

Working Paper Series

15-2007

September 2007

Economies of Scale and Population Size in Australian Local Government Structural Reform Programs[#]

Brian Dollery*, **Joel Byrnes*** and **Lin Crase****

**School of Economics & Centre for Local Government, UNE and **School of Business, La Trobe University*

Abstract: A common argument advanced by proponents of Australian local council amalgamation proposals is that 'bigger is cheaper' due inter alia to the existence of substantial economies of scale in local council service provision. This argument typically asserts that local councils with larger populations can provide municipal services at lower costs per unit of output than local authorities with smaller population bases, thereby conflating population size with the theoretically distinct concept of scale economies. This short note examines this argument in the light of standard economic theory. We conclude that it is fallacious to use population size as a proxy for scale economies in Australian local government.

Keywords: Amalgamation; local government; population size; scale economies.

Note: [#] Brian Dollery would like to acknowledge the financial support provided by Australian Research Council Discovery Grant DP070520.

Editor:

Professor Brian Dollery, University of New England

Editorial Advisory Board:

Joel Byrnes, University of New England

Dr Lin Crase, La Trobe University

Galia Akimova, University of New England

Dr Craig Parsons, Yokohama National University

Professor Lorenzo Robotti, Università Politecnica delle Marche

Mayor Ian Tiley, Clarence Valley Council

Professor Joe Wallis, American University of Sharjah

Note: All papers in the WP series have been refereed



Copyright © 2007 by the Centre for Local Government, UNE. All rights reserved. No part of this working paper may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, recording, or by information storage or retrieval system, without permission from the Centre.

Centre for Local Government, School of Economics, University of New England, Armidale NSW 2351. Phone: + 61 2 6773 2500, Fax: + 61 2 6773 3596. Email: bdollery@une.edu.au

Introduction

Since the mid-nineties, several Australian local government jurisdictions have embarked on ambitious local council amalgamation programs, notably Victoria, South Australia and New South Wales, with Queensland presently engaged in a radical forced merger process. A common premise that 'bigger is better' in local government has underpinned all these structural change proposals, based largely on the putative proposition that substantial scale economies existed in local council service provision (Dollery *et al.* 2008)¹, despite the paucity of empirical evidence in support of this contention (Byrnes and Dollery 2002). An even more unfortunate twist has occurred in the application of the 'bigger is cheaper' dogma to the implementation of forced amalgamation programs to actual local councils; population size has become the proxy for scale economies. Thus state Departments of Local Government have deliberately designed new constellations of merged councils on the assumption that larger populations subsumed greater economies of scale. Greater population size has thereby become synonymous with increased scale economies.

The conflation of population size with scale economies by state government policy makers is vividly illustrated in the controversial 2007 Queensland forced amalgamation program. On the 17 April 2007, the ongoing *Size, Shape and Sustainability* (SSS) local government reform process was abruptly abandoned through administrative fiat by the Queensland state government in favour of a program of forced amalgamation. Under its Local Government Reform Program, the Queensland government appointed a Local Government Reform Commission to make recommendations on compulsory local council mergers by August 2007. The official case for the rejection of the SSS process was set out in *Local Government Reform: A New Chapter for Local*

¹ Dollery and Soul (2000) have shown that the notion that substantial scale economies exist in local government economies has been used by numerous state-based inquiries into local government amalgamation dating back at least to 1960 and thus predating the Victorian, South Australian, New South Wales and Queensland episodes.

Government in Queensland (Department of Local Government, Planning, Sport and Recreation (DLGPS&R) 2007) on the basis that local councils had not proceeded speedily enough with the SSS program. The Reform Commission released its *Final Report* entitled *Report of the Local Government Reform Commission* (State of Queensland (Local Government Reform Commission) 2007) on 27 July 2007. It recommended that the number of local councils be compulsorily reduced from 157 to 73 organizations, including the Brisbane City Council. Almost all of the recommendations of the Reform Commission were passed into law in the Queensland Parliament on 10 August 2007 amidst rancorous controversy.

In its *Final Report*, the Commission deliberately recommended the amalgamation of councils with small populations into larger units with a greater mass of people in order to increase the 'size and strength' of these communities (p.8). The Commission argued the benefits of council consolidation were fourfold: Economies of scale; more efficient infrastructure delivery; more skilled staff; and improved financial governance and standards implementation. With respect to scale economies, the Commission presented neither conceptual nor theoretical evidence on either the existence of widespread scale economies in local government or the presumed relationship between population size and economies of scale. It simply assumed that amalgamated councils with larger populations would experience a significant reduction in the average costs of service provision regardless of demographic characteristics, the nature of service provision, or any other factors.

In common with its predecessors in other Australian states, the Queensland Reform Commission thus assumed a monotonic relationship between population size and the unit costs of service provision characterized by increasing returns to scale production function². According to this view, larger populations necessarily implied lower average costs and therefore could be

² Furthermore, the costs associated with diseconomies of scale were simply not acknowledged by the authors.

perfectly conflated with scale economies. This short note seeks to demonstrate that this presumption is false; population size does not automatically translate into economies of scale in local government services. Indeed, in principle, population size need bear no systematic relationship to scale economies at all.

The note itself is divided into three main parts. Section 2 provides a synoptic description of the concept of economies of scale in local government service provision as it is used in economic analysis. Section 3 considers the relationship between population size and scale economies within the institutional context of Australian local government. The note ends with some brief concluding remarks.

Economies of Scale

The nature of production carried out in organizations that create goods and services determines scale economies, size economies and scope economies (Ferguson 1969). In these organizations production normally combines various input factors, such as capital, labour, land, materials and technical knowledge, in varying proportions to a technologically defined process that produces single or multiple goods and services. In economic theory, the relationships between input factors and outputs are characterized by production functions. This technique has yielded a classification system, expressed in terms of returns to scale, for different types of relationships between inputs and outputs. In essence, returns to scale refers to how output reacts to increases or decreases in all inputs taken together. For instance, if all inputs are doubled, then returns to scale will indicate whether output will increase in the same proportion (i.e. constant returns to scale), in greater proportion (i.e. increasing returns to scale), or in smaller proportion (i.e. decreasing returns to scale). In general, economic theory holds that as the physical scale of production increases, production processes will first exhibit increasing returns to scale, followed by constant returns to scale, and finally by decreasing returns to scale. By allowing all inputs to increase, even inputs

such as physical plant and buildings, the concept of returns to scale deliberately assumes that the passage of time involved is sufficiently extensive to allow developments like these to occur. In theoretical terms, this is known as the long-run and must be distinguished from the short-run in economic jargon which allows the use of only some inputs to increase.

In principle, two countervailing influences affect the nature of returns to scale. In the first place, as production increases this allows for greater specialisation in the use of input factors thereby raising productivity, which leads in turn to increasing returns to scale. Secondly, difficulties in adequately managing ever larger production mount as production rises, which serve to decrease factor productivity and induce decreasing returns to scale. Eventually the complexities associated with scale will negate the gains from factor specialization; this inevitably results in decreasing returns to scale.

Whereas returns to scale refer to the physical relationship between factor inputs and outputs, economies of scale transform this relationship into monetary values. In other words, increasing returns to scale translates into increasing economies of scale (i.e. falling average costs), constant returns to scale into constant economies of scale (i.e. constant average costs), and decreasing returns to scale into diseconomies of scale (i.e. rising average costs). In formal terms, economies of scale occur where an increase in output reduces the unit cost of output. If cost is represented by a cost function (C) that depends on the quantity of output (Q), then scale economies is given by $C(Q_1 + Q_2, 0) < C(Q_1, 0) + C(Q_2, 0)$.

In the local government context, a useful way of depicting returns to scale is provided in Figure 1 below.

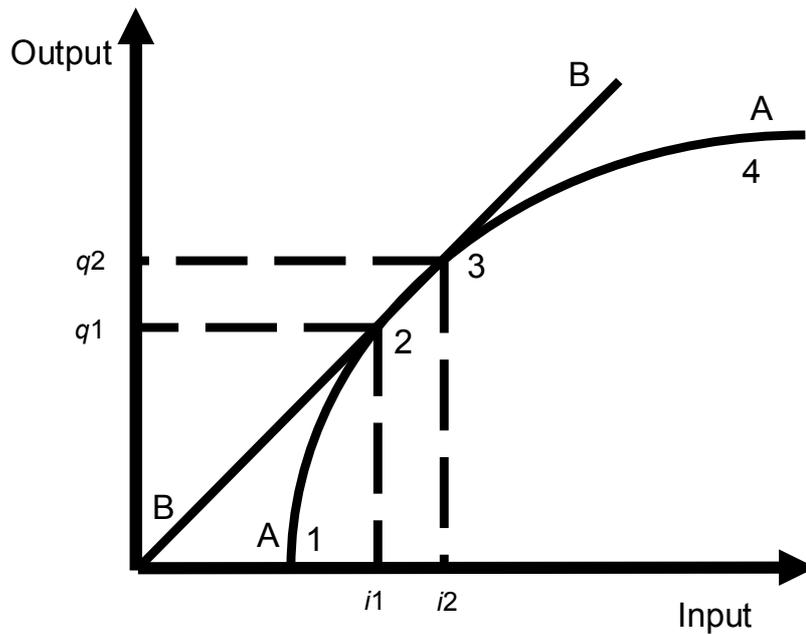


Figure 1: Returns to Scale

Figure 1 shows a variable returns to scale production function AA alongside line BB representing constant returns to scale. Segment 1-2 of AA illustrates increasing returns (or falling unit costs), segment 2-3 constant returns (constant average cost), and segment 3-4 decreasing returns (rising unit costs). It must be stressed that in a complex organisation, like a local council, providing a wide range of goods and services, each output will have its own production function akin to AA with its own unique characteristics since it will embody its own combination of physical and human input factors. This means that ranges 1-2, 2-3 and 3-4 will differ for each good and service. In other words, scale economies will not be uniform across the range of services provided by an individual Australian council.

Dollery and Fleming (2006, 274) have considered economies of scale in the Australian municipal milieu. They argued that 'if councils each produce their own services and there are substantial aggregate economies of scale, then it follows that a system of numerous small municipalities will result in higher expenditures for the same level and composition of output than a system of fewer larger councils'. But particular scale characteristics pertain to specific services. It thus follows that 'the most efficient level of production will depend

on the type of service in question', which implies that 'where local government produces a range of different services, each with its own unique production characteristics, no single size of government will be able to produce all services at the minimum possible cost for each service'. This argument echoes Andrew Sancton's (2000, 74) conclusion that 'there is no functionally optimal size for municipal governments because different municipal activities have quite different optimal areas'.

According to Dollery and Fleming (2006, 274), 'in general, labour-intensive, customer-orientated services, such as municipal rangers, health inspectors, etc., generate few scale economies because their idiosyncratic nature means that an increased volume of services requires a correspondingly larger number of employees'. In contrast, 'capital-intensive services, like sewage disposal and domestic water supply, usually yield significant economies of scale since the cost of fixed assets can be spread across a greater number of homes'. In terms of local government amalgamation policy, 'consolidation of councils into one larger council can thus reap scale economies through outcomes such as higher utilization rates of fixed assets owned by the council, greater opportunity to exploit the benefits of specialization, and discounted bulk-purchasing of inputs'. However, 'scale diseconomies can occur when enlargement of the boundary of a council makes it more difficult to manage its activities'. Moreover, 'management problems typically proliferate when amalgamation breaks the close links between small councils and their residents'.

Dollery and Fleming (2006, 275) draw two main implications from their analysis. Firstly, 'whether scale economies or scale diseconomies exist depends on the nature of the municipal service in question and it is a moot point whether aggregate economies or diseconomies characterize council service activities as a whole (especially since other factors potentially related to organizational size, like economies of scope, are simultaneously at play)'. This conclusion is reinforced when the shift in the composition of Australian local government service provision over the past two decades is taken into

account (Dollery *et al.* 2006b). Over this period, local councils in all Australian local government jurisdictions have moved from relatively capital-intensive ‘services to property’ to comparatively labour-intensive ‘services to people’. Thus, the impact of scale economies on production costs has steadily fallen. Secondly, Dollery and Fleming (2006, 275) contend that since ‘the existence and magnitude of scale economies and scale diseconomies depends on the particular municipal service under consideration’, it follows that ‘the ability of small councils to accrue scale economies by purchasing services with substantial scale economies from other service producers or to enter into “resource-sharing” arrangements with neighbouring local authorities in any event removes much of the force of the “bigger is cheaper” argument’.

Scale economies are conceptually distinct from size economies; while scale economies hold input proportions constant as output expands, economies of size permit input proportions to change as output increases (Deller *et al.* 1988). In practice, whereas this distinction often makes little real difference, it does sometimes matter. Dollery and Fleming (2006, 275) provide a useful illustrative example:

For instance, suppose several local authorities combine their administrative functions, thereby saving some of the costs incurred by individual councils producing the same core outputs but each carrying out their own administrative functions. The inputs into administrative functions are likely to be applied in proportions different from those used to provide core council services. It is likely that clerical inputs would have a smaller cost share, changing the overall proportions of input use, when councils combine their administrative functions. On the other hand, scale economies achieved through the discounted bulk-purchasing of inputs by a consolidated group of councils might entail negligible changes in cost shares among inputs.

Population Size and Scale Economies

As we have seen, the rationale for Australian local government amalgamations programs invariably rests on claims that *inter alia* 'bigger is cheaper' on grounds that substantial economies of scale exist in local government service provision. The translation of this theoretical presumption into policy practice always involves the conflation of population size with council size. Policy makers thus merge small spatially adjacent local authorities into bigger geographical entities with larger population masses in order to reap assumed scale economies in service provision.

Quite apart from the conceptual incoherence of this assumption (Dollery and Fleming 2006), and the lack of empirical support for economies of scale in Australian local government service provision (Byrnes and Dollery 2002), several additional arguments can be advanced to attack the conflation of scale economies with population size³. In the first place, the notion that population can be employed as a measure of scale carries the implicit presumption that population size and service output are very closely positively correlated. Indeed, this presumption formed the basis for the only and very influential study by Soul (2000) on the topic in Australia that has frequently been cited by advocates of amalgamation. In his doctoral thesis, Stephen Soul (2000) examined the effect of council size (as measured by population) on gross expenditure per capita. He concluded that increasing population yields a lower level of gross expenditure per capita up to a council size somewhere between 100,000 and 316,000 people, at which point 'scale diseconomies' begin.

It is easy to demonstrate that population size cannot serve as a satisfactory proxy for service output. For instance, in a local government area with a given

³ Boyne (1995) has advanced analogous arguments against the use of population size as a proxy for British local government. Given the substantial institutional differences between the Australian and British local government systems, some of his observations cannot be directly applied to the Australian case.

population, many other 'non-discretionary' factors can influence the aggregate costs of service provision, apart from the number of residents (Worthington and Dollery 2002). In the physical realm, topography, precipitation, soil type, temperature range, and so forth, will all obviously affect the costs of service provision, with population held constant. After all, in a hilly, rainy and climatically extreme local council jurisdiction, roads, sewerage systems, stormwater drains and other physical local government infrastructure will be more expensive to provide per capita than in its flat, dry and temperate counterpart with the same population. Similarly, the demographic characteristics of a given municipal population size can vary widely. The age profile of the community, especially the numbers of very young and elderly people, seasonal fluctuations in the composition of residents, particularly in areas with residential education facilities, will have pronounced effects on the 'services to people' dimension of local government output. Much the same applies to socioeconomic factors. For example, the level and distribution of income and wealth in the community will influence the degree of commercial development, the nature of housing, the need for public amenities, and the like, play a pivotal role in determining the cost of service provision (Dollery *et al.* 2007).

Secondly, assuming that population size accurately proxies service output ignores considerations of service quality. Service quality in turn has an obvious and decisive influence on the costs of service provision. Although state and territory legislatures in all Australian local government jurisdictions almost always mandate minimum uniform standards in local government service provision (Worthington and Dollery 2001), local councils can and frequently do provide services that exceed these minimum levels. Street lighting, coverage by paved sidewalks, public park size and amenity quality, sports facilities, amongst a myriad of typical municipal services, vary widely between local government areas within the same local government jurisdiction. This has major effects on the costs of service provision that are completely independent of population size. Furthermore, the cost incurred to

meet a given standard (such as potable water purity standards) may differ substantially from council to council as a result of exogenous influences.

Finally, Oates' (1972) famous decentralisation theorem demonstrated conclusively that the efficient provision of services by the public sector requires that decision-making be made by the level of government 'closest' to the people who consume these services, provided that spatial differences in tastes occur. Accordingly, the composition and quality of local services should be decided by local councils to the greatest extent possible to reflect local preferences. In political science, this is sometimes referred to as the subsidiarity principle. Worthington and Dollery (2001) have shown that Australian local government is characterised by immense diversity. It is thus not surprising that, despite the imposition of uniform standards by state governments in many areas of service provision, local councils nonetheless often modify the mix of circumstances to meet local demands from the local community. In other words, local government policy is an important determinant of local service provision.

The nature of local preferences (as expressed through local council policy) will obviously affect the structure of service provision and thereby the cost of service provision. For instance, in many crime-ridden Australian local government jurisdictions, local councils have responded to community concern by installing security cameras, bright lighting, etc., in shopping districts and other public precincts. Moreover, in this respect, the impact of local council policy will be independent of population size. This yet again demonstrates that population size cannot accurately proxy local government output.

Concluding Remarks

Australian local government policy makers have always been historically wedded to the idea that 'bigger is cheaper' in local council service provision. This assumption has led to structural reform policies aimed at the

amalgamation of small, adjacent local councils into larger local government entities in the belief that the average costs service provision would fall due *inter alia* to economies of scale contingent on bigger councils. In the implementation of these mergers initiatives, policy makers invariably conflate population size with service provision in the design of new local government areas on grounds that population size accurately proxies the magnitude of local goods and services delivered. This sequence of a factual presumption and policy formulation is clearly illustrated in the work of the Queensland Local Government Reform Commission and its *Final Report* entitled *Report of the Local Government Reform Commission* (State of Queensland (Local Government Reform Commission) 2007).

In this paper, we have argued that there are neither theoretical foundations nor empirical evidence to support the view that substantial scale economies exist in Australian local government service provision. Indeed, since different production processes are used to generate different services, there is a strong *a priori* presumption that that no uniform pattern of economies of scale will exist across the broad range of services offered.

In addition, we have argued that it is fallacious to employ population size as a measure of service output. Three broad reasons were advanced in support of this argument: Variations in the 'non-discretionary' environments of different councils; differences in service quality; and variations in content of local service provision by local councils. For these reasons, population size cannot accurately proxy either physical service output or the costs of service provision and therefore cannot correlate perfectly with the costs of service provision.

From a policy perspective, the major implication of this short note is that population size should not be employed as the basis for the amalgamation of small councils into larger single entities. At a broader level, structural reform in local government should aim at regional service provision for this municipal services marked by substantial scale economies carried out through regional

organizations of councils, alliances of geographical adjacent councils, and other similar models of council cooperation, but leave those services without economies of scale at the local level (Dollery *et al.* 2006a).

References

- Boyne, G. A. (1995). 'Population Size and Economies of Scale in Local Government', *Policy and Politics*, 23(3): 213-222.
- Byrnes, J. and Dollery, B. E. (2002). 'Do Economies of Scale Exist in Australian Local Government? A Review of the Research Evidence', *Urban Policy and Research*, 20(4): 391-414.
- Department of Local Government, Planning, Sport and Recreation (DLGPS&R) (2007). *Local Government Reform: A New Chapter for Local Government in Queensland*, DLGPS&R, Brisbane.
- Deller, S. C, Chicoine, D. L. and Walzer, N. (1988). 'Economies of Size and Scope in Rural Low-volume Roads', *Review of Economics and Statistics*, 70(2): 459-465.
- Dollery, B. E., Byrnes, J. D. and Crase, L. (2007). 'Too Tough A Nut: Determining Financial Sustainability in Australian Local Government', *Australasian Journal of Regional Studies*, 13(2) (forthcoming).
- Dollery, B. E., Byrnes, J. D. and Crase, L (2008). 'A Note on Structural Reform in Australian Local Government', *Australian Journal of Political Science*, (forthcoming).
- Dollery, B. E., Crase, L. and Johnson, A. (2006a). *Australian Local Government Economics*, UNSW Press, Sydney.
- Dollery, B. E. and Fleming, E. (2006). 'A Conceptual Note on Scale Economies, Size Economies and Scope Economies in Australian Local Government', *Urban Policy and Research*, 24(2): 271-282.
- Dollery, B. E. and Soul, S. (2000). 'An Analysis of the Criteria Used by Australian Local Government Amalgamation Inquiries Between 1960 and 1992', *Regional Policy and Practice*, 9(2): 41-52.

- Dollery, B. E., Wallis, J. L. and Allan, P. (2006b). 'The Debate That Had to Happen But Never Did: The Changing Role of Australian Local Government', *Australian Journal of Political Science*, 41(4): 553-567.
- Ferguson, C. E. (1969). *The Neoclassical Theory of Production and Distribution*, Cambridge University Press, London.
- Oates, W. E. (1972). *Fiscal Federalism*, Harcourt Brace Jovanovich, New York.
- Sancton, A. (2000). *Merger Mania*, McGill-Queens University Press, Montreal.
- Soul, S. (2000). *Population Size and Economic and Political Performance of Local Government Jurisdictions*, unpublished Ph.D. thesis, Southern Cross University, Lismore.
- State of Queensland (Local Government Reform Commission) (2007). *Report of the Local Government Reform Commission*, State of Queensland, Brisbane.
- Worthington, A. C. and Dollery, B. E. (2001). 'Diversity in Australian Local Government: The Case Against the Imposition of National Uniform Standards', *International Review of Public Administration*, 6(1): 49-58.
- Worthington, A. C. and Dollery, B. E. (2002). 'Incorporating Contextual Information in Public Sector Efficiency Analyses: A Comparative Study of NSW Local Government', *Applied Economics*, 34(1): 453-464.