Indicative Impacts of Population Decline on the Operations of Local Government in Tasmania

by

Bruce Felmingham[**]

School of Economics
University of Tasmania
GPO Box 252-85
Hobart Tasmania 7001

Tel: (03) 6226 2312
Fax: (03) 6226 7587
Email:
Bruce.Felmingham@utas.edu.au

Natalie Jackson

School of Sociology & Social Work
University of Tasmania
GPO Box 252-17
Hobart Tasmania 7001

Tel: (03) 6226 2943
Fax: (03) 6226 2279
Email:
Natalie.Jackson@utas.edu.au

Qing Zhang

School of Economics
University of Tasmania
GPO Box 252-85
Hobart Tasmania 7001

Tel: (03) 6226 2821
Fax: (03) 6226 7587
Email:
Q.Zhang@utas.edu.au

April 2002

JEL Classification: R50 Regional Government Analysis – General
Key Words: Regional, Local, Government, Depopulation, Efficiency, Optimally

[*] The financial support of the LGAT and University of Tasmania in the form of a University Collaborative Research Grant is acknowledged by the authors. We are also indebted to the referees of this paper.

[**] Corresponding Author.

Indicative Impacts of Population Decline on the Operations of Local Government in Tasmania

ABSTRACT

The objective is to assess the effects of population ageing and decline over the period (2000-2017) on the capacity and efficiency of local government operations in Tasmania. Tasmania's population has fallen from 474,000 in 1996 to 470,000 in 2001. Further declines are projected. A demographic analysis of local government areas (LGAs) finds that some will experience comparatively large depopulation, while others will make population gains. Tasmania's LGAs will experience a 5 percent loss total income loss which will have a modest impact on Tasmania wide employment, Output, Gross State Product and Wage income. Efficient population sizes for urban (76,274 persons) and rural (18,676 persons) LGAs are derived and the analysis of LGA population changes reveals that scale efficiency losses will increase substantially, strengthening the case for a further boundary review. Further related policy issues are discussed.

1. Introduction

The purpose of this study is to determine the effects of depopulation on the capacity of Tasmanian local government to meet the demand for its services and on the efficiency of local government operations in a small, self contained region, one which is already experiencing the effects of a declining population. At the 1996 census Tasmania's population was 474,000 but had fallen to 470,000 by December 2001.

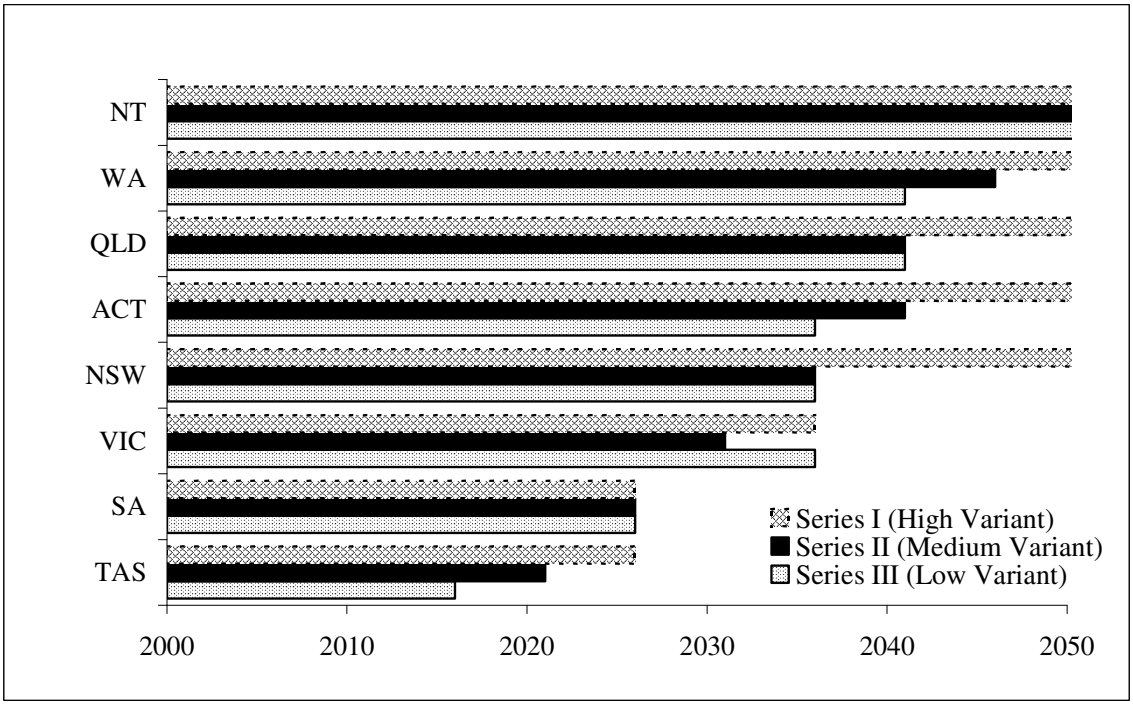
The study is motivated by the lessons which may be gleaned from Tasmania's comparatively early experience of population ageing-oriented decline for Tasmanian policy makers and for other regions of Australia. Tasmania is not alone in relation to its current population trends. The most recent United Nations survey[1] of population trends suggests that the twenty first century will not be that far advanced before what remains of current population growth slows and most of the developed world shifts from natural population increase (the difference between births and deaths) to natural decline. This is attributed to a forthcoming excess of deaths over births, the result of hyper population ageing associated with the ending of the demographic transition. Similar trends will soon be evident in all of Australia's States and Territories, although more so in some than others. The population of South Australia has recently ceased to grow, while the Tasmanian population is presently falling and is projected to fall further. However, the *immediate* cause of population decline in these two States is not the extremely low levels of fertility or birth rates that are evident in many counterpart countries, but rather, net outmigration to other Australian regions that, particularly in Tasmania, is ushering in a *premature* shift to natural decline. According to Jackson and Kippen (2001), the outmigration is concentrated in the 18 to 38 year age groups, exacerbating the effects of the moderately low and still falling fertility. If current trends continue, both SA and Tasmania will find that their respective rates of natural population increase will turn negative in the next two decades, an

[1]UN Population Division (2000), *Replacement-Migration*, UN, New York.

outcome that will not arise in most other Australian regions until nearer the middle of the century or even later.

Figure 1 shows the projected year of onset of natural decline for each State and Territory, according to the ABS' three main projection series (the high, medium and low variants, referred to below as Series I, II and III respectively[2]. Note that these trends therefore *include* migration at the levels assumed for each Series). Tasmania is projected to have begun natural decline by 2016 (according to Series I), and no later than 2026 (Series III). South Australia will follow around 2026 (all three projection series). Then, natural decline will occur in the remaining states and territories in the following sequence: Victoria, NSW, ACT, Queensland and WA. The NT will not, however, experience natural decline within the 2000-2051 period on any set of projections, while the Series III projection data indicate that this may also be the case for NSW and the ACT, Queensland, and Western Australia.

Figure 1: Natural Population Decline: Projected Year of Onset (on or before) by Australian State/Territory and ABS Projection Series



Source: Constructed from ABS (2000) Population Projections Catalogue 3222.0

[2] ABS Population Projections 1997-2051, No. 3220.0

The policy implications of the different timing of the shift to natural decline will be profound, particularly for regional Australia and its respective local government Organisations, the tier of government immediately affected by changing population characteristics. They will be especially profound because it is unlikely that 'replacement migration' will ultimately be sufficient *in any country or region* to offset natural decline (United Nations 2000). Not only are the numbers required far in excess of anything experienced by any country in the past, but in Australia there is as yet no acknowledgment of the migration-related implications of the regional temporality of natural decline (see for example Ruddock 2000). Hugo (1999) explains why an early shift to natural decline in South Australia and Tasmania will experience this outcome, *a priori,* a reflection of net migration loss and is a significant problem in itself.

Local government is the tier of government preferred for this study of population effects because population movements prove to be unevenly spread. Some local government areas (LGAs) will experience quite severe projected population losses while others gain in spite of the fact that the regional population is projected to decline. The uneven distribution of population change across LGAs has profound implications for individual Councils in Tasmania.

The structure of the remainder of this paper is as follows: the methodology and data are detailed in Section 2. The major results of the analysis are discussed in Section 3, and a summary of the issues emerging from the analysis are outlined in a concluding section, 4.

2. Methodology and Data

Four interrelated approaches constitute the methodology of this study. The first is a *Projection of the 29 Tasmanian LGA populations* for the medium term (2001 to 2017). These form the basis of the estimation of individual LGA gains and losses of *financial capacity* to meet the demand for local government services in Tasmania. These increases and decreases in

financial capacity are then translated into changes in the final demand for the output of local government services, and the *Tasmanian wide impacts* are then evaluated. Finally, the *effects on efficiency* of individual LGA population losses and gains are evaluated by assessing population losses and gains against an *optimal LGA population criterion* developed specifically for this purpose. These four steps are discussed in sequence.

2.1 Population Projections for Tasmania's LGAs (2001 to 2017)

The population projections published by the ABS[3] were not available for statistical local areas (SLAs) and LGAs when this study was conducted, so population projections for SLAs and Tasmania's 29 LGAs were commissioned by the authors from the ABS for the reference period 2001 to 2017. The assumptions underpinning these medium term projections are summarised briefly. Fertility rates are based on the average of age specific fertility rates observed in each LGA between 1991 and 1997 and change in accord with the ABS projections. Mortality assumptions are the prevailing State/Territory mortality rates. Migration is assumed to follow historical trends evident in individual LGAs and expected levels of interstate and overseas immigration. The age and sex distributions underlying the migration patterns are based on 1996 census data.

This study of demographic effects was confined to the medium term period 1999 to 2017 in preference to the usual ABS projection period, which extends to 2051. The medium term, as defined, is long enough to warrant some long term forward planning, particularly among the declining regions, but short enough to be relevant to the current generation of policy makers. The ABS projection outcome for each LGA appears later in this paper, in column (2) of Table 1, next to the estimated resident population of each LGA at the 30th June 2000. The percentage change in the population over the period 2000-2017 appears in column (3) of Table 1.

[3] See fn 2 for reference.

2.2: Financial Constraints on Local Government

Population ageing and decline will have two main effects on the *financial capacity of local government* to meet demand. The first will come through the impact on Commonwealth Government Financial Assistance Grants (FAGs) to States and Territories, so that declining population shares may mean less absolute funding from the Commonwealth[4]. To determine this financial effect, it is assumed that the Commonwealth's base grant to local government is constant in real terms over the period, and that the base grant is adjusted for Tasmania's declining share of the national population. Presently (2001), 2.50 percent of the national population reside in Tasmania, but according to the ABS, this proportion will fall to 2.02 percent by 2017. The ratio of these population shares is applied to the current Base Grant to Tasmanian local government, and provides the projected base grant allocation in 2017:

$$\text{Base Grant}^{5}_{2000-2001} \times \frac{\text{Population Share 2017}}{\text{Population Share 2001}} = \text{Projected Grant 2017}$$

$$\mathbf{\$22{,}531{,}691 \times \frac{0.0202}{0.0250} = \$18{,}205{,}606}$$

If the Commonwealth government were to maintain the current base grant funding over the medium term 2001-2017 in real terms, Tasmania's declining population share implies a fall in the real value of the base grant to Tasmanian local government of $4.33 million on the basis of current policy. The reasonableness of this argument can be debated, but the point of this analysis is to show how LGAs are affected by depopulation when policy is per capita based.

The projected Commonwealth FAGs in 2017 are distributed across all 29 Tasmanian LGAs in proportions applied by the State Grants Commission (States Grant Commission, *Annual Report 2000-01*, Table 4, p. 23 - Base Component). Our use of the current distribution assumes a

[4] This outcome is not certain, but the authors believe that the effect of maintaining current Federal policies should be emphasised in research of this type.
[5] Tasmanian State Government Grants Commission: Annual Reports – various years.

most unlikely outcome, namely that Tasmanian State Grants Commission relativities will not change over the next seventeen years. However, the value of using the current distribution is that it reveals the grant outcomes applying if nothing is done by way of policy intervention. The Base Grant loss calculated in this way appears in column (6) of Table 1.

The second cause of a demographically induced financial loss is to be found in the erosion of individual Councils rateable income bases, and the subsequent loss of rates income. As is evident from column (7) of Table 1, there will be population winners and losers among Tasmanian LGAs. For the losers and winners, the loss/gains of rates income may be calculated on a per capita basis:

Rates income per capita is the total rate revenue received by Tasmanian LGAs as a ratio of the estimated resident population of each LGA at 30th June 2000[6]. This is simply an average measure of the change in rates income per capita and does not capture the differing impacts of an industry or particular types of households withdrawing from a particular LGA. The regional social impact of industry withdrawal is a subject worthy of further analysis demanding a survey of the effects of such change. However, this is beyond the scope of the present analysis.

When rates income per capita is applied to the population change projected by the ABS, the change in rates income becomes evident. The total income loss shown on column (8) of Table 1 as the "financial effect" is the sum of the grant income loss plus the change in rates income appearing in columns (6) and (7) of Table 1 respectively.

2.3 Statewide Impacts

This income loss will restrict the capacity of local government in Tasmania to meet the demand for local services, and may lead to a loss of local government's current contribution to Tasmania's economy. To assess the statewide impact of the financial incapacity of local government, this income/expenditure capacity loss is interpreted as a reduction in the final demand for local government services, and an appropriate Input/Output (I/O) model is applied to

[6] Sourced from the States Grant Commission, *Tasmania Annual Report 2000-01*, Appendix 5 (p. 29) and Appendix 8 (p. 32).

determine Tasmanian Output, Gross State Product (GSP), Employment, and Wage income impacts, of this reduction in local government activity.

The model applied for this purpose is *EconSearch 1,* a 12 industry I/O model[7] developed within the School of Economics at the University of Tasmania, in 1990 to reflect the natural resource, rural and tourism bases of the Tasmanian economy. The 12 industries included in this model are not standard ANZIC industry classifications. The transactions table for *EconSearch 1* was fully revised in 1994-95 with funding from the Tasmanian Farmers and Graziers Association (TFGA), and has since been maintained by postgraduate students and staff of the School of Economics.

2.4 Population Scale Efficiency Effects

One of the issues associated with LGA population decline is that smaller populations may force the diminished LGAs to operate at suboptimal levels, namely at unit expenditures that are not at a minimum to achieve current service levels. The purpose here is to assess the efficiency loss associated with declining LGA populations in Tasmania. In order to proceed in this direction, some benchmark indicator of the minimum population size is required. The lack of these population benchmarks has bedevilled the policy debate about local government modernisation in the past. The population benchmark $\left(P_i^*\right)$ referred to is the minimum population size consistent with the point at which the local government per capita expenditure function enters the horizontal stretch shown on Figure 2. This is formalised in the general form of a per capita expenditure function dependent upon population size:

$$y_i = \left(\frac{E}{P}\right)_i = f\left(P_i\right) \qquad (1)$$

y_i = expenditure per capital

[7] The 12 industries included are Agriculture, Forestry, Fishing, Mining, Food and Beverage, Mineral, Timber Processors, Other Manufacturing, Construction and utilities, Public Services, Private Tertiary and Tourism.

The above expression suggests that expenditure is influenced by population size and is a general representation of the relationship between these variables. It is not a particular form of the relationship between population and expenditure per capita at a given point in time.

Figure 2: Population Benchmark

The problems involved in finding particular forms of general functions such as (1) are well known in the economics literature about production/cost and utility/demand. In particular, several interpretations (e.g. the Cobb-Douglas) are confined to narrowly restricted axiomatic bases, for example, that elasticities of factor substitution be equal to unity. These limitations are in evidence here also. To overcome these, the following flexible functional form is estimated:

$$\ln\ y_i = \alpha_0 + \alpha_1 \ln P_i + \alpha_2 \ln t + \alpha_3 \ln P_i \ln t + \varepsilon \qquad (2)$$

To provide greater flexibility, a multiplicative trend is included, and is represented by the term $\alpha_2 \ln t$ in equation (2). The reference to greater flexibility concerns the fact that an additional variable, namely, "time" appears as a generator of changes in per capita expenditure.

Population change is not a variable entirely under the control of LGAs. In fact local government is likely to have little if any influence over population trends, which are driven by a combination of demographic factors, long term economic developments and policies adopted by State and Federal Governments. This characteristic of population means that alternative techniques such as Data Envelopment Analysis (DEA) and Stochastic Frontier Methods (SFM) are inappropriate. DEA analysis, which treats population as an uncontrollable variable is used to modify raw DEA efficiency scores based on the managerial performance of decision making units. However, the raw scores are determined by factors controlled by the decision maker. The SFM technique requires some specific functional form and is less general than (2), in any case, there are too few time series observations to inferences drawn from reliable SFM.

The translog per capita expenditure function (2) is estimated over both urban and rural panels using the *Restricted Least Squares (RLS)* technique. The restriction involves setting the parameter on the population variable in (2) at $\hat{\alpha}_1 = 1$. This restriction is consistent with a specific interpretation of (2) in which the per capita expenditure elasticity with respect to population is unity. An approximation to the minimum required urban and rural populations is obtained for the first year of the time series (1994-95). In this period the variable time (t) assumes the value t = 1 and as a consequence ln (t) is zero eliminating the third and fourth terms of (2). Following this modification, the revised translog function takes a simplified form for that particular point in time:

$$\ln y_i = \hat{\alpha}_0 + \ln P_i \tag{3}$$

where e is the exponential base e = 2.7182.

This expression (3) may be transposed and expressed in levels to yield the following approximation to P_i^*:

$$P_i^* = y_i e^{-\hat{\alpha}_0} \tag{4}$$

To obtain an estimate of P_i^*, the average urban and rural LGA per capita expenditure at t = 1 (1994-95) is used to represent y_i in (4) while $e^{-\hat{\alpha}_0}$ is calculated from the restricted least squares estimate of $\hat{\alpha}_0$ in (4).

2.5 Data

The flexible functional form (2) is fitted to data drawn from the Tasmanian State Grants Commission (TSGC) annual reports for the years 1994-95, 1995-96, 1996-97, 1997-98 and 1998-99. The individual LGA populations reported in these annual reports are intercensal population estimates[8]. Per capita expenditure (y_i) is the ratio of all LGA expenditure except road

[8] State Grants Commission – Annual Report.

expenditures to estimated population in each year. Expenditures on roads are distributed under a different criteria.

The expression (2) is fitted to two data panels: the first is comprised of the six officially recognised Tasmanian local governments area cities, namely, Hobart, Launceston, Burnie, Devonport, Glenorchy and Clarence. The six cities' population and expenditures are observed in each of five years. These constitute a data panel consisting of 30 observations. This data set is labelled the *urban* panel. The second panel is comprised of the 23 rural municipalities observed in each of 5 years and taken together this *rural* data panel has 115 observations. The use of data panels obviates some of the limitations associated with small sample sizes. Further a pragmatic argument can be advanced to support this particular data disaggregation. Urban and rural communities have fundamentally distinct characteristics. Urban areas are more densely populated, are afflicted to a lesser extent by the tyranny of distance and remoteness from Council locations and the residents of urban and rural municipalities may have different levels of disposable income and of wealth. These differences are sufficient to warrant a separate study of urban and rural LGAs. In practice, the distinction between urban and rural LGAs is common. For example, the latest review of the structure of Tasmanian local government supports the preservation of this distinction in the allocation of local government FAGs.

> "… the Board favours the more direct and transparent approach to the distribution of financial assistance grants that would result from a system of local government which substantially retains councils with either a strong urban or rural focus".
>
> *Tasmanian Local Government Review*
> Final Report (1998, p.29)

The distinction between urban and rural councils is retained.

Table 1: Population Change and Financial Impacts on Local Government

3.1 Population Trends and Characteristics

The forecast total population of Tasmania's LGAs is indicated in column (2) of Table 1, and the projected percentage change in Tasmanian LGA populations from the base period (2000) is disclosed in column (3). Twenty of Tasmania's 29 LGAs will experience a population loss. Among the rural LGAs worst affected by such population movements are the mining municipalities on Tasmania's West Coast (-29.23%), and the Central Highlands (-13.90%). However, some rural communities can look forward to substantial population gains, including the Tasman municipality (+13.90%), South Midlands (+13.29%) and Sorell (+17.76%) communities.

A second interesting characteristic of these intra municipality population movements is evidence of a continuing urban population drift to neighbouring mixed urban/rural LGAs. Hobart's population is projected to fall (-9.20%), but this is partly offset by population increases in neighbouring Kingborough (+2.97%). Clarence City's population also declines by -13.97%, but this loss must be offset against the increase of neighbouring Sorell's population (+17.76%). Launceston's loss (-10.9%) will also be absorbed by increases in the West Tamar and Meander Valley population increase.

Change in the North West Tasmanian population are less well explained by urban drift. Neighbouring municipalities at the Western end of the North West Coast face declining trends. Burnie (-12.4%), Central Coast (-8.7%), Waratah/Wynyard (-9.3%), and Circular Head (-2.9%). So the North West region seems likely to lose population, although there is evidence of growth at Latrobe (+10.6%) offsetting to some extent a projected decline in the population of Devonport (-13.2%). In summary, eighteen of the twenty-nine Tasmanian LGAs face a projected population decline in the medium term, while eleven may gain population.

Although interregional population movements vary in their outcomes, the ageing process is uniform for all LGAs. This is evident on columns (4) and (5) of Table 1. Tasmanian LGAs will

experience the same ageing process evident in many Australian communities. From columns (4) and (5) of Table 1, the percentage of the population older than 50 years rises from 29.7% in 2000 to 41.1% in 2017. This represents a 38% increase in the size of the 50 plus population. The ageing of the population will affect the nature of the demand for local government services, an issue taken up in later research.

3.2 Financial Impacts and Statewide Effects

Columns (6), (7) and (8) of Table 1 outline the financial impacts of the population movements outlined above. The loss of grant income is negative for each Council, based on the logic argued in Section 2: if the Commonwealth's Grant to Australian local government remains at the same real level, then Tasmania's declining share of the national population will result in a smaller Commonwealth Grant to each Tasmanian local government.

The change in rates income is based on population movements for each LGA, so those Councils experiencing growth will also gain from an increase in rates income, which invariably offsets the loss of grant support. So in those eleven cases where a population increase occurs, the net financial outcome is positive in eight cases in column (8) of Table 1. In total, across all 29 Councils, the loss of grant income amounts to $4.328 million, while the loss of rates income is $16.621 million. The net financial loss from the demographic change is $20.948 million[9]. These losses must be met through increases in rates charged by LGAs or by revision of the Grants formulated to assist Councils affected by depopulation.

Income losses will force Councils to reduce annual expenditures by a similar amount, and in general this will produce a contraction in the final demand for local government services in Tasmania of $20.948 million annually. How will this contraction of final demand impact on Tasmanian wide employment, output, wages income, and Gross State Product (GSP)? The

[9] This change in final demand for local government services is apportioned to two industry groupings: Public Administration and Private Tertiary services.

application of the *EconSearch 1* I/O multiplier model to this $20.948 million change in the final demand for Tasmanian local government services has the impacts indicated on Table 2.

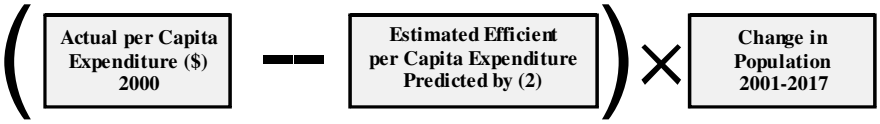
Table 2: Statewide Effects of the Change in Final Demand for Local Government Services

Table 2 indicates that population decline over the 2001-2017 period, which leads to a loss of financial capacity and a commensurate loss of final demand for local government services in Tasmanian, will reduce the value of production in Tasmania by $33.911 million per annum, while GSP falls by $25.63 million per annum. Wages income will fall by $9.53 million, and 618 jobs will be lost across all Tasmanian industries. The Statewide impacts of reduced local government activity are of small order: GSP, for example, reduces by less than 2 percent outcome which could be offset by quiet modest public sector productivity increases.

3.3 Scale Efficiency Effects

Those LGAs experiencing population losses over the medium term will be forced to operate at population sizes that do not minimise expenditure per capita. The assessment of these scale effects is based on the restricted least squares (RLS) estimate of the translog expenditure function (2). The results of these RLS estimates of (2) are shown on Table 3, which also includes estimates of the minimum optimal population required for scale efficiency $\left(P_i^*\right)$, and the total efficiency losses associated with population decline. These are calculated by taking the value of per capita expenditure projected from expression (3), using P_i^* for each Council predicted by the estimate of (2). This product will represent the scale efficient per capita expenditure. The efficiency loss per capita is then found in the efficient level of expenditure per capita, minus the current (2000) actual per capita expenditure for each LGA. This difference between actual and predicted (efficient) per capita expenditures is applied to the LGAs estimated population in 2001

and projected population in 2017 to assess the value of total scale inefficiencies in dollars for Tasmania's 6 urban and 23 rural LGAs. In summary, scale inefficiency for each Tasmanian LGA is calculated as follows:



This calculation provides the estimated loss included in rows (8) and (9) and column (6) of Table 3.

Rows (1) to (5) of Table 3 contain the results of the RLS estimates of (2) for both urban and rural samples. The restriction $\alpha_1 = 1$ is evident in row (2), while the constant in row 1 is significantly different from zero, which is not the case for $\hat{\alpha}_2$ and $\hat{\alpha}_3$ for the urban panel, while these estimates are significantly different from zero in the rural sample. These estimates explain 55 and 58 percent of the urban and rural per capita expenditure respectively.

Table 3: RLS Estimates of (2)

The minimum required populations in the urban and rural cases are 18,676 and 76,274 persons respectively. **Check that these figures are the correct way around (urban should be the bigger?)**

Tasmania's LGAs tend to have populations smaller than required for expenditure efficiency. There are only four municipalities which satisfy minimum population requirements, and so there are scale inefficiencies totalling $54.18 million (2000), rising to $64.14 million (2017) for urban Councils. Scale inefficiencies are 22 and 26 percent of total expenditures in 2000 and 2017 respectively in the rural sector of local government. Rural or non urban scale inefficiencies represent a smaller proportion of total expenditures (11 percent) in both years, however, scale inefficiencies do not increase among rural Councils in the medium term.

4. Concluding Comments

The disparate population trends in forth coming decades by Australian States and Territories was evident on Figure 1. Some regions, most notably, the Northern Territory, seem unlikely to experience natural population decline before 2051, while South Australia and Tasmania may confront it as soon as the next decade. Moreover in Tasmania, sub regional population churning will result in substantial declines in many LGAs well before the projected onset of natural decline at the regional level. These disparate trends require leadership at Federal level in relation to policy development, because individual regional interests are vested, and less likely to reach a consensus. Two aspects of current Federal policy require some review of the per capita basis on which local government FAGs are distributed. The impacts of population movements involve significant adjustment costs for local government and these are not afforded sufficient recognition in the current policy approach to local government. The Commonwealth's current distribution formula for local government FAGs is ripe for further review.

The basis for Federal/State cooperation on population strategies is evident in current financial arrangements. When bank branches, industries, and national retail chains withdraw from regional towns, the costs in terms of job, value added and rateable income losses are borne by local communities. There are some potential financial benefits accruing to the Federal and State governments, for example, capital gains tax and stamp duties on the transfer of property. These financial rewards could be earmarked and returned to the regions bearing the costs of adjusting to a smaller population.

There are several policy implications for local government in Tasmania. The first concerns the current approach to the distribution of Commonwealth FAGs to individual LGAs in Tasmania. Current distribution procedures follow national guidelines in general, but take into account specific regional disability factors. One of these is the inclusion of adjustments for

population growth/decline. The additional costs to LGAs explained by population movements are incorporated in the current disability weighting formula, provided a threshold population change (2 percent) is met. However, essentially permanent *natural* population decline occuring as the result of population ageing as opposed to essentially permanent *natural* population growth is a compelling argument for some research of the relative adjustment costs involved in distinguishing growing from declining regions *per se*. Those LGAs worst affected by significant depopulation may experience different kinds of adjustment costs compared to those applying in growing regions and the current distribution formulae may not capture the differing nature of these. A review of the population change disability adjustment may reveal a need for recalibration of the formula based on different weights for different kinds of population adjustment costs.

The ABS population projections for each Tasmanian LGA reveal a surprising number of inter LGA population movements, suggesting that some LGAs will experience quite substantial population declines. The pressure for further local government modernisation will increase throughout the forecast interval 2000 to 2017. Population declines in the officially designated cities are partially offset by population gains in adjacent non-urban municipalities. These are all expressive of an urban to suburban drift: Clarence's population decline is partly offset by Sorell's spectacular increase; Glenorchy's by Brighton's gains; Launceston by West Tamar's smaller gain; Hobart by Kingborough; Devonport by Latrobe. The much needed exploitation of scale effects in Tasmanian local government may be achieved through the cooperation of urban/neighbouring suburban municipalities or through amalgamation or an appropriate mix of these.

The size of the present urban municipalities in general is less than the population size required for scale efficiency. The cost to ratepayers is large and will increase as population declines in 20 municipalities. However, the population shortfall is not as large as previously

imagined: 76,000 and 18,000 are the respective population sizes required for the cost effectiveness of urban and rural municipalities respectively. That said, the criteria that specify urban or city status may also require review.

References

Australian Bureau of Statistics (ABS) *Population Projections 1997-2051*, No. 3220.0.

Coale, A. (1972) *The Growth and Structure of Human Populations*, Princeton, N.J: Princeton University Press.

Hugo, G. (1999) Regional Development Through Immigration? The Reality Behind the Rhetoric. *Research Paper 9*, Canberra: Commonwealth of Australia Parliamentary Library.

Jackson, N.O. and Kippen, R. (2001) Whither Tasmania? A Note on Tasmania's Population 'Problem'. *People and Place*, 9(1), pp.27-37.

Lutz, W., Sanderson, W., and Sherbov, S. (2001) The End of World Population Growth, *Nature*, 412, pp. 543-545.

McDonald, P. and Kippen, R. (2000) Strategies for Labour Supply in Sixteen Developed Countries, 2000-2005, paper presented to the 2000 Annual Meeting of the Population Association of America, Los Angeles, California, 23-25 March.

Ruddock, P. (2000) Minister's Article for the Business and Higher Education Round Table on the Theme 'Populate or Stagnate: Australia 2050, Economic and Environment Section, Department of Immigration and Multicultural Affairs, October.

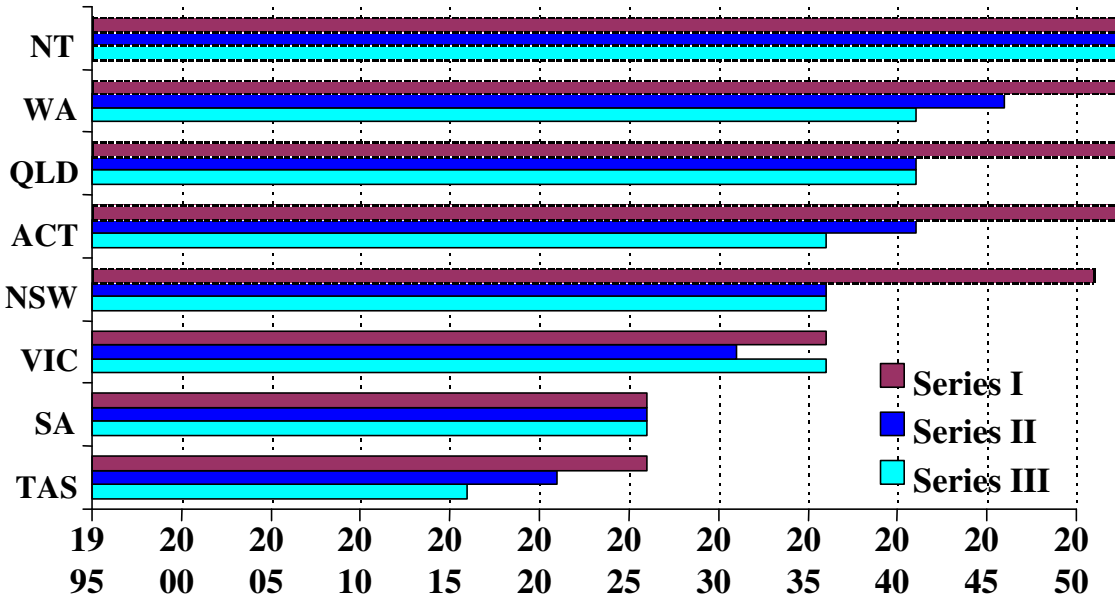
Tasmanian Local Government Review (1999) *Final Report* (Jan), Tasmanian Government Printer: Hobart, ps 146.

Tasmanian State Grants Commission *Annual Reports.* 1994/95, 1995/96, 1996/97, 1997/98, 1998/99, 1999/2000 and 2000/2001.

UN Population Division (2000) *Replacement Migration*, New York.

Worthington, A.C. and Dollery, B.E. (2000) Productive Efficiency and the Australian Local Government Grants Process: An Empirical Analysis of NSW Local Government. *Australian Journal of Regional Studies*, 6(1), pp. 96-121.

Figure 1: Year of Onset of Natural Decline by State and Projection Series (onset occurring within previous 5-year period)



Source: Jackson and Kippen 2001

Figure 2: Population Benchmark

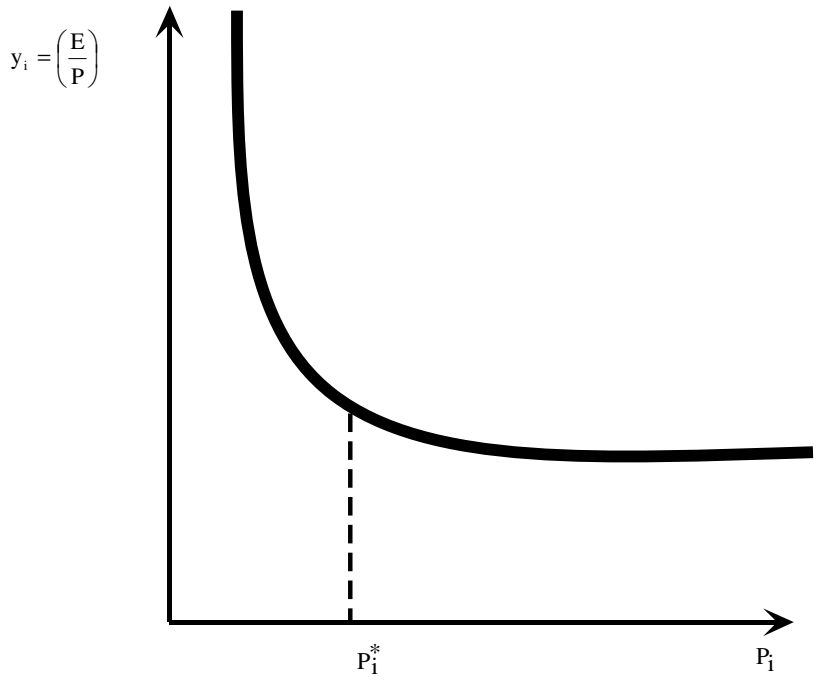


Table 1: Population Change and Financial Impacts on Local Government

LGA	Population 2000	Population 2017	% Change (2000 2017)	% of Pop > 50 (2000) No	% Pop > 50 (2017) No	Grant Income Loss 2000	Rate Change	Financial Effect
	1	2	3	4	5	6	7	8
Break O'Day	5805	6263	7.89	35.75	43.17	-132177	220336	88160
Brighton	12974	13818	6.51	17.57	28.63	-125993	270896	144903
Burnie	19496	17085	-12.37	29.04	39.25	-207716	-1423903	-1631619
Central Coast	20992	19157	-8.74	31.51	44.62	-234082	-768926	-1003008
Central Highlands	2461	2119	-13.90	31.08	40.44	-114054	-155591	-269645
Circular Head	8515	8265	-2.94	24.46	32.6	-161183	-124911	-286094
Clarence	48756	41945	-13.97	31.91	47.43	-250493	-3182455	-3432948
Derwent Valley	9794	9084	-7.25	27.89	40.92	-102162	-315115	-417277
Devonport	24508	21269	-13.22	31.83	44.54	-161383	-2012482	-2173866
Dorset	7415	7297	-1.60	31.71	43.03	-154854	-40845	-195698
Flinders	913	877	-3.94	33.41	36.83	-68151	-15766	-83917
Geroge Town	6773	6132	-9.46	26.28	37.59	-96709	-335593	-432302
Glamorgan/Spring Bay	4197	4352	-3.70	37.6	45.77	-67805	87828	20023
Glenorchy	43885	39493	-10.00	31.98	43.34	-164291	-2361228	-2525519
Hobart	46063	41827	-9.20	29.04	37.48	-129731	-3259075	-3388806
Huon Valley	13515	12997	-3.83	29.52	44.02	-180616	-220362	-400978
Kentish	5474	5737	4.80	28.85	41.61	-116649	60416	-56234
King Island	1791	1666	-7.00	30.76	38.78	-67472	-68459	-135931
Kingborough	28386	29229	2.97	28.09	42.24	-195936	378888	182952
Latrobe	8101	8960	10.60	31.87	41.25	-69325	425791	356466
Launceston	62610	55787	-10.90	30.34	41.7	-282247	-4211201	-4493448
Meander Valley	17422	18519	6.30	27.8	38.26	-194231	381731	187499
North Midlands	11805	11962	1.33	29.08	37.43	-207885	61973	-145913
Sorell	11056	13020	17.76	25.09	34.51	-103854	777773	673919
South Midlands	5659	6411	13.29	28.29	35.58	-131045	265119	134074
Tasman	2273	2589	13.90	35.37	39.75	-45314	106895	61580
Waratah/Wynyard	13879	12594	-9.26	29.3	41.59	-193068	-557645	-750713
West Coast	5748	4068	-29.23	22.15	29.87	-166415	-712362	-878777
West Tamar	19990	20433	2.22	31.74	43.75	-202679	108251	-94429
Total	***470256***	***442955***	***-5.81***	***29.73***	***41.07***	***-4327520***	***-16620024***	***-20947544***

Table 2: Statewide Effects of the Change in Final Demand for Local Government Services

Tasmanian Output	
♦ $ million	-33.911
Tasmanian GSP	
♦ $ million	-25.628
Tasmanian Wages Income	
♦ $ million	-9.528
Employment	
♦ No. of FTE Jobs	-618

Table 3: RLS Estimates of (2)

Coefficient		Urban		Rural	
		Estimate	**t-ratio**	**Estimate**	**t-ratio**
1	α_0	-4.68*	-12.54	-2.76*	-15.86
2	α_1	1	n.a.	1	n.a.
3	α_2	0.387	0.12	3.26*	8.18
4	α_3	0.11	0.97	0.68*	4.73
5	$\overline{R}^2$	0.55		0.58	
Optimal Populations 30 June 1995					
6	Urban	76,274*			
7	Rural	18, 676			

Efficiency Loss						
Sample		**2000**		**2017**		**2000-2017**
		$ million	**% Exp.**	**$ million**	**% Exp.**	**$ million**
8	Urban	54.18	22	64.14	26	9.96
9	Rural	20.43	11	20.38	11	-0.05

[1] α_1 restricted to the value $\hat{\alpha}_1 = 1$.

* Refers to significant at 5% level.