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Skilled Labour Migration Flows to Australia's Northern Territory 2001-2006: Beyond Periphery?

Dean Carson, Charles Darwin University

Abstract

This research describes the Australian domestic skilled labour migration system as recorded at the 2006 Census, and specifically examines the role of the Northern Territory within that system. The international literature suggests that most labour migration conforms to core-periphery (CP) patterns, although there is evidence that other structures are becoming increasingly common. There is little known about CP patterns for labour migration within Australia, the emergence of alternative structures, or what role the Northern Territory plays in the national system. This research shows consistently strong CP structures within Australia's States, but not in the Northern Territory. Instead, the NT has weak links to mainland State capital cities; a weak CP relationship with South Australia that may be a result of historical ties; and weak relationships with immediately adjacent regions. The challenge for the Northern Territory is to strengthen one or more of the structures or risk increasing difficulties in recruiting skilled workers.

JEL Classification: J110; J230; J480

1. Introduction

The recruitment and retention of skilled labour in rural and remote areas has long been a topic of interest for economists, particularly those interested in the provision of health, education and other essential services (Carson *et al*., 2010). In Australia, the resources sector, which operates extensively in the more remote parts of the nation, has needed to implement fly-in/ fly-out and other 'work at a distance' strategies to manage local skills shortages (Storey, 2010). While these strategies can be successful from an enterprise perspective, they contribute to the leakage of assets from the region (through wages paid to outsiders) and retard prospects for long term economic development by denying the region access to human capital. 'Outsourcing' regions' skilled labour needs is also likely to limit the potential for internal labour development

Address for correspondence: Dean Carson, The Northern Institute, Charles Darwin University, Darwin NT 0909. Email: dean.carson@cdu.edu.au
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as external systems (education, training, recruitment, career progression) increase in importance at the expense of internal ones. For these reasons, and notwithstanding that many jobs are difficult to do from a distance, regional governments must continue to promote labour in-migration and the development of internal labour pools through locally based education and training.

Recruitment of labour from outside of the country is an important component of any labour force strategy, however, attention must also be paid to recruitment from within national borders (Bell, 1997). In the case of Australia's Northern Territory (population 220,000 people or one per cent of the national population), for example, international immigration amounted to about 6,000 people between 2001 and 2006, while the number of new arrivals from other parts of Australia was in excess of 30,000 people (Carson and Brown, 2008). While not all interstate migrants were labour migrants, and not all labour migrants were 'skilled migrants' as determined by the Northern Territory Government, these top line figures illustrate the significance of the national labour pool for the Northern Territory (NT). Consequently, this paper focuses only on domestic labour migration – the movement of people within Australia.

Despite the relatively large inflow of population from other parts of Australia between 2001 and 2006, the NT continues to experience labour shortages. This is because of recent high rates of economic growth and expansion in the construction and public service sectors in particular, and continuing high rates of out-migration. The net national migration position of the NT has been on average a loss of around 750 people each year since 1990 (Carson and Brown, 2008). As a consequence, the NT Government continues to pursue a policy of actively encouraging in-migration from other parts of Australia, with the centrepiece being the Skilled Worker Campaign, which has been in place since 2005. The campaign works with NT based employers to identify skills shortages and to target ‘job shows’ and other events and media around Australia as vehicles through which to recruit to those shortages. Recruitment campaigns are largely location based (job shows are in particular cities or regional centres, media outlets have particular geographic coverage) and so the selection of locations which have more 'market potential' is an important policy consideration. This research examines the spatial patterns (flows) of skilled labour migration within Australia between 2001 and 2006 to provide insights into where the NT 'fits' in domestic labour migration patterns The research is important to the NT Government's 'active recruitment' policy because it describes both the potential and the limitations of targeting domestic migrants based on their places of origin.

2. Spatial Theories of Domestic Labour Migration

Economic geography provides insights into spatial migration systems, enabling some prediction of likely origin and destination 'pairs', particularly when it comes to national migration systems. The most widely referenced economic geography model is the core-periphery (CP) model described initially by Friedman in the 1960s and developed more recently by Krugman (1998), among others. CP models postulate an interdependent relationship between large urban centres and surrounding more sparsely populated regions. Core regions provide diverse education, training and employment opportunities and are sufficiently large to retain pools of excess labour.

Some of this excess labour flows to peripheral regions where employment opportunities are more specialised. Populations from the peripheries often migrate to the core to access education and employment, while reverse migration (or 'population turnaround' (Burnley, 1988)) occurs when peripheral jobs are readily available. The interactions between cores and peripheries can change depending on economic circumstances (relative unemployment rates, for example) and personal and social ambitions (in recent decades, some peripheral regions have experienced high rates of in-migration from skilled labour looking for lifestyle amenity). While it is still difficult to predict when such changes in interactions will occur (and for which populations), CP models can be quite useful in suggesting which origin and destination regions will be involved in migration flows.

Von Thunen (see, Combes, Mayer and Thisse, 2008) put forward a version of the CP model in his analysis of land use zones. He described zones as a series of 'concentric rings' emanating from a core and extending into the periphery. Each ring could be identified according to the dominant land use, with land uses changing as a function of the ratio between population and land area. More densely populated areas are suited to industrial and service functions. Less densely populated areas are amenable to different forms of agricultural and manufacturing activity. Inputs and outputs are exchanged between the core (most CP models consider a single core only) and its peripheries (but make allowance for multiple peripheries). Labour is one such commodity (Fafchamps and Shilpi, 2003). The concentric rings idea can be discerned in other writings on CP models. Borgatti and Everett (1999) describe a three region model with a core, a periphery, and a 'core-periphery' region nestled in between and containing some characteristics of core and periphery. (Brand, 2003; Brand and Bhatti, 2006) likewise describe a core-adjacent-periphery (CAP) model in which an 'adjacent' region which sits between the core and the periphery. The adjacent region is akin to hinterland or peri-urban regions described elsewhere. Its importance is that commodity exchange dynamics are different between core-adjacent, core-periphery and adjacent-periphery. Migration studies have shown, for example, waves of migration to and from hinterland areas around large cities that appear somewhat removed from the patterns of rural to urban and urban to rural migration occurring at the core-periphery level (Borgatti and Everett, 1999). On the other hand, when labour migration researchers describe 'stepped migration' or observe the existence of a 'rural pipeline' for particular professions (Murray and Wronski, 2006), they are mimicking Von Thunen's rings analogy and making the observation that exchange can and does occur between peripheries.

CP models, in summary, describe relatively closed systems of exchange between spatially contiguous regions, at least from the peripheral perspective. The core may be part of other exchange systems (serving as the hub through which new material is imported to the system and system-produced material is exported), but peripheries are strongly linked to a single core (von Braun, 2007). Inner peripheries are very strongly linked to the core alone, while outer rings link both to inner rings and the core. A CP model of labour migration would predict a core region which sources migrants from (and sends them out to) multiple regions (peripheries and import/export partners). Surrounding the core will be a ring of inner peripheries whose labour

market is essentially dependent on flows to and from the core. As distance increases, labour exchange becomes increasingly multiplicitous under the impact of both the core and inner peripheries. This pattern continues until the focus of flows switches to a different core. CP systems are often bounded by jurisdictional borders or natural features (rivers, oceans, mountains) which impede migration.

CP models help explain some aspects of national labour migration flows, but other features come in to play (Weller, 2008). As labour mobility has increased, particularly amongst highly paid and skilled workers, aspects of amenity have been proposed as important determinants of spatial patterns of migration. It has been argued that amenity decisions are becoming increasingly influential as improved transport and communications technologies make physical distance less of a barrier to movement (Iredale, 2001). There are at least three amenity conditions suggested by the literature (Sanchis-Guarner, 2007) -

1. Agglomeration – also referred to as 'the big sort' (Bishop, 2008), migration researchers have noted a tendency for people with similar characteristics (demographic, economic, skills) to gravitate to particular locations. For labour migration, this is linked to the tendency for businesses in similar sectors (and so desiring similar labour) to cluster together. An important implication of this is that different flow patterns are likely apply to workers in different sectors or with different skills, economic, or demographic characteristics;
2. Lifestyle amenity – there has been much discussion of 'sea-change' and 'tree-change' inspired migration, which favours rural or semi-rural regions with particular climatic and environmental characteristics (Klepeis, Gill and Chisolm, 2009). In Australia, these regions, (largely along the east coast)have been among the faster growing (population and economy) as particularly late career labour migrate to them (Stimson and Minnery, 1998);
3. 'Escalator' migration (Fielding, 1995; Heikkila and Pikkarainen, 2009) – thought to be more prevalent among early career workers is the tendency to seek destination regions where rapid career progression and above average remuneration are on offer. These escalator regions attract labour for a short period of time as they achieve their progression goals and move on to regions with longer term amenity. Escalator migration has classically been associated with young workers, but may also apply to older workers changing or re-starting careers or seeking rapid accumulation of capital as they approach (self-funded) retirement.

Models describing the specific spatial patterns of amenity migration flows have not been well developed in the literature (Weller, 2008). Amenity flows are not necessarily constrained to core-periphery patterns, and there is evidence that amenity based migration is less subject to distance constraints than would normally be expected. Destination regions in amenity migration flows may be identifiable by climatic, environmental or economic features (which may or may not be closely tied to geographic features such as longitude and latitude). Origin regions are more difficult to identify because the push factors are not necessarily related to poor conditions in

the origin. Specific origin-destination pairs (or sets) are also hard to model because amenity migration from any origin allows many alternative destinations to be considered. Amenity destinations therefore potentially source migrants from multiple and unpredictable sources. The literature suggests, however, that over time patterns stabilise under the affects of agglomeration or 'the big sort' (whereby people from similar origins come to favour similar destinations).

As 'friction to distance' (Sanchis-Guarner, 2007) decreases over time, more and more regions will rely on amenity aspects rather than geographical proximity to compete in the 'war over skills' (Iredale, 2007, p. 24). Examination of regions which are currently distanced from CP labour migration flows can provide useful insights into how national labour migration systems may operate in the future.

3. Domestic Labour Migration Flows in Australia

There have been numerous studies of migration across Australia's State and Territory borders. Many of these studies make a presumption about the relationship between migration and labour (i.e. that most migrants are in some way labour migrants), although few studies actually examine the movement of employed people in isolation from other migration flows. With some exceptions (Blakely, Bista and Khan, 2007, for example), research has examined the net position of regions as givers/ receivers of migrants but has not looked at the relationships between specific givers and receivers. Since at least the late 1970s (Rowland, 1979) the two major trends noted in the literature have been movement of people from the south and west to the north and east (particularly to the 'sun belt' destinations in northern New South Wales and southern Queensland) and movement of people from inland regions to coastal ones (Bell, 2002; Blake, Bell and Rees, 2000; Jarvie, 1985).

The oft-touted 'movement north' of Australian migration has been 'north' in relative more than absolute terms (Bell, 2002). While some regions north of the Tropic of Capricorn have experienced periods of net positive migration, these have tended to be over short periods and associated with either the mining industry or defence sector activity. Over the longer term, the far north has tended to lose population to the south. The movement from inland to the coast has largely been within the relatively heavily populated east coast states (Queensland, New South Wales and Victoria) rather than to the far north coasts (Blakely, Bista and Khan, 2007).

The efficiency of Australia's internal labour migration system has been questioned following observations that migration has only very slowly served to even out regional differences in unemployment rates (Debelle and Vickory, 1998). There is apparently a high friction to distance which has variously been attributed to the importance of local knowledge and networks for navigating the labour market, the difficulties associated with entering markets in new locations, and the increasing importance of non-economic factors in decisions about where to live and work (Blakely, Bista and Khan, 2007). A summary of the analysis of migration as an adjustment to differential labour market conditions (c.f. Debelle and Vickory, 1998; Denniss and Watts, 1999; Mitchell, 2008) suggests a hierarchy of preferences of those who face employment uncertainty -

1. Transition to a different job in the same location (often through government subsidised re-training programs);
2. Withdraw from the labour market and remain in the same location;
3. Move to a nearby location where existing information and social networks remain strong;
4. Move to the capital city or other large urban centre within the State/ Territory (where networks are also likely to be present);
5. Move interstate.

The persistence of preference for specific destinations over time suggests the fifth option is still mediated by connections (professional or social) with previous migrants, and so a strong agglomeration force is in play. One result is the increasing propensity (also observed internationally) for people to move between economically similar regions. Historically, a large proportion of labour migration flows were from relatively poor to relatively rich regions. Labour migration now is more likely to occur from relatively rich regions to other relatively rich regions. The result is increasing rather than decreasing disparities between regions in terms of access to labour and opportunities for regional development and individual advancement (Batista, 2008).

The Northern Territory has not featured in many analyses of national migration flows. It has been claimed that the States and Territories away from the eastern seaboard have played a peripheral role in Australia's migration system (Bell, 1997; Entel and Hamilton, 1997). Its contribution (as giver or receiver) to the national pool of migrants is numerically small. The observed periods of positive and negative migration flows to the Northern Territory have been attributed to local conditions – and specifically to levels of Government investment (Taylor, 1989; Carson, 2011) – more so than to a broader role in national flows. What is known about migration to the Northern Territory is that it favours relatively young working aged people, that it is driven by motives of career progression, a desire to see something different, and a desire to work in an area of social need (particularly in Indigenous communities). The Northern Territory therefore exhibits many of the characteristics associated with an escalator region.

There has been little analysis of exactly from where labour migrants to the Northern Territory originate. The Australian Bureau of Statistics conducted an analysis of the State of origin of movers to the Northern Territory as recorded in the 1991 Census (Australian Bureau of Statistics, 1994). The analysis revealed strong relationships with other 'norths' (Queensland and Western Australia) and with South Australia (consistent with findings from previous Census (Bell, 1992; Taylor, 1989; Rowland, 1979). The South Australian relationship may be sustained by geography and the historical link between the two jurisdictions. The Northern Territory was a part of South Australia up until 1911, and many organisations continue to include the Northern Territory and South Australia in the same branch (Guide Dogs South Australia and Northern Territory, Epilepsy Association, Council of Churches, Coeliac Society, etc.). The Australian Bureau of Statistics study included some analysis of regional (i.e. sub-State) origins of migrants, and noted that the higher volumes of in-migrants came from the larger (population) regions mostly along the east coast of Australia.

The question of where the Northern Territory should look to recruit skilled labour is therefore only partially answered in the existing literature. In particular, there has been scant regional level analysis, and no published analysis since the 1991 Census. What is clear from previous studies is that the Northern Territory is challenged by distance from the major source regions for labour migrants in Australia. The spatial structures of labour migration systems observed elsewhere – relatively high volumes of migration between adjoining regions, strong relationships between regions with small populations and nearby large urban centres – may or may not apply in the Northern Territory because of the challenge of distance. The Territory's adjoining regions are those noted as losing population to large urban centres and the east coast and the Territory is several thousands of kilometres distant from even the 'nearby' large urban centres.

4. Methods

The 2006 Census of Population and Housing included questions about current 'usual residence' (address where the respondent anticipated residing for more than six months of 2006) and usual residence on the same date in 2001. For the purposes of this research, a 'migrant' was a person who cited different usual residences in Australia for 2006 and 2001. The 2006 Census represents the most recent comprehensive data on domestic labour migration available at the level of geographic detail required here. There are more detailed and more current data for international migration, but this paper is concerned only with domestic migration. Domestic migration is measured in broad terms between Census by monitoring changes to Medicare (national health insurance) registrations, but that data do not include information about occupation or employment status.

Analysis was specifically conducted on migration between Statistical Divisions (SDs). There were 61 Statistical Divisions at the 2006 Census, covering all of Australia. Statistical Divisions were selected because there were a manageable number for national analysis (there were, for example, nearly 1400 Statistical Local Areas, the finest level of detail for which migration data have been available), and because movement between Statistical Divisions was more likely to be associated with a change of employment than movement between smaller areas. There were only two Statistical Divisions in the Northern Territory (Darwin and Northern Territory Balance). Intra-Territory migration analysis (see point 2 below) was therefore conducted at the Statistical Sub-division (nine in the Northern Territory) level. While the Northern Territory Skilled Worker Campaign does not specifically prioritise locations within the Northern Territory as destinations for migrants, there is recognition that factors stimulating migration to the relatively urbanised Darwin region may be different to those stimulating migration to the more remote parts of the jurisdiction. Where possible, then (1-4 below), Darwin has been distinguished from other parts of the Northern Territory.

Migration events were examined for people who were employed in one of the occupations identified in the 2010 Northern Territory Occupation Shortage List (Northern Territory Government, 2010). There were approximately 120 occupations on the list, and these were drawn primarily from the 2006 Australian and New

Zealand Standard Classification of Occupations (ANZSCO). Occupations Shortage List occupations were usually (but not always) specified from the four digit level of ANZSCO (the most detailed level) which contained about 600 occupations in all. Defence force workers were excluded from this analysis because migration decisions are often imposed on them by their employer. A limitation of the analysis is that the occupation of the person was only known for 2006. People may have changed occupations between 2001 and 2006.

Data were accessed using the Australian Bureau of Statistics Table Builder application. Spatial analysis was conducted using Quantum GIS open source software.

Five sets of analyses were conducted -

1. *Analysis of national skilled migration flows*. A concentration index was calculated for each SD in Australia. The concentration index was the percentage of all skilled worker migrants to an SD between 2001 and 2006 who came from the five largest source regions (by volume). A higher percentage represented a greater concentration (C5) of sources of migrants. Lower C5 scores indicated a greater diversity of sources of migrants. The concentration index analysis provides a high level view of the spatial structure of the national migration system. On average, the top five sources of skilled migrants accounted for two thirds of all skilled migrants to a region. While this research did not specifically examine out-migration flows (excepted as implied in points 4 and 5 below), it should be noted that out-migration concentration was similar on average (top five destinations for out-migrants accounted for two thirds of all out-migration events) and correlated very strongly at the regional level ($r = 0.86$).
2. *Analysis of skilled migration flows within the Northern Territory*. A limitation of the use of Statistical Divisions was the shallow view provided of migration within the Northern Territory. To account for this, without imposing the limitations of smaller scale geographic analysis on the national model as a whole, a separate analysis was conducted of skilled migration flows within the Northern Territory at the Statistical Sub-division (SSD) level. There were eleven SSDs in the Northern Territory, which was more consistent with the number of SDs in other jurisdictions. This analysis was important in illustrating more clearly the role of the Northern Territory jurisdictional boundaries in determining the structure of the national migration system.
3. *Source regions (by volume) for the Northern Territory*. Analysis was then conducted to identify the largest (by volume) SD sources of skilled migrants to each of the two SDs in the Northern Territory and the Northern Territory as a whole. This analysis provides a view of the spatial pattern of migration to the Northern Territory based on the number of skilled migrants sourced from each region. The limitation of the volume measure is that it does not account for the differences in size of SDs or their different propensities to produce out-migrants (Entel and Hamilton, 1997).

4. *Source regions (by likelihood) for the Northern Territory*. To account for this, analysis was also conducted according to the likelihood that a skilled out-migrant from an SD outside the Northern Territory would move to a Northern Territory SD.
5. *Out-migration rank analysis*. Finally, the ranking of the Northern Territory (considered as a single region) as a destination for out-migrants from each SD was calculated. The aim was to identify those regions for which the Northern Territory would be included in a concentration index (C5) of outmigration. This analysis did not consider the two Northern Territory SDs separately because of the relatively small population of the Balance SD in particular.

Each of the five analyses provided different views of the positioning of the Northern Territory within the national skilled migration system. The discussion focuses on the similarities and differences between the views.

Data were not sub-setted for different occupations, or specific characteristics of skilled migrants (age, sex, ethnicity, education qualification etc.). Such sub-setting could provide important insights into the dynamism of the migration system, and is an important task for further research. The substantive data limitation was the failure to account for multiple moves between 2001 and 2006. There would have been migration to and from the Northern Territory between the two measurement dates, and this migration may have exhibited a different pattern to that described here. The Census did include a question about usual residence one year previous (2005), and additional research could be done to compare the one year and five year migration patterns.

5. Results

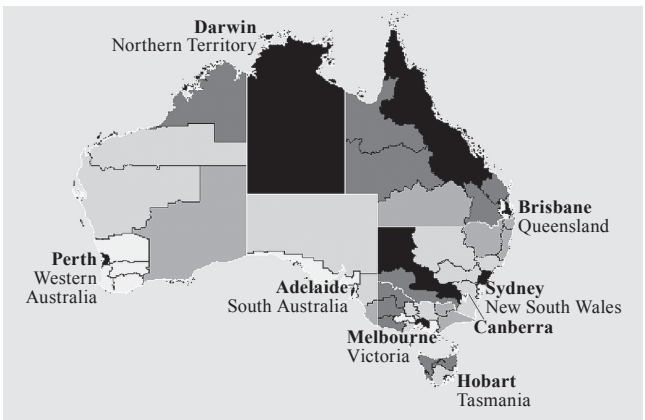
Between 2001 and 2006, nearly 334 000 people employed (in 2006) in one of the Occupation Shortage List occupations changed usual residence from one SD to another within Australia. Nearly 9 000 of these (2.6 per cent) moved to the Northern Territory (either Darwin or Balance SD). In the same period of time, nearly 8 500 skilled migrants moved out of the Northern Territory to another part of Australia.

Figure 1 shows a concentration index (C5) of sources of skilled migrants to each SD in Australia. Darker shaded regions have a lower concentration index (i.e. a lower percentage of migrants came from the top five source regions) and lighter shaded regions have a higher concentration index. The average index score was 65 per cent. Region shading was determined by quintiles. State/ Territory boundaries are represented by white lines. The map is labelled with capital cities for each State/ Territory and the corresponding State/ Territory name (except for Canberra, which is part of the Australian Capital Territory).

The darker (lower concentration index) regions in figure 1 are the capital cities, the far west region of New South Wales, regions along the north east coast of Queensland, and the two Northern Territory regions. The lighter (higher concentration index) regions are contiguous with the capital cities. In general, regions are darker the further they are from the capital city of their State/ Territory. The implication is of decreasing reliance on the capital city as a source of migration. Using Victoria as an example, the top five source regions for the Central Highlands SD (the light coloured

SD immediately to the left of Melbourne) accounted for 76 per cent of skilled migrants and were Melbourne (37 per cent), Barwon (contiguous to the south and 19 per cent), Loddon (contiguous to the north and 13 per cent), Wimmera (contiguous to the west and 11 per cent) and Western Districts (contiguous to the south-west and eight per cent). The Loddon SD sourced 74 per cent of its migrants from the top five regions, which were Melbourne (41 per cent), Goulburn (contiguous to the east and 21 per cent), Mallee (contiguous to the north west and 13 per cent, Central Highlands (10 per cent) and Ovens-Murray (east of Goulburn and eight per cent). The Mallee SD sourced 58 per cent of its migrants from the top five regions, which were Melbourne (20 per cent), Adelaide (18 per cent), Loddon (14 per cent), Murray (contiguous to the north and in New South Wales and ten per cent) and Wimmera (seven per cent). This general pattern – declining reliance on the capital city as distance increased, and increasing reliance on other contiguous regions – was also observed in all States except for Queensland (where Brisbane was less prominent as a source of migrants for all but the immediately contiguous regions) and for the Northern Territory.

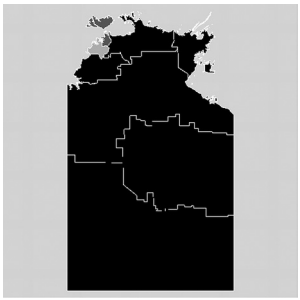
Figure 1 - Concentration Index (C5) of Sources of Skilled Migrants to Australian SDs 2001-2006



Q1: 42-54 per cent
Q2: 54-62 per cent
Q3: 62-67 per cent
Q4: 67-75 per cent
Q5: 75-100 per cent
Source: Australian Bureau of Statistics 2006 Census of Population and Housing custom tabulation.

In the Northern Territory, the Balance SD (which had a C5 of 42 per cent) received just 26 per cent of its migrants from Darwin, more resembling a distant than contiguous region. This could be a function of the geographic size of the Balance SD, so further analysis was conducted at a finer geographical level. Figure 2 shows the C5 for SSDs within the Northern Territory. Sources of migrants for this C5 calculation were SSDs within the Northern Territory and SDs outside of the Northern Territory.

Figure 2 - Concentration Index (C5) of Sources of Skilled Migrants to Northern Territory SSDs 2001-2006

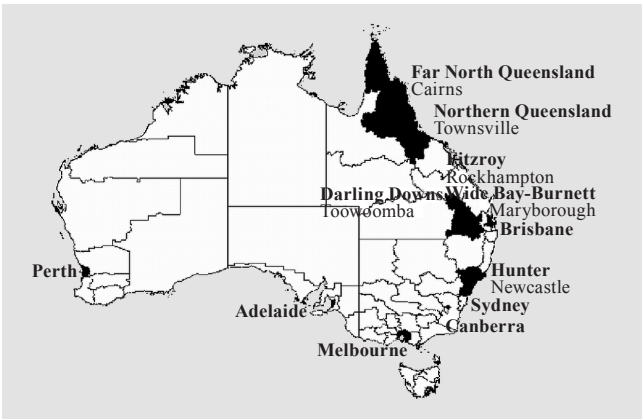


Q1: 42-54 per cent
Q2: 54-62 per cent
Q3: 62-67 per cent
Q4: 67-75 per cent
Q5: 75-100 per cent
Source: Australian Bureau of Statistics 2006 Census of Population and Housing custom tabulation.

Concentration index scores are higher immediately around Darwin SSD, but the two mainland regions with relatively light shading are part of the Darwin SD. The island (Bathurst-Melville) SSD to the north was the only SSD outside of Darwin with a concentration index score in excess of 50 per cent (56 per cent), and only the Central Australia SSD (the far south region) had a score over 40 per cent (42 per cent). Darwin was among the top five sources of migrants for all SSDs, but typically provided less than ten per cent of migrants and was the top source region for only one SSD (Alligator, the middle region along the north coast). The only region where another Northern Territory SSD featured was the Barkly region (contiguous to the north of Central Australia) which sourced five per cent of its migrants from Central Australia.

Outside the Northern Territory, the largest sources (by volume) of skilled migrants to the Northern Territory were the mainland capital cities of Melbourne (11 per cent of migrants), Adelaide (nine per cent), Brisbane (eight per cent), Sydney (eight per cent) and Perth (seven per cent). These were followed by migrants from Hunter, Far North Queensland, Northern Queensland, the Darling Downs, and Canberra (see figure 3). Each of these provided three per cent or less of the total migrant arrivals. Figure 3 labels the region and the major population centre in that region. The capital city regions are named for that city. Two additional regions are identified in italics in figure 3. Fitzroy and Wide Bay-Burnett were among the top ten sources of migrants to Northern Territory Balance, but not to Darwin. In contrast, Canberra and Darling Downs were in the top ten for Darwin but not for Northern Territory Balance. However, the percentage of migrants provided by these regions (even to the Northern Territory as a whole) was very small.

Figure 3 - Top Ten Sources of Skilled Migrants (by volume) to the Northern Territory, 2001-2006

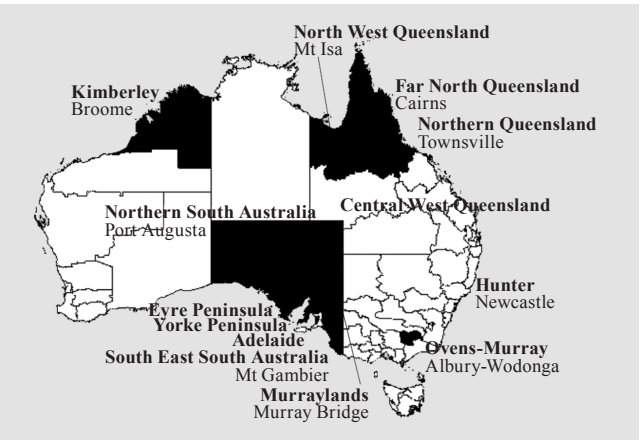


Source: Australian Bureau of Statistics 2006 Census of Population and Housing custom tabulation.

On average, each SD outside of the Northern Territory sent 2.6 per cent of its out-migrating skilled workers to the Northern Territory (1.3 per cent to Darwin and one per cent to Balance) between 2001 and 2006. The strongest likelihood of an out-migrant moving to the Northern Territory was from the Kimberley region in the far north of Western Australia, from where eight per cent of migrants moved to the Northern Territory (five per cent to Darwin and three per cent to Balance). There were ten other relatively high producing regions (greater than three per cent of out-migrants moving to the Northern Territory) identified in figure 4. In addition, two regions (labelled in italics) stood out as having a relatively high propensity to send migrants to Northern Territory Balance (greater than 1.5 per cent of out-migrants) but not to Darwin. In the case of Hunter, less than one per cent of out-migrants moved to Darwin (but 1.5 per cent to Balance) and in the case of Central West Queensland, less than 0.5 per cent of out-migrants moved to Darwin (but nearly two per cent to Balance).

Continuing this analysis, there were five regions for which the Northern Territory served as one of the top five sources of out-migrants. Those regions were Kimberley (for which the Northern Territory was the third most popular destination for out-migrants), Northern South Australia (fifth), Eyre Peninsula (fifth), Ovens-Murray (fifth) and Pilbara (fifth). Pilbara is in Western Australia contiguous to the south of Kimberley. Approximately 2.7 per cent of skilled out-migrants from Pilbara moved to the Northern Territory.

Figure 4 - Regions from Which Greater than Three per cent of Skilled Out-migrants Moved to the Northern Territory 2001-2006



Source: Australian Bureau of Statistics 2006 Census of Population and Housing custom tabulation.

6. Discussion

The national skilled labour migration system for Australia contains some clear core-periphery structures particularly around the capital cities of Sydney, Melbourne, Adelaide, Perth and Hobart. The core-periphery pattern is less obvious around Brisbane, which may be a result of what has now been several decades of 'sun-belt' migration from south to north along the east coast of Australia (Stimson, 1998). Nonetheless, even in Queensland the jurisdictional boundaries are important in constraining migration. The 'top five' analyses for regions in Victoria illustrate how the strength of relationship with the core diminishes as distance increases, but also shows that supplementary migration sources tend to be located between the destination region and the core. It is only at the extreme edge of the jurisdiction (as demonstrated in the example of Mallee SD) that external sources begin to appear among the top five list, and the total contribution of the top five sources of migrants declines substantially.

The Northern Territory stands out because there is no apparent core-periphery pattern around Darwin (even if modelled at relatively fine levels of geographic detail), and because there is no obvious core-periphery system to which the Northern Territory belongs. The Northern Territory has far less internal migration of skilled labour than other jurisdictions, substantially lessening the power of the jurisdictional borders as a constraint on the labour migration system. The top five (and even top ten) sources of migration by volume are spread around the nation, with none being contiguous to the Northern Territory. The dominant source regions by volume (for Darwin, remote NT and NT in total) were the capital cities of other jurisdictions and regions in the north of Queensland. For Darwin, this suggests high levels of core to core migration, and high levels of core to periphery migration to remote NT. It is difficult to conceive of Darwin as a 'core' however, because of its limited impact on migration systems within the

Northern Territory. Instead, analysis of national labour migration flows indicate the probability that the Northern Territory is an amenity destination for skilled workers. Carson and Brown's (2008) observations about the age of migrants to the Territory and their relatively short lengths of stay is suggestive of escalator migration more so than lifestyle amenity migration.

The view of the system provided by analysing the likelihood of migration to the Northern Territory is much more consistent with a concentric rings model. High likelihood sources for Darwin, remote NT and the NT as a whole include contiguous regions in Western Australia, Queensland and South Australia. Likelihood analysis particularly reveals a very strong link to South Australia (even for Darwin) which could reflect the historical relationship with that jurisdiction and position the NT as a distant periphery of Adelaide. Interestingly, the historical link to Canberra does not appear to have such strong residual effects, although this might say as much about Canberra (which does not act as a core for any of its immediately surrounding regions) than the Northern Territory. Despite the high likelihood of migration from South Australia, however, the overall volume of migrants was small (1046 migrants or about 12 per cent of the total skilled migrant pool from South Australia as a whole) compared with other and non-contiguous regions (Melbourne alone provided 11 per cent of migrants and Brisbane and Sydney in excess of eight per cent each).

Only five regions have the Northern Territory (even when considered as a single destination region) among their top five destinations for skilled labour migrants. With the exception of Ovens-Murray on the Victoria/ New South Wales border, the regions are contiguous to the Northern Territory. It is not clear why Ovens-Murray features on this list. There is no obvious historical link nor an obvious contemporary economic link (the two regions having similar industrial profiles, for example). Ovens-Murray could be an anomaly in terms of the 'normal' flows pattern, with some specific event generating an unusual number of migrants to the Northern Territory in the 2001-2006 period.

The analysis here has included all skilled migrants to the Northern Territory (excluding Defence force workers). While beyond the immediate scope of the paper, it is worth noting that replicating this research to compare male and female migrants produces very similar results, although the differences which do arise are certainly worth further investigation. Likewise, further investigation is warranted around age specific and occupation specific migration patterns.

7. Conclusions

The selection of source regions to target for the recruitment of skilled labour migrants is a difficult task for a destination region like Australia's Northern Territory. It lacks an efficient internal labour migration system where relatively few people move from one part of the Territory to another, making the power of the jurisdictional boundaries far less than is apparent in other parts of Australia. The Northern Territory therefore has to look outside the jurisdiction to meet its skilled labour needs. This immediately brings it into competition with the peripheries of other jurisdictions because the major source regions (by volume) are the jurisdictional cores. Analysis by likelihood of migration reveals closer links to regions that border the NT, but the likelihood versus

volume trade-off is generally unfavourable as these border regions themselves are sparsely populated and often experience labour shortages.

The conclusion, then, is that the Northern Territory appears to have few locational advantages when it comes to recruiting skilled labour. Its position within the migration system is likely to be as an escalator region, meaning that it is particularly attractive to young people in the early stages of their careers. These people are likely to have recently completed their professional education, and many of the training institutions are located in capital cities in other jurisdictions. The second feature of the Northern Territory system is the periphery-periphery links that emerge particularly when examining migration likelihood. This may reflect a 'rural pipeline' or step migration pattern, or it might suggest that the entire region (the Northern Territory and immediate adjacent regions) is a single migration system and that there is a sufficient amount of internal migration within the system to influence the modelling here (which is not the case when limiting the system boundaries to the Northern Territory alone as shown in figure 2). These observations – operation as an escalator region and extension of the Northern Territory internal migration system beyond the jurisdictional boundaries – warrant further investigation. Further investigation is also needed to see if differently skilled labour have different migration patterns, and whether the migration patterns are subject to change over time (particularly the emergence and decline of apparently anomalous regions such as Ovens-Murray).

Notwithstanding the need for additional research, this paper has provided valuable insights into the operation of the national labour migration system in Australia. The core-periphery model appears dominant in the more heavily populated areas, but breaks down in more sparsely populated regions. In the absence of a core-periphery model, identification of sources of labour migrants is difficult. Volume and likelihood measures offer different views of relationships between source regions and destinations 'beyond periphery'. Combining the two views emphasises the importance of migration within the extended periphery (i.e. among contiguous regions which all have weak relationships to their cores) and from national cores (in this case State capital cities). Targeting either presents challenges. In the case of the former, the contiguous regions are also likely to have labour shortages rather than surpluses. In the case of the latter, one must enter into competition with strong and established core-periphery patterns.

Current domestic labour recruitment strategies from the Northern Territory Government are spatially based – the policy is to identify locations across Australia from which labour is recruited. Such a strategy makes a lot of sense for destinations which are linked to core-periphery structures because it is obvious which regions are most likely to produce new migrants. The situation is less clear in the Northern Territory, however, where spatial relationships are dispersed and weak. The Northern Territory Government can continue this spatially based policy, and/ or it can consider some other approaches to increasing the efficiency of the labour system. The option likely to produce the highest pay off is to strengthen the position of Darwin as a core within the jurisdiction. This would require strategies to increase the production of local labour (through better provision of education and training for unskilled residents of the Northern Territory) and surplus labour (through policies which enable people

who are temporarily unemployed (or absent from the labour force) to remain in the Northern Territory). The small size of Darwin means that these strategies are difficult to implement. The past practice has been to recruit to vacancies, rather than recruit/develop skills even when vacancies do not exist. Whether this could be changed in the future is questionable given the persistent high out-migration rates of the very people that the Territory attempts to recruit. The recruitment challenge therefore cannot be addressed internally unless the retention challenge is addressed at the same time.

A second option is to further exploit the status of the Northern Territory as an escalator region, by improving understanding of what the dynamics of escalator regions are, and who is attracted to them. There are some hints in recent research (Martel and Carson, in press), for example, that it is not only young early career people who look for escalator opportunities, but that escalator regions might also be attractive to older workers looking for a change of career, or attempting to build their resources in anticipation of retirement (Heikkila and Pikkarainen, 2009).

A potentially related strategy is to consciously develop links to specific source markets perhaps through labour exchange programs, preferential recognition of skills qualifications obtained from specific institutions, or exploitation of Northern Territory 'alumni' by identifying regions favoured by NT out-migrants and using them as ambassadors for future generations of in-migrants. Whatever strategies are employed, it is apparent that regions which exist 'beyond the periphery' have very different labour migration dynamics to those in more classically bounded systems. There is a need for more research into such regions to see how their labour migration systems develop over time and the extent to which the challenges of distance can be addressed through strategies such as those suggested here. The research also raises the question of whether core-periphery migration systems are likely to become less common over time as amenity and 'escalator' motives (particularly among skilled and highly paid workers) become more prominent and transport and communication technologies continue to improve the ability of people to migrate across longer distances.

All of this makes the continued analysis of patterns of domestic labour migration a rich field for research. This paper has made its contribution by providing the first analysis of spatial flows which includes the Northern Territory (and other regions beyond the east coast). The primary interest here has been contribution that can be made to economic development policies – in this case, the policy of 'active recruitment' of skilled labour from to the Northern Territory from other parts of Australia. The research has revealed that the standard models of labour migration apply poorly in the Northern Territory and that even its strongest links to source regions are weak ones. It is not obvious what spatial patterns persist in places where core-periphery models are absent. More research needs to be done to propose alternative patterns, but this paper has demonstrated that such alternative understandings are required. Whether the Skilled Worker Campaign can be more effective by increasing focus on current links, by creating links to new source regions or by seeking alternatives to spatially based approaches to recruitment or by some combination of these is a policy question that can in part be informed by the research here. To further assist, the analysis here could be expanded to examine differences between specific occupations and between people with different characteristics (age, sex, education, family status etc.). As more

data become available (such as the 2011 Census), changes in flow patterns over time can be analysed in more depth. It may also be possible to replicate this analysis for the flows of international labour migrants to and around Australia. This paper has provided a set of techniques for conducting such analysis.

References

Australian Bureau of Statistics (1994), 'The Nature of Movement in to and out of the Northern Territory as Shown by the 1991 Census', Catalogue Number 3402.7, Australian Bureau of Statistics, Canberra.

Batista, C. (2008) 'Why Doesn't Labour Flow from Poor to Rich Countries? Micro Evidence from the European Integration Experience', *Economic Series Working Papers*, No 402, University of Oxford Department of Economics.

Bell, M. (1992), *Internal Migration in Australia 1981-1986*, Australian Government Printing Service, Canberra.

Bell, M. (1997), 'Interstate Migration: The South Australian Experience', Department for Transport, Urban Planning and the Arts and the University of Adelaide, Adelaide.

Bell, M. (2002), 'Comparing Population Mobility in Australia and New Zealand', *Journal of Population Research*, Special Issue, 169-193.

Bishop, B. (2008), *The Big Sort: Why the Clustering of Like-Minded America Is Tearing Us Apart*, Houghton Mifflin Company, New York.

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.

Blakely, E.J., Bista, S.K. and Khan, A. (2007), 'Flee Sydney: A Prospectus on Human Capital Competition between New South Wales and Queensland', *Urban Policy and Research*, 25, 455-471.

Borgatti, S.P. and Everett, M.G. (1999), 'Models of Core-Periphery Structures', *Social Networks*, 21, 375-395.

Brand, H.J.E.M. (2003), 'A Regional Core, Adjacent, Periphery Model for National Economic Geography Analysis', Technical Paper, University of Glasgow.

Brand, H.J.E.M. and Bhatti, R. (2006), 'Estimating Agglomeration and Dispersion Forces in a Multi-Region Geography Model as Applied to Spain', *European Trade Study Group*.

Burnley, I.H. (1988), 'Population Turnaround and the Peopling of the Countryside? Migration from Sydney to Country Districts of New South Wales', *Australian Geographer*, 19, 268-283.

Carson, D. (2011), 'Political Economy, Demography and Development in Australia's Northern Territory', *Canadian Geographer*, 55, 226-242.

Carson, D. and Brown, M. (2008), 'Demographic Change in the Northern Territory, 1976-2006', *Population and Tourism Studies Research Brief*, No. 2008010, Charles Darwin University, School for Social and Policy Research.

Carson, D., Coe, K., Zander, K. and Garnett, S.T. (2010), 'Does the Type of Job Matter? Recruitment to Australia's Northern Territory', *Employee Relations*, 32, 121-137.

Combes, P., Mayer, T. and Thisse, J. (2008), *Economic Geography: The Integration of Regions and Nations*, Princeton University Press, Princeton, USA.

Debelle, G. and Vickery, J. (1998), 'Labour Market Adjustment: Evidence on Interstate Labour Mobility', *Research Discussion Paper*, No. 46, Reserve Bank of Australia.

Denniss, R. and Watts, M. (1999), 'Regional Labour Markets: Naturally Less Efficient?', *Centre of Full Employment and Equity (CofFEE) Conference*, 24.

Entel, M.B. and Hamilton, N.T.M. (1997), 'Dynamics of Spatial Redistribution of Population in Australia', in *MODSIM97 - International Congress on Modelling and Simulation*, Modelling and Simulation Society of Australia, Hobart, Tasmania, 796-800.

Fafchamps, M. and Shilpi, F. (2003), 'The Spatial Division of Labour in Nepal', *Journal of Development Studies*, 39, 23-66.

Fielding, A. (1995), 'Migration and Middle-Class Formation in England and Wales, 1981-1991', in *Social Change and the Middle Classes*, (eds.) T. Butler and M. Savage, UCL Press, London, 169-187.

Heikkila, E. and Pikkarainen, M. (2009), 'Differential Population Development in the Regions of Finland', *Population, Space and Place*, 10, 1002, 12.

Iredale, R. (2001), 'The Migration of Professionals: Theories and Typologies', *International Migration*, 39, 7-26.

Jarvie, W. (1985), 'Structural Economic Change, Labour Market Segmentation and Interregional Migration', *Papers in Regional Science*, 56, 129-144.

Klepeis, P., Gill, N. and Chisolm, L. (2009), 'Emerging Amenity Landscapes: Invasive Weeds and Land Subdivision in Australia', *Land Use Policy*, 26, 380-392.

Krugman, P. (1998), 'Space: The Final Frontier,' *Journal of Economic Perspectives*, 12, 161-174.

Martel, C. and Carson, D. (in press), 'Changing Patterns of Migration to Australia's Northern Territory: Evidence of New Forms of Escalator Migration to Australia's Northern Territory?', *Migration Letters*.

Mitchell, W. (2008), 'Migration and Labour Market Outcomes by Skill in Australia', in *2008 Minimum Wage Research Forum*, Australian Fair Pay Commission, Melbourne, 65-92.

Murray, R.B. and Wronski, I. (2006), 'When the Tide Goes Out: Health Workforce in Rural, Remote and Indigenous Communities', *Medical Journal of Australia*, 185, 37-38.

Northern Territory Government (2010), *Northern Territory Occupation Shortage List*, Available at http://www.nt.gov.au/dbe/employment/workforce_nt/docs/nt_occupation_shortage_list_2010.pdf (accessed 4 May, 2010).

Rowland, D.T. (1979), *Internal Migration in Australia*, Canberra: Australian Bureau of Statistics.

Sanchis-Guarner, R. (2007), '*Analysing Migrations from a New Economic Geography Approach: An Extended Model and Some Evidence for the Spanish Case*', Unpublished Masters in Science Thesis, London School of Economics.

Stimson, R. J. and Minnery, J. (1998), 'Why People Move to the 'Sun-Belt': A Case Study of Long-Distance Migration to the Gold Coast, Australia', *Urban Studies*, 35, 193-214.

Storey, K. (2010), 'Fly-in/ Fly-Out: Implications for Community Sustainability', *Sustainability*, 2, 1161-1181.

Taylor, J. (1989), 'Migration and Population Change in the Northern Territory', *Australian Geographical Studies*, 27, 182-198.

von Braun, J. (2007), 'Rural-Urban Linkages for Growth, Employment, and Poverty Reduction', *Ethiopian Economic Association Fifth International Conference on the Ethiopian Economy*, Addis Ababa, 7-9 June. Available at: http://www.ifpri.org/sites/default/files/publications/20070607jvbruralurban.pdf (accessed 22 May, 2010).

Weller, S.A. (2008), 'Are Labour Markets Necessarily 'Local'? Spatiality, Segmentation and Scale', *Urban Studies*, 45, 2203-2223.