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Regional Labour Market Adjustment and the Movements of People: A Review

David C. Maré[1] and Wai Kin Choy[2]

Abstract:

This review paper examines the link between internal migration and regional labour market adjustment. It outlines the motivation and scope of our enquiry, discusses the three key questions that we plan to pursue, reviews relevant international and New Zealand literature, and outlines proposals for future research. The first key question examines whether migration helps regional labour market adjustment. The second question investigates how important migration is as a regional labour market adjustment mechanism. The final question looks at who is moving and whether it matters for regional labour market adjustment.

JEL Classification: R23 - Regional Migration; Regional Labour Markets; Population; J61 - Geographic Labour Mobility; Immigrant Workers

Keywords: regional labour market, internal migration, regional labour market adjustment.

[1] Motu Economic and Public Policy Research Trust, Email: Dave.Mare@motu.org.nz
[2] Policy Co-ordination and Development, New Zealand Treasury, Email: WaiKin.Choy@treasury.govt.nz

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EXECUTIVE SUMMARY

Introduction (Chapters 1 and 2)

There are strong links between policy, internal migration and regional labour market adjustment

- *Policy issues include regional development, regional inequalities and the spatial impact of non-spatial policies*

This paper focuses the enquiry by specifying the scope, key questions, relevant theory as well as empirical and data issues

- *We focus on the intersection of internal migration, labour market and regional adjustment*

We present some theory that shows how people move out of the region in response to shocks

- *Migration is potentially a key regional labour market adjustment mechanism*

Patterns (Chapter 3)

We summarise patterns and trends of internal migration and regional labour market adjustment

- *Internal migration is significant in itself and as a source of regional population change, and future empirical work should account for international migration*
- *There is regional labour market adjustment occurring but there are still disparities that are persistent. These patterns in New Zealand are consistent with international evidence*

The next three chapters examine whether there is a link between internal migration and regional labour market adjustment, and if so, whether the link is large, as well as whether it depends on who's affected by the shocks.

Key Question 1 (Chapter 4: Does Migration Help Regional Labour Market Adjustment?)

We distinguish between direct questioning and indirect inferences to reveal the factors influencing the decision to move

On balance, the evidence supports a link between labour market attractiveness of locations and migration flows, but:

- *Current indicators are not necessarily good indicators of attractiveness*
- *Observed differences in labour market indicators do not necessarily represent differences in attractiveness that induce migration flows. There may be differences in amenities, costs of living and other sources of omitted variable bias.*
- *There are other forms of adjustment, such as in the housing market*
- *There are differences across individuals that may not be obvious from aggregate flows*

We highlight the implications of these complications and different insights from using aggregate studies, microdata studies and longitudinal studies

- *Evidence of the labour market story is mixed from aggregate studies, particularly for the unemployment variable*
- *There is more consistent (stronger) evidence from microdata studies*
- *Longitudinal studies take into account life-cycle considerations that are potentially important in migration decisions*

Key Question 2 (Chapter 5: How Important is Migration as a Regional Labour Market Adjustment Mechanism?)

We look at how rapidly the migration adjustment process takes place, and its importance compared to other forms of adjustment

Methods vary according to length of time series used and structure imposed

- *Short time series approaches limit the extent of analysis, and do not explicitly model other forms of adjustment*
- *Longer time series approaches allow one to assess the contribution of migration to the full adjustment mechanism. These can be divided into studies that impose prior structure on the data, and those that impose little or no structure*
- *Different approaches tell us about different parts of the story – no one method is always better than another*

Vector Autoregression (VAR) is particularly common and we include an extensive discussion of VAR studies

- *The results vary across countries*
- *Internal migration is a significant regional labour market adjustment mechanism in some countries like the US and Australia, but not in most of the European countries*

Case studies can paint a richer picture because they are region-specific

- *The results suggest that external pressures and shocks impact upon different local labour markets quite differently*

Key Question 3 (Chapter 6: Who Moves and Does It Matter for Regional Labour Market Adjustment?)

We discuss two key issues – identifying heterogeneity and the implications for regional labour market adjustment

- *There is clear evidence of heterogeneity in migration flows. Some characteristics have been found to affect migration in a more systematic way (e.g. age and education) than others (e.g. ethnicity). Generally, there is evidence that younger, highly skilled, single males, who do not own homes, are relatively more mobile*
- *We find few existing studies on the implications of who moves on the origin and destination communities*

Research Options (Chapter 7)

We present three options for future research:

- *that can help answer the three key questions*
- *that are feasible research options, in terms of data availability and plausible ways of addressing the identification problem*
- *that are likely to generate findings that are robust and of relevance for public policy*

Option 1: Spatial interaction model of migration-labour market links
Option 2: VAR modelling of regional labour market adjustment
Option 3: Case study approach to get behind the average relationships

The choice of whether to proceed with each of these options depends on available resources, and a judgement about the importance of answering each key question, relative to other possible demands on research resources

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1 INTRODUCTION

1.1 Introduction

This review paper is part of a broader work programme in the Treasury that raises the profile of regional issues in public policy debate. Earlier work has set out the key concepts of economic geography, made progress on the database front, and illustrated some applications of the data (see Box (2000), Kerr, Maré et al. (2001), Kerr and Timmins (2000) and Maré and Timmins (2000)). This paper builds on these previous papers, and on an extensive international and (a smaller) New Zealand literature, to investigate the role of migration as a regional labour market adjustment mechanism. In particular, it provides a foundation for further empirical work. The outcome of this review document is a recommendation of a series of potential projects that can contribute to policy making and filling research gaps.

Against this background, the paper has four aims. The first is to identify the key questions that will help inform policy makers and contribute to the New Zealand research literature. Secondly, it reviews relevant international and New Zealand literature to identify the range of methods and models that are used to shed light on the key questions. The third aim is to briefly summarise key evidence in relation to each key question[3]. Finally, this paper will suggest possible approaches for further research aimed at improving our understanding the role of migration in regional labour market adjustment.

The remainder of this paper is organised as follows. The next subsection outlines the motivation for this paper in more detail, covering both the policy environment and research gaps. Chapter 2 outlines a framework for thinking about the underlying issue – migration as a regional labour market adjustment – and thus, provides a map to guide the reader through this document. Chapter 2 also highlights some data and empirical issues that have to be addressed. Chapter 3 then presents some summary statistics on patterns of internal migration and of regional labour market adjustment in New Zealand. Chapters 4 to 6 form the core of this paper and discuss each of three key questions in turn. For each key question, we discuss what researchers look for, how they go about finding it, and what they have found. Finally, Chapter 7 proposes three possible empirical projects for further work.

1.2 Motivation

This subsection covers the factors that led us to embark on this review document. These are discussed under two headings - the policy environment and the research literature (what we do know, what we don't know, and other current related work).

1.2.1 Policy environment

Government policies can affect outcomes in regions within New Zealand in various ways. These can be policies specifically aimed at intervening in a region, or policies that are not specifically aimed at particular regions (non-spatial policies) but that have regional implications. Both are considered below.

[3] In this paper, we survey the literature and draw inferences from our reading of it. We are not undertaking a formal meta-analysis although this would provide a more structured and systematic basis for drawing such inferences.

1.2.1.1 Regional Development Policy

It is clear that there is a resurgence of interest in the regional economic development debate. New roles in the current government were created, such as the Minister for Economic Development and Minister for Industry and Regional Development. The Ministry of Commerce was renamed the Ministry of Economic Development, and given the responsibility for regional development policy advice. Industry New Zealand was established to enter partnerships with the private sector and with local communities to transform the economic base of New Zealand.

Our first focus in this paper is the link between migration and developments in regional labour markets. Migration patterns are relevant for designing spatially targeted policies. Attempts to improve the prospects of people in particular regions may be confounded if the migration response is large. Assistance could, in this case, end up benefiting new entrants to the region rather than the initially targeted population or community, or could create concentrations of poverty. Also, even if a particular policy does lower unemployment in one area, from a national perspective, these benefits could be offset by increased unemployment in other areas. Does out-migration from less well-off areas increase or decrease the welfare of those remaining? How do we address declining regions?

Differences in unemployment across New Zealand regions have been remarkably persistent over the post war period (Morrison (1999)). Therefore, there is a need for more geographically based research. In particular, we need more knowledge of the differences between places and the way in which the local economy and associated opportunities interact with the presence of vulnerable groups.

The focus of active labour market programmes in New Zealand has traditionally been on the characteristics of vulnerable groups. There is little focus on the characteristics of the local labour markets in which many currently seek employment. However, there has been an increasing interest in devolution. For example, the Minister of Employment and Social Services has recently announced that he intends to introduce greater "flexibility" in the delivery of employment services in the regions[4].

1.2.1.2 Addressing Inequalities

There has been a significant amount of attention on the gaps between Maori and non-Maori recently (see for example, the *Closing the Gaps 2000* report by Te Puni Kokiri). There is a clear regional dimension to disparities between Maori and non-Maori. To what extent does migration ameliorate or worsen the disparities? Do the migration patterns of Maori differ from those of non-Maori? Are Maori more or less mobile than non-Maori? Do they vary with iwi area? The more important that iwi affiliations are in determining Maori migration patterns, the more policies will need to explicitly account for iwi.

One could also investigate regional disparities for other population groups, or in other dimensions, such as education and health. In terms of education, what effect does

[4] The Community Employment Group (CEG), a service of the Department of Labour, is physically located in nearly 30 local communities across New Zealand, and works in many more, creating local opportunities for employment and economic self-sufficiency. The service was transferred from the Department of Work and Income to the Department of Labour in early 2000 as part of the Government's strategy to strengthen community employment development capacity. Also, a formal memorandum of understanding recently reached between the Mayors' Taskforce for Jobs and Government Ministers fleshes out the Government's commitment to work in partnership with local communities to tackle unemployment.

parental mobility have on educational disparities? Who is moving and how does this change the nature of the demand for education in various regions? The same questions can be asked for health outcomes.

These questions suggest that we need a better understanding of what is happening at the regional level, what effect mobility has, and whom it affects the most. Only then can we develop more effective policies to address concerns about regional differences. It is noted, however, that an understanding of the regional dimension is important even for policies that are not aimed specifically at regions, as explored below.

1.2.1.3 Spatial Impact of Non-spatial Policies

Some policy instruments, although not specifically aimed at particular regions (i.e., non-spatial policies), nevertheless have regional implications or a spatial impact. Examples of such cases include the minimum wage, the wage-bargaining system, unemployment benefits, housing market arrangements, and industry assistance policies.

Where there are regional differences in the price level, national policies such as minimum wages or benefit levels can have uneven spatial impacts. In areas with lower price levels, the national minimum wage or benefit level will be worth more. This means that any effects of minimum wages in reducing the number of jobs on offer, or of benefit levels in reducing people's willingness to work, will be concentrated in low-price regions.

Public housing policy is yet another way the government influences regions, whether intentionally or not. When public housing is concentrated in particular areas, it restricts the mobility options of people receiving housing assistance. Public housing policy can also influence housing ownership patterns. There has been much debate about the link between housing tenure structure and the level of labour mobility (see for example, Cameron and Muellbauer (1998), Böheim and Taylor (2000), Gardner, Pierre et al. (2000), and Oswald (1999)). A very high rate of owner-occupation (illiquid rental markets) may impede labour mobility because of higher transaction costs than in private renting. Illiquid rental markets make it difficult for workers to move, especially less affluent groups of workers (i.e., typically the low skilled).

Finally, industry assistance (or protection) policies such as import licensing, tariffs, and export subsidies, can create regional imbalances (Gibson (1993) and references cited therein). These studies find that industry protection policies may have been an important cause of internal migration patterns from provincial areas to metropolitan areas. Metropolitan areas such as Auckland, Lower Hutt, Wellington and Christchurch were favoured by having a high concentration of protected, import-substitute manufacturing. On the other hand, provincial areas were less favoured because their industries tended to be export oriented ones which received lower levels of assistance.

There appears to be a wide range of policy questions that renders the regional dimension important, if not essential. This review document is aimed at providing broad-based knowledge, which is useful as background in a variety of applications and specific policy questions such as those above. This “baseline” knowledge requires a survey of the relevant literature, the results of which are summarised in the next subsection.

1.2.2 Overview of Literature

This subsection provides an overview of the international and New Zealand literature by discussing the current state of our knowledge (what we do know), some research gaps (what we don't know), as well as identifying some current work in New Zealand related to ours. A more detailed literature review will be presented in later sections, specific to the key question at hand.

1.2.2.1 Current State of Knowledge

A great deal of research, both theoretical and empirical in nature, has been conducted on internal migration, and regional labour market issues. It is not our aim here to summarise the literature; there are comprehensive literature surveys already available (see for example, Greenwood (1997)). However, it is worth pointing out the main strands of the literature. Firstly, there are many studies that examine the *determinants* of internal migration. These include investigating people's characteristics (e.g. age, gender, level of education, and marital status) and area characteristics (e.g. labour market conditions, housing, climate, cost of living) that drive moving decisions. There are studies that examine the *consequences* of migration. These studies evaluate the performance of migrants themselves, and the impact of their moving decisions on both the origin and destination areas (e.g. demographic, housing, social and labour market effects). There is also a separate literature looking at different *types of moves* – for example, residential moves vs labour market moves, internal migration and international migration.

The New Zealand literature is, of course, less extensive than the international literature just outlined. There are, however, several valuable studies that serve as a foundation for our work.

There has been substantial work documenting demographic patterns and trends in New Zealand. The authority on this line of work is the Migration Research Group (MRG) in the University of Waikato, comprising of Professor Richard Bedford, Dr Elsie Ho, Dr Jacqueline Lidgard, and others. The MRG are actively involved in research on both internal and international migration. It is noted however, that most of their work in relation to our focus (i.e. internal migration as a regional labour market adjustment mechanism) has been largely descriptive in nature.

There have also been studies which model the determinants of migration flows. Most of these studies have focussed on modelling trans-Tasman migration, that is, migration flows between Australia and New Zealand (see Brosnan and Poot (1987a); Brosnan and Poot (1987b); and Gorbey, James et al. (1999)). The general conclusion of these studies is that migration flows can be explained reasonably well by economic and demographic factors.

Meanwhile, there has been a separate line of work that provides descriptions of local labour market conditions in New Zealand. These studies identify appropriate labour market indicators across the regions. For example, Morrison (1999) finds that the 14 regional labour markets in New Zealand can be characterised in terms of four indicators, namely the labour force participation rate, unemployment rate, fulltime work rate and fulltime wage income. Other contributors to this line of work include Simon Chapple and the New Zealand Planning Council (see Chapple (2000) and NZPC (1989)). Generally, these studies help us look at how different regional labour markets are.

1.2.2.2 Research Gaps

Significant gaps in our knowledge remain. In the international context, a good review of research gaps can be found in Greenwood (1997). In the New Zealand case, Burnley (1993) is a good starting point. Essentially, the highlighted gaps are in linking or identifying interactions between the different strands of work already done. Our review work attempts to address interactions between regional adjustment and migration patterns – how internal migration acts as a regional labour market mechanism.

Also, much literature on these interactions has focussed on developed countries other than New Zealand, such as the United States, European countries and Australia. This paper aims to contribute further to this area of research in the New Zealand context.

Given the policy environment and research gaps, this paper reviews international and NZ literature on migration to identify the range of methods and models that are used to examine the role of migration in regional adjustment. This review suggests possible approaches for further research aimed at improving our understanding of labour market adjustment and the dynamics of disadvantaged communities and regions.

While we propose projects for further work, it is important to note how our work programme fits in the bigger scheme of things. This section briefly outlines the range of projects currently being undertaken in this area in the New Zealand context. In particular, we want to highlight the complementarities between our work and the current projects, as well as avoid, as much as possible, any redundant efforts.

1.2.2.3 Other Current Related Work

Internal migration is increasingly being studied as a multi-disciplinary area of research. Stillwell and Congdon (1991) identify three different academic disciplines that have contributed to research on inter-regional migration, as below (as cited from Groenewold (1997)):

1. Sociologists[5] and social psychologists have concentrated on individual motivation for migration that they have found in factors like personal, family and community stress, as well as demographic influences.
2. Geographers[6] have focussed on aggregate models of inter-regional population flows. They use mainly gravity models, which in their simplest form, explain population flows between two regions in terms of the two regions' population stocks and the distance between two regions.
3. Economists have built models based on the view that people migrate in order to maximise personal or family welfare. Models are of two main types: search-theory based models[7] and human-capital based models[8].

Our paper focuses mainly on the second and third approaches. It is important to note that our work must be put into a broader context and complemented with research from other disciplines.

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[5] For example, Ritchie (1976) provides an overview of migration research from a sociologist's perspective (as cited from Greenwood, Mueser et al. (1991)).

[6] For example, Clark (1986) provides an overview of migration research from a geographer's perspective (as cited from Greenwood, Mueser et al. (1991)).

[7] See Herzog, Schlottmann et al. (1993) for a literature review of empirical studies that treat migration as spatial-job search.

[8] Sjaastad (1962) is credited with the human capital approach to migration, which views migration as an investment decision to increase the productivity of human resources.

There is a range of projects currently being undertaken in this area in the New Zealand context. We want to highlight the complementarities between our work and the current projects, as well as avoid, as much as possible, any redundant efforts. Some current projects are discussed below.

Maryanne Aynsley recently completed her research essay, which looks at regional labour market adjustment in Australasia (Australia and New Zealand as two regions) (see Aynsley (2001)). Her work focuses on adjustments at the *national* level, rather than the *regional* or *state* level. It complements our work given similar issues, but at a different level of aggregation (national vs regional).

A group of researchers at Massey University are currently working on the FORST-funded *"Labour Market Dynamics and Economic Participation"* programme which focuses on information flows in regional labour markets (see Bartley, de Bruin et al. (2000)). In particular, the research programme examines how various institutions get their information about regional labour market demand, how they respond to them, how the information flows impact on capacity-building and matching, etc. The research is primarily looking at three regions – Hawkes Bay, South Waikato and Waitakere. The programme will shed further light on the role of migration as a regional adjustment mechanism, from an *individual's* point of view. In this way, our work will be complementary.

There are also other ongoing studies, for example in the Labour Market Policy Group at the Department of Labour, where a scoping project on regional migration and labour market interactions has recently been completed by James Newell (Newell (2001)).

Statistics New Zealand is considering appending a set of questions to an existing survey or designing a separate survey (if necessary) to understand the motivations behind decisions to move (both to elsewhere in New Zealand and overseas), or not to move. This will complement the "bigger picture" we get from the methods discussed in this paper.

Where do immigrants live? When they first arrive in New Zealand, do they usually stop in a particular region, for example Auckland? Do they move on to other regions over time? If yes, where do they go? To address these questions, the New Zealand Immigration Service is conducting a study of regional immigration impacts.

The Migration Research Group (MRG) in the University of Waikato is currently developing a special survey of recent immigrants into the Bay of Plenty. This is part of the research into the social and economic transformation of the Central North Island. In addition, the MRG comprising of Richard Bedford, Elsie Ho, Jacqueline Lidgard, Jenny Goodwin, and others are actively involved in research on both internal and international migration.

There are also graduate students working on specific areas of interest. For example, Hattie deVries (under the supervision of Philip Morrison) is currently looking at various ways of identifying local labour markets using GIS, how their spatial properties changed with developments in the economy (from 1986 to 1996), and how spatial properties of local labour markets vary by attribute of workers (e.g. age, occupation and sex). Meanwhile, James Kaiser (under the supervision of Philip Morrison) is trying to get a better understanding of the changing pattern of demand for labour at a regional and local level. This project will not only document the magnitudes and trends involved in the relocation of business units and the jobs they offer but will also start raising questions about the nature of demand change at the local level. The aim is to

document and model the migration of business units and associated employment within New Zealand over the period 1987/88 through 1999/2000. Also, Ozer Karagedikli (under the supervision of Jacques Poot) is doing further work on regional income inequality and regional growth, following on from Karagedikli, Maré et al. (2000).

This is not meant to be an exhaustive list. The idea is to illustrate that our work programme is only one piece in the jigsaw puzzle. Other studies, some of which are discussed above, are also part of this puzzle. None gives the whole picture, but each contributes to the mosaic. The challenge of course is to make progress on each of them and eventually see how they all interact. Against this broad setting, it is appropriate to identify our key questions and the focus of our own work programme, which is the topic of the ensuing section.

2 STRUCTURING OUR THOUGHTS

Within the context of the policy environment and research literature, we next need to focus our work to find key questions for which tractable research projects can be developed. In an economy, much is happening simultaneously. We generally have a limited ability to conduct controlled experiments. We face the problem of disentangling cause and effect from the maze of correlations observed between and amongst a whole range of economic and social factors. This is often called the identification problem, which virtually every researcher encounters.

How do researchers and modellers isolate the relationships and simplify the complex true state of the world? We try to make use of prior beliefs and/or assumptions and/or empirical patterns to impose some structure on the data (which is often limited, and hence acts as a constraint). The role of these assumptions and beliefs is discussed in Gorringe (2001). Gorringe also appropriately points out the range of problems that researchers face.

> "*The identification problem, the scarce data problem and the specification search problem together strongly limit what we can learn from the data about how the world works. The changing structure problem and the uncertain human action problem add to these difficulties. Together all these problems make nonsense of the idea of relying solely on induction - that how the world works can be gleaned from the data alone. Each of them in different ways forces on us the necessity to add to the data a set of assumptions, and our own judgements as to the appropriateness of these assumptions, if we are to make any sense of the world at all.*" (p. 239)

Our approach is to narrow and structure our work by first defining the scope of our enquiry. Within the scope defined, we shall focus our research around a few key questions. Following this, we use theoretical concepts to discipline our thinking and to provide insights into how we can even begin to understand the complexities of the real world. Finally, when we do empirical work, we inevitably have to deal with some data and empirical issues. Each of these is covered briefly below.

2.1 Scope

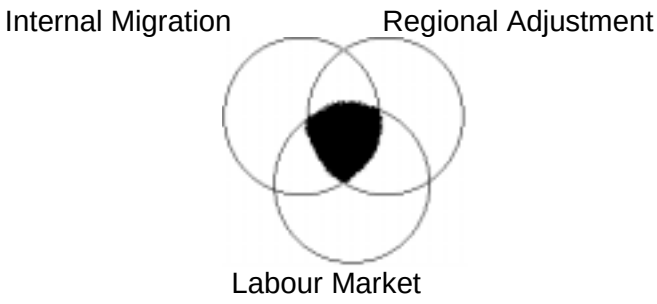
If we were to characterise our focus using just three key phrases, they would be internal migration, labour market and regional adjustment[9] (see Figure 1 below). Each of these is an interesting topic and has a substantial literature on its own. We are mainly concerned with the intersection of the three. The areas excluded[10] from our work include regional adjustments in response to a shock other than a labour market adjustment (e.g. via the capital, housing, goods and services markets), people moving for non-labour market reasons (e.g. residential moves, social migration, better climate/amenities), and international migration (a later section and Maré and Timmins (2000) discuss the importance of accounting for international migration), as elaborated

[9] This paper deals primarily with *inter-regional* labour market adjustment, rather than *intra-regional* (e.g. intra-urban) labour market adjustment. The latter, which is closely related to commuting and housing issues, also has important policy implications but is a different research program. The intra-urban labour market in large metropolitan areas is a topic currently of interest in the UK (e.g. research by Paul Cheshire) and the US (e.g. research by John Quigley) and could be relevant in New Zealand in the Auckland, Wellington and Christchurch contexts.

[10] By abstracting from these important factors, we are not simply ignoring them. We wish to find ways of satisfactorily accounting for them in order to highlight our main focus.

below. However, it is important that our research is eventually placed into a larger context, linking to the areas that are not our primary focus.

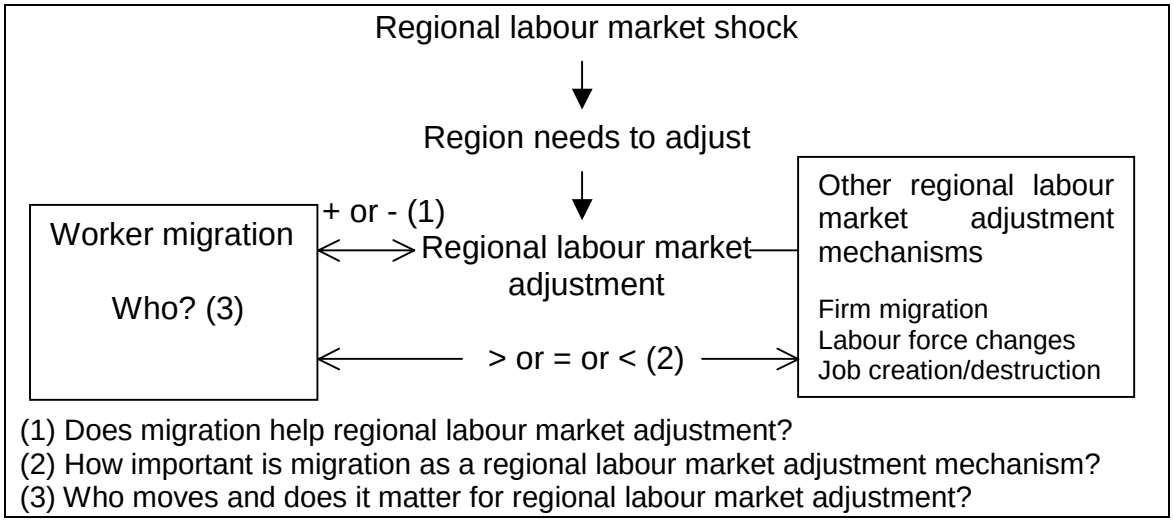
Figure 2.1 The scope of our work



2.2 Key Questions

Within this scope, there are still potentially many questions that can be asked. Our interest is in how regional labour markets adjust when there is a shock, and the role of internal migration. We further focus down to three key questions, as Figure 2.2 illustrates.

Figure 2.2 Defining our key questions



When a region experiences a shock, the region must adjust in one way or another (e.g. via the labour, capital, housing, goods and services markets). We are interested in how the regional labour market adjusts. There are different forms of regional labour market adjustments - internal migration is one of them. The first key question asks whether internal migration responds to labour market factors, and if so, whether it helps the particular region to adjust. The second key question compares internal migration to other forms of regional labour market adjustment. The final question looks at who is migrating and whether it matters for regional adjustment.

Researchers do not generally use the same methods, models or approaches to investigate these three questions. To do so would require an approach that explicitly deals with many complex interactions. What is more common is to choose an

approach that enlightens us about one of the questions, while controlling for the more important sources of heterogeneity or bias that arise due to the partial nature of the analysis. Therefore, for each key question, we will identify the sort of evidence that people look for (the "what"), the way they identify/isolate patterns/relationships (the "how"), and what evidence they have found (the "findings").

With the focus and key questions already defined, what theory can and should we use to provide a way of perceiving the world? This is covered in the next subsection.

2.3 Theory and Concepts

Another way of imposing structure is to adopt some theory and concepts. The purpose of a theoretical framework is to foster understanding of phenomena encountered in the real world. Any such framework necessarily abstracts from details of the complex true state of the world in order to develop an explanatory model able to provide insight into these complexities. Different explanatory models are designed to help us understand different facets of the world. Where do we begin? A good starting point is to consider an economy with only two regions.

Suppose that a region experiences a local labour market shock. This shock can be either a supply shock (e.g., workers do not work anymore for whatever reason, a sudden change to the labour force participation rate) or a demand shock (e.g., a firm closes down, a new firm opens, or an increase in the demand for the underlying product/service, hence more workers needed to accommodate the higher production). We are interested in how regions respond or adjust to these shocks.

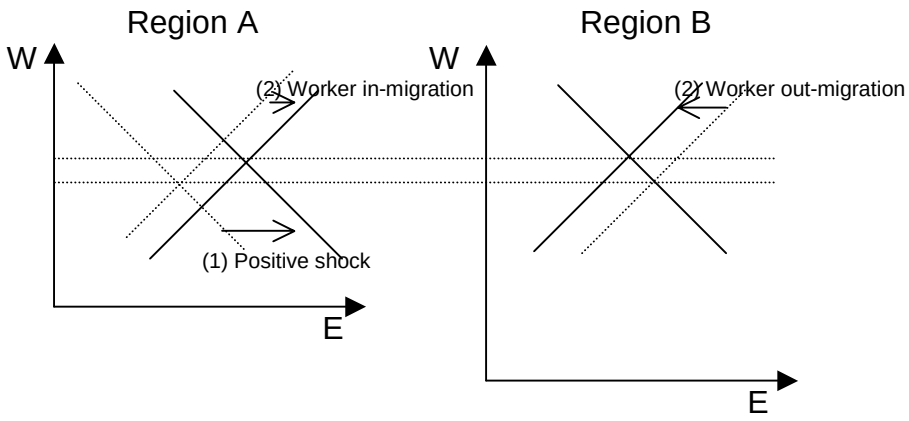
For ease of exposition, we shall look at one shock consistently throughout. Given there is some interest in regional development, let's suppose that a new policy (e.g. wage subsidies, tax breaks) is put into place to attract companies to set up in a particular region (region A). As a result, the demand for labour in region A rises.

Now let's assume that there is only one other region in the whole economy (region B) and that regions A and B are not closed (i.e., labour and capital are allowed to flow across regions). We allow amenities in regions A and B to be different; hence the absolute level of wages in regions A and B are not expected to be equal. In other words, we allow for some permanent differences in wage levels between the two regions. This can be the case for various reasons. For instance, if region A is a nicer place to live in (e.g., better views, more fresh air, less traffic congestion, etc.), then workers would be willing to accept lower wages in region A than in B. Conversely, workers need to be compensated for working in the less attractive region B. This compensation is to ensure that in the equilibrium state, utility is equalised across regions, from both consumers' and the producers' points of view. There is then no incentive for people or firms to change their location. In such circumstances, the demand for and supply of labour curves (in the initial equilibrium state) would be as depicted below (where the W-axis for the two regions have different starting points).

We are interested to see the effects of the rise in the demand for labour in region A. The initial impact of this positive shock will be a rightward shift in the labour demand curve in region A (annotated as (1) in Figure 2.3 below). This labour demand shift would result in a higher level of wages (W) and employment (E). What would follow this rise in labour demand in region A? For now, let's assume that region A can adjust in only one way (worker migration). At least some workers from region B will be induced to move into region A, because of better employment opportunities and

possibly higher wages (this depends on how flexible wages and employment are) in the affected region. Therefore, there is a rightward shift in the labour supply curve in region A (annotated as (2) in Figure 2.3). This in-migration will offset the wage increase and reinforce the rise in employment in region A. Similarly, region B will experience a leftward shift in the labour supply curve (annotated as (2) in the Figure 2.3). This will lead to higher wages and lower employment in the region where migrants are coming from (i.e. region B), as firms there are forced to compete with region A for workers. This adjustment will continue until once again nobody wishes to move, at which point the favourable impact of the initial labour demand shock has been spread across both regions, with higher wages and/or lower unemployment everywhere. Note that in the initial and final equilibrium state, utility is equalised across regions, from both consumers' and the producers' points of view.

Figure 2.3 A simple model of regional labour market adjustment



For simplicity reasons, the diagrams above have focused only on internal migration as a regional adjustment mechanism. There are other regional labour market adjustment mechanisms, as explored further below. This simple model can also be used to examine the effects of a negative shock.

The simple model above assumes that there are no costs of adjusting for workers and firms alike (i.e., no mobility costs). Unfortunately, in real life, things are not that simple. Where there are adjustment or mobility costs, two possible scenarios are possible. If mobility costs are very high, there will be very little migration or none at all. Otherwise, migration will take place until the difference in utility from living in one region rather than the other region equals the mobility cost.

In practice, there are plausible reasons to expect only slow or partial adjustment. These include:

fixed mobility costs: If there are costs of moving between locations, people will not move unless the differences in the attractiveness of local labour markets are large enough to outweigh the costs. There may therefore be sustained differences in attractiveness, and hence in indicators such as unemployment and wage rates.

convex adjustment costs: If adjustment is more costly if it is done all at once rather than gradually, mobility flows in response to regional shocks may have an extended impact. Such costs may arise, for instance, because of the high costs of rapidly expanding housing or infrastructure in the receiving region.

uncertainty: Adjustment may be slow because people want to be sure that differences in attractiveness will last. Adjustment in response to a transitory shock will be much smaller than adjustment to a permanent shock[11].

productive amenities:There may be sustained differences in labour market indicators because regions differ in dimensions other than those measured. These could arise for consumption reasons or for production reasons. For instance, people may be willing to stay in a region with a favourable climate, despite the fact that it has high unemployment. For the high unemployment rate to be maintained, it must be the case that firms choose not to create jobs in the region. There must therefore be a difference in regionally-specific productivity across regions – in this case lower productivity in the high unemployment region[12].

demographics: Some demographic groups are less mobile than others. Adjustment by means of outflows will therefore be slower for regions that have immobile populations.

The stronger are these effects, the less we can rely on regional migration to aid regional adjustment to labour market shocks.

Furthermore, in reality, there are many more regions, and many different reasons why people may move from one place to another (not merely job related or amenities). However, the general principles above still apply.

As mentioned earlier, migration is not the only regional labour market adjustment mechanism. The paragraphs below elaborate on the range of potential adjustment mechanisms to a regional labour market shock.

In a well-functioning labour market, geographical unemployment differences resulting from past shocks should be reduced, if not eliminated, relatively quickly. There could be two scenarios – firstly, suppose there is a *positive* region-specific shock due to a regional development program, and secondly, suppose there is an *adverse* region-specific shock on the labour market. The potential adjustment mechanisms for each of these scenarios are[13]:

1) **Creation or destruction of jobs** – With a positive shock, existing or new local firms could create new jobs to take advantage of or as a result of the regional development program. On the other hand, a negative shock could result in local firms destroying jobs and retrenching employees.
2) **Migration of firms[14]** – A positive shock could attract firms from other regions to relocate to the region to take advantage of the regional development program. Conversely, a negative shock will motivate existing firms in the region to move to other regions.
3) **Changes in the labour force participation rate** – A positive shock will result in an increase in the relative demand for workers in the particular region. There may be eventually an outward shift in the relative supply curve for labour either because of changes in the education and training decisions, or through non-labour force participants re-entering the labour force. On the other hand, if

[11] Sjaastad (1962) emphasised the intertemporal nature of migration decisions by analysing migration decisions in the context of human capital investments.
[12] For a fuller discussion, see Roback (1982).
[13] The effects do not need to be symmetric, as discussed later on.
[14] This concerns employers' decisions about the location of their plants and facilities.

there is an adverse shock on the local labour market, some unemployed workers will remain in the region, but become "discouraged" and drop out of the labour force.

4) **Migration of workers** – A positive shock will attract workers from other regions[15]. Conversely, with a negative shock, workers will migrate to seek jobs elsewhere. Unemployment itself is an incentive to migrate, but the incentive is even greater if there is a wage difference.
5) **Wage adjustments** – Unlike all the four *quantity* adjustments above, we could also have a *price* adjustment, that is wage differentials, to provide a further incentive for the *quantity* adjustments to occur. A positive shock will raise the region's wage relative to the rest of the country. A negative shock, on the other hand, results in the wage in the region falling relative to the other regions.

By separating different margins for adjustment, we are not suggesting that adjustment will take only one of these forms. We would expect there to be some adjustment on several margins simultaneously. The form and extent of adjustment will depend on relative demand and supply elasticities. Furthermore, short-run and long-run adjustments may take different forms.

Table 1 summarises the range of regional labour market adjustment mechanisms discussed above[16].

Table 2.1 Forms of regional labour market adjustment

Quantity adjustments	Within region	Between regions
Labour Demand	(1) Job creation or destruction by local firms	(2) Firm migration
Labour Supply	(3) Labour force participation changes	**(4) Worker migration**

(5) *Price* adjustment (Wage changes)

Our review focuses on worker migration. One might ask how appropriate this is. In some countries, for example in the United States, worker migration is an important adjustment mechanism (see Blanchard and Katz (1992)). However, in a few European countries (see Decressin and Fatas (1995), Mauro and Spilimbergo (1998) and Mauro, Prasad et al. (1999), worker migration is not as important. Therefore, we need to see how New Zealand compares with other countries in terms of the size and composition of its migration flows. In addition, migration is an important consideration in the design of regional development policy, as mentioned in section 1.2.1.1. This can be summed up by the "people versus place" debate. Should policies be targeted at disadvantaged people, or at the places where disadvantaged people live? Place-based strategies can fail if the in-migration response is large. Therefore, it is important to understand the dynamics of worker migration. Also, focusing on worker migration is an appropriate first step given that there is lack of data for the other three forms of *quantity* adjustments.

As mentioned earlier, in a well-functioning labour market, geographical unemployment disparities resulting from past shocks should be reduced, if not eliminated, relatively quickly. Therefore, if there are disparities in regional labour market outcomes and they are persistent, one might ask whether such disparities constitute a problem. It is possible that regional labour market disparities represent an optimal equilibrium where a region with an attractive environment and other amenities encourage people to

[15] There could be an international flow as well.
[16] Nijkamp, Rietveld et al. (1986) provides a diagram summarising the all the links in regional labour markets.

remain or move there, despite a lagging regional growth and high unemployment. To the extent that persistent regional labour market disparities reflect people's lifestyle choice and preferences, then the issue need not be a matter of great concern. Alternatively, this persistence can be due to regional differentials in productive amenities, such as better roads, better infrastructure, etc. Large and persistent disparities (due to a slow or partial adjustment process) may also be the result of market distortions or barriers to adjustment mechanisms. In this case, the issue of regional labour market disparities is more of a concern. As discussed earlier, impediments to regional labour market adjustment include information gaps and uncertainty, fixed mobility costs, rigid wage-bargaining systems, and imperfect competition in product and labour markets. These are all plausible reasons to expect only slow or partial adjustment.

We are interested in one particular factor in such persistence in regional labour market disparities – the direction, size and composition of internal migration flows. If a region experiences an adverse local labour demand shock, we expect to see, among other things, a movement of labour away from weaker to stronger regions. Does internal migration respond to labour market differentials in the direction predicted by theory (e.g. from high unemployment area to low unemployment area)? If the answer is yes, then worker migration is said to be *helping* regional adjustment. Then, we would expect to see the effects of any shocks dissipating over time. We would not expect to see persistence or divergence between locations (of whatever geographical scale). On the other hand, if migration fails to promote regional adjustment, shocks to locations will be permanent (i.e., not dissipate over time). In this case, locations with low unemployment, for example, will continue to have low unemployment, or will have even lower unemployment. The first key question examines whether internal migration helps regional labour market adjustment or otherwise.

Alternatively, migration might be playing a very small role. An examination of migration and commuting flows across OECD countries shows that the scale of labour mobility is limited in many countries, and therefore it is probably not sufficient to act as an adjustment mechanism (see OECD (2000)). This is our second key question.

In addition to the direction and size of internal migration flows, the heterogeneous characteristics of migrants could well have implications for the origin and destination regions. The third key question examines the question of who moves and how this matters for regional labour market adjustment.

Equipped with some theory and concepts above, and how they relate to the three key questions, we should consider the next set of issues for our journey towards gaining an understanding of the role of internal migration as a regional labour market adjustment mechanism – data and empirical issues.

2.4 Empirical Issues and Data Sources

When we do empirical work, we inevitably have to deal with some data and empirical issues. This can be considered another way to impose structure on the world, although it can be a constraint rather than an explicit choice on our part. This subsection highlights a few common empirical issues that research work in this area will encounter, and summarises the range of data sources that will be useful for our projects.

In the literature, there is a distinction between regional shocks and aggregate shocks. Regional shocks are likely to trigger different adjustments of labour, capital, and output than do aggregate shocks. One reason may be that some regions are specialised in the production of particular goods and services, and thus national markets are somewhat arbitrary constructs. If regional dynamics are different, policymakers may need to identify regional differences and/or imbalances in formulating policies and assessing their consequences.

Similarly, there is a distinction between regional shocks and sectoral shocks. The two are not unrelated concepts. For example, an aggregate shock may have different region-specific impacts because the regions have different sectoral compositions. Therefore, whether we use the concept of regional mobility, or sectoral mobility, depends on what structure we impose on the complex true state of the world. It depends on how we identify shocks. Our paper here focuses on the regional dimension[17].

There is also the issue of what the appropriate unit of analysis is when considering migration flows. This is essentially defining the parameters of what constitutes a migration flow. The first dimension is a *temporal* one – what the appropriate time period for the analysis is. In New Zealand, we only have census data to track internal migration flows. As a result, there is a five-year cut-off period, which is determined by the date of the previous census. The scope, limits and reliability of our census data for internal migration flows have been well documented (see for example, Poot (1986a)).

The second dimension of concern is a *spatial* one. Studies have shown that alternative calculations of distance between origin and destination areas can have very significant effects on the migration measures. In particular, place-to-place migration declines with distance. Put in another way, as we move from an aggregate unit of analysis (e.g. regions) towards a more disaggregated level of analysis (e.g. territorial local authorities (TLA), area units (AU), or meshblocks (MB)), the number of *counted* moves will presumably increase. Distance is also important because reasons for moving may vary by distance moved, that is, local movers (within area units or labour markets) and longer distance migrants (across area units or outside labour markets) move for different reasons. There is evidence that economic and employment factors are much more important in long distance than local movements (see Green (1994) and Lichter and De Jong (1990)).

How do we decide which level of analysis is appropriate for our purpose? A logical spatial unit of analysis could be areas whose boundaries are "*delimited on the basis of socio-economic criteria*", as adopted in Australia (Duke-Williams and Blake (1999)). How do we operationalise this in real life?

One common strategy is to work with administratively defined areas within which labour market policies can be taken by planning authorities, such as regional councils and territorial local authorities. Alternatively, one can use functional labour market areas, which are usually preferred on theoretical grounds, although this strategy has several drawbacks in practical modelling situations (see Isserman, Taylor et al. (1986)). Definitions about what constitutes a local labour market vary considerably in the literature (see for example Box 1 in (OECD 2000). Otherwise, one could also define boundaries strictly by distance. The concept of distance can simply be the distance

[17] See for example, the book edited by Padoa-Schioppa (1991) for a starting point on references examining sectoral mobility and mismatch.

over the Earth's surface between points (e.g. 20 kilometres), or a distance through a transportation network (e.g. road distances or travel times).

One might then ask what the most appropriate spatial framework is. The answer is that it depends on the purpose of analysis. This question has to be asked whenever we conduct any empirical work. It might well vary according to the key question at hand.

Earlier migration theories treat migration decisions as though only individuals make them. Some have noted that migration is often a family or household decision (see Greenwood (1997) and Snaith (1990)). A move takes place only if the net gain accruing to some members exceeds the others' net loss (see e.g. Mincer (1978), as cited in Lichter and De Jong (1990)). Therefore, some recent approaches model migration as a risk-sharing behaviour of families. In contrast to individuals, households can diversify their resources such as labour, in order to minimise risks to the family income. Therefore, by sending some family members to work in other labour markets (where wages and employment conditions are negatively or weakly correlated with those in the local region) and through remittances by family members, the family can secure their economic well-being in the face of an adverse shock to the local region. With this type of model, one can explain migration flows in the absence of wage differentials. Unfortunately, in New Zealand, there is limited data on migration at the household unit.

Another issue is how we actually impose structure on what we observe and thus draw inferences. The key source of statistical analyses in migration research in previous decades has been *aggregate* data due to a lack of available micro data sets or insufficient computer power. These data are either time series observations or cross section data, or some combination of both. Over recent decades, however, there has been an increasing amount of research using *individual* data. Each of these is discussed briefly below.

Time series analyses assume that the relationships among a set of variables (e.g. migration, wage and unemployment rate) stays the same over time. This can of course be challenged if one believes, for example, that economic reforms in the past 15 years have altered the behaviour of people in the economy. A particular issue is the problem of spurious regressions, whereby common trends can be mistaken for a strong relationship.

Alternatively, one can use cross-sectional data, which is data on regions (regional councils, territorial local authorities, area units, or meshblocks) at the same point in time. Cross-sectional studies have their own problems – heterogeneity. Different regions have different amenities, different levels and types of economic activities, different social structures, etc. Studies that utilise cross-sectional data implicitly assume that the unit of analysis is a group of people with a common set of characteristics. Also, cross-sectional studies estimate an average relationship among a set of variables (e.g. migration, wage and unemployment rate) across regions. We need to control for some of these sources of heterogeneity in the cross-sectional units in order to make sense of the relationships of interest.

One can also use elements of both time series and cross-sectional data, resulting in a pooled data set. In other words, we are imposing structure by inferring from variation over time and across areas. This is less restricted since we are not imposing the assumption that relationships are homogeneous either over time or across areas.

The problems of using aggregate data are already well known in the literature[18] (see for example, Bauer and Zimmermann (1998) and Greenwood (1997)). The alternative is to use individual data. However, the provision of individual data remains a problem in many cases, particularly in the New Zealand case, for a few reasons. Firstly, there is a confidentiality issue in the provision of statistics by Statistics New Zealand. Secondly, it is expensive to track the same units over time, particularly at the national level.

There is also a debate about equilibrium versus disequilibrium modelling, which is far from settled (see Hunt (1993), Greenwood (1997), Goetz (1999) and references cited therein). Disequilibrium models emphasise spatial variations in economic opportunities, and de-emphasise amenity factors. They assert that the migration process and land and labour markets are relatively inefficient. Since there is a significant time lag for the adjustment process to occur, one expects to observe persistent differences in economic opportunities between areas and across time. Therefore, one may choose to model variables such as employment opportunities as being integrated of order one (i.e., nonstationary).

On the other hand, the equilibrium view argues that the migration process is mainly driven by consumption amenity factors. Economic opportunities differentials across areas may exist but are adjusted fairly quickly by adjustments in efficient land and labour markets. Therefore, at any one point in time, the assumption of spatial equilibrium is reasonably accurate. If this were the case, one can resort to modelling variables proxying for economic opportunities as being integrated of order zero (i.e. stationary).

Rather than adopting explicitly at the outset an equilibrium or disequilibrium view (two polarised scenarios), we believe that it is more appropriate to ask the question of how long it takes for a system to adjust back to equilibrium, assuming that it is stable. As noted by Greenwood (1997), the speed of adjustment to equilibrium is an important issue about which little is known. This in fact is similar to our second key question, as explained in section 5.

These are just a few empirical issues that are important in migration research[19]. The key message from this discussion on empirical issues is that there are important decisions and judgements to be made on how to treat these empirical issues and that we may want to vary these treatments according to the key question at hand.

Before we move on, it is worthwhile giving a general flavour of the potential New Zealand data sources that might be relevant to this area of research and the tradeoffs between them.

As in most other countries, the main source of data for our research will be the *New Zealand Census of Population and Dwellings*. Using census data, we can only track movements over a five-year period. The census asks for current and previous census (5 years ago) residential addresses. From these two questions, a change of address, and therefore a move, can be identified[20]. An origin-destination table, produced by Statistics New Zealand (SNZ), provides gross movements of people in and out of Area

[18] For example, there are substantial problems in identifying the determinants of the migration decision, due to the inaccuracy of the aggregated measures to account for the important factors in the individual decision making (i.e., selectivity bias).

[19] Maré and Timmins (2000) also provides a discussion of some of these issues.

[20] Fixed period questions (as above) tend to underestimate geographic turnover and are unable to capture the following return and repeat migration (see Poot (1986a)).

Units within New Zealand[21] An Area Unit (AU) is a SNZ defined spatial unit roughly equivalent to a city suburb and normally contains 3,000–5,000 people, but AUs in rural areas can be considerably larger and contain fewer people. There are 1,766 area units defined for New Zealand. Area units can be aggregated into Territorial Local Authorities (TLAs) and Regional Councils (RCs) to allow examination of flows between larger administration zones.

Significant changes were made to the boundaries of New Zealand's local government regions in 1989 and so it is not possible to construct a time-series of migration flows that goes back to the early 1970s (as cited in Bedford, Goodwin et al. (1997)). Therefore, we shall restrict our empirical analysis of inter-regional migration to the last two inter-census periods: 1986-1991 and 1991-1996.

Census data contains mobility information of everyone in New Zealand at the time of the census. We therefore observe people who entered New Zealand in the five years prior to a census, but not those who left New Zealand over that period. The mobility data that we use contains information on movements only of people who were in New Zealand at the times of both the current and previous censuses (1986 and 1991 for the 1991 census, and 1991 and 1996 for the 1996 census). The analysis therefore excludes flows arising from international migration. This exclusion is discussed further below. The origin-destination table provides previous residence information at Area Unit level and for overseas countries. Current residence, however, is only provided for New Zealand (at Area Unit level).

Besides providing data on migrant status, the census provides a vast amount of demographic and labour market data down to meshblock level, which can be combined to create AUs, TLAs and RCs. This allows the data to be matched with the migration data described above and provide characteristics for each administrative zone. Key variables include age, sex, ethnicity, religion, income, employment status, occupation, child dependency, family relationships, living relationships, living arrangement, education, religion, industry, and unpaid work. The census generally has good geo-coding. The scope, limits and reliability of using the census data on internal migration have also been discussed elsewhere (e.g. Poot (1986a)). The latest data set is for the 1996 census. Provisional 2001 census data will be available around mid-2002.

We will need to supplement census data with other potential data sources. These are briefly highlighted below.

The *Household Economic Survey* (HES)[22] collects information on household annual income and expenditure, as well as a wide range of demographic information on individuals and households, for the years 1983/84 to 1997/98. However, post 1998, the survey is three yearly (i.e., the next will be for 2001). The survey covers approximately 3000 private households living in permanent dwellings and resident in New Zealand. Different households are surveyed each year. The survey data are available at a national level and for 4 broad regions (Auckland, top of North Island, bottom of North Island and South Island). There is information on around 3000 expenditure items (e.g. food, housing, household operation, apparel, transportation, insurance, medical and leisure). Variables include household/family type, employment,

[21] Only 82.8 percent of individuals in the 1996 census can be traced to an area unit at the time of the previous census: 0.7 percent and 4.4 percent respectively could be traced only to regional council or TLA; 6.5 percent were living overseas in 1991, and 5.5 percent did not respond to the question about prior location.

[22] The Household Economic Survey (HES) used to be called the Household Income and Expenditure Survey.

ethnicity, home ownership, vehicle and various appliances, and income. In addition, some Maori data are available, although the small sample size means only a limited amount can be used. A model-based regional household expenditure series is also available for around 500 items at the area unit level.

The *Quarterly Employment Survey* (QES) provides employment data on a place-of-work basis ("supply" of jobs from employers, number of jobs filled and weekly paid hours), using 15 categories derived from the Australia and New Zealand Standard Industry Classification (ANZSIC). It is available at the national level and for 12 regions and for some territorial authorities. The survey covers employers of more than 2.5 equivalent full-time workers, except in the case of the agriculture and fishing industries which are excluded from the survey.

The *Household Labour Force Survey* (HLFS) provides the official measure of unemployment. The quarterly HLFS provides a wide range of measures for 12 regions (aggregating Hawke's Bay and Gisborne; and West Coast, Tasman, Nelson and Marlborough). This data set is available since the fourth quarter of 1985. For HLFS-consistent unemployment data prior to 1985, see the work done by Gorbey, Briggs et al. (1993).

There is an Annual Income Supplement (in June) to the HLFS since 1998. This *New Zealand Income* survey provides annual data on household and personal income. Some sub-national data is available for broad regions and larger cities – including Northland, Auckland, Waikato, Bay of Plenty, Taranaki, Wellington, Canterbury, Otago, and Southland. The variables covered in the survey include age, sex, ethnicity and the source of income.

There are also the experimental *Regional Labour Market Estimates*, which are labour market measures for all regions and most territorial authorities subject to quality constraints. The labour market variables covered include employed, unemployed, not in labour force, total labour force, working age population, unemployment rate, and labour force participation. Demographic variables include: age (under 25 years, 25-49 years, 50 years and over), sex, and ethnicity (European, Maori, Pacific Islands, other). The series is based on HLFS estimates and model-based estimates using WINZ's registered unemployed data. It is noted that the model-based unemployed estimates are of good quality, but for all the other variables, it is better to use HLFS data.

Detailed business demography data is available from the *Annual Business Frame Update* survey and is available down to meshblock level. The information covered includes the number of business units, number of employees, full-time equivalent employees, industry, GST registrations, survival rates for new businesses, business migration, company size, overseas ownership and institutional sector. The data is particularly useful for making comparisons between regions and identifying key industries per selected area.

Statistics New Zealand is also undertaking a *Longitudinal Survey of Income Employment and Family Dynamics*, which will collect information on mobility. However, it is not clear at this stage whether data will be available at a sub-national level. There are also other data sources, which are under development at Statistics New Zealand (see Statistics New Zealand (2000) and Statistics New Zealand's website).

The *New Zealand Deprivation Index* (NZDep96) has been developed by the Health Service Research Centre for resource allocation purposes. The index, which is based on the census data, assigns a deprivation figure ranging from 1 to 10 for each

meshblock in New Zealand. The deprivation scale is based on the following census variables: communication, income, employment, transport, support, qualifications, owned home and living space.

The Department of Work and Income (DWI) maintains a register of unemployment beneficiaries coded by office of enrolment. This gives us data on the registered unemployed. Also, the database includes details about participants of active labour market programs.

The Ministry of Housing Bond Centre has residential rental data down to area unit level. The variables covered include the weekly rent, dwelling type, and number of bedrooms. Meanwhile, the market value of land and houses can be obtained from *Quotable Value New Zealand* (QVNZ).

A more complete catalogue of available regional data can be obtained from Statistics New Zealand's *Directory of Regional Statistics* (1995)[23].

The Policy Co-ordination and Development (PCD) directorate in Treasury has developed a regional database[24] to explore regional differences in income, employment, population movements, and other economic and social variables. The database uses a Geographical Information System (GIS) to map the relative concentration of variables across space. There is currently some effort in identifying and tapping existing and potential data sources (some of which are highlighted above).

This subsection has raised a few empirical issues and highlighted a few potential data sources that could be important in our work. These shall be raised again and discussed in more detail where relevant, when we examine the key questions. Before proceeding to the three key questions, the next section seeks to get an idea of how much internal migration there is and the extent of regional labour market adjustment in New Zealand.

[23] The latest version of the *Directory of Regional Statistics* is available on the Statistics New Zealand website (http://www.stats.govt.nz/).

[24] The database will include full documentation and may be made accessible to other research users, particularly government agencies and researchers. *Motu Economic and Public Policy Research Trust* and *Treasury* will both retain copies of the database.

3 NEW ZEALAND PATTERNS OF INTERNAL MIGRATION AND OF REGIONAL LABOUR MARKET ADJUSTMENT

This section presents some stylised facts and summary evidence on internal migration, and on regional labour market adjustment in New Zealand.

3.1 Internal Migration

Ideally, we would want to have data on the movements of workers between regions, but we currently have data only on population flows, which are based on census data. There is a range of migration measures discussed in the literature (see for example, Stillwell, Bell et al. (2000) and Kerr, Maré et al. (2001)). Migration figures can be defined as either gross migration, or alternatively, net migration after subtracting the equivalent gross figure from the opposite direction (i.e., the net change in population as a result of movements of people). The migration figure can be expressed in levels or as rates, gross vs net flows, migration effectiveness index, migration intensity index, etc[25]. Migration effectiveness is a commonly used indicator to measure the efficiency with which net migration redistributes the population across space. It can be used as a single area index, or between pairs of origin and destination areas. Meanwhile, migration intensity is simply a measure of the turnover or degree of migration "churning". It is usually calculated as the sum of inflows and outflows, as a percentage of the population size. Table 3.1 below summarises a few common measures of internal migration. These measures are appropriate for different purposes. Therefore, for each of the key questions, the particular measure(s) used may vary.

Table 3.1 Summary of Some Common Migration Measures

Migration Measure	Formulae	
	In	Out
Gross level	$\sum_i M_{ij} = M_{\bullet j}$	$\sum_j M_{ij} = M_{i\bullet}$
Net level	$m_{ij}=M_{ij}-M_{ji}$	
Gross rate	M_{ij}/P_j	M_{ij}/P_i
Net rate	m_{ij}/P_i	m_{ij}/P_j
Effectiveness (single index for area *k*)	$MER_k=100(M_{\bullet k}-M_{k\bullet})/(M_{\bullet k}+M_{k\bullet})$	
Effectiveness (between pairs of *i* and *j*)	$MER_{ij}=100(M_{ji}-M_{ij})/(M_{ji}+M_{ij})$	
Intensity (single index for area *k*)	$MI_k=100(M_{\bullet k}+M_{k\bullet})/P_k$	

Notes:
The terms used above are defined as follows:
M_{ij} = the number of individuals moving from area *i* to area *j*
$M_{\bullet j}$ = total inflows from all other areas
$M_{i\bullet}$ = total outflows to all other areas
m = the corresponding figure for M in net terms
P_i = the population size in area *i*
MER_i = the effectiveness of in- and out-migration streams in inducing a population redistribution for a particular area. (NB:The effectiveness ratios are expressed as percentages by convention)

[25] See for example, Bell (1996). In the New Zealand case, see James Newell's work.

Existing studies from the Waikato University Population Studies Centre provide a good summary of inter-regional migration patterns over the 1981-1996 period. For example, Goodwin and Bedford (1997) analyse gross and net migration rates separately by region, and for selected demographic sub-groups. We shall review some of these statistics here. First, let's look at gross migration (i.e. both in- and out-migration) and net migration, as a percentage of the total (identifiable[26]) population. Table 3.2 below shows these rates at the regional council (RC) level.

Table 3.2 New Zealand Internal Migration Rates (1991-1996)

Regional Council	Gross		Net
	Out	In	
NORTHLAND	10.2	11.9	1.7
AUCKLAND	5.5	5.7	0.2
WAIKATO	10.8	10.9	0.1
BAY OF PLENTY	10.4	13.7	3.3
GISBORNE	12.1	9.6	-2.6
HAWKE'S BAY	9.8	8.5	-1.3
TARANAKI	9.9	6.9	-3.0
MANAWATU-WANGANUI	11.7	10.4	-1.3
WELLINGTON	9.0	7.3	-1.7
WEST COAST	13.8	12.4	-1.4
CANTERBURY	6.1	7.1	1.0
OTAGO	9.4	10.4	1.0
SOUTHLAND	10.0	6.0	-4.0
TASMAN	12.5	18.8	6.3
NELSON	17.8	18.4	0.6
MARLBOROUGH	12.4	15.8	3.4
Weighted Mean	**8.5**	**8.5**	**0.0**

Notes:
1. The migration rates are specified as a proportion of the 1991 regional council population.
2. The figures above consider only those who can be traced back to their area units in 1991 (hereon, identifiable population).
Source: Authors' own calculations from census data.

One might ask whether these rates are relatively stable over time. The nature of internal migration has in fact changed over the years, particularly in the late 1980s and early 1990s[27]. An example is the observation that the long-established "drift north" of population from the South Island to the North Island was reversed between 1986 and 1991. Also, there appear to be net migration gains (albeit small) to the "sunshine regions" of the Bay of Plenty and Nelson-Marlborough between 1991 and 1996. Bedford, Goodwin et al. (1997) and Goodwin and Bedford (1997) and references cited therein provide a good summary of the migration patterns and trends in New Zealand.

As mentioned before in section 2.4, alternative definitions of boundaries can significantly affect the migration rates. Table 3.3 below illustrates this point by showing

[26] The identifiable population refers to those who can be traced back to their area units in 1991.

[27] These changes in internal migration patterns are due to a range of demographic, economic and technological factors, and should be placed into the context in which it occurred. See, for example, Le Heron and Pawson (1996) for a review of the impacts of economic restructuring during the 1980s and 1990s on the different regions in New Zealand. It is noted also that gross mobility tends to be pro-cyclical.

how migration rates change when we look at migration flows across regional councils (RC), territorial local authorities (TLA) and area units (AU).

Table 3.3 Proportion of the identifiable population[1] that moved within and between different (administrative) zones, 1991-1996

(Administrative) Zones	Within (%)		Between (%)	Total (%)
	Non-movers[2]	Movers		
Area Unit (AU)	60.5	n/a	39.5	100
Territorial Local Authority (TLA)	60.5	18.3	21.2	100
Regional Council (RC)	60.5	29.1	10.4	100
Area of 20 km radius	60.5	24.3	15.2	100

Note:
1. The figures above consider only those who can be traced back to their 1991 area units.
2. Non-movers are defined as those who either didn't move, or those who moved within their area units.

According to the table above, 39.5 percent of the 1996 population who can be traced back to their area units (i.e. the identifiable population) were living in an area unit different from the one they reported living in 5 years ago. This of course leaves about 60.5 percent who either were still living in the same address, or were living at a different address within the same area unit they reported 5 years ago. As we move to a more aggregated level, say the territorial local authority (TLA) level, only 21.2 percent of the identifiable population had moved across a TLA boundary over the same period (with 18.3 percent moving across area units but within the same TLA). As we move further up to the regional council (RC) level, only 10.4 percent of the identifiable population had moved from a different regional council. Therefore, the level of disaggregation matters when we look at migration flows. In particular, the general patterns is that the larger the area, the lower the measured migration rate.

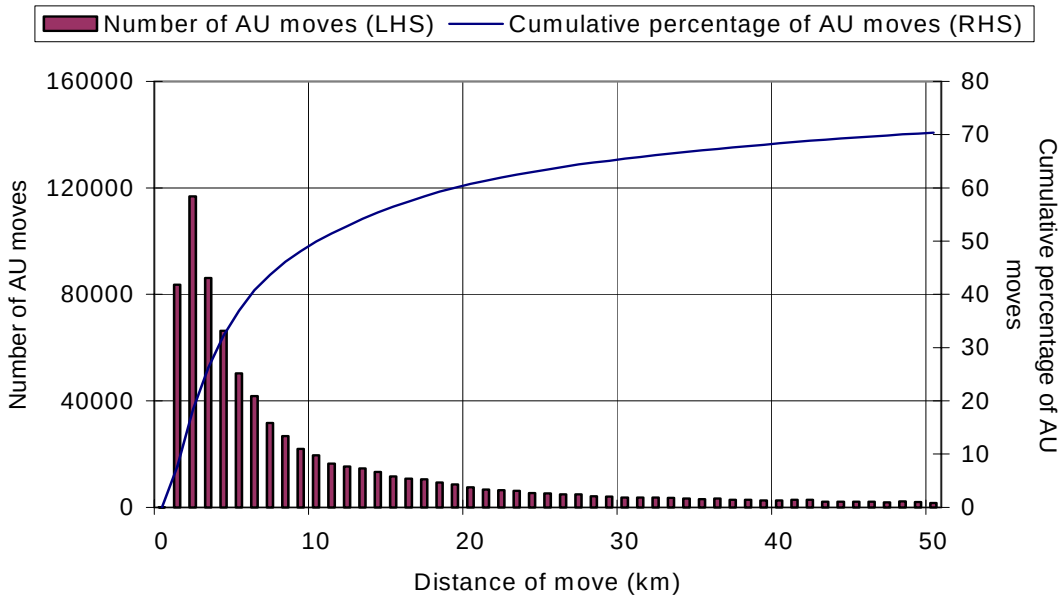
One could argue that this is due to the fact that a move between RCs is greater in distance, compared with a move between TLAs. It can be assumed, therefore, that the moves between RCs (i.e. 10.4 percent of the identifiable population) are *long* distance moves, compared to the moves between area units (i.e., 39.5 percent). However, wrapped up within the *apparent long* distance regional moves will be "border–hoppers"; people who only move a *short* distance, but cross an administrative boundary (in this case, RC). This is particularly important where main urban areas lie close to the border. For example, only 5.4 percent of the moves between the Waikato and Auckland regions are less than 20 kilometres, whereas as high as 66 percent of moves between the Tasman and Nelson regions are less than 20 kilometres (Richmond (in Tasman) and Nelson City both lie close to the border).

Such "border–hoppers" or short distance moves can be argued to reflect *residential* moves more than they do labour market factors. Short distance residential moves may also serve as a substitute for commuting. Our focus on the links between internal migration and labour market adjustment lead us to choose measures of migration that exclude many of these short moves, so as to more clearly identify moves that are likely to be more closely linked to labour market considerations.

In fact, it is well documented that distance is strongly (negatively) related to the magnitude of migration flows. Therefore, there is a danger of analysing moves using administration boundaries only. To illustrate the point, the final row of Table 3.3 shows migration rate estimates based on a distance definition. Here, we define *long* moves (i.e., those more likely to be labour market related) to be moves beyond a 20-kilometre

distance. Only 15.2 percent of the population moved more than 20 kilometres. Figure 3.1 below shows in more detail the distribution of the number of AU moves and the cumulative percentage of AU moves, by the distance moved. From the figure, about 60 percent of all the moves between AUs are short-distance moves (defined here as being less than 20 kilometres). This clearly illustrates the preponderance of short-distance moves[28].

Figure 3.1 Number of Moves between Area Units (1991–1996) and the Cumulative Percentage of AU Moves, by Distance



One can also be more sophisticated by taking into account significant physical barriers separating origins and destinations (e.g. lakes, hills and mountains). Using Geographical Information System (GIS) tools, it is possible to explore migration patterns using not only Euclidean distance but transport network distances (e.g. road distances) or travel times. The advantage of using distance to define migration is that distance can be used for specific reasons, for example identifying migrants that leave labour markets/school zones etc. In this regard, our GIS database provides a lot of flexibility and versatility.

An obvious question to ask is whether these flow rates are large or small relative to those of other countries. One may not realise that any country displays unusual or even unexpected patterns of migration until it is compared to a number of other countries. However, differences in regional size, population density, and the way in which internal migration is recorded in different countries make exact comparisons unlikely[29]. Nevertheless, the comparisons that have been made tell a consistent story. Internal migration in New Zealand is significant when compared to other OECD countries (OECD (2000)).

Earlier one-year and five-year measures of *residential* mobility (for 1971 and 1981) for 16 countries from Long (1991, as reproduced in Greenwood (1997)) show that rates of

[28] This observation has also been made elsewhere (see for example Heenan (1999)).

[29] Data in different countries vary in terms of, for example, the extent they are subject to some inaccuracy, regional classifications, and data sources (population census versus surveys versus administrative files).

movement in New Zealand are relatively high – similar to high rates in Australia, Canada, and the United States. On the other hand, Belgium, Ireland, and the Netherlands have the lowest rates of *residential* mobility (as cited from Greenwood (1997)). In particular, Long's measures indicate that around 1980 or 1981, the percentage of population who moved from one dwelling unit to another in one year was over 19 percent in New Zealand; 17 to 18 percent in the US, Canada and Australia; 9 to 10 percent in Great Britain, Sweden, Japan and France; 7 to 8 percent in the Netherlands and Belgium, and 6 percent in Ireland (see Long (1992)). To disentangle (labour market related) migration from *residential* moves, Long (1991) distinguishes between moves *within* and *between* local areas. Based on one-year measures, the US has very high internal migration rates. Based on five-year measures, the US and Canada have high rates. Unfortunately, there were no comparable data for other countries such as New Zealand and the United Kingdom (as cited from Greenwood (1997)).

Similarly, OECD (2000, Table 2.12) illustrates developments in internal migration rates in selected OECD countries in more recent periods (around 1995) and finds that only Japan, Canada and the USA had higher gross migration rates than New Zealand. The OECD study also shows that New Zealand had a relatively low ratio of net to gross migration, suggesting that there are relatively large two-way flows between regions. This table is reproduced as Table 3.4 below.

Table 3.4 Internal migration in selected OECD countries: gross flows and net flows[a]

Percentages

	Regional level	Number of regions	Ratio of gross flows to population					Ratio of net flows to gross flows
			1980	1985	1990	1995	1998	[b]
Australia	1	8	1.85	1.86	1.93	1.93	1.96	6.6
Belgium	2	11	0.86	0.84	0.60	1.27	..	7.4
Canada[c]	2	66	..	..	2.50	2.15	..	18.9
Czech Republic	2	8	..	..	..	0.55	0.56	14.0
Finland	2	5	1.28	1.30	1.29	0.92	..	10.3
France[d]	2	22	1.52	1.31	1.40	1.49	1.58	..
Germany[e]	1	16	1.29	1.05	1.34 |	1.24	..	7.8
Hungary	2	7	2.91	3.43	2.07	1.47	1.50	4.6
Italy[f]	2	20	0.68	0.59	..	0.50	0.53	19.3
Japan	1	10	2.89	2.59	2.59	2.45	..	..
Netherlands	2	12	1.56	1.56	1.64	1.61	..	4.3
New Zealand[g]	2	12	..	..	..	1.99	..	7.6
Portugal	2	7	..	0.19	0.54	..	..	21.8
Spain[h]	2	17	0.19	0.42	0.65	0.60	..	11.7
Sweden	2	8	1.30	1.44	1.54	1.61	..	9.8
United Kingdom	1	12	..	..	..	..	2.30	5.5
United States[i]	1	51	2.79	3.00	3.32	2.22	2.40	15.4

.. Data not available.
| Break in series.

a) Gross flows are expressed as the total number of persons who changed region of residence over one year. Total net flows by country are calculated as the sum of the absolute values of regional net flows, divided by two. Net flows by region correspond to inflows minus outflows. Data for the Czech Republic include external migration. Data for Canada, France, Hungary, Japan, New Zealand and the United Kingdom refer to the population aged 15 and over.

b) Data for the latest year available: Australia, the Czech Republic, Hungary and the United Kingdom: 1998; Belgium, Italy: 1997; Canada, Finland, the Netherlands, New Zealand, Sweden: 1996; Spain: 1994; Germany: 1993; Portugal: 1992; the United States: 1990.

c) 1991 instead of 1990 and 1996 instead of 1995.

d) 1982 instead of 1980.

e) 1993 instead of 1995. Before this date, data refer to western Germany.

f) 1997 instead of 1998.

g) 1996 instead of 1995.

h) 1994 instead of 1995.

i) 1981 instead of 1980.

Sources: *Belgium, Finland, Germany, Netherlands, Portugal, Spain, Sweden*: EUROSTAT Regio Database, demographic statistics domain.
Australia, Canada, New Zealand: Estimates based on the population census.
Czech Republic: Demographic statistics.
France: Labour Force Survey.
Hungary: Microcensus.
Italy: EUROSTAT Regio Database, demographic statistics domain and migration survey by ISTAT.
Japan: Internal Migration Survey.
United Kingdom: Data based on the movement of National Health Service doctors' patients.
United States: Geographic Mobility Reports, Census Bureau, various issues, based on data from the Current Population Census.

Source: Extracted from OECD *Employment Outlook* (2000, p. 53)

Comín (1999) presents a model of the relationship between the size of the country and the degree of inter-regional labour mobility. He concludes that if European economies were like the US (by rescaling them), the degree of inter-regional mobility in Europe would be as large as in the US. As far as we are aware, a similar exercise has not been done for New Zealand. This may or may not alter the conclusion earlier that New Zealand has a fairly significant degree of mobility, in comparison with other OECD countries.

While we are mainly interested in the link between internal migration and regional labour market adjustment, it is important that we do not ignore the fact that people have the choice to, and some do in fact, leave or enter the country. Ignoring the international flows, particularly when they are significant, may well distort the estimated labour market story, similar to an omitted variable bias. The New Zealand Planning Council, Richard Bedford, James Newell and others have done some work in this area.

Lidgard, Bedford et al. (1998) compares the components of the New Zealand population change over the period 1986-1996. The net gain from international migration during this decade was just over a fifth of the total population increase. When Gorbey, James et al. (1999) look at the breakdown of total population growth into natural increase and net international migration over the period 1950 to 1998, they find that net (international) migration has been the main cause of fluctuations in population growth, as the annual rate of natural increase has been a smoothly trending variable. Only twice since the early twentieth century (early 1970s and mid 1990s) has net (international) migration approached natural increase[30].

However, up to here, we have only been comparing different components of population change at the *national* level. We still have not assessed sources of population structure change at the *regional* level. This is considered next as we examine how internal migration compares to international migration.

Although international migration is significant for population change at least in recent years, inter-regional flows, in aggregate, continue to be larger than international flows in most parts of the country (see Bedford, Goodwin et al. (1997)). Table 1 in Bedford, Goodwin et al. (1997) shows the respective contributions of inter-regional and overseas immigration to the usually resident populations of the 14 local government regions in New Zealand, as these were defined in 1991. The figures show that the number of inter-regional immigrants exceeds the number of overseas immigrants in all the regions except for Auckland, over both the periods 1986-1991 and 1991-1996. Aside from Auckland, Wellington and Canterbury, the internal in-migration figure is at least about twice the international in-migration figure. In some cases, the internal in-migration figure is more than 5 times the size of the corresponding international figure. For Wellington and Canterbury, the internal immigration figure is about 50 percent higher than the international immigration figure. The evidence clearly indicates the significance of inter-regional migration in determining the changing spatial distribution and composition of New Zealand's population.

One might ask whether the predominance of internal migration is only a recent phenomenon. NZPC (1989) provides estimates of migration *into* each local government region (as defined prior to 1980) from other parts of New Zealand and from overseas countries (see Table 12) over the periods 1976-1981 and 1981-1986. For all the regions, the number of in-migrants from other parts of New Zealand is greater than

[30] See Figure 5.6 in Section 5.3 of the *Statistics New Zealand Official Yearbook on the Web 1999* (http://www.stats.govt.nz/).

the number of international in-migrants. Aside from Auckland, the internal in-migration figure is at least about twice the international in-migration figure. In some cases, the internal in-migration figure is more than 10 times the size of the corresponding international figure. In Auckland, the internal in-migration is about 70 percent (25 percent) larger than the international figure in 1976-1981 (1981-1986). Meanwhile, Table 13 in (NZPC 1989) shows the estimates of migration *from* each local government region to other parts of New Zealand and to overseas countries over the periods 1976-1981 and 1981-1986. The number of out-migrants to other parts of New Zealand exceeds the number of international out-migrants for all the regions, except for Auckland during the 1976-1981 period. In particular, the internal out-migration figure is at least about twice (again, up to more than ten times) the size of the international out-migration figure, in all regions except Auckland, Wellington and Canterbury. Therefore, the predominance of internal migration over international migration has been borne out even in earlier periods.

Up to here, we have highlighted the results from partial analyses (i.e. any two of the three components – internal migration, international migration and natural increase). NZPC (1989) presents a broader view of the components of population change (see Table 8). Two interesting observations can be made. Firstly, the summary statistics indicate that net migration (the balance of internal and overseas in- and out-migration) offers much more variation across regions and between periods than does natural increase. Secondly, the contributions of natural increase and net migration to population change in the regions since 1976 have been quite variable and diverse across the regions. However, it is safe to conclude that there has been a tendency for net migration to become relatively more important in determining regional population change. As cited from NZPC (1989), a study by Lowe (1988a) covering the period 1956-1986 found that net migration was equivalent to more than half the natural increase in more than two regions out of three between 1981 and 1987. This was the case in only two regions out of four in the 1960s, and of fewer still in the 1950s. It is noted that net migration here is the balance of internal and overseas in- and out-migration. However, given the evidence discussed earlier that internal migration dominates international migration, one could infer that internal migration is indeed an important contributor to regional population changes.

There is similar evidence overseas that internal migration is an important source of population structure change for regions. As Taylor and Bell (1996) puts it, "*…in Australia, as elsewhere in the developed world, internal migration has become the primary determinant of regional population change*" (p.154). This trend is also reflected by researchers such as Blanchard and Katz (1992). These authors treat the movement in the state labour force equation as characterising the migration of workers, because "*most of the differences in average employment growth rates across states are due to migration, rather than to differences in natural population growth rates*" (p. 17).

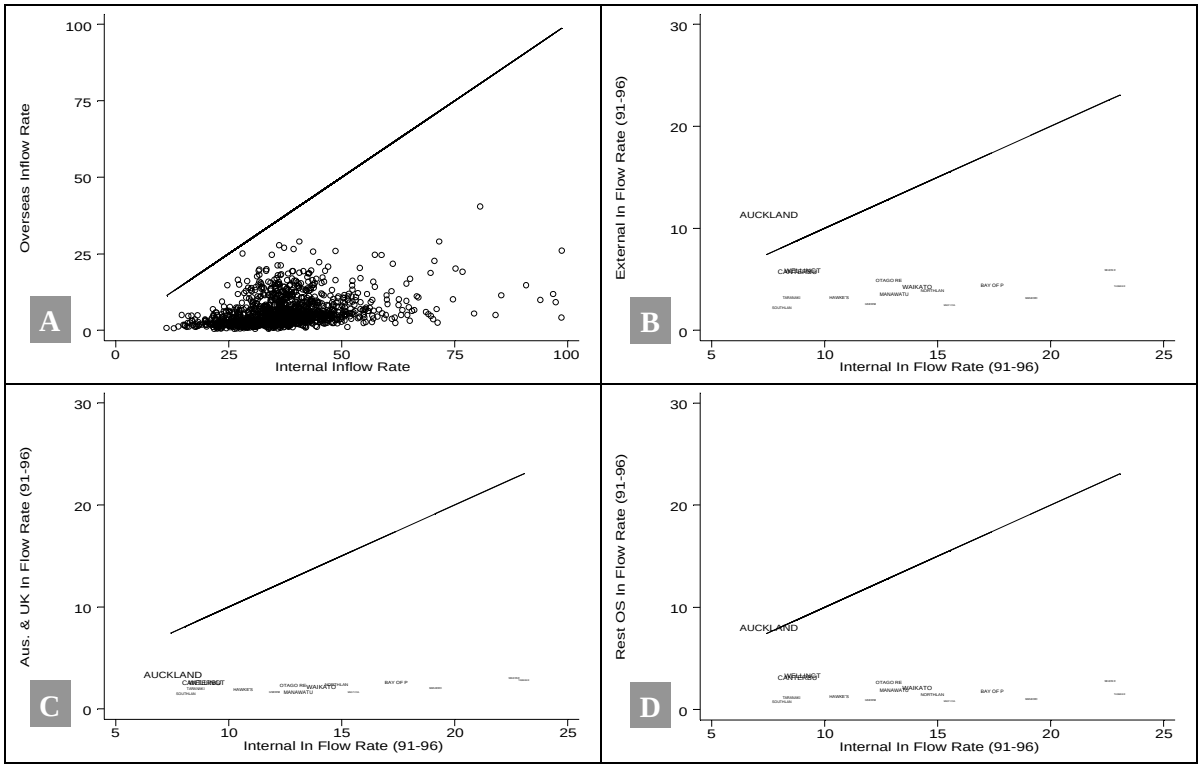
With respect to international migration, it is worth noting that New Zealand census data excludes migration flows to countries other than New Zealand. This exclusion is due to the obvious lack of census data on people who had left New Zealand between consecutive censuses (i.e., international migration *out*flows)[31], and the lack of consistent information on "regional" characteristics for other countries. Excluding international flows is potentially a weakness in empirical analyses if flows across New Zealand's border are a significant means of regional labour market adjustment. The open border between Australia and New Zealand makes Trans-Tasman migration a

[31] James Newell of MERA has derived estimates of international outflows at the regional level but not yet at other levels of aggregation.

feasible option for people seeking better labour market prospects in the neighbouring country[32].

Figure 3.2 analyses the relative sizes of internal and international migration *in*flows, and the relationship between them. At the Area Unit level, overseas inflows do not exceed internal inflows (Figure 3.2a), i.e., internal inflows are a greater proportion of total inflows. However, the picture changes at the Regional Council level (Figure 2b). The Auckland region is unique because it is the only region where overseas inflows out–weigh internal inflows (Figure 2b). This is true at least in 1991-1996 when international inflows into Auckland were at historically high levels. The Wellington and Canterbury regions have the next largest international inflow component. However, for both these regions, internal flows still dominate.

Figure 3.2 International vs Internal *In*flows (1991-1996)



Note: The relationship between New Zealand internal and international inflows at (A) Area Unit, (B) Regional Council, (C) Regional Council (includes all internal inflows, but only international inflows from Australia and the UK), and (D) Regional Council (includes all internal inflows and all international inflows, excluding inflows originating in Australia and the UK).

The two largest (gross numbers) overseas inflows are from Australia and the United Kingdom respectively. It is argued that due to weak perceived barriers between NZ and these two countries (both immigration and cultural), these flows are important. Figures 3.2c and 3.2d explore the international inflows in more detail (at the regional council level). Figure 3.2c suggests that on their own, international flows from Australia and the United Kingdom are not as important as internal flows (even in Auckland). This is not surprising as wrapped up in Australia and UK inflows will be many return Kiwi migrants (working holiday etc.), thus the inflows are absorbed across all NZ regions. However, when Australia and UK inflows are removed (see Figure 3.2d), we find that

[32] The national border does, however, still appear to be an impediment to movement – see Poot (1995)

overseas inflows are heavily concentrated in Auckland (Wellington and Canterbury lose their importance as international destinations)[33].

The omission of external flows in the analysis becomes a concern when external migration flows are significant, particularly when they are larger than internal migration flows. The discussion here focuses on *inflow* and *outflow* rates separately. With regard to *inflow* rates, overall, international migration seems to be a fairly constant proportion of local population across regions, with the exception of Auckland (see Figure 3.2b). In areas with high internal inflow rates such as Nelson and Tasman[34], the omission of international or external inflows would not constitute a significant problem. On the other hand, in areas other than Auckland where there are low *internal* inflow rates (e.g. Southland and Taranaki[35]), the omission of *external* inflows would understate the extent of inflow rates. The bias is even more pronounced for Auckland, which not only has a *low internal* inflow rate, but also a *high external* inflow rate.

Figure 3.3 shows the international migration flows as a proportion of total inflows (inflows from other parts of New Zealand and overseas countries) and total outflows (outflows to other parts of New Zealand and overseas countries[36]) for the period 1991-1996. For example, just over 60 percent of the total inflows into Auckland are from overseas countries, whereas just over 40 percent of the total outflows from Auckland have gone overseas. There are two messages to be inferred from Figure 3.3. Firstly, it shows that the pattern of external outflow rates is similar to that of external inflow rates, although outflows are less concentrated in Auckland than are the inflows. Secondly, Figure 3.3 indicates that for all the regions except Auckland, Wellington and Canterbury, internal migration (both inflows and outflows) accounts for more than 70 percent of total migration. The implication is that one should consider using modelled outflow data[37] for cases where international migration is significant, the extreme case being Auckland.

For our purposes of detecting the relationship between migration and regional labour market adjustment, the relative size and volatility of international migration are not the only things we are interested in. As important is the relationship between international migration flows and regional labour markets. We expect international migration flows to respond to imbalances between New Zealand and other countries. It is an open question whether international migrants choose their location *within* New Zealand based on regional labour market conditions. The primacy of Auckland as an international migrant destination may dominate the role of relative regional labour market conditions.

The determinants of location choices within New Zealand are probably different for internal and international migrants, and for international inflows as opposed to outflows. The bias that would be introduced by ignoring international migration depends on how different these determinants are, as well as on the relative size of the different flows.

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[33] Note however that Figure 3.2 uses data on inflows between 1991 and 1996, when there was an unusually high inflow of international migrants, especially from countries other than Australia and the United Kingdom.

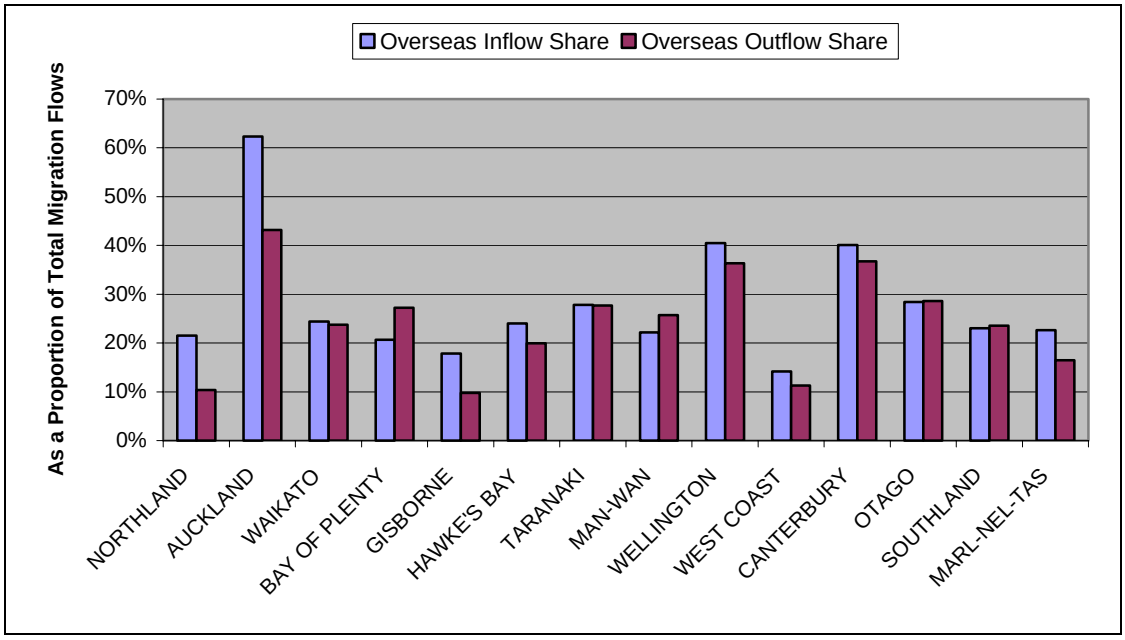
[34] These two regions are the two observations at the bottom right of Figure 3.2c, although their names are not intelligible from the figure.

[35] These two regions are the two observations at the bottom left of Figure 3.2c, although their names are not intelligible from the figure.

[36] The estimates of external *outflows* are provided by James Newell (see Newell (2001)).

[37] Recall that international outflows are not available from the census data.

Figure 3.3 International Migration Flows as a Proportion of Total Inflows and Total Outflows, by Regional Council between 1991 and 1996



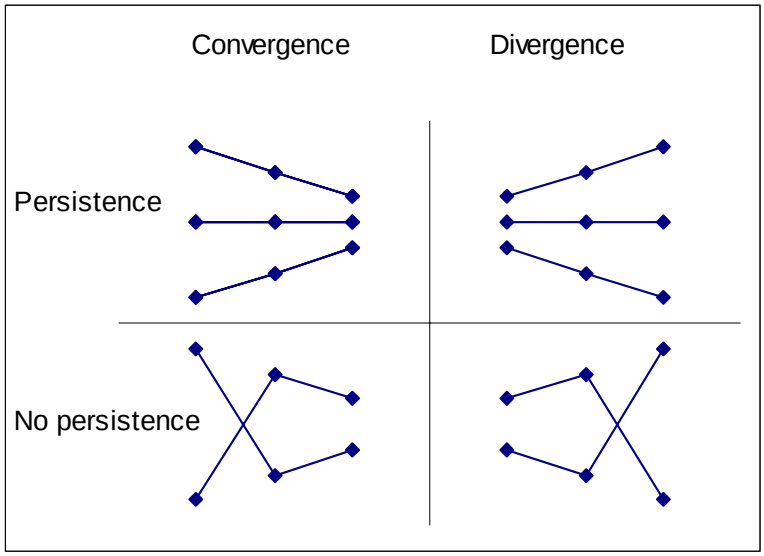
In summary, this section has given a “contextualised” view of internal migration trends and patterns in New Zealand. The key message is that internal migration is a significant source of regional population changes, and that future empirical work should find ways to account for the international migration aspect. Before moving on to the key questions, it is important that we look at the other items of focus (see Figure 2.1) - labour market and regional adjustment.

3.2 Regional Labour Market Adjustment

We wish to examine the relationship between internal migration and regional labour market adjustment. However, there is no universal agreement on what constitutes regional labour market adjustment. How do we know if regional labour markets are in fact adjusting and if so, how much regional labour market adjustment is there? To many commentators, regional adjustment occurs when differences between regions become less. This view implies that the equilibrium - when no further adjustment is needed - is one in which all regions are the same. Alternatively, we might accept that there are stable long-run differences between regions (a disequilibrium view, as discussed in Section 2.4). In this case, regional adjustment entails restoring long-run relativities after a regional shock.

In this section, we consider two types of evidence on the amount of regional adjustment - persistence and convergence. The four panels of Figure 3.4 illustrate the range of patterns that we are looking for in the data. The horizontal axis represents time and the vertical axis could be any labour market outcome. Each of the three lines represents one of three regions. In the first row of the figure (labelled "persistence"), the relative order of outcomes is maintained, so that a region that performs relatively well in one period also does so in other periods. The two graphs labelled "no persistence" show a pattern where the order is not maintained. In the convergence column of Figure 3.4, outcomes are becoming more similar across time, whereas the two graphs on the right show divergence, where the gap between well performing and poorly performing regions widens.

Figure 3.4 Patterns of Convergence and Persistence



What patterns do the actual data illustrate? The remainder of this subsection will cover the summary evidence for both persistence and convergence/divergence.

First, we present results for how persistent relative local labour market outcomes are across time, as sourced from Maré and Timmins (2000). As an indicator of this, the authors use the correlation between labour market outcomes for locations over time. Table 3.5 presents such correlations for five labour market indicators. The three panels (A, B, and C) of Table 3.5 relate to three different levels of spatial aggregation (area units, territorial local authorities and regional councils).

Table 3.5 Persistence of population and labour market indicators (Correlations over time)

(A): *Area Unit Relationships* (n = 1,652[#])

	Employed (E/WAP)	Unemployed (U/LF)	Participation (LF/WAP)	Median Income	Population (% of NZ pop)
Levels					
86–91	0.78*	0.73*	0.72*	0.87*	0.98*
91–96	0.88*	0.84*	0.82*	0.92*	0.98*
86–96	0.72*	0.70*	0.64*	0.78*	0.95*
Growth Rates					
8691–9196	-0.39*	-0.18*	-0.38*	0.18*	0.46*

(B): *Territorial Local Authority Relationships* (n = 74)

	Employed (E/WAP)	Unemployed (U/LF)	Participation (LF/WAP)	Median Income	Population (% of NZ pop)
Levels					
86–91	0.86*	0.88*	0.80*	0.88*	1*
91–96	0.93*	0.92*	0.89*	0.93*	1*
86–96	0.74*	0.89*	0.63*	0.81*	1*
Growth Rates					
8691–9196	0.08	-0.15	0.07	0.00	0.73*

(C): *Regional Council Relationships* (n = 16)

	Employed (E/WAP)	Unemployed (U/LF)	Participation (LF/WAP)	Median Income	Population (% of NZ pop)
Levels					
86–91	0.75*	0.84*	0.62*	0.93*	1*
91–96	0.96*	0.95*	0.93*	0.99*	1*
86–96	0.59*	0.81*	0.45	0.91*	1*
Growth Rates					
8691–9196	0.29	0.29	0.16	0.09	0.86*

Notes:
The analysis here only uses the 1,652 Area Units (1996 boundaries) which had a population of 100 or more. The 123 Area Units that were excluded accounted for 2,244 people, or 0.06% of the 1996 New Zealand total population.
* = significant at 5%.
Persistence in growth rates between 86–91 and 91–96.
Source: Maré and Timmins (2000)

The first panel of Table 3.5 (Panel A) shows high correlations for all indicators at the area unit level, between 1986 and 1991, between 1991 and 1996, and for the longer period between 1986 and 1991. Area Units that had high employment rates in 1986 tended to have high employment rates in 1991. A similar pattern is observed when comparing 1996 to 1991. The correlations of 1996 indicators with 1986 indicators are generally weaker than those between the shorter 1986-91 and 1991-96 periods, suggesting that persistence is less pronounced over longer time periods.

The second and third panels (B and C respectively) of Table 3.5 show comparable results for TLAs and Regional Councils. One of the patterns that emerge is that persistence is weaker between 1986 and 1991 than in the following five years. This earlier period was a period of significant change and contraction, which appears to have altered the pattern of relative labour market outcomes across regions. The only correlation that is not high and significant is the 1991-96 correlation of participation rates across time for regional councils.

The final row of each panel reports the correlation between growth rates in each of the variables. The correlation figures provide an indication of whether locations that had relatively high growth rates of an indicator between 1986 and 1991 continued to have relatively high growth in the 1991-96 period. In the first panel of Table 3.5, it appears that growth rates are not persistent for employment, unemployment and participation rates, but that median income growth and population share growth are[38].

It is likely that some of the apparent reversal of fortunes implied by the negative correlations of growth rates at the area unit level are due to random fluctuations due to the smallness of the areas. As the level of spatial aggregation increases, there appears to be stronger evidence of persistence in growth rates. Growth rates are positively correlated for regional councils, although the correlations are not statistically significant, except for population share.

In summary, the evidence of persistence depends on the variable we are looking at, whether it is specified in levels or in growth terms, the level of aggregation, and the

[38] A different relationship between the growth rates of 86–91 and 91–96 for income growth is observed when using per capita income. Median income did not present a particularly strong relationship, however, per capita income was found to be negative and the relationship strengthened as the spatial unit was increased from AU to RC. We do not currently have a full explanation of this difference, although it points to the importance of patterns of income change at the upper end of the income distribution.

time period. Although there is no overwhelmingly strong evidence of persistence, the evidence of such persistence is nevertheless strong enough to warrant further investigation.

One might ask if the persistence of these labour market variables and population flows holds for other countries as well. This is found to be the case in the US during the 20th century. Local areas which grow rapidly during one decade, tend to do so also over the following decades. Across US states, high persistence has been documented for employment growth over the period 1909-1953, for net migration over the period 1900-1987, and for employment growth over the period 1950-1990 (see Barro and Sala-i-Martin (1991), Blanchard and Katz (1992), Rappaport (2000a), and references cited therein). Similarly, across US cities and counties, there is high persistence in population growth over the periods 1950-1990 and beginning from 1930 onwards respectively (see Rappaport (2000a)).

Table 3.6 below, as reproduced from the OECD Employment Outlook (2000), shows that there is a high correlation between the previous and current unemployment rates in many OECD countries. In fact, unemployment is not the only labour market condition that is found to be persistent. According to the *OECD Employment Outlook* (2000), regional labour market disparities are important and persistent in many OECD countries. Such disparities are only partly explained by the composition of the labour force and the sectoral mix of regions. A specific regional dimension of labour markets clearly exists in many countries.

Table 3.6 Correlation between recent and historical values of regional unemployment rates

Country	Level 1				Level 2			
	Number of regions	Correlation between 1997 and 1995 rates	Correlation between 1997 and 1990 rates	Correlation between 1997 and 1985 rates	Number of regions	Correlation between 1997 and 1995 rates	Correlation between 1997 and 1990 rates	Correlation between 1997 and 1985 rates
Australia (a)	8	0.80	0.69	..	60	0.70	0.58	..
Austria	3	0.99	..	..	9	0.97	..	..
Belgium (b)	3	1.00	0.94	0.95	11	0.99	0.96	0.81
Canada	10	0.99	0.96	0.88	59	0.96	0.93	..
Czech Republic	1	—	—	—	8	0.82	..	..
Finland (c)	1	—	—	—	5	1.00	..	..
France	8	0.99	0.92	0.82	22	0.94	0.83	0.82
Germany (d)	16	1.00	0.96	..	36	0.99	0.96	..
Germany (e)	11	0.98	0.8	0.72	31	0.97	0.87	0.78
Greece	4	0.97	0.99	..	13	0.89	0.66	..
Hungary (f)	1	—	—	—	7	0.92	..	..
Italy	11	0.99	0.99	0.86	20	0.99	0.97	0.81
Japan (g)	10	0.92	0.92	0.82	47	..	0.94	..
Korea	1	..	..	..	15	0.82	0.92	..
Mexico	32	0.80	..	..	..	..	..	..
Netherlands	4	0.95	0.91	..	12	0.89	0.8	..
New Zealand (h)	1	—	—	—	12	0.82	0.61	..
Norway	1	—	—	—	7	0.95	0.92	..
Portugal	3	0.29	0.06	..	7	0.83	0.79	..
Spain	7	0.94	0.79	0.59	17	0.96	0.87	0.64
Sweden (c)	1	—	—	—	8	0.97	..	..
United Kingdom (c)	12	0.95	..	..	37	0.95	..	..
United States (b)	51	0.86	0.51	0.54	172	..	..	..
EU (i)	76	0.95	0.87	0.76	201	0.95	0.86	0.77
OECD (j)	192	0.96	0.85	0.84	588	0.92	0.79	0.77

.. Data not available.

— Not applicable.

(a) Year 1992 instead of 1990

(b) Year 1996 instead of 1997.

(c) Year 1996 instead of 1995 and 1998 instead of 1997

(d) Year 1991 instead of 1990.

(e) Data refer to western Germany.

(f) Year 1993 instead of 1995 and 1998 instead of 1997.

(g) Level 1: year 1998 instead of 1997. Level 2: year 1995 instead of 1997.

(h) Year 1998 instead of 1997.

(i) The correlation rates have been calculated from the values of each region belonging to the European Union. Denmark and Luxembourg, which constitute one region each at both levels of territorial breakdown, as well as Ireland at Level 1 only) are included.

(j) The correlation rates have been calculated from the values of each region belonging to the countries listed above, plus Denmark and Luxembourg, which constitute one region each at both levels of territorial breakdown and Ireland at Level 1 only).

Source: See OECD Employment Outlook (2000, p. 47)

Having established that there is a positive correlation of relative labour market outcomes across time for spatial units (i.e. persistence), we now turn to indicators of convergence or divergence - do differences between locations get smaller over time, or do locational labour market conditions diverge over time? We regress the proportional change (log difference) in each labour market indicator on the initial (logged) level. Table 3.7 reports coefficients from such regressions for various years and levels of spatial aggregation. A negative coefficient indicates that areas that began with a high level grow less, so they "lose ground" to areas with lower but faster growing levels (i.e. convergence in levels). A positive coefficient indicates divergence - the areas with initially high levels have faster growth, and those with low levels have slower growth, leading to a widening gap between them. Meanwhile, a coefficient close to zero implies that different areas are experiencing similar growth rates (i.e. neither converging nor diverging).

Table 3.7 Convergence indicators

(A): *Area Unit Relationships* (n = 1,652[#])

	Employed (E/WAP)	Unemployed (U/LF)	Participation (LF/WAP)	Median Income	Population (% of NZ pop)
Levels					
86–91	0.20*	-0.19*	0.05*	0.01	-0.03*
91–96	-0.22*	-0.03	-0.25*	-0.06*	-0.02*
86–96	-0.01	-0.09*	-0.17*	-0.12*	-0.07*

(B): *Territorial Local Authority Relationships* (n = 74)

	Employed (E/WAP)	Unemployed (U/LF)	Participation (LF/WAP)	Median Income	Population (% of NZ pop)
Levels					
86–91	0.48*	-0.03	0.22*	0.01	0.02
91–96	-0.03	0.25*	-0.08	0.08	0.01
86–96	0.33*	0.35*	0.00	0.09	0.03*

(C): *Regional Council Relationships* (n = 16)

	Employed (E/WAP)	Unemployed (U/LF)	Participation (LF/WAP)	Median Income	Population (% of NZ pop)
Levels					
86–91	0.52	0.02	0.15	0.11	0.01
91–96	-0.01	0.34*	-0.03	-0.05	0.00
86–96	0.25	0.38	-0.12	0.04	0.01

Notes:
[#] The analysis here only uses the 1,652 Area Units (1996 boundaries) which had a population of 100 or more. The 123 Area Units that were excluded accounted for 2,244 people, or 0.06% of the 1996 New Zealand total population.
* = significant at 5%.
Source: Maré and Timmins (2000)

The results in Table 3.7 show stronger signs of convergence in 1991-96 than in the preceding five years, with the exception of unemployment. National and regional unemployment rates rose strongly between 1986 and 1991. The pattern of correlations suggests that the proportional growth in unemployment rates was greatest for initially low-unemployment areas. Between 1991 and 1996, when unemployment rates fell, it appears that the greatest falls were in the areas that had relatively low unemployment in 1991.

Comparing across the different spatial levels, we find more evidence of convergence for area units than for the larger areas, possibly because of the reversals of random variation arising from small size. There is no significant evidence of convergence at the TLA or Regional Council level. Where coefficients are significant, they suggest that TLAs and Regional Councils are becoming less alike (i.e. diverging).

The stylized facts presented above are for the 1986-1996 period. It would be good to put them in a slightly longer time series context. Chapple (2000) examines the question of convergence or divergence in the growth of various variables (e.g. income, employment rates, participation rates and unemployment rates) for *urban* area units (which he calls neighbourhoods), over three inter-census periods (1981-1986, 1986-1991, and 1991-1996, as well as combinations of these three). Although these results are not strictly comparable to ours (due to the focus on *urban* area units), nevertheless it provides an earlier perspective to our stylized facts on convergence/divergence patterns.

The results (as summarized in Appendix One of his paper) provide evidence for *unconditional divergence* for the *income* variable (i.e. a positive relationship between initial average income and observed neighbourhood income growth) over the three periods, rather than convergence. The author then carried on to examine if the divergence pattern remains if other socio-economic characteristics of the neighbourhood in 1981 are controlled for. The socio-economic characteristics that are controlled for include the industrial structure, shares of various ethnic groups, average education, region, whether the neighbourhood is an Auckland or Wellington inner city suburb. The results suggest that once the socio-economic variables are controlled for, there is some evidence of *convergence* in neighbourhood incomes. In particular, neighbourhoods with similar industrial, educational and ethnic profiles show convergence to similar levels of income. More highly educated, employment rich neighbourhoods with a high percentage of their workforce in Finance and Business Services have pulled away from the others. It is also noted that when Chapple (2000) controlled only for regions and inner city areas, he found that the coefficient on initial income remains positive, suggesting within region income divergence.

The results for employment rates, participation rates and unemployment rates are more mixed. There is some convergence from 1981-1986, a divergence over the 1986-1991 period, and then some convergence again from 1991-1996.

Meanwhile, a study by Karagedikli, Maré et al. (2000) focuses on changes in regional *income* distributions since 1981. Similar to the United States and the United Kingdom, New Zealand experienced a rapid increase in *personal* income inequality during the last two decades. Moreover, *inter-regional* income inequality also grew sharply (i.e. diverging), particularly in the 1980s. There are also significant differences between New Zealand regions in shifts in the *intra-regional* income distributions (as measured by Gini coefficients). The growth in intra-regional income inequality is particularly pronounced in the Auckland and Wellington metropolitan regions. The authors note that in many regions, the lower deciles experienced persistent declines in real incomes even at times of economic expansion.

In summary, the evidence of divergence or convergence depends on the variable we are looking at, the level of aggregation, and the time period. Overall, there is some evidence of convergence for area units, particularly over the 1991-1996 period. On the other hand, there is also some evidence of diverging incomes across regions, and within particular regions (Auckland and Wellington). Again, although there is no

overwhelmingly strong evidence of convergence or divergence, there is enough evidence of inter-regional divergence to cast some doubt over the extent of regional labour market adjustments.

The evidence of inter-regional divergence is also borne out in overseas studies. For example, Cashin and Strappazzon (1998) examine Australian census data on regional incomes for the period 1976-91. They analyse the regional dispersion of per capita income for the six Australian states and at the sub-state level (statistical divisions, denoted as SDs). The coefficient of variation is used as the measure of dispersion, and Gini coefficients are also calculated to analyze income equality within regions. For Australia, the cross-state dispersion of per capita incomes increased (i.e. diverged) over the period, whereas there was neither convergence nor divergence of incomes among Australia's 57 SDs. In addition, the intrastate dispersion of per capita incomes across SDs remained largely unaltered over the period. Gini coefficients indicated that across income strata, the distribution of incomes both within states and within SDs has become more equal.

Similarly, Lloyd, Harding et al. (2000) examine the incomes of households in regional Australia and how the distribution changed between 1991 and 1996. The authors consider the changes at three levels – regions, states, and local government areas. The results suggest that there is a large and growing gap between the incomes of those Australians living in the capital cities and those living in the rest of Australia. However, regional Australia is not uniformly disadvantaged and not uniformly declining, with very different experiences in particular states and regions. The study also found that the proportion of households living in the middle income ranges has been declining across most regions.

The preliminary evidence that we have just presented on persistence and convergence/divergence patterns does not fully answer our question about how much regional adjustment there is. It does suggest that there are sustained differences between different spatial units that indicate either that adjustment to equalise levels is too slow to show up clearly in the decade time span we have considered, or that there are equilibrium differences in levels that do not necessarily require adjustment. More formal studies are required to better understand and explain the persistence or non-convergence or even divergence across regions (see for example, Barro and Sala-i-Martin (1991), Persson (1994), Rappaport (2000b), and Kelejian, Robinson et al. (1997)).

In summary, this chapter has presented some stylised facts and a summary of evidence about migration flows, and about regional labour market adjustments. Internal migration in New Zealand is significant, both in itself and in comparison to other sources of regional population change. The evidence of regional labour market adjustments seems to suggest that there are disparities in regional labour market conditions, and that they are quite persistent. Evidence of convergence is also rather scarce. These observations appear to be quite similar to international evidence.

The logical questions that follow are whether there is a link between the two, and if so, whether the link is large, as well as whether it depends on who’s affected by the shocks. These are the three key questions that we shall examine in the following sections.

4 KEY QUESTION 1: DOES MIGRATION HELP REGIONAL LABOUR MARKET ADJUSTMENT?

From the previous section, it is clear that internal migration is important. It is also clear that there are disparities in regional labour market indicators, and that they are persistent. This section examines whether there is a link between internal migration and regional labour market adjustment, and if so, the nature of the link. To say that there is a link between the two would imply that labour market reasons drive people's migration decisions. Do people in fact move for labour market reasons?

A broader question would be why migration occurs. People change locations for a wide variety of reasons. The labour market is one of the important factors, especially for longer distance moves. We are particularly interested in the labour market story[39] - for example, does migration occur because there are unemployment rate and wage differentials? If there is in fact a labour market story, does migration take place in the direction we expect (i.e. "right" direction) – for example, from a high-unemployment rate area to a low-unemployment rate area? If migration responds to labour market variables and does this in the "right" direction, one can say that migration is helping regional adjustment. On the other hand, migration may occur in the opposite direction to what we would expect based on labour market variables (i.e. "wrong" direction), if there are compensating effects such as lower costs of living, more attractive amenities, high home ownership, etc. In such cases, migration fails to help regional labour market adjustment. This is the essence of our first key question.

What sort of evidence do people look for to confirm or refute the labour market story, and to investigate if migration is helping regional labour market adjustment or otherwise? These questions are the gist of the ensuing subsection. It is noted that the discussion in this chapter is larger than that of the other chapters because it covers issues that are relevant for all key questions. Where the similar issues arise in subsequent chapters, we will make appropriate references.

4.1 What?

How do researchers examine the motivations for migration?[40] And since we are interested particularly in the labour market story, how do researchers identify the relationship between labour market characteristics of areas and/or individuals, and the decision to migrate? The factors influencing the decision to migrate can be detected in two main ways. One is to infer them from actual mobility patterns. The second way is through directly surveying and accepting the migrant's own statement of motives. These are elaborated below.

4.1.1 As revealed by actual mobility patterns

The first and more common approach is to infer the determinants of migration from actual mobility patterns. This approach implicitly assumes that individuals "vote with their feet" in the sense that they reveal though their migration decision their satisfaction or dissatisfaction with various attributes of their current residence. In other words, their

[39] For a good general discussion of the literature on internal migration and the importance of the labour market story, see Greenwood (1997) and OECD (2000). Other reasons why migration might occur can be categorised as the "pull" and "push" forces. These "pull" and "push" forces could be related to housing, amenities, weather, etc.

[40] A good discussion of the different approaches to conducting applied migration studies can also be found in Goetz (1999) and Greenwood (1997).

actual moves can be seen as their revealed preferences. By comparing these observed patterns of movement with variation in local labour market conditions, researchers hope to learn about the role of labour market differences in determining migration patterns.

However, as highlighted in Section 2, in an economy, much is happening simultaneously and it is often difficult to disentangle cause and effect from a whole range of social and economic factors. Therefore, the presence and significance of a labour market story can often be difficult to identify. How do researchers simplify these complexities in order to isolate the relationship of interest, between observed migration rates and labour market conditions in the two regions (i.e. the labour market story)?

The simple two-region model of regional labour market adjustment presented in Chapter 2 provides a good way to discipline our thinking. In that simple model, migration is a response to utility not being equalised across two regions. Differences in labour market conditions represent different levels of well-being, and people move until they are indifferent about which region they live in. Under the assumptions of the simple model - that the two regions are identical, that people are homogeneous, and that labour market differences represent utility differences, then we can state confidently that any migration between the regions must be related to the observed labour market conditions (i.e. labour market disequilibrium). In other words, under such strict conditions, people must be moving in response to a disequilibrium in the labour market (e.g. wages are higher in one region than the other) because everything else is the same across regions, and people have identical preferences.

However, in the real world, there are definitely deviations from the pure theoretical construct. The main challenge in moving from the theoretical model to an empirical investigation is that observed differences in labour market conditions do not necessarily represent utility differences. Regions are not identical and people are far from homogeneous. Therefore, researchers need to isolate and control for the "noise" or "nuisance variation" in order to identify exactly what constitutes a labour market disequilibrium that induces migration flows[41]. The ways researchers control for these complexities are discussed in the next subsection, under two headings - "Dealing with differences across regions" and "Dealing with differences across people". Furthermore, a disequilibrium in the labour market can result in regional adjustments other than migration (e.g. labour force participation rate changes). These other regional adjustment mechanisms are addressed under our second key question in Chapter 5.

In order to operationalise this approach (i.e. *inferring* from the data), we have to first of all select labour market indicators that are theorised to encourage or discourage migration. What qualifies as a labour market attractor? The answer to this question would depend on the economic theory that one adopts. Economic theory helps us to characterise the migration decision in a way that emphasises how labour market considerations can influence migration decisions. Two theories that have been used widely view migration either as an investment decision (the human capital approach), or a spatial job search process. These two theories will be discussed further below. It is noted, however, that there appears to be a wide range of labour market variables[42]

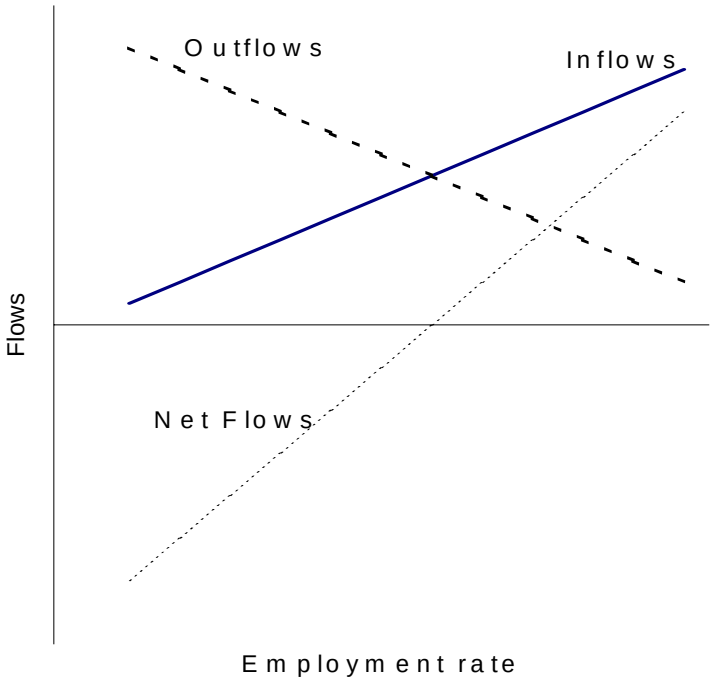
[41] We mentioned earlier that migration may occur in the opposite direction to what we would expect based on labour market variables (i.e. "wrong" direction), if there are compensating effects such as lower costs of living, more attractive amenities, high home ownership, etc. These are some of the "nuisance variation" that researchers need to control for in order to highlight the labour market story.

[42] For some of these variables, there can be a few ways to define them. For example, the unemployment rate can be defined as a percentage of the working age population or of the labour force population.

used in the literature, for example, regional differentials in the employment rate, unemployment rate, wages, labour force participation rate, new-hire rates, layoff rates, etc.[43]

Once one has selected the relevant set of labour market indicators, the next question is how we expect migrants respond to it. What sort of relationship do we expect to see? Figure 4.1 shows the expected relationship. The horizontal axis shows any *favourable* labour market outcome (e.g. employment rates, employment growth, wage rates, inverse unemployment rate). The vertical axis shows migration flows. We expect that inflows are positively related to *favourable* labour market outcomes – that is, people move to areas with stronger labour markets. Conversely, outflows are lower when labour market outcomes are better. Overall, we expect that net flows are positively related to good labour market conditions.

Figure 4.1 Migration and Labour Market Outcomes



4.1.2 As revealed by people when asked about the connection

Unlike the first approach discussed above, the second approach attempts to directly address specific issues of motivations behind people's decisions to move, at the individual level. This approach is operationalised by asking people directly about the connection between their decision to move or otherwise, and the factors influencing their decision. The advantage of this approach is that we can assess the presence and significance of a labour market story directly, rather than having to control for "noise" or "nuisance variation" before we can infer from mobility patterns.

Furthermore, regional unemployment differential can be specified as a ratio or as unemployment differences (see Pissarides and McMaster (1990)).

[43] See Morrison (1999) for a discussion of appropriate labour market indicators to characterise regional differences in the New Zealand context.

In the New Zealand context, such survey-based data are rather scarce, as discussed later. Therefore, the first approach (i.e. inferring motivations from actual mobility patterns) is likely to prevail. This is why the discussion in this chapter is predominantly on the first approach.

Now that we have highlighted the sort of evidence researchers search for, the next question is *how* they actually isolate the relationships and evidence to answer the key question at hand, i.e. presence of a labour market story.

4.2 How?

This subsection looks at the range of approaches that studies have used in shedding light on the key question. As before, the discussion here will be divided into two parts. The first part looks at techniques that infer motivations for migration from actual mobility patterns, while the second part covers the direct approach of determining motivations at the individual level.

4.2.1 As revealed by actual mobility patterns

The labour market story is essentially a link between observed labour market conditions and observed migration flows. Let's look at the first main ingredient - what qualifies as a labour market attractor?

Labour market attractors

The answer to that question would depend on the economic theory that one adopts[44]. Different theories highlight different reasons why observed labour market conditions are not a good guide to the differences in utility to which migrants are assumed to respond. Two approaches that have been used widely view migration either as an investment decision (the human capital approach), or a spatial job search process. The spatial job search approach extends the human capital approach by incorporating explicitly the joint determination of location and job choice in a world with uncertainty.

As noted by Sjaastad (1962), from the worker's point of view, migration is considered as an investment. Observed labour market conditions may be a very poor measure of how well potential migrants expect to fare in an area over their lifetime. People consider from time to time the income gain and other benefits which may result from a move and compare such benefits with pecuniary and non-pecuniary costs of the move. A worker would be expected to migrate when the present value of the benefits outweighs the costs.

Ideally, one would like to have discounted values of costs and benefits, to capture the forward-looking concept. However, Gallin (1999) argues that most existing empirical studies of net migration ignore this aspect and thus do not properly identify the underlying parameters of the theoretical model. This can be thought of as an omitted variable bias since no explicit measure of expected future labour market conditions is included. Gallin (1999) proposes that future migration should be included in the migration model to control for expected future labour market conditions. The author in turn proxies the expected future net migration rate by using a one-step-ahead forecast formula.

[44] See Goetz (1999), Greenwood (1997) and Vaithianathan (1995) for a more detailed discussion of the range of migration theories.

While the human capital approach facilitates a structural view of the migration decision, based on the rational decisions by migrants, a simple human capital approach fails to take into account the interdependence of the migration decision and other decisions. For example, a decision to migrate may well be taken together with the decision to change jobs[45]. This leads us to an extension of the simple human capital approach, as discussed below.

Observed wages may also be a poor proxy for the attractiveness of a region if potential migrants take into account their chances of getting a job. Higher wages are not the only monetary gains from migration. It has been argued that differential economic opportunities consist of two parts – the expected wage rate and the probability of receiving that wage. Harris and Todaro (1970) argue that regional wages should be weighted by the respective probability of employment. Both the unemployment rate (Day (1992)) and the employment rate (Treyz, Rickman et al. (1993)) have been used as proxies for the probability of getting a job, in order to capture the trade-off between wages and the probability of receiving the wage. It is hypothesised that other things being equal, areas with high unemployment rates (low employment rates) should have both more (less) out-migration and less (more) in-migration.

The spatial job-search theory views migration as a result of a job-search process. In other words, an individual decides to migrate when he or she accepts a job at a location different from his or her current location. Under this theory, a worker will continue searching for other jobs until a wage offer either equals or exceeds the reservation wage. The reservation wage is determined to equate the marginal cost of obtaining one more job offer with the expected marginal return from continued search. Reservation wages and thus search duration would depend upon one's personal characteristics as well as attributes of local labour markets that affect wage distributions. Reservation wages and search duration are also likely to be affected by the extent of unemployment insurance, and the amount of labour market information. Greenwood, Mueser et al. (1991) argue that individual decision makers focus on a manageable subset of potential destinations, as well as on a manageable subset of characteristics. This idea of a spatial choice set provides a new direction in migration research both in its own right and because it has the potential to be implemented with laboratory experimental techniques. Herzog, Schlottmann et al. (1993) provide a literature review of empirical studies that considered labour migration as a spatial job-search.

In summary, migration responds not only to income gains, but more generally to differential economic opportunities between regions. In fact, economic opportunities have been proxied by a wide range of labour market variables such as regional differentials in the employment rate, unemployment rate, wages, labour force participation rate, new-hire rates, lay-off rates, and various other labour market conditions (see Greenwood (1997) for examples).

Although the migration model is usually formulated in the context of individual decision-making, the data employed in estimating the models were for many years aggregate in nature. For example, the influence of wages on migration is tested using average wages in origin and destination areas. However, this is really asking whether migration occurs from low-to-high wage areas. Alternatively, if one had access to individual data (in this case, migrant-specific wage measure), then one would be able to determine whether migrants themselves benefit by moving (consistent with the individual utility maximisation framework). The latter situation is important if we were interested

[45] Vaithianathan (1995) provides a summary of the criticisms of the human capital approach.

particularly in the personal characteristics of migrants (as examined in the third key question). This aggregate versus individual data issue will be discussed again later, when we talk about how researchers control for the heterogeneity amongst people.

A further problem from using *current* labour market conditions to explain *current* migration flows, is that causality may well run in two directions. Although some migration models include employment growth as one of the explanatory variables, employment growth can as easily be caused by migration. One way that has been used to address this issue is to include *lagged* measures of local labour market conditions in the model. For example, Maré and Timmins (2000) regress the migration flow over the 1991-1996 (1986-1991) period on the values of the explanatory variables as at 1991 (1986). Similarly, all the independent variables were lagged one period in two of the equations in Day (1992). She then compares the estimates from these equations to estimates obtained from equations using only current values of the independent variables, to test the hypothesis whether individuals do have fairly accurate information about conditions in other regions. Another approach is to model migration and local labour market conditions *jointly*, rather than modelling only migration in response to wages or unemployment (the latter being a partial equilibrium approach) (see for example Gallin (1999)).

When choosing a measure of labour market attractiveness, it is important to note that only changes in *relative* attractiveness are expected to induce migration flows. Changes that improve the attractiveness of all locations will not necessarily change relative attractiveness. Although different regions may experience different *region-specific* shocks at different times, they also face some *aggregate* shocks from time to time. An example of an aggregate shock is national slumps and booms. The distinction between the aggregate and region-specific shocks has been highlighted as an empirical issue in Section 2.4.

Available evidence seems to indicate that migration declines during national slumps and rises during recoveries (see Molho (1984) and Gordon (1985), as cited from Greenwood (1997)**,** and Milne (1993)). There are of course other fiscal and macroeconomic influences that may constitute an aggregate shock (see Milne (1993)). If aggregate shocks explain a large proportion of the variance in regional labour market variables, then it would make sense to control for such aggregate shocks by specifying the relevant labour market variables in *relative* terms – for instance, relative to the national average. This effectively "filters out" the effect of aggregate shocks (i.e. those that impact all regions across the board), so that what is left is the influence of region-specific or idiosyncratic shocks.

Examples of studies that specify regional labour market variables as deviations from national means include Blanchard and Katz (1992), Decressin and Fatas (1995), Jimeno and Bentolila (1998), Fredriksson (1999) and Debelle and Vickery (1999). Most of these authors do perform tests to examine the validity of the assumption that a significant proportion of the variance in regional labour market variables can be explained by aggregate shocks. For example, Blanchard and Katz (1992) ran a regression, for each state, of the change in the logarithm of state employment on the change in the logarithm of national employment[46]. This test basically tries to answer the question of how much the typical movement in state employment is common to all states (i.e. due to an aggregate shock) and how much is state-specific. Their results generally suggest that much of the year-to-year movements in state employment are

[46] For a more detailed discussion of the test that Blanchard and Katz (1992) used, see pages 25 and 26 of that article.

accounted for by movements in aggregate employment. Therefore, it makes sense to analyse regional labour market variables expressed as deviations from the corresponding national means (so that the effect of aggregate shocks is "purged").

Interpreting labour market changes

We note also that even where a plausible measure of relative labour market attractiveness exists, it is not a straightforward matter to interpret what is causing changes in those measures. Essentially, there is an identification problem in that changes may arise due to changes in labour demand, or labour supply. These changes have different expected impacts on migration behaviour, but are difficult to identify separately.

Let's discuss a labour demand shock first. Successful regional economic development policy (a positive local labour demand shock) increases labour demand in a local region. This increase is expected to reduce unemployment, increase labour force participation, and induce in-migration. As for a labour supply shock, there could be at least two important changes in a particular region's labour supply. Let's discuss a positive supply shock. One is rising educational attainment and skills of the labour force, amongst both new entrants and existing workers. The second is an increase in in-migration of individuals, possibly because the region has become perceived as a more attractive place to live (for whatever reason). This could be the case, for example, if a disproportionate number of overseas immigrants settle first in the Auckland region, from where they may then subsequently migrate to other regions.

In the real world, both labour demand shocks and labour supply shocks may be occurring. How do we distinguish between them? These shocks induce different regional labour market adjustments. Therefore, it would be important to identify which type of shock is causing the changes. This identification process requires a combination of theory, judgements, and empirical patterns[47]. Most researchers have in fact focused on region-specific labour demand shocks, particularly in studies employing the Vector Autoregressive technique (see Section 5.2) (e.g. Blanchard and Katz (1992), Decressin and Fatas (1995), Jimeno and Bentolila (1998), Fredriksson (1999), Debelle and Vickery (1999)). These researchers associate unforeseen movements in employment with innovations in labour demand (i.e. equating a shock to employment to a labour demand shock). Blanchard and Katz (1992) argue that this assumption is approximately correct since they find that positive shocks to employment increase wages and reduce unemployment.

Therefore, one can draw inferences from these studies (focusing on labour demand shocks) to provide some insights to the effects of regional economic development policies. There are of course studies that focus on local labour market adjustments in response to a labour supply shock (see for example, (Hanson and Slaughter forthcoming, 2001) and references cited therein).

While we are on the topic of shocks, there is a distinction between a once-and-for-all (or temporary) shock and a shock with subsequent adjustments (permanent shock). To elaborate, Bartik (1991) considers a one-and-for-all shock to local job growth, with subsequent growth unchanged from what it would have been. For example, a local area has been continuously experiencing job growth of about 3 percent per annum, and suddenly is hit by a positive once-and-for-all shock, raising the job growth rate to 5

[47] This is one example of the identification problem that has been highlighted previously at the beginning of Chapter 2.

percent for that year. The following year, the area's job growth rate returns to the normal rate of 3 percent. On the other hand, Blanchard and Katz (1992) considers the effects of a permanent shock, that is, the one-time shock to local job growth is allowed to affect subsequent growth. In our numerical example just now, the area's job growth rate would be 5 percent in the years subsequent to the one-time shock (i.e. it does not return to the normal rate of 3 percent). The effects on the dynamics of the variables of interest from the simulation exercise would be different under the two scenarios (see Bartik (1993)). This is an issue that researchers have to consider.

Where there is a known labour market shock

Sometimes, we can identify a labour market shock more clearly and easily. In such cases, one could use case studies or event studies to trace implications of the known labour market shock. Also, case studies are appropriate when a local area is unique in terms of what attracts migrants, and its regional adjustment process.

A particular study worth highlighting here is by Klier (2000). This study looks at the migration response when auto plants open in a US county. In particular, they estimate the impact of auto plants on county-level net migration during the 1980s and 1990s.

Meanwhile, shocks in New Zealand that are recognisable include industrial closedowns such as the Mosgiel Textile Mill and Southdown and Patea Freezing Works closures. Peck (1985) reviews published material on firm closures in New Zealand since 1980. Table A in Peck (1985) lists textile plant closures over the period 1980 to 1983 which have been reported through searches or in published reports. Peck (1985) highlights the main issues identified in the literature. It sets out the issues perceived as being important by the local community and outside agencies, and records ways in which individuals and communities adjusted to the closures. The kind and extent of local and central government intervention and support provided, and any known effects, are also recorded. Another background source for potential case studies would be Le Heron and Pawson (1996).

Measure of migration

The second main ingredient in uncovering a labour market story is the migration flow. What is the right measure of migration flows? As mentioned in Section 3.1, there is a range of alternative migration measures. The migration figure can be expressed in levels or as rates, gross versus net flows, migration effectiveness index, migration intensity index, etc. As alerted earlier, these measures are appropriate for different purposes. Therefore, for each of the key questions, the particular measure(s) used may vary.

Different researchers have looked at modelling migration differently. For example, the gross-migration model focuses on the individual migrant's decision-making or choice process (e.g. Poot (1986b) and Juarez (2000)). It attempts to directly identify the determinants of migratory behaviour. On the other hand, the net-migration model focuses on the equilibrium-seeking tendency of the population system. It abstracts from the processes that induce migration flows that cancel one another (e.g. Pissarides and McMaster (1990) and Treyz, Rickman et al. (1993)). Others have started to model individuals' *probability* of making a move (e.g. Enchautegui (1997) and Molho (1987)), which is discussed further below when we talk about the use of individual data in estimating dichotomous choice models. Others have even used multiple choice models to allow for more than two alternative choices (e.g. Day (1992), Antolin and Bover (1997) and Böheim and Taylor (2000)).

Now that we have covered the two main ingredients to infer the labour market story – labour market attractors and migration flows, let's look at how researchers "mesh" the ingredients together.

In a perfect world, with identical regions and identical individuals

In a perfect world where regions are the same (except perhaps in labour market conditions), and people are identical, then one could use descriptive techniques to uncover the labour market story, such as simple correlation analyses and cross tabulations. These descriptive analyses are able to control in a fairly crude way for the characteristics of *migrants* and/or of *migration origins and destinations* ("pull" and "push" forces) that make some individuals more likely to migrate. Descriptive analyses can be presented for homogeneous sub-populations (for example, by age) and show if there is a correlation between migration rates and labour market conditions defined for that subgroup (e.g. age).

A general indication from studies of this type is that migration behaviour is far from homogenous and that there are a host of reasons for people's moving decisions. For example, the young and more highly skilled tend to have higher propensities to move. Besides, some regions (e.g. those with high welfare benefits) may attract people with certain characteristics (e.g. the unemployed or low-skilled ones). Descriptive studies that ignore these forms of heterogeneity, and rely instead on aggregate patterns can be misleading.

Descriptive studies, however, do not control for other influences, and do not provide precisely the quantitative nature of the relationships. Nevertheless, they help suggest explanatory variables that should be included in more formal multivariate analyses of migration behaviour. More formal studies basically control for a range of other influences, each of which are discussed below.

Modelling the relationship between migration and labour markets

Before discussing the way that researchers have dealt with non-labour market differences across regions, differences across individuals, and the impact of non-labour market forms of adjustment, we will first discuss a common way of modelling the systematic variation in migration rates that serves as a benchmark against which labour market influences can be measured. This common method is the use of a gravity relationship.

If one were to simply look at the number of individuals migrating, it is almost certain that more populous areas such as Auckland will have a larger numerical migration flow than less populous areas such as Gisborne or the West Coast. Scale differences need to be controlled for. One possible treatment is to model migration rates (i.e. dividing the migration flow by the size of the population in either the origin or the destination), rather than migration levels. For example, Pissarides and McMaster (1990) models the net migration rate of region *i*, calculated as the number of persons that move as a percentage of the population in region *i*.

Alternatively, some studies rely on the model itself to deal with this scale difference. One such model is the gravity model. The gravity model provides an appropriate functional form that treats the scale difference by including population size variables to proxy for the attractiveness of each area. At the heart of the model is a simple relationship derived from physics (see Box 1). Its attractiveness stems in part from its

simplicity, and in part from the fact that it requires only aggregate area data. In particular, gravity models can be estimated using data of a form that is available in many countries – a single cross-section with a retrospective question on location in a prior period (usually one or five years earlier).

Box 1 Gravity models

Basic Gravity Model

The most simple gravity models relate the flow of people from area i to area j (M_{ij}) to the attractiveness of each area, as proxied by population size (P_i and P_j), and the distance between the areas (D_{ij}). The form of the relationship is based on the formula for the Newtonian law of gravitation[48], where force of attraction is proportional to the product of the masses of the two bodies involved and inversely proportional to the square of the distance between them:

$$M_{ij} = GP_i^{\alpha_1} P_j^{\alpha_2} D_{ij}^{\alpha_3}$$

Different definitions/measures of the size of the masses

There are two masses in the model; one for the transmitting region, and the other for the receiving region. One interpretation of the former mass can be the size of the population in the transmitting region, or the migrating population. The mass of the receiving region can represent the population size there, the size of the region's economy (Gross Regional Product), or some labour market variables such as the number of jobs (see the discussion on modified gravity models below).

Different definitions/measures of distance

Depending on the circumstance, different measures of distance may be appropriate. Some common measures or interpretations of the distance variable include the simple linear distance between two points, travel time, transport or travel cost, the cost of relocation (e.g. removal cost). For example, Day (1992) used the forgone wage cost of moving from region *i* to *j*, and the cost of transporting oneself and one's belongings from *i* to *j*, while Bukenya, Schaeffer et al. (1999) or the actual distance variable between *i* and *j*. Other studies have included more general measures of distance: social distance, political distance, and psychological distance or psychic cost (e.g. the cost of leaving behind relatives and friends).

The pure gravity model is nowadays rejected on numerous grounds (Poot 1986b). For example, it is not based on a behavioural theory, and does not predict very well. In addition, since the model explains a flow (i.e. migration) in terms of stocks (i.e. population size), the timing of measurement of the stocks is an important issue. Besides, it (unrealistically) assumes that the migration flow between regions *i* and *j* is not affected by characteristics of the other regions in the system (i.e. it ignores the substitution effect)[49]. Furthermore, there will be a simultaneous equation bias if the population masses are themselves very sensitive to changes in the migration flow. Some (but not all) of these criticisms against the pure gravity model are addressed by incorporating some modifications, as discussed below.

Modified Gravity Model

The basic gravity model is often extended by adding variables that have a behavioural content, typically characteristics of the origin and destination areas, ($M_{ij} = GP_i^{\alpha_1} P_j^{\alpha_2} D_{ij}^{\alpha_3} X_i^{\beta_1} X_j^{\beta_2}$), and additional variables that are expected to influence the decision to migrate. Commonly added attributes include income or wage rate, unemployment rate, weather, degree of urbanisation, housing prices, heating costs, various measures of public expenditures and/or taxes and many others. The exponents of these additional variables in the model generally indicate the "attractiveness" of area attributes in the sense of making the area a good place to leave (β_1) or to move to (β_2).

There have also been criticisms of the modified gravity model (see for example, Schultz (1982), as cited in Greenwood (1997)). For example, Schultz argues against the common use of the double logarithmic functional form to estimate modified gravity models. The argument is as follows. Since the regions of any country differ significantly in population size and land area, a larger share of all moves will tend to occur within the boundaries of larger regions. Therefore, more non-migration will appear to exist for such regions. The consequence is that non-migration is spuriously correlated with origin population size and land area.

Other extensions to the basic gravity model include adding individual characteristics, amenities in the origin and destination areas, as well as public or national policies. These are discussed in the text.

[48] The Newtonian Law of Gravitation replaces M_{ij} with "gravitational force", and constrains α_1=1, α_2=1, α_3=-2.

When researchers get to the empirical stage of their study, they need to decide on how they actually want to estimate their gravity models. The first and simplest way is to take the logarithms of the gravity model and use the OLS estimator. However, this method suffers from two drawbacks, as discussed in Bailey and Gatrell (1995, pp. 352-358)[50]. Alternatively, one can perform the maximum likelihood estimation of parameters under more realistic distributional assumptions. A commonly used distributional assumption used is the independent Poisson distribution (see Bailey and Gatrell, 1995). A more detailed discussion of the use of these procedures in gravity modelling can be found in Fotheringham and O'Kelly (1989), Sen and Smith (1995), and Isard, Azis et al. (1998).

As elaborated in Box 1, the basic gravity model as used in the migration context depicts the relationship between the number of migrants from area *i* to *j*, the size of the population in areas *i* and *j*, and the distance between areas *i* and *j.*

The basic gravity model is often extended by adding variables that have a behavioural content, typically characteristics of the origin and destination areas, as well as additional variables that are expected to influence the decision to migrate. The question of what variables to include in the migration equation have been reviewed extensively and thus, we do not have the intention of providing a comprehensive coverage[51]. For the purposes of answering our key question, we note that measures of relative labour market attractiveness can be included as variables in a gravity model.

Other variables can be added to control for non-labour market differences across regions, for differences in demographic composition, and for other forms of adjustment. The sort of variables that are commonly used for these purposes are discussed in subsequent sections of the paper.

In estimating the gravity relationship, one can use either aggregate (or area) data, or individual data. This distinction essentially separates migration studies into those that concentrate more on the characteristics of *places* (areas of origin and/or destination) and distance between areas as determinants of migration (a macro-level approach), and those that focus on characteristics of *individuals*[52] (rather than on streams of aggregate movement) that influence migration behaviour (a micro-level approach)[53]. We shall discuss first the studies that use aggregate data (i.e. the macro-level approach).

Aggregate gravity studies

In the New Zealand context, an early study by Giles and Hampton (1978) estimates an out-migration and in-migration simultaneous equation model of urban migration, using

[49] Poot (1986b) incorporated such interdependencies in a system of spatially separated labour markets.

[50] Firstly, there is no guarantee that flows predicted from the model, when summed over origins and destinations, would agree with the observed totals leaving origins and arriving at destinations, and that the total predicted 'cost of travel' would agree with that observed. Secondly, estimating parameters by the ordinary log-linear regression model would only be justified statistically if the flows were independent and log-normally distributed about their mean value with a constant variance. Such an assumption is patently not valid since flows are discrete counts whose variance is very likely to be proportional to their mean value.

[51] See in particular Greenwood (1997) and Goetz (1999).

[52] In practice, migration is often a family decision. This creates some complications, which are discussed in Section 2.4.

[53] Empirical studies on migration can also be subdivided into *time series* studies (e.g. Pissarides and McMaster (1990) and Treyz, Rickman et al. (1993)) as well as *cross-sectional* ones (e.g. Saltz (1998) and Goetz and Debertin (1996), as cited in Goetz (1999)). More recently, some studies have used pooled time series and cross-sectional data (sometimes known as panel data) to obtain more reliable and precise coefficient estimates than either times series or cross-sectional models by themselves (e.g. Antolin and Bover (1997)).

aggregate data. The "push" and "pull" forces they included in their in- and out-migration equations include the road distance from Auckland, per capita income in the origin area, and a dummy variable for urban areas in the South Island. A few other variables, such as the average temperature and the population size of the areas, were initially included but were omitted later because they did not perform very well (as cited in Vaithianathan (1995)).

A later study by Poot (1986b) used aggregate data to examine inter-urban migration for males between the main urban areas between 1971 and 1976. The dependent variable used was the number of individuals migrating from region *i* to region *j*, and the explanatory variables included a range of characteristics of region *i* and region *j*. These area characteristics can be thought of as "pull" and "push" forces. Examples of area characteristics he used include labour force participation rates, the percentage of people aged over forty years, average rainfall, average temperature, and the proportion of non-Europeans in the region.

Maré and Timmins (2000) recently carried out a multivariate analysis of migration-labour market links over the period 1986-1991 and 1991-1996. The data were obtained from the New Zealand census. They estimate three different forms of gravity models using gross flows between regions. The first one models a simple gravity relationship (population size in origin and destination regions, and distance), using regional data. A second model adds labour market and demographic attributes, as measured as at the beginning of the period in order to avoid problems of endogeneity. The labour market variables that are included are the unemployment rate, the employment rate, and median income. Demographic variables include the proportion of the region's population that are in various age, ethnicity, and qualification groups. Finally, the authors also add three variables capturing how similar each pair of regions is. The variables that they use are Duncan dissimilarity indices for ethnic composition, one-digit industry, and one-digit occupation. The coefficients indicate whether people are more likely to move to other areas that are similar to their own, or to ones that are different. One might expect people to move to similar regions because they would be more likely to fit in, because their knowledge, information and behaviours would be more in line with those in their destination.

Individual (micro-level) data gravity studies

Alternatively, one could also use individual data in estimating gravity models. The availability of individual data allows researchers to estimate gravity-type relationship using limited dependent variable methods such as the logit and probit models, which are designed to deal with models where the dependent variable takes on a small number of values – in this case an indicator for whether someone moves or not. This is discussed in more detail when we talk about how researchers control for composition effects, as a result of heterogeneous individuals.

When we conduct empirical analyses to highlight the labour market story, we have to "filter" out the "nuisance variation" that is not part of the labour market story. These include (a) differences between regions in terms of their climate, amenities, and cost of living; (b) differences amongst people in terms of characteristics (e.g. age, education, etc.) and preferences (e.g. highly skilled people prefer regions with higher wages), and allowing for other (non-migration) forms of adjustment. The way researchers have gone about filtering out these "nuisance variation" is the gist of the rest of this section.

Dealing with non labour market differences across regions

Now that we have covered the ways to address the scale differences between areas, let's get back to our objective of uncovering the labour market story. As alerted earlier, there are differences across areas – in labour market and non-labour market factors. The non-labour market differences across areas may offset or reinforce the influence of labour market conditions on migration (i.e. the labour market story). These then are considered "nuisance variation" from our perspective.

Cost of living differences

One example is differences in the cost of living across areas. We discussed earlier that most studies examining the determinants of internal migration have used some economic price variable such as wages. Other things being equal, workers tend to migrate toward areas whose cost-of-living-adjusted wages are higher. However, some studies ignore the nominal income versus real income debate[54], either because of a lack of data about cost of living, or because it is assumed that *perceived* differences in purchasing power are small (as cited from Poot (1986b)). Researchers can control for cost of living differences in at least two ways. One is to calculate a cost-of-living-adjusted wage or income level to be included in the migration equation (e.g. Poot (1986b)). This approach basically uses a measure of "real" wages based on full adjustment for cost of living. The second way is to include directly a proxy for the cost of living (usually the Consumer Price Index) in the migration equation itself (e.g. Juarez (2000)). This latter approach is a partial regression-based cost of living adjustment to wages or income, that lies between the no adjustment (i.e. using nominal income) and full-adjustment approaches (i.e. using "real" income) (as cited from Dumond, Hirsch et al. (1999)). In addition, including cost of living and income separately allows one to test for the significance of each variable.

An important, and perhaps the largest component in the cost of living is housing costs[55]. The theory is that *ceteris paribus*, housing cost differentials between regions have a negative effect on migration. In other words, other things being equal, the higher the house prices or housing costs in a particular region, the more in-migration is discouraged. How do studies incorporate housing cost? Some studies use house price differentials (e.g. Antolin and Bover (1997), Cameron and Muellbauer (1998), Papps (2000), and Kennedy and Borland (2000)), while others use housing rent (e.g. Bukenya, Schaeffer et al. (1999)).

Differences in amenities

Another example of a non-labour market difference between regions that can affect the labour market story is amenities. The focus on the labour market story means that we are interested only in differences in regional labour market factors that induce migration flows. However, since people move for variety of reasons – labour market and non-labour market reasons – we have to remove the effects of non-labour market differences between regions such as amenities, which may have an influence on migration flows.

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[54] Dumond, Hirsch et al. (1999) looks at whether cost of living matters for wage differential studies. In this paper, various versions of cost of living adjustments are made to wages and the results are then compared.

[55] The discussion here focuses on housing costs as a proxy for the cost of living. The impact of housing tenure (e.g. home ownership versus rentals) on migration flows will be dealt with later, when we discuss about the other forms of adjustments.

How important amenities are depends in part on whether one adopts a disequilibrium or an equilibrium perspective (as discussed in Section 2.4). Early studies, particularly those that adopted a disequilibrium perspective, did not place much importance on amenities. Under this perspective, spatial variations in wages or earnings across areas are assumed to reflect opportunities for utility gains. More recently, the equilibrium perspective arose, which assumes that spatial variations in wages or earnings across areas are compensating and thus do not reflect opportunities for utility gains[56]. An example of such a compensating differential is amenities. In other words, the view we adopt influences how we think of labour market differences observed at any point in time. Do these differences represent disequilibrium conditions (perhaps with slow adjustments), or do they represent equilibrium differences (i.e. compensating differentials)? The question of whether equilibrium or disequilibrium views of migration are more appropriate continues to generate discussions in the literature (see Goetz (1999) and Hunt (1993)).

If one does not account for amenities in a particular region, then there might appear to be more in-migration into that region than one might otherwise expect, based on labour market conditions alone[57]. This is true whether or not amenities get reflected in labour market conditions. The logic is as follows.

Let's look at two regions in a multi-region economy – A and B. For simplicity sake, assume that wages and amenities are the only or main sources of attractiveness of a region. Region A has a better climate and more beautiful scenery than region B. There are two possible scenarios. The first scenario is that the additional amenities in region A are not reflected in labour market conditions, such as wages. Therefore, wages would be the same in both regions. Based on wages alone, one would not expect a difference in migration response to A and B (i.e. A and B are equally attractive). However, adding amenities and wages together makes region A relatively more attractive than region B, hence we would expect a higher migration response to A. Therefore, more people may migrate into region A (for the amenities) than region B, than one would expect based on labour market conditions alone.

The second scenario is where the additional amenities in region A are reflected in labour market conditions, such as wages. Therefore, people living and working in region A are willing to accept lower wages. Based on wages alone, one would expect a lower migration response to A. However, adding amenities and wages together makes region A equally attractive as region B, hence one would not expect any differences in migration response to A and B. Therefore, under this second scenario, more people may migrate into region A (for the amenities) than region B, than one would expect based on labour market conditions alone.

The implication of the last two paragraphs is as follows. Under both scenarios, the existence of amenities means that labour market conditions alone do not provide a good indicator of the relative attractiveness of regions. Therefore, it is important that researchers control for such amenity differentials in order to highlight the labour market story[58].

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[56] A recent study by Carlsen (2000) tests for the validity of two models that view regional disparities as an equilibrium phenomenon – the amenity model and the matching model.

[57] A similar argument applies for dis-amenities, except in the opposite direction. If one does not account for dis-amenities in a particular region, then there might appear to be less in-migration into that region than one might otherwise expect based on labour market conditions alone.

[58] Nevertheless, some current studies still do not include amenities for some reason. For example, there are researchers who contend that the regions selected for study are sufficiently homogeneous in terms of

Some studies have chosen to model amenities more explicitly. They include a proxy for amenities, to the extent that they are measurable, in the migration equation. Examples of regional amenities include the level of pollution, average temperature, average humidity, the presence or absence of a seacoast and national forest lands, and crime rates per capita. This method is particularly appropriate if the demand for amenities change over time (e.g. some areas may become more attractive as the general income level rises) (as cited from Carlsen (2000)).

Alternatively, if amenities are not measurable, they can be thought of as an unobserved source of compensating differentials between regions. Since such amenities do not change much, at least not over the short time, some studies have allowed for time-invariant differences between regions[59]. This has been done in at least two ways. One is to use a fixed effects model. This model effectively allows the intercept term (or the constant) to vary across cross-section units (and over time, where appropriate).[60] This is done by adding region-specific dummy variables to the model, in order to capture the difference in the cross-section (and time series) intercepts. Studies that have adopted such an approach include Juarez (2000), Pissarides and McMaster (1990), Blanchard and Katz (1992) and Jimeno and Bentolila (1998).

The second way is to model regional *differentials in levels* (either as a single regressor variable or as separate regressors). For example, one might model the regional unemployment rate relative to the average for that region over time, to account for the fact that some regions are consistently under-performing or over-performing the national average. An equivalent way to address the permanent differences is to include the *first difference* of relevant regional variables. For example, Cameron and Muellbauer (1998) uses the unemployment rate and its first difference, as well as the log average earnings for fulltime employees and its first difference, to detect regional fixed effects.

Most of the amenities discussed above focus on climate and/or geographical features, which are beyond the control of the public sector. However, the public sector can provide public amenities, as well as preserve and promote the natural environment as an amenity (e.g. national parks). In fact, the government can carry out a whole range of policies, as discussed below.

Government actions

Almost all categories of government actions can have a direct or indirect effect on migration flows[61] – taxation policies (central, state or local government), public investments (e.g. interstate highway system), government restrictions on the private sector, government protection of natural amenities or provision of public amenities, central and state revenue sharing programmes and tax deductibility systems, and government systems to support residents in crises (e.g. unemployment, health care) (see Charney (1993)). Charney's literature survey covers three sets of central government policies (defence spending; direct migration incentives; and

climate and amenities to ensure that such issues are of little importance in determining inter-regional migration.

[59] However, it is noted that such permanent differences may represent more than just amenities. They may reflect differences in the regions' overall intrinsic attractiveness, their labour force characteristics, and availability and cost of transport.

[60] See Mátyás (1997) and Eggers (2000) for a further discussion of the appropriate use of fixed and random effect models in this context.

[61] The literature on government's role in industrial location has been reviewed by Bartik (1991).

intergovernmental transfers and/or equalising grants) and four sets of state or local government policies (welfare; unemployment insurance; education; and taxes, government services and local fiscal structures).

Up to here, we have been discussing the ways researchers control for differences across regions. We shall next look at how researchers deal with differences across individuals.

Dealing with differences across people

As mentioned previously, no two individuals are exactly the same. Thus, even if average labour market conditions are the same across areas, one may still expect to observe migration flows. For example, if young people are more mobile and more responsive to labour market changes than older ones, then one would expect that an area with a larger representation of young people will experience more migration flows than another area that comprise of only old people, in response to the same labour market shock. This example is merely an illustration that even having controlled for regional differences, we still need to control for differences in individuals. How have different studies controlled for the heterogeneity? There are two forms of heterogeneity across individuals – the composition effects, and selection effects. Each is explained below.

Controlling for composition effects

What we call composition effects are basically differences in characteristics of individuals in our sample of study. There are two ways of controlling for composition effects – they differ essentially in the type of data used. The first way is to use area data to represent the demographic characteristics of the populations or migration streams, such as the average age or average education level of the origin population. The use of such aggregate data was predominant in most of the early gravity-type studies. In fact, prior to 1975, almost all migration research was based on aggregate data (Greenwood (1997)). However, such aggregate data may conceal differences in the underlying determinants of migration of various population subgroups[62]. For example, quality of life aspects may be more important to some (e.g. retirement migrants) than to others (e.g. working age migrants) and thus, the researcher needs to consider the potential migrants' socio-economic characteristics that may affect the perceived gain in the present value of lifetime utility resulting from a move.

The second way to control for composition effects is to use individual record data (also known as unit record data or microdata). Such data allow the researcher to focus on the characteristics of *individuals*, rather than characteristics of *areas*, that influence migration behaviour. Therefore, the limitation of using aggregate data as mentioned above would no longer be a matter of concern. Studies that use microdata include for example Enchautegui (1997) and Day (1992).

However, aggregate data are still frequently studied for a few reasons. Firstly, for many countries, such data are all that is available. Secondly, aggregate trends and tendencies are of interest in their own right. Much can still be learned from studying aggregate data. Recent studies employing aggregate data include Juarez (2000), Maré and Timmins (2000) and Kerr, Maré et al. (2001).

[62] A discussion of the limitations of using aggregate data for studying the determinants of migration is provided in Greenwood (1997) and the references cited therein.

Regardless of the type of data used, researchers basically add covariates to estimating the equation, to control for the composition effects. The equation can be a gravity equation, or any other equation. For example, one may well estimate limited dependent variable methods such as the logit and probit models. [63] However, such limited dependent variable methods are more suited to microdata.

An example of a migration study that used a logit model is Herzog, Schlottmann et al. (1986). The authors used a logit model to compare the migration decisions of a subsample of US high tech workers with those of lower grade workers. The results indicate that high tech workers were more mobile overall, and their decision to migrate was sensitive to age, children and transportation access.

Meanwhile, an example of a study that models the migration decision using a probit model is Enchautegui (1997). She investigates the effects of welfare payments, wages and employment on women's probability of inter-state migration in the US. The study employs micro-level data from the census.

In real life, when making a migration decision, one can choose from a range of regions to move to. The logit and probit models discussed above allow for only two choices, but this can be extended to a multinomial logit model. The multinomial logit model has several attractive features that make it particularly useful for analysing inter-regional migration rates (as cited from Day (1992)). Firstly, the multinomial logit model is appropriate for modelling multiple (i.e. more than two) discrete choices, as opposed to the standard dichotomous choice models (which allows for only two choices). Secondly, it is consistent with the utility-maximisation framework. Thirdly, it allows the migration rate from region *i* to *j* to be influenced not only by the characteristics of regions *i* and *j* but also by the characteristics of other possible destinations.

An example of the application of this multiple choice model is Day (1992) who developed a multinomial logit model of migration that allows individuals to choose to live in the province where their utility would be highest. Meanwhile, Böheim and Taylor (2000) model the decision to move within three frameworks. The first uses a random-effects panel probit model, modelling the decision to move (i.e. a dichotomous choice model) as a function of employment status. The second models the decision to move house and to find or change a job jointly using a bivariate probit estimation. The third is a multinomial logit model for local moves (within a local authority district), intra-regional moves (between local authority districts but within a region), and inter-regional moves (between the regions). One advantage of the last approach is that it is appropriate if the determinants of local, intra-regional and inter-regional moves are different.

Controlling for selectivity effects

Although adding covariates to the equation can help take into account *individuals'* characteristics (i.e. composition effects), there is still the selectivity bias problem[64]. This problem arises in the following way[65]. The migration decision in fact separates the population into those who expect to gain by moving, and those who expect to gain by staying. In other words, those who choose to move naturally should have better

[63] For a discussion on logit and probit models, see Greene (1990), Gujarati (1995) and other standard econometric textbooks.

[64] The selectivity bias problem is in fact yet another criticism against the use of aggregate data.

[65] Sample selection problems can arise in migration studies for various reasons. Greenwood (1997) discusses four sources that are most likely to cause these problems, the last of which is the most typical and is discussed in our text.

prospects in the destination area compared to those who chose not to move. Otherwise, the latter would have moved as well. The problem is that average attributes ignore migrants' selection process, giving rise to a "selectivity bias". In a reduced form migration equation, we can only observe the earnings of the immigrant at his or her point of residence. This level of earnings is then compared to his or her unobserved earnings at the previous location (the origin). It is usually assumed that the latter can be inferred by relating his or her characteristics to the characteristics and earnings of those currently found at the other location (the origin). Therefore, to the extent that migrants' and non-migrants' earnings are affected by this selection process (apart from the effect of observed characteristics), the comparison of earnings related to migration is biased (Mazumdar (1987)). In other words, one might (wrongly) find more gains (for example, in wages) to migration than there actually are.

One might ask whether there is in fact any empirical evidence of such a selectivity bias, or is this merely a theoretical concept? There are studies that have been done to address this question. For example, Borjas, Bronars and Trejo (1992) use longitudinal data to test whether regions that pay higher returns to skills attract more skilled workers than regions that pay lower returns. Their empirical results indicate that inter-state differences in the returns to skills are a major determinant of both the size and skill composition of internal migration flows. Individuals whose skills are most mismatched with the reward structure offered by their current state of residence are the ones most likely to migrate out of the state, and these individuals tend to move to states that offer higher rewards for their particular skills. Therefore, there is in fact evidence of selectivity bias. Evidence of selectivity bias can also be found elsewhere, for example in Canada (see Greenwood (1997)).

The selectivity bias problem mentioned above is a more serious concern when one has only aggregate data. In order to control for selectivity bias, one necessarily requires unit record data. However, it is worth noting that using microdata in itself does not necessarily absolve one from the selectivity bias problem. There can still be some unobservable factors, and thus, one still needs to use particular techniques to control for potential selectivity bias.

The effects of the selectivity bias are similar to those caused by omitted variables. Controlling for these omitted variables yields consistent estimates. What are the different ways researchers can utilise the unit record data to address the selectivity bias problems?

A number of econometric procedures are available to control for such selection bias problems (see Maddala (1983), as cited from Greenwood (1997)). One way is to follow the two-stage estimation procedure originally proposed by Heckman (1979)[66]. This procedure basically recasts the migration model as a selection model to take full advantage of all the information contained in the data set. In particular, it corrects for the fact that we are dealing with a sub-sample of data points, which are not randomly selected from the total population. Yet another way is to use a switching regression model with endogenous switching (see for example, Nakosteen and Zimmer (1980, 1982), as cited from Greenwood (1997)).

Life histories – insights from longitudinal studies

In addition to controlling for composition and selectivity effects, a number of life-cycle considerations (i.e. intertemporal effects) are potentially important in an individual's or a

[66] A discussion of this two-step estimation procedure can be found in Goetz (1999).

family's decision to migrate. A migration decision is likely to be made in conjunction with other events that amount to important transitions in the personal histories of individuals/families, such as marriage or divorce, birth and ageing of children, graduation from school, episodes of unemployment and finding new jobs, entering the workforce and retirement. In order to examine life-cycle effects on migration (i.e. to take into account the interdependencies between migration events and the other events mentioned above), one needs to have event history data or longitudinal data (which tracks the same individuals or families over time).

There are several advantages of using longitudinal data, as discussed in Greenwood (1997) and Odland (1997). One advantage is that this type of data allows the development of an event history for an individual or family. In other words, migration is treated not as a one-off or discrete event of the kind captured by the census data, but rather as part of a dynamic process. Another advantage is that one can distinguish between a personal status and a transition event. For example, while migration rates may differ between married and unmarried persons (i.e. a personal status), migration may also be associated with the marriage event itself (i.e. the transition from "unmarried" to "married")[67]. The same argument applies to other dimensions of interest, for instance, in relation to the status of employment, and entry into a new job. Without longitudinal data, it is not possible to allow for the interdependencies between migration and such events.

A recent example is by Böheim and Taylor (2000) who used longitudinal data from 1991 to 1997 from the British Household Panel Survey (BHPS) to examine the relationships between labour market dynamics and residential mobility. Such longitudinal data allow the authors to study the sequence of household moves and individual labour market status changes. They provide important information on the events associated with each change. Meanwhile, Antolin and Bover (1997) used pooled cross-sectional microdata (i.e. "synthetic" longitudinal data) to test the importance of family characteristics, personal factors, the personal employment situation, and regional economic variables for the migration decision in Spain.

Although longitudinal data have the advantages mentioned above, they typically provide less information about the locational context of migration than cross-sectional samples. The problem is sample size (see Odland (1997)). Cross-sectional data (e.g. census data) usually provide very large samples that are appropriate for examining differences in migration behaviour that are associated with the contexts of different localities. Furthermore, in many countries including New Zealand, cross-sectional data remains the main source of migration data.

Controlling for other forms of adjustments

Up to here, we have looked at studies trying to explain migration, controlling for a range of "nuisance variation" associated with differences across regions and across individuals, in order to highlight the labour market story. However, as pointed out in Section 2.1, when a region experiences a shock, the adjustments can occur not only in the labour market. The region can also adjust via, for example, the housing market and commuting patterns.

A good example to focus on here is the housing market. There are at least two reasons for accounting for the housing market when we look at migration. Firstly, relative house prices form a large portion of an individual's cost of living, and thus are

[67] See the study by Mulder and Wagner (1993), as cited from Odland (1997).

important for migration decisions. Secondly, numerous studies have highlighted the connection between housing tenure and migration. For example, Hughes and McCormick (1987) find that other things being equal, council tenants experience much greater difficulty than owner-occupiers in actually fulfilling their migration intentions (as cited from Johnes and Hyclak (1994)). This relationship is not only being borne out by specific countries. Oswald (1999) finds a positive relationship across countries between levels of home ownership and unemployment rates, suggesting that the fixed costs of home ownership discourage migration. Other studies that have examined the link between migration and the housing market include Cameron and Muellbauer (1998), Böheim and Taylor (2000) and Johnes and Hyclak (1994).

Commuting is often an alternative to migration. Cameron and Muellbauer (1998) argue that labour market conditions should influence commuting rates in the same direction as migration rates. However, the effect of relative house prices on commuting should operate in the opposite direction on migration. In other words, commuting is a way of overcoming housing market impediments. Therefore, Cameron and Muellbauer (1998) model regional commuting and migration choices in a common framework.

Since these other forms of adjustments have either a direct or indirect effect on migration, it may be worthwhile modelling them in some way. There are at least three general approaches to doing this. The first approach is to basically add covariates representing them in the single-equation migration model. For example, one can add the relative house prices variable, or the proportion of homeowners in a region, in the migration equation.

A second and more elaborate approach is to use a multi-equation system or simultaneous equation models. This approach recognises that many variables are changing simultaneously, and thus one needs to reflect the simultaneous determination of a range of variables and the feedback and interaction amongst them.

Earlier simultaneous equation models were developed during the 1970s to explain the determinants and consequences of migration (see for example Muth (1971) and Greenwood (1975b), as cited from Greenwood (1997)). Another example is the study by Gordon and Lamont (1982, as cited from Crampton (1999)) who used an 11-equation simultaneous model, which has as endogenous variables the following: in-migration and out-migration under three separate streams, net commuting, employment growth, unemployment, house building and owner-occupied house prices. An overview of these approaches is provided in Mueller (1982, as cited from Greenwood (1997)). However, there has been relatively little further development in this area during the past one-and-a-half decades (Greenwood (1997)).

A study worth mentioning here is by Fry, Fry et al. (1999), who used data from 1982 to 1996 to estimate a structural econometric model of inter-regional migration in Australia. The net migration equation itself is quite straightforward. The explanatory variables include lagged migration, time trends, real wage differentials, unemployment rate differentials, and housing price level differentials. The migration equation is, however, embedded in a fuller model of the economy, which allows the authors to compare model predictions allowing for a migration response with predictions excluding that response.

A third approach is to use a case study approach on known shocks, such as the closure of the Patea Freezings works in 1982 and the state-sector restructuring

Reefton in the late 1980s[68]. For example, Patea, which is a small town situated in Taranaki, lost its only substantial industry when the Patea Freezing works closed in September 1982. A total of 720 people were employed by the works, of which 348 were residents of Patea. When a small town loses its only substantial industry, the effects of that loss can be far-reaching. A few reports were produced to monitor and examine the impact of the closure upon the Patea community, in terms of numbers likely to leave, their characteristics, and the effect on business, sports, community, cultural and other organisations, and on health and educational, and religious services in the town. These reports include a review report by John Martin dated 15 December 1984, and two interim monitoring reports dated 4 October 1982 and 17 January 1983, which are attached as appendices to the 1984 report (see Martin (1984)). Although these reports have slightly different estimates (due to the timing difference), the main conclusions are essentially the same.

For those cases, the researcher can focus on how the shock affects not only the labour market, but also the housing market, the education sector (e.g. teachers leaving), and the transport market, just to name a few. One may well find that for particular subgroups, there are certain barriers to migration occurring, such as the inability to sell their property, or being tied to their "homeland".

There are tradeoffs between the different approaches. While a multi-equation approach allows the researcher to take into account the various interdependencies and feedbacks amongst a set of variables, it often requires that the individual equations in the model to have relatively simpler specifications and fewer regressor variables, compared to when we use a single equation model only. For example, in Johnes and Hyclak (1994)'s four-equation model (wage inflation, unemployment rate, net migration and house price inflation), the net migration equation only included the wage level and house prices of both transmitting and receiving regions. This is relatively parsimonious compared to Poot's (1995) migration model, which had up to 18 regressor variables. Meanwhile, a case study approach allows one to look at cases with a known (or easily identified) shock and trace through the impact of that shock. However, the results from that case may not be generalisable.

In summary, because regions and individuals exhibit different characteristics, studies have to control for a whole lot of things before they are able to confidently say something about the labour market story. However, most people would agree that it is not possible to perfectly control for everything. Another approach to uncover the labour market story, which arguably has fewer things to control for (i.e. fewer "nuisance variation"), is to ask migrants directly what motivates their migration decisions. This is the topic of our next subsection.

4.2.2 As revealed by people when asked about the connection

Studies that have tried to detect the labour market story by asking people directly usually ask about people's intentions. Some of them focus on people who moved and ask for factors that have led them to make their migration decision. Meanwhile, other studies include in their sample also those who had not moved. The researcher might also pose some "speculative" questions to these people who had not moved. The questions posed basically attempt to reveal people's judgements and decision-making process. For example, the respondent may be asked whether he or she would have moved if he or she were given an additional supplement (e.g. $1000)?

[68] See Le Heron and Pawson (1996) and Peck (1985) for other ideas of possible case studies.

An example of a questionnaire that allows such a direct approach is the output from the internal migration component of the US Current Population Survey. This type of data allows researchers to analyse the determinants of internal migration in a way previously impossible. Examples of studies that have examined the reasons for geographical mobility based on survey-based questionnaires include Lansing and Mueller (1967) and Bartel (1979) (as cited from Greenwood, Mueser et al. (1991)).

Bartel (1979) examined the role that job mobility plays in the migration decision. She used three data sets that encompass different age groups to demonstrate the importance of the relationship between job mobility and migration at different points in the life cycle. The data sets are the National Longitudinal Survey (NLS) of Young Men, NLS of Mature Men, and the Coleman-Rossi Retrospective Life History Study. The NLS of Mature Men, for example, provides information on whether a move was undertaken for economic reasons or personal (for instance, family, health) reasons.

A more recent example is Böheim and Taylor (2000) who used data from 1991 to 1997 from the British Household Panel Survey (BHPS) to investigate the reasons for moving house and the extent and determinants of house moves. The BHPS is a nationally representative sample of some 5500 households recruited in 1991, containing approximately 10000 persons. These same individuals are interviewed each successive year (i.e. longitudinal data). The questionnaire collects information about income, labour market status, household composition and consumption, education and health at each interview, as well as information on employment changes that have occurred within the period between interviews. Respondents are also asked about their intentions to move house and reasons for that[69]. Panel data such as these are really suitable for the study of migration, because they provide detailed information on individuals and households *before* and *after* any move.

In the New Zealand context, such survey-based data are scarce. An early study that attempted to assess the motivations for moving at the individual level is Barrington and Davey (1980). However, this study focused on international out-migrants only. It is worth noting that Statistics New Zealand is currently considering the idea of having a survey explicitly for investigating the reasons for moving, both internally within New Zealand and overseas (as discussed in section 1.2.2.3). One possibility is to append a set of questions to an existing survey to collect the necessary data[70]. If this eventuates in the future, then researchers can take advantage of the methodological and theoretical work already done in the US context. Such data would enable researchers to examine what motivates migration decisions (i.e. this key question), as well as the characteristics of movers and the non-mobile population (i.e. the third key question). However, even if this project eventuates, the data would not be available in the near future. Therefore, it is likely that the first approach (i.e. inferring motivations from actual mobility patterns) is going to prevail for a while.

Another paper in New Zealand that attempts to uncover individuals' motivations to move is by Heenan (1999). This paper uses autobiographical details of residential mobility for a small sample of New Zealand male career professionals collected in 1981. Classified by cohort and employment sector, the information is used to examine

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[69] The residential mobility questions asked at each annual interview are "If you could choose, would you stay here in your present home or would you prefer to move somewhere else?", "What is the main reason why you would prefer to move?", and "Can I just check, have you yourself lived in this (house/flat) for more than a year, that is before September 1st, 199{0,1,2,3,4,5,6}?" (as cited from Böheim and Taylor (2000, p. 12))

[70] The contact person at Statistics New Zealand for this proposed project is Mansoor Khawaja (email: Mansoor_Khawaja@stats.govt.nz).

migration in the context of personal career development. Aspects explored include age of entry to the workforce, frequency of movement, migration and career promotion, and the spatial structure of migration. Apart from date of birth and career related details, the questionnaire did not explicitly request information on life-cycle events and related matters. Therefore, this paper focuses on a narrow segment of longitudinal or life history mobility in New Zealand.

However, as is true for everything else, there are pros and cons. One criticism against this approach is that people may not have conceptualised their motives or find the questions difficult to articulate. Also, researchers have to rely on people's *reported* reasons for migration. Another criticism is that the sample size is often much smaller than census data (for example, there were only 33 usable responses in the autobiographical study by Heenan (1999)). Nevertheless, it does give us directly a potentially useful perspective on migration motives.

4.3 Findings

This subsection summarises some of the evidence in relation to the first key question under two headings. The first looks at the evidence from studies employing the indirect way of inferring the labour market story. The second covers the findings from studies using the direct approach to determine specific motivations of individual migrants.

4.3.1 As revealed by actual mobility patterns

We begin by providing a picture of whether the labour market story is borne out using descriptive techniques, for OECD countries and New Zealand. We then discuss some of the findings when researchers control for the "nuisance variation" as discussed in the previous subsections. The question is whether the basic relationship (i.e. labour market story) changes when these additional controls are made.

Table 4.1 below provides an international comparison of the relationship (correlation) between net in-migration flows and unemployment rates. In almost all the countries[71], the sign of the relationship is of the expected sign (negative), and of these, the correlation coefficient is statistically significant. The evidence generally implies that low-unemployment regions will experience a net inflow of people from regions with higher unemployment, hence supporting the existence of a labour market story.

Table 4.1 Correlation between net migration flows and unemployment by region, for OECD countries

	Regional level	Number of regions	Period	Net migration [a]
Belgium	2	11	1993-1995	-0.36**
Canada	2	59	1996	-0.38***
Czech Republic [b]	2	8	1998	0.04
Finland	2	5	1996	-0.89**
Germany	1	16	1992-1993	-0.62***
Hungary	2	7	1998	-0.82**
Italy	2	20	1985-1995	-0.61***
Japan	1	14	1992, 1997	-0.13
Netherlands	2	12	1989-1996	-0.09
New Zealand	2	12	1996	-0.28
Portugal	2	7	1987-1992	0.41
Spain	2	17	1984-1994	-0.09
Sweden	2	8	1996	-0.61*
United States	1	51	1990	-0.23*

*, ** and *** mean statistically significant at the 10%, 5% and 1% levels respectively.

a) Net migration flows for each region are calculated as inflows minus outflows per 1 000 population. Data for Canada, Hungary, Japan and New Zealand refer to the population aged 15 and over. Regional net migration flows for each year are correlated with the corresponding unemployment rate for the previous year.

b) External migration is included.

Sources. See Table 2.12 for migration data and Annex 2.B for unemployment data.

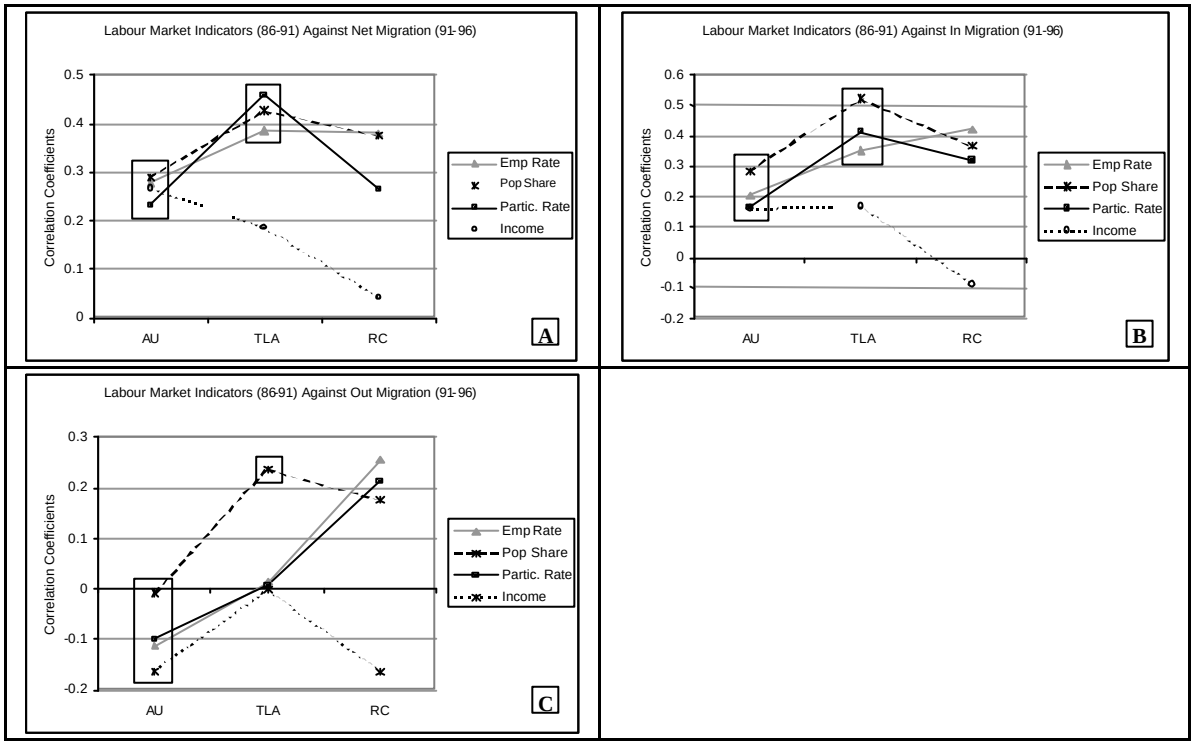
Source: *OECD Employment Outlook* (2000, p.56)

[71] The two exceptions are Czech Republic and Portugal, but the correlation coefficients for these two countries are not statistically significant.

The stylised facts of the labour market story above are in relation to unemployment rates. A logical question to ask is whether this is true for other labour market indicators. The answer is generally yes. For example, Blanchard and Katz (1992) point out that the correlation of state employment growth and net migration rates in the United States is 0.84 for the 1950-1987 period, and 0.91 for the 1970-1987 period. Again, the evidence seems to support the presence of a labour market story.

Now that we know how the labour market story holds up in other countries, one might ask whether this evidence can also be found in the New Zealand context. We have performed some preliminary tests to investigate the presence and significance of a labour market story for migration in New Zealand. A good starting point would be to examine simple correlations between selected labour market indicators and each of three migration flow measures (inflows, outflows and net flows) at different levels of spatial disaggregation, as summarised in Figure 4.2.

Figure 4.2 Correlations of migration flows with labour market indicators



Notes:
The data points enclosed in boxes are significant at 5%
AU = Area Unit, TLA = Territorial Local Authority and RC = Regional Council.

The indicators shown in Figure 4.2 are the employment rate, the participation rate, the share of national population, and per capita income[72]. For each of these indicators, we would expect a positive correlation with net migration and inflows, and a negative correlation with outflows. There are significant positive correlations with net migration and inflow rates at the area unit and TLA levels. The correlation at the regional council level, while positive, is not significant. The expected negative correlation with outflow rates holds only at the area unit level.

[72] The patterns of per capita income differ from the patterns of median income, as noted earlier.

The observed patterns suggest that the link between labour market conditions and net migration is due more to a link with inflow rates than with outflow rates. We speculate that people may leave locations for non-labour market reasons, but their choice of destination is more closely linked to labour market prospects. The exception is that people appear less likely to leave area unit that are doing well. The relationships at regional council level are not significant, suggesting that internal migration may be aiding labour market adjustment more at the sub-regional level.

The descriptive evidence thus seems to confirm that there is a connection between migration and relative labour market conditions, although it is clearly not the only factor driving migration patterns. We turn now to findings from studies that attempt to model the relationship more formally.

Modelling the relationship between migration and labour market conditions

We noted above that the relationship between migration and labour market conditions could be modelled either with aggregate (area level) data or with data on individuals. When we look at the findings in the literature, we find that this difference matters. By and large, studies using aggregate data show less consistent results, especially when testing the link between unemployment and migration. Studies using data on individuals (unit record data) are more likely to confirm the importance of labour market considerations in influencing migration flows. It seems that the relatively better performance of unit record studies is due to the fact that it is possible to incorporate much better controls for factors that can bias aggregate studies.

Most of the studies using aggregate data focus on the characteristics of *places*, and thus fail to detect the traits of *individuals* (such as educational attainment and age), and their influence on the decision to migrate. This often results in insignificant coefficient estimates for their explanatory variables including labour market variables (see Greenwood (1985), as cited in Goetz (1999)).

It is worth summarising first the general results from gravity models, in terms of which variables are usually significant with the correct sign, and which have mixed results. Generally, distance and size come out as important. In many studies, the coefficient of distance is consistently negative, which suggests that on average, people prefer to move short distances if at all (see for example, Day (1992) and Bukenya, Schaeffer and Gebremedhin (1999)). This is found to be true regardless of the proxy used – the forgone wage cost of moving from region *i* to *j*, the cost of transporting oneself and one's belongings from *i* to *j*, or the actual distance variable between *i* and *j*. Evidence of the deterrence effect of distance on migration is also borne out in New Zealand studies (e.g. Poot (1986b) and Maré and Timmins (2000)). Therefore, it is important to include distance when trying to uncover the labour market story.

Focusing on the labour market story, Poot (1986b) finds that labour market variables are indeed important. These variables have the right sign and are significant. In summary, out-migration is a function of the labour force size, real income, employment growth, age composition, average temperature and an opportunity cost index. Meanwhile, in-migration is a function of nominal income, employment growth, population size, and a relative attractiveness index. Poot (1986b) finds that the labour force participation rate and the percentage of individuals over forty years at the origin area act as a "push" force. Meanwhile, the "pull" forces include the real income and employment growth in the destination area. People tend to migrate from low real income to high real income and high job growth regions.

However, as pointed out by Vaithianathan (1995), the direction of causality is unclear for these economic factors. Employment growth may as easily be caused by migration. The other variables such as the average rainfall, average temperature, and the proportion of non-Europeans in the region were not found to be significant (see Vaithianathan (1995)).

An earlier study by Giles and Hampton (1978) found that there is evidence of a clear interdependence between in-migration and out-migration. Regional income is found to have an influence on in-migration, but not on out-migration, thus acting as a "pull" force only. The authors also found that the closer an area is to Auckland, the greater the rate of in-migration and the lower the rate of out-migration. The population in the South Island also appears to be less mobile (see Vaithianathan (1995)).

In contrast, a more recent paper by Maré and Timmins (2000) finds that the evidence for a labour market influence on migration flows at the regional council level is weak at best. Few of the coefficients are significant, and the pattern of signs is not stable. The labour market variables included are the unemployment rate, the employment rate, and median income. The paper estimates different forms of gravity models applied to data on regional councils in New Zealand. The authors carry out a multivariate analysis of migration-labour market links over the period 1986 to 1996.

The next question is whether inflows are more responsive to labour market variables than outflows, or are they equally responsive? A common finding amongst earlier gross migration models in the US and Canada is that income (and job) opportunities can better explain in-migration than they do of out-migration (Shaw, 1985, as cited from Greenwood, 1997). In other words, there is a paradox that origin economic conditions do not matter (for out-migration) but destination economic conditions do matter (for in-migration). Similarly, a recent study by Shen (1999) also finds a strong "pulling" effect of rapidly growing regions to migrants, but the "pushing" mechanism is not operating effectively in inter-regional migration. However, this paradox has been challenged by several researchers (see Poot (1986b)). One explanation put forth for this apparent paradox is that the use of *population* migration as a proxy for *labour* migration underestimates the sensitivity of workers to economic conditions in the origin (that is, it dilutes the labour market story). Consistent with this view, by focusing on male workers only, Poot (1986b) finds that employment growth is significant in both the in-migration (a "pull" factor) and out-migration (a "push" factor) models.

However, not all labour market variables perform as well. For example, we noted earlier that the relationship between unemployment and migration is the most fragile. Examining estimates of this relationship paints the least flattering picture of what aggregate studies can tell us, but provides a useful illustration of some of the differences between area level and unit record studies.

Empirical studies that have examined the influence of *area* unemployment rates on migration have found mixed evidence. The hypothesis is generally that areas with high unemployment rates should have more out-migration and less in-migration, all else equals. However, some obtained significant coefficients with the anticipated signs, while others found insignificant coefficients and/or unanticipated signs. Several possible explanations have been put forth for this mixed evidence. However, until microdata were available to test these explanations, they remained as speculative hypotheses (Greenwood, 1997).

The importance of microdata is highlighted in the literature review by Herzog, Schlottmann et al. (1993) dealing with the relationship between personal employment status, migration and the likelihood of re-employment. Without microdata, personal characteristics have to be proxied by *mean* characteristics. In general, results from migration studies using aggregate data may not be all that clear. These studies find that labour market variables (commonly entered in levels) end up with insignificant or perverse coefficients, particularly for unemployment. Such findings are not surprising since the aggregate variables may be virtually uncorrelated with the individuals' traits of concern. For example, in a net-migration model, the results showing a negative sign on the regional unemployment differential variable could mean at least two things. First, the regional unemployment differential could be proxying for differences in employment probabilities in the regions. Therefore, people are moving out of the region because there are fewer employment prospects there. Second, unemployed workers are more likely to move out than employed ones. If a region's unemployment rate rises relative to the unemployment rate of other regions, the region's net migration falls.

Not many studies have estimated the relationship at both the individual and area levels, although there are exceptions - Navratil and Doyle (1977) provide a good case for discussion because they estimated both aggregated and disaggregated models. These authors find a significant regional unemployment variable in the aggregate model, but not in model using disaggregated data. Vaithianathan (1995) opines that the reason for observing such results is because in the disaggregated model, where the personal and regional unemployment is separated, the regional unemployment variable becomes insignificant while the personal unemployment status is significant. It is noted that without individual data, it is not possible to separate out these aggregate and individual effects.

Similarly, other studies subsequent to Navratil and Doyle (1977) that employ microdata to look at the impact of personal unemployment on the likelihood of migration mostly find that *personal* unemployment significantly augments migration likelihood (see literature review in Herzog, Schlottmann et al. (1993)). In other words, personal unemployment encourages migration to another labour market. However, this effect varies in magnitude across countries and subgroups of the population by race, gender, occupation, ethnicity, and prior geographic mobility. Besides, the stimulative effect of joblessness on migration falls with search duration (Herzog, Schlottmann et al. (1993)). The evidence generally indicates that labour migration is *micro*-efficient, by responding to *personal* unemployment. The evidence also generally suggests that labour migration is *macro*-efficient, since higher *area* unemployment rates induce labour out-migration.

Some researchers such as Antolin and Bover (1997) have gone further by distinguishing between persons that are registered as unemployed at the Official Employment Office in Spain, and the unregistered unemployed. The reason for this distinction is that registration not only has a direct negative effect on the probability of migration, but it also alters the effect of regional unemployment. This implies that a higher than average unemployment in the individual's region will only have a positive effect on the probability of migration if the person is a non-registered unemployed, but will have an important negative effect if the person is registered. In short, migration from a high unemployment area to a low unemployment area is valid only for the non-registered unemployed, at least in Spain.

Meanwhile, Juarez (2000) who used gross migration models, concludes that a high unemployment rate in a region tends to increase out-migration because unemployed

people search more actively than the employed. However, this is qualified in a sense that for unemployment rates greater than a certain threshold, there is a relative reduction of this effect. A high unemployment rate in a region also tends to discourage in-migration, but without the same qualification.

Gallin (1999) argues that some authors have found weak or contradictory evidence for the relationship between unemployment and migration, because they ignore the role of expected future labour market conditions (an omitted variable bias) (see for example, Greenwood, 1969; Fields, 1979; and Pissarides and McMaster, 1990; as cited from Gallin (1999)). By controlling for future conditions, Gallin (1999) finds significantly different results. For example, in a model without unemployment, the strength of the relationship between current wages and net migration is less than half as large. On the other hand, in a model with unemployment, the effect of current wages is larger and the effect of current unemployment is smaller.

The key message from the evidence thus far is that there is a labour market story. But it is not the only story. As discussed earlier, there is "nuisance variation" that may distort the labour market story. One could end up finding no evidence of a labour market story when there is in fact one, or over-estimating the relationship between migration and labour market when there is none or a weak one only. That is why we need to control for the "nuisance variation". The question of how much the "nuisance variation" actually biases the labour market story is an empirical one. The findings from studies that have tried to control for these sources of "nuisance variation" (that is, differences across regions and across individuals) are discussed next.

Dealing with differences across regions

This subsection summarises the evidence from studies that have controlled for non labour market differences across regions. We then ask whether these controls do in fact matter. However, this is not asking whether the controls (for instance, for amenities) influence migration, but whether the controls alter the estimates of the labour market story. Unfortunately, this question is difficult to answer since most studies that incorporate such controls do not have the labour market story as their primary focus. For example, while Day (1992) finds, amongst other things, that individuals are less likely to move to a province where the chance of being unemployed is higher, *ceteris paribus*, the primary focus of her paper is whether government policies affect provincial migration. Therefore, the robustness of the labour market story according to the model chosen (aggregate gravity model versus logit versus probit versus multinomial logit) cannot be directly commented upon.

Controlling for amenities

Studies that control for amenities are primarily interested in the impact of amenities on migration. However, the question we would really like to answer is whether controlling for amenities changes the labour market story. Ideally, we would like to have examples of studies that begin with labour market variables alone, and gradually expand the explanatory variables to include amenities. This way, we can work out how controlling for amenities affects the labour market story. Unfortunately, most of the studies do not look at the effect of labour market variables *with* and *without* amenities. Instead, their primary focus is on amenities. For example, an early study of the influence of location-specific amenities on migration by Graves (1979) demonstrates that when income levels and unemployment rates are accounted for, climatological amenity variables are

important in explaining age- and race-specific net migration during the 1960s (as cited from Greenwood (1997)). Therefore, it is difficult to infer about the impact that the inclusion of amenities has on the labour market story.

Nevertheless, it is still worth examining the stock of evidence with respect to the significance of amenities, as covered in the next few paragraphs. In general, studies find that amenities are important.

Numerous studies have been published on the implicit valuation of amenities (see references in Goetz (1999) and Greenwood (1997)). As an illustration, Clark and Knapp (1995) find that professors at all ranks attach a value to the amenity of sunshine and the dis-amenity of violent crime. Meanwhile, Day (1992) finds that other things being equal, most people prefer warm climates to cold ones.

However, many studies find less support for the amenities hypothesis. Greenwood and Hunt (1989) re-examined Graves' amenity hypotheses and findings, and found that employment opportunities are far more important in explaining metropolitan migration compared to location-specific amenities (as cited from Greenwood (1997)). For a more recent study, see Clark and Knapp (1995) (as cited in Goetz (1999)).

A relationship has been found between amenities and labour market variables (e.g. Elhorst (2000)) and separately between amenities and migration flows (Goetz, Ready and Stone (1996) as cited from Goetz (1999)). Although we cannot infer from these facts whether and how the exclusion of amenities bias our estimates of the relationship between labour market variables and migration (i.e. the labour market story), it would be prudent at least to test for any such bias by including amenities measures in migration models.

In summary, amenities are generally important in influencing migration. Although we do not know for sure whether, and the extent to which, they change the labour market story, the evidence nevertheless serves to prompt researchers to control for them.

Cost of living differences

The evidence of the significance of the cost of living component has been quite mixed. For example, Juarez (2000) finds that the coefficient on relative prices (origin relative to destination) in the migration equation is statistically significant and has a positive sign. This suggests that other things equal, migration flows are from regions with high prices to those with lower prices. In contrast, Antolin and Bover (1997) finds that cost-of-living differentials as measured from the Consumer Price Index are not significant, but house price differentials are significant with the expected sign. They conclude that people in regions with higher-than-average house prices have a higher probability of moving. Meanwhile, when Bukenya, Schaeffer et al. (1999) included housing rent in the migration equation to proxy for the role of living expenses, they found that the variable exhibits a statistically significant positive effect at origin, but not the expected negative effect at destination. They conclude that these results do not show any effect of living expenses on migration.

Public policy effects

Based on the literature survey by Charney (1993), the evidence in general suggests that some public policies have a positive impact on migration (as well as income and employment), some have a negative impact, while some others have shown mixed results. For example, education tends to attract migrants and in some studies diminish

out-migration, while taxes are found to be a location disincentive. Meanwhile, generous welfare benefits tend to attract subgroups of population who are more likely to be welfare recipients but are disincentives to others[73]. Similarly, national policies designed to influence patterns of migration (e.g. in Sweden) have shown mixed results.

Day (1992) provide evidence that inter-regional migration flows are influenced by tax and government expenditure policies. She separately considers health, education, and social services policies, and finds evidence that at least health and education expenditures serve to attract migrants. Again, however, although these are things that matter for migration, we do not know whether or how much their omission would bias labour market estimates.

Case studies results

We mentioned earlier that the case study approach is particularly useful when a shock can be identified, and one can trace through the impacts of the shock. The crucial question for us is whether the case study approach gives us additional insights, and whether it reinforces or refutes the labour market story. We present the results from a case study on Patea. The findings, estimates and quotations on Patea cited hereon have been drawn mainly from the two monitoring reports (included as appendices in Martin (1984)), and serve as illustrations.

Prior to the closure of the freezing works in September 1982, the Town and Country Planning Division of the Ministry of Works and Development published a report (entitled *Patea After the Freezing Works*) in August 1982 that attempted to assess the social and economic impact of the forthcoming closure. The report estimated that after the closure, about 210 people were likely to move out of Patea. However, as it turned out, only about 80 people left Patea permanently because of the closure.

A few reasons were put forth for the reluctance (or inability) of workers to move – "*the lack of jobs for unskilled workers elsewhere in New Zealand; the difficulty in selling property; the importance to the Maori of their turangawaewae; and the hope that future jobs will be provided in Patea.*" Some of these barriers to migration occurring (i.e. barriers to regional labour market adjustment) have been discussed earlier – housing, lack of skills and Maori links to their iwi area. It is worth elaborating on the lack of mobility of unskilled workers. Those who had already moved out of Patea as early as October 1982 (i.e. those who were more mobile) were mainly skilled tradesmen and skilled workers. Almost all the tradesmen were immediately absorbed by Taranaki Energy projects. Most of the meat inspectors also moved to other freezing works. The unskilled workers were the ones remaining in Patea and looking for other work in the area. The observation that the unskilled workers were finding it difficult to move (i.e. less mobile group) is consistent with the findings in other studies employing other approaches (see for example, Mauro and Spilimbergo (1998)).

Not only were the out-migration figures smaller than predicted, the direction of migration was not unidirectional. There were a few families moving into Patea after the closure. "*The majority of these people have retired and are attracted to Patea by its inexpensive house prices (compared to metropolitan areas) and its pleasant life style.*" This confirms findings from other approaches that the labour market story is not the only story, and that some people move out of their areas for a range of reasons such as housing, amenities, and life style reasons.

[73] See Enchautegui (1997) for a more recent study that investigates the effects of welfare payments on women's probability of inter-state migration.

Dealing with differences across people

Controlling for composition effects

As will be discussed in more detail in Chapter 6, researchers generally find that there are differences in migration propensities and patterns related to demographic characteristics. Our focus here is on how controlling for these differences changes our estimates of the relationship between migration and labour market conditions.

Analysis of the impact of personal characteristics using aggregate data are often found to lack significance and/or have unanticipated signs. Such findings are not surprising since aggregate variables may be virtually unrelated with the characteristics of migrants (Greenwood (1997)). In other words, the aggregation process camouflages some of the personal characteristics that are important determinants of an individual's migration decision while it had only a marginal effect on the labour market characteristics of an area. Many migration studies report a lack of significance of area economic variables, particularly unemployment, in explaining migration.

The impact on estimates of the role of labour market variables of controlling for composition (in aggregate studies) or individual characteristics (in individual studies) varies across studies. Our general impression from the literature is that adding these controls more commonly strengthens the estimated role of labour market variables, which is consistent with the view that their omission leads to biases in the estimated labour market effect.

Controlling for other forms of adjustment

As outlined in our theory discussion earlier, migration is not the only avenue through which regional labour market adjustment can occur. Some researchers explicitly control for other forms of adjustment, to ensure that estimates of the response to labour market changes is not biased due to omission of these related variables. For instance, Johnes and Hyclak (1994) looked at the Southeast region of the UK, and found that house prices do indeed play an important role in short run regional labour market adjustment, by exerting a strong influence on the movement of labour.

In general, explicit treatment of other forms of adjustment (e.g. housing, commuting, etc) in multi-equation studies generally yield significant results, but more importantly, they do not usually overturn the basic labour market results.

An example is the study by Fry, Fry et al. (1999), who used data from 1982 to 1996 to estimate a structural econometric model of inter-regional migration in Australia. The net migration equation itself is quite straightforward. For each of the five larger states[74], the economic variables perform quite well. Each of the economic variables have correct signs and are significant (i.e. migration helps regional labour market adjustment). For example, as unemployment in a state rises relative to the rest of Australia, the probability of finding a job in that state (relative to rest of Australia) would fall. As a result, net migration into that state would decline. Similarly, as house prices rise in a state relative to the rest of Australia, net in-migration to that state is expected to fall. However, the labour market story is less clear for the smaller states[75], possibly because of their small size relative to the rest of the country (see Fry, Fry et al. (1999)).

[74] These five states are New South Wales, Victoria, Queensland, South Australia and Western Australia.
[75] These smaller states are Tasmania, Northern Territory and Australian Capital Territory.

4.3.2 As revealed by people when asked about the connection

Survey-based questionnaires that have examined the reasons for geographic mobility, such as Lansing and Mueller (1967) and Bartel (1979), indicate that economic reasons are very important (as cited from Greenwood, Mueser et al. (1991)).

Bartel (1979) finds that 76 percent of the young men (aged between 19 and 29 at the start of the period) who migrated and experienced a job separation (either quits or layoffs) indicated that they moved because of economic reasons. The corresponding figure for the mature men group (aged between 45 and 59 at the start of the period) is 52 percent.

Studies that use survey data also provide some insights on the individual characteristics that influence migration decisions. For example, as noted by Charney (1993), these studies show that education of the migrant is appropriately viewed as human capital investment following Sjaastad (1962). Bartel (1979) finds that the education level of the migrant is a positive and significant determinant of migration.

A more recent example is Böheim and Taylor (2000) who used data from 1991 to 1997 from the British Household Panel Survey (BHPS) to investigate the reasons for moving house and the extent and determinants of house moves. A few observations are highlighted here, using both descriptive techniques such as cross-tabulations, and formal modelling techniques such as the probit and multinomial logit models. The descriptive techniques find that although job related reasons are not dominant reasons for wanting to move, those wishing to move for job related reasons are more likely to subsequently move than those wishing to move for any other reason. The formal techniques confirm this observation that a desire to move motivated by employment reasons has a quantitatively large and positive effect on the probability of moving house. A second observation from the descriptive techniques is that those in rented accommodation, particularly private rented ones, are most likely to move. This result in later confirmed by the formal modelling techniques. A third observation is that the unemployed are most likely to want to move, and are also more likely to actually move, compared with the self-employed and employees. Two-thirds of movers, however, are employees. Formal modelling techniques reach a similar conclusion that the unemployed have a higher probability of moving than employees. However, the probability of moving falls with unemployment duration (i.e. long spells of unemployment hinder mobility). The authors also find that the unemployed are more likely to move across regions, again indicating that the unemployed are not immobile; regional moves can be thought of as a response to personal unemployment (again, this declines with duration). A fourth observation is that the probability of moving declines with the length of time spent at the current address. The shorter the duration in a locality, the less an individual has invested in and becomes attached to that locality. For each additional year spent at an address, the probability of moving house falls by 0.3 percent. It is worth noting that in this study, the descriptive and formal modelling techniques provide similar conclusions on the motivations and determinants of migration.

As mentioned earlier, such survey-based data are rather scarce in the New Zealand context. The two studies that we are aware of are highlighted here. The first is an early study that has attempted to assess the motivations for moving at the individual level is Barrington and Davey (1980). Although the study focused on international out-migrants, it is still worth highlighting the sort of evidence uncovered. The reason most frequently mentioned for leaving was the opportunity of a working holiday (32

percent)[76]. The next most important reasons were the desire for a change or change of lifestyle (27 percent), work or career opportunities (26 percent), family situation overseas (23 percent), and wages (16 percent). There were a few other observations which are hardly surprising, and are consistent with results from the indirect approach. For example, reasons for leaving appear to vary with age. People aged between 20 and 34 years of age cited work opportunities and wages as important reasons for leaving, whereas those aged 60 years and above mentioned family situation and climate reasons.

A more recent and more relevant paper is by Heenan (1999). Bearing in mind the caveat that there is only a very small sample size and covers only male professionals, the author documented some interesting findings. For example, he finds a predominance of multiple moves (return migration, onward migration, etc.) among respondents, which is something that is not picked up by census data. Heenan (1999) also finds that most of the moves within New Zealand were comparatively short. In terms of the labour market story, the author finds a close but by no means exclusive link between migration and job promotion.

In summary, the direct approach also finds evidence supporting the labour market story. In particular, labour market reasons are reported as an important consideration in the moving decision, as well as for actual moves. However, it is also clear that people do move for non-labour market reasons too.

4.4 Concluding Remarks

This chapter poses the question whether internal migration helps regional labour market adjustment or otherwise. In particular, we have covered the sort of evidence researchers look for, the approaches they use (both direct and indirect) and a summary of the empirical findings.

From the stylised facts and empirical results, it is clear that there is indeed a labour market story. In other words, there is an indication that migration is in fact influenced by labour market variables. Although it is non-trivial, the labour market story is not the complete story or not the only story. It is also noted that although the descriptive techniques are often simplistic in nature, their findings are in certain instances, powerful and insightful. In these cases, the more formal studies that have controls for various forms of "nuisance variation" do not overturn the general findings.

Evidence of the labour market story is generally mixed from aggregate studies. These studies find a range of results; in some cases, researchers find insignificant coefficients, and sometimes even the wrong sign, particularly for the unemployment variable. In the latter case, the evidence indicating that migration fails to promote regional labour market adjustment may be due to compensating influences that were not controlled for in earlier studies. That is why most of the more recent studies have included controls such as amenities and costs of living in their models to capture these non-labour market elements, as discussed earlier.

Another reason why some studies obtain correct signs on the coefficients of certain labour market variables while others obtain perverse signs (i.e. unexpected signs) is that they use microdata and longitudinal data, as opposed to aggregate data alone. Studies using microdata and longitudinal data are generally better at pinning down the

[76] Many people in the sample mentioned more than one reason for leaving New Zealand.

labour market story. They tend to find that migration does help regional labour market adjustment in some cases.

Recall that in Chapter 3, we concluded that there is persistence in regional labour market disparities. This chapter has just investigated one possible explanation for such persistence – that is, whether internal migration is not helping regional labour market adjustment. There are of course other reasons why there could be persistence in regional disparities. For example, migration could be playing only a small role, compared to the other regional labour market adjustment mechanisms. This leads us to our next key question.

5 KEY QUESTION 2: HOW IMPORTANT IS MIGRATION AS A REGIONAL LABOUR MARKET ADJUSTMENT MECHANISM?

The first key question as presented in the previous chapter examined whether there is a link between internal migration and regional labour market adjustment. This section looks at the size of this link. The second key question is whether internal migration is a major channel of regional labour market adjustment, compared to changes in labour force, wage level, and employment level/growth. Worker migration plays a substantial role in the local labour market adjustment process in the US. Interstate migration plays quite an important role in Australia as well. However, labour mobility plays a much smaller role in the adjustment of European labour markets to region-specific shocks. Where does New Zealand fit in? We shall discuss in the following subsections, the evidence that researchers seek, the methods and models they use, as well as their findings.

5.1 What?

The word *adjustment* in our key question naturally implies that one has to look at how things *change* or *evolve* or *respond* to some stimulus, over time. Therefore, in order to answer our second key question, researchers look at the co-variation across time in selected labour market or economic variables for chosen spatial units. For instance, is an increase in employment in a region usually followed by a decline in unemployment, a rise in labour force participation, and/or an inflow of migrants? Alternatively, a negative shock to employment can produce a relative wage decline, an increase in joblessness, a decrease in the labour force participation rate, and/or an out-migration of workers. These adjustment mechanisms have been discussed in detail in Section 2.3. Examining how strong the various links are, and what sort of lags are involved allows researchers to compare the relative strength of the various potential adjustment mechanisms.

As mentioned above, one needs to observe some stimulus (or shock) to the system in order to be able to observe an adjustment. The researcher can isolate this stimulus in various ways. However, as apparent in the next subsection, most of the studies that examine this key question estimate the response to a change in employment.

Now that we know the type of evidence researchers look for, the next question is *how* they go about searching for them. The approaches differ according to the length of time series variation that is modelled, the range of variables that are modelled as changing, and how much theoretical structure is imposed. These are discussed in more detail in the following subsection.

5.2 How?

This subsection discusses common approaches that have been used to assess the role of migration as a regional labour market adjustment mechanism. The approaches differ according to the length of time series variation that is modelled, the range of variables that are modelled as changing, and how much theoretical structure is imposed. Approaches that use a short time series include simulations of gravity model, the Markov transition method and the labour market accounts technique. Approaches that utilise longer time series can be divided into those that do not impose a prior structure on the data, and those that do. Those that impose little structure or none at all on the data include Vector Autoregressive (VAR)-type studies and case studies. In contrast, those that do impose some structure, whether it is based on theory or some

other a priori information, are generally called structural models[77]. We will begin with the approaches that use a short time series.

5.2.1 Short-time series approaches

The minimum time variation in order to be able to say anything about an *adjustment*, is one time window (i.e. a snapshot of the world at two points in time). The basic idea is to estimate transition (migration) probabilities as a function of labour market conditions and then possibly simulate. We then compare the base-line results with the simulation outcomes to infer the importance of migration. At least two methods have been used – simulations of gravity models and the Markov modeling approach.

An example of the use of simulation methods applied to a gravity model is provided by Nijkamp and Poot (1987). However, it is noted that simply taking the gravity model and simulating it may not give meaningful results. More care is needed in specifying the form of gravity model if it is going to be used for simulation purposes (see Nijkamp and Poot (1987)).

A Markov or transition matrix contains the probability that an individual will remain in the region for another period and the probabilities that the individual will migrate to each of the other regions in the system. These probabilities are usually based on past rates. According to Rogers (1968, as cited in Isserman, Taylor et al. (1986)), the empirical results of using Markov chains to project future population totals have been disappointing because of "the restrictive assumption of unchanging movement probabilities". Attempts to adjust the transition probabilities (i.e. to use endogenous probabilities) have been shown to lead to greater accuracy (see references cited in Isserman, Taylor et al. (1986))[78].

Another approach that uses a short time span is the labour market accounts technique. The labour market accounts method is basically a decomposition technique, to analyse inter-relationships between changes in labour supply and labour demand. In particular, this technique addresses the question of what the relative contribution of natural change, participation change, and net in-migration are to labour supply changes, and whether job shortfalls are translated into increases in unemployment and/or net out-migration. The analysis can be performed both through time and across space. In some circumstances, it may be worthwhile to focus on certain local areas with similar experiences of change, to allow the main types of experience of labour market change to be identified. An illustration of this technique is provided by Green (1994) and Beatty, Fothergill et al. (1997). Green (1994) examines the role of migration in bringing labour supply and labour demand into balance (or in mitigating balance) in Britain in the 1980s. Meanwhile, Beatty, Fothergill et al. (1997) explores how different coalfields and individual districts adjust to external pressures in the UK coal industry during the 1980s and early 1990s.

Although the approaches above can shed some light on the regional labour market adjustment process, a short time span limits the extent of analysis one can perform. More importantly, these approaches do not explicitly model (i.e. have a simplistic treatment of) the other forms of adjustment, such as changes in the labour force

[77] However, nowadays, there is a lot of emphasis on the "middle way", namely structural VAR models (where theory dictates the restrictions imposed). Two recent examples include Balakrishnan and Michelacci (2001) and Leeves (1999).

[78] The advantages and disadvantages of the Markov modelling approach are discussed in Nijkamp and Poot (1987).

participation rate, and wage levels. Therefore, one cannot say much about the contribution of migration to the *full* adjustment mechanism. This brings us to the next set of approaches that have the luxury of longer time series.

5.2.2 Longer time series approaches

With a longer time series, there is much more information that we can infer from the data about the role of migration. In fact, one is more likely to be able to assess the contribution of migration to the full adjustment mechanism. There are generally two ways that we can exploit the longer time series. The first one does not impose any prior structure on the data set, that is, it allows the data to speak for themselves. Conversely, the second is to take advantage of any a priori information we have, to impose some structure on the relationships amongst the set of variables of interest. This is usually done by incorporating insights from theory. Both have been used in examining the second key question.

Under the first approach, which imposes little prior structure or none at all on the data set, one can focus on the correlations amongst a set of variables (the "system"), introduce a shock to the "system" and then trace the impact of this shock. Using such an approach, the researcher needs to select the appropriate variables to include in the "system". Some researchers have looked at labour market variables alone, and some have used a broader range of variables. We shall cover both in turn.

Using time series correlations (VAR)

As it turns out, the largest strand of the literature examines the second key question by analyzing the correlation amongst a set of labour market variables. A convenient modelling technique in this context is the vector autoregressive or VAR model. The VAR technique models the systematic co-variation amongst the selected set of variables, and uses this to get predicted paths for all of the variables. In other words, this technique examines the joint fluctuations of the selected set of variables over time. This then forms the baseline results. Box 2 provides an illustration of the VAR model, as adopted by Blanchard and Katz (1992), Decressin and Fatas (1995) and Debelle and Vickery (1998)).

Box 2 Illustrative VAR equations

Blanchard and Katz (1992) use three equations involving labour market variables, with lagged values on the right-hand side (except for the second and third equations, where the first variable is allowed to feed through simultaneously into them). The first variable (em) is the natural logarithm of employment in the region as a proportion of total employment. The second variable (ur) compares the region's unemployment rate to the national unemployment rate. It is defined as the logarithm of the ratio of the region's "employment rate" to the national "employment rate" (where the "employment rate" is one minus the unemployment rate). The third variable is the logarithm of the ratio of the region's participation rate to the national participation rate. In each case, the variable is a ratio between the region's and national levels, hence a relative performance of the region (the rationale is discussed in the text).

The exact specification of the VAR would depend on the time series properties of the variables of interest. Without going into too much detail, it is sufficient to say that if a variable is found to be integrated of order one (I(1) or non-stationary), it has to be modelled in first difference, whereas a variable that is integrated of order zero (I(0) or stationary), is modelled in levels.

$$\Delta em_{jt} = \alpha_{1,j} + \sum_{s=1}^{n} \delta_{1,s} \Delta em_{t-s} + \sum_{s=1}^{n} \delta_{1,s} \Delta ur_{t-s} + \sum_{s=1}^{n} \delta_{1,s} \Delta pr_{t-s} + \varepsilon_{1jt}$$

$$ur_{jt} = \alpha_{2,j} + \sum_{s=0}^{n} \delta_{2,s} \Delta em_{t-s} + \sum_{s=1}^{n} \delta_{2,s} \Delta ur_{t-s} + \sum_{s=1}^{n} \delta_{2,s} \Delta pr_{t-s} + \varepsilon_{2jt}$$

$$pr_{jt} = \alpha_{3,j} + \sum_{s=0}^{n} \delta_{3,s} \Delta em_{t-s} + \sum_{s=1}^{n} \delta_{3,s} \Delta ur_{t-s} + \sum_{s=1}^{n} \delta_{3,s} \Delta pr_{t-s} + \varepsilon_{3jt}$$

The variables above are typically defined as follows:

$$em_j = \ln\left(\frac{\text{employment in region } j}{\text{total employment}}\right)$$

$$ur_j = \ln\left(\frac{1 - \text{unemployment rate in region } j}{1 - \text{national unemployment rate}}\right) = \ln\left(\frac{\text{employment in region } j / \text{labour force in region } j}{\text{total employment /total labour force}}\right)$$

$$pr_j = \ln\left(\frac{\text{participation rate in region } j}{\text{national participation rate}}\right) = \ln\left(\frac{\text{labour force in region } j / \text{population in region } j}{\text{total labour force/total population}}\right)$$

Some studies also include a wage equation in the VAR model (see for example Debelle and Vickery (1999)).

For a closer look at the application of this technique, see Blanchard and Katz (1992), Debelle and Vickery (1998), and Debelle and Vickery (1999).

In order to see how the set of variables in the VAR respond to some "shock" (allowing for lagged effects), the researcher can obtain the impulse response function. The impulse response function (IRF) traces the impact of a shock on all the variables in the VAR over time. Using the IRF, the researcher basically introduces a shock to, say, the level of employment in one period and uses the same model of systematic variation to get an alternative predicted path. When compared to the base-line results, one can then infer about the relative importance of each variable and the time taken for adjustment. In short, the VAR technique can be used to address the following questions. When hit by an adverse shock to one of the regional variables, how has the typical region adjusted (i.e. what changes and by how much?)?

Specification issues for VAR

In using the VAR technique, there are some specification issues that need to be addressed. Some of these specification issues are similarly treated across different studies (e.g. type of variable included, as discussed below), whereas other issues have been handled in different ways by various researchers. These issues are discussed below.

The first specification issue relates to the choice of variables. In particular, the researcher needs to determine the type and number of variables one should include in the VAR model. Given that our objective is to uncover the importance of a labour market story, the natural set of variables would be labour market variables, such as the unemployment rate, wage level, level of employment and the labour force participation rate. However, there is no universal agreement as to which variables are the most appropriate – it will depend on the circumstance. For example, there are problems with using the unemployment rate in aggregate migration models, as noted by Greenwood (1985) and Fields (1979) (as cited from Poot (1995)). Instead, these authors note that layoff rates, quit rates and unemployment duration, where available, may be better

measures of labour market conditions. Furthermore, what variables enter the VAR can be constrained by what data is available. For example, wages are excluded from the VAR in Jimeno and Bentolila (1998) due to the lack of quarterly data. Similarly, some studies (e.g. Blanchard and Katz (1992)) may choose to leave out one or two variables from their VAR because including them may reduce the size of the sample (i.e. at least one of the series has a smaller sample size) and/or would introduce additional right-hand-side variables, resulting in too few degrees of freedom.

Ideally, it would be great to have a migration variable in the VAR model. However, data on migration flows is either not available on a quarterly basis, or the sample period for which such data is available is not sufficient for formal estimation work. Therefore, migration is not directly estimated in studies that have used the VAR model. In order to overcome this problem, most researchers calculate migration as a function of the other variables that are modelled. In other words, an estimate of migration flows is backed out of the model based on the time paths of the other variables in the VAR. Different studies have done it (slightly) differently. The following is the approach taken by Blanchard and Katz (1992), Decressin and Fatas (1995) and Debelle and Vickery (1998)).

Based on the three equations shown in Box 2 above, migration (as a percentage of the working-age population) can be derived from the identity equation below:
Migration = $d(em) - d(ur) - d(pr)$
This method essentially equates the movement in the labour force to the migration of workers. This method is based on the assumption that most of the changes in the labour force are due to migration, rather than to natural population increases (which arguably are relatively stable, particularly if one uses quarterly data). This assumption is usually tested with some diagnostic test to check if the assumption is reasonably valid (see for example, Blanchard and Katz (1992)).

Maryanne Aynsley's research essay uses a slightly different way to infer the role of migration, but based on similar principles as above (see Aynsley (2001)). She treats the movement in the working age population as characterizing worker migration flows. The relative importance of migration as a labour market adjustment mechanism is then assessed by estimating two models. The first model assumes that the working age population is exogenous and hence there is no mobility of labour (given her treatment above). Therefore, adjustments in response to a shock have to be in the form of changes in employment, unemployment, labour force participation and/or wages. The second model allows for labour mobility (by making the working age population endogenous) and thus comparing the two models would indicate the role of labour mobility as a labour market adjustment.

Although one can choose to extend the VAR model to include non-labour market variables, most studies that use the VAR technique in the literature on regional labour market adjustment do in fact use labour market variables only. These studies often use information on how different labour market series such as unemployment, wages, employment and labour force participation change together over time in response to some shock, allowing for lagged effects. In other words, the technique examines the joint fluctuations of the selected set of labour market variables over time. In terms of the use and interpretation of the impulse response function, the VAR technique addresses the following questions. When hit by an adverse shock to employment (for example), how has the typical region adjusted? Did the shock mainly produce a decline in relative wages, an increase in joblessness, a decrease in the labour force participation rate, and/or an increase in labour migration?

As mentioned above, there are not many examples of VAR studies that have extended the Blanchard and Katz (1992) work to incorporate a broader range of variables (i.e. non-labour market variables). One such example is the study by Fredriksson (1999) that takes into account active labour market programs in Sweden. Using the same scenario in the previous paragraph, where we asked how the typical region adjusts when hit by an adverse shock to employment, there is a contention that the presence of some active labour market programs may have adverse effects on the regional adjustment process. Active labour market programs could have lock-in effects, that is, people who would have migrated in the absence of programs choose to stay on in a depressed region (following an adverse shock to employment). The reason for this is that active programs decrease the unattractiveness of joblessness (either by offering higher compensation or improving subsequent re-employment probabilities), thus reducing the incentive to migrate to other regions with more favourable employment opportunities. Furthermore, active labour market programs may also prevent discouraged workers from exiting the labour force. In other words, a labour market program could be a substitute for out-migration and labour force participation changes.

This is only one example of the incorporation of a broader range of variables in the VAR. Conceptually, one can include other appropriate variables provided that there is a justifiable reason to do so and there are sufficient data available.

As mentioned earlier, in applying the VAR technique, there is a range of specification issues that researchers have to consider. Up to here, we have discussed the choice of variables to include in the model. The other specification issues include the stationarity of the series, the definition of shocks, the distinction between temporary and permanent shocks, aggregate and region-specific shocks, and the way to address permanent differences across areas and population heterogeneity, as well as the appropriate level of disaggregation (e.g. regions or sub-regions)[79]. Each of these is discussed in turn.

Given the set of variables selected, an issue arises as to whether the variables should be modelled in levels or in the first difference form. As a precursor to answering this question, and thus using the VAR technique, one needs to determine the time series properties of the variables of interest. In particular, one needs to test whether the underlying stochastic process generating the series is invariant with respect to time, that is, stationary[80]. This is because variables entering the VAR have to be stationary. If the variables in the VAR are nonstationary, but not cointegrated (i.e. it is not possible to construct a stationary linear combination of the variables), then the correct procedure is to estimate the VAR in the differenced form[81]. Meanwhile, if the variables are nonstationary but are cointegrated, a vector error correction model (VECM) can be constructed. The VECM is a VAR of the differences variables with, in addition, a vector of residuals of the cointegration regression[82]. For example, if relative unemployment

[79] There are of course other specification issues not discussed here, for example, the choice of lags.

[80] There are two ways to test for stationarity. The first is to use a descriptive approach. For example, one can calculate correlation coefficients (between current and past levels) and plot persistence diagrams to assess whether regions have experiences sustained differences in the labour market variables of interest. Some of these persistence measures have already been illustrated in Section 3. A second and more formal method to test whether a series is stationary or otherwise, is to use unit root tests, such as the Augmented Dickey-Fuller (ADF) test (see for example Blanchard and Katz (1992) for an application). For a review of the concept of stationarity and other important concepts in time series modelling, see Enders (1995) and Gujarati (1995).

[81] Another rationale for first differencing the variables in the VAR is to account for fixed effects, as discussed further below.

[82] For an introduction to VAR, VECM and the concepts of stationarity and cointegration, see Enders (1995) and other standard (time series) econometric textbooks.

rates are found to be stationary, they enter the VAR in levels. Conversely, if there is evidence that relative employment contains a unit root (i.e. non-stationary), then one should model the series in first difference form (i.e. employment growth) (see for example Blanchard and Katz (1992)). In some circumstances, it may be worthwhile to try different specifications, particularly if the unit root tests provide mixed or inconclusive evidence. Jimeno and Bentolila (1998) provides such an example. Their first specification models the unemployment rate and labour force participation rate in levels, and employment in first difference. Meanwhile, their second specification models all three variables in first differences.

Another specification issue facing researchers employing the VAR technique is the choice of identifying assumptions[83]. Although this has been discussed previously in Section 4.2, it is worth noting again the typical approach used by researchers to define shocks in VAR-type studies. What most researchers (e.g. Blanchard and Katz (1992), Decressin and Fatas (1995), Jimeno and Bentolila (1998), Fredriksson (1999), and Debelle and Vickery (1999)) have done is to basically associate unforeseen movements in employment with innovations in labour demand (i.e. equating a shock to employment to a labour demand shock). Blanchard and Katz (1992) argue that this assumption is approximately correct because they consistently find that positive shocks to employment increase wages and reduce unemployment.

An issue related to the above is the distinction between a once-and-for-all (or temporary) shock and a shock with subsequent adjustments (permanent shock). As pointed out in Section 4.2, the type of shock analysed has quite different implications for the evolution of the variables of interest over time (see Bartik (1993)).

The distinction between aggregate and region-specific shocks has been discussed in Sections 2.4 and 4.2. Recall that we are ultimately interested in shocks that can change the relative attractiveness of locations. A region-specific shock certainly qualifies for this. On the other hand, aggregate shocks that impact proportionately on all regions do not change relative attractiveness of locations. Meanwhile, aggregate shocks, to the extent that they impact disproportionately or unevenly on some regions, need to be accounted for[84]. The issue of controlling for such aggregate shocks is particularly important when shocks are predominantly aggregate in nature (i.e. a large proportion of the variance in regional labour market variables could be explained by aggregate shocks). Researchers usually test whether this is indeed the case (see for example, Blanchard and Katz (1992)). If aggregate shocks are found to be significant, then researchers control for them by specifying the regional variables as deviations from the national means. Most studies employing the VAR technique in this area in fact tend to define their variables as being relative to their national counterparts (see for example Blanchard and Katz (1992), Decressin and Fatas (1995), Jimeno and Bentolila (1998), Fredriksson (1999) and Debelle and Vickery (1999)).

Most studies employing the VAR model attempt to control for permanent differences across regions that do not necessarily induce migration flows. The permanent difference arises because some variables (e.g. local participation rate and employment rate) reflect unobserved "fixed effects" of local areas. For example, unobserved aspects of an area's demographics or amenities could affect the participation rate, such that some areas will have permanently higher relative participation rates while others

[83] Bartik (1993) and Blanchard and Katz (1992) provide a good summary of this issue.

[84] As discussed in Sill (1997), regions may be affected by the same economic shock in different ways and with some variation in the timing of a response to shocks (i.e. leading and lagging regions). One likely reason for such differences is industry mix.

have permanently lower relative participation rates. If these unobserved aspects are correlated with an area's job growth, then ignoring them will lead to biased estimates of local job growth effects on local participation or employment rates. Similar permanent differences could arise for other reasons. Researchers can use at least two ways to avoid the bias. One is to include fixed effects controls (i.e. region-specific constants) in the estimation (see for example Blanchard and Katz (1992) and Jimeno and Bentolila (1998)). The second way is to eliminate fixed effects by first differencing all level variables. Under this second method, the estimation then considers how changes in local employment cause changes in local labour markets (e.g. changes in local participation or employment rates, as above).

Besides, the VAR studies above have examined regional labour market adjustment in relation to the labour force as a whole. It may be worthwhile taking a closer look at specific labour force groups (for example, high-skilled versus low-skilled, or females versus males). For instance, one may expect that in response to an adverse shock, the highly skilled are more likely to migrate than remaining unemployed or dropping out of the labour force, compared to the low skilled. An example is provided in the Spanish context by Mauro and Spilimbergo (1998) and Mauro, Prasad et al. (1999). These studies look at five educational groups (ranging from illiterate to the college-educated) and estimate how rapidly different groups of workers respond to regional labour demand shocks.

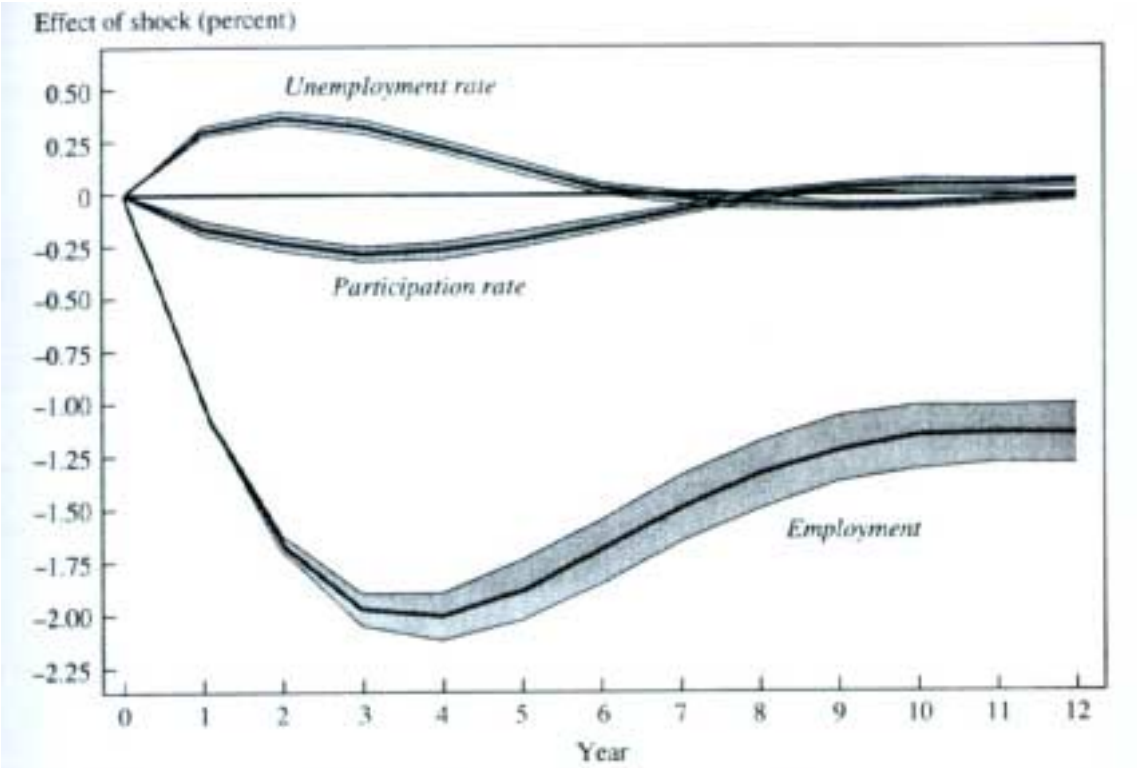
Another issue that is important to note is that some researchers have used a different level of disaggregation. For example, Maryanne Aynsley's research essay (as mentioned above) looks at labour market adjustment mechanisms in Australasia (Australia and New Zealand as two regions). In other words, her work focuses on adjustments at the *national* level, rather than the *regional* or *state* level. It is thus important that we eventually highlight how her work complements ours given the different units of analysis (national vs regional).

Up to here, we have discussed what the VAR technique does, some specification issues, and cited some relevant references. We shall next briefly talk about the advantages and disadvantages of using this technique.

One of the advantages of the VAR technique is that it does not require much theoretical structure or a priori information[85]. This is particularly so in cases where there is much uncertainty over the structure of any behavioural relationship governing migration patterns. Another advantage of this method is that it is possible to trace the impact of a "shock" to any of the variables over time. For instance, if there were an employment shock, the initial effect would be represented as an increase in ε_E. In the following period, E_{-1} would be higher, which would lead through to wages and unemployment, which in turn would feedback to other variables over time. The figure below shows an example of an impulse response function, as extracted from Blanchard and Katz (1992).

[85] This is arguably a strength as well as a weakness of the VAR technique.

Figure 5.1 Impulse Response to a 1 percent Negative Employment Shock (in the US)



Source: Authors' calculations based on the system of equations described in the text, using data described in the appendix. All 51 states are used in the estimation. The shock is a −1 percent shock to employment. Bands of one standard error are shown around each line.

It is worth giving an illustration of how the impulse response function above is interpreted. The impulse response results selected for illustration are obtained from Blanchard and Katz (1992). According to Figure 5.1 above, when a state experiences a one percent adverse shock to its employment, in the first year, there is an increase in the unemployment rate of 0.32 percentage points and a decrease in the labour force participation rate of 0.17 percentage points. These estimates are the initial impact. Over time, the effect on employment builds up, and reaches a peak of –2.0 percent after four years and a plateau of about –1.3 percent. The effects of the negative employment shock on unemployment and participation steadily fall and disappear after five to seven years.

However, it is important to note that the VAR approach, as for other approaches, have a few limitations. Firstly, VAR is only a partial modeling approach, rather than a system modeling approach (examples of the latter to be discussed further below). Secondly, it usually assumes a symmetric response to shocks – a positive shock in one variable leads to the same response in the set of variables as a negative shock, except in opposite direction. There is a debate about the validity of this assumption. Thirdly, VAR-type studies are of an aggregate nature, in the sense that it picks up the relationship for a *typical* region. However, different regions may well adjust in different ways to the same shock. The latter limitation can be addressed by using other approaches such as case studies, as discussed below.

Case studies approach

The VAR technique analyses correlations from the data (labour market variables alone, or both labour market and non-labour market variables) imposing little prior structure on them. Another approach that does not impose much theoretical structure is to use case studies. Case studies are particularly suitable when there are some aspects that cannot be measured easily, but nevertheless are important. Under such circumstances, instead of restricting the analysis so that the VAR technique can be used, some researchers have chosen to using case studies to capture the qualitative aspects. Some of these unique qualitative aspects are region-specific, and thus regional case studies might be appropriate. Furthermore, case studies allow researchers to focus on places with big and/or identifiable shocks.

In the New Zealand case, Reefton is a clear example. Reefton is a small town of 1100 people in the West Coast. During the long boom, its main industries were farming, coal mining and forestry. Reefton received support from the state for these activities, and the provision of infrastructure to develop the economy there. There were a series of state-sector restructuring in that small town in the late 1980s. David Conradson briefly summarises the impact of this restructuring, focusing on the employment paths of people rendered redundant (see Le Heron and Pawson (1996)). Conradson examined the question of what adjustments were undertaken by people made unemployed within that town.

Another case study that is worth highlighting is the closure of the Patea Freezing works in 1982. As discussed previously in Section 4.2, there was a rapid rise in the number of registered unemployed immediately following the closure in September 1982 (i.e. the initial impact). This figure went up to a peak of about 300 people in late October 1982[86]. However, the situation stabilised from November 1982. Again, this case study allows one to ask what the significant adjustment mechanisms were in response to the shock identified.

Up to here, we have discussed approaches that basically address the key question without imposing a prior structure on the data (i.e. let the data speak for themselves). We shall next discuss approaches that impose some structure on the data, usually obtained from theories and other a priori information.

Structural modelling approach

Just to refresh the reader's memory, as discussed in Section 2.2, when a region experiences a shock, the region can adjust in various ways, for instance via the labour, housing, capital, goods and services markets. The previous discussion of the VAR technique has summarized how some researchers have attempted to uncover the regional labour market adjustment story. These can be broadened to account for the other forms of regional adjustment that are ignored but are expected to be important. Two examples are given below.

One example would be to take into account regional adjustments in the housing market. There are at least two reasons for considering the housing market when we look at the role of migration. First and more importantly, relative house prices are important for migration decisions. Housing cost forms a significant proportion, if not the largest, of households' expenditures. A shock to a region can often affect the house prices simultaneously with the labour market. For example, a positive shock may lead

[86] See Le Heron and Pawson (1996) and Peck (1985) for other ideas of possible case studies.

to a rise in relative wages and employment opportunities (which encourages migration into a region), and a corresponding increase in house prices (which discourages in-migration). Therefore, some authors (see below) have argued for endogenising the determination of house prices. Secondly, numerous studies have highlighted the impact of housing tenure upon migration. Some researchers have argued and presented evidence that the lack of flexibility in the housing market can hamper migration of workers. This can take the form of higher transaction costs on the purchase and sale of residential real estate (e.g. via taxation), long minimum duration of rental contracts (for whatever reason), public allocation of rental housing, etc. Studies that have argued and found evidence supporting the importance of the housing market include Johnes and Hyclak (1994), Cameron and Muellbauer (1998), Böheim and Taylor (2000) and Oswald (1999).

The other example would be to recognize that commuting[87] is often an alternative to migration. As explained in the previous paragraph, the housing market can be an impediment to the migration process. It is often argued that commuting is a way of overcoming such housing market impediments (see for example Cameron and Muellbauer (1998)). This is because if house prices increase concurrently with employment opportunities and wage levels as a result of a positive shock in a region, individuals from other regions can still work in that region while commuting back and forth to their original location (instead of migrating). Therefore, it may be appropriate to model regional commuting and migration choices in a common framework, as done by Cameron and Muellbauer (1998).

One approach that captures the interactions between labour market and non-labour market variables that are expected to be simultaneously determined in the system (e.g. housing prices and/or commuting, as discussed above) is the structural model. A structural model gets its name from the fact that its form is given by the underlying theory or behavioural relationship governing migration patterns. This approach contrasts with the VAR technique, which is a reduced form approach[88]. A structural model is usually more complicated, and often involves multiple equations in the model.

One could have a small structural model with a few equations only. An illustration of such a small structural model that incorporates a migration equation is provided by Johnes and Hyclak (1994). These authors used a four-equation model which has as endogenous variables the following – wage inflation, unemployment rate, net migration and house price inflation. The endogenous housing and labour market variables are therefore simultaneously determined, hence emphasising the linkages between the two markets.

Alternatively, one can go further and allow for a large set of feedbacks, resulting in a structural model with many equations, and sometimes many regions (i.e. multi-regional structural model)[89]. However, this approach has a cost. It would have to be done at the expense of each equation in the model becoming simpler. In other words, although we are taking into account the interactions between different equations, we will have to settle for more straightforward individual equations.

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[87] Green, Hogarth et al. (1999) provides a review of the trends, issues and some implications of longer distance commuting as a substitute for migration in the UK.

[88] The reduced form approach is preferred by some because of the uncertainty over the structure of the behavioural relationship.

[89] See Bolton (1985) for an early comprehensive survey of structural econometric models.

An illustration of such an extensive model is Fry, Fry and Peter (1999) who used data from 1982 to 1996 to estimate a structural econometric model of inter-regional migration. They then used the results to respecify and calibrate the model MONASH-MRF[90] and to simulate the response of net inter-state migration to changes in State Government spending (see Fry, Fry et al. (1999)). Another such study is Giesecke (2000), which provides a multi-regional, multi-sectoral model of the Australian economy.

Meanwhile, Groenewold (1997) provides an illustration of the use of a structural model to examine the importance of migration as a form of labour market adjustment in Australia. The author performed an empirical analysis of the interaction between wages, unemployment and inter-regional migration for the six Australian states and two territories, based on a 24-equation econometric model. In particular, two exercises were performed. The first is to solve for steady-state values of wage and unemployment differences. The second is to investigate the stability of the equilibrating mechanism, where the model is used to simulate the effects on unemployment, migration and wage rates of a shock to employment growth.

A third example would be Gordon and Lamont (1982) who used an 11-equation simultaneous model, with in- and out-migration, net commuting, employment growth, unemployment, house building, and owner-occupied house prices all treated as endogenous (as cited from Crampton (1999)). Their model also had 19 exogenous variables contributing to their two-stage and three-stage least squares estimations, making this one of the largest efforts at structural modelling of an intra-urban labour and housing market adjustment model (as cited from Crampton (1999)).

At the extreme, one can of course opt to use a computable general equilibrium (CGE) model (see the survey by Nijkamp, Rietveld et al. (1986)). CGE is a model of the economy that portrays the operation of many markets simultaneously. This contrasts with a partial equilibrium model, which focuses on a single market or at most several markets, ignoring feedback loops and repercussions in other markets. The substantial investment of time and resources required to develop and analyse these models makes them impractical for many researchers. The following quote from Nijkamp, Rietveld et al. (1986) clearly illustrates this point:

> *One would expect that models with a large scope are used more extensively than are the more partial models, but this is in reality not the case. An explanation may be that model users prefer partial models since they are easier to understand. The structure of comprehensive models is usually more complex. Another reason may be that there is a clear conflict between the model's scope and its level of detail. Models with a large scope are usually characterized by a low level of detail and vice versa. Model users seem to find the latter element a heavier weight than the former.* (pp. 285-286)

While much progress has been made on more complex regional modelling since this quote was made, the basic trade-offs remain. Also, both time series methods and structural modelling require fairly long time series. Researchers do not always have access to geographically disaggregated data that spans a long enough time period to support such analyses.

[90] MONASH-MRF (MMRF) is a multi-regional, multi-sectoral Computable General Equilibrium (CGE) model of the Australian economy, used extensively by State government bureaucracies and the private sector to conduct comparative static simulations and for forecasting.

5.3 Findings

This subsection summarises the findings in relation to the second key question – the significance of migration as a regional labour market adjustment mechanism.

5.3.1 VAR approach

Since the VAR technique is the most commonly used approach to address this key question (as noted earlier), the discussion in this subsection is predominantly based on the literature employing VAR techniques. In fact, we shall begin with an overview of the results from the VAR studies, as summarised in Table 5.1 below.

Table 5.1 Overview of results from the VAR studies

Persistence in National Variables	Persistence in Regional Variables	
	Low	High
Low	• United States Blanchard & Katz (1992) **Migration**	
High	• Europe Decressin & Fatas (1995) **Labour force participation**	• Italy Decressin & Fatas (1995) • Spain Jimeno & Bentolila (1998)

Note: The term in bold denotes the main regional labour market adjustment mechanism in response to a shock in employment.

Table 5.1 provides a good starting point for the results. It classifies countries along two dimensions – whether they exhibit high persistence in *national* variables and whether there is persistence of *regional* relative variables. This classification illustrates that there is a diverse range of experiences in terms of labour market adjustment (at the aggregate and regional levels). The United States falls into the category where there is a low degree of persistence of the aggregate and regional relative unemployment rates (for example). The EU as a whole is a case where persistence of aggregate labour market variables is high but persistence of regional labour market variables is low. Exceptions within Europe include Italy and Spain, where the degrees of persistence at the aggregate and regional levels are both high.

Not only were these countries different in their classification, where there is low persistence in regional variables (the United States and Europe), the main regional labour market adjustment channel is different in the two cases. In particular, in the United States, migration plays a substantial role as a regional labour market adjustment mechanism (Blanchard and Katz (1992)). In other words, adjustment to labour demand shocks appears to occur mainly through migration flows (i.e., laid-off workers leave depressed areas to find jobs elsewhere). Following a state-specific shock, the migration response is strong even in the first year after the shock. For example, if relative state employment falls by 10 workers, in the initial year, unemployment rises by 3 workers, participation falls by 0.5 workers, and 6.5 workers migrate out of the state. In the long run (after 7 to 10 years), employment falls by approximately 13 workers, all of whom have migrated to other states (as cited from Debelle and Vickery (1999)). Blanchard and Katz (1992) also conclude that wages

decrease and dampen the employment response, but by relatively little. This evidence suggests that in the US, wages play a limited role as a regional labour market adjustment mechanism in response to economic shocks. Meanwhile, in European labour markets, labour force participation rate changes play an important role in bringing unemployment back to trend after a region-specific shock, rather than migration (Decressin and Fatas (1995)). In other words, workers leave the labour force rather than migrate out of their region.

Of those countries that were not mentioned in Table 5.1 above, the results are summarised as follows. In Australia, inter-state migration does play an important role in reducing differences in labour market conditions across states, although permanent (or very persistent) differences between state unemployment rates remain (Debelle and Vickery (1999)). Similarly, in the Swedish case, regional adjustment has been comparatively rapid and labour mobility appears to be high by European standards (Fredriksson (1999)).

The natural question to ask is of course where New Zealand fits in. This is the gist of the second key question.

The results from Aynsley (2001) are worth highlighting here although her work focuses on the labour market adjustment at the *national* rather than *regional* or *state* level. An employment demand shock has a larger and more persistent impact on the New Zealand than the Australian labour market. However, international labour mobility (between the two countries) appears to be a more important adjustment mechanism for New Zealand than Australia. The author suggests that the apparent difference in trans-Tasman labour mobility may be due to the different size of the labour markets. Since Australia is larger than New Zealand, there is a greater number of local labour markets within the former, and thus there is likely to be greater opportunities for people to relocate within the country in response to a adverse shock in a local area. In fact, there is evidence that labour mobility is an important inter-state labour market adjustment mechanism in Australia (see Debelle and Vickery (1999)). In contrast, the opportunity for people in New Zealand to relocate within the country is relatively limited. Besides, Aynsley (2001) finds that labour force participation change is also an adjustment mechanism for both countries, but not the real wage.

A recent study by Chapple (2000) examines this question focusing on urban area units (which the author calls neighbourhoods). Although the paper does not use the VAR technique, it is worth noting its findings here for comparison. The author finds that an increase in labour demand (i.e. employment) has a number of effects on the neighbourhood labour market. In particular, this shock reduces the neighbourhood unemployment rate, raises labour force participation, and encourages in-migration. However, the migration response is much weaker than the impact on neighbourhood unemployment and participation.

A further New Zealand study that examines the link between migration and labour market adjustment is Morrison, Papps et al. (2000). They find a positive relationship between migration flows and wages, and emphasise the role of migration in increasing competition between firms for labour inputs, thus reducing monopsony power (especially for more mobile higher skilled workers).

The overview above summarises the relative contributions of each of the regional labour market mechanism, in response to a shock to the system. The general impression is that the significance of migration varies a lot across the countries. However, it is important to examine some quantitative estimates. There are basically

two questions - how much adjustment actually occurs in response to a shock, and given this amount of adjustment, how much adjustment actually takes place through each of the mechanisms. At this point in time, we have not been able to track down comparable estimates for the first question. On the other hand, Fredriksson (1999) provides a summary table that decomposes the response to a shock in employment growth in various countries, as reproduced below.

Table 5.2 Decomposition of the response to a one-standard-deviation shock in employment growth (percentages of the change in log employment)

	Year 1	Year 2
Europe[1] (51 regions, 1975-87)		
Employment rate	22	23
Participation rate	75	50
Net migration	4	27
United States[2] (51 states, 1978-90)		
Employment rate	34	23
Participation rate	26	23
Net migration	40	54
Spain[3] (17 regions, 1976-94)		
Employment rate	36	39
Participation rate	23	18
Net migration	41	43
Sweden[4] (24 regions, 1966-93)		
Regular employment rate	8	5
Participation rate	26	9
Net migration	66	87

Source: Table 1 (p. 636) from Fredriksson (1999)
[1] Decressin and Fatas (1995)
[2] Blanchard and Katz (1992)
[3] Jimeno and Bentolila (1995) and Jimeno and Bentolila (1998)
[4] Fredriksson (1999)

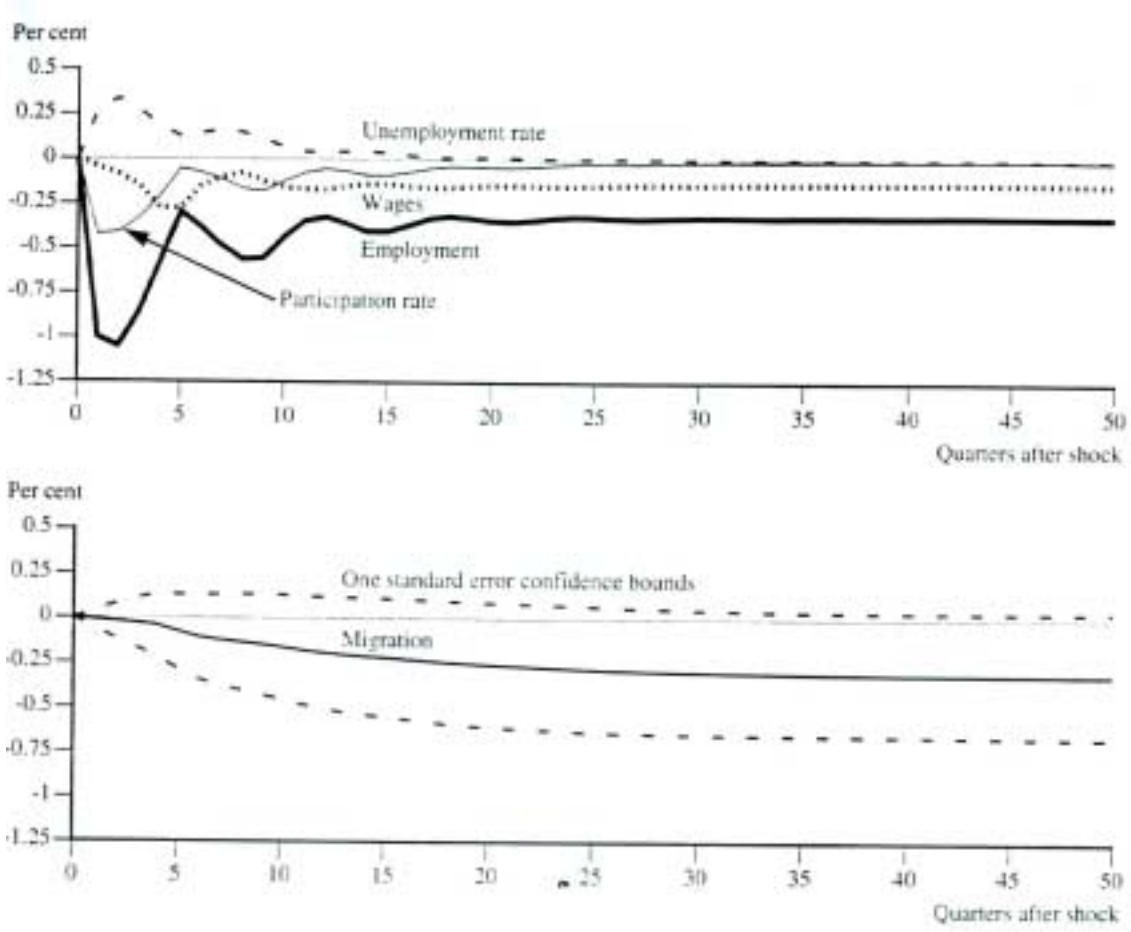
Table 5.2 shows for example, that changes in participation rates have been the primary initial response to shocks in employment in Europe. In the first year after a negative shock, 75 percent of the impact is borne by workers dropping out of the labour force. Conversely, migration has been the principal response to job destruction in Sweden. By two years, the employment response consists mainly of out-migration of workers (implying that 87 percent of the affected workers would have left their region).

However, while table 5.2 tells us about the relative contribution of migration as a labour market adjustment mechanism, it does not provide much information as to how much adjustment occurs. For example, it is not clear from table 5.2 that there is high persistence of regional unemployment differentials Spain.

Up to here, we have been focusing on the mix of adjustment mechanisms. Another aspect of the dynamics is the speed of adjustment. When there is an adverse employment shock to the local labour market, how long does it take for the adjustment mechanisms to occur? In the US, net migration plays a substantial role even in the first year of an employment shock. After 5 to 7 years, the employment response consists entirely of worker migration (Blanchard and Katz (1992)). In the EU, it takes about 3

years for the effect on the labour force participation rate and 4 years for the effect on the unemployment rate to disappear (Decressin and Fatas (1995)). Meanwhile, in Australia, most of the migration takes place, on average, within four years. In particular, approximately one-third of the out-migration occurs within two years, roughly two-thirds of the net migration takes place within three years of the shock, and then the rate of out-migration flattens out. The process of adjustment is complete after seven years (Debelle and Vickery (1999)). These speed of adjustment estimates can be seen more clearly from Figure 5.2 below, which presents the impulse response results and a one standard error confidence bounds for net migration from Debelle and Vickery (1999) in response to a 1 percent negative shock to employment.

Figure 5.2 Impulse Response to a 1 percent Negative Employment Shock (in Australia)



Next, we shall examine some of the findings from studies that have used slightly different specifications. The question we are asking is whether these issues alter the results, in terms of the significance of the migration mechanism (i.e. do these specification issues matter in practice?).

Bartik (1991) and Blanchard and Katz (1992) reach different conclusions about local job growth's long run effects. In the case of Bartik (1991), a one percent shock to employment results in the local employment reaching a new equilibrium (a one percent higher than the pre-shock level) from year one onwards. On the other hand, Blanchard and Katz (1992) find that over time, the effect on employment builds up, and reaches a peak of 2.0 percent after four years and a plateau of about 1.3 percent. Bartik (1993)

re-analyses the data set used by Blanchard and Katz (1992) to examine why this difference exists. One of the reasons put forth is that Bartik (1991) considers a once-and-for-all shock to local job growth, with subsequent growth unchanged from what it would have been (i.e. a one-time growth shock). In contrast, Blanchard and Katz (1992) allow the one-time shock to local job growth to affect subsequent growth (i.e. a shock with readjustment). As noted by Bartik (1993), both are interesting thought experiments, and one may be more appropriate than the other in some circumstances.

Most VAR studies have looked at the regional labour market adjustment process in relation to the whole labour force. In contrast, Mauro and Spilimbergo (1998) and Mauro, Prasad et al. (1999) examine the same question, but focusing on the different subgroups within the population with varying levels of skills in the Spanish context. Mauro, Prasad et al. (1999) finds evidence that suggests that the high-skilled in Spain are indeed more likely to migrate than remaining unemployed or dropping out of the labour force, compared to the low-skilled. In other words, high-skilled workers migrate very promptly in response to a decline in local labour demand while low-skilled workers drop put of the labour force or stay unemployed for a long time.

There is some empirical evidence that supports the idea that active labour market programs do prevent workers from leaving the depressed region (Edin et al. (1991) and Westerlund (1995) in Fredriksson (1999)). However, using VAR techniques, Fredriksson (1999) found little evidence for this. Active labour market programs in general do not seem to have impeded regional adjustment substantially.

5.3.2 Case studies approach

Now that we have reviewed the evidence from the VAR literature, let's discuss next the evidence from case studies, which also impose no or little prior structure on the data. In the Reefton case, for example, it was found that there has been a great diversity of personal experience in response to the state-sector restructuring in the late 1980s. About 36% (45 out of 125) of the original group of 125 workers have left Reefton by 1994. Most of them, incidentally, were younger workers. Meanwhile, another 24% were working in the private sector, 16.8% of the original group was still employed in state agencies, and 5.6% were self-employed. A relatively small number (2.4%) of the original group was unemployed in 1994. However, David Conradson argues that the employment effects of redundancy are disguised in that case. The low unemployment figure in part reflects those (4.8%) who had withdrawn from the workforce (for reasons such as sickness or study), and those (9.6%) who were forced into retirement by being made redundant in their fifties or sixties (with little chance of finding another job in Reefton, or moving out of town given the higher real estate prices in larger centers).

Another case study that is worth highlighting again is the closure of the Patea Freezing works in 1982. There was a rapid rise in the number of registered unemployed immediately following the closure in September 1982 (i.e. the initial impact). This figure went up to a peak of about 300 people in late October 1982. However, the situation stabilised from November 1982. The final impact was as below:

Registered unemployed, but not on benefits = 50
Registered unemployed and are on benefits = 70
Those on job creation schemes (public and private) = 145
Those who migrated out of Patea = 80

From the figures above, it is clear that migration did play quite an important role as a regional labour market adjustment mechanism. Out of those 348 people who lost jobs, approximately 23% had moved out after a year. However, it did not play quite as

important a role as predicted, for reasons such as housing, the lack of mobility of unskilled workers and Maori links to their homeland, as discussed in Section 4.3.

The findings from the case studies can be summarized as follows. In Reefton, there has been a great diversity of personal experiences in response to the restructuring in Reefton. Similarly for Patea, the effects of the closure were not only felt on labour market, but also on the housing market, education sector (teachers leaving, etc.), transport sector, etc. Such diversity of adjustment mechanisms in a region may not be picked up by standard models, which inevitably have structures imposed on them. Furthermore, the case studies offer researchers an opportunity to analyse the impact of unique shocks occurring in unique localities.

5.3.3 Structural modelling approach

The VAR-type studies and the case studies approaches discussed thus far impose little prior structure, if any, on the data. In contrast, structural models are more complicated, often involving many equations in the model. The question is whether we gain anything further (beyond the VAR or case studies approach) in terms of understanding the role of migration as a regional labour market adjustment mechanism.

Johnes and Hyclak (1994) used a four-equation model of the labour market – wage inflation, unemployment rate, net migration and house price inflation. They looked at the Southeast region of the UK, and find that house prices does indeed play an important role in the short run regional labour market adjustment, by exerting a strong (negative) influence on the movement of labour. A number of other studies have also looked at the link between the housing market (housing tenure and house prices) and migration (e.g. Cameron and Muellbauer (1998), Böheim and Taylor (2000) and Oswald (1999)). These studies tend to find that homeowners have relatively lower mobility rates, and that high relative house prices discourage net migration to a region.

A more extensive model by Fry, Fry et al. (1999) find that when the results from their structural econometric model of inter-regional migration are used to re-specify and calibrate their CGE model, it provides a more detailed picture of labour market responses when they simulate the response of net inter-state migration to changes in State Government spending[91]. However, the authors suggest that more work is needed to help understand whether the observed differences are significant in practice.

Another quite extensive model is by Groenewold (1997) which provides an illustration of the use of a 24-equation structural model to examine the importance of migration as a form of labour market adjustment in Australia. The author finds that inter-state migration and relative wage movements play a role in labour market adjustment, but they do not eliminate inter-state unemployment differentials. The adjustment following a shock is slow, with only half of the adjustment complete after 20 quarters.

5.3.4 Other approaches

The discussion thus far is on the findings from approaches that use longer time series. It is worth noting also the findings from approaches that use shorter-time-span data sets, such as simulations of gravity models and Markov switching techniques (see Nijkamp and Poot (1987)), as well as the labour market accounts technique.

[91] This is a realistic shock designed to disturb unemployment rates and house prices, which turn out to be significant and have the correct signs in the migration equation (this evidence of a labour market story has been highlighted in Section 4.3).

The labour market accounts technique has been used by Green (1994) and Beatty, Fothergill et al. (1997). Green (1994) finds (among other things) that although in the short term, net out-migration may not be an immediate response in some areas to a deterioration in labour demand, the effect of long term economic decline in stimulating out-migration (and depressing in-migration) is evident. The study also finds that local areas respond over different time periods, and in different ways. Similarly, Beatty, Fothergill et al. (1997) find that there is diverse range of labour market adjustment processes, and that there is no single model of labour market adjustment that is applicable across a range of localities. Unemployment can arise in markedly different ways in terms of changes in migration, commuting, labour force participation, job loss and job creation.

5.4 Concluding Remarks

The methods used to examine the question of whether migration is a significant form of regional labour market adjustment include approaches that use short time series and longer time series. Approaches of the former type include simulations of gravity model, the Markov transition method and the labour market accounts technique. Meanwhile, approaches that utilise longer time series can be divided into those that do not impose a prior structure on the data, and those that do. Those that impose little structure or none at all on the data include VAR-type studies and case studies. In contrast, those that do impose some structure, whether it is based on theory or some other a priori information, are generally called structural models.

The crucial question is whether there is a difference in the results of these various approaches. How much do we gain (in terms of a better understanding of our key question) by adding further complexities to the model? If there is not much of a difference, then we would of course prefer the less complex models. The answer is that different approaches tell us about different parts of the story. No one method is always better than another; it depends on the circumstance. For example, results from case studies and labour market accounts technique suggest that external pressures and shocks impact upon different local labour markets quite differently. This might suggest that VAR-type studies, although having advantages, will not pick up idiosyncratic patterns of labour market adjustment in different regions.

In summary, however, it is clear that internal migration is a significant regional labour market adjustment mechanism in some countries (e.g. the US and Australia), but not in others (most of the European countries). The relevant question is where New Zealand fits in.

Up to here, we have been looking at the direction (Chapter 4) and size (Chapter 5) of internal migration as a regional labour market adjustment mechanism. In the next chapter, we address the question of who moves and whether it matters for regional labour market adjustment.

6 KEY QUESTION 3: WHO MOVES AND DOES IT MATTER FOR REGIONAL LABOUR MARKET ADJUSTMENT?

The first and second key questions looked at the direction and size of migration as a regional labour market adjustment mechanism. This chapter focuses on the composition of migration flows and its implications on regional labour market adjustment. A few of the issues and points raised in this chapter have already been discussed in previous chapters, particularly in Chapter 4. Relevant references will be made at the appropriate places.

As for the previous chapters, the discussion here is divided into three subsections – "what?", "how?", and "findings". For each of these subsections, there are two parts. Firstly, we ask whether migration behaviour is homogeneous across individuals, and if not, what are the characteristics that make some people more mobile than others. The second part considers the question of whether who moves matters for regional labour market adjustment, and if so, how it matters.

6.1 What?

6.1.1 Identifying heterogeneity

Some groups within a society may be more mobile than others. For example, high-skilled workers are expected to be more mobile than low-skilled ones. Besides, one might expect that younger individuals are more mobile than older individuals for reasons linked to life-cycle events, such as the departure from the parental home, the start of tertiary education, entry into the labour force and the establishment of independent living arrangements. We could also examine whether this difference in mobility exists for other group classifications, such as gender, ethnicity, family structures (e.g. husband-wife families versus unattached individuals), etc.

There is also a strand of the literature that argues that workers in different occupations have varying propensities to migrate. Although this is essentially an occupational mobility issue, it is not unrelated to geographical labour mobility. For example, certain regions may have greater concentrations of workers in particular occupations and thus spatial and occupational mobility are related (see for example, Padoa-Schioppa (1991)).

As will be pointed out later in the findings subsection, it is clear that there is heterogeneity in migration behaviour. However, migration propensities are different across a range of dimensions, not only one or two. In addressing our third key question, we will have to ask whether there is anything we can say conclusively about who is more likely to move and who is more likely to stay, when the region experiences a shock. Are there any similarities between people who choose to move? What makes them more mobile?

When a particular region is hit by an adverse shock (for example), there are generally three types of people. There are those who have a lower cost of moving, be it in the form of psychological cost, physical cost, etc. This group will be the first to move out of the region for better prospects elsewhere (i.e. the most mobile people). At the other extreme, there is another group of people that finds it costly to move (be it for financial reasons, family ties, etc.), and thus is willing and/or able to bear the consequences of the adverse shock instead of moving out of the region straight away (unable, and/or not wanting, to adjust by migrating out). This group is the least mobile group. Finally,

there are those who are somewhere in between, for whom the cost-benefit difference is not sufficient to induce a move yet. The important feature that distinguishes these three groups of people would be the cost of adjustment that they have to bear, in order to move. For the second and third groups, the form that the costs take will depend on factors such as labour supply responses, housing markets, etc.

6.1.2 Implications of heterogeneity on regional labour market adjustment

Given that migration behaviour is in fact far from homogeneous, there are at least four implications for us. The first two implications relate to policy and arise because the heterogeneous migration behaviour results in different individuals bearing a different cost of adjustment.

The first implication relates to the *share* of the cost of adjustment. When a region experiences an adverse shock, for example, there needs to be some adjustment. This cost is spread across the heterogeneous population. More mobile people (i.e. those with a lower cost of moving) can capture the gains[92] (avoid the costs[93]) of regional shocks.

The second implication is that the *size* of the cost of adjustment (due to a negative shock) may be magnified if there is "cumulative causation". "Cumulative causation" implies that once a region becomes uncompetitive, it is very difficult to return to its original condition, in level terms. In other words, there is a downward spiral. This could happen for various reasons. For example, it could be due to the interaction between economic performance and the creation of human capital (see for example, Taylor (2000)). If this is the case, one has to consider the impact of the migration flow of particular subgroups on the origin and destination communities. For example, a continuous outward migration of young and highly skilled from declining regions may have negative effects of deskilling the regional population and further weakening the regions' growth potential. The theoretical approach proposed by Roy (1951) argues that the size and direction of migration flows depend on regional differences in the returns to skills (as well as regional differences in mean income). Regions that pay higher returns to skills would attract more skilled workers than regions that pay lower returns. If this is the case, the economic impact of migration depends on *which* people move as well as on *how many* people move. Therefore, one has to consider the spillover and neighbourhood effects of migration patterns.

These first two implications can be thought of as the *consequences* of migration (see for example Greenwood (1997)). The consequences of migration can be addressed at two levels. One refers to the performance of migrants in their new locations relative to a benchmark, such as their presumed performance in their previous place of residence had they not moved. The second deals with the *impacts* that migrants have on others in origin and destination areas.

The third and fourth implications relate to further empirical work. The third one is that any modelling of migration needs to control for differences in population compositions. The fourth and final implication is that one has to take into account the selectivity bias. The migration decision in fact separates the population into those who expect to gain

[92] In the case of a *positive* regional shock, the more mobile people are the ones benefiting. For example, if the government introduces assistance programs in particular regions, in-migrants will benefit from them.

[93] On the other hand, when there is an *adverse* shock to a region, the more mobile people are able to leave while those remaining are the ones who have to bear the cost of lack of adjustment. For example, if a factory closes down, the more mobile people are able to move to other regions to look for jobs, but those unable to leave will remain unemployed in their region.

by moving, and those who expect to gain by staying. If we ignore this selection process when we estimate the earnings equation (or any other labour market variables) of the two sub-groups, then we may wrongly find more gains to migration than there actually are. Therefore, we have to consider the selectivity bias problem when we conduct our empirical work.

6.2 How?

This subsection discusses how researchers identify the heterogeneous migration behaviour, as well as the implications of this heterogeneity on regional labour market adjustment. Before we proceed, it is worth highlighting three main ways in which the approaches used are different.

The first distinction is between univariate (using a single characteristic to explain migration behaviour) and multivariate studies (using more than one characteristic). The second distinction lies in the unit of analysis (essentially the type of data used). Some studies use area (or group) characteristics to explain migration rates of the area (or group). These are generally called aggregate studies. On the other hand, there are studies that use not only area characteristics, but also individual characteristics. These studies have access to micro-level data (be it from the census, or survey data, along the lines proposed by Statistics New Zealand as discussed in Section 4.2). Finally, the third distinction is between studies that use a short time series and those that use a long time series. The minimum time variation in order to be able to say anything about the implications of who moves on regional labour markets, is one time window (i.e. a snapshot of the world at two points in time). The New Zealand census is one example of such a data set[94]. With a longer time series, there is much more information that we can infer from the data about the implications on regional labour market, because the adjustment process would have had enough time to work itself out. An example of a data set that provides such long time series is the National Longitudinal Survey of the Labor Market Experience of Youth (in short, National Longitudinal Survey of Youth), in the United States. McCarthy (1992) used this data set to assess the unemployment and wage motivations for migratory behaviour among young males. Given these distinctions, we shall discuss in more detail the range of approaches that researchers have used to examine the patterns of migration behaviour.

6.2.1 Identifying heterogeneity

When identifying personal characteristics that influence mobility patterns, one can focus on a single dimension (univariate studies) or look at the interaction of multiple dimensions (multivariate studies). We shall begin with a discussion on univariate studies, which is the easiest to carry out.

Univariate and simple descriptive studies

Studies of this type have typically used descriptive techniques, such as cross tabulations, simple descriptive statistics and bar charts, to infer about the links between personal characteristics and migration.

A few examples are worth mentioning here (as cited from Herzog, Schlottmann et al. (1993)). Saben (1964) inferred from cross tabulations that unemployed workers in the United States are more likely to migrate than are the employed. Meanwhile, Lansing

[94] A good discussion of the scope, limits and reliability of using the New Zealand census data on internal migration is provided by Poot (1986a).

and Mueller (1967) document the important link between personal unemployment and migration, to the extent that such causation can be revealed within summary tables.

However, this approach has a few limitations. Firstly, such an approach does not serve to formally quantify the relationships between *migrant* and *area* characteristics, and migration propensities. Secondly, it (wrongly) assumes that there is causality running from one variable to another (e.g. unemployment driving migration decisions).

Thirdly, such descriptive techniques do not adequately control for other personal and place characteristics that may affect migration. In other words, the univariate approach focuses on one characteristic alone, *in isolation of*, or *ignoring* other characteristics (i.e. only a partial analysis). Without such controls, one may well reach the wrong conclusions. For example, the stereotypical image in Australia and some (naïve) stylised facts may suggest that indigenous Australians are more mobile than the rest of the population (as cited from Taylor and Bell (1996)). However, these observations do not consider variations in age structure across different ethnicity groups. The higher mobility rate among indigenous Australians could be due to the greater concentration of indigenous people in the more mobile, youthful age groups. By standardising the data for the effects of variable age structure, Taylor and Bell (1996) find that the mobility rates for the two groups are essentially the same.

Therefore, it is important to consider the *interaction* between and among different characteristics that are expected to influence migration behaviour. One can of course extend the descriptive analysis to two or more personal characteristics. However, descriptive studies still face other limitations, some of which were discussed above. This leads us to seek multivariate approaches, which (as the name implies) permit the researcher to examine the relative contribution of a range of characteristics on migration behaviour.

Multivariate studies

A simple multivariate approach is the shift-share technique. As discussed in Section 4.2, the shift-share method is basically a decomposition technique. This is one way for decomposing the change in a particular variable in a region (e.g. change in migration flow) to changes in the variable of interest (change in migration behaviour or mobility) and other influencing variables such as demographic effects (e.g. age). In principle, one can of course control for other dimensions of interest, for example skill, provided that there are sufficient data available. However, the shift-share technique is still very much a descriptive technique. It does not explain why certain regions have locational advantages, or why mobility patterns have changed as they did.

An example of the use of the shift-share technique is provided by Green (1994). Green (1994) provides an illustration of the use of the shift-share approach to examine the role of migration in bringing labour supply and demand into balance (or in mitigating imbalance) in Britain in the 1980s. The author decomposes the change in the number of migrants between a base period and a terminal period into three additive components: the population base component (the 'age composition' effects), the mobility component (the age-specific rates of inter-area mobility), and the geographic-distribution component (the change in attractiveness of specific destinations for out-migrants from specific origins). The identity equation is as below:

$$\Delta M_{ijk} = A_{ijk} + B_{ijk} + C_{ijk}$$

where ΔM_{ijk} is the change in the number of migrants from origin *i* to destination *j* in age group *k* during the intervening period.

A_{ijk} is the population base component, which is a purely demographic supply measure, encompassing 'age composition' effects.

B_{ijk} is the mobility component.

C_{ijk} is the geographic-distribution component, that is, the portion of the change in migration by persons of age *k* from *i* to *j* that is attributable to increases or decreases in the destination-specific flow after the effects of the population base (A_{ijk}) and mobility (B_{ijk}) components are removed.

Although the shift-share technique can help control for some characteristics of interest, while analysing people's propensities to move, it can only do so to a certain extent. The number of dimensions one can control for are limited to usually three or four; the analysis gets rapidly more complex with more variables.

A more sophisticated and elaborate multivariate approach is the regression technique. The regression technique allows one to assess the impact of a particular characteristic on migration behaviour, controlling for other characteristics (i.e. under true *ceteris paribus* conditions). The regression technique usually uses the ordinary least squares (OLS) estimator and variants of it. Since these have been covered earlier in Section 4.2, we shall only highlight issues that are particularly relevant to this key question, for example the use of unit record level data.

Aggregate studies

The regression analysis could be based on average area characteristics (or composition of the area). Such aggregate studies formed the bulk of early research. These studies basically modelled the number of individuals moving across areas as a function of distance, and *area* characteristics (e.g. the unemployment rate and the average wage level at the origin and destination). Later studies extended the explanatory variables to include demographic characteristics of the migration streams such as the average age and education levels. However, these studies are still of an aggregate nature.

Studies of this category have already been discussed in Chapter 4. However, it is worth noting a recent example of such a study in the New Zealand context. Kerr, Maré et al. (2001) attempted to identify the characteristics that push people to move and/or pull them to a new location. Their paper investigates the effect that the characteristics of a community have on the likelihood of people leaving and/or travelling to the community. The data are aggregated to an Area Unit (equivalent to a suburb); therefore, the smallest definable community is an Area Unit. They use geographical information system (GIS) tools to define variables based on aggregations of meshblocks around the area units of interest.

Such aggregate studies have been criticised on several grounds, three of which are particularly noted here. Firstly, the theoretical foundation on which most of these studies were based is Sjaastad's (1962) human capital approach and variants of it, which focuses on the behaviour of *individuals*. In order to analyse the individual's migration decision, strictly speaking one needs to have *individual* characteristics as well as *area* characteristics, rather than *area* characteristics alone. A related criticism

of aggregate studies is that a high qualification area may have a high mobility but this does not necessarily mean that it is the high-qualification people who are moving. Secondly, aggregate studies fail to adequately capture the heterogeneity of the stream of individuals moving from one area to another. Aggregate data is likely to conceal differences in the underlying determinants of migration of various population subgroups. Thirdly, there is still the selectivity bias problem, as discussed in Section 4.2. While it is noted that one necessarily requires unit record data to control for selectivity bias, using microdata in itself does not necessarily absolve one from the selectivity bias problem.

Individual (microdata) studies

There is quite an extensive list of studies employing individual data in countries such as the United States and Britain (see for example, Böheim and Taylor (2000), Gardner, Pierre et al. (2000), Enchautegui (1997), and Day (1992)). In the New Zealand context, there have been few such studies.

However, one such study is by Vaithianathan (1995) who used micro level data (1991 census data) to model the Maori and non-Maori males regional migration decision. The author employed a binary logit model (move/stay) to assess the effect of observed regional and personal characteristics on the probability that an individual leaves an area.

Longitudinal data

Furthermore, there is a strand of literature that takes into account a number of life-cycle considerations that are potentially important in an individual's or a family's decision to migrate. For example, a migration decision is likely to be made in conjunction with other events such as marriage or divorce, birth and ageing of children, graduation from school, episodes of unemployment and finding new jobs, entering the workforce and retirement. These studies employ event history data or longitudinal data (which tracks the same individuals or families over time). Alternatively, where no "pure" longitudinal data set is available, one can use pooled cross-sectional microdata (i.e. "synthetic" longitudinal data). The advantages of using longitudinal data and some key references (e.g. Odland (1997)) have already been discussed in Chapter 4.

As far as we are aware, little work has been done in New Zealand to capture such dynamic effects (e.g. migration history). The only example we have come across is Heenan (1999). This paper is based on autobiographical details of residential mobility for a small sample of New Zealand male career professionals collected in 1981. Classified by cohort and employment sector, the information is used to examine migration in the context of personal career development. Aspects explored include age of entry to the workforce, frequency of movement, migration and career promotion, and the spatial structure of migration. However, this study has a small sample size. Despite this caveat, this New Zealand study is nevertheless a good attempt to account for the context and individual decision-making processes involved.

One reason for the scarcity of longitudinal studies in New Zealand is because we do not have a suitable longitudinal data set. We only have cross-sectional data (based on the national census), which are available over several five-year periods. Based on such data, one can only use either aggregate studies (impact of "area" characteristics, or "average among individuals in the area" characteristics, on migration flows) or individual studies (if unit-record data is available).

Case studies

Another approach that has been used to identify sub-groups within the population who are bearing the cost of adjustment or the lack of adjustment (i.e. identifying heterogeneity in migration flows) is using case studies. This approach contrasts with the other approaches discussed earlier because it focuses on a particular location and has advantages particularly when mobility patterns and their dynamics differ across locations. Le Heron and Pawson (1996) and Peck (1985) provide a good starting point for thinking about possible case studies in New Zealand to address our key questions.

6.2.2 Implications of heterogeneity on regional labour market adjustment

As discussed earlier, the consequences of migration can be addressed at two levels – one deals with the migrants themselves, and the other deals with migration's impact on others in the origin and destination areas.

In general, although there has been much research on the *determinants* of migration, little research has focused on the *consequences* of migration (see Greenwood, Mueser et al. (1991) and Greenwood (1997)). However, the first type of consequence (i.e. impact on migrants themselves) has been studied relatively more than the second (i.e. impact on origin and destination). As Greenwood (1997, p.650) puts it, "*… the second* [consequence]*, which although potentially important, has not been studied in sufficient depth regarding internal migration*". Greenwood, Mueser et al. (1991) argues that this is because micro and panel data, while valuable for studying the behaviour of individuals (rather than streams of aggregate movement) and on decision-making processes, "*…do not lend themselves to an analysis of the consequences of migration, except the personal consequences*".

Many studies, however, put forward speculative and often untested statements that imply that the question of who moves have some impact on origin and/or destination areas. As an illustration, the quote below is taken from Green (1994):

"The concerns of many policymakers with retaining more highly qualified young adults in their origin areas to contribute to local economic development would appear to be well placed." (p. 1576)

Of those studies that have in fact looked at assessing the effects of shocks and migration flows on the community, case studies are probably the most common approach used. One could focus, for example, on the impact of industrial closedowns and mass redundancies. As mentioned earlier, Le Heron and Pawson (1996) and Peck (1985) provide a good starting point for thinking about possible case studies in New Zealand to address this second part of the third key question.

6.3 Findings

This subsection summarises the findings from research that seeks to identify the heterogeneous migration behaviour, and the impacts of this heterogeneity. For the latter, the discussion will be divided into two parts; one looks at the impact on individuals themselves, and the other focuses on the link between who moves (i.e. the heterogeneous pattern) and the effects on the origin and destination communities. The first part effectively covers the *share* of the cost of adjustment while the second looks at the *size* of the adjustment cost.

6.3.1 Identifying heterogeneity

The conclusion from this subsection is that migrants' behaviour is far from homogeneous. It depends on factors such as qualifications, family structure, gender, home ownership, ethnicity, etc. And this is true for New Zealand and for other countries. Generally, there is evidence that younger, highly skilled, single males, who do not own homes, are relatively more mobile. As for ethnicity, there is no strong evidence of such a systematic mobility relationship. The relationships are more complex, as evident below. We shall now examine the various pieces of evidence that point to these conclusions.

Univariate studies

First, let's look at some stylised facts of mobility differences, according to descriptive-type studies.

Table 6.1 Proportions of migrants by age, for the 1996 total population[1]

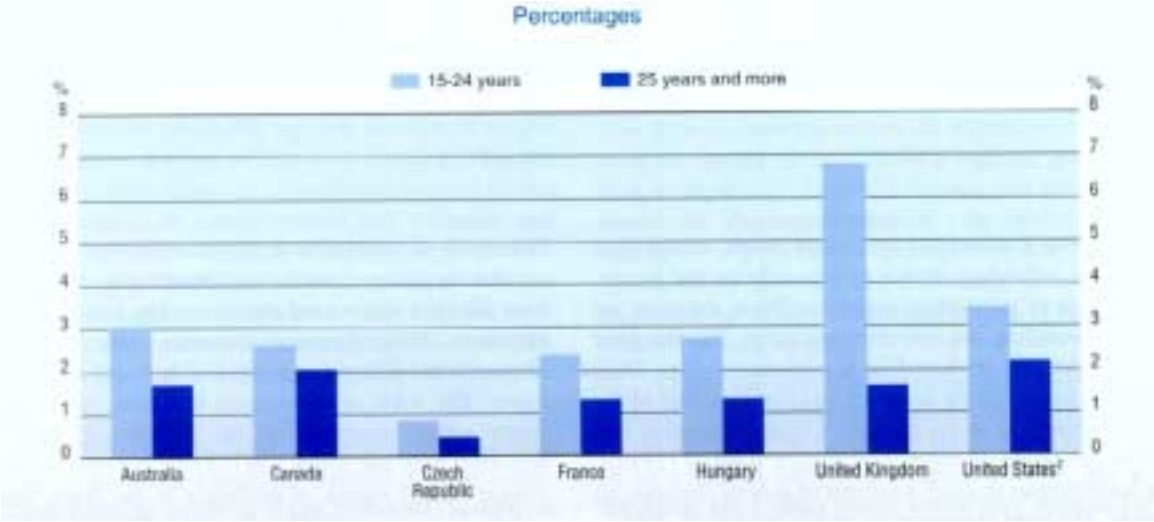
Age	Local & Non migrants	Inter-regional migrants	Overseas migrants
5-9	81.2	12.0	6.8
10-14	83.3	10.0	6.8
15-19	78.1	14.0	8.0
20-24	70.7	21.6	7.7
25-29	69.2	17.4	13.4
30-34	73.5	13.1	13.5
35-39	80.0	11.0	9.0
40-44	84.4	8.6	7.0
45-49	87.5	7.4	5.1
50-54	89.6	6.9	3.5
55-59	90.5	6.4	3.1
60-64	90.8	6.4	2.7
65-69	92.2	5.6	2.2
70-74	93.6	4.7	1.7
75+	94.0	4.8	1.2
Total	**82.1**	**10.9**	**7.0**

Note:
1. These percentages are calculated from a total excluding the "not specified" category.
Data source: Unpublished data files prepared by the Customer Services Division of Statistics New Zealand from the 1991 and 1996 Censuses of Population and Dwellings.
This table was extracted from Goodwin and Bedford (1997), p.8.

Table 6.1 shows the proportions of each five-year age group that are local and non-migrants (i.e. those that have not moved out of their previous region of residence), inter-regional migrants, and overseas migrants in 1996. It is clear that the most mobile age group are those aged 15-39 years, particularly those between 20 and 34 years of age. For example, approximately 22 percent of all 20-24 year olds had moved out of their usual region of residence into another region in New Zealand, whereas only 7 percent of the 50-54 years age group have done so. This is also true for international migrants. This pattern (i.e. more mobility amongst younger people) is apparent in other countries as well. Figure 6.1 illustrates the incidence of internal migration by age in selected OECD countries.

Figure 6.1 Incidence of internal migration by age[a] in selected OECD countries, for the latest available year[b]

Notes:



a) Gross migration flows by age as a percentage of population by age.
b) 1998 for all countries except Canada: 1996.
c) Age group 16-24 years instead of 15-24 years.
Data source: See Table 3.3 of this paper.
This figure was extracted from the OECD Employment Outlook (2000, p. 54).

The next dimension that has been found to influence migration propensities is education. As apparent in the table below, there is evidence in the US that for each age category, migration propensities rise with education. For example, for the 25 to 29 years old class, the migration propensity for the group with five or more years of college is 4.6 times higher than that of the group with 0 to 8 years of elementary school (see Column 2 in Table 6.2). This pattern (i.e. a higher propensity to migrate for people with more education) holds true for all age classes.

Table 6.2 Propensities to migrate inter-state in the US, by age and education (1980-1985)

Education	Age[a]				
	18–24	25–29	30–34	35–44	45–64
Elementary					
0–8 years	8.21	7.02	6.74	4.37	3.78
High school					
1–3 years	9.33	12.50	9.30	5.61	3.94
4 years	11.31	13.10	9.83	7.33	4.84
College					
1–3 years	10.12	15.67	11.60	10.75	6.84
4 years	24.13	25.32	16.54	12.97	7.19
5 years or more	29.04	32.24	21.67	14.06	7.71

[a]The base population is the relevant number of nonmovers over the 1980–85 period, plus out-migrants. Age is defined as of 1985.
Source: Calculated from data presented in US Bureau of the Census (1987: Table 17).

Source: Greenwood (1997, p.656)

Using an age-specific application of the shift-share technique, Green (1994) also finds that young people have a greater migration propensity than (most) other population subgroups. In particular, the author highlights the importance of both the changing age structure and migration pattern shifts of young people in influencing the quantity and shape of the migration flows of working-age people.

Another dimension that researchers have observed that influences the propensity to move is ethnicity. People of particular ethnicities may have a higher propensity to move than others. However, it may not be a straightforward exercise to analyse mobility patterns across ethnicities. For example, simply cross tabulating migration rates and ethnicity in Australia, one might (wrongly[95]) conclude that indigenous Australians are more mobile than the rest of Australia (see Taylor and Bell (1996)).

Meanwhile, in the New Zealand context, Table 6.3 shows migration rates for the Auckland region for 15- to 29-year-olds, by ethnicity. Auckland appears to be "pulling" the mainly 15 to 29 year old group (a net migration rate of 4.3 for 15-29 years old group compared to 0.6 for all age groups). The impact is greatest amongst the European and Maori young adult populations. However, this is mainly due to the fact that Pacific Island Polynesians and Asian populations are already heavily concentrated in Auckland (see Goodwin and Bedford (1997)).

Table 6.3 Internal migration rates for the 15-29 year age group, by ethnicity in Auckland

Group	In Migration Rate	Out Migration Rate	Turnover Rate	Net Migration Rate
All age groups	7.1	6.5	13.6	0.6
15-29 years				
Total	12.2	7.9	20.1	4.3
European	14.3	8.9	22.2	5.4
Maori	18.4	13.0	31.4	5.5
Pacific Is Polynesian	4.1	3.8	7.9	0.3
Asian	4.1	2.8	6.9	1.3

Note: People whose place of usual residence at the time of the previous census was "not specified" have been removed from the denominator used in the calculation of the various rates.

Source: Unpublished data files prepared by the Customer Services Division of Statistics New Zealand from the 1991 and 1996 Censuses of Population and Dwellings.

This table was extracted from Goodwin and Bedford (1997), p. 24.

[95] As it turns out, this higher rate of movement is due almost entirely to the greater concentration of indigenous people in the more mobile, youthful age groups (as cited from Taylor and Bell (1996)).

In New Zealand, some have suggested that Maori are less mobile than non-Maori, despite a more youthful age structure (see for example, Poot (1984)). However, this conclusion is not all that clear. In fact, there is no simple or straightforward relationship between ethnicity and migration. A more interesting exercise may be to see how net migration rates differ across ethnicity for different regions. A related exercise would be to assess how Maori and non-Maori interregional migration is responsive to different factors (examined under the discussion on formal studies below). A closer look at net migration rates by ethnicity for all regions (see Table 6.4) for the 1991-1996 period reveals that a high proportion of Maori and Pacific peoples are moving to Nelson-Marlborough, while a high proportion of Europeans are moving to Bay of Plenty. This could have a large impact on population redistribution in terms of ethnicity.

Table 6.4 Internal migration rates for New Zealand's regions by ethnicity, 1991-1996

	European	Maori	Pacific Island Polynesian	Asian
Northland	-0.6	1.4	2.9	-4.1
Auckland	0.5	0.3	0.2	1.3
Waikato	-0.3	1.4	0.4	0.2
Bay of Plenty	5.0	2.0	6.5	1.9
Gisborne	-4.5	-2.6	7.0	-6.1
Hawke's Bay	-2.4	-2.3	2.9	-7.0
Taranaki	-4.4	-3.3	3.9	-6.5
Manawatu	-1.8	-1.3	1.2	-6.9
Wellington	-1.5	-2.6	-3.0	-2.6
Nelson-Marl.	3.5	7.5	12.7	-1.7
West Coast	-2.0	-3.9	-2.3	-4.5
Canterbury	1.3	2.0	3.5	0.5
Otago	0.9	2.4	-8.3	0.2
Southland	-5.7	-10.8	-20.7	-8.1

Note: People whose place of usual residence at the time of the previous census was "not specified" have been removed from the denominator used in the calculation of the various rates.

Source: Unpublished data files prepared by the Customer Services Division of Statistics New Zealand from the 1991 and 1996 Censuses of Population and Dwellings.

This table was extracted from Goodwin and Bedford (1997), p. 19.

From the stylised facts above, it is obvious that migration patterns are different for different subgroups. Let's now turn to the results from more formal studies.

Multivariate studies

As mentioned earlier, descriptive studies usually focus on only one (univariate) or perhaps two variables. They do not control formally for other influences when examining the relationship between one particular dimension and migration. Furthermore, the relationships are not formally quantified. In the New Zealand context, most of the studies done so far, such as Young and Bedford (1996) and Goodwin and Bedford (1997), are mainly of a descriptive nature. This gap is filled by more formal studies, such as regression techniques, which go beyond merely looking at the

motivating facts. The question of whether the evidence from such formal studies reaches different conclusions or gives us a different insight is addressed next.

Aggregate data

As discussed earlier, aggregate studies are not well suited to examine the influence of personal characteristics on migration behaviour. For example, many aggregate studies have obtained an unexpected sign on variable such as unemployment. For this reason, we shall proceed to individual and longitudinal studies.

Individual data

As discussed in Chapter 4, studies employing individual data allow the researcher to control for composition effects. These studies have shed new light on, for example, the role of personal unemployment. For instance, Böheim and Taylor (2000) find that the unemployed people are more likely to move than employees. This supports the classical economic hypothesis that individuals move to escape unemployment, and suggests that the unemployed are not immobile. Since labour migration is responding to *personal* unemployment, one can say that it appears to be *micro*-efficient. This contrasts with the question of whether labour migration is *macro*-efficient (that is, migration responding to *local* unemployment rates), which is addressed by looking at the aggregate studies.

Some researchers such as Antolin and Bover (1997) have gone further by distinguishing between persons that are *registered* as unemployed at the Spanish Official Employment Office, and the *unregistered* unemployed. The reason for this distinction is that registration not only has a direct negative effect on the probability of migration, but it also alters the effect of regional unemployment. This implies that a higher than average unemployment in the individual's region will only have a positive effect on the probability of migration if the person is a non-registered unemployed, but will have an important negative effect if the person is registered. In short, migration from a high unemployment area to a low unemployment area is valid only for the non-registered unemployed.

Using micro level data on New Zealand male interregional migration, Vaithianathan (1995) finds that in general, Maori who live within their traditional iwi region are 40 percent less likely to leave the region than Maori living outside their iwi area (after controlling for other personal characteristics). The author also finds that non-Maori inter-regional migration is found to be highly responsive to the regional unemployment rate. In contrast, Maori are found to be much less responsive. A 1% increase in the regional non-Maori (Maori) unemployment rate increases the non-Maori (Maori) probability of leaving the region by 5% (0.7%). Vaithianathan's overall conclusion is that iwi-affiliation significantly affects Maori migration. Therefore, if one were thinking of combating Maori unemployment, for example, the more important that iwi affiliations are in determining Maori migration patterns, the more policies will need to explicitly account for iwi.

Longitudinal data

As discussed in Section 4.2, longitudinal data are claimed by some to provide a richer set of information in terms of event history. One might ask if using longitudinal data provides any additional insights *in practice*. The short answer is yes. For example, according to Mulder and Wagner (1993), most of the difference in migration rates between married and unmarried persons is accounted for by unmarried persons

moving in connection with their own marriages (as cited from Odland (1997)). Therefore, estimates of the difference in migration rates between married and unmarried people are likely to be misspecified if the interdependence between the events is neglected. Other studies that find that the absence of this kind of information leads to serious inferential problems in analyses of cross-sectional data include Davies and Pickles (1985) and Odland (1996) (as cited from Odland (1997)). However, Clark (1992) argues that longitudinal and cross-sectional models for the same migration data are likely to yield similar results (as cited from Odland (1997)).

Nevertheless, the weight of the evidence thus far is that life-cycle and family factors are important. Therefore, longitudinal data would provide a much richer perspective of how individuals and families make migration decisions. However, the evidence does not seem to reverse, but reinforce the labour market story. As pointed out by Greenwood, Mueser et al. (1991) and Greenwood (1997), there is likely to be significant gains if future research on migration incorporates these factors.

Case studies

The closure of the Patea Freezing works in September 1982 has been highlighted previously in Chapter 4. There were a few barriers to migration (i.e. barriers to regional labour market adjustment) as discussed earlier – housing, lack of skills and Maori links to their homeland. It is worth elaborating the lack of mobility of unskilled workers. Those who had already moved out of Patea as early as October 1982 (i.e. those who were more mobile) were mainly skilled tradesmen and skilled workers. Almost all the tradesmen were immediately absorbed by Taranaki Energy projects. Most of the meat inspectors have also moved to other freezing works. The unskilled workers were the ones remaining in Patea and looking for other work in the area. The observation that the unskilled workers were finding it difficult to move (i.e. less mobile group) is consistent with the findings in other studies employing other approaches (see for example, Mauro and Spilimbergo (1998)).

Overall patterns

Given all the methodological differences across studies, what can we say about overall mobility patterns? This part summarises the findings on the influence of personal characteristics on migration rates (see Greenwood (1997) and Goetz (1999) for a more comprehensive discussion).

Age

One of the most universal relationships found in the literature examining who moves, is that between age and migration. Migration propensities peak during the early to mid-twenties and then decline steadily, with a slight upturn at retirement age in some countries (Plane (1993)).

Education

Another important mobility relationship found is that between education and migration. The evidence in developed countries almost certainly suggests that migration propensities rise with education (see Greenwood (1997)). Similarly, many studies have found a mobility difference across skill groups (e.g. Mauro and Spilimbergo (1998)).

Gender
There is a marked asymmetry between the mobility of men and women. Men are generally more mobile than women. However, the relationships are more complex than gender differences *per se*. For example, there are interactions with marital status and the employment status of the spouse. Men are most mobile when living with a partner who does not work. When women are in relationships, they are less mobile for own-job reasons, but more mobile for partner's job reasons (see Gardner, Pierre et al. (2000)).

Ethnicity
There are likely to be differences in migration behaviour between different ethnicities (see Vaithianathan (1995) and Taylor and Bell (1996)). In some countries, racial minorities tend to have lower propensities to migrate. However, in others, the direction of the relationship is not all that clear. In New Zealand's case, a common ethnicity distinction is Maori vs non-Maori. There is reason to expect that the differences in migration behaviour could be due to unique cultural and structural factors. For example, continued iwi (tribal-land) affiliations may inhibit the responsiveness of Maori migration to local unemployment conditions, compared to the rest of the population.

Home ownership
There is evidence that non-home owners are generally more mobile. Homeowners, particularly mortgage holders are found to have low levels of labour market and residential mobility.

Personal unemployment
The balance of evidence is that unemployed people are more likely to move, that is, they are not immobile. However, as discussed in Chapter 4, there could be some institutional factors that can complicate the apparent relationship.

Marital status/Family structure
There is quite a clear relationship between marital status/family structure, and the propensity to migrate. Unattached individuals are more likely to move than large families.

We now move on to the second part of the third key question.

6.3.2 Implications of heterogeneity on regional labour market adjustment

As summarised earlier, there is a substantial amount of literature that indicates that migration propensities are dissimilar for different people. One could argue that this suggests that some people (i.e. those with a higher cost of moving) bear more of the cost of adjustment than others (i.e. those with a lower cost of moving). As far as we are aware, there have not been any empirical studies that have *directly* looked at this hypothesis.

Nevertheless, there are theoretical papers that lend some support for this hypothesis. What researchers have done instead, is to infer *indirectly* about the validity of this hypothesis from studies discussed previously.

Despite the scarce amount of studies that directly assess the impact of migration on sending and receiving areas, one can certainly tease out some observations from various case studies. One example is the case study on the closure of the Patea freezing works, the background for which we have described in previous chapters.

"*The effects of population loss on those who remain could be severe. Some of the people now contemplating leaving have played significant roles in the community and their departure will leave roles which are difficult to fill*" (p. 1, TUC Energy Monitor Progress Report No. 8, 4 October 1982).

For example, due to the freezing works closure, some sports clubs and community organisations in Patea were experiencing a decline in membership. More importantly, the departure of key members from these organisations raised questions about their future viability. Meanwhile, in the education sector, the Patea High School student roll fell by 14% over the year following the closure. Similarly, Patea Primary School experienced a 13% decline in student numbers over the same period. Therefore, the question of who actually moves out of a declining area (in this case, Patea), has substantial impacts on that area.

Other case studies for further exploration can be found in Le Heron and Pawson (1996) and Peck (1985).

6.4 Concluding remarks

In summary, we have sufficient evidence that migration propensities differ across the population. Some characteristics have been found to be affecting migration in a systematic way (e.g. age and education) more than others (e.g. ethnicity).

While there has been much research on the *determinants* of migration (*area* and *personal* characteristics), relatively less research has focused on the *consequences* of migration. The consequences of migration can be divided into two – the impact on migrants themselves (personal consequences), and the impact on origin and destination areas (broad consequences). There is relatively little research on the broad consequences of migration. However, the composition of migration flows could have significant implications on origin and destination areas, and this in turn have some policy implications (e.g. debate on whether or not to have area-based economic development policies, or people-based strategies). A challenge for researchers is to ensure that their work catches up with the existing debate on issues.

7 RESEARCH OPTIONS

7.1 Introduction

This section of the paper outlines selected research projects that could shed light on the key questions that have been identified. The list of projects is not exhaustive but reflects instead our view of what is feasible, and is most likely to provide reliable findings of relevance for public policy.

In judging relevance, we have drawn on the analysis and discussion that has been set out in the preceding chapters. We have focused on research that can help us answer the three key questions discussed above. The links of these questions to policy issues have already been articulated, so will not be repeated here. We have also kept in mind the research gaps that were identified in Chapter 1 and have chosen research projects that do not replicate existing or current research.

We have focused our attention on feasible research options - those for which appropriate data are available, and for which there are plausible ways of addressing the 'identification problem' discussed in Chapter 2. We have considered cost and scope as part of feasibility, and have chosen projects that can be undertaken at moderate cost. We have therefore excluded complex projects that require significant investment, such as the building of complex multi-regional models. This is in part a pragmatic choice, and in part a recognition that the knowledge gaps that exist in the New Zealand literature are large. Faced with fundamental gaps in knowledge, uncovering broad patterns can be of great use, and will provide a good foundation for more complex analyses that may follow.

Finally, in selecting research options, we have considered the expected quality of findings. In our reviews of the methods that have been used to answer the key questions, we have noted the potential sources of bias associated with different empirical methods. Our research options incorporate suggestions about how to account for these biases, so as to generate findings that are as robust as possible.

7.2 Choosing which of the options to proceed with

As noted in Chapter 1, no single research project is able to provide answers to all three of the key questions that we have focused this paper on. The methods and types of data that researchers generally use to focus on each question differ by question. The questions, and the research options that are presented, have in fact been chosen to be largely complementary. The choice of which research option is the most important or should be done first therefore centres on which of the three questions is of greatest interest.

Having said that, choosing any one option may shed some light on all three questions. It is just that what will revealed about the questions that the option was not designed to answer will be less robust.

For instance, option one is designed to detect the existence and size of migration responses to labour market changes. One of the suggested sets of controls to be included in the study are controls for demographic composition of areas. We will therefore learn something about "who moves" - one of the parts of key question three.

Similarly, option two is designed to learn about the relative size of the migration response to regional labour market changes, compared with other forms of labour market change, and about the speed of regional labour market adjustment. It will therefore reveal something about the presence and strength of the migration response to labour market change (key question one). It does not, however, allow as much attention to be paid to biases that may arise from differences in demographic composition or non-labour market differences across regions.

The case study option, option three, focuses on the way that labour market adjustment in the form of migration affects particular communities. Given the breadth of information that can be collected as part of a case study, it will be possible to say something about the existence and relative importance of migration adjustment for the communities or incidents studied. However, being case studies, they will not be able to inform us about how significant the patterns that are identified are for New Zealand as a whole.

Options one and two are fairly clearly defined, although some work is still needed to confirm that the necessary data are available for option two. Option three is less well defined, but we suggest that a first step would be to develop the proposal in more detail along the lines that we set out below.

The choice of whether to proceed with one or more of the options comes down to a question of available resources, and a judgement about the importance of answering each key question, relative to other possible demands on research resources. It is hoped that the extensive discussion in the body of this paper about the strengths and weaknesses of various methods, and about the range of findings found in the existing literature, will greatly reduce the inevitable uncertainty surrounding this judgement.

7.3 Option 1. Identifying the link between migration flows and regional labour market adjustment

7.3.1 Introduction

This first research option relates to key question one, which considers the evidence for a link between migration flows and labour market conditions. We see the estimation of a spatial interaction model, based around a generalised gravity relationship, as the most appropriate way forward. There is a well-developed empirical literature using these models which provide guidance and will allow for comparison of results (including comparisons with existing New Zealand studies (Poot (1986b); Maré and Timmins (2000)).

Our proposal is for a study using New Zealand area-level census data, examining the relationship between inter-censal (5-year) migration flows and labour market conditions at various levels of aggregation (area units, territorial local authorities, and regional councils). The discussion of this research option describes the analysis that we envisage, and outlines a range of specification and sensitivity issues that the study should address.

7.3.2 Methods

The foundation for the study is a spatial interaction model as outlined by Alonso (1978). This model formulates migration flows as a function of relative attractiveness of origin and destination areas, and of frictions between areas. The flow from area i to area j is modelled as:

$M_{ij}(t) = c(t)\, O_i(t)\, D_j(t)\, F_{ij}(t)$

where $M_{ij}(t)$ is the migration flow from i to j
$c(t)$ is a constant
$O_i(t)$ is the total forces 'pushing' people out of region i
$D_j(t)$ is the total force 'pulling' people into region j
$F_{ij}(t)$ is the friction affecting flows between i and j

In the simplest gravity model, O_i and D_j are replaced by the populations of areas i and j respectively (each with an estimated exponent), and the friction term is replaced by a measure of the distance between i and j (also with an estimated exponent). See Nijkamp and Poot (1987) for a fuller discussion of the components of the spatial interaction model.

One of the main criticisms of such models is the lack of an explicit behavioural foundation that would justify the functional form used.[96] While accepting that criticism, for our purposes, we suggest relying on a simple gravity relationship to capture the strong empirical patterns that are known to exist between population size, distance, and migration flows.

Our main interest is to estimate the relationship between migration and labour market conditions. We therefore suggest augmenting the basic model by adding appropriate measures of the relative attractiveness of local labour markets that are more closely linked to behavioural factors. Other measures could be added capturing factors that

[96] Some progress has been made in developing microfoundations for gravity models in the context of international trade (Anderson and van Wincoop (2001) and Deardorff (1998)), although Deardorff (1998) has pointed out that a gravity equation is derivable from any plausible model of trade.

are suggested by theory and that could bias our estimates of labour market impacts if they were omitted.

The general form of the estimating equationwould be[97]:

$$M_{ij} = cP_i^{\alpha_1} P_j^{\alpha_2} D_{ij}^{\alpha_3} \left(X_i^{\beta_1} X_j^{\beta_2} F_{ij}^{\beta_3} \right)$$

where P_i and P_j are populations of areas i and j respectively
D_{ij} is the distance (or travel time) between i and j
X_i and X_j are other measures of the attractiveness of areas i and j
F_{ij} contains other measures of friction of flows between i and j.

Labour market measures

Measures of relative labour market attractiveness could include:

- relative employment rates: employment/working age population, or employment/labour force (depending on whether the employment chances of discouraged workers and non-participants are relevant for the migration decision)
- relative employment growth rate;
- relative wage rate (measured as average or median)

All relative measures are to be measured as deviations from national average so as to capture relative attractiveness[98]

Other measures of area relative attractiveness

In our discussion of key question one, we emphasised the potential importance of permanent differences in the attractiveness of an area. These could arise due to the presence of amenities, sustained differences in cost of living, etc. Where direct measures of environment, climate, infrastructure, etc. are available these can be included as covariates. Otherwise, location-specific attractiveness can be accommodated by methods such as fixed effects modelling.[99]

Where available, a range of other measures of attractiveness can be included, such as

- fiscal measures (net public provision of goods and services to an area);
- diversity or concentration measures (e.g. a broad based industrial structure may be attractive as it allows some 'insurance' by pooling industry-specific risks (see Maré and Timmins (2000)).
- neighbourhood measures: If using spatially coded data, it is possible to derive measures of characteristics of areas surrounding a particular location, which may be relevant for migration decisions (see Kerr, Maré et al. (2001)).

Composition differences

Another issue emphasised in the discussion of key question one was the importance of allowing for differences in demographic or employment composition. One of the costs of using area-level data rather than individual data is that the ability to control for inter-group differences in migration rates is limited. To the extent that these are also

[97] For larger geographical areas, the equation can be estimated in log form by linear regression. For smaller geographical areas, such as area units, some areas will have zero inflows or outflows, so the log transformation is not appropriate, and some form of nonlinear estimation (eg: maximum likelihood) is needed.

[98] This would not be appropriate if we wished to understand international migration flows as well, as it ignores the relative attractiveness of New Zealand compared with other countries. See below for a brief discussion of the treatment of international migration

[99] See Mátyás (1997), Mátyás (1998), and Eggers (2000) for a discussion of estimating gravity models with panel data. See also Isard (1998) and Sen and Smith (1995) for a more complete discussion of gravity model specification issues.

correlated with labour market conditions, estimates of the relationship between migration and labour markets could be biased.

At a minimum, measures of demographic composition along key dimensions such as age, gender, marital status, ethnicity, home ownership, industry mix should be included as covariates. As with the attractiveness measures, these should be measured as deviations from national means.

Measures of Friction

As noted above, the most common measure of migration friction is distance between locations. We consider that travel time is superior to linear (crow-flight) distance. When using area-level data, each area must be assigned a specific location. We consider population centroids as the most appropriate measure for migration modelling. Indicators of physical barriers between any pair of locations, such as Cook Strait or the Southern Alps can be included in order to test whether they represent any additional friction.

When looking at links between migration and labour markets, it is plausible to consider more general forms of 'distance' or dissimilarity between locations. For instance, migration may be stronger between areas that have similar occupational mixes, age structure, ethnic mix, or industrial composition. Conley and Topa (2000) argue that such measures capture aspects of social and information networks. Some may also reflect the importance of industry or occupation-specific human capital.

A related concept that is common in the internal migration literature is that of the "well-worn-path". Migration flows will be stronger between two areas where there has been significant past migration. Sometimes, lagged migration flows are included to reflect this factor. An alternative that we suggest is to express the sum of inter-area flows for a given pair of areas as a proportion of the sum of their populations. This approximates the proportion of the two areas' populations that have (recently) lived in both regions.

Administrative boundaries have also been included as possible sources friction. In the context of a New Zealand internal migration study, regional council or territorial local authority boundaries can be used where the unit of observation is an area unit.

7.3.3 Specification issues to be resolved

As with most empirical studies, the devil of the project is in the detail. We list in this section a range of technical, conceptual, or modelling issues that will need to be dealt with in some way by a credible applied study.

International Migration

Many existing studies of migration and regional adjustment have focused solely on internal migration, ignoring the adjustment that takes place via external migration. As we have noted earlier, this (lack of) treatment of border flows is more of a problem in the New Zealand context than for other larger countries.

Two main issues arise if we are to incorporate external flows into an analysis of migration and regional labour markets in New Zealand:

- Labour Market Attributes: Ideally, we would like to treat foreign countries in the same way as we do any other location – using information on relative labour market conditions, attractiveness, and frictions. In practice, it is not possible to get as complete information on all potential source and destination countries as

we have available for New Zealand locations. Similarly, it is not clear what distance or population measures should be chosen to associate with flows to the rest of the world.

- Missing Emigration rates: If we are to use Census data, which contains retrospective 'prior location' questions, there is no information on people who had left New Zealand, as they were not present on Census night.[100]

The way that these two issues are resolved depends on how misleading the omission of external flows would be for our inferences on the role of migration as a regional adjustment mechanism. Figure 3.2 shows that for the 1991-1996 period, international inflows occur at a relatively low rate that does not vary greatly across regions (with the exception of non-UK non-Australian inflows into Auckland). There is therefore limited scope for external inflows to serve as a general regional adjustment mechanism. Figure 3.3 show that the pattern of external inflows across regions is similar to the pattern of (estimated) external outflows, again with the exception of Auckland. Although external migration may play a significant role in facilitating to changes in relative labour market conditions between countries, it appears to play a more limited role in facilitating labour market adjustment between locations within New Zealand.

While this suggests that an analysis of internal flows alone is likely to be informative for the question at hand, we consider that it is still prudent to check the sensitivity of any inferences to the inclusion of external flows.

Estimates based on gross internal migration flows alone could be used as a base specification. Including the data that is available on inflows from outside New Zealand entails adding one observation for each area in New Zealand, capturing the flow from the rest of the world to each area. Area attributes could be entered as sample means, and then the relative attractiveness of New Zealand compared with the rest of the world absorbed by a dummy variable/ fixed factor. If estimated external outflow rates are available, these could be treated symmetrically[101].

Commuting

Short term migration (essentially residential moves) and commuting are substitutes. A credible study would need to either model commuting patterns explicitly, or find a way to focus attention on non-residential moves. A plausible way to reduce the influence of residential moves on estimates is to exclude short-distance moves. For instance, moves of less than 10km or less than 20km could be excluded. Figure 3.1 shows that a 10km limit excludes around 50 percent of moves, and a 20km limit excludes around 60 percent of moves.

Endogeneity of labour market conditions

A well known issue associated with estimating flows from stock measures, as is done when migration flows are modelled as a function of labour market conditions and population sizes, is that choices need to be made about when to measure the stocks, and that these choices can matter. For instance if we wish to understand migration flows between 1991 and 1996, we could use relative wage levels from 1991, or from

[100] It is possible to estimate outflows by using estimated mortality rates to isolate the unexplained population loss, as James Newell has done at the Regional Council level for flows between 1991 and 1996.

[101] Given the inevitable additional noise that is introduced by the modelling of outflows, it would be informative to report estimates of key labour market parameters based on internal flows and external *inflows* only.

1996. Measures from 1991 may miss subsequent wage changes that induced migration flows. However, to the extent that migration influences wages, estimates based on 1996 wages would confound this effect with the influence in the other direction (wages to migration), which is what we are trying to estimate. One way of steering through this dilemma is to instrument for 1996 wages (or 1991-96 wage changes) using information available in 1991.

Adding-up constraints

Estimates from a spatial interaction model will not necessarily 'add-up' unless additional constraints are imposed. When modelling internal migration flows, total outflows are equal to total inflows, since everyone has to be somewhere! There is a range of constraints that have been applied in the literature. Singly constrained models require that the sum of estimated inflows equals actual total inflows, or that the sum of estimated outflows equals actual total outflows. A 'doubly-constrained' model requires both. If the estimates are going to be used for simulation or prediction, it is important that these adding up conditions are taken seriously (see Nijkamp and Poot (1987)).

Symmetry of inflows and outflows

Modelling gross migration flows can allow for relative attractiveness to affect inflows and outflows differently. Modelling net flows imposes symmetry – the effect on inflows is assumed to be exactly the opposite of its effect on outflows. Gross flow modelling also reveals more about the underlying influences on flows. In New Zealand, where migration effectiveness is relatively low, it is particularly important to use information on two-way flows, and thus to model gross flows.

Level of aggregation

The relationship between labour market conditions and migration flows may differ at different spatial scales. Table 3.5 shows that the estimated patterns of persistence in labour market conditions is different for area units compared with regional councils. No level of aggregation is of greater importance or interest *a priori* if the objective is to understand the links between migration and labour markets. Care is however needed when drawing inferences, given that there is likely to be more idiosyncratic noise in data on smaller spatial units.

It would be useful to produce estimates for area units, TLAs and Regional Councils.

7.3.4 Data

The New Zealand quinquennial census is the most appropriate source of data for this study. The database that the Treasury and Motu have established contains information from the 1981, 1986, 1991 and 1996 censi. These data provide sufficient information on migration flows, labour market characteristics and conditions, and broad demographic characteristics of area populations at area unit level.[102] Area unit data can be aggregated to TLA or Regional Council boundaries. In the course of the project, it may be possible to supplement the dataset with additional measures of amenities.

[102] The exceptions as noted earlier are the lack of data on external out-migration, and the lack of labour market characteristics for countries outside New Zealand.

The data are stored as geographic information, so it is relatively straightforward to derive spatially defined variables such as neighbourhood characteristics and travel times.

Unit record analysis would require access to unit record data from Statistics New Zealand. At this stage, we consider that a study using spatial units as the unit of observation would enable us to advance our knowledge substantially. Once the broad patterns and relationships have been identified, consideration can be given to a more detailed analysis using individual data.

7.3.5 Resources & Timing

The main resources needed for the project are in the form of the time of researchers. The data are already largely assembled for this project.

Although we have not done detailed estimates or costings, we judge that this project would take a competent empirical researcher a minimum of 4-6 weeks full-time to complete, probably spread over several months. Dealing credibly with the range of specification issues and sensitivity testing could double this estimate.

7.4 Option 2. Identify relative strength of migration as a regional labour market adjustment mechanism

7.4.1 Introduction

The second research option is most closely linked to the second key question, looking at the relative strength of migration adjustment, compared with other forms of labour market adjustment. The suggested method is to use a VAR modelling technique to capture the time series variation in labour market measures. Following the approach in the literature, the migration response will be inferred from estimates of variation in other labour market measures.

7.4.2 Methods

The general form of Vector Autoregressive (VAR) models is discussed in Chapter 5, as is the literature that uses VAR models to estimate regional labour market adjustment patterns. Given the discussion in Chapter 5, the presentation here will be somewhat condensed, reiterating some of the main issues with which a credible empirical project will need to deal.

Base specification

Box 2 in Chapter 5 presents a stylised Vector Auto-Regressive (VAR) model using three labour market variables. While this gives a good idea of the form of the model, there is a range of issues that need to be resolved even before settling on a base specification.

Specification issues to be resolved

The discussion in Chapter 5 has already covered many of the specification issues. They are therefore discussed only briefly here.

Choice of variables

The first choice that a project in this area will need to settle is the choice of which labour market variables to include. There is a variety of choices in the literature, reflecting data availability, data quality, and the main interest and focus of particular authors. Adding more variables uses up degrees of freedom fairly quickly, so parsimony is essential. The insights from including non-labour market variables must similarly be weighed against the (statistical) costs of doing so.

The form in which the variables enter the equations is also requires some judgement by the researcher. As noted in the text, the errors of the VAR system of equations should be time-series stationary. This can be achieved by testing and suitably transforming the labour market variables. Blanchard and Katz (1992) also transform their labour market variables to be deviations from national means, so as to exclude the (common) impact of aggregate shocks, and focus their findings on the impact of changes in relative labour market conditions.

Choice of lag structure

Choosing an appropriate lag structure for each variable also reflects a tension between capturing non-trivial dynamics and reducing the time period for which estimation is

possible. Univariate analyses are often used to learn about time series properties of particular series before deciding on the appropriate lag structure.

Identification assumptions

In order to interpret the coefficients of the VAR system, assumptions need to be made (and preferably tested) about how shocks are transmitted. For instance, Blanchard and Katz (1992) assume that current changes in employment affect current values of participation rates and employment rates but not *vice versa*. Further, they assume that changes to employment can be interpreted as changes in labour demand. With these assumptions, they can draw inferences about the response to a shock to labour demand. They spend some time in their paper justifying their assumptions.

7.4.3 Data

One of the main challenges for a research project in this area is that existing data sets do not currently provide the data series that are required on regional labour market conditions over time.

The most complete data source is the Household Labour Force Survey (HLFS), which contains data from December 1985 to the present, but from which sub-national statistics are available only from June 1990. The sub-national detail increased in December 1994, but is still available only for groupings of regional councils.

A priority for this project will be to discuss with Statistics New Zealand whether it is possible to use unpublished geographic data from the HLFS. Although the sampling errors on population estimates are too large to warrant publication, it may be acceptable to use the data for estimating time series relationships (noting that standard errors may be large due to the sampling error). Ideally, data on regional councils (or grouped regional councils where they are small) would be used in the study. The small area statistics group within Statistics New Zealand may be able to help in obtaining the required data.

An additional weakness of the HLFS for this project is that it does not contain a wage measure. For this, data from the Quarterly Employment Survey (QES) could be used. Although it is not strictly comparable with the HLFS,[103] the time series behaviour of the wage variable could be used as a guide to wage evolutions. The geographic definitions for the QES are not the same as for the HLFS, so we would need to investigate whether QES data could be provided on a basis consistent with the HLFS data. The QES series has a break in 1988, and some consideration will need to be given to how to deal with this.

At this stage, we cannot see any feasible alternative to the HLFS/ QES combination, or any feasible data source that would allow the analysis to extend prior to 1985. Labour Force estimates are available prior to 1985, based on the QES, or the half-yearly survey of employment, combined with unemployment register data. These were not however, derived for sub-national areas. Neither do they provide measures of the working age population by location, as would be needed to calculate employment rates or participation rates.

Backdated HLFS series have been generated at the national level by Gorbey, Briggs et al. (1993), but have not been derived for subnational geographic units.

[103] For instance, the QES is a survey of firms whereas the HLFS is a survey of (household) addresses.

7.4.4 Resources & Timing

The greatest uncertainty surrounding this project relates to acquiring the data. Confirming that the required data are available is therefore a necessary first step.

Once the data are available, the analysis and preparation of a paper would take something in the order of 4 weeks of full-time work by a competent researcher, probably spread over several months.

7.5 Option 3. Who moves and does it matter?

7.5.1 Introduction

The third research option relates to the third key question, which deals with who moves and whether it matters for regional adjustment. We envisage a case study, or set of case studies, focusing on the impact of migration in locations where there are known to have been labour market shocks such as plant closures or the establishment of new plants. The case study approach could investigate a wide range of types of adjustment, including migration. It could also assess the impact of any migration response on the community that experiences the shock.

While we are confident of the value of using a case study approach, neither author of this report is an expert in case study design. We therefore suggest that, if a decision is made to proceed with this research option, further input be sought from someone experienced in this method.

The question of "who moves" may suggest a project to identify different migration propensities of people with different demographic characteristics. Such a project could analyse unit record data from the census, and model migration propensities as a function of demographic and area characteristics. Using unit record data would allow for plausible controls for selection bias, and would enable us to identify heterogeneous migration behaviour more credibly than is possible with location-based data. While such a project would be worthwhile, and would help to fill a current (partial) knowledge gap, we recommend that the case study proposal be undertaken first. Consideration could be given to a detailed analysis of unit-record data once the patterns for particular spatial units are understood.

7.5.2 Methods

The range of information that could be collected as part of a case study is immense, and anyone carrying out this research would need to maintain a clear focus.
An effective case study could be focused on two main questions:

- How does a labour market change alter the migration decisions and actions of people in communities affected by labour market change?
- What impact do migration decisions and patterns have on communities affected by labour market change.

The information that would need to be collected to answer these questions would include

- quantitative and qualitative information about the labour market prior to and after the change, and about the change itself;
- information about actual migration patterns prior to and after the change
- subjective reports from potential and actual migrants about their 'move or stay' decision
- information about community resources and dynamics, and how they change as a result of migration flows.

The case study should be designed to develop testable hypotheses, and where possible also to test refutable propositions. A purely descriptive account of the experience of a particular community is less likely to yield insights that can be tested and applied elsewhere.

Given that the focus of the project would be on adjustment over time, the individuals, community and labour market chosen would ideally be followed over an extended period. To bring the completion of the project forward, some information could be collected retrospectively. Information collected retrospectively will be less reliable and complete, so this needs to be weighed against the need for timely findings.

7.5.3 Data

The choice of which labour market changes and which communities to choose for study is a crucial one. It may be that combining insights from a small number of carefully chosen case studies could reveal more than is revealed by any one.

For instance, the closure of three Bendon plants in late 1999 provides a natural cluster of case studies that can be used to shed light on the role of different labour market conditions. The three plants were in Te Rapa (just North of Hamilton), at Te Aroha, where the plant was a major employer, and in South Auckland, near a large labour market. Given the similarity in the type of work done in the three plants, case studies could investigate whether former employees in the three plants made different migration decisions that reflected their local labour market conditions. Given that these closures occurred some time ago, it may be difficult to retrospectively analyse the decisions, migration responses and the impact on the communities. The example is included here in part to indicate the sort of selection that might highlight the questions listed above. We should also remember that the establishment of new enterprises also provides a labour market change that could be. Given the interest in regional development policy issues that was noted in Chapter one, there may be at least as much interest in the dynamics of positive labour market change as in negative labour market change.

Developing a list of possible communities and incidents to study requires a great deal of knowledge and judgement about changes at the local level. Rather than providing such a list, we instead suggest the sort of criteria that might help in choosing case study candidates. At a minimum, any chosen community should:

- have experienced a substantial, discrete labour market change that could be expected to induce a migration response;
- contain a mix of people, with a range of characteristics (e.g.: skill levels, household composition, age);

We recommend studying more than one incident/ community, to allow for comparisons to be made. Such comparisons can help in framing and testing different hypotheses. If multiple case studies are considered, the selection should allow for:

- differences in demographic characteristics
- differences in community characteristics (e.g.: urban/ rural; ethnic mix; immigrant mix; strength of community bonds)
- either similar changes in different sorts of labour markets, or different changes in similar labour markets
- differences in location (degree of isolation; commuting options)

In analysing the implications of these differences, the project should where possible derive and test hypotheses about causal links between factors.

7.5.4 Resources & Timing

The key input into for this sort of project is a researcher (or small team of researchers) who is skilled in qualitative and quantitative case study methods, and who has particularly strong analytical skills. The researcher should ideally have a strong interest in and knowledge of local labour market issues.

We suggest that the project be split into two stages – the first would identify plausible candidate communities for study. This would involve collecting summary information about the nature of labour market changes and community characteristics, and more precisely specifying what insights are most likely to be gained from looking at different candidates. This stage would initially rely on secondary material and the knowledge held by people in local government, community and iwi organisations to identify candidates.

Once this preliminary work has been done, a decision could then be made about which communities or incidents to study, and a detailed research plan drawn up for a second stage of carrying out the research. Estimates of the resources and timing needed for the studies would need to be developed at this stage.

With this sort of research, it is beneficial to allow for a lengthy data collection period. At least a year is likely to be needed to collect and process information, although researchers would not be actively working on the project for all of this period.

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