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Do Municipal Mergers Improve Technical Efficiency? An Empirical Analysis of the

2008 Queensland Municipal Merger Program

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ABSTRACT:

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 which 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 to 2013 inclusive. Our evidence suggests that (a) in the financial year preceding the mergers there was no statisticaly significant difference in the typical efficiency scores of amalgamated and non-amalgamated councils and (b) two 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.

Keywords: 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 1,067 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 41,527 compared to an OECD average of 27,244 for the comparable period (OECD, 2013).

There are some clear benefits that might be expected to arise from amalgamation and these have been discussed 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 of activity (rather than historical practice) are likely to facilitate more effective regional planning and infrastructure provision, and reduce interjurisdictional spill-overs (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 the 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., 2016). 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 academic 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* 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 (an economic concept which suggests that 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 difficulty in co-ordinating large numbers of staff and lower levels of transparency (Drew et al 2014; Boyne, 1998). The question of changes to technical efficiency is thus an important avenue of inquiry for academics 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 four years either side of the 2008 Queensland amalgamations which reduced the number of local governments from 157 to 73. We emphasise that the following analysis only answers the specific (economic) question relating to the outcomes in technical efficiency following the Queensland amalgamations and that it is therefore not, in itself, a suitable foundation for making wider judgements on the efficacy of amalgamation as a whole.

In the next section we briefly outline the Queensland amalgamation process with emphasis on the claims made regarding technical efficiency by the architects of the reform. Thereafter we examine the methods commonly employed in the academic literature to estimate technical efficiency and explain why intertemporal data envelopment analysis is ideal for the present purpose. Following this we 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 article concludes with some observations relating to the saliency of empirical work for amalgamation architects concerned with the question of technical efficiency.

The 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 79,664 constituents, ranging from 291 individuals (Diamantina) to 1,110,331 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), endorsed and partly funded by the Queensland Treasury Corporation (QTC) (LGAQ 2005; 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 which 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 (a) the desirability of compulsory council consolidation, (b) alternatives to amalgamation, and (c) a model for structural reform in Queensland local government (LGRC 2007).

In its *Final Report* released on 27 July 2007 –a relatively brief three 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, Drew, et al. 2015).

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 two to three 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 Grant 2017; Drew and Dollery 2014a).

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. Firstly, Worthington (2000), Fogarty and Mugera (2013), Drew et al. (2014) and others have analysed of the efficiency of local authorities. This has been utilised to (a) compare the relative efficiencies of municipalities and make inferences regarding the optimal size of these councils, (b) identify which councils in particular are relatively technically inefficient, (c) evaluate the impact of council mergers, and (d) determine the impact of environmental factors on the efficiency of councils. In the majority 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 which do not appear to offer scale economies. In both of these strands multiple linear regression, Stochastic Frontier Analysis (SFA) and Data Envelopment Analysis (DEA) are commonly utilised. Whilst multiple linear regression and SFA are econometric techniques in that the use the parametric relationship between a decision making units (DMUs) inputs and outputs, and a chosen functional form to construct an efficiency frontier, DEA is a non-parametric technique which 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, whilst Worthington (2000) has used SFA in addition to DEA to measure the cost efficiency of councils in New South Wales.

However, these techniques have limitations when compared to DEA. In the determination of municipal efficiency the latter technique, DEA, has a number of benefits which 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 which 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. (2015) who examined the proposed amalgamations of New South Wales councils in terms of returns to scale and found that merging councils which 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.

While 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

In order 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 decision-making unit (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 nine year period. By way of contrast, locally inter-temporal DEA is founded on a series of short overlapping windows of time (in the present case two 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 was exhausted. Pecuniary data was set in 2013 dollar equivalents (using the ABS (2013) CPI values). Once all the window

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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 since 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:

$$\min_{\theta,\lambda} \theta,$$

$$s.t. \quad -q_i + Q\lambda \geq 0$$

$$\theta x_i - X\lambda \geq 0$$

$$I1'\lambda = 1$$

$$\lambda \geq 0$$

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 i-th 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. Whereas 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

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(Drew et al. 2015). 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 it's ability to minimise the inputs (staff and operational expenditure) involved with providing a fixed service level.

The data employed in our analysis was sourced from the Department of Infrastructure, Local Government and Planning's (DILGP) *Local Government Comparative Reports* (DILGP 2013), the Australian Bureau of Statistics (ABS) *National Regional Profile (2003-2013)* (ABS 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 capital input data for all amalgamated and non-amalgamated councils for the period between 2003 to 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 to 2013 has been obtained from the Queensland Local Government Grant Commission'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 (a) 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), (b) a measure of total operational expenditure by the councils and (c) 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. (2015) 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 which 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 since 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

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'services to people' such as police, education and fire services. Furthermore, the use of households and businesses results in measures which 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, Drew and Dollery (2014c) consider this error to be 'relatively insignificant' in regard to its effect on the validity of the estimates obtained. Finally, a measure of the roads maintained by local councils should be included as an output, since it represents the single largest expenditure category for Australian local governments (Drew and Dollery 2014b).

Whilst 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 is 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 which 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 below). Table 1 summarises the key central tendency measures of the inputs and outputs used in the analysis.

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

[PLEASE INSERT TABLE 1 HERE]

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. {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)}. We also present a graphical depiction of the median result for the period 2004 to 2012 inclusive with notations regarding important explanatory events. The other approach to comparing amalgamated and non-amalgamated cohorts is to conduct parametric or non-parametric tests to determine whether statistically significant differences exist between the two treatment groups. This has been achieved through ANOVA[5] 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.

[PLEASE INSERT TABLE 2 HERE]

[PLEASE INSERT FIGURE 1 HERE]

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 sub-optimal

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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 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. (2015) 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.

In order 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 three 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.

[PLEASE INSERT TABLE 3 HERE]

Staff expenditure rose at just over twice the rate for amalgamated councils as it did for the non-amalgamated cohort. 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. 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

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the functions of the council including expenditure and general operating decisions (Drew and Grant 2017; Boyne 1995). 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 deconcentrated 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 measures 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 do stress again that this was but one of the benefits outlined in the Local Government Reform Commission (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, 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 for selling amalgamations.

Generally the projected savings from amalgamations are strongly predicated on reduced staff expenditure once any moratorium on redundancy has expired (see, Dollery and Drew 2016). 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) then improvements to technical efficiency must largely depend on reduced operational expenditure – however, this also appears to have largely failed to materialise.

However, it is possible that careful planning which 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 2015 for an example of this kind of analysis or Drew and Grant 2017). This would require intertemporal 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. 2015).

It has been suggested in the literature that shared services provide an efficacious alternative to amalgamation, given that economic theory predicts 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 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 which 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 in due course.

[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] As the data satisfies 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.

References

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

Bell, B., J. Drew and B. Dollery. 2016. 'Learning from Experience in New South Wales.' *Economic Papers* 35(2):99-111.

Boyne, G. 1995. 'Population Size and Economies of Scale in Local Government.' *Policy & Politics* 23(3):213–22.

Boyne, G. 1998. *Public Choice Theory and Local Government: A Comparative Analysis of the UK and USA*. Basingstoke: Macmillan Press.

Byrnes, J., L. Crase, B. Dollery and R. Villano. 2009. 'An Analysis of the Relative Efficiency of Wastewater Utilities in Non-Metropolitan New South Wales and Victoria.' *Australian and New Zealand Regional Science Association* 15(2):153-69.

Coelli, T., P. Rao, C. O'Donnell and G. Battese. 2005. *An Introduction to Efficiency and Productivity Analysis*. New York: Springer Science and Business Media Inc.

Cooper, W., Seiford, L. and K. Tone. 2007. *Data Envelopment Analysis*. Texas: Springer.

Da Cruz, N. and R. Marques. 2014. 'Revisiting the Determinants of Local Government Performance.' *Omega* 44:91-103.

De Souza, S., B. Dollery and M. Kortt. 2014. 'De-amalgamation in Action: The Queensland Experience.' *Public Management Review* 17(10):1403-24.

Department of Infrastructure, Local Government and Planning (DILGP). 2013. *Local Government Comparative Reports (2003-2013)*. Brisbane: DILGP.

24

Department of Local Government, Planning, Sport and Recreation (DLGPSR). 2007. *Stronger Councils for a Growing Queensland*. Brisbane: DLGPSR.

Dollery, B. and Drew, J. 2016. 'Hired Guns: Local Government Mergers in New South Wales and the KPMG Modelling Report'. *Australian Accounting Review*, DOI: 10.1111/auar.12163.

Drew, J. and B. Dollery. 2014a. 'Separation Anxiety: An Empirical Evaluation of the Australian Sunshine Coast Regional Council De-amalgamation.' *Public Money & Management* 34(3):213-20.

Drew, J. and B. Dollery. 2014b. 'Would Bigger Councils Yield Scale Economies in the Greater Perth Metropolitan Region? A Critique of the Metropolitan Local Government Review for Perth Local Government.' *Australian Journal of Public Administration* 73(1):128-37.

Drew, J. and B. Dollery. 2014c. 'Keeping it in-House: Households Versus Population as Alternative Proxies for Local Government Output.' *Australian Journal of Public Administration* 73(2):235-46.

Drew, J. and B. Dollery. 2015a. 'The State of Things: The Dynamic Efficiency of Australian States and Territories.' *Economic Papers* 34(3):165-76.

Drew, J., and Dollery, B. 2015b. 'Inconsistent Depreciation Practice and Public Policymaking: Local Government Reform in New South Wales.' *Australian Accounting Review, 72*(25): 28-37.

Drew, J., Grant, B. and Fisher, J. 2016. 'Re-evaluating Local Government Amalgamations: Utility Maximisation Meets the Principle of Double Effect'. Policy & Politics, In Print (21/12/15) DOI: 10.1332/030557316X14539914690045.

Drew, J., M. Kortt and B. Dollery. 2014. 'Did the Big Stick Work? An Empirical Assessment of Scale Economies and the Queensland Forced Amalgamation Program.' *Local Government Studies* 42(1):1-15.

Drew, J., M. Kortt and B. Dollery. 2015. 'No Aladdin's Cave in New South Wales? Local Government Amalgamation, Scale Economies and Data Envelopment Analysis Specification.' *Administration and Society*. In Print.

Drew, J. and Grant, B. 2017. Local Government Amalgamations. In Grant, B., and Drew, J. *Local Government in Australia: History, Theory and Public Policy* (pp.357-372). Singapore: Springer Nature Singapore Pte Ltd.

Electoral Commission Queensland (ECQ). 2013. *Election Information and Results- De-amalgamation Polls*. Brisbane: ECQ.

Fogarty, J. and A. Mugera. 2013. 'Local Government Efficiency: Evidence from Western Australia.' *Australian Economic Review* 46(3):300-11.

Grant, B. and Drew, J. 2017. *Local Government in Australia: History, Theory and Public Policy*. Springer Palgrave, Singapore.

Levitt, S., and List, J. 2011. Was there Really a Hawthorne Effect at the Hawthorne Plant? An Analysis of the Original Illumination Experiments. *American Economic Journal: Applied Economics 3*(1): 224-238.

26

Local Government Association of Queensland (LGAQ). 2005. *Size, Shape and Sustainability of Queensland Local Government*. Brisbane: LGAQ.

Local Government Reform Commission (LGRC). 2007. *Report of the Local Government Reform Commission Volume 1*. Brisbane: LGRC.

Oates, W. (1999). An essay on fiscal federalism. *Journal of Economic Literature*, XXXVII: 1120–1149.

Organisation for Economic Co-operation and Development (OECD). 2013. *OECD Council Size*, Paris: OECD.

Queensland Local Government Grants Commission (QLGGC). 2013. *Grants Commission Reports- Distribution of the Commonwealth Financial Assistance Grant in Queensland*. Brisbane: QLGGC.

Queensland Treasury Corporation (QTC). 2008. *Financial Sustainability in Queensland Local Government: Findings and Recommendations*. Brisbane: QTC.

Queensland Treasury Corporation (QTC). 2009. *Review of Local Government Amalgamation Costs Funding Submissions- Final Summary Report*. Brisbane: QTC.

Riker, William H. (1986). *The Art of Political Manipulation*. New Haven: Yale University Press.

Worthington, A. 1999. 'Performance Indicators and Efficiency Measurement in Public Libraries.' *Australian Economic Review* 32:31-42.

Worthington, A. 2000. 'Cost Efficiency in Local Government: A Comparative Analysis of Mathematical Programming and Econometric Approaches.' *Financial Accountability and Management* 16:201-24.

Worthington, A. and B. Dollery. 2000. 'Measuring Efficiency in Local Governments'
Planning and Regulatory Function.' *Public Productivity and Management Review*
23(4):469-85.

Worthington, A. and B. Dollery. 2001. 'Measuring Efficiency in Local Government: An
Analysis of New South Wales Municipalities' Domestic Waste Management
Function.' *Policy Studies Journal* 29(2):232-49.

Tables

Table 1: Inputs and Outputs for Data Envelopment Analysis of Queensland Councils 2003/13

	Definition	Mean (Standard Deviation)
Inputs		
Operational Expenditure	Total expenditure less staff costs, depreciation and borrowing costs in thousands of dollars.	57,404.17 (131,686.70)
Staff	Total staff expenditure in thousands of dollars.	44,909.89 (99,589.51)
Outputs		
Business	Number of employing businesses in the jurisdiction.	2,555.09 (6,114.39)
Households	Number of households in the jurisdiction	24,676.14 (54539.58)
Roads	Total length of roads in the jurisdiction in kilometres	2,605.82 (1,523.51)

Table 2: Summary Statistics for Queensland Councils 2004/12

Year	Mean (Standard Deviation)		Median (Interquartile Range)		ANOVA Results (Mann-Whitney)
	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)

Table 3: Compound Average Percentage Change in Outputs and Inputs for Amalgamated and Non-Amalgamated Councils 2010/12

	Households		Business		Roads		Staff Expenditure		Operational Expenditure	
Year	A	NA	A	NA	A	NA	A	NA	A	NA
2010-11	1.76	2.02	-0.40	-4.73	-0.56	3.12	3.45	0.08	31.57	33.72
2011-12	2.14	1.92	-1.01	-0.34	0.18	-2.81	4.88	4.29	20.52	20.56
2010-12	1.95	1.97	-0.72	-2.69	-0.22	-0.04	3.93	1.93	21.51	16.53

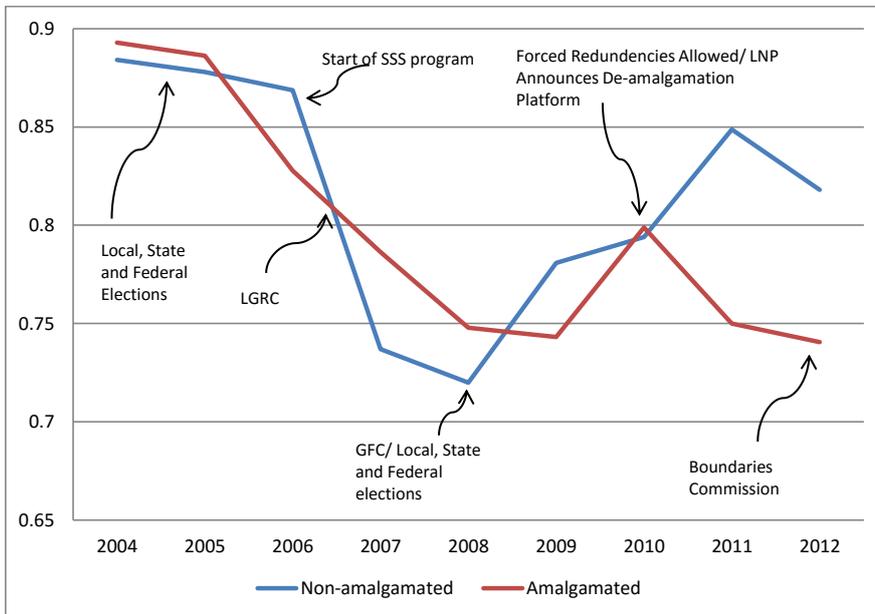*[Note: NA- Non Amalgamated Councils; A- Amalgamated]*

Figures

Figure 1: Median Efficiency of Queensland Councils 2004/12