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How demography helps business

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Summary

Business gets help from the Australian Bureau of Statistics, state planners, and some academic and private sector consultants. This paper looks at the services provided, and the underlying techniques.

The material published by the Bureau is comprehensive, authoritative and very widely used. Access through summary publications, special purpose requests and sample files is excellent, although there are some pricing problems. Funding restrictions have restricted agricultural data.

The state planning authorities vary widely in resources, methods and effectiveness. At their best, they blend extensive data, statistical techniques and local knowledge, to make better small area projections than the Bureau can provide.

There is widespread business demand for small area projections, not always met. For example, shopping centre developers may use a mixture of Commonwealth, state and their own projections. As actuaries, we use earnings and price indices for many purposes, and small-area data for market analyses and population projections.

Introduction

The Concise Oxford Dictionary (1976) defines demography as the "study of statistics of births, deaths, disease, etc., as illustrating conditions of life in communities". Business uses "demographics" to describe characteristics such as age, income, and family structure, which may help target sales. But demography has a broad range of applications - for example, life expectancies are regularly used by courts in determining awards in personal injury cases. This paper is written from a business perspective, and treats any practical application of statistics about persons as "demography". It reflects the personal experience of the author, and does not cover many important sources of demographic advice. Most of the paper is about the ABS, occupying as it does a central role in almost all Australian demographic statistics. Only two of the state planning agencies (Victoria and WA) are mentioned.

Australian Bureau of Statistics

Along with Canada and New Zealand, the ABS is rightly regarded as one of the three best national statistical agencies in the world. Its effectiveness is a vital part of our open, well-informed democracy. Voters view with suspicion any political tampering with unemployment data or consumer price indices. ABS indices are used to set government tax levels and income benefits. Business uses ABS data in a huge range of routine and specialised applications. The ABS is using data interchange and the internet to make a wider range of data available more flexibly, at less cost. But ABS's pricing policy, and its poor agricultural data, are current sources of concern.

Table 1 : Revenue raised by ABS from statistics

| Source | 96-97 \$m | 97-98 \$m | 98-99 \$m | 99-00 \$m |
|--------------------------------------|--------------|--------------|--------------|--------------|
| Publication subscriptions | 2.2 | 2.0 | 1.8 | 1.7 |
| Other publication sales | 1.5 | 1.7 | 1.5 | 1.2 |
| Other standard products | 1.9 | 8.9 | 3.0 | 2.6 |
| Information consultancy | 4.6 | 6.5 | 5.5 | 4.4 |
| Statistical consultancy | 0.8 | 1.0 | 0.9 | 1.2 |
| User funded surveys | 8.2 | 6.0 | 5.5 | 5.3 |
| Other products & services | 3.9 | 4.9 | 4.4 | 5.1 |
| Total | 23.1 | 31.0 | 22.7 | 21.5 |
| ABS expenses | 326.9 | 240.3 | 227.9 | 255.5 |
| Statistical revenue as % of expenses | 7.1% | 12.9% | 10.0% | 8.4% |
| ABS average staff numbers | 3980 | 3202 | 2985 | |

The figures in Table 1, from ABS annual reports, show a large peak in "other standard products" in 97-98. This reflects sales of products such as CDATE from

the 1996 census. Information consultancies also peaked in 97-98.

ABS pricing policy

As Table 1 shows, ABS only gets about 10% of its revenue from the sale of statistics. ABS relies on public co-operation to obtain most of its data, and attempts to raise more revenue might reduce this co-operation. ABS (1999) says that its pricing policy is intended to serve three main purposes:

- to enable the demand for ABS products and services to be used as a more reliable indicator of how ABS resources should be used
- to encourage users to address their real needs for ABS products
- to relieve the general taxpayer of those elements of the cost of the statistical service which have a specific and identifiable value to particular users.

These purposes are largely garbage. High prices will deter many potential users with genuine needs for data, so that sales reflect only a small part of the demand. Users often cannot judge the relevance of ABS data to their real needs without making explorations. Specific data may be of considerable commercial value to a few users, but also be relevant to many members of the community.

Unsatisfactory nature of ABS cell charges

Prices for ABS data requests and consultancies incorporate one or more of

- labour hourly charges
- infrastructure charges, based on the number of cells of data provided, and intended to recover the various system and computing costs associated with providing statistical information to clients
- direct costs direct attributable to a consultancy, such as courier charges.

Labour charges are reasonable in principle, as users should have to pay for extra costs they cause ABS. Labour charges are however costly for some potential users, and there may be a case for charging less than ABS's current \$140 an hour.

Table 2 : ABS charges for data cells

| Number cells | Charge |
|--------------|---------|
| 1000 | \$40 |
| 25000 | \$520 |
| 50000 | \$895 |
| 100000 | \$1,095 |

ABS's scale of charges for data cells is not available to the public, but some examples are in Table 2. A minimum charge of \$110 for any information consultancy applies. Charges for cells can rapidly reach high levels in many practical situations. Even a charge of \$520 is a significant deterrent for many business and community applications. Large costs can occur if multivariate statistical analyses are proposed (for example of migration within Australia), or where significant data exploration is

needed to identify relevant variables. The expenditure may prove wasted if comparison with other data shows faulty responses (as occurred for us with 1996 census data on retirement villages). The non-transparent nature of ABS's charges causes significant costs for ABS, as potential users request various quotations to try to balance data value against cost. Given the confidentiality restrictions imposed on small cells, analyses involving large numbers of cells may be of limited value.

Most of these difficulties could be avoided by making no charge for data cells, or a very small charge per cell, regardless of the number of cells. Facilities should be provided to allow users to request and receive data electronically, without ABS manual intervention. Charges should be intended to recover ABS's direct costs, for example in programming to meet non-standard data requests, and should be on a per hour basis.

ABS electronic products

Table 1 shows sales of "other standard products" as \$8.8m in 97-98, \$3m in 98-99 and \$2.6m in 99-00. The high 97-98 figure clearly reflects sales of CDATE96, which gives detailed census data for collection districts, together with MapInfo Professional. The low 99-00 figure may reflect transitional problems with IRDB, the very useful Integrated Regional Data Base. IRDB gives access to census data at the statistical local area or postcode level, together with a wide range of other data. The latest version is called the "Geographical Statistics Platform", described as "a data retrieval system with a fully integrated mapping facility". It is extremely useful to be able to blend and map data from several sources, but the mapping facilities need some refinement.

Table 3 : Users of CDATE and IRDB

| Type of user | Percent of users |
|--|------------------|
| federal/state/local government | 80% |
| consultants | 15% |
| businesses, charities and religious groups | 5% |
| Total | 100% |

The above rough estimates show that government agencies, including local government, account for most of the use of CDATE and IRDB. Consultants include those devising marketing campaigns and advising shopping centre owners and investors. Businesses include those seeking an optimum distribution of retail outlets, for example for fast food stores. Charities use demographic data to plan revenue raising, but may not find sufficient detail to identify small-area needs. Religious groups are interested in local needs for their services, including schools and retirement villages.

Australian Statistics Advisory Council

The Council, appointed under the Australian Bureau of Statistics Act 1975, has to report to the Minister each year. Of the 20 members in 98-99, 13 were from federal or state agencies, 4 from private industry, 2 from universities and 1 from the Australian Council of Social Services. The 98-99 report listed 14 new statistical publications, but no discontinued ones. Council asked ABS to explore the possibility of using a combination of ABS and taxation data to produce state and regional dissections of businesses. Disturbingly, the Council supported the view that the predominant activity of the legal entity may have to be reflected, rather than that of the individual locations of multi-location businesses. Will all of Coles Myer's employees be recorded as working in Glen Iris? While the Council was concerned about the need for data on income distribution in regional and rural Australia, it did not seem to see the need for detailed local business data.

Restrictions on agricultural data

For many agricultural commodities, the ABS had annual records at local district level from about 1860 to 1996-97. Similar data are now being collected in 00-01, and perhaps at 5-yearly intervals thereafter. Because most agricultural commodities have strong year-to-year variability, 5-year censuses will give slow and inaccurate trend warnings (for example, of declining wheat yields as a result of soil exhaustion). The lack of yearly data will make it much harder to design effective crop disaster insurance schemes (a subject of current government interest). For some high-value rural industries, such as horticulture and grape-growing, complete annual surveys are still being made. For others, yearly stratified sample survey are being made, providing useful data for broad areas.

ABS population projections

ABS makes two-yearly population projections for each state, of which the latest is "Population projections Australia 1999-2101". In 1999 it published "Household and family projections Australia 1996 to 2021". The state population projections are used each two years to make population projections for each statistical local area, which are available in IRDB2000. The state projections assume continuation of present migration trends within Australia, rather than attempting to estimate the effects of future economic activity on migration patterns. ABS small area projections are based on information obtained from ABS's involvement in statistical local area population estimates, existing state government projections where they are available and forecast land use data obtained directly from planning authorities.

ABS's static life expectancy estimates

As part of its two-yearly population projections, ABS makes detailed assumptions about long-term mortality rate improvements. No allowance is made for such improvements, however, in its published life expectancies. As a result, individuals planning for their retirement may underestimate the years they have to provide for. Courts using the life expectancy tables to make awards for future expenses of care may make awards that are too low. ABS's failure to make realistic life expectancy estimates is made worse by its failure to publish adequate details of its mortality rate projections.

Victorian Department of Infrastructure

The Research Unit has a staff of about 16, and access to departmental staff in land monitoring and regional offices. During the 1970s the Commonwealth's Impact project worked with the Victorian Premier's Department, and Dennis Sams, a member of the Impact project, subsequently established a population projection unit in the Victorian Treasury. The unit was transferred to the Department of Planning in 1993, and then to the Department of Infrastructure.

The unit sees its customers as

- The Department of Infrastructure (for example, for land release forecasts and zoning uses)
- Other major state government departments, particularly Education, Health & Human Resources, Treasury, Premier's and Justice
- Local government (who sometimes use the unit's projections at the SLA level, or use their own staff or consultants to make projections for smaller units)
- Infrastructure agencies (water, electricity and gas, but not Telecom or Optus)
- Major developers.

The unit sees local knowledge as essential background for its projection methods and assumptions. This is obtained from regional and local seminars, regional offices, institutional accommodation authorities, local governments and residential land developers.

The unit takes current economic conditions into account, but makes no use of formal economic models. It is monitoring the development of microsimulation projection models, but has not yet attempted to create such a model. It uses two projection methods - the cohort-component method, and the housing unit method. A third method, the household formation method, is under development as a bridge between the two (Department of Infrastructure, 2000, p8).

Western Australian Planning Commission

The Western Australian Ministry for Planning (1996) has developed a Metropolitan Land Use Forecasting System. It uses constrained logistic functions to project the development of census collection districts, taking into account overall population projections, developer intentions and estimated maximum capacity of each district. MLUFS forecasts presumably underlie the Planning Commission's 1999 urban land release plan, a detailed publication of considerable interest to developers and potential residents. Potential water and wastewater infrastructure difficulties are noted:

"While several network extensions are being negotiated with developers, the majority of required works to support the Land Release Plan are not included in the Water Corporation's current Capital Works Program".

Australian Housing and Urban Research Institute

AHURI was formed in 1993, on the recommendation of the National Housing Strategy. A national tender process resulted in a joint venture between RMIT, CSIRO, Monash and QUT, joined by the University of Queensland in 1998. In the last year AHURI has been restructured, and is now a network of participating research centres through Australia, with a small management company, AHURI Ltd, in Melbourne. The website (www.ahuri.edu.au) lists 34 current research projects, including an ANU

Research Centre project to provide accurate and timely medium term (10 years) and long term (30 years) projections of future housing requirements at the small area level. A Swinburne and Monash project, in collaboration with Macquarie Bank, aims to identify an appropriate financial product and vehicle for raising retail private finance for investment in community housing. While nearly all AHURI's current work is government-funded, there is clearly potential for commercially-funded research.

NATSEM

The National Centre for Social and Economic Modelling was established on 1/1/93 as part of the Faculty of Management of the University of Canberra, under a 5-year agreement between the University and the Department of Health, Housing & Community Services. A new agreement from the end of 1997 is for 3 years, with the Departments of Social Security, Health and Family Services, and Employment, Education, Training and Youth Affairs. Using 1% population samples with limited geographic segregation, NATSEM has done very detailed modelling to help shape government programs such as HECS. More recently, some of its work has become commercially oriented. In August it published a report commissioned by Telstra In September, together with KPMG Consulting, it released a report on internet spending. Although no details are available on its website (natsem.canberra.edu.au), it is apparently making long-term projections of retail expenditure for census collection districts.

Shopping centre developers and investors

Shopping centres are costly investments, sometimes requiring market forecasts or valuations. While writing this paper, I talked with three consultants specialising in this area. ABS small-area population projections are sometimes considered not to incorporate enough information on land availability and developer intentions. State government projections may be better informed, but are not regularly available, and are sometimes suspected of bias. As a result, consultants may make their own small area projections, after talking to local authorities. Household expenditure estimates are sometimes based on Household Expenditure Survey data, combined with census collection district data, and updated using aggregate indicators. Surveys of shopping behaviour are sometimes made of local residents, and of persons using local shopping centres.

Table 4 : Actuarial uses of demographic data

| Type of data | Actuarial uses |
|------------------------|---|
| Agriculture | Crop insurance |
| Business locations | Population projections, market analyses |
| Earnings | Court awards, accident compensation benefits & reinsurance treaties |
| Family structure | House prices, population projections |
| Fertility | Population projections |
| Household expenditure | Court awards |
| Income | House prices, population projections, welfare needs |
| Industrial disputes | Court awards |
| Labour costs | Superannuation & accident compensation analysis |
| Migration | Population projections |
| Mortality | Court awards, population projections, market projections |
| Overseas arrivals | Tourism projections |
| Population projections | Market projections, accident analysis |
| Prices | Pensions, social security & accident compensation benefits |
| Travel distances | Population projections |
| Unemployment | Court awards, migration analyses |

Table 4 gives some idea of the uses our actuarial consultancy makes of demographic data. The simplest data, such as average weekly earnings and consumer price indices, are very widely used by business, government and the courts. More detailed data, obtained from composite sources, can be needed to make detailed market analyses or long-term population projections. Like many other businesses, our work would be crippled by significant cutbacks in the work of ABS.

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