The Development of Australian Internal Migration Database

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Abstract. *This study attempts to discuss the development of a time series of Australian Internal Migration (AIM) Database that covers five sequential intercensal periods 1976-1981 until 1996-2001. The database has been constructed to support the study on "Understanding the structure and dynamic of interregional migration in Australia." Information on migration is heavily derived from the 1981-2001 Censuses of Population and Housing. The great value of this database lies in two factors: (1) the design of geographical zones that devise a system of 69 temporally consistent regions (TSDs) across censuses, and (2) the methods used to decompose inter-regional flows (transition) that differentiate age, period, birth cohort, and sex. It provides a unique resource to be utilized in testing ground for models and theories of migration. The utility of the database is illustrated by examining selected features of Australian inter-regional migration. In the future, the database is planned to be accessed on-line for the academic sectors.*

Background

In terms of population mobility, there has been a long standing recognition of significance of Australian internal migration as one of the highest levels of internal mobility in the world (Bell and Hugo 2002). As shown in Table 1 on internal migration in several countries, it indicates that about 17.5% or 42.1% of Australian total population changed their residence within the country during the period of one year or five years, respectively. Based on the 1996 censuses, on average Australian male and female will move 11.1 times and 11.5 times, respectively, during his/her lifetime (Bell and Hugo 2000). Such a situation has not only demographic but also social and economic implications. In other words, these figures certainly reflect a fact that internal migration has become a fundamental driver of social, economic and politic changes in this country. Therefore, there is a contemporary salience to furthering internal migration studies in the Australian context.

Table 1. International Comparisons of Internal Migration (2001)

One-year interval		Five-year interval	
Country	***% Moved***	***Country***	***% Moved***
United States	16.3	New Zealand	49.4
Australia	17.5	United States	43.0
Canada	14.3	Australia	42.1
United Kingdom	12.0	Canada	41.9
Netherlands	10.2	Korea	31.4
Ireland	8.8	Japan	28.1
Belgium	5.3	Puerto Rico	27.2
Norway	4.5	Norway	23.3

Source: Brown, Bell and Hugo (forthcoming) Trends and patterns of internal migration.
     In: *Australian mobility in the new millennium,* Chapter 2.
Note: Migration data were captured in different ways in those countries.

Despite its acknowledged significance, however, remarkably little progress has been made in understanding the underlying dynamics of internal migration over space and time. Though several studies have been done, by using the census data, it has primarily adopted a cross sectional approach, focussing on patterns and characteristics during a single time interval, and limited time series comparisons. Unavailability of comparable time-series data sets is the main reasons for this. Fortunately, a recent project on understanding the structure of internal migration in Australia over the twenty five year period 1976 to 2001 has been proposed by Queensland Centre for Population Research. The project aims to redress these deficiencies and contribute significant improvements in understanding of population mobility through a systematic analysis of the special structure of migration and its demographic determinants. In order to do so, it requires time series migration database which will be discussed in this paper. Such a database makes it possible to track changes over time in age-specific migration intensities and hence to analyse the influence of life course events, secular trends and birth cohort size on these intensities.

This present paper describes the development of a time series of Australian Internal Migration (AIM) Database. The database is developed to facilitate a wider study on understanding the structure of internal migration in this country over the twenty five year period 1976 to 2001. The documentation here begins with a description of the objective of the study and a review of the problems posed by the boundary changes that have occurred. Next, it discusses some steps involved in constructing the database, which includes the step in generating datasets with geographically consistent over time. At the end, brief examples are given to illustrate the utility of the time series database. Some conclusions will be addressed at the end of this study.

Objectives

The main objectives of this study are: (1) to develop an internal migration database for Australia which overcomes geographical boundary inconsistencies; provides a time-series of internal migration, affords the user to undertake APC (age-period-cohort) analysis; and offers the possibility to do cross national comparisons. (2) to support the systematic analysis of migration through the research grant on "Understanding the dynamics and structure of Internal Migration in Australia" and (3) to increase the use of migration data from censuses by providing users with the access to the AIM database.

Construction of Database

The database utilizes migration data from the 1981, 1986, 1991, 1996 and 2001 Australian Censuses on Population and Housing. Preliminary data set were initially acquired from the Australian Bureau of Statistics (ABS) that provided the migration data as origin-destination flows between Statistical Local Area (SLAs – the main sub-state reporting areas used in the Census). Accordingly, it has been possible to assemble a time series database of internal migration over five 5-year time periods: (1) period 1976-1981, (2) period 1981-1986, (3) period 1986-1991, (4) period 1991-1996, and (5) period 1996-2001.
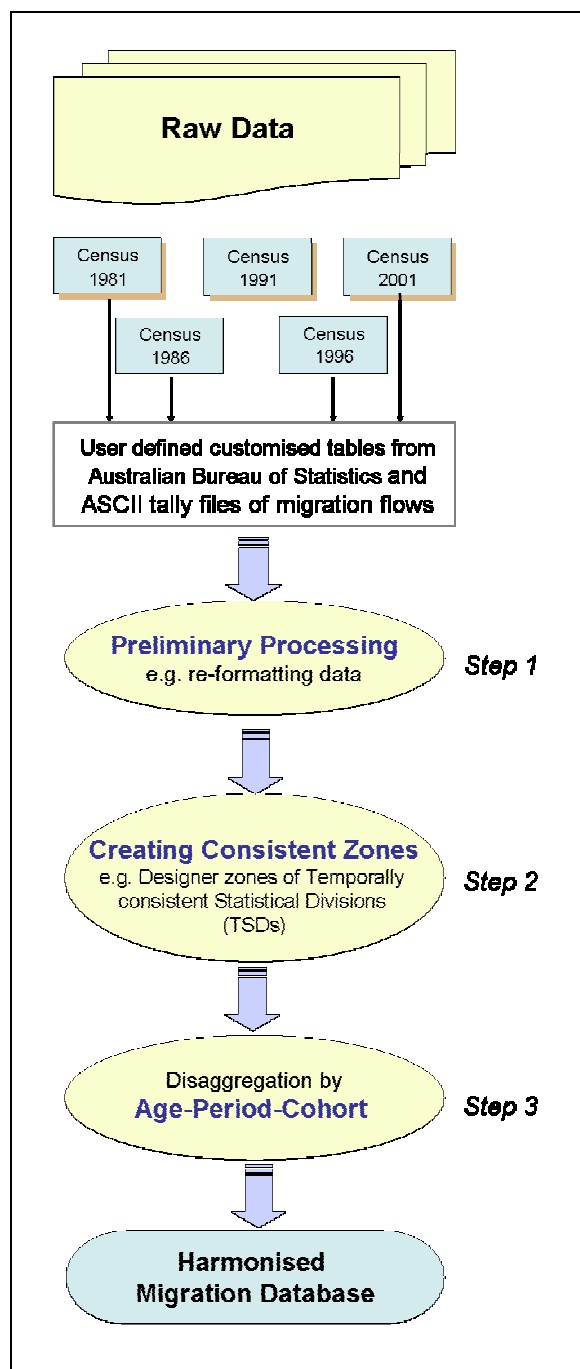
Step 1. Preliminary Processing

To create a uniform dataset, the framework for database is organized as SODAPC (Sex-Origin-Destination-Age-Period-Cohort). The information of age refers to age at the time of migration, similarly to the period of migration, and birth cohort membership.

Data re-formatting:
a. To define the migration data (e.g. event or transition)
b. To define the population at risk (PAR)
c. To define the migration period: one or five years base
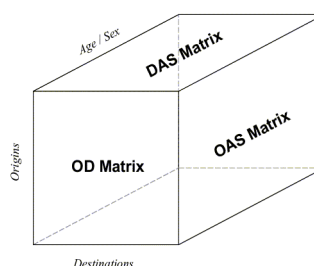
Step 2. Response to boundary changes

Some administrative boundaries in each census period tend to change. For example, the changes in boundaries of Darwin (Northern Territory) for Statistical Divisions (SD) in the 1981, 1986 and 1991 censuses.

Creating the designer zones (by applying one of the methods in defining temporally consistent migration regions, Blake et al. 2000).
a. Comparing the SLA (the smallest of spatial unit code) and SD (Statistical Divisions) boundaries at each of censuses to identify the boundary changes.
b. Using SD as the lowest spatial level which relatively homogeneous region characterised by identifiable social and economic links between the inhabitants and between the economic units in the region (ABS, 1992).
c. A heuristic procedure was used to search for the nearest set of boundaries at SLA level.
d. Adopted the 1996 SDs as the standard (where possible).

Step 3. Finalized database

At the end, it has been possible to assemble time series datasets for Australia that consists of: 69 statistical divisions (TSDs), 38 city regions (ATSDs), 8 state, over five 5-year time periods (1976-1981, 1981-1986, 1986-1991, 1991-1996, and 1996-2001), using two sexes (males and females), sixteen five-year age groups (0-4, 5-9, …, 65-69, 70-74, 75+), and twenty five-year birth cohorts (pre-1906, 1906-11, .., 1986-1991, 1991-96, and 1996-2001). Detailed description of the database processing is documented in Bell et al. (1999).

Age group	Age Code	Period years	Period Code	Birth cohort years	Cohort code	Sex	Code
0-4	1	1976-81	1	Pre -1906	1	Males	1
5-9	2	1981-86	2	Born 1906-11	2	Females	2
10-14	3	1986-91	3	Born 1911-16	3		
15-19	4	1991-96	4	Born 1916-21	4		
20-24	5	1996-01	5	Born 1921-26	5		
25-29	6			Born 1926-31	6		
30-34	7			Born 1931-36	7		
35-39	8			Born 1936-41	8		
40-44	9			Born 1941-46	9		
45-49	10			Born 1946-51	10		
50-54	11			Born 1951-56	11		
55-59	12			Born 1956-61	12		
60-64	13			Born 1961-66	13		
65-69	14			Born 1966-71	14		
70-74	15			Born 1971-76	15		
75+	16			Born 1976-81	16		
				Born 1981-86	17		
				Born 1986-91	18		
				Born 1991-96	19		
				Born 1996-01	20		

Conclusion

This paper has reviewed the development of Australian Internal Migration (AIM) database and its application. It has showed that the AIM database is a unique dataset for understanding the dynamics and structure of internal migration in Australia. The database has advantages in the design of the zonal system (consistency across censuses), and in the methods used to decompose inter-regional flows (to differentiate age groups, periods, and birth cohorts). It provides a unique resource to be utilized in testing ground for models and theories of migration.

The AIM Database has been used in wide range of studies, among others are: Brown *et al*. (2006) *The structure of internal migration*; Bell *et al*. (2006) *The changing structure of internal migration in Australia*, and Bell *et al*. (2006) *Regional and cohort dimension of Australian internal migration*. In addition, it can be utilised as a testing ground for models and theories of migration e.g. four key dimensions of migration measurements (Bell *et al*. 2002).

The features from this database have allowed comparative analysis with migration in other countries, including UK and New Zealand, to be carried out by resolving the definitional, measurement and geographical inconsistencies among the data sets. In the future, the database is planned to be accessed on-line for the academic sectors. The database will also be extended to incorporate the 2006 census data.

References

Australian Bureau of Statistics (2001) Evaluation of Administrative Data Sources for Use in Quarterly Estimation of Internal Migration between 2001 and 2006, Demography Working Paper 2001/5

Australian Bureau of Statistics (2002) Australian Demographic Statistics: December Quarter

Bell M. and Hugo G. J. (2000) Internal migration in Australia 1991-1996: Overview and the overseas-born, Department of Immigration and Multicultural Affairs, Canberra.

Bell M., Blake M., Boyle P., Duke-Williams O., Rees P., Stillwell J., and Hugo G. (2002) Cross-national comparison of internal migration: issues and measures, Journal of Royal Statistical Society A, 165(3): 435-464.

Blake, M., Bell, M., and Rees, P. (2000) Creating a temporally consistent spatial framework for the analysis of inter-regional migration in Australia, International Journal of Population Geography, 6, 155-174.

Hugo G. (2000) International migration and labour market in Asia: Australia country paper. Workshop on International Migration and Labour Marker in Asia, organized by the Japan Institute of Labour (JIL), Tokyo, January 26-28.

Rees P., Bell M., Duke-Williams O., and Blake M. (2000) Problems and solutions in the measurement of migration intensities: Australian and Britain compared, Population Studies, 54(2): 207-222.