarly literature, a number of valuable research questions emerge which provide the motivation for the research contained within this thesis. These research questions and their relation to the extant knowledge on local government reforms and financial sustainability will be provided in the following section.

Research Questions

In consideration of the challenges posed for the communities of local governments suffering from financial stress, and the consequent importance of ensuring financially sustainable operations, the central question which has guided the research within this thesis is:

How can policymakers improve local government financial sustainability through reform?

Although the question might, *prima facie,* appear simple, developing a solution which can be readily and easily applied to a myriad of disparate local government systems is almost certainly a challenging endeavour. However, with reference to the extant literature summarised above, this central question can be disaggregated into four smaller sub-questions, which can be more easily addressed through academic analysis:

*R1: What are the **determinants** of financial sustainability?*

*R2: Has the previous reform **process** been implemented successfully?*

*R3: Have previous reform programs been successful in achieving their stated **outcomes**?*

*R4: Are **alternative** reform instruments more efficacious for addressing financial sustainability concerns?*

In order to support the extant research addressing each of these individual sub-questions, five analyses were conducted, which form the body of this thesis. Again, it is important to note that each of these research questions are not mutually exclusive, and thus, individual analyses have been conducted which have the potential to address multiple sub-questions concurrently.

The positioning of each of the papers with regard to the central question and sub-questions is provided hereafter.

Outline of the Thesis

Given that this thesis is by publication, in addition to this introductory chapter, the body of the thesis contains five chapters each representing a single published paper. A key benefit of this format is that the included chapters have already been subject to the peer review process as part of the manuscript submission and have thus been greatly improved compared to earlier drafts. Whilst each analysis may be considered in isolation, when taken as a whole they form a coherent suite of published works. These analyses have been selected to address the aforementioned gaps in the literature and have been ordered in such a way to provide compelling and logical solutions to the research questions outlined above, and thus provide valuable information for academics and policymakers alike within the four-step framework.

Chapter 2 of the thesis has been selected to address the first research sub-question (R1), through the identification of the determinants of financial sustainability. As outlined previously in the four-step guideline, this is the important first step for policymakers and other interested parties interested in improving the efficacy of reform and hence financial sustainability. Specifically, in this chapter the effect of an external factor – the method of mayoral election – on financial sustainability has been studied. The paper empirically estimates the association between the type of mayoral system employed (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[15].

The empirical examination was supplemented with a discussion of the relevant merits associated with directly elected mayors which have been used by proponents to justify

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

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 2024) Central Darling).

Building on the results obtained from the previous chapter, Chapter 3 also aims to identify the determinants which may significantly affect local government financial sustainability and thus provide an answer to the research question R1. Specifically, this chapter focuses on measuring the impact of an internal factor – the budgeting process and the accuracy of budget estimates created. A six-year panel of all NSW local governments was employed to test the association between budget inaccuracy (disaggregated into revenue and expenditure accuracy) and the changes in expenditure per assessment (controlling for past performance[16]). 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 2, 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 4 and 5 are dedicated to addressing research questions R2 and R3 simultaneously, through an examination of previous local government reform programs through amalgamation. These chapters encompass the vital second and third steps of reform

[16] Controls for past performance were needed to avoid a potential endogeneity problem between the measures of inaccuracy and current spending. Following inclusion of a dynamic term, the Hausman test was insignificant ($p=0.3051>0.05$).

improvement, namely a detailed analysis of both the processes and the outcomes of reforms, made possible through an *ex post* examination. In particular, an emphasis is placed on determining the success (or failure) of individual interventions to achieve financial sustainability improvements (outcomes) and the reasons why the individual interventions were successful or not (processes). Through this, the efficacy of previous reforms programs can be identified.

For Chapter 4 the focus is on the 2008 Queensland amalgamations. Specifically, the Chapter examines the effect 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, 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 gains (or losses) from the amalgamation to be realised (which the LGRC stated would take 2 to 3 years; LGRC, 2007).

Chapter 5 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, and to determine if similar insights could be obtained when applied to another disparate jurisdiction and reform program. 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 valuable to the scholarly literature and allowed for a better understanding of the cause of any amalgamation shortcomings.

Finally, Chapter 6 has been selected to provide answers to the final research question (R4). This is achieved through a focus on the alternatives to local government amalgamation which are often proposed when amalgamation plans are deemed unsatisfactory. Indeed, given the highly controversial and contested nature of previous amalgamation programs, it is surprising that a sufficient consideration of alternative reform instruments has not been conducted. This is particularly relevant given that alternatives may potentially represent a more effective means of improving financial sustainability, and thus an examination of these instruments (rightly) constitutes the essential fourth step needed to determine how local government financial sustainability might be improved through reform.

The most prominent alternative proposed in both the scholarly and grey literatures is shared services (Drew, 2020). Thus, in Chapter 6 econometric analysis was employed to determine if shared service arrangements are indeed viable alternatives to local government amalgamation 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 different shared services arrangements for targeting cost savings and hence financial sustainability improvements.

In order to ensure the robustness of each of the analyses outlined above, supplementary analysis has been extensively conducted incorporating additional testing to ensure that model assumptions are not violated, alternative model specifications, additional control groups and varying panels of data. A collection of these supplementary analysis undertaken to address key potential concerns which might be raised can be found in Appendix C of this thesis.

The positioning of each chapter of the thesis in relation to the central theme of financial sustainability and reform, the research sub-questions, as well as the step-by step framework outlined above has been summarised in Figure 1.9:

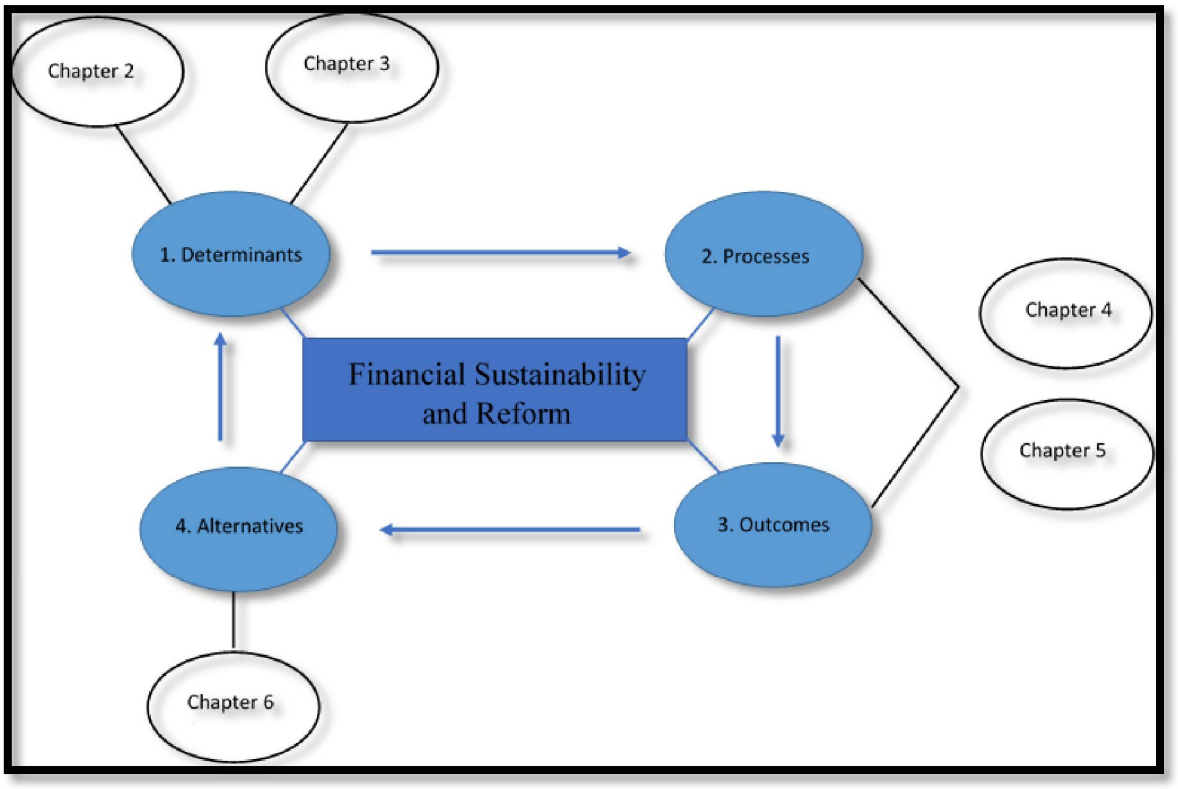

Figure 1.9: Scope of Thesis and Position of Articles Within Research Framework

Methodology

To conduct these analyses, publicly available financial data was sourced from the annual reports and audited financial statements of individual councils. This was supplemented by data reported by relevant local government agencies such as the individual state grants commissions, the Office of Local Government, state treasury corporations and the Australian Bureau of Statistics (ABS). The data collected and transformations applied (such as aggregation of pre-amalgamation and post-amalgamation records) were largely dependent on the unique requirements and nature of each analysis.

In the studies where the efficiency of the local governments was the main indicator of interest (Chapters 4 and 6), data envelopment analysis (DEA) was employed, rather than stochastic frontier analysis (SFA) or regression approaches. DEA is a non-parametric technique, which

employs linear programming in order to determine optimal production levels and construct a best-practice, or efficient frontier. The efficiency of individual decision-making units (in this instance, local governments) is then measured by solving the linear programming problem (below) to find the radial distance to the efficient frontier:

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

This choice of approach compared to alternatives was primarily due to the benefits associated with DEA. In particular, the lack of a *priori* functional reform (which can generate heated scholarly debate), the ability to incorporate multiple inputs and outputs in the estimation of the frontier, and the ability to provide point estimates of efficiency (rather than an average function) result in DEA being considered a more suitable approach to measure the efficiency of local government entities (Drew, Kortt, and Dollery, 2017). Where necessary supplementary DEA models, incorporating bootstrapped and super-efficiency scores were employed for the purposes of confirming the validity and robustness of the results. A more detailed discussion of the econometric methodology can be found in the relevant chapters.

With the exception of Chapter 4, regression analysis was also required to identify if significant associations exist between variables of interest. The regression model employed in each analysis was selected based on the research focus and the characteristics of the underlying data. For instance, the use of panel data and favourable Hausman test result (which did not identify potential endogeneity problems) provided the impetus for the utilisation of a random effects model in Chapter 2 (see model 1 below), whilst the use of a

DID model in Chapter 5 was necessary to estimate the impact of a distinct 'treatment' or 'intervention' (i.e. the amalgamations) (see model 2 below):

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

$$Y_i = \beta_0 + \beta_1 \cdot period_i + \beta_2 \cdot treated_i + \delta \cdot period_i \cdot treated_i + \gamma X_i + \varepsilon_i \quad (2)$$

In each analysis, supplementary testing was utilised to identify any potential problems with the data such as non-normality, heteroskedasticity, or multicollinearity which could be subsequently addressed, and to ensure the robustness and reliability of results.

The choice of variables employed in each analysis was principally determined through an examination of the relevant literature, however adjustments were made based on theoretical insights, and the need to account for the unique jurisdictional and contextual requirements of each analysis. For example, the variables used to measure efficiency for Chapter 4 were chosen based on the suggestions by Da Cruz and Marques (2014) that included a measure of labour input and other expenditure (mainly material expenses and other expenses), whilst recognising that "the output varied…. in a national context". This was extended by Drew et al. (2015) and Drew and Dollery (2014d) to include the inputs of staff costs, rather than full time equivalent staff, and outputs including the number of households, businesses, and road length (which has been widened over time to include a measure of other (non-household or business) assessments). Relevant control variables for the regression analyses were also identified based on the literature, theory, and context. However, common variables included in the analyses were:

- measures of municipal size (population size, density, municipal area);

- resident diversity (the percentage of children (under 15), elderly (over 65), proportion of residents of Aboriginal and Torres Strait Island descent (ATSI) and from non-English speaking backgrounds (NESB));
- socioeconomic status and disadvantage (measured through the median wage, the proportion of individuals receiving a job seeker (Newstart) allowance and proportion of individuals receiving disability payments);
- service quality and/or key expenditure determinants (length of sealed and unsealed roads and intergovernmental grant levels); and
- indicator variables to account for the location of the municipality and/or individual years under analysis (Drew and Dollery, 2014d).

A more detailed discussion of the data utilised, econometric model employed, supplementary robustness testing, as well as a justification for the model selected can be obtained by consulting the methodology section of the relevant chapters. A summary of the key results arising from these econometric analyses will be discussed in the next section.

Summary of the Research Findings

As a result of the analyses contained within this thesis, a number of important lessons for public policymakers, scholars and local government authorities alike has been identified. Whilst the policy prescriptions raised will undoubtedly be useful for the improvement of the design and implementation of future reform programs, the analyses also raise a number of areas which will require additional scholarly attention.

However, before discussing the general contributions and policy recommendations arising from this research, it is first useful to summarise the key findings in each chapter.

Chapter 2- 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.

Chapter 3- The Association Between Budget Inaccuracy and Efficiency in Local Government

Chapter 3 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 for 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 and internal determinants of financial sustainability.

Chapter 4- Do Municipal Mergers Improve Technical Efficiency? An Empirical Analysis of the 2008 Queensland Municipal Merger Program

Chapter 4 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. Analysis of Variance (ANOVA) testing 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).

Chapter 5- Do Amalgamations Make a Difference? What we can Learn from Evaluating the Policy Success of a Large Scale Forced Amalgamation of Local Government

Chapter 5 provided a supplement to the results obtained in Chapter 4, 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 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, 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 4, 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.

Chapter 6- Is a Problem Shared a Problem Halved? Shared Services and Municipal Efficiency

Given the demonstrated failure of previous structural reform programs to generate improvements in financial sustainability, Chapter 6 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 6 indicate that shared service arrangements are associated with significant *reductions*, rather than gains, in 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 or efficiency improvements are the main objective. However, similar to amalgamation, it is important to recognise that shared service arrangements may be established for other reasons.

Contributions and Policy Implications

As stated earlier in the 'Research Questions' section, this thesis aims to provide answers to one of the key challenges confronting the local government sector internationally: *How can policymakers improve local government financial sustainability through reform?*

To do this, with reference to the existing literature, four sub-questions were identified, which are more easily addressed through econometric analysis:

*R1: What are the **determinants** of financial sustainability?*

*R2: Has the previous reform **process** been implemented successfully?*

*R3: Have previous reform programs been successful in achieving their stated **outcomes**?*

*R4: Are **alternative** reform instruments more efficacious for addressing financial sustainability concerns?*

The research contained within this thesis provides valuable answers to each of these sub-questions. With regards to R1, Chapters 2 and 3 identified the importance of political structures and the internal budgeting process as significant determinants of financial performance and hence sustainability. For questions R2 and R3, the problems/challenges which arose during the implementation of previous amalgamation programs (such as a

reticence to reduce staff numbers) which restricted their ability to achieve their stated outcomes was identified in Chapters 4 and 5. Finally, for R4, the association between shared service arrangement and significantly higher unit expenditure identified in Chapter 6 suggests that they do not represent a more efficacious alternative for addressing financial sustainability concerns.

However, it is important to recognise that a comprehensive and definitive solution to local government financial sustainability problems cannot be obtained in a single thesis. Rather, the research undertaken has been selected to supplement the extant knowledge on local government financial sustainability, so that new insights may be identified. Consequently, as a result of this research, this thesis has made four notable contributions to the extant academic and political understanding of financial sustainability. These contributions may then be used as the basis for policy implications and recommendations which are needed to improve future reforms. These contributions and policy implications have been summarised below:

Importance of Challenging Preconceived Notions

The first contribution arising from this thesis is the importance of ensuring that preconceived notions about local government financial sustainability are subject to robust empirical scrutiny before being utilised as a basis for decision making. This is important because as the research revealed: (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) 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); and (iii) shared

service arrangements which had previously been lauded as a viable alternative to local government amalgamation are similarly unlikely to achieve successful outcomes.

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. This further highlights the importance of consulting with both consulting firms as well as local government experts in academia, to ensure that the forecasted outcomes are indeed empirically defensible and free from external interference (Drew and Grant, 2017; Dollery and Drew, 2017).

Importance of Internal Factors

The second contribution relates to the importance of internal determinants of financial sustainability, and the need for decision-makers to give greater consideration to the internal factors when designing policies aimed at improving sustainability. As Chapter 3 indicated internal factors, such as budgeting decisions, can also have a significant effect on the financial performance of local government entities. Somewhat surprisingly these factors have hitherto largely been ignored in previous studies, and in the design of previous reform programmes. Instead, there has been an overwhelming focus on external determinants, particularly 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, potentially representing relatively less disruptive avenues for targeting sustainability improvements (although this is not always the case).

Thus, 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 point, robust empirical analysis should be conducted prior to implementation.

Importance of the Reform Process for Achieving Successful Outcomes

The third major contribution to the extant knowledge relates to the importance of the reform process for achieving successful outcomes. In particular the results from the analyses suggest a 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 collaboration between reform administrators, local government decision-makers, reform architects and the affected communities to help ensure that the intended outcomes of reform (final causes; see Drew, 2021). This should help ensure that decision makers act in a manner consistent with the assumptions of reform architects and that the assumptions are reasonable and achievable (Drew, 2021). 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.

Importance of non-conventional methods of reform

The final major contribution from this research relates to the importance of non-conventional methods of local government reform to target sustainability improvements. As Chapters 4, and 5 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, this is particularly concerning. However, as stated earlier in this thesis, amalgamation is not the only reform 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. Given that political structures and budgetary processes were identified as a significant determinant of expenditure, a further exploration of non-conventional internal governance and management reforms may be warranted.

Through the use of alternative methods of local government reform, it may be possible to achieve improvements to financial sustainability and hence greater policy success. However, as Chapter 6 reveals, caution should be given to the use of shared service arrangements as an alternative for improving financial sustainability, given the evidence that it can also potentially lead to increased, rather than reduced, costs.

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 areas which require further exploration before definitive conclusions can be obtained.

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 one factor, in the form of the internal budgeting processes (budget inaccuracy), 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 internal factors 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 any 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 being 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 internal governance and management reforms, such as 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 methods. 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 research. 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.

Conclusion

Concerns regarding the declining financial sustainability of local governments internationally has 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 five 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 – have been identified. Moreover, the inability of recent Australian amalgamation programmes to target sustainability improvements, and similar inability of shared service arrangements to improve financial performance are now evident. 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 through reform.

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 financial 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.

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Chapter 2

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

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The Price of Populism: The Association between Directly Elected Mayors and Unit Expenditure in Local Government

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Abstract It would appear that directly elected Mayors have indeed become fashionable. However, few seem to have paused to ponder the pecuniary impact of directly elected Mayors on local government: Indeed there is no evidence at all from the Antipodes and much of the extant work is somewhat dated. We analyse a five year panel of data for New South Wales, Australia and find evidence of strong and statistically significant increased unit operational expenditure in local governments that employ the directly elected mayor model. We conclude by outlining the effect that this association might have on local government sustainability.

Keywords: • directly elected mayors • DEM • local government • populism • unit expenditure

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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, 2017). 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, 2017). 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.

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.

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).

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).

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 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 indicated. Whilst both models provide relatively good estimates on average (Drew and Dollery, 2016) 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, 2016). 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 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 1). The descriptive statistics for these variables have been provided in Table 1:

Table 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[1] (Drew and Dollery, 2014; 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, 2014). Population density and assessment growth have been included in the regression as the former has long been recognised to result in significantly lower 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, 2014) 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 2012-2016 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 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 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%

4 Discussion

The results from our empirical analysis of the effect of DEMs on operational expenditure have been provided in Table 3[2]. 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).

Table 3: Effect of Directly Elected Mayor on Operating Expenditure, New South Wales 2012-2016

	Entire State	Urban	Rural	Regional
Mayor	0.0800+	0.1348**	0.1346+	-0.0516
	(0.0438)	(0.0516)	(0.0829)	(0.0995)
No. of assessments (ln)	-0.7977**	-0.5348	-1.5488	4.3698
	(0.2929)	(0.9233)	(0.9613)	(4.2122)
No. of assessments squared (ln)	0.0322*	0.0268	0.0690	-0.2088
	(0.0149)	(0.0468)	(0.0571)	(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))[3]. Unfortunately it is difficult to get suitable data on the quantum of non-formula 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.

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 2) tends to confound any association that might be present.

5 Public Policy Implications

This paper 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, *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 non-formula 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.

Notes

[1] 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).

[2] 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.

[3] 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).

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Chapter 3

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Statement of Author's Contribution

This document is to certify that all co-authors have consented to the inclusion of their work in this thesis and they agree with the individual author contributions as indicated below:

Author	% of Contribution
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The association between budget inaccuracy and technical efficiency in Australian local government

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ABSTRACT

Budgeting is a valuable anticipatory tool, able to support technically efficient production, manage financial vulnerability, and increase financial resilience. However, inaccuracies in the budgeting process can undermine these objectives. The authors investigated the sources of budget inaccuracy and the consequences for technical efficiency, employing a six-year panel of Australian local government data. The results suggest a reduction in technical efficiency of 0.6% for every 1% increase in expenditure inaccuracy.

IMPACT

Little is known about the effect of budget inaccuracy on technical efficiency and financial resilience. To remedy this gap, we employed a six-year panel of data to conduct various econometric estimations. We found that budget inaccuracy did indeed lead to worse technical efficiency outcomes. Further investigation revealed that the cause of the inaccuracy was largely beyond the control of the local government authorities, suggesting a limited ability to mitigate the problem independently. As a result, it seems that co-operation from higher tiers of government will be required to address this problem and ensure that local governments can operate more efficiently.

KEYWORDS

Budgeting; budget accuracy; local government; public policy; technical efficiency

Introduction

Budgeting is the process of planning, executing, monitoring, and auditing financial programmes, 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 & 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 unfavourable 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 should be of particular concern to practitioners. It is therefore important to determine the nature, cause, and consequences of deviations from budget projections. As we show 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:

- To what extent does inaccuracy exist in local government budget estimates (also referred to as 'budget appropriations') when compared to the actual results achieved?
- Does the presence of inaccuracy create any negative consequences for local government technical efficiency?

To achieve these objectives, we employed 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 (i.e. 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 cognisance 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—see Drew, 2020). Further justifications include the lack of sufficiently accurate disaggregated output data at the local government level. There is wide agreement in the extant literature that operational expenditure per property assessment is the most suitable proxy, which explains its widespread use (see, for example, Drew et al., 2019; 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 New South Wales (NSW) local governments. We conclude the paper with a brief consideration of the implications of our findings for local government practitioners and scholars.

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, while 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). The use of budgeting by local governments for anticipatory purposes has been well developed in the literature (Barbera et al., 2020; Ferry & 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 & 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 & 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 & 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 arise due to 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 & 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 & 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 & 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. Budget inaccuracy can either be positive or negative, with the former referred to as under-estimation (budget lower than actual result), while 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 12 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—see 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 often with detrimental impacts for the technical efficiency of the local government (Jordan, 2003). 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 examine in this paper 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 are 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), a reduction in technical efficiency will result. (Note that 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.)

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 while the under-estimation of expenditure will be associated with lower technical efficiency. Thus the third and fourth propositions examined in this paper are:

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

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

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 legislation. Indeed, quality standards are mandated for some goods and services such as water and wastewater (Drew et al., 2019). 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) (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 (1 July), 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, a conventional ordinary least squares (OLS) model was employed.

The model employed in our analysis can be specified thus:

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

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, ***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:

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

$$Expenditure\ inaccuracy = \frac{\left(\begin{matrix} actual\ total\ expenditure - \\ budgeted\ total\ expenditure \end{matrix}\right)}{actual\ total\ expenditure} * 100\%$$

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 in cognisance of the remit of local governments in Australia (Drew, 2020). 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—see Drew, 2020). The proportion of residents under 15 years of age, residents receiving a state 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 care facilities and services (such as home nursing) provided for the elderly. The number of individuals receiving a carer's pension, disability support pension, or Newstart allowance (a federal welfare payment to individuals actively seeking employment), and the median income received by residents were included the analysis due to the well-established link between 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 control 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—see Dollery & Worthington, 1995).

Finally, to account for differences in local government performance over the period under analysis, indicator variables representing individual years were applied, while a lagged term of the dependent variable (operational expenditure per assessment) was included to account for the inherently dynamic nature of local government expenditure (i.e. 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—see 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. Note that this specification is consistent with existing literature on budget accuracy (see Barnett et al., 1991).

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

Where necessary, natural log transformations were applied to correct for skewed distributions. Descriptive statistics for the variables employed are presented in Table 1.

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.

Results and discussion

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 was the result of forces beyond their control.

An analysis of rudimentary measures of central tendency and spread (Table 2) revealed that income and expenditure are typically under-estimated (i.e. 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. While this may indicate strategic manipulation or gaming of budget estimates by decision-makers, further work would be required to

Table 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 councils and 0 to rural councils	0.540	0.498

Table 2. 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%

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—see Drew, 2018).

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 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 ($p = 0.4\ 2 > 0.05$) 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 3 and 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 stratified local governments into those which had under- and over-estimated income respectively, while Models 4 and 5 stratified 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 was 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 represented the effects of the variables on

Table 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.

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, the former is likely to dominate. This is because, while the level and composition of local government goods and services fluctuates 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 found that it 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 relevant period. Moreover,

Table 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.

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., 2019). Furthermore, 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, while it is not impossible for improvements or deterioration in quality to have affected our estimates, it is highly 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, while 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 programmes (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 3, the overall results for expenditure inaccuracy provided support for the extant theory, while 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 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: 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. Put differently, this suggests that inaccuracy was more likely to threaten the ability of a local government to optimize technical efficiency and hence resilience, rather than improving matters.

To ensure that our various empirical estimations (in Tables 3 and 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.

Table 5. Sources of budget inaccuracy (percentage 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 **
Depredation	2.82 **
Employee expenses	1.99 **
Other expenses	1.92**
Borrowing costs	0.06

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

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 5. From Table 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, other income, and interest income (with weak evidence of under-estimation of taxes) while 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* (where 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:

- Additional work requested by other government agencies—the most common being the state road authority, the Roads and Maritime Services (RMS), with payment received as service fee or charge revenue.
- Higher than expected use of fee-based local government goods or services by the community.
- 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, while substantial variation in the 'other income' and 'other expenses' category and a lack of explanation for this variation prevents conclusions from being made.

Therefore Table 5 suggests that unintentional errors may be responsible for most deviations, primarily driven by factors beyond the control of local governments, rather than deliberate actions by decision-makers. While depreciation and losses on disposal of assets may result from gaming of budget estimates (see Rose & Smith, 2011), it may also be a consequence of poor-quality methodology or data. Further analysis will be required to conclusively determine the sources of this inaccuracy.

In sum, these results provide evidence for a negative association between expenditure underestimation and technical efficiency, thus confirming proposition H3 (there was 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.

Policy implications and concluding remarks

These results have a number of implications for local government budget practitioners, decision-makers, and regulators. In order for budgets to be employed as effective anticipatory tools for local governments to increase their financial resilience, budget estimates need to be accurate (Rose & Smith, 2011; Barbera et al., 2020). 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 optimizing technical efficiency.

A similar argument can be made for the need for greater predictability in the process of subcontracting 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). While 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 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 effectiveness as an anticipatory tool, budget estimates need to be accurate. In cases where inaccuracy exists, care must be taken to address the underlying causes and to develop methods to avoid inaccuracy in the future. However, while 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 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 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 & 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 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, while budgets have been identified as an important anticipatory tool for the purpose of promoting resilience (Barbera et al., 2020; Ferry & 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 armoury.

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Chapter 4

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.

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Statement of Author's Contribution

This document is to certify that all co-authors have consented to the inclusion of their work in this thesis and they agree with the individual author contributions as indicated below:

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Research and Evaluation

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

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Municipal mergers remain an important instrument of local government policy in numerous countries, including Australia, despite some concerns surrounding its efficacy. We consider the claim that amalgamations enhance the technical efficiency of the merged entities by examining the 2008 Queensland compulsory consolidation program that reduced the number of local authorities from 157 to 73 councils. To test the claim, we conduct locally inter-temporal data envelopment analysis over the period 2003–2013 inclusive. Our evidence suggests that (1) in the financial year preceding the mergers, there was no statistically significant difference in the typical efficiency scores of amalgamated and non-amalgamated councils and (2) 2 years following the mergers, the typical technical efficiency score of the amalgamated councils was well below the non-amalgamated cohort. We argue this may be attributed to increased spending on staffing expenses, although comparatively larger operational expenditure also served to diminish efficiency.

Key words: *local government*, *amalgamation*, *technical efficiency*, *Queensland*, *Australia*

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 2017). 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 councils would otherwise have in recruiting suitably skilled staff (Drew and Grant 2017). In addition, changes to boundaries, which reflect current work, recreation and education patterns

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of activity (rather than historical practice), are likely to facilitate more effective regional planning and infrastructure provision, and reduce inter-jurisdictional spillovers (where residents of one council benefit from the expenditures of their neighbouring council) (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 2017).

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 2017). 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 councils 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 councils 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 2017). 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. 2014). 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 councils subsequent to a wide-scale amalgamation programme. Accordingly, this paper sets out to address this gap in the empirical literature with an examination of the technical efficiency of councils 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 the empirical analysis in this paper 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 council 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 paper concludes with some observations relating to the saliency of empirical work for amalgamation architects concerned with the question of technical efficiency.

Queensland Amalgamation Process

The Queensland local government sector presently consists of 73 local councils. These councils 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 councils serve an average of 79664 constituents, ranging from 291 individuals (Diamantina) to 1110331 individuals (Brisbane) (ABS 2013).

The process of structural reform through compulsory council 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 councils, substantiated by the 'failure' of a 'significant number' of these councils 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 councils in Queensland to assist the LGAQ in identifying those councils 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. 2014) to investigate (1) the desirability of compulsory council 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 councils in Queensland (Drew et al. 2014). The Commission justified its recommendation by citing the potential benefits of council 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. 2014, 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 councils 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 2017). 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 councils was the subsequent de-amalgamation of four councils starting in 2013. It has been suggested that the de-mergers

arose due to the dissatisfaction among the local communities of consolidated councils, and the inefficiencies and diseconomies of scale created by the amalgamations (Drew and Dollery 2014a; Drew and Grant 2017).

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 councils submitted proposals for de-amalgamation. However, only five were examined by the Boundaries Commissioner and just four councils 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 councils 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 council 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).

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. (2014), 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 councils, (2) identify which councils in particular are relatively technically inefficient, (3) evaluate the impact of council mergers, and (4) determine the impact of environmental factors on the efficiency of councils. 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 council) 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. (2014) 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 councils 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 councils, 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 councils rather than merely an average function or upper bound for which inefficiency will occur (see Drew et al. 2014). 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,[1] sensitivity to outliers and the inability to conduct hypothesis tests or construct confidence intervals to gauge the robustness of the model,[2] these advantages and the ability 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 councils in terms of returns to scale and found that merging councils 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 (2015a) 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 councils compared with their non-merged counterparts both prior to and after forced mergers. The present paper thus seeks to fill this gap in the empirical literature on local government.

Empirical Methodology

To measure the technical efficiency of merged and unmerged councils over time, inter-temporal DEA has been employed. Global inter-temporal DEA examines the efficiency of an individual council in each period as a separate DMU, thereby enabling not only a comparison of the technical efficiency between councils, but also of an individual council over time (Drew and Dollery 2015a). However, this technique assumes constant technology and regulatory conditions, which are unlikely to be valid over a 9-year period (Drew and Dollery 2015a). 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 councils 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 council size on this analysis. The VRS algorithm is presented below:

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

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 council), λ is a vector of constants and $I1$' is a vector of ones. The subscript i is used to denote the ith council 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, councils 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 councils 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 councils, this will ensure that a council'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 council. The DILGP report and individual audited financial statements contain financial information for the 57 Queensland councils (and the 123 councils prior to the 2008 mergers).[3] These documents have been used to construct the staff and operational expenditure input data for all amalgamated and non-amalgamated councils for the period between 2003 and 2013. The ABS *National Regional Profile (2009–2013)* contains extensive data on the 57 Queensland councils, including information relating to population size, number of households, and number of employing businesses within each council'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 council 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 municipality), (2) a measure of total expenditure by the councils

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 council employees, which affects the remuneration they receive, and a measure of spending on operational expenditure, rather than a measure of total expenditure.[4] Drew and Dollery (2014c) also justify the use of households and employing businesses as a proxy of a council's output, rather than the population within the council boundaries. This is because councils 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 2014c).

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 2014c). 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 (2014c). Finally, a measure of the roads maintained by local councils 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 councils or utilised by residents, at present this disaggregated data are not collected by all councils and made publically available (for instance Queensland councils 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 paper 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 over time (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 councils, with the number of households, employing businesses and the length of roads as the chosen outputs (see Model X next). Table 1 summarises the key central tendency measures of the inputs and outputs used in the analysis.

Table 1. Inputs and outputs for data envelopment analysis of Queensland councils 2003–2013

	Definition	Mean (standard deviation)
Inputs		
Operational expenditure	Total expenditure less staff costs, depreciation and borrowing costs in thousands of dollars	57404.17 (131686.70)
Staff	Total staff expenditure in thousands of dollars	44909.89 (99589.51)
Outputs		
Business	Number of employing businesses in the jurisdiction	2555.09 (6114.39)
Households	Number of households in the jurisdiction	24676.14 (54539.58)
Roads	Total length of roads in the jurisdiction in kilometres	2605.82 (1523.51)

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

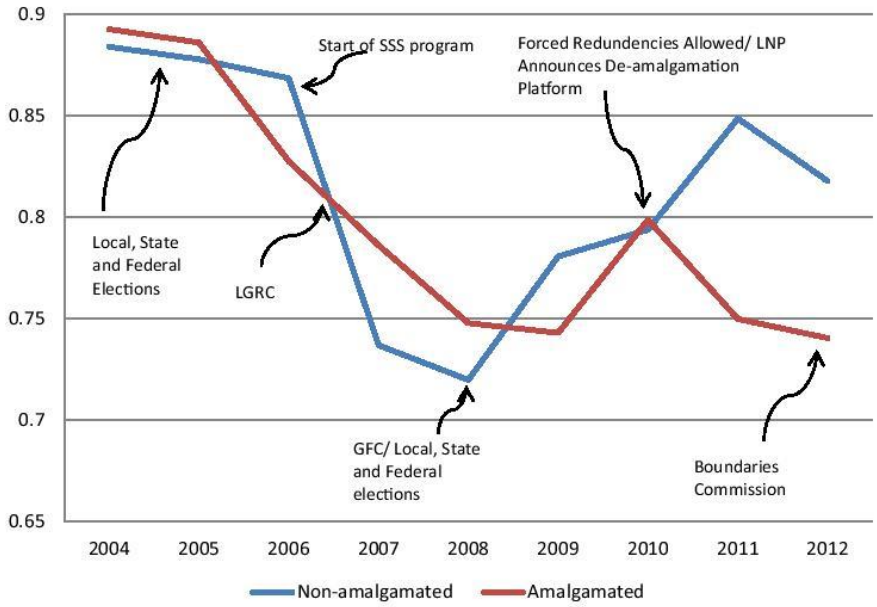
Results

There are two approaches that might be adopted to comparing the performance of the amalgamated and non-amalgamated cohorts of Queensland councils. The first approach examines the typical performance of the respective cohorts. Table 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 councils.[5] 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

Table 2. Summary statistics for Queensland councils 2004–2012

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

Figure 1. Median Efficiency of Queensland Councils 2004–2012 [Colour figure can be viewed at wileyonlinelibrary.com]



tests to determine whether statistically significant differences exist between the two treatment groups. This has been achieved through ANOVA[6] and Mann–Whitney tests. The p values for these tests are included in the last column of Table 2.

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 2 and Figure 1) – which is the preferred measure of central tendency due to its inherent resistance to skewing – it is clear that the typical amalgamated council 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 councils scheduled for amalgamation prevented them from becoming efficient due to the inefficiencies generated from 'the duplication and suboptimal 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 councils 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 councils (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 councils increased markedly and this may

Table 3. Compound average and median percentage change in outputs and inputs for amalgamated and non-amalgamated councils 2010–2012

Average										
	Households		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										
	Households		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 councils; A, amalgamated.

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 councils, possibly indicating a common cause, such as the recovery following the global financial crisis, restructuring following the elections, or the increased scrutinisation placed on the performance of Queensland councils 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 councils 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 councils, 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 councils from 2010 onward, we have examined the relationship between the outputs produced by the councils and the inputs required to produce these outputs. Table 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.

Staff expenditure rose at just over twice the rate for amalgamated councils 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 councils 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 3 indicates, amalgamated councils 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 regards to the functions of the council including expenditure and general operating decisions (Boyne 1995; Drew and Grant 2017). Consequently these merged entities can increase expenditure with relatively less fear of public rebuke that smaller councils 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 councils can serve to reduce the technical efficiency of these councils (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 global recession following 2008 or de-amalgamation debate in Queensland.

Conclusion

Our evidence suggests that the predicted improvements to technical efficiency for Queensland amalgamated councils 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 2017). 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 2017). 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.

Endnotes

1. Although this can be mitigated through stratification according to environmental influences or second-stage regression analysis

2. Although, again this can be overcome through re-specification of alternative models.

3. Excluding Aboriginal and Torres Strait Islander land councils.

4. 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 2015b).

5. 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).

6. 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.

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Chapter 5

McQuestin, D., Drew, J., and Miyazaki, M. (2021). 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*, *45*(3): 278-298.

Chapter 5 – McQuestin, D., Drew, J., and Miyazaki, M. (2021). 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, 45*(3): 278-298.

Statement of Author's Contribution

This document is to certify that all co-authors have consented to the inclusion of their work in this thesis and they agree with the individual author contributions as indicated below:

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Do Amalgamations Make a Difference? What We can Learn from Evaluating the Policy Success of a Large Scale Forced Amalgamation of Local Government

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Abstract

Deteriorating financial sustainability of local governments internationally has resulted in increased implementation of structural reform programs as a potential solution. However, the lack of a coherent framework to evaluate policy success has resulted in a myriad of approaches being applied by scholars, sometimes with conflicting results. This inconsistency is problematic given the importance of ex post analyses to the learning process, needed to ensure better decision-making and more efficacious interventions in the future. To address this gap in the literature, we employed the policy success framework along with a number of difference-in-difference analyses to assess the impact of amalgamation following a recent large-scale program. Moreover, in cognisance of the policy success literature, we also introduced a new innovation whereby we conducted empirical estimations on the disaggregated elements of total expenditure. We conclude with an enumeration of important lessons for policymaking and scholarly analysis.

Key Words: Policy success; Structural reform; Local government; Amalgamation

Points for Practitioners:

- A coherent framework derived from the policy success literature is beneficial to support objective analyses of the processes and outcomes arising from local government reform.
- Despite being undertaken with the intention of improving financial sustainability, it appears that reform through local government amalgamation has further hindered performance.
- A failure to conduct the necessary reform processes, in particular those related to staffing arrangements, was a key catalyst for the increased total expenditure observed.

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

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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, 2015; 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.

A Framework for Measuring Policy Success

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, 2015). 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.

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, 2015; 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, 2015).

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[1] (LGNSW, 2020).

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

[1] 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.

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.

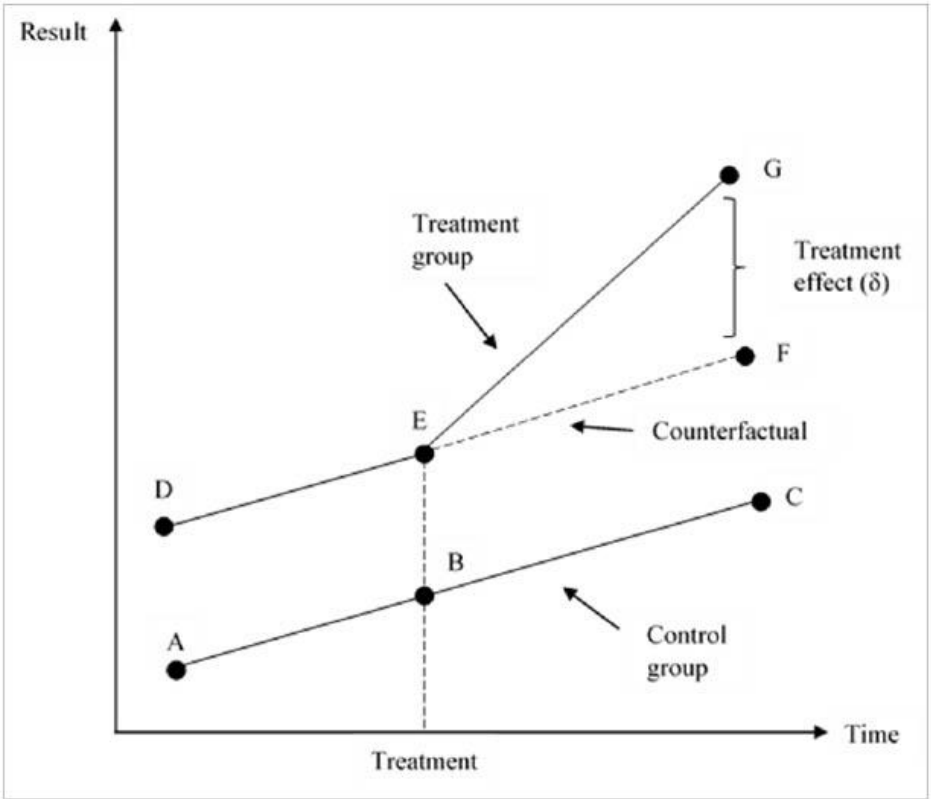
In the next section we will introduce the data and empirical methods which we employed to test whether these expected processes and outcomes were indeed realised.

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 1).

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.

Figure 1. Difference-in-Difference Estimation



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 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 control group with similar pre-reform financial performance and community characteristics was also selected 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). 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[2]. 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 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).

[2] 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.

Where necessary natural logarithmic transformations were used to correct for skewed distributions. The definition of the variables employed have been provided in Table 1. In Table 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 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 2. Summary Statistics of Variables Employed (Standard Errors in Parentheses)

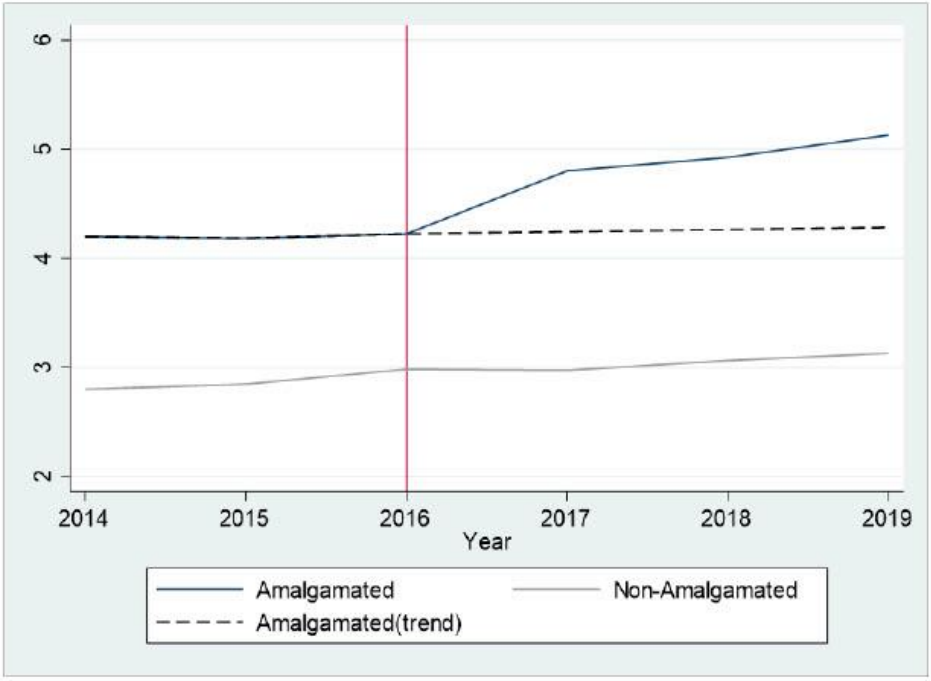
Variable	Entire State	Amalgamated	Avoided Amalgamation	Not Considered for Amalgamation
Totexp per assess (ln)	1.51 (0.01)	1.47 (0.03)	1.07 (0.02)	1.58 (0.02)
Staff exp per assess (ln)	0.48 (0.01)	0.40 (0.03)	0.14 (0.02)	0.54 (0.02)
Mat exp per assess (ln)	0.13 (0.02)	0.08 (0.04)	-0.21 (0.02)	0.18 (0.02)
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.

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 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)[3]. Supplementary regression diagnostic testing did not identify problems related to heteroskedasticity, multicollinearity or normality, within the models tested.

Figure 2. Trends in Total Expenditure per Assessment ($000)



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

The results of the DID on the key outcomes of the reforms – total operating expenditure per assessment –are provided in Table 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.

Table 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** (0.041)	0.167** (0.053)	0.086** (0.028)	0.097* (0.049)
DID* Metropolitan	-	-0.086+ (0.053)	-	-
Period	0.052 (0.034)	0.049 (0.034)		
Treated	-0.016 (0.051)	0.006 (0.053)		
Assess	-0.215** (0.078)	-0.205** (0.079)		
Median Wage	-0.341* (0.152)	-0.365* (0.152)		
Total Grants	0.417** (0.096)	0.400** (0.096)		
Metropolitan	-0.055 (0.063)	-0.012 (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

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 3, 4 and 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 4.

Figure 3. Trends in Staff Expenditure per Assessment ($000)

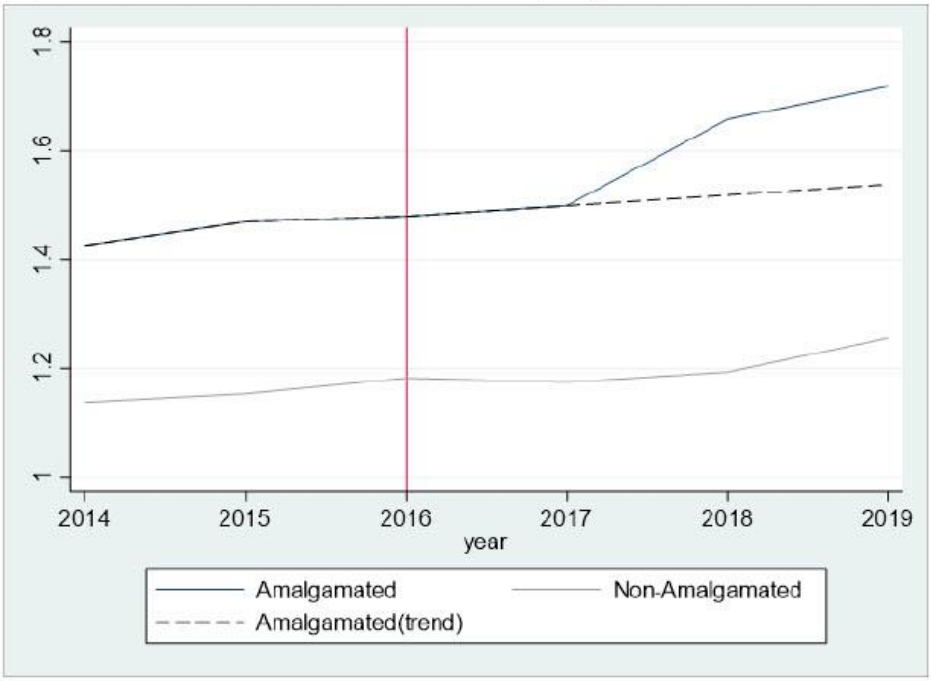


Figure 4. Trends in Materials and Contracts Expenditure per Assessment ($000)

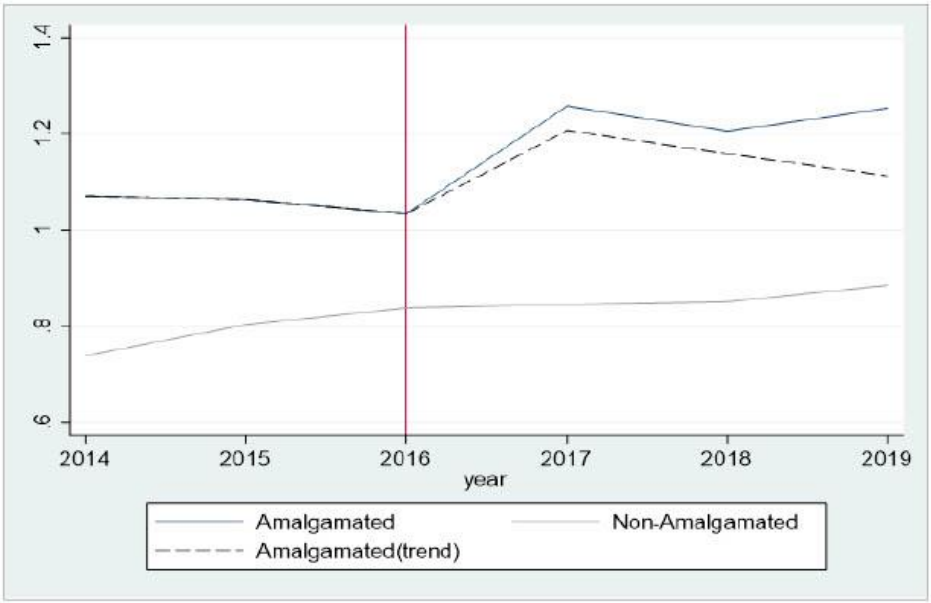


Figure 5. Trends in Other Expenditure per Assessment ($000)

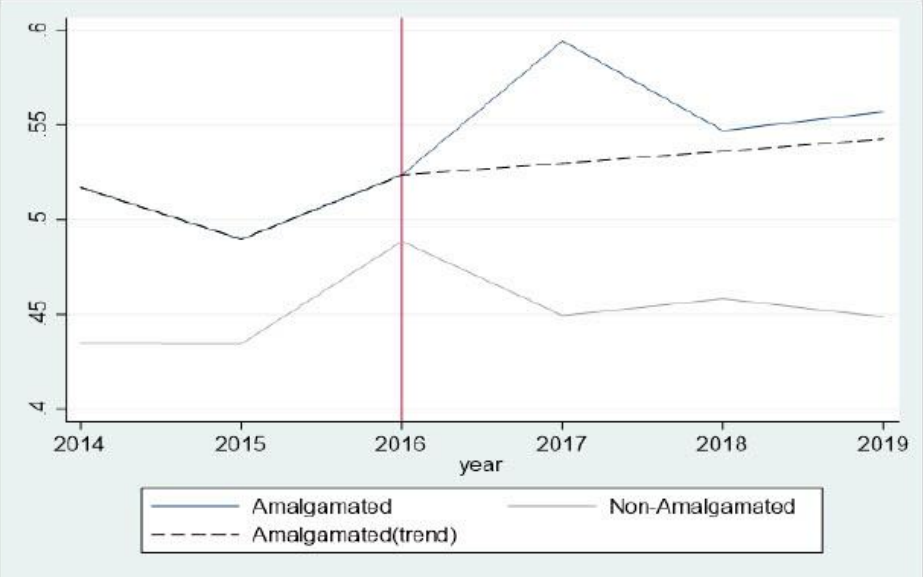


Table 4. Difference-in-Difference Regression Results: Processes

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* Metropolitan	-0.030	0.014	-0.066
	(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	128	128	128
Coefficient of Determination	0.78	0.77	0.57

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

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[4]. 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

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

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).

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.

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, 2015).

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, 2019). 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.

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Chapter 6

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Statement of Author's Contribution

This document is to certify that all co-authors have consented to the inclusion of their work in this thesis and they agree with the individual author contributions as indicated below:

Author	% of Contribution
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RESEARCH AND EVALUATION

Is a problem shared a problem halved? Shared services and municipal efficiency

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Abstract

It has long been argued that shared services represent an efficacious means of securing efficiencies for municipalities. Indeed, pressures from fiscal austerity, taxation limitations, and the specter of forced amalgamations have resulted in an increasing uptake of shared service arrangements. However, the extant evidence is rather inconclusive and is largely restricted to analyzing the nett efficiency outcomes for the specific service shared. We broaden this evidential base by examining the association between shared service production and the efficiency of entire municipalities. Our analysis, employing a 5-year panel of data, suggests that shared services are associated with a statistically significant reduction in overall municipal efficiency. We conclude by explicating on the public policy implications arising from our *prima facie* surprising results.

KEYWORDS

collaborative arrangement, exogenous costs, local government efficiency, municipal efficiency, shared services, transaction costs

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 cooperative 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 & 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, Kortt, & Drew, 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 & Warner, 2017). Moreover, evidence is largely restricted to an analysis of the nett pecuniary outcomes for the specific service produced cooperatively (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, e.g., Conway, Dollery, & Grant, 2011; KPMG, 2015). 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 5-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 favorable 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 (Bel & Warner, 2014; Kwon & Feiock, 2010). However, there are other reasons for pursuing shared services, apart from the hope of securing efficiencies (although the promise of efficiencies is 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 & Warner, 2014; Dollery et al., 2016), reduce professional isolation (Conway et al., 2011), facilitate coordination of regional infrastructure planning (Kim & Warner, 2016), promote innovation (Carr & Hawkins, 2013), and improve service quality (Aldag & Warner, 2017). Moreover, shared production of municipal goods and services can provide an efficacious path to internalizing externalities (whereby benefits or costs imposed on municipal neighbors as a result of municipalities operating in isolation become distributed to partner municipalities in the event that the relevant service is shared; see Kwon & 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 paper 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 (2012–2016 inclusive) based on the entire cohort of 68 general purpose municipalities, which comprise the jurisdiction of South Australia. We conclude our paper with a discussion of the public policy implications arising from our study.

1 | 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 cooperative venture (Kwon & 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, Drew, & Dollery, 2016). Once economies of scale have been fully exhausted (i.e., when average total costs cease to decrease with increased output and hence efficiency is first maximized) 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 1 provides a graphical depiction of the association between average total costs and output for services that exhibit scale economies. Clearly production benefits arising from shared services will be maximized where output is increased from a point to the left of the output level at which efficiency is first maximized 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.

Even if economies of scale can be captured, the existence of transaction and agency costs directly associated with the cooperative 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 behavior of others, and occur in both shared and in-house production (but are more easily managed in the latter; Brown & Potoski, 2005). Transaction costs include information and coordination costs, negotiation and division costs, monitoring and enforcement costs, and defection costs.

Information and coordination 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

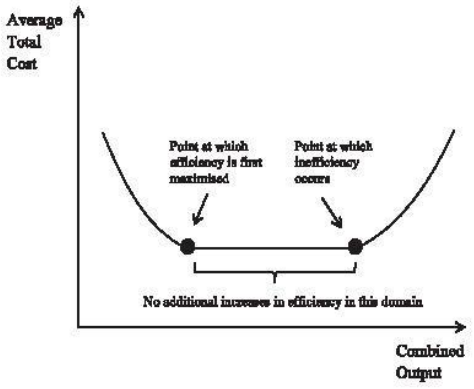

FIGURE 1 Potential production (scale) efficiencies arising from shared services

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 & 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 & 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 behavior does not occur. Moreover, if unsatisfactory behavior is identified then enforcement costs are likely to be borne by the party seeking to correct unsatisfactory behavior. 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 cooperative venture (Carr & Hawkins, 2013; Conway et al., 2011; Dollery et al., 2016). 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 that they withdraw) that may accompany defection. There is also a contingent cost, which is often overlooked in the literature, associated with the mere threat of defection. If other members of a cooperative 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 redistribute 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 & 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 decentralization theorem (the theorem provides an efficiency rationale for provision of goods and services through municipal government; Oates, 2011). That is, decentralized 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 decentralized 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 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

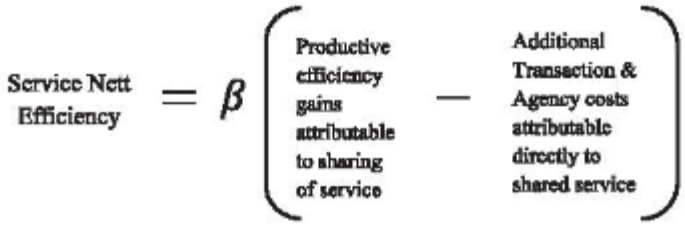

FIGURE 2 Nett service efficiency arising from shared services

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).

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 cooperatively may result in an erosion of extant economies of scope for the municipality. Economies of scope refer to the savings that may be realized when a single organization 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 a similar vein, if staff and resources previously dedicated to produce a service that is moved to a cooperative 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 organizational attention. Indeed, it is quite possible that there will be differences between and within staff and elected representative cohorts given that shared services have 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 cooperative 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.

As represented in Figure 3, the difficulties in selecting a service amenable to production efficiencies in conjunction with significant transaction costs, agency costs, and exogenous costs suggest 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, e.g., Brown & 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 cooperative venture (Brown & 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

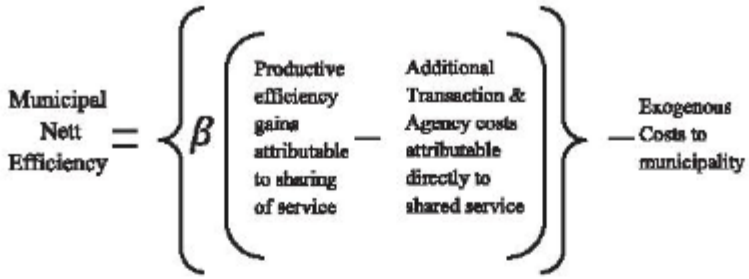

FIGURE 3 Nett municipal efficiency arising from shared services

a shared service (Brown & Potoski, 2005). In a similar vein, heterogeneity of resident preferences between and within municipalities entering into cooperative ventures may also increase the costs, and hence reduce the efficiency, of shared services (Carr & Hawkins, 2013; Feiock, 2007). 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.

2 | EMPIRICAL METHODOLOGY

To investigate the propositions developed earlier, we conducted two-stage empirical analyses of relative technical efficiency (TE) for the 68 general purpose municipalities that constitute the jurisdiction of South Australia over 5 financial years (2012–2016 inclusive). It might be noted that municipal government in Australia has a relatively limited remit, compared to jurisdictions abroad, that is focused on the provision of road infrastructure and services to properties (such as waste removal; see Grant and Drew [2017] 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 TE of each municipality for each year by employing data envelopment analysis (DEA). In the second stage, we regressed the relative TE scores against control variables and indicators responding to whether or not the municipality was involved with shared services.

2.1 | 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 TE 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, while not a perfect reflection of efficiency, is an improvement on other methodologies (such as unit cost analysis or stochastic frontier analysis [SFA]; Drew, Kortt, & Dollery, 2015). In the calculation of efficiency, an input orientation was selected as the output of municipalities is generally considered to be fairly exogenous (Worthington & Dollery, 2001). DEA employs linear programming to first establish an efficient frontier that represents municipalities that best minimize inputs for the level of output produced—these municipalities are assigned a relative TE score of 1.0. The input/output conversion of

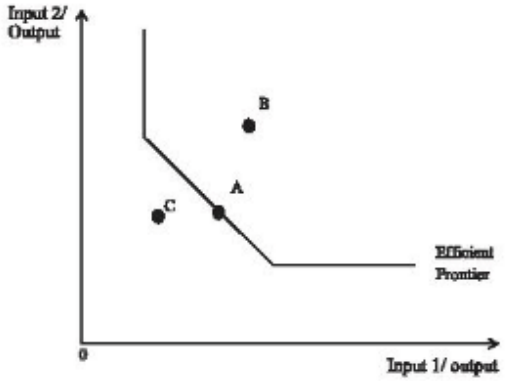

FIGURE 4 Input-orientated DEA model

the remaining municipalities is 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 program that prevented a municipality from using itself as a peer (Coelli, Rao, O'Donnell, & Battse, 2005).

Figure 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 1.0 (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 section), a constant returns to scale (CRS) model was employed. It is important to note that no infeasible solutions were obtained upon utilization of this method, and that all weightings obtained were nonzero. Moreover, to provide additional assurance regarding the validity of the results obtained, a supplementary model incorporating bootstrapped[1] efficiency scores was also estimated. Summary statistics for the efficiency scores obtained using both the super and bootstrapped methods have been presented in Table 1. Readers requiring a more detailed explanation of this increasingly common empirical technique are referred to the seminal work of Cooper, Seiford, and Tone (2007).

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; South Australian Local Government Grants Commission, 2015) followed by services directed to properties (Grant & 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 (e.g., 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 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,

TABLE 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 kilometers)	267.689	225.271
Unsealed roads	Length of unsealed (graded dirt) roads (in kilometers)	833.656	839.280
Business assessments	Number of businesses within 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 municipality	−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

maintenance). Our DEA specification is consistent with a host of studies performed in the antipodes and readers can consult Drew et al. (2015) for an in-depth analysis that confirms our proxy selections as the most appropriate case. However, due to the fact that this technique, not any other technique, can incorporate a complete rendering of every municipal output (were the data even available) readers should remain cognizant 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).

2.2 | 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 5 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 (for an exhaustive list and definition of the individual shared services examined, please see Table 2).

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 limit and a 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 unfavorable Hausman test result, indicating the presence of endogenity, random effects tobit was not used. We

TABLE 2 Shared service classifications

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

Note: The shared service categories presented above may be comprised of several homogeneous subcategories (for instance, health shared services incorporate the sharing of health inspection, immunization, 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 councils in South Australia.

therefore conducted a time fixed effects tobit (to account for the individual level differences in a fixed slope, rather than error term)[2]. The model employed can be expressed as:

$$E_{it} = \alpha_{it} + \beta_1 X_{it} + \beta_2 S_{it} + \mu_{it}\, i = 1 \ldots 68\, t = 1 \ldots 5$$

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 that 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 socioeconomic 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).

The population variables were selected to account for the potential presence of economies (and diseconomies) of scale in municipal service provision (see Kwon & Feiock, 2010), which can serve to increase (or decrease) the efficiency of an individual municipality (note to achieve this, and account for the nonlinear relationship between costs and output, a quadratic term was included for Models 2–4). Similarly to account for potential economies of density (whereby the average cost decreases as population density increases; Holcombe & Williams, 2008), the variable of population density was included. Measures of population demographics and socioeconomic 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 TE 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 that are incurred in rural and urban areas, respectively[3]—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 & 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 & 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 1.

Data for the analysis were sourced from the respective audited financial statements obtained from municipalities, the Australian Bureau of Statistics (ABS) *National Regional Profile* (ABS, 2017), and the South Australian Local Government Grants Commission *Annual Reports* (see, e.g., SALGGC, 2015)[4]. The various reports were combined to provide full and consistent strongly balanced panels of data (i.e., the ABS [2017] report goes back to 2012 and these data were 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 were obtained from 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).

3 | ASSOCIATIONS BETWEEN RELATIVE TE AND SHARED SERVICES

To investigate the two propositions developed from theory, we ran a total of four second-stage regressions. 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 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 2012–2016 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 provide additional assurance regarding our results (we also reran the regressions using ordinary least squares (OLS) and found no real difference in the regressors of interest). Our results are summarized in Table 3.

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 from a non-English speaking background (NESB) (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, municipalities that participate in at least one shared service might be expected to have lower efficiency 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 that was 0.876). It thus seems as if there is strong support for our first proposition.

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 CRS efficiency specification there is no size constraint regarding which peers municipalities are benchmarked to and hence a

TABLE 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 ($000)	−0.0077**	−0.0064**	−0.0065**	−0.0058***
	(0.0029)	(0.0028)	(0.0028)	(0.0015)
Financial assistance grant	0.00002	0.0000	0.0000	0.0000
	(0.00001)	(0.0000)	(0.0000)	(0.0000)
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 transport			0.0493	−0.0263
			(0.0606)	(0.0321)
Shared cemetery			−0.0863	−0.0264
			(0.0827)	(0.0438)
Shared equipment			0.0738	0.0135
			(0.0539)	(0.0286)
Shared procurement			−0.1197*	−0.0825**
			(0.0662)	(0.0351)
Rural	0.1584***	0.1858***	0.1942***	0.2430***

(Continues)

TABLE 3 (Continued)

	Model 1 super-efficiency	Model 2 super-efficiency	Model 3 super-efficiency—by shared service type	Model 4 bootstrapped efficiency
	(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.

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, our more comprehensive analysis of the association between municipal efficiency and the provision of at least one shared service suggests that participation in cooperative ventures might be expected to result in considerably lower relative TE (which we have now demonstrated at the highest level of statistical significance). Given the distribution of relative TE (mean 0.876), this is quite a strong association. Thus, Model 2 confirms the strong evidence to support Proposition 1 that we developed earlier.

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 (i.e., 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, although 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 4). Thus, although we have been able to show that the efficiency outcomes associated with different shared services do vary, we have not 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 & Potoski, 2005; Carr & Hawkins, 2013; Feiock, 2007), and this is therefore an important area for future scholarly work.

4 | PUBLIC POLICY IMPLICATIONS AND CONCLUSION

Despite being oft lauded as a panacea for waning municipal efficiency our evidence suggests that shared services may very well result in *reduced* municipal efficiency. However, there still remain a number of

TABLE 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 redeployable)	Relatively high

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 internalization 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 service-specific assertions and that, as a result, it can no longer be considered reasonable to pursue shared services on the *assumption* of enhanced 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, prioritizing arrangements that select a small group of largely homogenous partners, minimizing transaction and agency costs, and paying close attention to exogenous costs (being prepared to make the hard decisions regarding rationalization 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.

The literature has considered a number of contractual and institutional remedies that might be used to limit transaction costs, in particular (and hence maximize efficiency outcomes arising from cooperative arrangements), and these also deserve careful consideration by parties contemplating shared services. Three of the most prominent solutions are (a) use of binding contracts or statutes (to prevent defection costs and aide enforcement of obligations; see Dollery et al., 2016), (b) use of adaptive agreements such as memoranda of understanding (that minimize upfront negotiation costs and allow parties the flexibility to respond to unpredictable events and opportunities sequent to the commencement of shared service arrangements; Carr & Hawkins, 2013), and (c) 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 & 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 examine the dynamics of shared service effects on municipal efficiency. The extant theory suggests that some upfront costs might be recouped over time, so a study employing

variables to measure the length of time for which a service had operated would provide additional important guidance to practitioners (Feiock, 2007). Similarly, there are good reasons to suppose that multiple experiences with shared services might result in better contract management that could help to optimize municipal efficiency outcomes (Brown & 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. 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 toward 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 efficiency outcomes arising from shared services at the level of the entire municipality, to augment the extant service level studies. Our analysis of an entire jurisdiction over a 5-year panel of data provides evidence that shared services may indeed reduce overall municipal efficiency, which is probably contrary to most people's assumptions. 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 maximizing 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 emphasize again that this evidence should not be construed as suggesting that shared services cannot improve efficiency—rather the take-home message of this paper is that arrangements must be very carefully designed if improvements in efficiency are the objective of cooperative ventures. Indeed, when it comes to cooperative ventures, our empirical evidence would seem to suggest that without very careful planning and execution a problem shared may very well end up as a problem exacerbated.

[1] Bootstrapping is a resampling 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.

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

[3] Note that the urban council category is used as the reference category.

[4] Note that the 2016 grant data are an estimate contained within the SALGGC report.

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Appendix A: Certificates of Completion – Research Integrity

Graduate Research School

Research Integrity for Students

Certificate of Completion

This is to certify that

Dana McQuestin

has successfully completed

Module 1: Research Integrity and Code of Conduct

Production Note:
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prior to publication.

Professor Lori Lockyer,
Dean, Graduate Research School

University of Technology Sydney

Date: *21/09/2020*

Graduate Research School

Research Integrity for Students

Certificate of Completion

This is to certify that

Dana McQuestin

has successfully completed

Module 2: Plagiarism and Misconduct
Module 3: Risk Assessment
Module 4: Risk Management and Health & Safety
Module 5: Project Management

Production Note:
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Professor Lori Lockyer,
Dean, Graduate Research School

University of Technology Sydney

Date: 21/09/2020

Appendix B: Glossary of Terms

ABS: Australian Bureau of Statistics

ACT: Australian Capital Territory.

ALP: Australian Labour Party

ANOVA: Analysis of Variance (econometric test)

ATSI: Aboriginal and Torres Strait Islander, Australia's indigenous people

COFOG: Classification of the Functions of Government

CPA: Comprehensive Performing Assessment

DEA: Data Envelopment Analysis (econometric model)

DEM: Directly elected mayors

DID: Difference-in-difference (econometric model)

FFTF: Fit for the Future reform program

FSR: Financial Sustainability Ratios

IPART: Independent Pricing and Regulatory Tribunal

IV: Instrumental Variables (econometric model)

LGAQ: Local Government Association of Queensland

LGNSW: Local Government New South Wales

LGRC: Local Government Reform Commission

LNP: Liberal National Party

NESB: Non-English Speaking Background

Newstart Allowance: Australian unemployment payments

NSW: New South Wales

NT: Northern Territory

OECD: Organisation for Economic Cooperation and Development

OLG: Office of Local Government

QLD: Queensland, state of Australia

QTC: Queensland Treasury Corporation

SA: South Australia

SFA: Stochastic Frontier Analysis

SSS: Size, shape and sustainability program

SUR: Seemingly unrelated regression (econometric model)

TAS: Tasmania, state of Australia

TCorp: NSW Treasury Corporation

TELs: Taxation and expenditure limitations

VIC: Victoria, state of Australia

WA: Western Australia

Appendix C: Supplementary Analysis for the Studies Undertaken

Given the constraints typically imposed to the word limits or depth of analysis in the publication process it is very common for supplementary modelling to be excluded from the finished manuscript or included as an appendix item. In order to demonstrate the robustness of the econometric models and to build on the original results presented, these additional models will be presented here. A short description of each model, and its relation to the original results will be presented hereafter.

Supplementary models for Chapter 2: The Price of Populism: The Association between Directly Elected Mayors and Unit Expenditure in Local Government

The results given in Chapter 2, employing random effects modelling, suggest that directly elected mayors (DEMs) were associated with significantly higher spending, in the order of 13% for urban and rural local governments. While these results were confirmed to be unbiased, one potential concern may arise about whether the same of local governments with DEMs and indirectly elected mayors are sufficiently similar to enable a fair comparison. If the two groups are dissimilar in terms of external characteristics it may lead to unreliable results for the variable of interest. One prominent method which is used to address this, and ensure the robustness of the results obtained, is the use of propensity score matching estimators. Developed in a seminal paper by Rosenbaum and Rubin (1983), and refined by Imbens and Rubin (2015) and Abadie and Imbens (2015) the method uses the select characteristics of the local governments in the sample to measure the probability of a local government having a DEM or not (the propensity score). The regression is then conducted by matching each local government with a DEM to its counterpart(s) with indirect election which have the most similar propensity scores. In essence, this restricts the sample to ensure

that the local governments compared are those with relatively similar characteristics. The results from this model for the variable of interest can be seen in Table A1.

Table A1: 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)

Although the magnitude of the coefficients attunes slightly, the results are largely comparable with those obtained in the original model. That is, directly elected mayors are associated with significantly higher spending, *ceteris paribus*. In this model, when a single match is used the spending is approximately 11% higher overall, 13% higher for urban local governments and 9% higher for rural local governments on average. The model with two matches used produces similar results. Of note is the increase in the significance of the DEM indicator variable at the 1% and 5% level (from 5% and 10% respectively in the random effects model). This serves to further strengthen and validate the arguments made in the original analysis (Chapter 2), and demonstrate the robustness of the results against alternative specifications.

It must also be noted that the coefficient for the regional local government cohort is now significant (at the 10% level- one match, and 5% level- 2 matches). Although this deviates from the original model, it further supports the idea that the heterogeneity between regional local governments may be a driving cause of the different effects of DEMs on spending.

Given that this model suggests the potential for savings, further analysis may provide useful information for public policymakers.

Supplementary models for Chapter 4: Do Municipal Mergers Improve Technical Efficiency? An Empirical Analysis of the 2008 Queensland Municipal Merger Program

As Chapters 3 and 4 demonstrated is important to measure the short-term outcomes of reform, and ensure that the processes necessary to achieve intended savings are being implemented. However, it is equally important to measure the outcomes of reform over a longer period of time, given that some of the intended sources of savings such as employee savings and benefits from economies of scale will take time to materialise. Given that sufficient time has now passed since the 2008 Queensland reforms, the long-term impacts of the policy on the efficiency of the affected local governments can now be examined.

To do this the original 4-year post-reform analysis has extended to incorporate a longer panel of data. To avoid conflating the result with the impact of the Covid-19 pandemic, the sample has been restricted to 2020. Using the same specification as the model presented in Chapter 3, the extended model is presented in Table A2 and Figure A1 below:

Table A2: Summary statistics for the DEA Analysis of 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)

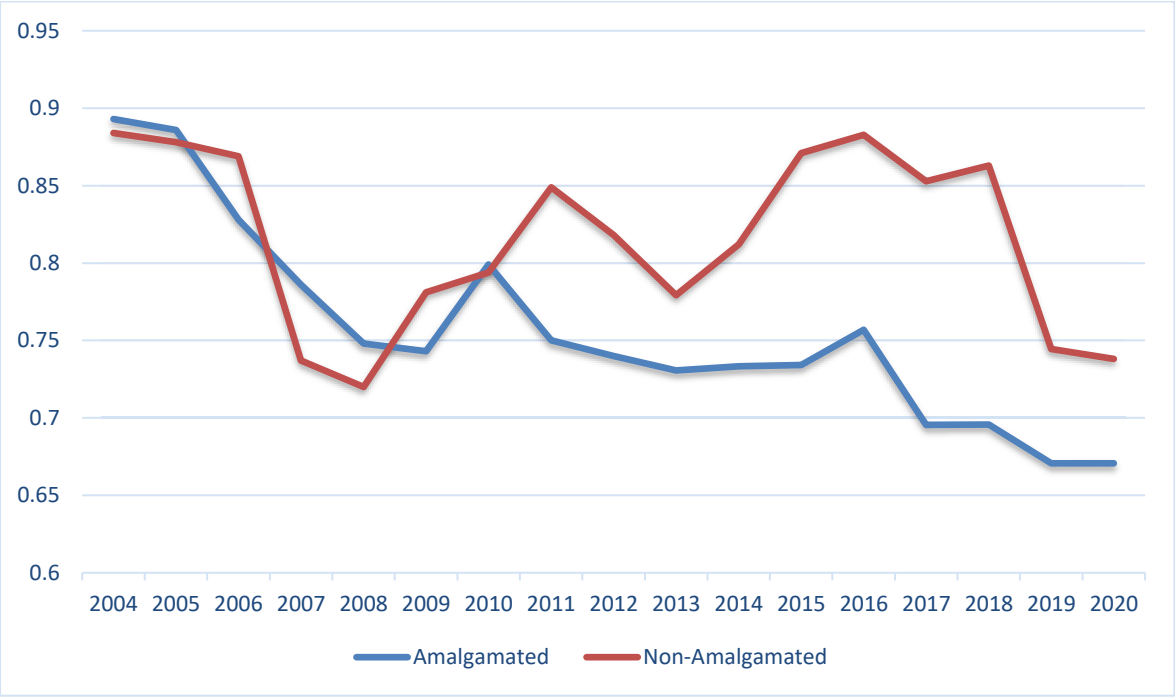

Figure A1: Median Efficiency of Queensland Local Governments 2004–2020

We can see from this table and figure that the gap between the non-amalgamated and amalgamated local governments further widened until 2017, becoming statistically significant at the 5% level. As the non-amalgamated local governments performed better during this period, it seems that there is evidence to question the effectiveness of the amalgamations for improving performance. Notably, the worsening performance also occurred beyond the expiration of the moratorium on employee terminations, where large reductions in employee expenses were predicted. This suggests that reform architects may need to consider the practicality of staff reductions, or to take measures in collaboration with the amalgamated local governments to ensure that the planned processes actually occur. However, before this can be conclusively stated, it is important to look closer at the reforms, most likely using survey data or interviews, to identify exactly why the improvements in efficiency did not materialise. Although the gap has narrowed in the last three years of the sample, the amalgamated local governments have continued to follow a downward trend in efficiency.

In addition, one concern which may be raised with the original model relates to the effect of external influences beyond the control of the amalgamated local governments. The most notable include the effect of the business cycle on local government performance, and external market conditions, including total factor productivity. To ensure that the results obtained in Chapter 4 are not biased as a result of these external market conditions, additional data was collected and analysed against the calculated efficiency scores. The correlations levels between efficiency, economic growth (a key indicator of the business cycle) and total factor productivity is given in Table A3, whilst a graphic description is presented in Figures A2 and A3.

Table A3: 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)

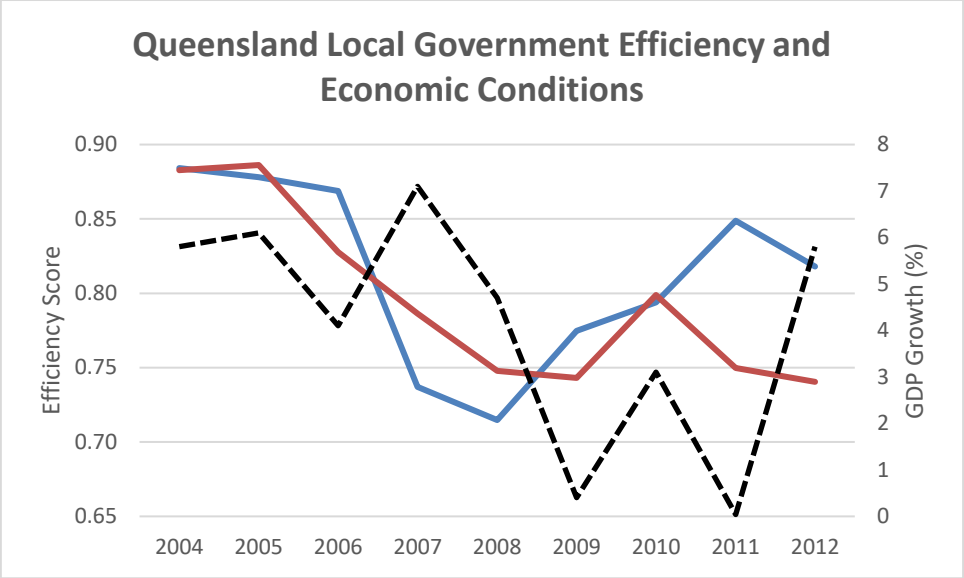

Figure A2: Changes in Efficiency Relative to Economic (GDP) Growth, 2004-12

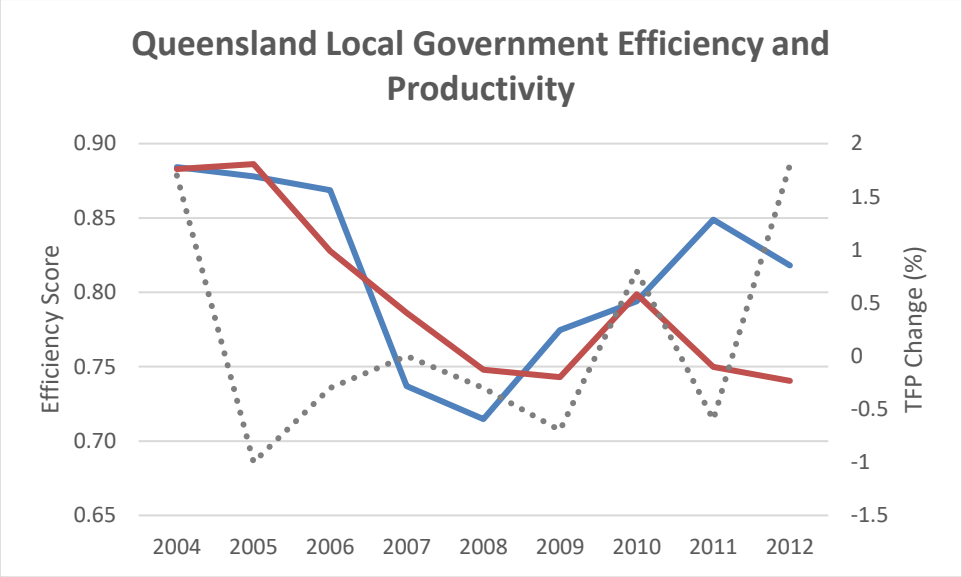

Figure A3: Changes in Efficiency Relative to Total Factor Productivity, 2004-12

From these supplementary tests we can see that there is no significant association between either the average or median efficiency scores and these external market factors. As a result we can be reasonably assured in the validity of the results obtained in Chapter 4.

Supplementary models for Chapter 5: Do Amalgamations Make a Difference? What we can learn from Evaluating the Policy Success of a Large Scale Forced Amalgamation of Local Government

The results obtained in Chapter 5 use leading econometric analytical techniques, through the use of difference-in-difference (DID) estimators. It is notable that this approach has been gaining prominence in the local government literature on reform outcomes (see Reingewertz, 2012; Andrews 2015; Blom-Hansen et al. 2016). However, whilst DID estimation is widely applied, debate continues about the most appropriate control group to compare the amalgamated local governments with. In Chapter 5 the local governments which avoided

amalgamation through legal action were selected as they were expected to have similar pre-reform attributes (thus justifying their initial section for reform).

A popular alternative control group which has been applied in the literature on public policy outcomes is the synthetic control method (SCM) which may be attributed to the efforts of authors such as Abadie and Gardeazabal (2003) and Abadie et al. (2010). This approach combines attributes of the propensity score matching and DID model to estimate the effect of reform. It does this by using a weighted combination of potential controls (in this case all local governments in the state) to create a synthetic local government which is similar in characteristics to the amalgamated local government. Following this, the DID estimator is then applied to the amalgamated local governments and the synthetic control group.

By applying this method to the same data and model specification used in Chapter 5, it will be possible to see if the results are biased as a result of the particular control group selected, and thus provide an excellent opportunity to verify the robustness of the results obtained. The weights used to generate the synthetic controls, and the results obtained from the SCM model are presented in Tables A4 and A5:

Table A4: 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 A5: 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)

Although the value of the DID estimator in the synthetic control model is slightly lower compared to the original DID model (8% compared to 11% respectively), the high statistical significance is maintained. Moreover, the magnitude is not much different from the coefficients obtained in the nearest neighbour (9%) and propensity score (10%) matching methods also presented in Chapter 5. Consequently, it can be inferred that the choice of control group in this analysis does not exert a sufficiently large undue influence on the results obtained, and hence the results obtained in Chapter 5, and associated conclusion can be considered reliable.

Supplementary Models for Chapter 6: Is a Problem Shared a Problem Halved? Shared Services and Municipal Efficiency

The fixed effects Tobit modelling in Chapter 6 provides evidence that shared services are associated with lower efficiency levels, ceteris paribus. However, whilst this model can provide point estimates of the effect on efficiency, it does not provide much information about the effect of shared service arrangements over time. While it may be possible that shared services have a detrimental impact on local government performance at first, this may be reversed in subsequent years. In order to identify whether this is the case, supplementary analysis using the local projection method, applied by scholars such as Jordà (2005) and later

Jordà and Taylor (2016), was conducted. This technique uses the lags of the explanatory variable in order to forecast the expected impact of a policy (or other variable of interest) in future periods. When applied to the data used in Chapter 6, the expected impact of shared services can easily be seen. The results from the local projection method are provided in Table A6 and Figure A4 and A5 (the analyses for the disaggregated service categories yielded similar graphs).

Table A6: 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)

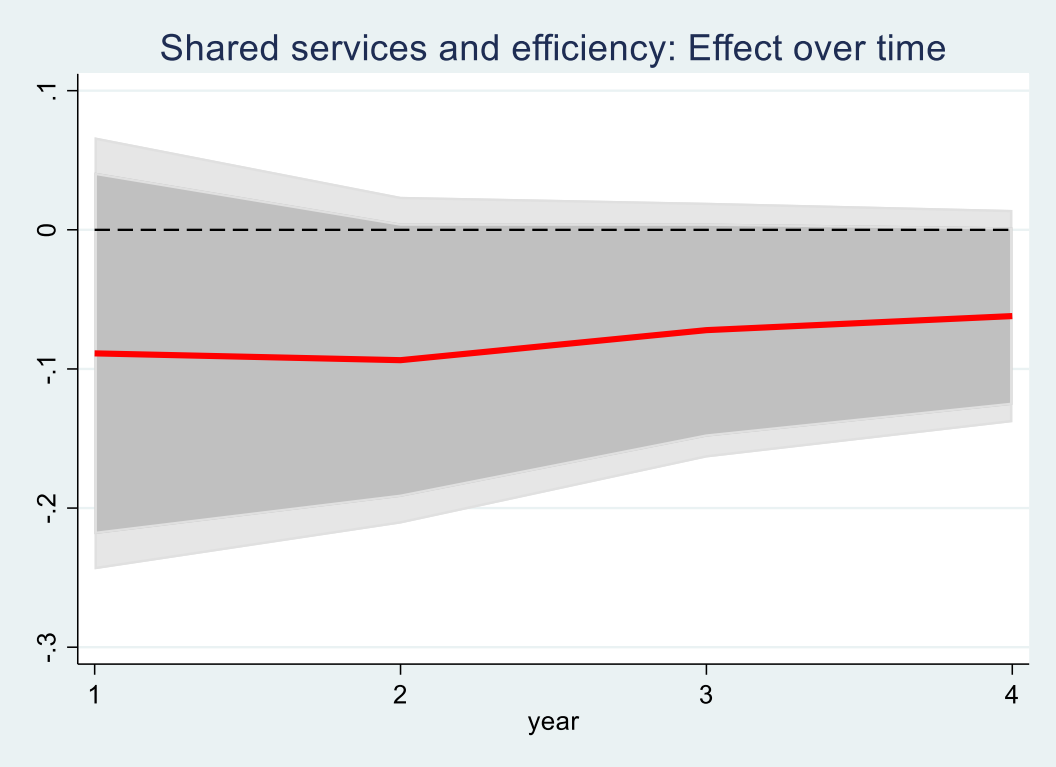

Figure A4: Evolution of Impacts from Shared Service Arrangements

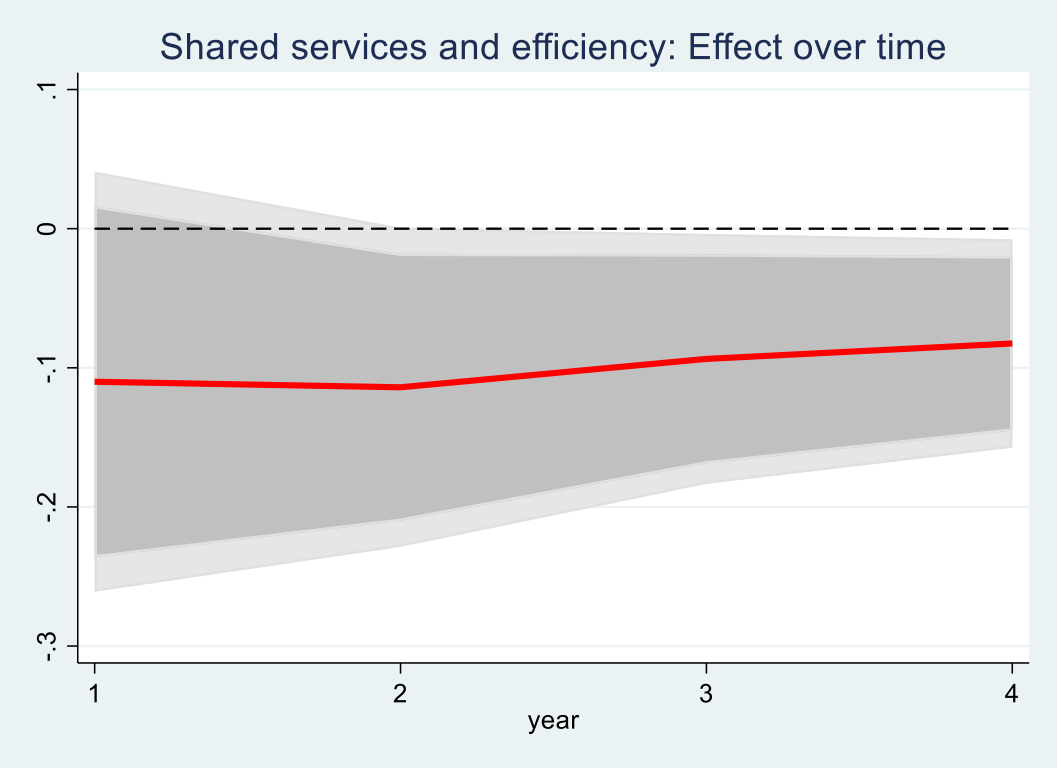

Figure A5: Evolution of Impacts from Shared Service Arrangements_ Quadratic Model

The sign of the estimated impact of shared service arrangements in the local projection method remains consistent with the original model in Chapter 6, and the significance of the association strengthens over time. As such this supports the robustness of the model and the conclusions which were obtained from it in Chapter 6. Although it appears that the higher costs do appear to be reducing over time, this will need to be verified through additional analysis over a much longer panel of data.