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PLANNING URBAN GREEN SPACE: A COMPARISON OF EUROPEAN AND DUTCH CITIES

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ABSTRACT: This paper addresses the relevance of urban environmental quality of life. It aims to compare Dutch cities with European cities in terms of the present state and availability of urban green spaces. A comparative tool based on the so-called *spider model* is proposed. The results of these spider models show interesting links and patterns both between and in Dutch and European cities. The spider models also show that small cities in both Europe and the Netherlands have better conditions in terms of urban green and non built-up area. A high population density goes together with a low availability of total recreational and urban green areas. While Big-European and Big-Dutch cities have a relatively higher population density and lower total recreational and urban green areas, Small-European and Small-Dutch cities have higher total recreational and urban green areas and a lower population density. This comparative framework shows that a sufficient availability of urban green spaces is more problematic for big cities.

1. INTRODUCTION

Urban green spaces play an important role in improving the quality of life and sustainability of towns and cities. With the increasing interest in greening cities, societies have become more concerned with the built environment and with shaping nature in urban areas. Actually, several interesting national (DTLR, 2001; Scottish Executive, 2001) and international (URGE[2], 2002) projects on urban green spaces are being conducted by universities, research centers and national and local planning agencies. These projects are focussing on informative databases about the quantity and the quality of urban green spaces on the one

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[2] URGE is an EU project on 'Development of Urban Green Spaces to Improve the Quality of Life in Cities and Urban Regions' (URGE) which is funded under Key Action 4 'The City of Tomorrow and Cultural Heritage' of the Programme 'Energy, Environment and Sustainable Development' of the 5th Framework Programme of the European Union. The objective of the project is to provide a systematic research contribution to support methods and measures of green space development and management in cities. The main question of the project is how urban green spaces (both in a qualitative and a quantitative sense) can be developed from ecological, economic, social and planning perspectives, and which tools and instruments are helpful in this respect.

hand, and more integrated and new approaches for the planning, development and management of green spaces in cities on the other hand. The need for an informative database and a more integrated approach requires comparative analyses in order to better understand the similarities and differences among cities and city groups.

Several comparative case studies bring to light important characteristics of urban green spaces in different size classes of cities. A comparative factor-analytic approach to European cities in terms of urban green spaces has shown that a strong relationship exists between urban green areas-built-up and urban green areas-water (Baycan-Levent *et al*., 2002a). The results of this study indicated that the availability of 'urban green' is relatively high in metropoles and big cities, whereas the availability of 'natural green' such as forest and agricultural area is relatively high in medium-sized and small cities. Another comparison of European cities by means of a so-called spider model concluded that parallel structures in terms of built-up area and urban green spaces can be observed in big and medium-sized cities (Baycan-Levent *et al*., 2002b). Cities having higher scores on built-up areas have also higher scores on urban green spaces. Similarly, higher scores on urban green spaces also implies, higher scores on water in the same city groups. The results of this study demonstrate that there is an order from small cities to metropoles in terms of available green per inhabitant, where metropoles constitute the most disadvantaged city group. Recent comparative case studies on Dutch cities show also interesting links and patterns for different city groups such as big cities, new cities, intermediate cities and peripheral cities in the Netherlands (see van Leeuwen *et al.*, 2002; Rodenburg *et al*., 2002). A comparative factor-analytic approach shows that Big-Dutch cities have a high score in terms of urban recreational factors, whereas new cities have higher scores on the daily leisure factor, and peripheral cities tend to have high scores on the structural, longer-stay recreational areas (van Leeuwen *et al.*, 2002). Another comparison by means of spider models shows that Big-Dutch cities have the lowest scores on the availability of different types of urban green (Rodenburg *et al*., 2002). They accommodate less green spaces, especially less natural green spaces, not only as a percentage of the total land use, but also concerning its availability per inhabitant.

This study aims to compare the present state and availability of urban green spaces in several European and Dutch cities by means of the spider model. The next section will evaluate "urban green" from an interdisciplinary approach including ecological, social, economic and planning perspectives. Section 3 gives a description of the study and introduces the above mentioned "Spider Model". Section 4 compares and evaluates the present state and availability of urban green spaces in European and Dutch cities based on the application of this spider model. The final section offers some concluding remarks.

Table 1. Contributions of Green Spaces to the Urban Quality of Life.

Social Life	• Offer many opportunities for a wide range of activities • Help to foster active lifestyles • Can be a benefit to health • Contribute to social justice by creating opportunities for people of all ages to interact • Meet varying needs of different communities • Enhance cultural life by providing venues for local festivals, civic celebrations etc. • Provide safe play space for children and contribute to children's physical, mental and social development • Play an important role in the basic education of schoolchildren with regard to the environment and nature and also in the academic education and research
Economic Life	• Deliver products such as wood or fruits and compost and energy • Provide new jobs • Create an increase in the economic value of an area
Ecological System	• Moderate the impact of human activities by absorbing pollutants and releasing oxygen and contribute to the maintenance of a healthy urban environment • Improve the urban climate • Maintain the balance of the city's natural urban environment • Preserve the local natural and cultural heritage • Conserve a diversity of urban resources
Planning System	• Help to improve the accessibility and attractiveness of local facilities • Help to encourage people to travel safely by foot or bicycle • Provide a barrier to noise • Function as a visual screen

2. URBAN GREEN SPACES

Urban green spaces provide a range of benefits at both the national and the local level and offer many use opportunities to people in different ways. Urban

green spaces play a key role in improving the liveability of towns and cities. They help to define and support the identity of towns and cities, which can enhance their attractiveness for living, working, investment and tourism. Therefore, they can contribute positively to the competitiveness of cities. On the other hand, urban green spaces make many contributions to social and economic life, to the ecological and planning system and as a whole to the urban quality of life (Table 1). Many studies refer to the contributions of urban green spaces from several perspectives including social, economic, ecological or planning dimensions (Jacobs, 1961; Hueting, 1970; Hough, 1984; Dole, 1989; De Groot, 1994; Stanners and Bourdeau, 1995; Hart, 1997; Priemus, 1999; Scottish Executive, 2001; DTLR, 2001).

Despite the benefits and contributions to the urban quality of life the potential of urban green spaces is not always realized, as current management practices are sometimes sub-optimal. Therefore it is of strategic importance to create an analytical and taxonomic framework for mapping out the importance of green space in cities.

Several functions of urban green spaces such as utilization, production, employment, education, regulation, and preservation form the basis for the determination of the dimensions, criteria and indicators that are relevant for the assessment of urban green spaces. A functional taxonomy from an economic perspective was recently developed by Rodenburg *et al*. (2001) to evaluate existing urban green structures. This economic framework provides an opportunity to investigate the complex relationships of the multidimensional structure of urban green spaces. It also provides a useful framework for social, ecological and planning perspectives, policies and management issues. On the other hand, an "interdisciplinary catalogue of criteria" including social, economic, ecological and planning criteria and indicators at a city and site level has recently been developed by the URGE project (URGE, 2002). All research and policy efforts for understanding and developing tools and instruments which will be helpful in improving the green spaces in cities and urban regions will provide a systematic research contribution to support methods and measures of green space development and management. However, these methods and measures including operational criteria and indicators should not be seen as a "prescription" or "blueprint". It is obvious that each city has different conditions and characteristics, while the needs or demands for urban green may differ between cities. Therefore, each city may deploy this interdisciplinary framework for city-specific needs. More comparative case study investigations and experiences of different cities in terms of planning and management of urban green spaces will be very helpful to better understand the relevance of the methods and measures adopted. These experiences will be also helpful in developing relevant policies at both the national and the local level.

3. URBAN GREEN SPACES: A COMPARISON OF EUROPEAN AND DUTCH CITIES

In this paper we aim to compare the present state and availability of urban green spaces in several Dutch and European cities. 10 European cities and 24

Dutch cities, in total 34 cities, constitute our sample. The size of this sample depends on the available data from institutions and cities. For Dutch cities we used data from Statistics Netherlands, while for European cities we deployed data from extensive survey questionnaires that were filled out by the cities (or city representatives). The Dutch Statistical Bureau provides both socio-economic and land use data which facilitates the creation of a data set for Dutch cities. The Dutch Statistical Bureau gathered the land use data with the help of aerial photos and city maps and the different categories of land use were defined in the same way for each city. However, due to the difficulties in gathering officially available land use data for European cities, we deployed data from extensive survey questionnaires that were filled out by the cities. Therefore, the data set for European cities is limited by the willingness to participate of the European cities in this research. In other words, this sample is not based on a method of selection of the cities; on the contrary, it contains all volunteering participant cities. Although the number of cities is limited, particularly for Small-European cities, the results of our comparative analysis show interesting links and patterns. For the data set concerning socio-economic and land use data for European and Dutch cities, we applied spider models to illustrate and visualize the contrasts and commonalities in different categories of cities.

3.1 A Comparative Framework for Urban Green Spaces: The Spider Model

The spider approach is a proper visualisation tool for qualitative or quantitative case study comparison (see Rienstra, 1998). Spider models can be used to visualise the relative strengths and weaknesses of the selected case studies or different scenarios for various relevant factors or attributes. Each factor is represented by an axis starting from the interior towards the outer boundary of the spider, in which the lowest scores are to be found in the centre of the spider.

The score of each factor is based on numerical or soft data, standardised on a ten-point scale, in which the centre of the web represents a score of zero, whereas the outer edges represent the highest score (10). All factors are scored on this range under the assumption that a higher score represents a better performance. It is noteworthy that there is no mutual weighing between the factors. A score of 7 on one factor does not necessarily mean that it is a better score than a score of 6 on another factor. These scores may also have a rank order meaning.

The extreme points on each axis have only a meaning as reference points; they do not present cardinal information, but rather a rank order (in terms of 'more' or 'less'). This is important for scenario design or comparative analysis, since experts are more concerned with statements on which systems options and underlying forces are likely to be viable than on precise assessments of all consequences of such options. This spider model will be used as an analytical instrument for a case study comparison of urban green spaces (see Figures 1 to 6).

The envelope composed of all scores per factor forms a connecting line resulting in a surface representing the integral representation of these factors per

city type. In general, one might state that the larger the surface, the better the city type in question scores. However, it should be recognised that the size of the area formed by linking the points on all axes has no statistically significant meaning, because (i) the information on the axes has only a qualitative (and not a cardinal data) meaning and (ii) the size of the resulting area is also dependent on the order in which the axes are positioned in the spider.

The advantage of this visualisation by means of the spider model is that it is easy to show the relative score of the various city types concerning urban green spaces. The spider model can be used for visualisation of hypothetical scenarios as well. For example, if we increase the share of urban green spaces and/or if we increase also the budget for maintaining urban green spaces, then we might observe a decrease in air pollution, or some changes in other land use. It might be kept in mind however, that these changes are based on underlying background calculations; the spider model is only a means to visualise these estimated changes. It does not calculate or assess changes itself. Clearly, with the help of the spider model we can evaluate the effectiveness of the suggested policies for improving urban environmental quality conditions. However, the most important point to keep in mind is that the spider model is not real in the sense that it is interpreted by real mathematics or econometrics, but rather, a helpful tool to visualise the results of analysis.

3.2 Availability of Urban Green Spaces in European and Dutch Cities

Urban quality of life is a multidimensional phenomenon comprising economic, social, demographic, ecological and technological dimensions. The socio-economic dimensions of urban green space may serve as either signposts for policy-making or as quantified tools for comparative analysis. As an analytical tool for our comparative analysis, we employ here the above described spider model.

For the comparison and evaluation of the present state and availability of green spaces in Dutch and European cities we divided European and Dutch cities into four groups, viz. Big-European Cities, Big-Dutch Cities, Small-European Cities and Small-Dutch Cities according to their population size and total surface (see Table 2). This gave us a multidimensional data set as European and Dutch cities, comprising various characteristics of urban environmental quality in these cities.

For the application of the spider model, we used “general socio-economic data” such as population density and average income per capita, “general land use data” such as residential, industrial and agricultural areas, and “green land use data” such as total recreation/urban green and forest. Compared to Dutch cities where more detailed data especially for green land use was available, the data for green land use for European cities were only available at a more general level. Therefore, our comparison for green land use is limited by the available data. We will now offer the results from our comparative analysis.

Table 2. Four Groups of European and Dutch Cities.

Big-European Cities	**Big-Dutch Cities**	**Small-European Cities**	**Small-Dutch Cities**
Berlin	Almere	Espoo	Alphen aan den Rijn
Istanbul	Amsterdam	Salzburg	Den Helder
Lodz	Breda	Sarajevo	Deventer
Marseilles	Den Haag	Tallinn	Ede
Vienna	Eindhoven		Emmen
Warshaw	Enschede		Shertogenbosch
	Groningen		Leiden
	Nijmegen		Maastricht
	Rotterdam		Middelburg
	Tilburg		Roermond
	Utrecht		Zaanstad
			Zoetermeer
			Zwolle

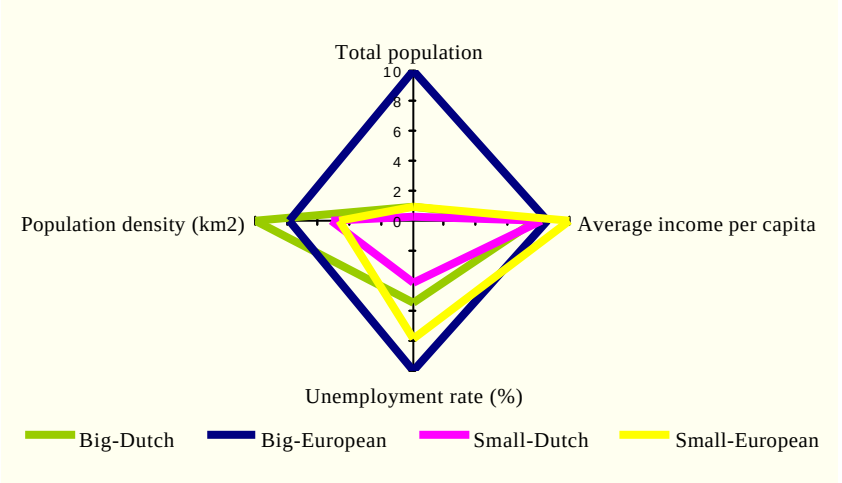

Figure 1. General Representation of the Four City Groups on the Basis of Socio-economic Indicators.

Figure 1 presents the socio-economic data for the four city groups, weighted for the city size of the population (number of inhabitants). Not surprisingly, in this figure, the Big-European cities, have the highest scores on total population and unemployment rate. Small-European and Big-Dutch cities have almost the

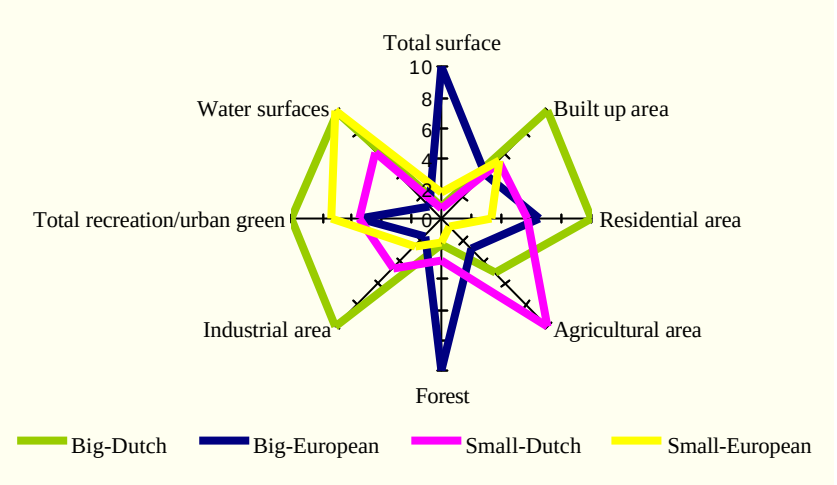

Figure 2. General Land Use Within the Four City Groups.

same scores, whereas Small-Dutch cities have the lowest scores on total population. For the unemployment rate we find a rank order respectively as Big-European cities, Small-European cities, Big-Dutch cities and Small-Dutch cities. We may thus conclude that in both big and small European cities the unemployment rate is higher than in Dutch cities. On the other hand, this rank order for the unemployment rate is inversely related to population density. Big-Dutch cities have a higher population density than the Big-European cities, whereas Small-Dutch cities have a higher population density than the Small-European cities, a phenomenon that can be explained by the smaller total surface of the Dutch cities. When we look at the average income per capita, we see that Small-European cities have the highest scores, but there is no big difference with other city groups.

Figure 2 shows the different kinds of land use that can be found within the city groups as a percentage of the total surface of the city groups. Similar to the total population in Figure 1, there is a clear rank order from Big-European cities, via Small-European and Big-Dutch cities, to Small-Dutch cities in terms of total surface. Both big and small European cities have a larger total surface than Dutch cities. On the other hand, generally Big-Dutch cities have the highest scores on many land uses such as built-up area, residential area, industrial area and total recreation and urban green. Except for the total surface, Big-European cities have the highest scores on forest use and Small-Dutch cities have the highest scores on agriculture. For water surface, Small-European cities have the highest scores, while Big-Dutch cities have the second rank order. While generally Big-Dutch cities have the highest scores on many land uses, Small-European cities have the lowest scores on land uses such as residential and agricultural uses. Both Big- and Small-Dutch cities have higher scores on agricultural and industrial uses than the European cities. For residential areas, Big-Dutch cities have higher scores than the Big-European cities, and Small-Dutch cities have higher scores than the Small-European cities. Although the big

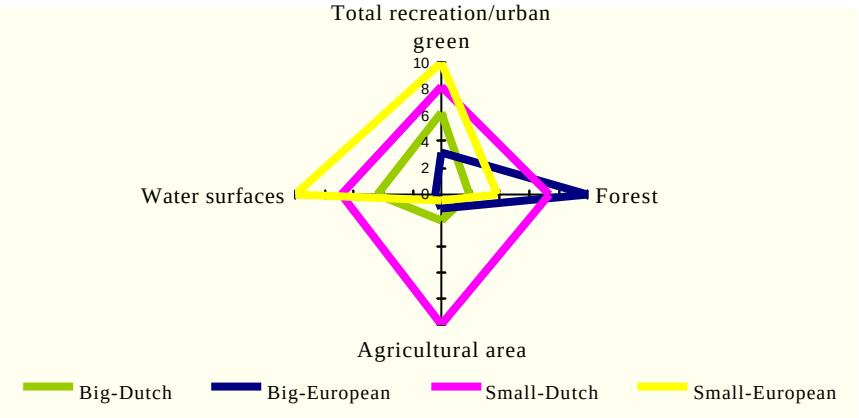

Figure 3. Green Land Use Within the Four City Groups.

European cities have the highest scores on forest, they have the lowest scores on total recreation and urban green. Therefore, it is interesting to analyze possibilities for the use of forests as a substitute for urban green.

Next, Figure 3 shows the types of green land use within the four city groups in hectares per inhabitant. Because of the lack of detailed data on green land use, we decided to show not only green land uses such as forest and total recreation/urban green, but also the other non built-up areas such as agriculture and water surfaces. Therefore, we can say that this figure presents urban green in terms of non built-up area. Although agriculture and water surfaces are not real green land uses, our approach can be seen as an evaluation of the green image of the cities. Within the four city groups, Small-Dutch cities show regularities in the pattern for all non built-up areas. Small-Dutch cities have the highest scores on agriculture, for the other uses they have the second highest scores. Small-European cities have the highest scores on both total recreation/urban green and water surfaces, they have the lowest score on agricultural areas. Big-European cities have the highest score on forest, but they have the lowest scores on both total recreation/urban green and water surfaces. For agricultural areas also, they have lower scores. On the other hand, Big-Dutch cities have higher scores than Big-European cities on all the uses, except forest. Both big and small Dutch cities have higher scores than the European big and small cities on agriculture. It is clear that both small cities in Europe and the Netherlands have better conditions in terms of non built-up areas and green land uses. The conditions in terms of the usable public urban green space available to the inhabitants appear to be more problematic for the big cities.

After having analyzed the socio-economic and the environmental economic city dimension separately, it is interesting to see what the spider models will show when we combine those two economic dimensions of urban green. Figure 4 shows the combination of socio-economic indicators and the *general* land use indicators of the environmental dimension. Both Big-European and Big-Dutch

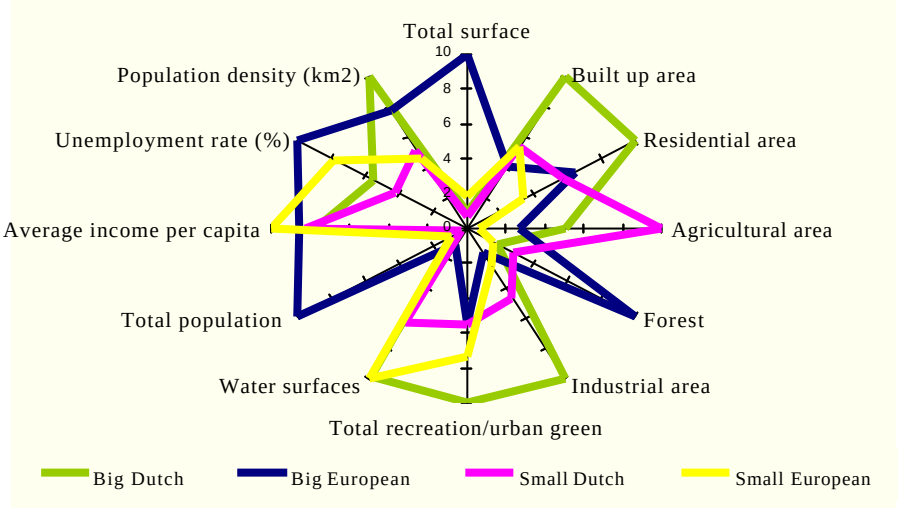

Figure 4. Socio-economic Dimension Versus Environmental Dimension (General Land Use).

cities share the highest scores on many factors, which does not necessarily mean that they have the best scores. While Big-European cities have the highest scores on total surface, unemployment rate, total population and forest, Big-Dutch cities have the highest scores on population density, built-up area, residential area, industrial area and total recreation/urban green. The high scores of Big-Dutch cities especially on man-made areas can be explained by their small total surfaces and high population densities. Although Big-Dutch cities and both Small-European and Small-Dutch cities have higher scores on built-up area, they also have higher scores on total recreation and urban green than Big-European cities. For the factors such as agriculture and water surfaces, Small-Dutch and Small-European cities respectively have high scores. It can be said that small cities have better conditions in terms of urban green and non built-up area. However, Big-Dutch cities have high scores on total recreation and urban green as a share of the total area. This does not hold for the score of urban green per inhabitant. This spider model illustrates that the both Big-Dutch and Big-European cities have the highest scores on population density and therefore, logically, also residential areas. The Big-Dutch cities show very high values on 'man-made' areas, which means built-up area, residential area and industrial area. This is a result of the high population density and leaves less room for agricultural area and forest.

Figure 5 shows a combined analysis of socio-economic and environmental economic indicators of urban *green* land use per inhabitant within the different city groups. This spider model illustrates that a high population density goes

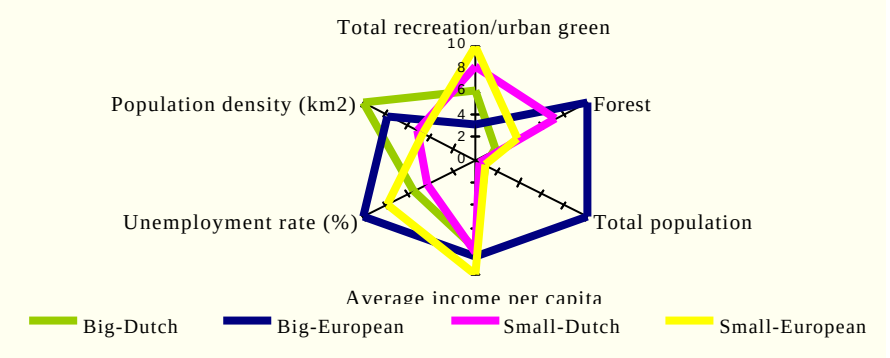

Figure 5. Socio-economic Dimension versus Environmental Dimension (Green Land Use).

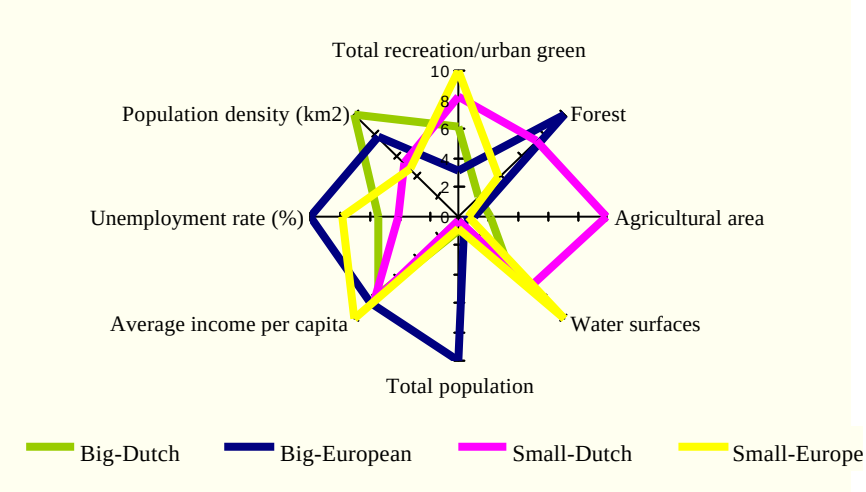

Figure 6. Socio-economic dimension versus Environmental Dimension (Green Land Use/Non Built-up Area).

together with a low availability of total recreational and urban green areas. Big-European and Big-Dutch cities have a higher population density and lower total recreational and urban green areas, whereas Small-European and Small-Dutch cities have higher total recreational and urban green areas and a lower population density.

Finally, if we undertake another combined analysis of socio-economic indicators and environmental indicators of non built-up areas in terms of green image of the cities, we see quite some similarity in patterns (see Figure 6). Small-European and Small-Dutch cities have once again higher scores on water

Table 3. Rank Order of 'Green' Land Use Within the Four City Groups.

'Green' Land Use	Big-European Cities	Big-Dutch Cities	Small-European Cities	Small-Dutch Cities
Urban green spaces	4	3	1	2
Forest	1	4	3	2
Agriculture	3	2	4	1
Water	4	3	1	2

and agriculture, respectively, than Big-European and Big-Dutch cities. Especially Big-European cities seem to be responsible for the high scores of the socio-economic indicators on the left-hand side of the spider, whereas Small-Dutch cities seem to be responsible for the high scores of non built-up areas on the right-hand side of the spider.

After these several analyses by means of spider models, when we compare all city groups together in terms of their scores on natural and urban green space per inhabitant, we can say that big cities show lower scores on the availability of urban green per inhabitant than small cities (Table 3).

Small cities in both Europe and the Netherlands show higher scores on urban green space and non built-up area. A comparison between Small-Dutch and Small-European cities shows that Small-European cities have higher scores on urban green areas, whereas Small-Dutch cities have higher scores on natural green areas such as forest and agriculture. A similar comparison between Big-European and Big-Dutch cities shows that Big-Dutch cities have higher scores on all green land uses (except forest) than Big-European cities. For Big-European cities, the most important 'green' resource seems to be forest, and therefore, the possibilities for the use of forests as a substitute for urban green gains importance. On the other hand, when we compare Dutch cities with European cities, both big and small Dutch cities have higher scores on agricultural uses than the European cities. This comparative analysis shows that Big-European cities constitute the most disadvantaged group in the four city groups in terms of their performance.

4. CONCLUDING REMARKS

Our comparative analysis by means of the spider model shows interesting results. A final conclusion from the comparison of 34 European and Dutch cities is that a high population density goes together with a low availability of urban green spaces and that a sufficient availability of urban green spaces is more problematic for big cities. This problematic situation of big cities draws our attention to the analysis and planning of urban green spaces, especially in big cities.

Generally, most development plans adopt a simple, population-based standard approach to the need for green space in every size class of cities. From a planning perspective, this standard approach may create several scarcity problems, especially in the planning of big cities. Instead of this population-based standard approach, planning authorities may develop their own local

standards for green spaces that aim at satisfying local needs. On the other hand, more integrated and new approaches to combine strategic planning for green space with innovative design and the active involvement of the community at all stages of planning processes may be developed. Planning policies might give a high priority to ensuring that new green spaces are of sustainable high quality.

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DECOMPOSITION OF EXPORTS AND GDP INTO DIRECT AND INDIRECT INDUSTRY CONTRIBUTIONS[1]

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ABSTRACT: A recent paper by McGovern (1999) documents two contrasting views on the importance of exports to Australian agriculture. One view suggests using direct exports only, which corresponded to about 22% of agricultural production in 1993-4. The opposing view suggests including indirect exports, and produces a figure of 74%. This latter figure is clearly not consistent with the national accounts data. This raises the more general issue of how to obtain estimates of direct and indirect industry contributions to GDP, of which exports are a part, which are consistent with the national accounts. This paper describes such a methodology. The decomposition provides an alternative insight into the production structure of the Australian economy which is lacking in the more traditional national accounts data.

1. INTRODUCTION

There has been ongoing controversy for some time, initiated by a paper in this journal, regarding the importance or unimportance of agricultural exports to the Australian economy. In recent papers, McGovern (1999, 2001) uses the documented value of agriculture exports to argue that exports of agricultural products, while important, are not as significant to the extent conventionally believed. The opposing view, as suggested by some organisations such as ABARE[2] (2000), is that the overwhelming bulk of agricultural product goes overseas.

On the surface, it would appear a simple exercise to verify or refute these claims; one need simply to refer to the official statistics. That is exactly what McGovern has done. On closer reading, however, it becomes apparent that there is a more subtle issue under consideration. It is not just a question about direct exports, but about determining the level of indirect exports of agricultural products through downstream producers.

The problem of estimating the proportion of production that is exported is, of course, not restricted to agriculture. Other industry groups, such as mining and manufacturing, are equally interested in export earnings and their contribution to Australia's export trade. This paper addresses the general issue of measuring the amount of any given industry's production which is destined, both directly *and* indirectly, to be exported. Clearly, the total value of goods exported, directly and

[1] The author wishes to thank Emeritus Professor Rod Jensen for encouragement and constructive comments on an earlier draft of this paper.

[2] Australian Bureau of Agricultural and Resource Economics.

indirectly, by all industries cannot exceed the total documented amount that is shipped overseas; to do so would make a mockery of the national accounts. Rather, this paper proposes a general methodology for decomposing the recorded exports of all industries to identify their constituent components and summing those ingredients to better reflect the source of primary activity of exports from each sector.

This paper uses the McGovern / ABARE debate about agricultural exports as an example to demonstrate the issues involved. It briefly outlines the two sides of the argument as seen by McGovern and ABARE, before addressing the theoretical issue of measuring the significance of exports to Australian production. The suggested methodology is applied to the 1993-4 database as used by McGovern and also the latest national input-output accounts for 1996-7. The empirics refute the claim that Australian agriculture exports two thirds or more of its output.

The methodology is then extended to calculate the direct and indirect contributions by each industry to gross domestic product (GDP) and its components. The decomposition provides an alternative insight into the production structure of the Australian economy which is lacking in the more traditional national accounts data.

2. THE "CONVENTIONAL" VERSUS "CONSISTENT" DEBATE

There appears to be two diametrically opposed positions with respect to the estimated domestic usage and export shares of the Australian agriculture sector. Table 6 of the McGovern (1999) paper lists for 1993-4, what he defines as the "*national account consistent*" shares as 77% minimum for domestic usage and 23% maximum for exports, while the "*ABARE conventional*" shares[3] are shown as 26% domestic share to 74% export share. ABARE, in a subsequent media release, revise their export claim to 60-70% of the value of agricultural production (ABARE, 2000). The ABARE method of calculation appears to be based on production volumes valued at wholesale market prices. These figures are supported by DFAT (1999) which claimed 66% of agricultural production was exported in 1997-8, calculated using the 1994-5 national input-output tables although the specific methodology used is not disclosed.

The '*consistent*' approach takes the conservative view that only the direct exports, as documented in the national accounts, should be considered. This refers to the value of industry production[4] which is exported from farms directly overseas[5]. In 1993-94, using the same definition of agriculture as used by

[3] The term "conventional" is a misnomer. While the percentage of agricultural products exported has 'conventionally' been regarded as high relative to domestic usage, the method of calculation to support these figures appears far from 'conventional'.

[4] The term 'production' in this paper is used interchangeably with the more conventional input-output terminology 'total output'.

[5] Note that the value of production in agriculture includes some basic processing. For example, the dairy cattle sector produces both dairy cattle and raw milk, and the sheep

McGovern[6], Australian agricultural production was valued at $23.537 billion with exports valued at $5.071 billion, or 21.5% of production, in basic values[7]. Exports fell to $4.898b, or 18.5% of agricultural production, in 1994-95 but increased to $7,801 billion, or 25.4%, in 1996-97. This is traditionally referred to as the *direct* value of exports, as it is the value which is exported directly from the industry in question, and is the value which appears in the exports column of the national input-output accounts. Hereafter, we will use the term *direct* exports to avoid ambiguities inherent in the term 'consistent'.

The *direct* or *'consistent'* approach is not without criticism if it is used as a measure of an industry's contribution to export trade. Direct exports for example underestimate the significance of agriculture in its contribution to export income, because that part of agricultural production sold to other sectors for further processing before export is excluded. In contrast, the so-called ABARE '*conventional*' approach takes a more global view and attempts to capture not only the direct value of exports but also the *indirect* exports from industries which use agricultural products as inputs into the production process. For example, not only are live cattle exported from the beef cattle sector (direct exports), but also cattle are slaughtered and some of the processed meat exported as fresh or frozen meat from the meat processing sector (indirect exports). The argument can be extended further down the chain of production. The fresh meat can be purchased by pie manufacturers who in turn export some of their pies, and so on. This is the approach taken by ABARE and DFAT. Conceptually, this is a reasonable argument as it provides a clearer picture of the original source of the inputs which go into the products ultimately exported.

In the following section, we derive a methodology for estimating the real contribution of each industry to gross domestic product and export production, in which both direct and indirect exports are 'national account consistent' and directly comparable with Australia's gross domestic product.

3. DIRECT AND INDIRECT INDUSTRY CONTRIBUTIONS

The exports column in the national input-output accounts documents the value of goods and services exported from each industry, and for many purposes

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sector produces prime lamb, sheep milk and wool. In the input-output tables, imported commodities which are re-exported are included as a separate item.

[6] McGovern defines agriculture to include industries 0101-0200 in the national input-output accounts classification. See Table 1.

[7] Basic prices are defined as the price of the commodity when it leaves the producer, before commodity taxes, transport and storage costs, wholesale and retail margins and other margins such as marine insurance are added. Thus, basic prices reflect the 'true' value of the commodity, without any post farm gate transport or handling costs. They are not the same as wholesale prices. Basic prices are sometimes used interchangeably with producers' prices but, strictly speaking, are not the same. Producers' prices are inclusive of commodity taxes whereas basic prices record the value at which the goods leave the producer before commodity taxes are charged.

is an adequate representation of what an industry exports. It is consistent with the strict accounting conventions of the national accounts. However, this value reflects the situation from an industry production viewpoint and does not tell us anything about the composition of inputs which make up the exports. Consider the following simple example.

A grain farmer grows grain. Grain growing is a production process. Like any other industry, it uses inputs to produce output. Inputs are either primary or non-primary (intermediate). Primary inputs are labour, capital and land. Non-primary inputs include, among other things, seed, fertilizer, irrigation, transport, electricity and fuel, in addition to services such as agricultural and other business services. These inputs are non-value adding since they are inputs from other processing sectors, but are nevertheless included in the value of grain sold. The output is sold to a number of destinations. Some is exported in raw unprocessed form, some goes to flour millers and cereal food manufacturers, and so on.

The question is, what is the 'real' contribution of the grain growing industry to the Australian export sector? In order to answer this question, we need to partition each industry's output into its constituent inputs and identify the grain component. We can then sum the grain components, after identifying the proportion of each industry's output which is exported.

Clearly, the use of grain to produce flour and breakfast cereal, some of which is exported, is contributing to Australia's exports. Similarly, the sale of flour to bread and other bakery producers, who may also export some of their products, is contributing to Australia's exports. But what component or proportion of these downstream exports constitutes grain? If we make the assumption that the proportion of an industry's production exported also applies on average to the proportion of inputs eventually exported (that is if, for example, bread is made up of 70 percent flour, and 10 percent of bread production is exported, then the value of flour exported in bread is 10 percent of 70 percent of the total value of bread produced), then we can utilise the input-output structure to calculate the total value of the grain component in the exports of all downstream commodities. The formula for calculating these downstream indirect exports is derived as follows:

The input-output accounts can be written as the set of linear equations

$$\sum_{j}^{n} x_{ij} + \sum_{j}^{m} f_{ij} = X_i \qquad \text{for } i = 1,\ldots,n \tag{1}$$

where n = number of industry sectors,
m = number of final demand users,
x_{ij} = amount sold by sector i to sector j for further processing,
f_{ij} = amount sold by sector i to final user j, and
X_i = total value of production (output) of sector i.

This equation simply states that, for each industry (sector), the total value of production (sales) is equal to the sum of all intermediate sales (for further processing) and sales to final users.

If we define a_{ij} as the proportion of sector i's output sold to sector j, then (1) becomes

$$\sum_{j}^{n} a_{ij} X_i + \sum_{j}^{m} f_{ij} = X_i \quad \text{for } i = 1,\ldots,n \tag{2a}$$

In matrix notation, this is equivalent to

$$\hat{\mathbf{X}}\mathbf{A}\mathbf{i} + \mathbf{F} = \mathbf{X} \tag{2b}$$

where $\mathbf{X}$ = n x 1 vector of sector total outputs (the caret denotes a diagonal matrix),
$\mathbf{F}$ = n x 1 vector of aggregate final demands,
$\mathbf{A} = [a_{ij}] = [x_{ij} / X_i]$, and
$\mathbf{i}$ = n element column vector of ones.

In addition, $\mathbf{e}$ is defined as the n element column vector of e_i's, where e_i is defined as the proportion of sector i's output which is exported.

Consider sector k. The direct value of exports from sector k is

$$E_k = X_k e_k \tag{3a}$$

which, in matrix terms, is the k^{th} element in the column vector

$$\Gamma_{\text{D}}^{\text{O}} = \mathbf{E} = \hat{\mathbf{X}}\mathbf{e} \tag{3b}$$

Sector k sells some of its output to other sectors as inputs for further processing. These other sectors then export some of their production. Assuming a Leontief function, that is on average the proportion of each input purchased by each industry which is eventually exported is the same as for the final product of that industry, the first round indirect exports of sector k's product through downstream firms are

$$g_{1k} = \sum_{j} x_{kj} e_j = \sum_{j} X_k a_{kj} e_j \tag{4a}$$

which is the k^{th} element of

$$\Gamma_1 = \hat{\mathbf{X}}\mathbf{A}\mathbf{e} \tag{4b}$$

Each of these sectors may in turn sell part of their output to other sectors for further processing and export. These second round indirect exports of sector k's product are

$$g_{2k} = \sum_{i} \sum_{j} X_k a_{ki} a_{ij} e_j \tag{5a}$$

or the k^{th} element of

$$\Gamma_2 = \hat{\mathbf{X}}\mathbf{A}^2\mathbf{e} \tag{5b}$$

If we continue this sequence and make use of the Neumann series, we get the total indirect exports of sector k's product through other sectors:

$$\begin{aligned}\Gamma_I^O &= \Gamma_1 + \Gamma_2 + \Gamma_3 + ... \\ &= \hat{\mathbf{X}}\mathbf{A}\mathbf{e} + \hat{\mathbf{X}}\mathbf{A}^2\mathbf{e} + \hat{\mathbf{X}}\mathbf{A}^3\mathbf{e} + ... \\ &= \hat{\mathbf{X}}(\mathbf{I} - \mathbf{A})^{-1}\mathbf{e} - \hat{\mathbf{X}}\mathbf{e} \\ &= \hat{\mathbf{X}}[(\mathbf{I} - \mathbf{A})^{-1} - \mathbf{I}]\mathbf{e}\end{aligned} \tag{6}$$

The total direct and indirect exports is therefore given by

$$\begin{aligned}\Gamma^O &= \Gamma_D^O + \Gamma_I^O \\ &= \hat{\mathbf{X}}(\mathbf{I} - \mathbf{A})^{-1}\mathbf{e}\end{aligned} \tag{7}$$

where the superscript *O* denotes an *output-based* measure and subscripts *D* and *I* refer to direct and indirect respectively.

If equation (7) looks familiar, it is because it is similar to the conventional input-output multiplier formula[8], except it is applied to the downstream flows (sales) rather than the usual upstream flows (purchases). We will refer to this equation as the *output-based* direct and indirect exports.

While this formula seems intuitively reasonable, there is, however, a problem. If we apply this procedure to all industries and sum the total direct and indirect exports, the result will exceed the actual exports in that year (209% in 1993-4 and 223% in 1996-7).

The reason is simple. The value of goods sold to other industries is multiple-counted. The price of goods on-sold at each intermediate stage of production includes the prices of all inputs used up to and including the production of that stage. For example, in the case of our bread example, the cost of grain is included twice, in the sale of grain to flour millers and in the sale of flour to bread manufacturers. Each successive round of sales in the production chain adds an additional layer of multiple-counting[9]. Clearly, to be national account consistent, we need to remove the double-counting component. This is done by counting only the value-adding component at each stage of production rather than the gross (cumulative) value of production[10].

Adjusting the indirect exports in equation (6) to exclude the multiple-counting is achieved by premultiplying by the diagonal matrix $\hat{\mathbf{v}}$, which contains elements v_i defined as the proportion of sector *i*'s output that is value-added:

$$\Gamma_I^V = \hat{\mathbf{v}}\hat{\mathbf{X}}[(\mathbf{I} - \mathbf{A})^{-1} - \mathbf{I}]\mathbf{e} \tag{8}$$

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[8] See, for example, Miller and Blair (1985).

[9] See Burns and Mules, pp.13-14 in Burns, Hatch and Mules (1986) for a simple example which demonstrates this fact.

[10] Summing industry value-added over all industries gives Gross Domestic Product, which is the accepted measure of what an economy produces.

where the superscript *V* now denotes a value-added measure. However, it is not sufficient just to correct the indirect downstream exports for multiple-counting. For the same reason that the indirect exports depicted in equation (6) are not a true measure of the value of goods exported, so too is the direct value of exports in equation (3b). The direct value of exports shown in equation (3a) and in the input-output accounts represents the gross value of all inputs, including intermediate inputs, that went into the production of the goods exported. The intermediate inputs are again double-counted at each stage of the production process.

To obtain a measure of the *real* contribution of exports to the Australian economy, we need to remove the multiple-counting of intermediate inputs which will leave the value-added component of export production. This will then be directly comparable with Australia's gross domestic product, of which exports is a part (*GDP = C + G + I + E – M*, where *C* = private final consumption, *G* = government final consumption, *I* = investment, *E* = exports and *M* = imports). This is achieved by adjusting the direct exports in a similar manner to that applied to indirect exports in equation (6), by premultiplying by $\hat{\mathbf{v}}$:

$$\Gamma_{\mathrm{D}}^{\mathrm{V}} = \hat{\mathbf{v}}\hat{\mathbf{X}}\mathbf{e} \tag{9}$$

The total real value of direct and indirect export production is therefore

$$\begin{aligned} \Gamma^{\mathrm{V}} &= \Gamma_{\mathrm{D}}^{\mathrm{V}} + \Gamma_{\mathrm{I}}^{\mathrm{V}} \\ &= \hat{\mathbf{v}}\hat{\mathbf{X}}(\mathbf{I} - \mathbf{A})^{-1}\mathbf{e} \end{aligned} \tag{10}$$

We shall refer to this value as the *value-added* based direct and indirect exports.

If this calculation is applied to all industry sectors, the total direct and indirect value of exports must equal the total documented value in order to be consistent in both an economic sense and an accounting sense. This accounting identity is verified as follows:

Summing the value-added based direct and indirect exports over all industries gives

$$\begin{aligned} \mathbf{i}'\Gamma^{\mathrm{V}} &= \mathbf{i}'\hat{\mathbf{v}}\hat{\mathbf{X}}(\mathbf{I} - \mathbf{A})^{-1}\mathbf{e} \\ &= \mathbf{i}'\hat{\mathbf{V}}(\mathbf{I} - \mathbf{A})^{-1}\mathbf{e} \\ &= \mathbf{V}'(\mathbf{I} - \mathbf{A})^{-1}\mathbf{e} \end{aligned} \tag{11}$$

where $V_j = v_j X_j$ are the primary inputs (value-added) of sector *j*. Since total output is the sum of the primary and non-primary (intermediate) inputs, we can write

$$\begin{aligned} V_j &= X_j - \sum_i x_{ij} \\ &= X_j - \sum_i a_{ij} X_i \end{aligned} \tag{12a}$$

which, in matrix notation, is

$$\begin{aligned} \mathbf{V} &= \mathbf{X} - \mathbf{A}' \mathbf{X} \\ &= (\mathbf{I} - \mathbf{A})' \mathbf{X} \end{aligned} \tag{12b}$$

Substituting into (11) gives

$$\begin{aligned} \mathbf{i}' \Gamma^{V} &= \mathbf{X}'(\mathbf{I} - \mathbf{A})(\mathbf{I} - \mathbf{A})^{-1} \mathbf{e} \\ &= \mathbf{X}'\mathbf{e} \\ &= \mathbf{i}' \Gamma_{D}^{O} \end{aligned} \tag{13}$$

which is the sum of all direct (documented) exports.

While the procedure outlined above has been described in the context of exports, there is no reason why it cannot be applied in a more general context. For example, it can be used to measure the direct and indirect contribution of each industry to household consumption, government expenditure or investment (capital expenditure), or indeed to total final demand sales. In the latter case, G^V represents each industry's direct and indirect contribution to gross domestic product, and is equivalent to the sum of primary inputs or value added by that industry. This can be demonstrated by replacing **e** in equation (10) by **f**, the proportion of sector *i*'s output which goes to final demand sales ($C + G + I + E - M$). Since total output is the sum of the intermediate sales and final demand sales F_i, we can write

$$\begin{aligned} F_i &= X_i - \sum_j x_{ij} \\ &= X_i - \sum_j a_{ij} X_i \\ &= X_i (1 - \sum_j a_{ij}) \end{aligned} \tag{14a}$$

which, in matrix notation, is

$$\mathbf{F} = \hat{\mathbf{X}}(\mathbf{I} - \mathbf{A})\mathbf{i} \tag{14b}$$

Therefore

$$\mathbf{f} = (\mathbf{I} - \mathbf{A})\mathbf{i} \tag{15}$$

Substituting **f** into (10) in place of **e** gives

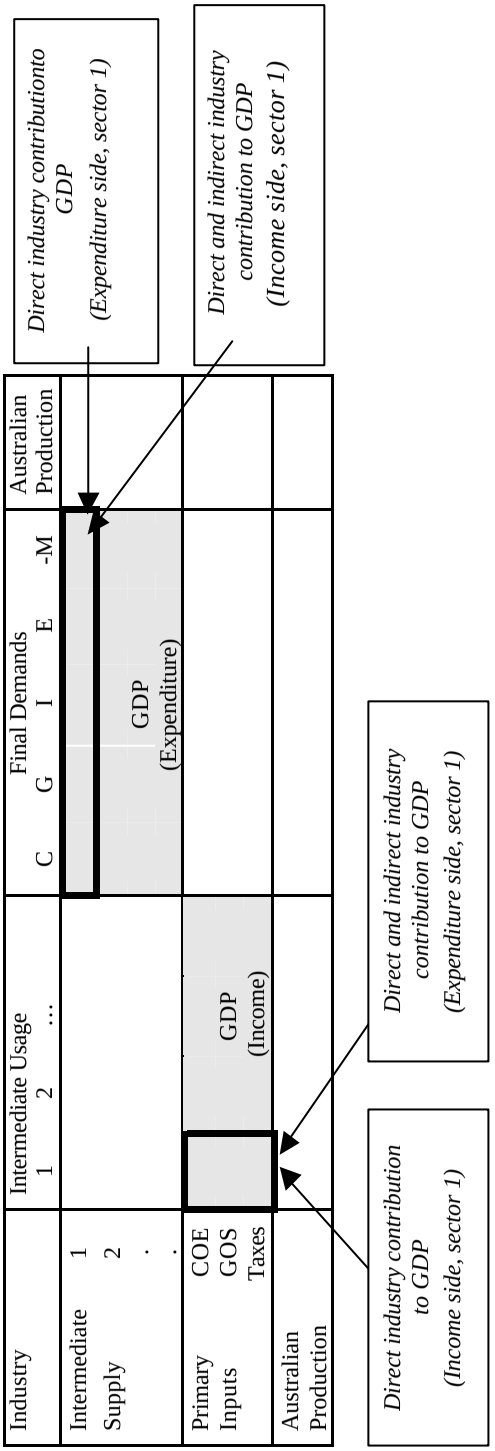

Figure 1. Direct and Indirect Industry Contributions, National Input-Output Table with Indirect Allocation of Imports.

Table 1. Direct and Indirect Exports by Selected Industries, Australia, 1993-4, Basic Prices.

Industry	Production	Value Added		Documented Exports		Output Based Direct &Indirect Exports		Value-Added Based Direct &Indirect Exports		
	$m	$m	% of Production	$m	% of Production	$m	% of Production	$m	% of Production	Multiplier[1]
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
0101 Sheep	2,810.3	1,545.3	55.0	1,639.6	58.3	2,195.2	78.1	1,207.1	43.0	1.34
0102 Grains	4,339.9	2,140.8	49.3	2,137.7	49.3	2,793.5	64.4	1,378.0	31.8	1.31
0103 Beef Cattle	4,040.6	2,227.2	55.1	111.1	2.7	1,930.4	47.8	1,064.1	26.3	17.37
0104 Dairy Cattle	2,448.0	1,085.2	44.3	-	-	726.9	29.7	322.2	13.2	-
0105 Pigs	598.2	169.1	28.3	1.2	0.2	278.7	46.6	78.8	13.2	240.06
0106 Poultry	1,117.9	428.2	38.3	2.1	0.2	397.9	35.6	152.4	13.6	189.45
0107 Other Agriculture	6,193.4	4,269.2	68.9	514.0	8.3	1,776.5	28.7	1,224.5	19.8	3.46
Total Primary 0101-0107	**21,548.3**	**11,865.0**	**55.1**	**4,405.7**	**20.4**	**10,099.0**	**46.9**	**5,427.1**	**25.2**	**2.29**
0200 Services to Agriculture	1,988.5	731.8	36.7	665.2	33.5	1,277.5	64.2	469.1	23.6	1.92
Total Primary 0101-0200	**23,536.8**	**12,595.1**	**53.5**	**5,070.9**	**21.5**	**11,376.5**	**48.3**	**5,896.1**	**25.1**	**2.25**

Table 1 (contd). Direct and Indirect Exports by Selected Industries, Australia, 1993-4, Basic Prices.

Industry	Production	Value Added		Documented Exports		Output Based Direct &Indirect Exports		Value-Added Based Direct &Indirect Exports		
	$m	$m	% of Production	$m	% of Production	$m	% of Production	$m	% of Production	Multiplier[1]
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
0300-0400 Forestry & Fishing	3,570.2	1,637.7	45.9	462.6	13.0	900.8	25.2	416.1	11.7	2.14
Total Primary 0101-0400	**27,107.0**	**14,232.8**	**52.5**	**5,533.5**	**20.4**	**12,277.3**	**45.3**	**6,312.2**	**23.3**	**2.25**
1100-1500 Mining	32,863.9	19,793.3	60.2	18,093.6	55.1	27,550.1	83.8	15,711.9	47.8	1.43
2101-2903 Manufacturing	182,830.2	62,150.5	34.0	29,506.1	16.1	59,587.4	32.6	19,377.9	10.6	2.12
3601-9601 All Other Industries	513,886.1	313,438.9	61.0	19,374.3	3.8	52,153.7	10.1	31,105.4	6.1	2.76
Total All Industries	**756,687.3**	**409,615.7**	**54.1**	**72,507.5**	**9.6**	**151,568.5**	**20.0**	**72,507.5**	**9.6**	**2.12**

1. The ratio of direct and indirect to direct value-added based exports.

Table 2. Direct and Indirect Exports by Selected Industries, Australia, 1996-7, Basic Prices.

Industry	Production	Value Added		Documented Exports		Output Based Direct & Indirect Exports		Value-Added Based Direct & Indirect Exports		
	$m	$m	% of Production	$m	% of Production	$m	% of Production	$m	% of Production	Multiplier[1]
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
0101 Sheep	3,584.5	1,950.7	54.4	1,610.8	44.9	2,554.9	71.3	1,390.4	38.8	1.59
0102 Grains	7,001.5	4,126.4	58.9	3,907.6	55.8	4,996.8	71.4	2,945.0	42.1	1.28
0103 Beef Cattle	3,067.3	1,621.9	52.9	362.9	11.8	1,308.5	42.7	691.9	22.6	3.61
0104 Dairy Cattle	3,032.0	1,209.5	39.9	-	-	967.6	31.9	386.0	12.7	-
0105 Pigs	593.2	270.2	45.6	1.1	0.2	236.3	39.8	107.7	18.2	208.59
0106 Poultry	1,378.4	620.6	45.0	2.0	0.1	417.3	30.3	187.9	13.6	205.12
0107 Other Agriculture	9,056.2	5,300.5	58.5	919.6	10.2	2,848.1	31.4	1,667.0	18.4	3.10
Total Primary 0101-0107	**27,713.1**	**15,099.9**	**54.5**	**6,804.0**	**24.6**	**13,329.5**	**48.1**	**7,375.7**	**26.6**	**1.89**
0200 Services to Agriculture	3,006.1	1,328.0	44.2	997.4	33.2	1,849.1	61.5	816.9	27.2	1.85
Total Primary 0101-0200	**30,719.2**	**16,427.9**	**53.5**	**7,801.4**	**25.4**	**15,178.7**	**49.4**	**8,192.6**	**26.7**	**1.88**

Table 2 *(contd).* Direct and Indirect Exports by Selected Industries, Australia, 1996-7, Basic Prices.

Industry	Production	Value Added		Documented Exports		Output Based Direct & Indirect Exports		Value-Added Based Direct & Indirect Exports		
	$m	$m	% of Production	$m	% of Production	$m	% of Production	$m	% of Production	Multiplier[1]
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
0300-0400 Forestry & Fishing	3,362.0	1,290.2	38.4	607.8	18.1	923.5	27.5	354.3	10.5	1.54
Total Primary 0101-0400	**34,081.2**	**17,718.1**	**52.0**	**8,409.2**	**24.7**	**16,102.2**	**47.2**	**8,547.0**	**25.1**	**1.87**
1100-1500 Mining	41,767.0	23,381.2	56.0	24,061.0	57.6	36,477.1	87.3	20,266.8	48.5	1.49
2101-2903 Manufacturing	213,558.5	67,747.0	31.7	38,218.5	17.9	80,659.1	37.8	24,480.2	11.5	2.22
3601-9601 All Other Industries	683,230.1	394,767.4	57.8	29,410.9	4.3	90,057.2	13.2	46,805.6	6.9	3.06
Total All Industries	**972,636.8**	**503,613.7**	**51.8**	**100,099.7**	**10.3**	**223,295.5**	**23.0**	**100,099.7**	**10.3**	**2.25**

1. The ratio of direct and indirect to direct value-added based exports.

$$\begin{aligned}\Gamma^{V} &= \hat{\mathbf{V}}(\mathbf{I}-\mathbf{A})^{-1}(\mathbf{I}-\mathbf{A})\mathbf{i} \\ &= \hat{\mathbf{V}}\mathbf{i} \\ &= \mathbf{V}\end{aligned} \tag{16}$$

which are the sectoral value-added inputs. In other words, each industry's payments to factors of production (labour and capital) measures not only the *direct* contribution to gross domestic product on the income side, but also the *direct and indirect* contribution to gross domestic product on the expenditure side of the accounts. Furthermore, it is quite easy to demonstrate, because of the symmetry of the input-output model, that a similar relationship occurs on the demand side. That is, each industry's sales to final demand measures not only the *direct* contribution to gross domestic product on the expenditure side, but also the *direct and indirect* contribution to gross domestic product on the income side of the accounts. This is highlighted in Figure 1.

A comparison of the direct contribution of each industry's payments to factors and sales to final demand provides a useful and often overlooked insight into how various industries contribute to the economy, not only individually but as an amalgam of interrelated industry structures. Each direct contribution also includes an indirect component, which can be positive or negative. Sectors with positive indirect expenditure contributions are those whose intermediate purchases are less than their intermediate sales for further processing and which tend to have large value-adding operations. Conversely, sectors with positive indirect income contributions are those with intermediate purchases greater than intermediate sales and produce a relatively larger proportion of goods and services for final consumption. These two types of sectors counterbalance and complement each other and can be characterized by their position in the production chain; the former tend to be positioned at the beginning or early in the production chain and the latter at its end.

4. EMPIRICAL ESTIMATES

The calculations were applied to the same data set as used by McGovern (1999), namely the 1993-4 national input-output tables (ABS, 5209.0) in basic values, at the 107 sector level. They have also been applied to the 1996-7 input-output tables which are the latest published tables. The results are provided in Tables 1 and 2.

It could be argued that services to agriculture should be treated separately from other agricultural sectors because it doesn't actually produce agricultural commodities.[11] Similarly, there are arguments for and against including forestry and fishing as part of agriculture. For this reason, in Tables 1 and 2, services to

[11] The primary activities of Services to Agriculture are: cotton ginning, shearing services, aerial agricultural services, and other services such as wool classing, land clearing, pest control, agistment services. It also includes hunting and trapping. These services were included in McGovern's "consistent" value.

Table 3. Estimated Export Rates of Agriculture by Selected Methods, Australia, 1993-4 and 1996-7.

Method	% Agriculture Output[1]	% Total Exports[2]
1993-4		
Documented Exports	21.5	100.0
Direct + Indirect Exports (output valuation)	35.9	148.8
Direct + Indirect Exports (value-added valuation)	26.5	100.0
1996-7		
Documented Exports	25.4	100.0
Direct + Indirect Exports (output valuation)	37.9	148.0
Direct + Indirect Exports (value-added valuation)	27.6	100.0

1. Agriculture includes sectors 0101 – 0200 inclusive.
2. Total estimated exports as a percentage of total actual exports.

agriculture as well as forestry and fishing are shown as separate running totals. In 1993-4, including services to agriculture but excluding forestry and fishing (McGovern's definition), the direct value of exports of agriculture products was $5.071 billion, or 21.5% of agricultural production. In 1996-7, this value increased to $7.801 billion or 25.4% of agricultural production. Excluding services to agriculture as part of total agriculture reduces these percentages by about one percent.[12]

Adding the downstream gross output-based value of indirect exports of agricultural products to direct agricultural exports gives an additional $6.306 billion or a total of $11.377 billion exported in 1993-4. This represents 48.3% of agricultural production. In 1996-7, the total output value of agricultural products directly and indirectly exported was $15.179 billion, which represents 49.4% of agricultural production. The extent of multiple-counting in this estimate can be seen by comparing the column totals of columns (4) and (6) in Tables 1 and 2, summarised in Table 3. It shows what happens if this procedure is applied consistently across all sectors and the resultant total estimated exports compared with the total actual exports. Using the output method of valuation, the total estimated direct and indirect exports over all sectors is over double (209.0% in 1993-4 and 223.1% in 1996-7) that of total actual exports.

Eliminating the multiple-counting by including only the value-added at each production stage gives total direct and indirect agriculture exports of $5.896 billion in 1993-4 and $8.193 billion in 1996-7. This represents about 25.1% and 26.7% of agricultural production in 1993-4 and 1996-7 respectively. Since this measure of exports excludes multiple-counting, it must sum to the total documented value of goods and services exported by all industries during the

[12] The calculations were performed including intra-sectoral flows. Excluding intra-sectoral flows changes these percentages by about 0.3 of a percent.

year. This can be confirmed by again comparing the column totals of columns (4) and (8) in Tables 1 and 2 and as reflected in Table 3.

Removing the multiple-counting when calculating direct and indirect exports brings it back to levels more on a par with the documented exports of each industry. Whether the direct and indirect measure is greater or less than the documented value for an industry depends not only on the amount of further processing of the products that is undertaken by downstream firms, but also on the extent of value-adding of those products. Thus, for example, mining and manufacturing both show smaller direct and indirect value-added exports than the documented value, but for different reasons. Mining has high value-adding in mining activity itself (56% of total inputs in 1996-7), but little downstream processing with a multiplier of 1.49 (column (10) in Table 2). Manufacturing, on the other hand, shows larger flow-ons to downstream processing firms with a multiplier of 2.22 but little value-adding within manufacturing firms (31.7% of total inputs in 1996-7). Ideally, of course, Australia would like industries with strong downstream multiplier effects combined with significant value-adding at each production stage.

So far, the empirical analysis has been in terms of exports. We now turn to the more general question of measuring the direct and indirect contribution of each industry to gross domestic product and its components, namely household consumption, government expenditure and investment (capital expenditure). This has been done with the 1996-7 accounts and the results presented in Tables 4 and 5 for a highly aggregated set of industry sectors. The results are also summarized in Figures 2 and 3.

Table 4 decomposes the industry final sales into five categories: private final consumption expenditure, government final consumption expenditure, gross fixed capital expenditure, increase in stocks, and net exports (exports less imports). These represent the direct industry sales which together make up the gross domestic product of $503.6 billion. The first thing to note from Table 4 is that it places the various components of GDP in perspective. Private final consumption expenditure is by far the largest category, contributing over 58.5% to GDP, with capital expenditure and government final expenditure contributing 22.5% and 19.1% respectively. Net exports contributes only 0.05%. It comes as no surprise as to which industries rank highly within each expenditure category: Finance, property and business services, trade and food processing in private consumption expenditure; community services, health and education, and government administration and defence in government consumption expenditure; construction, machinery and equipment, and finance in capital expenditure; and mining and agriculture in net exports.

Table 4. Sales to Final Demand, Australia, $m, 1996-7, Basic Prices[1].

Industry	Private Final Consumption Expenditure		Government Final Consumption Expenditure		Gross Fixed Capital Expenditure		Increase in Stocks		Net Exports		Total[2]	
Agriculture, Forestry and Fishing	4,600.3	(12)	381.0	(9)	1,026.5	(7)	387.4	(2)	7,628.1	(2)	14,023.3	(11)
Mining	458.6	(17)	56.3	(11)	2,169.8	(6)	-1,960.9	(19)	18,609.6	(1)	19,333.4	(9)
Food Processing	28,371.0	(3)	0.0	(15)	311.4	(13)	112.4	(4)	5,285.5	(5)	34,080.3	(6)
Textiles, Clothing and Footwear	7,653.4	(10)	-0.1	(19)	125.4	(16)	32.9	(7)	-3,206.1	(16)	4,605.6	(15)
Wood and Paper Products	4,436.9	(13)	87.0	(10)	518.6	(10)	-412.2	(18)	-3,410.5	(17)	1,219.8	(17)
Chemical Products	6,756.4	(11)	2,879.0	(6)	287.0	(14)	373.4	(3)	-9,332.5	(18)	963.4	(18)
Non-Metallic Mineral Products	300.8	(18)	0.0	(16)	30.1	(18)	101.2	(5)	-843.1	(13)	-411.0	(19)
Metal Products	1,094.5	(15)	0.0	(17)	971.6	(8)	-150.7	(16)	5,553.1	(4)	7,468.4	(13)
Machinery and Equipment	11,366.9	(8)	0.6	(13)	25,767.5	(2)	-198.7	(17)	-31,244.9	(19)	5,691.3	(14)
Other Manufacturing	2,708.0	(14)	0.0	(18)	3,118.5	(5)	474.1	(1)	-2,458.8	(15)	3,841.8	(16)
Electricity, Gas and Water	8,317.8	(9)	224.6	(8)	283.9	(15)	14.0	(9)	16.4	(11)	8,856.7	(12)
Construction	1.5	(19)	2,962.2	(5)	57,048.1	(1)	-5.5	(15)	81.8	(10)	60,088.2	(4)
Wholesale and Retail Trade	64,192.2	(2)	13.0	(12)	11,313.4	(3)	31.3	(8)	7,529.5	(3)	83,079.4	(2)
Accommodation, Cafes and Restaurants	17,737.0	(7)	0.3	(14)	0.0	(19)	0.0	(12)	275.2	(8)	18,012.5	(10)
Transport and Communication	18,971.7	(5)	5,095.7	(4)	796.9	(9)	8.8	(10)	4,702.2	(6)	29,575.2	(7)
Finance, Property and Business Services	77,497.3	(1)	2,657.6	(7)	8,701.6	(4)	63.3	(6)	-1,236.4	(14)	87,683.4	(1)
Government Administration and Defence	771.0	(16)	33,075.7	(2)	405.1	(11)	0.0	(13)	151.1	(9)	34,403.0	(5)
Community Services, Health & Education	20,761.1	(4)	40,899.1	(1)	121.9	(17)	0.0	(14)	2,389.6	(7)	64,171.8	(3)
Recreational and Personal Services	18,894.0	(6)	7,894.2	(3)	401.0	(12)	0.2	(11)	-262.2	(12)	26,927.3	(8)
Total Contribution to GDP	**294,890.5**		**96,226.2**		**113,398.4**		**-1,129.1**		**227.8**		**503,613.7**	
Percent	**58.55**		**19.11**		**22.52**		**-0.22**		**0.05**		**100.0**	

1. Values in brackets represent the rank.
2. Total sales to final demand is equivalent to that industry's direct and indirect income contribution to GDP.

Table 5. Direct and Indirect Expenditure Contribution to Gross Domestic Product, Australia, $m, 1996-7, Basic Prices[1].

Industry	Private Final Consumption Expenditure		Government Final Consumption Expenditure		Gross Fixed Capital Expenditure		Increase in Stocks		Net Exports		Total[2]	
Agriculture, Forestry & Fishing	9,897.4	(9)	539.2	(15)	1,193.1	(14)	259.2	(1)	5,829.2	(2)	17,718.1	(9)
Mining	7,009.3	(13)	1,104.5	(12)	4,328.6	(7)	-1,002.5	(19)	11,941.3	(1)	23,381.2	(6)
Food Processing	10,952.5	(7)	156.2	(19)	292.6	(19)	41.5	(3)	1,259.1	(6)	12,701.9	(13)
Textiles, Clothing & Footwear	4,144.7	(15)	309.2	(16)	397.7	(18)	38.6	(4)	-1,546.2	(16)	3,344.0	(17)
Wood and Paper Products	8,027.5	(12)	1,670.6	(10)	3,646.6	(8)	-197.9	(18)	-1,907.5	(17)	11,239.3	(15)
Chemical Products	8,292.6	(11)	2,472.4	(6)	3,048.5	(9)	37.4	(5)	-4,675.6	(18)	9,175.3	(16)
Non-Metallic Mineral Products	944.1	(19)	203.5	(18)	2,520.9	(10)	27.8	(6)	-534.8	(13)	3,161.3	(18)
Metal Products	5,005.1	(14)	988.4	(13)	6,244.2	(6)	-114.9	(17)	-405.1	(12)	11,717.7	(14)
Machinery & Equipment	10,739.5	(8)	2,204.0	(8)	16,060.3	(3)	-95.4	(15)	-14,966.0	(19)	13,942.4	(10)
Other Manufacturing	1,637.1	(16)	210.7	(17)	1,460.5	(12)	199.2	(2)	-1,042.5	(15)	2,464.9	(19)
Electricity, Gas & Water	9,810.2	(10)	1,338.2	(11)	2,324.5	(11)	-63.1	(14)	-130.7	(10)	13,279.1	(11)
Construction	1,017.5	(18)	1,915.7	(9)	27,487.6	(1)	-18.1	(10)	175.0	(7)	30,577.6	(5)
Wholesale and Retail Trade	44,345.3	(2)	2,436.4	(7)	10,284.5	(4)	-45.5	(12)	2,551.0	(4)	59,571.7	(2)
Accommodation, Cafes & Restaurants	11,170.0	(6)	888.5	(14)	1,253.7	(13)	-19.4	(11)	-48.0	(9)	13,244.8	(12)
Transport and Communication	28,377.0	(3)	8,098.4	(4)	8,649.8	(5)	-59.3	(13)	2,842.2	(3)	47,908.1	(4)
Finance, Property & Business Services	101,379.2	(1)	10,922.7	(3)	21,880.7	(2)	-105.2	(16)	-939.5	(14)	133,137.9	(1)
Government Administration & Defence	1,636.2	(17)	19,596.1	(2)	763.8	(16)	-6.0	(9)	133.0	(8)	22,123.1	(7)
Community Services, Health & Education	16,952.2	(4)	34,668.7	(1)	473.4	(17)	-0.9	(7)	2,047.1	(5)	54,140.6	(3)
Recreational & Personal Services	13,553.2	(5)	6,503.0	(5)	1,087.2	(15)	-4.7	(8)	-354.1	(11)	20,784.6	(8)
Total Contribution to GDP	**294,890.4**		**96,226.2**		**113,398.4**		**-1,129.1**		**227.8**		**503,613.7**	
Percent	**58.55**		**19.11**		**22.52**		**-0.22**		**0.05**		**100.0**	

1. Values in brackets represent the rank.
2. Each industry's total direct and indirect expenditure contribution is equivalent to that industry's value-added.

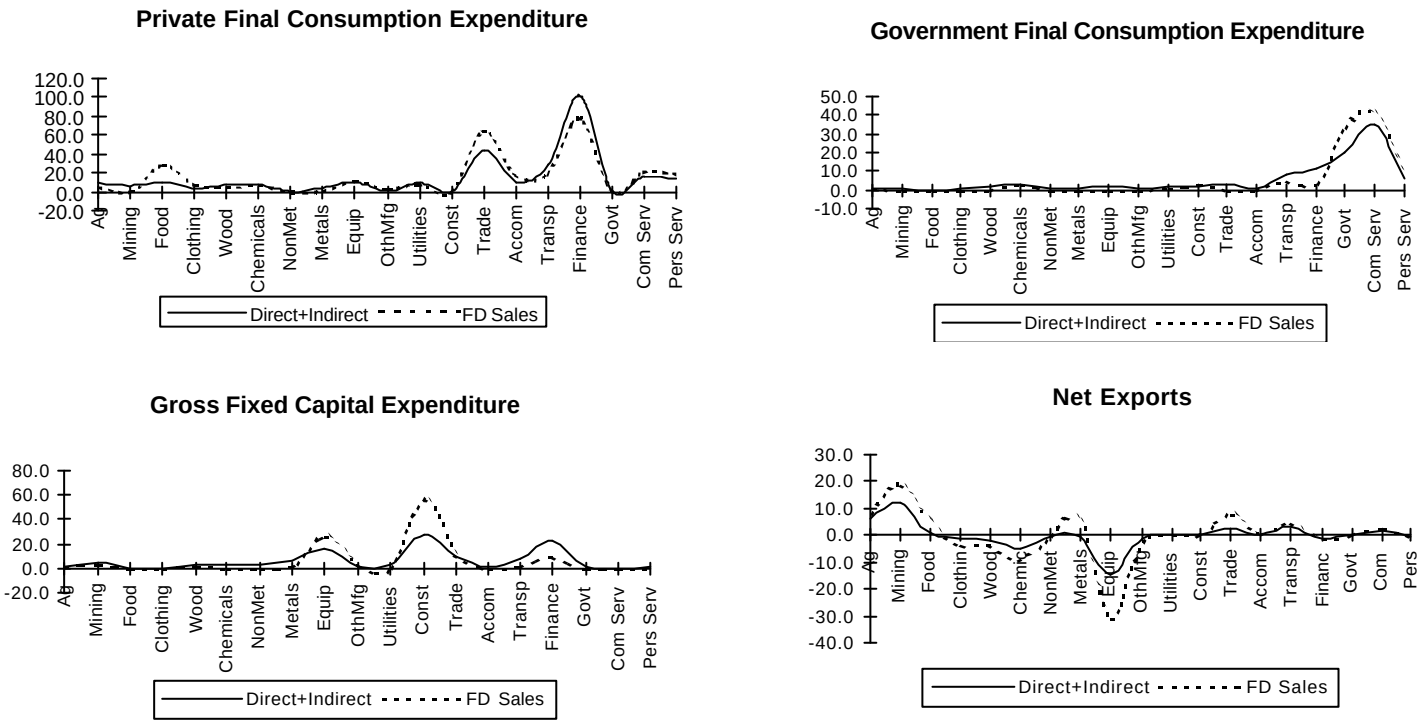

Figure 2. Industry Final Demand Sales and Direct and Indirect Contributions to Gross Domestic Product, Australia, 1996-7, $billion.

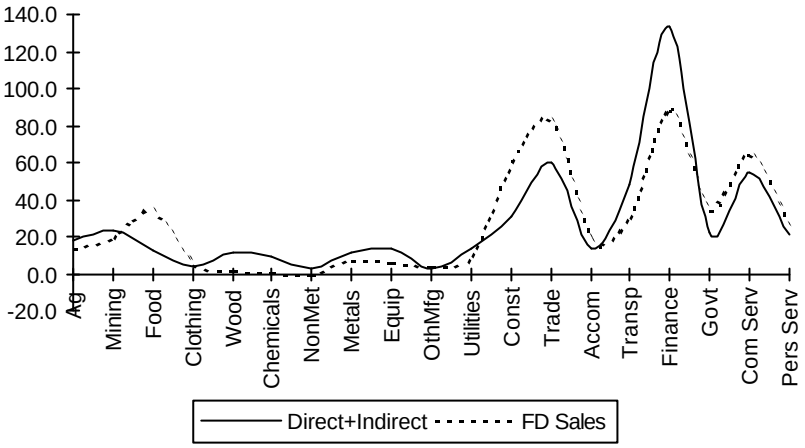

Figure 3. Total Industry Final Demand Sales and Direct and Indirect Contributions to Gross Domestic Product, Australia, 1996-7, $billion.

Table 6. Industries with Positive Indirect Contributions to Gross Domestic Product, Australia, 1996-7.

Industries with Positive Indirect Expenditure Contributions	Industries with Positive Indirect Income Contributions
Agriculture, Forestry and Fishing	
Mining	
	Food Processing
	Textiles, Clothing and Footwear
Wood and Paper Products	
Chemical Products	
Non-Metallic Mineral Products	
Metal Products	
Machinery and Equipment	
	Other Manufacturing
Electricity, Gas and Water	
	Construction
	Wholesale and Retail Trade
	Accommodation, Cafes and Restaurants
Transport and Communication	
Finance, Property and Business Services	
	Government Administration and Defence
	Community Services, Health and Education
	Recreational and Personal Services

An alternative way of viewing the industry contributions to gross domestic product is to measure the value-added direct and indirect contributions, as developed in this paper and shown in Table 5. Except mainly for finance, property and business services, the expenditure patterns tend to be more evenly distributed across the industry sectors which is to be expected when indirect flow-ons are taken into account. The three industries that rank highest in terms of their direct and indirect contribution to GDP are finance, property and business services (26.4%, compared with 17.4% when only direct sales are taken into account), wholesale and retail trade (11.8%, compared with 16.5%), and community services, health and education (10.7%, compared with 12.7%).

Table 6 draws together the information in Tables 4 and 5 to list the industries which have positive indirect expenditure and income contributions to GDP. As noted previously, those industries with positive indirect expenditure contributions tend to be positioned early in the production chain, and include agriculture, mining, most of manufacturing, utilities, transport, and finance and business services. The others, with positive indirect income contributions, tend to be positioned towards the end of the production chain, and include food processing, clothing and footwear, construction, trade, accommodation, cafes and restaurants, and government, community and personal services.

By comparing both the income and expenditure sides of the story, it can be seen that a very different picture is revealed when indirect contributions are taken into account. We get a clearer view of the role of various industries within the wider perspective of the overall economy, and the internal interdependencies that exist among industries. If a similar analysis is undertaken over time, then changes in the structure of the economy can also be identified, which can complement some of the tools and techniques used in, for example, Schnabl *et al*. (1999) and West (1999) to analyse structural change.

5. CONCLUSION

The McGovern paper poses an interesting question, and one which has important policy implications. The policy issues are not addressed here, but it is clearly in the interests of policy makers to have a clear understanding of the relative magnitudes of important micro-economic and macro-economic indicators. In terms of the example discussed in the McGovern paper, there are obvious abnormalities which, as McGovern rightly says, should have been cleared up a long time ago. The ABARE figure of 60-70% is clearly unsupportable, and simply defies both economic logic and the national accounts data. The national account "consistent" figure of 22% in 1993-4 or 19% in 1994-5, advocated by McGovern, is certainly consistent with national accounts data and is appropriate for what it is intended, as a measure of the direct value of goods and services leaving the farm gate and destined for the export market.

If, however, we want to estimate the total effective value of exports of specific commodities, whether or not it is a part of a more processed product, such as the value of the meat in a pie, then the national account consistent figures will not give us the answer. It can tell us the value of the whole pie, but not just the meat component. But it is just these types of issues that are of interest to

policy analysts.

The purpose of this paper was to describe a methodology which attempt to answer this question, namely to estimate the indirect industry contributions to GDP and its components which are consistent with input-output theory and national account methods. The question of 'do we want to include indirect flows' in calculating the significance of an industry's export market is left to the analyst, but the more important question of potential multiple-counting cannot be ignored.

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JOB TRANSFERS AND REGIONAL LABOUR MIGRANTS IN NEW ZEALAND

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ABSTRACT: Organisational labour migrants shift their place of residence as a consequence of moving between work locations of the same employer. Large multi-regional employers account for around a fifth of New Zealand's employment making such migration potentially a significant share of population movement. Employment continuity and subsidised relocation costs differentiate organisational labour migrants from independent movers. Economic models based on external labour market conditions may not explain migration within internal labour markets. Evidence from a survey of large employers in New Zealand indicates that organisational labour migration has reduced but that it generates a distinctive migrant flow.

1. INTRODUCTION

It has been argued that theories to explain intra-national migration in industrial economies need to reflect the importance of internal labour markets (Salt, 1990). Models of regional migration have tended to assume movement reflects an individual's evaluation of employment opportunities in differing locations. In contrast, employment concentration in national and transnational organisations has given rise to the organisational labour migrant. These labour migrants change residence but not employer. Consequently they avoid many of the barriers that may impede independent migrants and may move for organisational reasons rather than location characteristics or career advantage. Evidence in the UK indicates that by 1981, organisational labour migration accounted for over half of inter-regional relocation by employed persons (Salt 1990, p. 54). It has also been cited as a significant aspect of migration within Australia, although no quantified estimate was provided to support this claim (McKay and Whitelaw, 1977).

The contribution of internal regional migration to labour market adjustment in New Zealand remains unclear. Large numbers of people move but the net migration flows are small (Bedford and Goodwin, 1997). Given persistent regional variations in unemployment, it was argued in the past that internal migration is too low (Poot, 1986). Against the context of deregulation of some aspects of the labour market during the 1990s (see Walsh and Brosnan, 1999), recent analysis has suggested that the working population is highly migration responsive to regional employment change when migration is compared with other labour market adjustments (Choy *et al*., 2002). On the other hand, a review of regional migration since the 1980s has found that it remained hard to discern a

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consistent labour market influence on population movement (Newell, 2002). One reason for the latter assessment is the importance of international migration as an alternative to regional relocation. While assessments of labour mobility continue, there is a case for examining the contribution of organisational labour migration to population movement.

Employer commitment to their internal labour market is a prerequisite for employee relocation. Internationally, there has been much discussion that the traditional relationship between employer and employee based on internalised employment systems has been eliminated by a shift to external market-driven relationships (Cappelli, 1999). This transition has been linked to the downsizing of corporate workforces and the use of information technology to take over many of the coordinating and monitoring tasks once performed by middle management. Four considerations reduce the extent to which an overall decline in the role of internal labour markets has occurred.

1. The shift toward short-term employment contracts is most pronounced in fields such as information technology where the pace of technological change has increased the investment required to keep employee skills up-to-date.
2. All organisations continue to need their employees to acquire company-specific capabilities and this requires employers to retain some commitment to their existing employment relationships.
3. New ways of rewarding and motivating staff are needed to offset the adoption of flatter organisational structures that reduce the possibility of promotion and remove a powerful incentive for employee loyalty. In this context, relocation may be used as a way of diversifying employee experience.
4. The downsizing of large organisations arising from the outsourcing of functions formerly conducted in-house shifts employment to specialised service providers. These service providers may become large employers and develop their own internal labour markets.

For these reasons, employer dependence on maintaining an internal labour market will continue to give rise to the possibility of employee relocation although there are reasons to believe that the frequency may have declined. Particular attention is therefore given to how changes in an organisation's commitment to an internal labour market influence organisational labour migration.

Studies of international labour migration recognise movement within internal labour markets as one of the three main channels organising the transfer of skilled labour (Findlay, 1990; Iredale, 2001). Comparable investigation of regional movement within internal labour markets has not occurred. In New Zealand's case, the image of being a predominantly small-business economy may be grounds for dismissing the contribution of organisational migrants. For example, while there are around 1,200 enterprises with more than 100 employees, there are over 250,000 with fewer than 100 employees (Cameron and Massey, 1999). On the other hand, in 2001 a quarter of national employment was in organisations with over 100 employees and 28 percent was in organisations with six or more geographic locations (Business Demography Database, 2001

Table 1. Contribution of the One Hundred Largest Employers Nationally to Regional Employment

Region	Share of Regional Employment Provided by the Top 100 Employers Nationally (%)	Difference Between Region's Share of National Employment and Top 100 Employment (%)
Northland	12.9	-9.9
Auckland	19.0	-13.0
Waikato	19.4	10.3
Bay of Plenty	14.0	8.4
Gisborne	12.1	11.1
Hawke's Bay	20.1	16.4
Taranaki	20.4	17.9
Manawatu-Wanganui	22.9	17.3
Wellington	24.4	11.8
West Coast	9.3	8.5
Canterbury	19.9	6.5
Otago	20.7	15.8
Southland	23.9	21.4
Tasman	9.5	8.4
Nelson	30.1	29.0
Marlborough	20.7	19.6

Source: Business Demography Database, Statistics New Zealand and Statistics New Zealand (2002) New Zealand Census of Population and Dwellings 2001, Regional Summary volume two.

cited in Carroll *et al*., 2002). Reflecting this, the largest 100 employers account for a disproportionate share of employment outside of Auckland (New Zealand's largest region) and the neighbouring region of Northland (Table 1).

Rather than organisational size, a constraint on organisational labour migration may be the extent of employment concentration in the Auckland region. Auckland accommodates around a third of national employment. The pronounced primacy in the national urban system is long established, explained originally by the advantage accruing to port locations. Among port cities, Auckland gained particular advantage from its large local market and capacity to distribute to most of the remaining national market (Johnston, 1971). In those organisations that retain employment in multiple regions, the dominance of Auckland can encourage a functional separation with small sites down country, creating few reasons to relocate employees. This possibility aside, there is no prior reason to think that the context for organisational labour migration differs from that in other industrial countries. On this basis a survey was undertaken to ascertain its contemporary importance in New Zealand. The results suggest that

organisational labour migration is a smaller part of total migration than indicated in the earlier claims from UK and Australian experience.

2. SURVEY OF LARGE ORGANISATIONS AND LABOUR MIGRATION

Employee relocation data were obtained through interviews with human resource managers of 50 organisations. The organisations were selected from separate rankings of private and public sector organisations. For business organisations, a ranking of New Zealand's top 100 business organisations published in 2001 (*New Zealand Management,* December, 2001) was utilised. The ranking of government organisations was taken from an annual survey of public sector organisations (State Services Commission, 2001). The largest organisations identified in these two sources that were known to have employment in more than one region were approached for interviews. The 50 successful requests came from a total of 89 organisations.

It is possible that employee relocation may be disproportionately high among participating organisations. Of the 39 unsuccessful requests, about half used a lack of employee relocation as a reason for declining. Estimates of none to less than five moves a year were given, although a lack of definite information was also acknowledged. The 50 respondents are broadly representative of the 100 largest multi-region employers identified from official business demography statistics (Table 2). Business services, community services and education and health are under-represented in the survey sample while finance and utilities and construction are over-represented. The total employment (full time equivalents) in the top 100 organisations was almost 272,000 compared to 119,249 in the sample, indicating a bias to smaller organisations. Consequently the final sample may not over-estimate the extent of organisational labour migration when estimates are projected across all sectors.

The first part of the survey involved face-to-face meetings with human resource managers in the organisation's head office plus three telephone interviews with respondents who were unwilling to participate in a face-to-face meeting. Selected respondents were then requested to complete a profile of relocation over the prior 12 months to confirm and augment the information obtained in the interview. A willingness to supply the data, based partly on the accessibility of the information sought, influenced the selection of organisations for the second part of the study. The 15 profiles include three cases where a form was completed without a prior face-to-face meeting. Both parts of the survey covered domestic and international relocation. International relocation was found to be less frequent than domestic relocation. For every international transfer there were over five internal moves with 17 respondents having no international transfers. The two types of relocation can be analysed separately and findings relating to international moves are reported elsewhere (Perry, 2002; Perry, forthcoming).

Table 2a. Employment Distribution in the One Hundred Largest Employers and the Sample Respondents: Sector Comparison.

Sector	Distribution of Employment (%)	
	Largest Employers in 2001 (n =100)	**Sample Organisations (n = 50)**
Primary	0.81	2
Manufacturing	23.16	22
Utilities & construction	2.21	10
Wholesale & retail	14.10	14
Transport	5.16	6
Accommodation & restaurants	1.26	2
Communications	7.19	6
Finance	9.33	20
Business services	7.02	4
Government	10.08	10
Education & health	6.75	0
Community services	12.93	4

Table 2b. Employment Distribution in the One Hundred Largest Employers and the Sample Respondents: Employment Size Profile.

Employment Range	Number of Organisation	
	Largest Employers 2001	**Sample Organisations (%)**
over 5000	10	9 (18)
2000-4999	46	10 (20)
1000-1999	38	9 (18)
less than 1000	6	22 (44)
Total	100	50

Source: Business Demography Database, Statistics New Zealand

Relocation was defined as moves between work-sites requiring a change in residence for an expected period of at least 12 months. Interviews probed connections between an organisation's commitment to an internal labour market and the frequency of relocation. Beyond that focus, prior conceptualisation recognised three potential types of organisational labour migration:

(i) job relocation arising from a change in the location of work that employees follow;

(ii) vacancy relocation to fill a position vacated by another employee or produced through changes in activity or work organisation at the site with the vacancy; and

(iii) employee-initiated relocation through an employee request to be relocated to another work location.

With respect to the interpretation of migration data, all three types of move involve some degree of employer influence and support and so warrant separation from independent labour migration. Distinguishing types of relocation is important to explain the extent of movement and how it may change.

Once a decision is made to relocate jobs, the extent of employee relocation is determined by the employer's preference to transfer staff between locations rather than recruit from outside the organisation. Where a large number of jobs are being relocated, the employer is likely to seek more transfers than where the same activity is relocated incrementally over an extended time-period. In the latter case, the dilution of organisational knowledge is less than where a large number of positions need to be filled simultaneously. Consequently an incremental shift gives opportunity to integrate externally recruited persons into the organisation as an alternative to offering relocation.

From the employee's perspective, acceptance of an opportunity to transfer depends on the relative attractiveness of redundancy over relocation. Alternative employment opportunities as well as the terms of redundancy and the significance of any other severance payments such as employer pension funds will influence the selection.

Vacancy relocation is primarily an outcome of an employer's interest in supporting an internal labour market that spans work sites in different locations. To the extent that labour turnover cost is reduced and employee commitment is strengthened, employers have a general interest in developing an internal labour market. Such support is expected to increase for employees that have skills and knowledge specific to the workplace (Doeringer and Piore, 1971). This tends to limit inter-site internal labour markets to managerial and professional employees. A further qualification is that an organisation needs a capacity to support skill acquisition to sustain its internal labour market. Thus organisations with a specific but dynamic skill base may not develop an internal labour market because of the uncertainty over future skill needs (Cappelli, 1999). From the employee's perspective, a decision to relocate is influenced by the evaluation of:

- advancement opportunities inside and outside the organisation that do not depend on relocation;
- job security in the existing and potential position; and
- the terms on which the internal transfer is offered.

Employee-initiated relocation partly arises as an outcome of other forms of labour migration. One household income earner contemplating relocation may result in another person in the same household approaching their employer about possible relocation. A growth of dual income households increases the potential for these types of linked requests. There are other reasons why an employee may seek to pre-empt an employer's invitation to relocate, some of which are also connected to social change. For example, to facilitate care of an elderly parent, employees may seek to shift to a work site closer to the parent. In other cases, the knowledge that the employee operates in other locations may in itself stimulate interest in migration.

Further types of relocation exist. Training programmes, for example, may result in the planned movement of new recruits. This form of relocation gives experience in several aspects of the business before making a long-term posting. Training-linked migration exists in New Zealand. The present study suggests that it results mainly in short-term (up to six months) rotations and is mainly associated with selected graduate entrants. Developmental postings are more likely to produce permanent relocation (defined as over 12 months) when the transfer is international rather than domestic. Again, among the sample organisations small numbers of staff are involved as these international transfers are typically restricted to staff destined for senior management. A further complication is that the boundaries between the three main types of organisational labour migration may overlap, as where employees seek a job to be relocated to suit their residential preference. A few examples of employee-initiated job relocation are referred to by organisations in the study but the incidence is small.

Information was collected on the three main types of relocation but the main focus was on identifying the 'background' rate of movement arising from vacancy and employee-initiated movement. Job relocation was expected to be comparatively infrequent. To obtain a cross section of experience with this form of relocation would therefore require a larger sample of organisations than when focussing on more frequent forms of relocation. Information relating to the incidence and explanation of organisational labour migration in the sample organisations is summarised in four stages. First, the extent of labour relocation is outlined, distinguishing the three main types of movement identified above and the types of employee typically moved. As well as the incidence of relocation, organisational assessment of the acceptability of the present rate of movement is explained. Second, the reasons organisations relocate employees are summarised. Third, changes in the frequency of movement are discussed. Fourth, a detailed profile of employees relocated is reviewed using data supplied by 15 organisations.

2.1 Relocation Frequency

The annual rate of relocation is small when expressed as a share of the total employees (Table 3). It amounts to around 1.2 percent of the total workforce of the sample organisations, involving 1480 employees. Relocation increases among employees that organisations wish to be mobile. Around a quarter of total employees are in job categories that employers believe justify relocation to fill vacancies. Among these employees, around 5 percent of potentially relocated employees are relocated annually. This typically involves senior to middle managers, sales staff and technical specialists.

The organisation with the highest rate of relocation moved over 400 staff in 12 months out of a total workforce of 7,000. This gives a rate of movement that is around five times the sample average. At the other extreme, three organisations report no relocations. Two of these are public sector organisations. In both cases human resource management is devolved to regional offices. Some relocation could occur without corporate office knowledge but respondents

Table 3. The Frequency of Relocation Among Fifty Organisations

Estimates of:	
Total Employees	119,249
- Number of employees organisations are potentially willing to relocate	28,350
Number of employees relocated in the last 12 months	1,480
Number of organisations with annual relocation :	
- over 100 persons	1
- 50 - 99	9
- 10 - 49	22
- less than 10	15
- no relocation	3
Number by type of relocation:	
- vacancy relocation	922 (62.3%)
- job relocation	215 (14.3%)
- employee initiated	211 (14.5%)
- unclassified	132 (8.9%)

expressed confidence that relocation was not important. Although both have large national workforces they avoid relocation either by relying on short-term secondments or short-distance transfers. The third organisation without relocation is a co-operative of separately owned and operated businesses.

Vacancy relocation accounts for most organisational labour migration with job relocation and employee-initiated movement of equal secondary importance. The unclassified relocation reflects the difficulty respondents had in distinguishing types of relocation. A human resource manager in the corporate office may not be familiar with the origin of the relocation or have difficulty allocating it to one category. These problems aside, it is evident that vacancy relocation dominates movement.

None of the organisations interviewed monitored relocation. To respond to the survey, data were obtained most frequently from a record of relocation assistance paid. Organisational policies with respect to the payment of assistance thus influence the reported relocation. With the exception of two organisations, employee-initiated moves are generally not eligible for relocation assistance. Most organisations provide relocation expenses to a person voluntarily applying for a vacancy but some see this as another form of employee-initiated move and make assistance discretionary to the individual circumstances.

A comparison of relocation by two organisations in the same industry shows how relocation expense policies potentially distort relocation estimates. One of the organisations has a policy of not funding vacancy relocation and the other does. Both have employment with concentrations in Auckland and Wellington plus a large number employed in a national branch network. Both organisations have shifted corporate functions and business unit management from Wellington to Auckland, although this shift is ongoing in the organisation that does not fund vacancy relocation. The organisation funding vacancy relocation reported 55

vacancy relocations over 12 months out of a total workforce of around 4,500. The organisation not funding vacancy relocation reported 3 vacancy relocations over a similar 12-month period out of a total workforce of around 3,000.

It is possible that not paying expenses reduces participation in relocation. Otherwise on a proportional basis, actual vacancy relocation may be close to 40 in the organisation not paying expenses. In addition, as neither organisation provides assistance for employee-initiated relocation, there is a further gap in the capture of all people moving within internal labour markets.

The estimate of relocation frequency obtained captures the assisted component of all organisational labour migration. No attempt is made to adjust this estimate for differences in relocation policies but it can be concluded that actual organisational labour migration among the 50 surveyed organisations is probably significantly higher than the assisted migration.

Most organisations are satisfied with their present rate of relocation. One organisation (a retail chain) reported that the rate of relocation was too high and seven indicated that it is lower than they would like. Two further respondents were uncertain but tended to believe more movement would be helpful.

Organisations believing mobility is too low tend to have employment in locations outside main centres. The assessment reflects difficulties attracting staff away from or to specific locations rather than a general unwillingness to move, although there is one organisation that believes this to be the case. The locations identified as problematic tend to be individual to the organisation, partly reflecting the particular mix of locations.

The organisation reporting that it has too much relocation believes the frequency of movement is disrupting efforts to manage career development and staff succession. The respondent argues that the high rate of labour turnover is a consequence of a national shortage of experienced managers in their area of business rather than of influences under the organisation's own control.

2.2 Reasons for Relocation

Employers have a variety of reasons for relocating staff (Table 4). These organisational motivations are one reason for distinguishing employee relocation from other types of labour migration. It generates movement that reflects organisational priorities and resources even when combined with an employee preference to make the move.

Providing career development and ongoing employment is the most frequent motivation for supporting relocation. This motive exists because locations give experience in different aspects of a job or, more usually, because of limited opportunities in a single location.

Relocation to fill skill gaps and recruitment difficulties identifies movement that would not happen if external recruitment were an option. Retail managers and sales representatives in customer service industries were referred to as occupations generating high rates of relocation. A shortage of persons willing to enter these professions and the importance of company allegiance and knowledge as the basis for promotion explains the difficulty recruiting externally for these jobs.

Table 4. Organisational Reasons for Relocating Employees (n = 30).

Motivations for Relocating Employees	Number of Organisations Citing this Influence[1]
Maximise continuity of employment & career development	28
Promote organisational flexibility	20
Fill skill/recruitment gaps	15
Promote organisational integration & uniform work practices	15
Accommodate employee requests	12
Job relocation	11
Fill gaps in hard to recruit locations	8
Minimise external recruitment	8
Induction of new recruits	1

Note [1]: Respondents were asked to identify up to three influences from the list supplied.

Other important motives are to assist organisational flexibility and integration. Relocation helps ensure that the distribution of skills and experience matches staff turnover and market changes and can help to standardise work processes. As goals in themselves, organisational motivations may be hard to realise where promotion is not part of the outcome for relocated employees. Other motives are identified by a small number of organisations. These confirm the secondary role of job relocation and employee requests to move.

The diversity of motivations revealed partly reflects how hard the organisation needs to work to secure movement. Where there is staff interest in relocation, multiple objectives may be secured without the organisation having to specifically plan for them.

2.3 Changes in Relocation Frequency

Movement over the last 12 months prior to the survey was generally viewed as representative of recent experience and of that expected in the near future. Most organisations able to make a longer term historic comparison (five years or more) indicate that the frequency of relocation has declined. This decline was especially significant in those organisations with a national branch network of customer service and sales offices. Changes in work and organisational design as well as in the perceived ability of the employer to direct relocation are given as reasons for the decline. The experience of banks illustrates how these processes have reduced relocation.

Banks traditionally relocated branch staff as part of the process of developing staff and distributing experience between places. Employees were expected to see relocation at the employer's instigation as necessary for promotion. Lending authority was delegated to branch staff according to the status of the office. In turn, lending authority influenced the ranking of management jobs. At the same time, years served was a significant determinant of employee seniority and

qualification to advance to higher ranked positions. This resulted in the frequent reshuffling of staff to match jobs and individual seniority.

The breakdown of this system commenced as organisations moved away from time-served seniority to more active human resource management. This broadened the range of candidates suitable for any promotion opportunity, reducing the need for relocation to fill vacancies. Independently, the organisation of work changed. The status of branch managers was reduced, both overall and in the differential between branches. Authority for business lending was transferred to sector specialists. A combination of automated processing and the centralised assessment of applications outside computerised evaluation reduced the branch discretion over personal lending. Centralisation of back-office functions reduced the range of jobs within branches and created a spatial concentration of employment within national or at least multi-regional customer service and processing centres.

Coincidentally, employee willingness to relocate reduced. The growth of dual income households was identified as a significant contributor to the change in attitude. It reduced mobility and raised expectations that relocation assistance would compensate the cost of the shift on a spouse's career. More recently, changes in work organisation have made branch management a more female occupation than previously. In turn, to the extent that careers of males exert a stronger influence on household decisions, the gender shift accentuated employee disinterest in relocation. Internal recruitment is still favoured for managerial positions but now relies on employee application and generates less movement than originally.

These types of change are typical of all organisations with a branch network, although with differences in sequencing and the relative importance of different processes. For example, in the case of physical goods distribution, the deregulation of road transport in the late 1980s produced a first round of organisation change as the number of regional depots was rationalised. More recently, information technology has increased capacity to centralise logistics management and enabled the physical concentration of warehousing.

In organisations without a sales or distribution network affected by the above processes, consolidation of control functions in Auckland has been the single main influence reducing relocation. The dominance of Auckland as a centre of employment and population is long established. Even so there has been ongoing opportunity for greater consolidation of corporate control functions in Auckland. When this occurs, it typically increases functional separation between Auckland-based activities and the rest of the country. The consequence is reduced scope for staff relocation. A second reason for employment consolidation in some organisations has been the externalisation of maintenance, logistics and other 'non core' functions. This has had a similar effect in reducing the coverage of internal labour markets in regional service centres.

Overseas ownership and the transfer of national control to regional offices outside New Zealand (typically Australia or Singapore) adds a further level of organisational centralisation that depresses relocation. In the last five years, 11 organisations have shifted senior management and corporate positions to the

regional head office. The loss of New Zealand head office functions has the immediate impact of relocating positions to the regional office. In one organisation, for example, this had resulted in the replacement of the national CEO by direct reporting to individual line managers in Australia. Data processing is another frequently centralised activity as is human resource management. In the long term, the loss of national control can limit New Zealand to implementation and operational roles with less need or scope for employee mobility.

Even though the frequency of organisational labour migration appears to be reducing, respondents argued that this was not because of any reduced support for internal recruitment over external recruitment. A low rate of relocation is believed to be compatible with support for their internal labour market for three reasons. First, most organisations have employment concentrated in one or two locations that facilitate internal appointments without relocation. Second, the commitment to internal recruitment is typically strongest in respect of positions that have low turnover. Third, the shift toward flatter managerial structures reduces the scope for promotion-linked moves.

The organisation generating most movement (over 400 moves annually among 7,000 employees) shows the impact of these influences on relocation. Attributes producing its exceptional rate of movement include the following.

- The restriction of external recruitment to entry-level positions and a policy of encouraging experience in different work locations as one of the qualifications for career advancement.
- Maintenance of multiple job grades, including formalised qualifications and experience requirements for career advancement.
- Nationally dispersed employment locations in which the region with the greatest concentration of employment (Auckland) does not disproportionately offer senior positions. This allows employees to advance their career in regional locations.
- High levels of vacancy for experienced staff as a consequence of organisational growth and the constraints on external recruitment.

In addition, four further influences particular to the organisation encourage relocation.

- A national rate of pay that effectively increases an employee's real wage outside of the main urban centres (although this may be offset by the reduced access to urban amenities). This promotes an incentive to move to smaller centres. Movement increases because entry-level recruitment is highest in the main population centres, especially Auckland where vacancy rates are highest. Outside main centres, recruits typically wait for up to 12 months between selection and actual entry.
- Conditions of employment vary geographically. The higher rate of vacancy in Auckland increases work pressure compared with fully-staffed locations. Offsetting this, Auckland can be an attractive location because of the possibility of more rapid advancement to senior levels.
- The workforce includes a comparatively high proportion of people with a spouse also employed by the organisation. This results in 'welfare moves' to

follow a partner's relocation, estimated at around 20 percent of all relocations a year.

- The organisation is comparatively resource rich for expenditure on employee relocation partly as a consequence of having unfilled positions.

Work arrangements facilitated by new communications and information technology are not a significant influence on the frequency of relocation. In the two situations where it was of some importance, the impact has been in reducing relocation. An organisation identifying that its workforce had become 'high tech' linked this to a reduced commitment to an internal labour market. The instability of skills in new technology-based activities reduced the organisation's willingness to provide employment continuity. To facilitate use of the external labour market, activities had been concentrated in Auckland.

The second example involved two organisations reliant on project-based work. The short-term nature of much engineering and business consulting work potentially gives rise to considerable instability in the distribution of employees. Information technology is said to be reducing this by enabling work to be distributed between work sites rather than being conducted close to the client. This has most impact in reducing the relocation of junior and mid-grade staff. Customer relations and new business generation tend to be a large part of the responsibility of senior staff and this requires a location close to active clients.

2.4 Movement in Detail

A profile of recent employee relocations over a 12-month period was obtained from 15 organisations. A total of 910 employees were relocated by these organisations, amounting to almost two-thirds of the relocations identified in the larger sample. The organisations are of a similar size range to those in the larger sample but differ in being drawn from a narrow cross-section of industries (Table 5). Given that the 15 organisations account for slightly over half the moves identified among the 50 respondents in the main survey, the sub-sample appears to include comparatively active movers. As explained in the discussion of relocation frequency, it is likely that they do not capture all employee-initiated moves, but this may equally affect the estimate in the main sample.

Employees relocated are predominantly male, have over five years of experience with the organisation and occupy non-senior managerial or skilled professional roles prior to being moved (Table 6). These characteristics are strongly dominant, except that staff with less than five year's experience are clearly not exempt from relocation opportunities. The profile is disproportionately influenced by one organisation that accounts for almost half of the relocations. Excluding this organisation, there is an almost equal proportion of male and female staff being relocated.

Table 5. Sector and Size of the Organisations Supplying a Profile of Employee Relocations (n = 15).

Sector	Share (%) of Sample Employment	Employment Range	Number of Organisations
Primary	4	over 5000	3
Manufacturing	3	2000-4999	3
Communications	26	1000-1999	2
Finance	23	less than 1000	7
Business services	2		
Government	20		
Community services	18		
Other	4		

Table 6. Characteristics of Employees Relocated Among Fifteen Organisations.

Number of Employees Relocated			
Years of Service		**Job Status Prior to Relocation**	
Less than 1	26 (3%)	Senior manager[1]	83 (9%)
1-5	214 (24%)	Other manager or skilled professional	570 (63%)
Over 5	517 (57%)	Other	105 (12%)
Unclassified	153 (17%)	Unclassified	153 (17%)
Total relocations	910	Share of total male	600 (66%)

Note [1]: Senior managers defined as managers with responsibility for other managers.

Table 7. The Geography of Employee Relocation Among 15 Organisations.

	Number of Employees		
Region	**Relocated from**	**Relocated to**	**Net Flow**
Auckland	261	212	-49
Wellington	99	129	+30
Other North Island	277	246	-31
Canterbury	67	89	+22
Otago	41	43	+2
Other South Island	55	71	+16

The geography of relocation within the sub-sample shows that Wellington and the South Island are net recipients of relocated staff while other parts of the North Island are net suppliers of staff (Table 7). The largest gross flows are into and out of Auckland and other North Island locations excluding Wellington. Overall, the data suggest how relocation achieves a circulation of staff between locations, as reflected in the small net flow compared with the total gross flow. The largest net flow indicates Auckland's role in supplying labour to regional

locations. The small numbers relating to one 12-month period raise doubts over the regional data but it is possible that the geography of organisational labour migration differs from the independent movement of skilled labour.

3. IMPLICATIONS OF THE SURVEY FINDINGS

The 2001 Census indicates that there are around 70,000 internal regional migrants a year (this total is limited to persons identifying a specific region of residence). Of these, around 77 percent or 53,700 are of working age (15-64). The present study identified almost 1,500 organisational migrants among 50 employers. If this rate of relocation holds among the country's largest 100 multi-region employers, and these large employers account for most relocation, organisational labour migration would account for around 5.5 percent of gross regional migration a year by working-age people. The relocation estimate takes no account of dependants moving with the relocated employee. The concentration of movement among persons with over 5 years experience makes it reasonable to assume that a significant number of relocations will result in the movement of multiple persons. It is also reasonable to expect some relocation among smaller organisations other than the largest 100 employers. Allowing for these possibilities, organisational labour migration may account for 10-15 percent of all internal migration.

An estimate of 10-15 percent is consistent with a recent survey of internal migrants who moved into or out of the Western Bay of Plenty at some time between October 2000 and September 2001 (Lidgard and McLeay, 2002). For this sub region, from a sample of 192 in-migrants, around 15 percent of males and 10 percent of females identified either a 'company transfer' or 'business relocation' as an important reason for the move. The actual proportion of organisational labour migrants is potentially higher than this as respondents might identify other reasons for the move (such as environmental or income attributes) while being relocated by an employer. The proportion of male out-migrants indicating either a 'company transfer' or 'business relocation' as an important reason for their move was around double that of in-migrants. Although based on a sub region, including the possibility of moves within the Bay of Plenty region as a whole, the survey suggests that organisational labour migration does need to be recognised as a distinctive component of internal migration.

On the other hand, based on the experience of the 50 respondents to the national survey, the frequency of employee relocation has declined. In organisations with branch networks that have reduced significantly in employment, relocation is now perhaps half the level of 10 years ago. Further investigation is required to identify the sequencing and overall importance of individual processes, but broadly five issues seem to have arrested and reversed the growth of organisational labour migration.

1. Changes in human resource management have reduced the influence of 'time served' as a determinant of seniority. This opens internal vacancies to a wider range of applicants than where seniority determines who is 'next in line' for

the position. Competition for vacancies reduces relocation where it increases the ability to obtain recruits close to the vacancy.

2. In 'high tech' occupations, increased use of external labour markets has reduced organisational investment in an internal labour market.
3. The reduction of branch networks, centralisation of customer support and externalisation of service functions has tended to reduce regional employment within large organisations. This reduces the volume of relocation, both because of less opportunity and increased functional separation of the centre and branch establishments.
4. The growth of dual income households has reduced individual mobility where relocation impacts negatively on a working spouse. Organisations are generally unwilling to respond to this issue beyond referral of a spouse to an employment search agency. This is despite recognising that a move disadvantaging one working spouse is a risk to their employee's satisfaction with the move. It probably encourages employment concentration within large centres, so as to reduce employee turnover and maximise recruitment potential. It has encouraged employers to rely on voluntary relocation rather than directing it.
5. Regionalisation of management within transnational organisations reduces management positions within overseas territories. Where the overseas subsidiary's role is limited to implementation, it tends to reduce the range occupations and employee relocation.

The New Zealand context probably accentuates the decline of organisational labour migration compared with larger industrial economies. The concentration of employment and national head offices in Auckland reduces the need for employee relocation. Indeed, one interviewee indicated that their organisation had concentrated activity in Auckland expressly to facilitate access to a 'fluid' labour market that reduced the need to be committed to their internal labour market. The high level of foreign ownership of multi-region employers is another New Zealand characteristic that reduces employee relocation. This impact arises from the reduced occupation diversity in branch establishments compared with independent operations. Even so, other influences suggest that New Zealand's experience is not unique in experiencing a decline in employee relocation.

4. CONCLUSION

The paper's main contribution has been to estimate the share of organisational migrants among all regional migrants. In this regard, the first important finding was that organisations rarely monitor this issue beyond recording the expenditure on relocation expenses. Consequently, even when confined to a recent 12-month period, organisations had difficulty supplying an estimate of the three types of movement that exist: job relocation, vacancy relocation and employee-initiated relocation. A record of employees relocated from the disbursement of relocation expenses has the advantage of emphasising relocation that is unlikely to occur without the organisation providing the opportunity to move. It has the disadvantage of making the data dependent on organisational relocation policies rather than a consistent definition of the three

types of move. This inconsistency limits the assessment of the significance of employee relocation.

The possibility that the timing of moves and location choice of organisational migrants differs from independent migrants is a primary reason for seeking to measure the contribution of alternative migration channels. Differences in timing and choice support a case for customising explanations of migration according to the context in which moves occur. One way of overcoming the limited data held by human resource managers is to augment their perceptions by a survey of relocated employees and other managers responsible for relocation policy and recruitment decisions. This is important because it appears that organisations increasingly rely on 'voluntary' application rather than on compulsion to achieve employee transfers. In this context, it would be desirable to examine how far relocation is consistent with individual preferences and the extent to which organisational assistance mitigates the costs of relocation to movers. Present evidence indicates that organisations target preferred individuals for at least some of the appointments resulting in transfers and that most employers seek to minimise assistance given to employees that seek relocation for personal reasons. This suggests that separate analysis of organisational labour migration is justified.

The 10 to 15 percent estimated share of migration attributable to organisational labour migration is considered to be conservative. For example, even where an organisation does not assist an individual to relocate it is possible that the opportunity to stay with the same employer is important to a decision to relocate. Among other advantages, the employee potentially saves employment search costs and retains recognition of past employment service that may enable career advancement in the future. As well, a larger sample of organisations or a long time frame is needed to capture the full significance of job relocation. There is, therefore, justification for further research to clarify the quantitative and qualitative significance of employee relocation.

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HOME AND COMMUNITY CARE AND THE PRINCIPLE OF SELF-RELIANCE: IMPLICATIONS FOR OLDER AUSTRALIANS

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ABSTRACT: The Home and Community Care programme may disadvantage certain groups, as its success depends in part on informal support from family and friends. We examine the individual characteristics of older Australians to help explain the levels of informal support presently available, as represented by the social network. Based on the findings from 401 non-institutionalised older Gold Coast residents, we have concerns about the availability of the informal support for older men living alone as the level of the social network was the lowest for this group.

1. INTRODUCTION

This paper examines the implications of the Australian government's Home and Community Care (HACC) programme for older Australians in relation to adequate informal care and support. The purpose of this work is to extend previous research by investigating individual characteristics that explain older people's level of informal support, as represented by the social network, and the identification of groups vulnerable to inadequate informal care. The analysis is based on this study's household survey consisting of a sample of 401 non-institutionalised men (N = 197) and women (N = 204) aged 65 and over, residing in the Gold Coast City in 1999. Using regression analysis we test: 1. the significance of individual variables (gender, education and household type) in explaining levels of social network; and 2. that older males are more vulnerable than older females to the social network effect of living alone.

1.1 The Significance and Contribution of the Study

Since the mid-1980s, mounting pressure on government expenditure, contributed to by an ageing population[1], has led to the strengthening of the

[1] The Australian population has become increasingly top heavy at the upper end of the age spectrum with those aged 65 and over the fastest growing age-group. The proportion of this age cohort rose from 8.5% in 1966 to 12.2% in 1998 (ABS, 1986; 1998). Australia is also supporting a rising number of the 'old' old (aged 80 and over). Over the next three

government's commitment to the principle of self-reliance. This principle implies that the accessibility of care resources for older people is increasingly the responsibility of the individual (Millward, 1998). Given this, knowledge of individual characteristics that explain social network will provide us with a better understanding of the circumstances facing older people.

The principle of self-reliance prevailing in recent Australian government policies[2] is reflected in the government's encouragement of the Home and Community Care (HACC) programme. Services provided through this programme play an increasingly critical role in the health maintenance of an ageing population. Indeed it represents an important complementary component to the health system (Council on the Ageing (COTA), 2000). About 20% of Australians over the age of seventy years use aged care services, and HACC services support more than half of this group (COTA, 2000). Among those 65 to 79 years, 54% of female HACC clients in 1997 lived alone compared to 37% of their male counterparts. Among those aged 80 years and over living alone, the proportion of HACC clients rose to 65% women and 43% men (Australian Institute of Health and Welfare (AIHW), 1999).

The success of the HACC programme is partly dependent upon unpaid care from family and friends (Kendig, McVicar and Reynolds, 1992; Beilharz, Considine and Watts, 1992; Office of the Ageing, 1991; Courtney, Minichiello and Wait, 1997; Family Community Development Committee, 1997). According to Arber and Ginn (1991) it is well accepted that older people living alone have less access to unpaid care. The rising trend in the number of single-person households among older Australians, an increase of 24% since 1971 (Australian Bureau of Statistics (ABS), 1996), raises concerns for the need for more resources to satisfy the growing demand for care within these households[3]. The Commonwealth Department of Health and Family Services (1998) acknowledges that "the present range of facilities is limited". Since single older males have the weakest social

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decades the population of people aged 80 and over is expected to increase by more than 200% (Productivity Commission 2000).

[2] such as compulsory superannuation, HACC (Home and Community Care) and private health insurance.

[3] Telephone interview transcript (21/08/01):

Department of Health and Aged (Queensland branch): *"The number of subsidised care hours and services is determined by the Aged Care Assessment Team (ACAT)"*.

Author: *"May I have a copy of the list of criteria that determines older people's eligibility for government subsidised community care services?"*

Department of Health and Aged: *"We have a criteria sheet but ultimately eligibility is left to the discretion of the ACAT"*.

Author: *"So if resources are limited do ACAT attempt to spread these resources thinly across their clients and is this reflected in their discretionary assessment?"*

Department of Health and Aged: *"Possibly."*

network (Millward, 1999; Lee, Willetts and Seccombe, 1998; Avlund, Damsgaard and Holstein, 1998), they may face a poorer level of care compared to others.

The Gold Coast City, characterised by its high proportion of older people - 17% of the total Gold Coast population, far exceeds the Australian average of 12.1% (ABS, 1998). Additionally the area possesses one of the fastest growing older populations and continues to remain a popular retirement location. The resultant increase in geographically dispersed families may preclude adult children from providing day-to-day practical and personal care to older people (Arber and Ginn, 1991). An investigation of the Gold Coast aged by this study is therefore most timely.

1.2 Organisation of the Paper

Section 2 is a literature review of the determinants of individual characteristics in establishing social networks. This is followed in Section 3 by an overview of the Australian HACC programme. Section 4 outlines the conceptual framework in which the two hypotheses are posited, and is followed in Section 5 by an explanation of the research method. Section 6 presents the models for testing the determinants of informal care and the social network effect of living alone. The descriptive and analytical statistics in Sections 7 and 8 respectively outline the research results. The conclusions of the study are detailed in Section 9.

2. GENESIS OF THE STUDY

It is widely recognised that social relationships have a powerful effect on physical health (Berkman *et al*., 2000). Throughout the 1970s and 1980s a series of studies consistently showed that the lack of social ties or social networks accelarated mortality from almost every cause of death (Cohen, 1988; House, Landis and Umberson, 1988; Berkman, 1995).

Durkheim provides a fundamental theory for the empirical investigation of social relationships and their influence on health. His most important contribution is to the understanding of how social integration and cohesion influence mortality. Durkheim shows how 'social facts' can be used to explain changing patterns of tendency toward suicide. Durkheim's theories easily extend to health outcomes such as cardiovascular disease (Berkman *et al.*, 2000).

The literature suggests that older women have stronger social networks than older men (Hessler *et al*., 1995; Antonucci, 1994; Lee, Willetts and Seccombe, 1998; Avlund, Damsgaard and Holstein, 1998; Millward, 1998, 1999). Women are more likely to be in contact with family and friends and are more likely to initiate social contact than men (ABS, 1995)[4]. Studies report that while divorce or widowerhood tends to weaken relationships between older men and their

[4] A 1995 ABS family survey from a sample of older Australian's found that older men, aged 70 years and over and living alone, spent an average 90% of each week alone compared to women in the same situation who spent only about a third of their time alone.

children, relationships between divorced or widowed older women and their children continue to remain robust (Lee, Willetts and Seccombe, 1998; Millward, 1998). Generally married men depend on their wives to maintain their social contacts (Sax, 1993), and appear to have more difficulty developing social networks after the death of their wives (Lee, Willetts and Seccombe, 1998; Keith, 1986). This then places men at a greater risk of social isolation than women (House, Landis and Umberson, 1988; Arber and Ginn, 1991). The strong evidence of older men's weaker social network could, in part, be reflected in the suicide rates among older Australian males which are five times greater than those of older women (Goldney and Harrison, 1998).

3. FROM INSTITUTIONAL CARE TO COMMUNITY CARE

In line with the federal government's push towards self-reliance, the HACC programme, introduced in 1985, changed the focus of care to a coordinated set of services. Such changes were made to help satisfy the assessed needs of disabled individuals, including the frail elderly, by providing care within their home rather than in institutions. Jointly funded by the Commonwealth and State governments, HACC includes meals on wheels, paramedical and home nursing services, respite care, transport, housekeeping and other domestic assistance services (Schulz, Borowski and Crown, 1991; Courtney, Minichiello and Waite, 1997). The cost effectiveness of community care services in comparison to institutionalised care motivated the government towards this policy direction[5] (Onyx and Bradfield, 1991).

Including state government spending, community care funding has increased to about 21% of nursing home expenditure in Australia (Courtney, Minichiello and Waite, 1997). In comparing 1988 and 1993 data, Table 1 highlights the steady decline in health establishments for the severely handicapped aged, and shows the increased contributions made to this area from private households. Undoubtedly home and community care rather than institutionalised care is the preferred option for most frail aged and their families, and this has contributed towards the rise in single-person households among older people. Table 2 outlines the changes in living arrangements among older people for 1971 to 1996. Single-person households have steadily increased over this time to 24% of the older Australian population in 1996 (ABS, 1996). Between 1971 and 1996 the proportion of males living alone increased by 33%, from 12% to 16% of the older male population. During this time, the proportion of women living alone increased by 31%, from 26% to 34% of the older female population. Conversely the proportion of the aged in non-private dwellings decreased after the introduction of community care in 1985.

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[5] Community care in the 1990s has relieved the government of the burden of subsidising for the construction and maintenance of nursing homes, hostels and self contained units for the aged. Many services are provided voluntarily by family and friends (Beilhorz, Considine and Watts, 1992).

Table 1. Type of Residence, Older People (Aged 65 and Over) with Profound or Severe Handicap by Gender in Australia, 1988 and 1993.

Location	1988			1993		
	Older Males	Older Females	Total Older Persons	Older Males	Older Females	Total Older Persons
Private households (%)	72.98	62.80	65.80	74.60	70.30	71.60
Health establishments (%)	27.02	37.20	34.20	25.40	29.70	28.40
Total (N '000)	99.10	231.70	330.80	113.20	250.00	363.20

Source: Calculated from Australian Institute of Health and Welfare and the Office for the Aged 1997 section 19.

Table 2. Living Arrangements of Those Aged 65 and Over by Gender in Australia in Selected Years.

Living Arrangements	Older Men						Older Women					
	1971	1976	1981	1986	1991	1996	1971	1976	1981	1986	1991	1996
PRIVATE DWELLINGS (%)												
With spouse	43.97	49.93	51.52	53.86	51.64	52.58	22.94	26.27	28.15	30.20	30.29	31.67
With other family	24.89	22.11	20.36	21.69	17.68	16.67	29.72	25.66	23.05	24.11	18.62	17.44
Alone	12.21	14.33	14.69	13.92	14.81	16.14	25.77	32.2	32.99	30.97	32.01	33.56
Others (a)	10.42	4.92	4.33	2.72	8.23	7.59	11.47	4.73	3.87	2.59	7.32	6.66
Campers/caravan/migratory (b)	0.60	1.12	1.48	0.12	NA	NA	0.29	0.53	0.71	0.08	NA	NA
NON-PRIVATE DWELLINGS (%)	7.91	7.58	7.62	7.69	7.64	7.02	9.81	10.63	11.23	12.05	11.76	10.66
Total (N '000)	446.90	507.00	601.10	693.30	816.20	938.50	618.10	701.90	828.30	953.40	1091	1227

Source: Calculated from unpublished ABS data 1971-96.

(a) Includes group households, visitors and others not classifiable plus Aboriginal missions and settlements before 1991.

(b) Not recorded as a separate category since 1991 census.

4. SOCIAL NETWORK STATUS OF OLDER PEOPLE

For the purposes of this paper, social network is indicated by frequency of contact with family and friends[6]. This paper postulates that the most important individual characteristics in accessing levels of social networks are *gender, education and household type*. Extending the life course theory by linking Durkheim's concepts, this paper explains how the level of social network is a function of an individual's ability to socially integrate over time. Government, corporate and family institutions have assisted in the creation of roles that have contributed to differentials in the development of social skills and to the support that determines social network. This study seeks to extend the understanding of the significance of gender, education and household type in determining care resources among the Gold Coast older population.

The first research question therefore becomes:

> *Are gender, education and household type significant determinants of the frequency of contact with friends and family among older people on the Gold Coast?*

Past research has shown that the social network impact of living alone is greater among men than women. This finding has led to the speculation that men possess a deficit in social networking that renders them disadvantaged in receiving adequate informal care and support when living alone.

The second research question then becomes:

> *Are older males more vulnerable than older females to the social network effects of living alone?*

5. RESEARCH METHOD

The lack of information available on the relevant social indicators made it necessary for this study to conduct a household survey[7] in 1999 of the non institutionalised aged in the 10 statistical areas with the highest median age in the City of Gold Coast (Statistical Subdivision)[8].

The household survey questions were influenced by the outcomes of key informant interviews with persons providing services for the elderly on the Gold Coast within the following organizations: 60 and Better, Home and Community

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[6] Although the influence of family ties among the aged is well documented, friendships have received little attention from researchers (Arber and Ginn, 1991). Friends often provide the primary and most enduring link with society as well as the main source of emotional support and help in coping with the loss of previous roles (Atchley, 1980:364 cited in Arber and Ginn, 1991 p.164). The key informants have highlighted the greater reliance on friends compared to family among the Gold Coast older population.

[7] Referred hereafter as the household survey 1999.

[8] Bilinga, Broadbeach Waters, Burleigh Heads, Burleigh Waters, Coolangatta, Hollywell, Palm Beach, Paradise Point, Runaway Bay, Tugun.

Care (HACC), Blue Nursing, St Vincent's Community Services, Fast Track and the Gold Coast City Council.

Because of the influx of retirees to the area, the key informants were able to assist in identifying issues specific to the Gold Coast, such as length of residency and accommodation type. These issues have not been considered in previous economic studies.

The data collected from two pilot studies enabled the refinement of the survey instrument and improved its robustness. This involved compiling a frequency matrix to identify consistent responses, a missing response report to identify misunderstood, inappropriate questions and bivariate correlation to assist in the greater dispersion of the questions.

After the deletion of several questions and the refinement of others, the total number of survey questions was reduced from 41 to 29. The implementation of the refined household survey using the postal method increased the response rate of the household survey from 33.3% (pilot studies conducted in 1998) to 45.4%. The 401 usable questionnaires obtained in the survey exceeded the minimum required sample size of 287. The total number of respondents represented 0.8% of the Gold Coast's total 49,235 aged population residing in the chosen 10 Statistical Local Areas.

After completion of the survey, the data was screened for validity and reliability using the SPSS statistical package. This involved an examination of the survey data for plausibility, missing data, outliers, normality, linearity, homoscedasticity and mutlicollinearity. After this, Box's Test confirmed the homogeneity of variances. The Spearman correlation (nonparametric) statistics reported no bivariate correlations greater than 0.7 (Tabachnick and Fidell, 1996). The absence of multicollinearity produced no biased coefficients for the explanatory variables.

A comparison of characteristics of the surveyed households with ABS local area statistics (1996) revealed that the household sample was highly representative of the Gold Coast's older population.

6. THE REGRESSION MODELS

6.1 The Significance of Gender, Education and Household Type

To test the significance of gender, education and household type for each indicator of social network (frequency of contact with friends, frequency of contact with family), two ordinal regression models are run. Since each social network indicator is ordinally scaled[9], the model is used to predict cumulative

[9] The survey responses for the frequency of contact with friends and the frequency of contact with family are ordinally scaled from one (1) through five (5): Never/hardly ever (1), Less than monthly (2), Monthly (3), Weekly (4), Daily (5).

probabilities for the categories[10]. Age, dependence level and government pension are the control variables.

The model is:

$$Y_{ij} = b_{0j} + b_1 G_i + b_2 E_i + b_3 A_i + b_4 HHT_i + b_5 P_i + b_6 D_i + e_i, \quad j = 1,2,3,4,5 \text{ -1} \tag{1}$$

where Y is the cumulative probability[11] of a measure of social network for indicator i (either the level of frequency of contact with friends or the level of frequency of contact with family) for the jth category[12].

where G = 1 if male; 0 if female
E = 1 if junior secondary education or less; 0 if other
A = Continuous variable from 65 years of age
HHT = 1 if couple household; 0 if single-person household
P = 1 if receives a full government pension; 0 if other
D = 1 if full independent living; 0 if dependent on others.

This regression analysis also includes factors specific to the Gold Coast region (residency status and accommodation type) to determine their significance as explanations for variations in the level of social network. To analyse the social network indicators of friendship ties and family ties the model adds:

Accom = 1 if living in a detached house; 0 if other
Resid = 1 if residing on the Gold Coast for more than 10 years;
0 if less than 10 years

6.2 The Social Network Effect of Living Alone

To investigate observed gender differences, an interactive model (moderated regression analysis with a dummy variable) determines the difference between the household type coefficients of male and female samples. The model identifies the source of this difference, whether it occurred at their intercept values or slope

[10] When predicting ordinal responses, the usual linear regression models do not work well. Those methods can work only by assuming that the dependent variable is measured on an interval scale. Because this is not true for each social network indicator, the simplifying assumptions on which linear regression relies are not satisfied (SPSS, 1999).

[11] The link function is a transformation of the cumulative probabilities that allows estimation of the model. Five link functions are available in the ordinal regression procedure. The link function was chosen based on: the investigation of the distribution of values for the outcome variable; the evaluation of the model fitting information of several link functions; and the evaluation of the Pseudo - R^2 measure of several link functions (SPSS, 1999).

[12] Each equation gives a predicted probability of being in the corresponding category or any lower category.

values or both[13]. Age, education, government pension, dependence level are the control variables.

7. DESCRIPTIVE STATISTICS

Table 3 documents the characteristics of the survey respondents by gender and household type. These descriptive statistics reveal that the respondents are in good health, with between 76% to 80% reporting full physical independence. All subgroups showed strong friendship ties, viz. the majority meeting friends either on a weekly or daily basis. However while single women (69.2%) and couples (males 72.2% and females 68.5%) meet with family members at least once a month, a smaller proportion of single men (48.8%) meet with family members over the same period. With only 53% of single males residing on the Gold Coast for 10 years or more compared to 72% of single females, the lower residency status of males suggests that they may be confronted with greater social isolation and less informal support compared.

Table 4 indicates that older people living alone are, in general, more susceptible to isolation, but that single males appear to be more socially disadvantaged than females. It includes single males reporting: higher levels of distress at relocating to the Gold Coast (10% of the total single males compared to 4% couple males, 7% couple females and 4% single females); and nearly 30% of single males admit to experiencing loneliness compared with single females (18%). A greater proportion of both single males (17%) and single females (13%) report that having very few, or no, relatives or friends living nearby causes hardship, compared to a smaller number of men (7.7%) and women (9.6%) from couple households. A relatively large proportion of single males also report separation or divorce as a cause of hardship (17%). This supports the literature that single males do in fact face greater social isolation (Millward, 1996; Lee, Willetts and Seccombe, 1998; Barber, 1994).

The model is:

$$Y_ij = b_{0j} + b_1 G_i + b_2 HHT_i + b_3 (\text{G.HHT}_i) + b_4 A_i + b_5 E_i + b_6 P_i + b_7 D_i + e_i, \quad (2)$$

Further deficits in access to informal support by single person households are evidenced in a greater proportion of single-person households deferring elective surgery (7% for single-person households, compared to 2% for couple households). Indeed several older women spoke of the frustration of deferring elective surgery because they did not have access to post operative home care. This issue of care is more dramatic among single males with an astonishing 41%

[13] Analysis can reveal one of 4 possibilities. That: male and female regressions are identical i.e. coincident regression; male and female regressions differ only in their intercept i.e. parallel regression; male and female regressions have the same intercept but different slope i.e. concurrent regression; male and female regressions have the different intercepts and different slope i e. dissimilar regression (Gujarati, 1999).

stating that they would move from the Gold Coast if ill/disabled compared to 24% of single females. This reflects the poorer level of informal care available to single males in the area and the fear that this isolation can engender.

Table 3. Statistical Characteristics of the Survey by Gender and Household 1999.

Definition of Variables and Unit of Measurement	Lone Households		Couple Households	
	Male	**Female**	**Male**	**Female**
Friendship Ties (%)				
Never/hardly ever	12.2	5.6	6.7	11.8
Less than once a month	4.9	2.2	4	5.5
Once a month	4.9	15.6	20	17.3
Weekly	48.8	57.8	50.7	45.5
Daily	29.3	18.9	18.7	20
Family Ties (%)				
Never/hardly ever	26.8	17	9.9	10.2
Less than once a month	24.4	13.6	17.9	21.3
Once a month	26.8	29.5	29.1	27.8
Weekly	17.1	29.5	31.8	28.7
Daily	4.9	10.2	11.3	12
Residency Status (%)				
Lived in the Gold Coast 10 years or more	52.5	71.9	76.6	73.6
Less than 10 years	47.5	28.1	23.4	26.4
Accommodation Type (%)				
Caravan park	17.1	8.8	7.7	10.6
House	26.8	33	46.2	50.4
Unit/flat	51.2	52.7	34	27.4
High rise	4.9	5.5	12.2	11.5
Ability to Drive (%)				
No	12.2	50.5	11.7	40.2
Yes	87.8	49.5	88.3	59.8
Health Status (%)				
Dependent on others	20	20.2	23.7	22.4
Independent living	80	79.8	76.3	77.6
Main Source of Income (%)				
Full government pension	51.2	63.2	38.7	41.8
Part government pension	29.3	20.7	33.5	35.5
Self funded	19.5	16.1	27.7	22.7
Household Type (%)	20.8	44.6	79.2	55.4

Source: Household Survey, 1999.

Table 4. Issues that Have Caused Significant Hardship or Worries for Gold Coast Older Residents, 1999.

Hardships/Worries	Couple Household (%)			Single-person Household (%)		
	Male	Female	Total	Male	Female	Total
Loss of close ones	9.7	8.8	9.3	41.5	38.9	39.7
Little family/friends nearby	7.7	9.6	8.6	17.1	13.3	14.5
Separation/divorce	0.6	1.8	1.1	17.1	4.4	8.4
Relocating	3.9	7	5.2	9.8	4.4	6.1
Loneliness	1.3	5.3	3	29.3	17.8	21.4

Source: Household Survey, 1999.

8. RESULTS FROM TESTING THE HYPOTHESES

8.1 The Significance of Gender, Education and Household Type

Table 5 presents the estimated coefficients (with Wald-statistics in parentheses) for the two model specifications[14] (friendship ties, family ties) of the total sample of 401 older men and women. The regression analysis for the model "friendship ties" reveals that residency status explains the frequency of contact with friends. Those living on the Gold Coast for 10 or more years are more likely to meet and socialise with friends than those residing on the Coast for less than 10 years.

The analysis of the "family ties" model reveals that education and household type explain the frequency of contact with family. Those living alone and those who are better educated are likely to meet family less often. The estimated odds that a single older person's response is in the direction of less frequent contact with family ($Y \leq j$ rather than $Y > j$) is equal to 1.6 times the estimated odds for couples[15].

8.2 The Social Network Effect of Living Alone

Table 6 presents the results for the interactive model. Both the "friendship ties" and the "family ties" models are statistically reliable ($\chi^2 = 23.726$, $p < .01$;

[14] The significant chi-square statistic indicates that the model gives a significant improvement over the baseline intercept-only model, that is, the model gives better predictions than if we guessed based on the marginal probabilities for the outcome categories.

[15] Since the logistic link function was chosen the interpretation of the estimate as an odds ratio can be made (SPSS, 1999). In this case we convert the household type estimate (.471) in the family model 1, that is, $e^{.471}$.

Table 5. Regression Analysis of the Total Sample Explaining Social Network, Model 1[16].

	Estimate (Wald-Statistics)	
	Friendship Ties	**Family Ties**
Gender (Male)	.232 (1.288)	-.006 (0.099)
Education (Junior)	-.167 (0.677)	.416 (4.558)*
Age	.0002 (0.019)	-.0002 (0.032)
Household type (couple)	-.308 (1.862)	.471 (4.723)*
Government Pension	-.005 (0.068)	.203 (1.043)
Dependence (full independent living)	.744 (8.986)**	-.006 (0.087)
Residency status (10+ years)	.722(10.157)**	.007 (0.117)
Accommodation type (house)	-.219 (1.104)	.290 (2.129)
R^2	.067	.044
χ^2	23.589**	15.837 *

Source: Household Survey 1999

* Significant at 0.05 level (two-tailed)

**Significant at 0.01 level (two-tailed).

Table 6. Differential Intercept and Differential Slope Between Coefficients of Male and Female Samples: The Interactive Model, Model 2.

	Estimate (Wald-Statistics)	
	Friendship Ties	**Family Ties**
Gender (Male)	.515 (0.437)	-1.414 (3.616)*
Education (Junior)	-.172 (0.719)	.441 (5.093)**
Age	.0002 (0.023)	-.0003 (0.060)
Household type (couple)	-.241 (0.691)	.138 (0.245)
Government Pension	-.004 (0.057)	.181 (0.825)
Dependence (full independent living)	.747 (9.033)**	-.007 (0.093)
Residency status (10+ years)	.728(10.185)**	.003 (0.020)
Accommodation type (house)	-.219 (1.105)	.302 (2.292)
Gender x Household type	-.167 (0.141)	.798 (3.529)*
R^2	.067	.054
χ^2	23.726**	19.359**

Source: Household Survey 1999.

* Significant at 0.05 level (two-tailed)

**Significant at 0.01 level (two-tailed).

[16] The threshold parameters are not important from a theoretical standpoint (SPSS, 1999) and have therefore been omitted from the table.

χ^2 = 19.359, $p < .01$; respectively). In the "family ties" model the differential intercept coefficient b_1 is statistically significant, indicating a difference between the expected values of frequency of contact with family for males and females.

Significant differences also occur in the slope coefficients for the "family ties" model. The coefficient of the interaction term for household type, as an explanation for the frequency of contact with family, is positive and significant. This verifies that household type is pronounced among men. Thus it can be said that men are sensitive to living arrangements (live alone or as a couple) in terms of their frequency of contact with family.

9. DISCUSSION OF THE RESULTS

With the growing emphasis on home-based care, informal support by family and friends is increasingly an important resource for older people.

9.1 Descriptive Statistics

The descriptive statistics from our household survey reveal that there is lesser informal support within single-person households compared to couple households. This is consistent with previous studies by Arber and Ginn (1990), Manning and King (1992), ABS (1994), Gonyea (1994), Schulz (1992), and Older Women's Network Australia (1995). Of those living alone, males appeared to possess a deficit in access to social network.

The larger proportion of divorced/separated single males (17% of single males) to single females (12% of single females) in our household survey implies that a higher proportion of these men possess inadequate social network[17]. Added to this is the reluctance of the older men to accept assistance (as suggested by our key informants and evidenced in our household survey) which raise further concerns about adequate care and support for these men.

In contrast to single men, single women are more open and accepting of assistance which, in turn, strengthens their social networking. While 13% of single females stated that they were always willing to accept help from government sources, only 5% of single males and couples reported that they would do so. The remaining respondents stated that they would only use such services when they were recommended by their doctor, when they reached a critical situation or never. While it was expected that respondents from couple households would be less reluctant to accept outside help because of the strong support base within the home, the reluctance of single males to accept help was, while surprising, in line with the expectations of our key informants. It could be said that the results reflect a culture among older males of independence associated with masculinity.

Generally we found that across all groups, social networking among the Gold Coast respondents appeared to be more tied to friends and less to family.

[17] Antonucci (1990) reported that separated and divorced older men had the weakest social network.

Although between 65% and 78% of respondents had contact with friends at least once a week, less respondents had similar contact with family (22% single males, 40% single females, 43% couple males, 41% couple females). The migration of older Australians away from their families to retire on the Gold Coast explains the greater frequency of contact with friends in this region. Our household survey reported that 28% of respondents resided on the Gold Coast for less than 10 years. A notable 34% of those surveyed previously resided outside Queensland's southeast region, while a further 58% had previously resided outside Queensland. On average single males reported the shortest stay on the Gold Coast (6-10 years) compared with others (10 or more years).

9.2 Statistical Analysis

Regression analysis reveals that, in comparison to couples, those living alone experience less contact with family. Also, among the total sample, the lower educated met with family more frequently than better educated counterparts. As education and income are positively correlated, this result was not surprising considering that higher income levels increase opportunities for retirees to migrate away from family (to the Gold Coast).

When testing for explanatory variables special to the Gold Coast, we found, as expected, that those residing on the Gold Coast less than 10 years possessed weaker social networks.

A feature special to the Gold Coast region is the greater proportion of older people residing in high-rise accommodation units (5.4% of the total older population), compared to Queensland in general (1.5% of the total older populations) and the Australian average (2% of the total older population) (ABS 1996). Such living arrangements could mean that these residents may face greater social isolation than others. Indeed interviews with key informants and high-rise apartment managers led to assumption that older people residing in high rise apartments are most vulnerable to social isolation. However we found no evidence of this in our statistical data. Possibly the low proportion of high-rise apartment residents (9.7%) in our analysis may have biased the results. There is the possibility of course that those residing in these apartments do not face social isolation. As high-rise residential apartments are located in high-density areas with easy access to public transport, health services, shops and entertainment, this could create greater opportunities for social integration.

The above statistical analysis answers the research question - that "males are more vulnerable than females to the social network effects of living alone" - in the affirmative. Additionally, the frequency of contact with family is different between older males and females, with older males more sensitive to their living arrangements. Single older males appear to possess weaker family ties than single older females.

The low R^2 suggests that factors other than individual characteristics better explain the determinants of the social networks of older people. Clearly community attributes, local government resources, government funded

programmes, and welfare policies, could provide explanations. This is beyond the scope of this paper[18].

10. CONCLUSION

Our analysis reveals that: 1. household type, residency status and education explain the social network of the Gold Coast older population; and 2. older males are more vulnerable than older females to the social network effects of living alone.

Currently single older males are adequately supported under the HACC programme mainly due to the many support services available in the Gold Coast region. This is evidenced by the general satisfaction of health services reported by the survey respondents. Although groups are protected by the safety nets of government entitlements and programmes, the current political environment of cost cutting and notions of self-reliance mean that the circumstances of vulnerable groups need to be closely monitored.

Unless formal support from community care is maintained, single older males may be faced with increased hardships (Arber and Ginn, 1991) since community care is increasingly reliant on the informal support provided by friends and family. Indeed this seems an essential ingredient in the maintenance of health and wellness for our ageing population and their continued independence through non-institutional living.

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[18] We chose to investigate individual characteristics since at the individual level older people have greater control of resources and greater opportunities for independence.

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MEASURING ECONOMIES OF SCALE IN AUSTRALIAN LOCAL GOVERNMENT: THE CASE OF DOMESTIC WASTE COLLECTION IN NSW[1]

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ABSTRACT: Both international and Australian efforts aimed at estimating economies of scale in local government service provision have been bedevilled by conceptual problems and methodological difficulties. Moreover, this empirical literature has produced mixed results. Nevertheless, Australian policymakers have embarked on a widespread program of structural reform through amalgamation in the apparent belief that significant economies of scale exist. This paper seeks to determine the extent of economies of scale in NSW domestic waste collection for the period 1995/96 to 1999/2000. Although we find some evidence in support of economies of scale, our results suggest resource sharing rather than amalgamation may represent the optimal policy instrument.

INTRODUCTION

Over the past decade, state governments across Australia have embarked on an ambitious program of local government reform aimed at enhancing efficiency in this sector. Although the implementation of this program has taken a number of forms, including resource sharing, cooperative service provision, joint service delivery enterprises, boundary redefinition and amalgamation, the last has evoked by far the most controversy. Advocates of amalgamation have argued that reducing the number of councils through their consolidation into larger units will result in considerable cost savings in service delivery. Indeed, Marshall, Witherby and Dollery (1999, p. 41) have observed that "it appears to have been universally accepted across all states that local government consolidation will result in reduced costs".

This argument centres on the proposition that substantial economies of scale and scope exist in municipal service delivery in Australia. For example, the National Office of Local Government (NOLG, 1998, p. 52) has claimed that

[1] The authors would like to thank two anonymous referees for helpful comments on an earlier draft of the paper. The views expressed in this paper do not necessarily reflect the views of the Reserve Bank of Australia or Network Economic Consulting Group.

"structural reform delivers economies of scale and permits councils to employ a wider range of professionals, so that they can offer a wider range and higher quality of service".

Quite apart from legitimate concerns over municipal democracy arising from amalgamation (Vince, 1997), extravagant claims about the existence of considerable economies of scale in Australian local government appear to contradict both international and Australian empirical evidence on the question. For instance, after an exhaustive review of the international empirical literature on scale economies in local governance, Bahl and Vogt (1975, p. 13-14) concluded that:

"Most positive findings of scale economies are based on statistical results that show a negative relationship between population size and per capita expenditures. There are great statistical and theoretical problems with interpreting such results as showing scale economies, and about as many studies that find a negative relationship find a positive one".

Similarly, after his examination of the available evidence, Newton (1982, p. 193) caustically observed that "we can conclude with confidence that, under certain not well understood circumstances, it may, or may not, be more or less, economical to have larger, or smaller, local authorities. In short, it is not possible to make out a case against large local authorities on grounds of diseconomies of scale". Boyne (1995) drew much the same conclusion in his survey of the empirical evidence.

Australian empirical work on economies of scale in local government is afflicted with similar conceptual and econometric problems. To our knowledge, nine published studies exist. Only one finds both scale economies and diseconomies (Soul, 2000), five find scale economies (KPMG, 1998; Local Government Commission, 1986; Office of Local Government, 1993; South Australian Department of Local Government, 1988; Victorian Grants Commission, 1985), two find limited evidence of scale economies (Institute of Public Affairs, 1993; Musgrave *et al.*, 1985), and one study establishes no evidence of scale economies at all (Abelson, 1981). In common with much of the international evidence, most Australian studies adopt population as their sole explanatory variable, a procedure fraught with theoretical and statistical difficulties. Byrnes and Dollery (2002) provide a detailed critique of this literature.

Given the controversial nature of municipal amalgamation in Australia, and the inconclusive extant empirical evidence on both the existence and magnitude of economies of scale in local government service delivery, there appears to be a need for further research on this question. The present paper seeks to address this problem by investigating economies of scale in domestic waste collection in NSW councils for the financial years 1995/96 to 1999/2000.

The paper itself is divided into seven main parts. Section 1 outlines the institutional characteristics of domestic waste collection in NSW local government. Section 2 explores the various theoretical and statistical problems involved in estimating economies of scale in local government. Section 3 sets out the research objectives of the paper. The statistical model is outlined in Section 4

and data considerations are examined in Section 5. Section 6 focuses on the econometric procedures followed and discusses the results obtained in the light of *a priori* expectations. The paper ends with some brief concluding comments in Section 7.

1. INSTITUTIONAL CONSIDERATIONS

In NSW domestic waste collection is a service provided largely by local government. Residents are given a garbage bin into which they place their domestic waste. Waste collection typically occurs once a week by means of a dedicated truck fitted with a garbage compactor.

However, the process of waste collection is not entirely uniform across all NSW local government jurisdictions. In order to gain some idea of different procedures, we conducted a survey of all NSW councils. Of the 177 councils contacted, seventy responded. The results revealed that all but six percent of the responding councils collected domestic waste once per week. All councils collect the bins from the kerbside, except from apartments where a large "skip" bin is located in the basement of the building. The size of the bins issued to residents varied. 59.4 percent of councils issued 240 litre bins, while 11.6 percent issued 120 litre bins. In 18.8 percent of cases, residents could choose either a 240 or 120 litre bin.

All responding councils indicated their domestic waste collection was undertaken in trucks with purpose-built compactors. The degree of outsourcing revealed two interesting features. Firstly, about 75 percent of councils contract out the collection of domestic waste. The market for waste collection does not appear to be dominated by any one contractor. Of those councils that did outsource, 23 percent held their contract with the same company. The remaining contracts were split between twenty-two contractors and the next largest share of contracts held by any one of those companies was 7.7 percent. These results thus show that the major providers of domestic waste collection services in NSW are local councils themselves.

Twenty five of the seventy responding councils expressed an opinion on the existence of scale economies in NSW domestic waste collection. Of those, sixteen thought that economies of scale do exist, although four qualified this in some way. Five argued that economies of scale do not exist.

2. THEORETICAL AND INSTITUTIONAL CHALLENGES

In theory, economies of scale can arise across a production function in which a homogeneous good is produced. This conceptual definition presents significant problems in applying the theory of economies of scale to local government (Gupta and Hutton, 1968). Australian municipalities dispense a wide range of services and functions. For instance, in NSW local government is responsible for waste collection and disposal, library services, local roads, footpaths, land zoning, building approvals, stormwater drainage and street lighting – to name but a few. Each function has its own cost per unit of output. It is thus impossible to measure economies of scale for the whole of local government. We need to

distinguish between different services and functions and then test each function separately for scale economies. Furthermore, even where it is possible to distinguish between discrete functions, the unit of output may be far from homogeneous. For instance, building approvals are complicated by the fact that buildings come in many different shapes and sizes, and may thus require markedly different lengths of time to inspect.

Even if it were possible to find a service in which complete homogeneity in the unit of output existed, the environment in which the service is provided may influence production costs. Thus, for building approvals, a council with primarily residential housing would presumably exhibit a lower cost per unit of output than a council incurred with many large commercial and industrial premises.

Questions of service quality further complicate the problem of measuring economies of scale. In local government, where we are dealing to a large extent with local public goods of some degree, the price mechanism is weakened by the presence of free riders. For example, in domestic waste collection, a council, given public health considerations, is unlikely to leave a full rubbish bin at the kerb because a resident has not paid their waste collection charge.

By far the most compelling difficulty faced in the application of the theory of economies of scale to local government resides in valuing inputs. Where local governments are required to report cost figures, they typically do not split the cost between labour and capital, or identify the costs associated with overheads. Although it would be advantageous to have data on all input requirements, simply having a statistic for average cost per unit of output does at least allow us to determine what happens to average cost as the scale of local government changes. However, it limits our ability to measure relative factor price changes or marginal rates of substitution between inputs. Moreover, it is not possible to explicitly determine whether a council's output and cost is being measured in the short or long run. These difficulties necessitate several assumptions.

In the present instance, we assume that the five-year period captured by our data is sufficiently long to allow for variation in all inputs. Since it is customary to assume that capital is likely to be the fixed factor in the production of a good or service, in the case of domestic waste collection, it seems reasonable to presume that the primary capital requirement is the truck that collects the waste. NSW councils either own vehicles themselves and use council labour or they outsource the service. Discussions with a number of NSW municipal engineers indicated that council-owned trucks are replaced at five to ten year intervals. For outsourcing councils, the number of vehicles in use varies in proportion to the number of bins to be collected and the contractor is responsible for varying the capital stock. Furthermore, it seems reasonable to assume that if a council is not satisfied by the service furnished, it will engage a different contractor. It appears acceptable then to assume that we are measuring costs in the long run.

Finally, the question of scale is problematic. Many empirical studies simply adopt the population of a municipal jurisdiction as a proxy for scale: thus, as the population of a given area grows, so too does the scale of its production. However, Boyne (1995) has argued that population may not be an adequate measure of scale for a number of reasons, not least population diversity and

temporary migration from adjacent jurisdictions.

These difficulties explain why the present study is limited to analysing domestic waste collection. This service is relatively homogeneous, in that there is little variation in the quality of the work or in the environment in which the function takes place. Moreover, the panel data covers a sufficient length of time to allow for the measurement of costs in the long run. Finally, the measure of output to be used, the number of bins collected, seems to be relatively closely related to the demand for the service, and may thus provide a reasonable measure of scale.

3. RESEARCH OBJECTIVES

The major objective of this paper is to determine whether economies of scale occur in the collection of domestic waste in NSW. The investigation itself may be sub-divided into three constituent elements. Firstly, in order to determine whether economies of scale exist, the first objective is to establish whether a statistical relationship exists between the long-run average cost of collecting domestic waste and the number of bins collected. If a relationship is present, then the second objective is to determine whether this relationship provides evidence of economies of scale, diseconomies of scale, or both. Finally, if scale economies are found across the entire data set, the final objective is to conduct tests in order to ascertain whether these are more prevalent in metropolitan NSW councils relative to rural and regional local governments.

4. STATISTICAL MODEL

Table 1 outlines the explanatory variables employed in the cross-sectional analysis of a sample of 158 local government areas in NSW. The dependent variable in this model is the average cost (AVCOST) of collecting domestic waste per bin collected. Since the data set spans a five-year period, a variable (PRICE) is included to measure the effect changes in price may have upon AVCOST. Although it would be desirable to measure the various factor input costs, data deficiencies do not allow this, and given the absence of a more suitable dependent variable, AVCOST is used.

Table 1 defines the set of independent variables employed. These variables are included to capture the salient characteristics that are likely to influence the average cost of domestic waste collection. In order to test for economies of scale, a "client group" approach, following Hirsch (1965), is taken in measuring output. In the context of domestic waste collection, the quantity of bins collected is deemed to be the best available proxy for output. To approximate a U-shaped long run average cost curve (LRAC), a parabolic relationship is assumed in QBIN (the number of bins collected per week). This variable is expected to be negative, reflecting the negatively-sloped portion of the LRAC curve, whereas the square of QBIN is expected to exhibit a positive coefficient with respect to average cost, indicating that diseconomies of scale set in after some level of output.

Table 1. Variable Specification.

Variable	Details	Data Source	*A priori* Expectation of Sign
AVCOST	Average cost in dollars of collecting domestic waste per bin	NSW Department of Local Government comparative statistics, 1995/96 - 1999/00	
QBIN	Number of bins collected per week	NSW Department of Local Government comparative statistics, 1995/96 - 1999/00	-
$QBIN^2$	Square of QBIN	NSW Department of Local Government comparative statistics, 1995/96 - 1999/00	+
INC^2	Average taxable income of council residents	Regional Statistics Data – NSW 1999 Statistical Local Areas (ABS) and Australian National Accounts: State Accounts (ABS) Cat. 5220.0	+
POP	Population within council boundaries	NSW Department of Local Government comparative statistics, 1995/96 - 1999/00	-
PRICE	Implicit price index of state and local government expenditure	Table 45, Australian National Accounts, ABS Cat. 5206.0	+
BINDEN	Number of bins per square kilometre	NSW Department of Local Government comparative statistics, 1995/96 – 1999/00	-

Notes: The City of Sydney has been excluded from the data set since it is an atypical council, mainly servicing either high-rise apartments or commercial premises. During the period of analysis, a number of amalgamations took place amongst councils in NSW. Of those, the councils of Armidale City and Dumaresq Shire began operating as a new council, Armidale Dumaresq, during the financial year 1999/2000. As a result, Armidale Dumaresq, Armidale City and Dumaresq Shire councils have each been excluded. No other amalgamated councils began operating in their new form within the period of analysis. Nineteen councils failed to submit data pertaining to the variables employed in this model in at least one of the years, and have therefore been excluded from the analysis. We thus have 158 NSW local governments over five years, or 790 observations for the requisite period.

The variable included to measure the average individual taxable income (INC) of residents within a local government area is expected to have a positive sign, following Hirsch (1965) and Abelson (1981). It is argued that relatively

[2] The average taxable income of council residents was first published in 1999 by the ABS, so some other measure of change in income was required for every other year in the data set. In order to apply this data to years other than 1999, use was made of gross household disposable income (ABS, 2000, Table 25). Although this is a less accurate measure of average taxable income for each local government area, it may provide some indication of the effect of relative income upon the average cost of collecting domestic waste.

higher income leads to the generation of greater quantities of domestic waste[3]. Residents with relatively higher incomes might also be expected to live within metropolitan Sydney, and as a result complications, such as on-street vehicle parking and traffic congestion, might impact upon the ability of waste collection trucks to operate at least cost.

The variable PRICE measures the price of factors that the local government employs in offering local government services. Its sign is expected to be positive. If the price of factors increases, so too should the cost if using those factors to supply local government services. Its proxy is the implicit price deflator for state and local government expenditure, from Table 45 of the Australian National Accounts (ABS, 2002).

Finally, in order to measure relative density among the councils, the variable BINDEN is included in the model. This variable represents the number of bins per square kilometres: it is added on the assumption that the larger the number of bins per square kilometre, the greater will be the time spent collecting waste rather than travelling to gather it. It is important to note that this measure can in some circumstances be deceptive, especially for regional and rural councils which often span large areas. However, waste collection services extend only to residents within relatively densely populated towns. As a result, while it may be expected that an increase in the number of bins collected per square kilometre might be assumed to reflect greater density, a council with a relatively low value for this variable could well have a relatively dense collecting area. Although it is anticipated that, in the main, this variable will have a negative sign, this coefficient should be interpreted with this caveat in mind. We arrive at a model consisting of five independent variables taking the following form:

$$\text{AVCOST} = \beta_1 + \beta_2 QBIN_t + \beta_3 QBIN^2_t + \beta_4 INC_t + \beta_5 POP_t + \beta_6 PRICE_t + \beta_7 BINDEN_t + e_t \quad (1)$$

Having established the *a priori* expectations of the variables within the statistical model, we now discuss the data sources for each variable.

5. DATA CONSIDERATIONS

Table 1 indicates the source of the data for each variable employed in the statistical model. All but two of the six variables rely on data published by the NSW Department of Local Government (DLG, 2001). The data set spans the financial years 1995/96 through to 1999/2000. Although the published figures are not audited by the Department, councils are nevertheless required to have their annual financial returns independently audited. Since much of the data is taken from these returns, we can approach the data set with a reasonable degree of confidence regarding reliability. Whilst it would be preferable to make use of

[3] This assumption is open to question on grounds that some new evidence suggests that higher incomes correlate with lower levels of domestic waste. See, for instance, Inglehart *et al.* (1998).

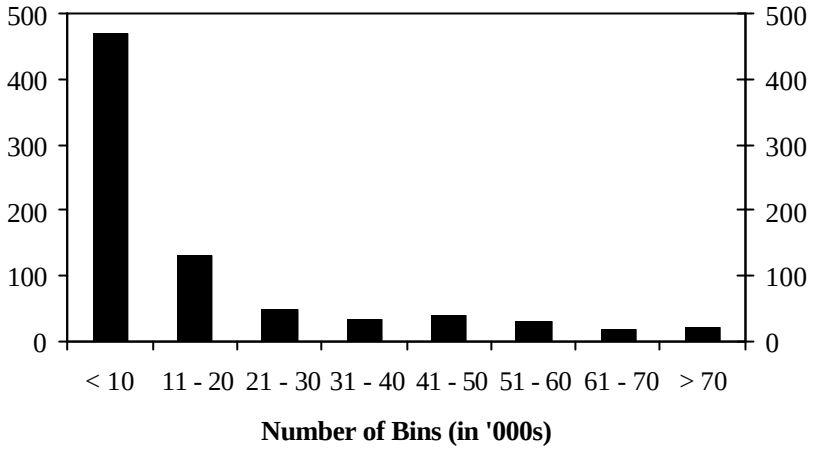

Figure 1. Bin Distribution.

a data set compiled by professional statisticians, such as the Australian Bureau of Statistics (ABS), the DLG data set is the only one available that spans a sufficient period of time for our assumption regarding the long run to hold.

6. DESCRIPTIVE STATISTICS

The vast majority of local councils under investigation (some 59%) collect ten thousand or fewer bins (see Figure 1): these councils thus "produce" a domestic waste collection service that is very small in scale. At the other extreme, only twenty one municipalities (or 3%) collect in excess of seventy thousand bins, six of which produce at a very large scale by collecting more than one hundred thousand bins. The average costs in Figure 2 vary across localities, as expected if economies of scale are important. Unexpectedly, however, the two groups of localities that have the lowest unit costs are the largest collectors, with an average unit cost of $67, and the smallest collectors, with an average unit cost of $76. The localities with the highest unit costs collect between twenty and thirty thousand bins per year. Perhaps even more surprisingly, localities that collect between thirty and seventy thousand bins have similar unit costs at an average of around $90.[4]

Conceptually, these results can be described in terms of a LRAC function that exhibits economies of scale. Consider Figure 3. A small locality that collects ten thousand bins may use their relatively small fleet of garbage trucks highly efficiently, even though they operate a plant that is positioned to the left of the long-run minimum efficient scale, generating a low unit cost of $76. A large council that collects one hundred thousand bins may employ its large fleet of

[4] Each group of localities has around the same coefficient of variability, and the median measure is close to the mean.

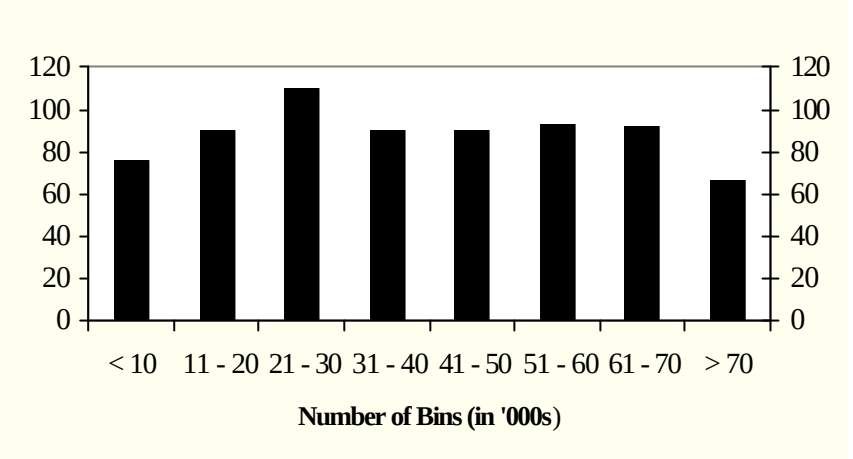

Figure 2. Distribution of Average Cost.

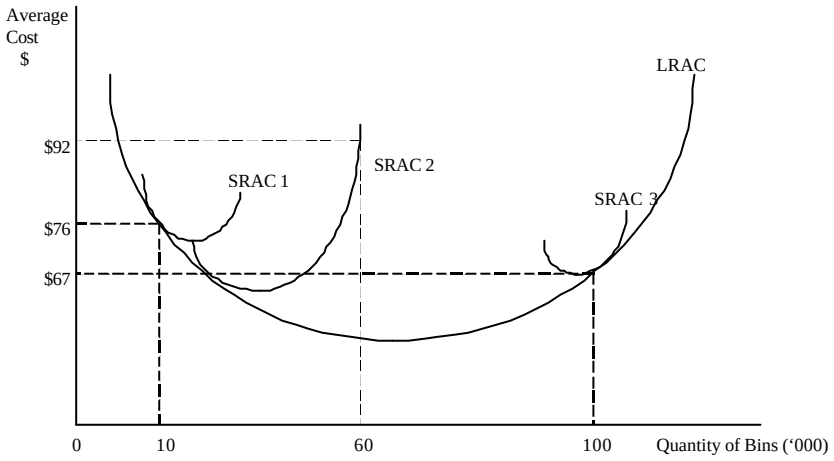

Figure 3. Relationship Between Long Run and Short Run Average Cost.

trucks efficiently, taking advantage of economies of scale to collect each bin at an average cost of $67. Councils that collect sixty thousand bins use a medium-size fleet of trucks relatively inefficiently, operating high on the right hand side of the short-run average cost curve.

In Table 2, some of the right hand side variables in the econometric investigation may suffer from multi-collinearity, thus reducing the precision with which the relevant coefficients are estimated. The quantity of bins and the population size are highly positively associated, with a correlation coefficient of

Table 2. Correlation Coefficients.

	QBIN	POP	BINDEN	INC	Price
QBIN	1				
POP	0.79 (0.00)	1			
BINDEN	0.26 (0.00)	0.07 (0.00)	1		
INC	0.12 (0.00)	0.08 (0.00)	0.31 (0.00)	1	
PRICE	0 (0.91)	0 (0.74)	0 (0.74)	0.10 (0.00)	1

Note: *p*-value in parentheses.

Table 3. Ordinary Least Squares Estimates.

Variable	Estimated Coefficient
QBIN	-0.16984E-02 (0.00)
$QBIN^2$	0.30859E-08 (0.121)
BINDEN	0.10089E-01 (0.00)
POP	0.60863E-03 (0.00)
INC	0.10952E-02 (0.00)
PRICE	1.2024 (0.00)
Constant	-86.577 (0.00)

Breusch-Pagan-Godfrey (BPG) test = χ^2_6 = 50.040 (0.00)

Breusch-Godfrey test (BG) = χ^2_1 = 8.927 (0.00)

Jacque-Bera (JB) = χ^2_2 = 163.3902 (0.00)

R^2 = 0.253

79% that is significant at conventional levels. This is to be expected: an increase in the population leads to an expansion in the number of residences and thus the number of bins required to accommodate the waste collection needs of those new residences. However, this relationship is not monotonic; in part reflecting the fact that growing households make do with the same number of bins. The remaining correlation coefficient of significance is that between bin density and income. At an association of 31%, this may be explained by rising income levels inducing a more densely located population, and thus bins located closer to one another. Although the existence of these significant correlations may affect the precision with which the coefficients of QBIN, POP, BINDEN and INC are estimated, they will not suffer from bias. If these coefficients are found to be significant, this is evidence that the collinearity is not strong enough to mask the separate explanatory influence of the relevant variables.

Equation (1) was estimated over the full panel of data consisting of $T = 790$ observations using Ordinary least Squares (OLS). The results are presented in

Table 3 along with relevant diagnostics. The results show that, based on coefficients that are significant at the 10% level, the LRAC curve is linear and decreases with output, implying that there are significant economies of scale benefits experienced by councils collecting a large number of bins.

The LRAC curve is not U-shaped since $QBIN^2$ is insignificant at the 10% level. Despite the strong collinearity with the quantity of bins collected, the size of the population induces higher average collection costs. There are at least two possible explanations for this significance. The first is that as the population size increases for a given number of bins collected, the amount of waste collected per bin is likely to rise. This in turn forces the same number of collection trucks to make more trips, or the time taken for the waste in each bin to be collected increases, thus increasing the amount of labour required to meet collection requirements. Alternatively, councils may make a decision to use more trucks to collect waste; however, this may position them high on the left hand side of a new short-run average cost curve, especially if many of those trucks are under-utilised. The second explanation is that an increase in the population results in more waste being deposited in public waste bins (and/or a need for more public waste bins), which increases total council waste collection costs per domestic bin. There may also be an increase in commercial waste collected, which in turn increases total and thus unit waste collection costs. The remaining variables that significantly shift the LRAC curve are income, bin density and factor prices. In earlier estimations, the area of a council (in square kilometres) and kilograms of domestic waste collected were found to be significant, but were omitted in the pursuit of the most parsimonious specification.

If it is accepted that the coefficient on $QBIN^2$ is significant, then the LRAC curve is U-shaped, making it possible to compute the minimum efficient scale. Differentiating the expected LRAC with respect to *QBIN*, setting the result equal to zero and solving for *QBIN* yields the minimum efficient scale of 275,187. This level of bin collection is feasible if two or more of the large urban councils, especially those within reasonably close proximity, amalgamated their waste collection divisions.

The diagnostic statistics in Table 3 indicate that the OLS estimates suffer from heteroskedasticity (BPG test), first order serial correlation (BG) and non-normality of the residuals (JB test). These problems undermine the efficiency with which the coefficient of the LRAC function is estimated, and the reliability of tests of significance. In order to overcome the heteroskeasticity and serial correlation problems, Kmenta's (1986) maximum likelihood estimator, specifically designed for panel data, is used. The following assumptions about the disturbance term are employed:

These respectively imply that the disturbance variance varies across all i cross-sections, there is no contemporaneous disturbance correlation between cross-sections, and there is first-order serial correlation in the disturbances for

$$E\left(e_{it}^2\right) = \sigma_i^2 \tag{2}$$

Table 4. Kmenta Maximum Likelihood Estimates: Full Panel.

Variable	Estimated Coefficient
QBIN	-0.12330E-02 (0.00)
$QBIN^2$	0
BINDEN	0.84699E-02 (0.00)
POP	0.51536E-03 (0.00)
INC	0.95398E-03 (0.00)
Price	1.3149 (0.00)
Constant	-98.456 (0.00)

Breusch-Pagan-Godfrey test = χ_5^2 = 13.904 (0.02)

Breusch-Godfrey test = χ_1^2 = 0.4734 (0.49)

Jacque-Bera = χ_2^2 = 25.503 (0.00)

Buse (1973) R^2 = 0.3321

$$E\left(e_{it}e_{jt}\right) = 0 \tag{3}$$

$$e_{i1} = re_{i,t-1} + h_{it} \tag{4}$$

each cross-section across time. The autocorrelation coefficient ρ is estimated using OLS to be 0.18, which is used in order to generate the maximum likelihood estimates of Table 4.

The results reported in Table 4 indicate that the LRAC is not U-shaped – the same conclusion reached by the OLS estimates at the 10% level. The LRAC curve is linear and downward sloping, implying that there is no minimum efficient scale. This suggests that there are considerable economies of scale benefits to be enjoyed by councils if they amalgamate or share resources in order to expand the number of bins they collect. The diagnostic statistics for the Kmenta estimator are more favourable then those for the OLS estimator, particularly the improvement in the degree of explanatory power as indicated by the Buse R^2, although there is evidence that some heteroskedasticity persists in the estimated specification and the residuals are non-normal, casting doubt on the accuracy of the t-statistic results.

In order to understand whether the shape of the LRAC curve differs across the general location and size of councils, the sample is broken up into two groups: that is, metropolitan councils; and rural and regional councils combined.

Table 5. Kmenta Maximum Likelihood Estimates: Metropolitan.

Variable	Estimated Coefficient
QBIN	-0.19766E-02 (0.00)
$QBIN^2$	0.66049E-08 (0.01)
BINDEN	0.46819E-02 (0.02)
POP	0.39420E-03 (0.00)
INC	0.60391E-03 (0.00)
PRICE	0.86015 (0.00)
Constant	0

$T = 240$

Breusch-Pagan-Godfrey test = χ_6^2 = 19.8 (0.00)

Breusch-Godfrey test = χ_1^2 = 9.742 (0.00)

Buse (1973) $R^2 = 0.3685$

Table 6. Kmenta Maximum Likelihood Estimates: Rural and Regional.

Variable	Estimated Coefficient
QBIN	-0.29796E-02 (0.00)
$QBIN^2$	0.12989E-06 (0.01)
BINDEN	0
POP	0
INC	0.23616E-02 (0.00)
PRICE	0
Constant	16.391

$T = 550$

Breusch-Pagan-Godfrey test = χ_3^2 = 3.575 (0.311)

Breusch-Godfrey test = χ_1^2 = 9.742 (0.01)

Buse (1973) $R^2 = 0.2432$

In aggregate, there are 48 metropolitan councils, generating $T = 240$ observations, and 110 rural and regional councils combined, yielding a panel of $T = 550$ observations, a total of 790 observations. OLS estimates of both the metropolitan and rural and regional LRAC found quite severe heteroskedasticity and serial correlation. The Kmenta estimator is used in order to overcome these problems with the results presented in Tables 5 and 6.

The results of Table 5 and Table 6 indicate that both the metropolitan and rural and regional LRAC curves are U-shaped, with the QBIN and $QBIN^2$

variables significant at conventional levels in both specifications. The metropolitan specification, with a superior Buse R^2, explains more of the variation in average costs than the rural and regional specification. This is explained by the lack of significance of BINDEN, POP and PRICE in the rural and regional specifications. The minimum efficient scales for both groups of councils can be estimated because the LRAC curve is U-shaped, given by:

MES_{metro} = 149,631
MES_{RR} = 11,470

These results suggest that the economies of scale are far greater in urban localities than in rural and regional localities.

An interesting question arises from the relatively low R^2 score for the results in Table 6. This suggests that the model as presented in equation (1) is of limited use in explaining the variation in LRAC in rural and regional councils. It appears that it would be advantageous to include a number of supplementary variables in this model. With this in mind, we suggest a number of possible variables that one might include in a future study. They can be categorised under three broad lines of inquiry: economic, technical and empirical.

From an economic perspective, one possible variable that has not been included in the model is the degree of competition in the waste collection industry in rural and regional NSW. Baumol *et al*. (1982) introduced the concept of contestable markets in order to show that the threat of competition, even in a monopolistic market, may be sufficient for a firm to act as though it were in a competitive market. In the case of the waste collection industry in rural and regional NSW, it may be argued that firms do not face the threat of competition to the same degree as those in the larger metropolitan centres. It follows that rural and regional firms may be able to charge relatively higher prices for waste collection, and this could explain the variation in the LRAC of domestic waste collection faced by councils in rural and regional NSW. It need hardly be added that collecting data or adducing reasonable proxies for the "degree of competition" would be no easy matter.

Similarly, at the technological level, domestic waste collection providers, whether firms or councils in rural and regional NSW, may not have access to the same waste collection technology as their metropolitan counterparts. If this is the case, this may be an important variable to include in any model seeking to explain LRAC. If a firm or council employs, say, a relatively less productive garbage compactor, then this would presumably necessitate more frequent trips to the disposal site, leading to an increase in the average cost for each bin collected. Measures of "technical access" are difficult to determine, both conceptually and empirically.

In empirical terms, two further conceivable reasons for the results obtained in Table 6 relate to the data used in the analysis. We have already indicated that the NSW DLG data set was not audited: there is thus a possibility that parts of the data set could be flawed. It may well be the case that in the relatively smaller councils that dominate rural and regional NSW, some municipal officers simply estimate figures when returning the information required by the DLG. This could

weaken any systematic relationship between the variables employed in the statistical model. As a result, the R^2 is likely to be lower than would otherwise be the case.

Finally, it is possible that the method by which the data was segregated in order to categorise NSW councils as either metropolitan or rural and regional was imprecise. Perhaps a less aggregated approach was required. This is an interesting question that would seem to lend itself to further study.

7. CONCLUDING REMARKS

The present study has sought to determine whether economies of scale exist in the delivery of services by local government in NSW by examining the specific case of domestic waste collection. This function was chosen since it is a relatively homogeneous dimension of municipal service delivery, thus lending itself to comparison among the 158 NSW councils under investigation.

The major finding of this paper is that there is some evidence of economies and diseconomies of scale in municipal domestic waste collection, with respect to the number of bins collected, when NSW is considered in its entirety. Put differently, both rural and regional and metropolitan councils enjoy economies of scale with respect to the number of bins involved in waste collection. Furthermore, the results relating to rural and regional councils suggest that the slope of the LRAC curve is steeper on both sides of the output associated with minimum efficient scale, suggesting that rural and regional councils may benefit from changing their scale of output relatively more than their metropolitan counterparts.

Various policy implications derive from these results. Firstly, our findings suggest that the amalgamation of neighbouring councils both within metropolitan and rural and regional NSW is likely to yield lower per unit costs in the collection of domestic waste. The *initial* policy inference that *could* be derived from these findings is that there is empirical evidence in support of amalgamation throughout NSW, at least for domestic waste collection.

However, our results should be interpreted with a number of important caveats in mind. Firstly, the relatively lower R^2 score obtained from the analysis of rural and regional councils implies that we must exercise a degree of circumspection if it is to be deduced from these results that a policy of amalgamation should be pursued in rural and regional NSW. The explanatory power of this model is much lower when applied to an analysis of local government in rural and regional NSW than metropolitan centres. As a result, any conclusions we may draw from these results should be tentative, since a number of other factors, not considered in this paper, appear to influence the LRAC of collecting domestic waste in the rural and regional councils of NSW. Put differently, some other factor, not accounted for in this model, may impact upon LRAC to such an extent that any reduction in cost attributable to an increase in size may be eroded, or even exceeded, by an increase in cost correlated with one of the variables not included in this study.

A related point follows. To the extent that we can be confident of the results presented in Table 6, the LRAC curve for rural and regional municipalities has a

relatively steeper slope either side of the minimum efficient scale of output in comparison with that obtained for metropolitan councils. This may have grave consequences for policy makers if they pursue amalgamation in rural and regional NSW. If this policy was achieved, and an error was made with respect to the most efficient number of bins to be collected per council, then the increase in cost would be higher in rural and regional councils than for their metropolitan counterparts. Consequently, our results, in so far as they relate to rural and regional local government authorities at least, may be a poor guide for policy making in this contentious area.

With respect to metropolitan councils, we can approach the results with a greater degree of confidence. This arises from the fact that the coefficients on QBIN and $QBIN^2$ are highly significant. Likewise, the R^2 score, at 0.3685, is relatively higher than that obtained in the analysis of rural and regional councils. With this in mind, we thus can argue that the model explains an appreciably higher proportion of the variation in the LRAC of collecting domestic waste in the context of metropolitan local government. Moreover, since the LRAC curve is relatively flatter for metropolitan councils, the cost of policy errors is accordingly somewhat lower.

Whereas amalgamation seems to have been the preferred approach to structural reform in local government across most of the states in Australia during the 1990s, this may not necessarily be the most desirable policy option available, since amalgamation inexorably implies a change in the population of councils. This argument can be developed on the basis of the results obtained in Table 5 and Table 6. In the case of metropolitan councils, the population of a local government increased the costs of collecting domestic waste. By contrast, for the rural and regional councils, population was an insignificant variable. These results thus suggest that reductions in the LRAC of collecting domestic waste are more likely to be achieved by increasing the number of bins to be collected by each council, whether in rural and regional or metropolitan councils. This implies that neighbouring councils should share both the capital and labour inputs used in the process of domestic waste collection. Resource sharing rather than amalgamation would thus best capture any cost reduction.

Our results appear to support the theoretical arguments advanced by Dollery (1997). Drawing on the economic theory of fiscal federalism, largely derived from Oates (1972), Dollery argued that the various local public goods and services provided by Australian local government are likely to have different benefit regions. He presented the following argument (Dollery, 1997, p. 450):

"Local public services vary greatly in their economic characteristics, like economies of scale and benefit regions. This has important implications for determining optimal public service provision in local government. For example, it is highly unlikely that the optimal service district for fire protection services will coincide, or even resemble, optimal service districts for, say, refuse collection, public parks, or sewerage treatment services. It follows on theoretical grounds that a single common service district for even a relatively small number of local public services resulting from amalgamation of small councils may not be efficient, even if any positive gains in administrative efficiency are included."

Although the results presented in this paper suggest that the number of bins collected by each council bears a significant relationship to the LRAC of collecting domestic waste, they do not necessarily support an argument for amalgamation *per se*. An economic case for amalgamation could only be made if it could be shown that the shape and position of the LRAC curves for a large proportion of the services provided by local government in NSW were substantially similar. This awaits further empirical work on services other than domestic waste collection.

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BOOK REVIEWS

PLANNING FOR SUSTAINABLE INDUSTRY

Brian Roberts and David Wadley (eds.) (2002), Queensland Division of the Royal Australian Planning Institute, Brisbane. ISBN 0-9092581-0-4, pp. 124.

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As the editors note in their introductory chapter, ' "sustainability" is a most ambiguous word' (p.2). Whilst they refer to traditional literal meanings including 'maintain', 'endure' and 'nourish', the editors identify more pertinent connotations of 'economic viability, social acceptability and ecological efficiency', the elements of accountability underpinning the so-called *triple bottom line*.

Given the nature of this text, it is not difficult to be challenged by an appearance of ambiguity, even when well into the material. It is a compilation of ten papers presented at a seminar held, in May 2001. The book under the theme 'Planning for Sustainable Industry Development' and will be of value to development agencies from federal to local levels, members of industry and those who are interested in industrial ecology. Since the professional backgrounds of the authors cover a broad range of interests and standpoints, the juxtaposition of differing perspectives presented in this book maintains a sense of tentativeness or uneasiness and perhaps a consequential heightening of interest. This directs the reader to move quickly on from one chapter to the next in order to identify the philosophical allegiance of each author. For example, there is a case where industries are to be potentially sustainable due, in part, to their proximity to an abundance of electricity from a planned 1,400 MW coal-fired power station. Yet there are others where there is planned minimisation of energy use and waste generation with anticipated benefits from symbiotic integration between the industries involved.

After a very brief overview of some elementary concepts of sustainability and a short piece on the State of the Environment reporting, there are chapters on infrastructure provision in Queensland, an industry perspective on efforts to improve the environmental performance of manufacturers and models of voluntary partnerships between government and industry to enhance sustainable development outcomes. Then follows a chapter on industrial ecology, prompting reflection on concepts developed by Isard (1968; and Isard *et al*., 1969). A profile of proposed development in the Stanwell-Gracemere industrial corridor in Central Queensland and details of Synergy Park, to the west of Brisbane, precede a chapter providing an overview of the Integrated Planning Act 1997 and the Integrated Development Assessment System in Queensland. The final chapter is titled 'Planning Guidelines towards Industrial Ecology' and reinforces the

complexity of such processes as had been exemplified in many of the previous chapters.

Many pages of the text are dotted with future directives – 'should', 'needs to', 'must' and others. The difficulty confronting planners and agencies involved in development is to translate these into practice. A further challenge is to ensure that essential environmental criteria are preserved in the face of future arguments for less desirable development. Perhaps, rather than planning for sustainable industry, the book has suggested to this reviewer that one should target sustainable planning for industry. This could encompass key issues of long term environmental monitoring, the implications of new technology on industrial inputs and outputs, accommodating industry expansion in order to achieve economies of scale, industrial succession planning and the consequences of changes in land zoning to name but a few. In relation to the last, it is felt that the triple bottom line needs to be extended to include political pressure.

To sum up, this short text is an interesting collection of seminar papers that provides a range of viewpoints and includes several case studies of planned approaches to sustainable industry.

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REGIONAL ECONOMIC DEVELOPMENT: ANALYSIS AND PLANNING STRATEGY

R.J. Stimson, R.R Stough and B.H. Roberts. Springer-Verlag, Berlin, 2002, Hardcover, 397 p., ISBN 3 540 43731 2, EUR 79.95; £56.00.

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This book, in Springer's *Advances in Spatial Science* series, should be particularly welcomed by practitioners and teachers of regional and local economic development. It provides an up-to-date, comprehensive and innovative guide on how to analyse a regional economy and to use the results of the analysis to guide a strategy for regional economic development. Some of the tools discussed will be very familiar to practitioners, but there are also a number of new ones, some of them techniques which the authors have played a leading role in developing. A particular strength of the book is that these techniques are

presented in the context of approaches to strategic regional planning. In the words of the authors:

> *the book sets out to provide teachers, students and practitioners in regional economic development with a tool-kit of tried and tested methods for regional economic analysis and strategy planning. But importantly it also introduces the reader to recent innovations in methodologies for setting about the process of regional economic development planning.*

Chapter 1 introduces a number of concepts and approaches in regional economic development, including an outline of changes in the second half of the last century and up to the present in economic development policy and planning strategies. It also introduces the major theories that attempt to explain regional economic development, from economic base theory developed in the 1950s to competitive advantage theories that became popular in the 1990s. Chapter 2 describes the evolution of regional development strategies in the 1960s, 1970s and 1980s, and provides some case studies of the tools adopted during this period.

Chapter 3 has an extensive explanation of economic base and shift-share analysis, with detailed examples of the use of these analytical techniques. Criticisms of shift-share analysis are noted and discussed, and recent extensions to the technique are explained. The chapter then goes on to discuss newer approaches, such as the incorporation of total factor productivity measures into shift-share analysis, and Data Envelopment Analysis. Whether readers unfamiliar with these techniques will readily be able to follow the applications is questionable. While the emphasis in the book is on how to apply the results of these analytical methods rather than on how to do them in the first place, readers need to know what the columns of figures mean if they are to follow the applications. A more basic account of a simplified shift-share table, for example, would greatly help the uninitiated. On the other hand, the discussion of the relative strengths of each of these methods is excellent.

Chapter 4 is about input-output analysis (I-O), a method which few people outside a small group of aficionados seem to understand. I therefore read this chapter with particular interest, to see if it was able to break through the barrier of incomprehension that seems to surround this technique. The authors provide more help for the beginner than with shift-share analysis, as they set out and discuss a simple I-O transactions table, and tell the reader where to go for a more detailed account. They then illustrate the use of the method with two case studies. The first is of the impact of a large firm on the Virginia economy, but the lack of an I-O table for the region means that the reader can't see how the figures for impacts are derived. The second example is a sophisticated and very interesting case study of the use of I-O analysis in the construction of projections made for comparing development scenarios for Brisbane-South East Queensland.

Chapter 5 discusses the application of new approaches to strategy formulation, developed by management theorists, to regional economic development strategy. The focus is on ways of thinking about and analysing futures for regions, and then developing strategies that attempt to influence these

futures. The authors are well aware that planners are unable to accurately predict the future or to have full control of the events that produce that future. They argue that 'the role of planning for futures thus needs to become less concerned with defining and predicting events and outcomes and more concerned with the processes of anticipating and managing the future.' The chapter outlines a number of techniques that can be used to analyse regional futures, and some strategic approaches to attempting to manage a region's future. A number of the approaches to strategy discussed in the chapter are then brought together in an integrated approach, one that has been tested through one of the authors' own work on an economic development strategy for the Cairns region. Two of the key tools used in this integrated approach are industry cluster analysis and multi-sector analysis, which are discussed in the next two chapters.

Chapter 6 provides an excellent account of industrial clusters and their contemporary significance in regional economic development strategies. The focus of the chapter is on techniques for identifying industry clusters, with a range of examples drawn from several countries, but there is also a short section on cluster-building strategies. Chapter 7 describes the development, methods and applications of multi-sector analysis (MSA), a technique that has been developed by the authors, illustrated by case studies from several regions. The first objective of this technique is to identify and the evaluate the factors that contribute to the competitiveness of a region's firms and industries. The second is to identify new opportunities and markets for the region's industries. A particularly interesting section deals with the assessment and management of regional risk, illustrated with a case study from Far North Queensland. MSA is a relatively complex process, and one that may be beyond the scope of many regional development organisations, but it does seem to yield some interesting and useful information. However, using this information to implement appropriate regional development strategies is a lot more difficult.

Chapter 7 discusses the role of leadership and capacity building in regional economic development. After a short account of developments in economic growth theory and its recognition of the role of local factors in regional development, and of social capital, the chapter focuses on leadership, the concept of an agile region (defined as a region with rapid response capability) and the role of hard and soft infrastructure, networks, and strategic alliances in creating agile regions. This is another interesting chapter, less technical than the others, but possibly with more ideas that practitioners with limited resources could use.

Chapter 9 examines analytical techniques that assist decision making by modelling the effects of alternative policies, and their integration with Geographic Information Systems to produce spatially disaggregated outputs. Examples are given of spatial and non spatial decision support analyses, but I found the non spatial case study of North Virginia much more interesting and useful than the case studies which incorporated Geographic Information Systems. This may reflect the stage of development of the latter technique. The final chapter which reviews regional development strategy in the context of rapid change, knowledge based economies, the challenge of the virtual economy, the need to develop regional competitive advantage and the pressures for environmentally and

socially sustainable development, provides lots of ideas to think about.

The book contributes to two areas of knowledge that regional development practitioners and teachers will find useful. One is material on a range of contemporary and sophisticated analytical tools and their application, for which the book provides a unique and comprehensive guide. Although there are good books that explain the longstanding and basic techniques, none cover the newer ones. However, I suspect that many practitioners from smaller organisations will find some of these techniques beyond their capacity to use. The second is a range of ideas on strategic thinking for regional economic development. Here I believe that even those who find they can use few of the techniques will gain a lot of benefit, in issues such as what underpins regional competitiveness, the concept of regional risk, the role of collaborative competition and strategic alliances or strategies to influence a region's future. This is not a beginner's book, but it will repay careful study. Definitely recommended if you can afford it.

Which brings me to two minor complaints. One is the cost of the book - £56 Sterling - which is unfortunately normal for many academic and technical books from Europe. The second is the number of unforced errors (to use a tennis analogy), presumably the result of insufficient checking and proofreading. Examples include 'tenant' instead of 'tenet' on p. 27, 'wear-with-all' instead of 'wherewithal' on p. 233, a wrongly formatted quotation on 25, a scrambled definition of the intermediate sector in I-O tables on p. 120, and sentences with missing, repeated or incorrect words. In this fast moving world, someone has to slow down and take responsibility for the details that are vital for clear comprehension.

URBAN GOVERNANCE, INSTITUTIONAL CAPACITY AND SOCIAL MILIEUX

Göran Cars, Patsy Healey, Ali Madanipour, Claudio de Mãgalhaes (eds.), Ashgate Publishing. 2002. ISBN 0 7546 1939 7. 264 p.

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Recognizing that urban governance "fails to respond to citizens' needs as citizens perceive them [and that] it responds only to well articulated voices or those accepted among elites, not to those of ordinary daily life experiences" (p.209), the authors explore the dynamics of change and transformation in the institutional capacity of urban governance. The book achieves a balance between theoretical exploration that disentangles various dimensions of the concept of institutional capacity and application in a series of case studies. Whilst the case studies explore European examples, the concepts elaborated in the book have far broader relevance – many resonating with urban govemance problems in developing countries.

It is argued that a 'one size fits all' governance model has little utility in a world in which complex, intersecting, and continually evolving social and economic relations operate at multiple levels and timespans. The authors maintain that "a dualist contrast between coordinated, technocratic 'managerial' governance and proactive, risk taking, 'entrepreneurial' governance fails to capture the dynamic inventive and inherently variable way in which urban governance trajectories are being moulded" (p. 220). The case is made that trajectories need rather to be understood as being contextually specific, and dependent on their positioning in local and global relations, as well as upon the availability of resources upon which to build intellectual and social capital. A key lesson, then, is that since governance capacity is formed in continual interaction with its social milieu, it is important to focus on the relationship between urban governance processes and the evolving qualities of that milieu. There is consequently a heavy focus on process – the interactions, relations and networks that shape the social processes through which accountable and responsive collective action arenas can be created.

One of the appealing aspects of this book is the applicability of key concepts to a wide diversity of contexts. For instance, some of the problems with dysfunctional governance are not dissimilar to those in developing countries. Given that in the cities of poor countries, up to two-thirds of urban populations live 'informally' or outside legal frameworks, the thread that runs throughout the book concerning the relationship between formality and informality is of particular interest. The authors argue that whilst formal governance parameters can never be ignored, it is necessary to pay greater attention to the role of informal networks and activity. In this regard, they argue in favour of challenging existing vertical sectoral networks, and replacing them with new network morphologies with "'horizontal', territorial networks, with tentacles reaching to and linking together all kinds of stakeholders, in attempts to mobilise a collective 'voice' for territory, city and neighbourhood" (p. 212). They state that it is important to search for negotiated, collaboratively arrived at rules and practices, rather than continue to rely on formal legal and procedural rules embedded in established organisations.

The book is organized into three parts, each preceded by an overview and introduction of key concepts. Part One explores the meaning of institutional capacity and provides a theoretical foundation for the book. This part analyses the complex processes through which the shape of governance has changed, and in particular, the fragmentation and multiplication of agencies involved in city management, as well as the capacity of these agencies to work together. In the introductory chapter, three propositions are presented. The first stresses the importance of individuals and groups in the wider society alongside the formal processes of representative democracy. Second, it is argued that the role of place and territory as a focus for integrating governance activity will present an expanding challenge to the already well-established sectoral modes of governance. The third is that the quality of urban governance capacity makes a difference to the experience of citizens, of business and to the quality of the natural environment. These three propositions serve as threads that are woven throughout the subsequent ten chapters. Chapter 2 by Enrico Gualini reviews the

concepts of institutional capacity building and social capital, asserting the link between institutional capacity and collective action. Chapter 3 by de Mãgalhaes, Healey, and Madanipour combines a case study with theoretical development of the notion of institutional capacity as linking three elements of social interaction: knowledge resources, relational resources and mobilisation capacity. This conceptual framework is used to analyse a case of urban regeneration that generated a new set of institutional relationships between the agencies involved in the process.

Part 2 explores struggles in different arenas to make sense of, and create, institutional capacities for action within complex situations. In a fascinating case, Ulf Matthiesen traces the different institutional evolutions in a post-communist context of two sides of a town, previously divided by the German-Polish border and now separated by the EU border. The author highlights the fact that formal arrangements on both sides of the border largely ignored what goes on in the everyday lives of people – a mismatch between formal level of national institutions and the informal level of local milieux. Situating institutional capacity at the convergence of formal governance institutions and informal networks also underpins Allen and Cars' Chapter 5. They examine the way in which the transformation of governance impacts distressed neighbourhoods across Europe, and how this affects local social relations. The theme of the relationship between formal and informal institutions is also present in Taylor's review of the British experience of promoting community involvement in neighbourhood renewal in Chapter 6. She argues that institutional capacity is not hierarchical, but rather relies on persuasion and engages with the different values held by different stakeholders, and in so doing, allows for mutual learning. In Chapter 7, Lambert and Oatley describe difficulties in building new capacities at the regional and sub-regional level in southern Britain. They examine the capacity of the planning system to reconcile conflicting interests at the regional level in order to pursue strategic policies, and to build up effective governance at that level. In order to achieve economic competitiveness at the level of the city–region, they argue that institutional frameworks need to help local networks and decision-making arenas to transcend artificial geographical boundaries.

The starting point of Part Three is that 'traditional' governance arrangements are incapable of handling contemporary urban development problems – evidenced, for example, by fragmentation of policy and agencies, high transaction costs and lack of co-ordinated action. These chapters examine attempts to organize collective actions and create institutional capacity in the context of the 'hollowing out' of the state, and problems with partnerships, unequal power relations between collaborators and the inability to incorporate conflicting interests. In Chapter 8, Stewart critiques national attempts at promoting capacity building in governance structures. In order to bring about integrated governance, he argues for need to address cultural, organizational and administrative mechanisms via a single culture of governance in order to reduce transaction costs, achieve integration and improve effectiveness. In the chapter, Goodstadt and Buchan describe the building of a regional strategy in a context where formal structures and competences for strategy building had been abolished. They focus on ways of addressing the fragmentation of strategic planning. These

include broadening the scope of planning to include economic regeneration, social inclusion, environmental quality and integrated transport systems. In terms of networking, they argue that 'new' types of partnership are necessary, which include stakeholders with diverse and sometimes competing agendas. In Chapter 10, Wenban-Smith examines the forms of support necessary for building institutional capacity in the context of fragmented formal governmental arrangements. He argues that the existence of institutional capacity should not be seen to be an enduring condition – it is varying and shifting over time, requiring contextually specific analysis. The book concludes in Chapter 11 by summarising the processes of transformation of urban governance analysed in the previous chapters. This is a particularly useful chapter in that it reviews the three propositions made in Chapter 1, synthesizes key themes arising from the contributions and draws these strands together, concluding with an assessment of the implications for urban policy that can encourage the emergence of new governance capacities.

A comment regarding the concept of institutional capacity. Each of the contributions uses a definition of the concept that is appropriate for the case under consideration. For instance, while Chapter 3 builds upon knowledge resources, relational resources and capacity for mobilisation as key ingredients of institutional capacity, other contributions deal with a range of social, economic, environmental and political dimensions of the concept. However, this diversity of conceptualisations of institutional capacity leads to the concept becoming a somewhat slippery target. If urban governance is ultimately about ensuring an acceptable quality of life for all city residents, and if building institutional capacity is about putting in place the ingredients necessary to ensure ongoing improvement in this quality of life ("distributive justice and human flourishing" (p. 22) in the words of the editors), then it would be interesting to see how the social dimensions aspects of the concept of institutional capacity could be developed to more clearly integrate other dimensions, such as the building of physical assets, natural resources and a viable local economic base. Whilst acknowledging that the editors have deliberately avoided formulating a 'catch-all' conceptualization of institutional capacity, it seems a pity that these strands were not pulled together in a more integrative formulation of the concept, particularly given the richness of experience covered in the case studies and the conceptual advances made by various contributions.

Overall, an excellent book that makes a significant contribution to conceptualisations of changing institutional capacities for urban governance, and raises thought-provoking issues that have relevance for urban governance in rich and poor countries alike.

AUSTRALIA: TOO MANY PEOPLE? THE POPULATION QUESTION

Paul, Erik C., Ashgate Publishing Ltd., November 2001, Hardcover – 200 pages, ISBN 0 7546 1850 1, RRP £39.93.

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This book discusses Australia's population policy for the twenty first century. It argues that Australia needs to redefine herself using a population strategy that encompasses clear ideas about the level of immigration and, importantly, the distribution of population. It is organized around three main sections. The first, comprising three chapters, examines Australia's recent well-being. This is followed by four chapters on the shortcomings of Australia's democracy. In the following five chapters, the book then turns its attention to a number of policy questions (in the following five chapters).

Chapter 2 reviews issues associated with the quality of life. The author's view is that the considerable economic growth of the past few decades has not been associated with improvement in the quality of life. A range of evidence is paraded before the reader in support of this stance, including statistics on crime, mental and physical health, child abuse and alcohol and drug use. It also discusses a diminishing level of trust that people have in relations with each other. While the chapter is interesting, and the wide range of supporting evidence introduced is informative, much of the evidence is used uncritically. For example, an increase in hospital admissions is advanced in support of the idea that economic growth is not necessarily making people healthier. But it can equally be argued that it is through economic growth that society can afford to treat so many people. The chapter could have been opened up to consider a wider range of views: many readers would appreciate balance in the discussion.

Equity issues are covered in Chapter 3. It reviews the evidence on the polarization of the Australian population into "haves" and "have-nots", of the changing mix of jobs (fewer full-time, more casual part-time) in the Australian economy and the changing circumstances of disadvantaged groups. Some parts of the chapter are well documented; other are characterized by sensationalism which hurts the book. For instance, the author argues "Market deregulation has encouraged business to pay below minimum wages and to employ illegal migrants. Another outcome is the growth of the informal sector and proliferation of sweatshops".

Chapter 4 has the appealing title "Scarcity and Conflict". It argues that in recent years scarcity has increased the level of conflict. Like the preceding chapters, this is based on major issues, including racism, an increasing incidence of crime, landrights and refugees. But in attempting to appeal to a wide audience, the chapter sensationalises. "One Nation is the beginning of a rebellion against

economic rationalism". "Economic rationalism is the main ideology which governs and divides society". This style may appeal to some. It wore thin on this reviewer rather quickly.

The fifth chapter, on "Democracy", commences with the theme that via the political process, power in Australia is in the hands of a minority of well-educated and well-off people. The theme is pursued for a while with discussion of money politics, vested interests and the consequences of the close links between government and big business. The book then moves on to discuss manageralism. Some parts of the discussion are hard to follow, or swallow. For example, "Pharmaceutical corporations have been granted the right to market a whole range of stimulants and anti-depressants whose power to keep people out of politics is just as effective as outlawed drugs." Again economic rationalism is forced to carry the blame for many of society's problems, though a new twist is added in that universities' economics and business management departments, among other groups, are argued to be responsible for propagating neo-conservative dogma. Neo-conservative economists in the top public service echelon are also taken to task for "pushing privatization, deregulation and other conservative policies which led to increasing social and geographical inequalities". The chapter also examines cases of corruption in Australian political life and the loopholes used by many to minimize the amount of tax they pay. A very negative picture is painted of Australia's democracy. The picture is too negative: surely some positive aspects of our political system could have been included.

The sixth chapter, on foreign investment, has the same features as its predecessors. It contains a blend of facts on foreign ownership and headline statements. The presentations based on facts are useful and have the potential to inform debate on foreign investment. This feature of the chapter is a plus. The interpretation of some aspects, such as 'National economic planning is no longer possible because control of the country's assets is in the hands of companies with headquarters in some other country" is not however, helpful.

The book weaves to the foundation for its main point in Chapter 7. Here the distribution of the population is analysed, and the growth in areas on the southeastern coast, highlighted. The apparent abandonment of regional Australia is also emphasised. This is in part due to what the author refers to as a geopolitical bias. The chapter concludes with a series of big questions that much of the remainder of the book sets out to answer.

Chapter 8 examines resource management but is basically a review of instances of resource mismanagement. The aim in writing this chapter must have been to convey a feeling of doom in readers. Readers are, however, offered a glimmer of hope when the author outlines some new directions at the end of the chapter. Further development of the section on new directions would have provided better balance to the book.

Chapter 9 has the appealing heading "Engagement with Asia". There are many challenges for Australia that might be analysed under this heading, challenges where a careful weighing up of pros and cons could be helpful in shaping policy. The book's ability to contribute to this is limited by the less-than-practical suggestion at the current time that until there is free movement of people

across all nations, free trade can only worsen inequalities and intensify conflict. Paul takes time out in the chapter to return to an old favourite. Thus, in discussion of the education of students from Asia at Australian universities, the reader is informed "Much of the demand for educational services has been in commerce, marketing and management, and the content of that education could be seen as indoctrination and diffusion of neo-colonial economic and cultural discourse to the region". The chapter concludes on a mixed note. Arguing for a shift towards a common market with our Asian neighbours as the first step, the next step is the development of a chain of coastal cities of 1-2 million people in northern Australia to "absorb Asian dynamism and merge into an Asian-Australian Eurasian civilization for the twenty first century". How this ideal can be implemented, and how it might work out, are not spelt out.

The tenth chapter of the book deals with "External Pressure". External pressure refers to the forces in Asian countries that have been pushing and continue to push people to want to migrate to Australia. There is little doubt that such pressures exist. What is at issue is Australia's response to these pressures. The author's view is that Australia has a moral obligation to accept all refugees. Indeed, he goes further to, as noted earlier, support free migration. How this will work is not investigated. So all we are left with is an ideal, which is very much removed from current policy. Paul really needs to work through the consequences of his views more fully and should outline the necessary implementation stages.

Chapter 11, titled "Room for More", examines possible population targets for Australia. It is distinguished from previous chapters by producing a reasonably balanced coverage of the topic. Among those who favour a larger population for Australia, a possible population of 200 million is mentioned. Among those favouring a smaller population, a figure as low as 6 million is mentioned. While the positions of a number of influential commentators are paraded before the reader, we never really learn the author's preferred target, or how it will be met, in terms of source countries, or how the infrastructure for any growth in population will be financed. Nor do we learn anything of substance concerning the character of a new Australia of (say) 100 million to 200 million people. Will English be the national language? How will the "focus for a population growth policy should be Northern Australia" be managed?

Chapter 12, "Australia's Frontier", contains a review of the pattern of settlement in Northern Australia. This is quite interesting. It is argued that Australia's North has been a major zone of cultural interaction with Asia for a long period of time. The key question of how the integration of Northern Australia with Southeast Asia will develop through time given Northern Australia's pattern of settlement and population level is raised. Unfortunately, possible scenarios in this regard are not presented. Some of the obstacles to be encountered in the pursuit of this ideal are noted at the conclusion of the chapter (the smallness of the economy, political weight of the South).

The final chapter of this short book titled "Which Way Australia?", presents sketches of a number of scenarios. But these are not very helpful, if one wants to know how the North can be populated in a sustainable way.

When I first picked up this book, I turned to the references. I found few names that I cite in my own research. Checking several of the pages of references I

found around half were newspaper articles. This alerted me to the possibility that what I was about to read would differ from my usual reading material. This was certainly the case. *In Australia: Too Many People?*, Erik C. Paul has canvassed a wide range of interesting issues. The strong parts are the links to the popular press, and if I needed to find useful references in the popular press for my research, Paul's book would provide a useful starting point. But in terms of gaining a perspective on a likely target population for Australia, the regional spread of this population, the ethnic mix, and, importantly, how the population growth would be financed and sustained, the book does not deliver enough.

INDUSTRIAL DISTRICTS: EVOLUTION AND COMPETITIVENESS IN ITALIAN FIRMS

Ivana Paniccia, Edward Elgar Publishing Ltd. 2002, Hardback, ISBN 1 84064 684, pp. 236, RRP £55.00.

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A driving force behind industrial policy in recent years has been the concern of national governments to stimulate innovation, upgrade national technology capability and promote regional development. Although these policy imperative are not the prime focus of *Industrial Districts,* the interesting and thorough analysis presented in this book carry some important policy implications. The task Ivana Paniccia sets herself is to improve the conceptual definition and 'unpack' the structural characteristics of industrial districts (IDs) in order to answer some clearly articulated and substantial questions. Are IDs a successful and sustainable socio-economic phenomenon? Is 'agglomeration' itself sufficient to account fully for the efficiency and growth of IDs? Is cooperation a pervasive rule of ID governance? Do IDs change yet preserve their identity or do they evolve toward different forms? How or who are the actors introducing change in IDs? Irrespective of change, will IDs be able to conjugate competition and social competitiveness in the face of globalisation? (see p. 43). Although the author doesn't claim to provide comprehensive answers to these questions, the impressive work does lead to some important observations. Further, through the analysis she makes an important contribution toward an emerging new research agenda for innovation and knowledge-based regional development.

From an analytical perspective, the idea of industrial districts has generated considerable research and academic debate for over fifty years. As a multidisciplinary perspective, it has attracted attention from economists, historians, geographers, political scientists and sociologists. While Paniccia claims this literature has exerted a great influence on both theory and policy, it is the former rather than the latter where the influence is most evident. Indeed, as the author points out elsewhere in the book, IDs in Italy have flourished in the absence of supportive policy (p.174). The absence of ID policy in many other

countries is even more pronounced. In recent Australian innovation and industry policy documents the concept is barely mentioned. One of the reasons for this is, as Paniccia notes, the difficulty of applying the 'non-replicable features' of a single ID …to a general model' (p. 3). Although the work presented in this volume does not overcome that difficulty, the author's structural analysis and efforts to establish a typology of IDs provide a valuable contribution by setting out how the development of a general model might proceed.

This volume is particularly timely. It comes at a time when two recent and influential analytical perspectives, cluster analysis and national systems of innovation (NSI) have reached a critical stage in their capacity to usefully inform contemporary policy problems. Through an interesting and scholarly analysis of the literature and a detailed qualitative and quantitative study of Italian firms, Paniccia offers some insights into why cluster analyses and the NSI perspective are failing to deliver the critical perspectives demanded by policy makers. Essentially they have failed to take account of the complexity and significance of the interplay between various aspects of social activity at the interface between global and local knowledge systems. As Paniccia puts it:

> *Change in IDs will not come about through reliance on traditional local resources; instead, it will derive from 'contamination' or 'hybridisation' with new actors: processes that generate new practices and rationalities that may enrich local patterns of learning* (p. 194).

The transformation of institutions and organisations, from this perspective, thus takes precedence over industry and locality. The implication for policy is that interventions should not simply focus on locality, nor target industry sector, but the social processes that bind them.

A key anchor point for Paniccia's analysis is her definition of what she refers to as the 'Canonical' ID: a 'socio-territorial entity' where analytical distinctions can be made between a 'community of people' and a 'population of firms' and their inter-relationship (p. 10). This 'canonical' model provides a base against which three other types of IDs identified in her Italian study are contrasted and to some extent, deconstructed: Artisan IDs; Integrated IDs; and Embryonic IDs.

Following a comprehensive review of the broad multidisciplinary literature concerning IDs, the reader is led on an empirical journey through four clusters of Italian firms. The clusters are identified according to the author's ID typology. The analysis is both qualitative and quantitative drawing on fifty years of census data and a rich 'thick description' of cases studies. The range of industrial production covered is wide ranging and includes silk, ceramics, shoes, furniture and tractors. The qualitative analyses are particularly interesting and valuable in the way they capture the changing (and persistent) features of the social landscape or 'territory' where 'communities of people' intersect with the 'populations of firms'.

The analytical approach allows for some important structural features of the Italian IDs to emerge. These include: the process of hybridisation and industry clustering; the spread of 'enabling' technologies; the role of networks in the delivery of financial and business services; the process of knowledge transfer and transition; changing patterns of production and consumption; and the role of cities as innovation hubs.

These observations are consistent with an emerging new agenda for steering industrial and innovation policy: one that is built around the idea of knowledge concentrations or 'knowledge-hubs' and the transfer of knowledge and skills through social networks. *Industrial Districts* provides the sort of detailed multidisciplinary analysis and lateral thinking required for understanding and providing supportive policies for concentrating knowledge and stimulating innovation in local regions now inextricably bound up with global economies, processes and institutions. Paniccia departs from the traditional view of IDs and argues that cooperation is no longer the key to competitiveness in the new global environment cooperation.

> *…looking at the weaknesses of existing IDs, a doubt arises whether cooperation – if not further qualified – is a necessary condition for their sustainability. It therefore appears that the critical resource for competitiveness and growth is no longer cooperation, as suggested by the 'canonical' literature, but hybridization or contamination: the ability to learn and adapt new codes and practices* (p. 200).

The author presses the point that IDs, like networks, are 'hybrid' institutions and often governed by conflicting rules. 'This view of IDs points to a possible redirection of research toward comparative studies within the multifaceted world of IDs, which overcomes a misleading divide between cooperative and non-cooperative systems, IDs and markets, and IDs and hierarchies'. (p. 199).

For the author, the notion of territories remains largely a geographic concept. Her analysis, however, suggests more. Ambiguity can be observed in the way she deals with the concept of 'socio-territorial entity'. On the one hand this is articulated as an historically and geographically defined construct (p. 45). Yet throughout the work, the social and cultural dimensions of the 'territorial entity' receive most attention.

> *…an awareness of what is happening inside their own area (industry) and related environments, but outside their own social confines, could directly influence their work patterns* (p. 184)

It is a pity there is not more of this 'struggle' between geographic and social space. Although the implication is not drawn out explicitly, the social 'struggle' that can be identified from the cases presented reinforces one of the key policy observations. That is, the variety in form and lifecycle of industrial districts (even where they are specialised in the same industry) requires 'differentiated' policy interventions (p. 179). The story would also have been the richer for some discussion of comparative international literature. While Paniccia strongly supports the need for an agenda of comparative research, it would have been helpful to have made some connection to work already moving in this direction. For example, the extensive body of literature that is emerging on the economic success of township village enterprises in China could have provided some interesting cases to support her thesis. Nevertheless, this structural analysis of industrial districts in Italy provides a creative and thoughtful contribution the to understanding of the nature of industrial transformation and innovation processes at sub-national levels. It will be of considerable interest to policy makers, scholars and many others concerned with regional development, innovation and organisational studies.

AUSTRALASIAN JOURNAL OF REGIONAL STUDIES

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