SELECTED CONVENTIONAL MIGRATION CORRELATES AND THE EXPLANATION OF INTERNAL NET MIGRATION IN NEW ZEALAND, 1966-1971

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ABSTRACT

Migration research in New Zealand with national data sets is limited. It is generally assumed, however, that the most common trends of population redistribution such as the movement north, in particular to Auckland, the movement from rural areas to urban areas and the increasing concentration of the population in cities are responses to economic variation in the national space economy.

A number of general hypotheses are selected to examine the age and sex characteristics of migrants. The research hypotheses, which focus on relationships between net migration and the largely untested correlates in New Zealand of income, employment, unemployment and population, examine the validity of the assumption that internal migration in New Zealand is a response to spatial variation. In addition to the testing of the hypotheses an examination is made of spatial variation within the selected parameters.

The research hypotheses are tested at three levels of data aggregation - regions, counties and urban areas. The migration data, which are generated by residual estimates using both vital statistics and life survivorship techniques indicate that the majority of migrants are the young adults with females being marginally more migratory than males.

It is the examination of the selected conventional migration correlates that the most important, and in many cases unexpected, results emerge. It is found that aggregate migrant behaviour in New Zealand cannot be predicted from the selected migration correlates.

At the regional level the Central Auckland data affect the nature of the entire relationship with large values for both dependent and independent variables. With the omission of this data correlations between variables approach zero. A number of data problems are apparent, however, which may be of importance in explaining the lack of relationships. On the other hand, it is shown that there is minimal spatial variation within the parameters so that regional migration may be the result of noneconomic space preferences rather than economic and demographic variation.

At the county level and urban area levels some relationships emerge which are good. There are again some doubts about these relationships as they may reflect a degree of autocorrelation; the higher levels of migration to larger centres of population being simply a function of the population size of these areas.

It is concluded that net migration in New Zealand cannot be explained by previously accepted although largely untested economic and demographic correlates.

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Chapter 1

CONCEPTUALISATION OF THE RELATIONSHIP BETWEEN NET MIGRATION AND REGIONAL DEVELOPMENT IN NEW ZEALAND

Interregional migration is a widely researched and published area of scientific enquiry. It has been suggested, however, that few additional generalisations have been made to those observed by Ravenstein in the last century (Lee, 1966). In spite of this, there have been a number of conceptual developments which provide alternative frameworks within which migrant behaviour may be considered. The major concepts which are discussed in this chapter by no means cover all alternative conceptual frameworks or models. This has been done elsewhere (e.g. Olsson, 1965a). What is attempted is the synthesis of those concepts which, in addition to a general understanding of the New Zealand space economy, are applicable to the formulation of the research problem that this thesis will examine.

MAJOR CONCEPTS AND MODELS

In general the major migration concepts can be differentiated by where the emphasis is placed on the interplay of the migration constants - the migrant, the origin, the destination and the intervening obstacles. As a result, emphasis on the migrant may be seen as a behavioural approach while emphasis on the other constants may lead to a more functional economic approach.

An early formulation of the relationship between the migration constants was made by Young with:

$$m = ax/y$$

where migration 'm' is a function of the independent variables 'x' and 'y', defined as "forces of attraction" and distance, with 'a' being a constant for proportionality (Young, 1928). The concept of forces of attraction is similar to the push - pull conceptual framework (Thomas, 1938). In this framework negative factors at the origin, which exert a push force on potential migrants, act in association with positive pull forces at a destination.

Pull forces are analogous to Stouffer's conceptualisation of opportunities (Stouffer, 1940). Stouffer postulated a direct relationship between migration and opportunity; thus, the number of migrants going a certain distance is directly proportional to the number of opportunities at that distance and inversely proportional to the number of intervening opportunities. The relationship between migration and distance was conceptualised as being dependent on an auxiliary relationship where the cumulated intervening opportunities are modelled as some function of distance. It will be noted that the modelling of this conceptualisation of migration attempts to explain interaction between distance bands rather than between specific locations.

The P_1P_2/D formula on the other hand represents an alternative operationalisation of migration between locations where the numerator is defined as population size rather than opportunity (Zipf, 1946). The Zipf model approaches maximum utility when the basic assumptions of homogeneous distribution of income and unemployment are relaxed (Anderson, 1955).

In many respects the model outlined by Lee is a conceptual synthesis of the earlier postulates (Lee, 1966). Lee conceptualised migrant perception of the relative merits of origin and destination as a set of positive and negative factors plus other variables to which the migrant is indifferent. A surplus of positive factors at the prospective destination, defined differentially for each individual does not, however, necessarily lead to migration. Intervening obstacles such as distance and residential inertia reinforced by personal factors such as the effect of impedimenta, for example children, and stage in the life cycle may act to prevent migration in spite of perceived benefits at some destination.

Two further conceptual frameworks will be considered; they tend to epitomise the behaviourist and functionalist alternatives. The conceptualisation of migrant behaviour by Wolpert extends the importance of residential inertia and migrant characteristics (Wolpert 1965). The decision to migrate and residential inertia are bound by the subjective appraisal of what Wolpert terms "place utility" rather than the sole consideration of objective economic circumstance. The appraisal of place utility represents a subjective analysis of achieved against expected or perceived returns at an alternative location. As a result, collective migrant behaviour is the aggregation of individual decisions regarding place utility.

The gravity model is a refinement of the earlier Zipf model and is an extension of potential models (Olsson,

1965a). While there are a number of methodological weaknesses in adopting an analogue model from the physical sciences the gravity model nevertheless is an effective aid in the explanation of aggregate migrant behaviour (Harvey, 1970). The model may be stated thus:

$$I_{ij} = k\frac{P_i P_j}{D^b_{ij}}$$

where I_{ij} = interaction between place i and place j
P_i and P_j = size of places i and j
D_{ij} = distance between i and j, and
k and b = empirically derived constants.

The nature of this model is such that its power of explanation may be increased by the application of weights and exponents to account for even anomolous migrant behaviour due to factors such as cultural background and noneconomic space preferences.

MIGRATION AND REGIONAL DEVELOPMENT IN NEW ZEALAND

There has been little quantification of the relationship between migration and patterns of economic variation in New Zealand. In view of the lack of published material on this relationship both migration research and some key trends in regional development, as a general index of spatial economic variation, have been considered individually.

Migration Research in New Zealand

Migration research in New Zealand is hindered to a great extent by the limitations of available data; thus, investigation at the regional level is minimal. More

attention has been given to other aspects of migration.

Considerable research has been done in the field of the migration patterns of specific ethnic and culture groups. The study of non-British migration to New Zealand of groups such as the Dutch, Yugoslavs and Germans has used a number of sociological concepts in explaining differential spatial and economic patterns of absorption into New Zealand society (Thomson and Trlin, 1970).

Similarly, patterns of Maori internal migration are generally well understood (Heenan, 1966; Poulsen, 1970). The determinants of Maori migration, while reflecting in part some of the general trends are, however, different from those of the total population. This is due to the demographic characteristics of theMaori population which exhibit, for example, greater population increase than the total population (Vosburgh, 1976).

Some general investigation has been made into the process of rural to urban migration (Viggers, 1952; Heenan, 1968), however, migration process has generally been considered at the intra-regional level. Migration research has been done emphasising mobility within the urban hierarchy of the Manawatu (Anderson, 1964; Moore, 1968). Mobility through the hierarchy has also been examined within the framework of stepwise migration and the career cycle for a South Island rural area (Keown, 1971).

A third area of migration research has been at the intra-urban level, with Christchurch in particular having received attention (Fairbairn, 1963; Johnston, 1969).

While there has been an examination of net migration in the South Island (Heenan, 1968), until recently the work by McCaskill represented the only broad examination of general trends of migration at the interregional level for the whole of New Zealand (McCaskill, 1964). This work aimed to map and describe variation in non Maori net migration as a component of population change in New Zealand for the 1956-1961 intercensal period. The results, based on vital statistics, take the form of rate of net migration for counties and both rate and volume of net migration for boroughs and urban areas.

It was found that while there were losses in rural areas and small boroughs only the West Coast of the South Island and the eastern extremity of the East Coast of the North Island were losing population without some gain at a regional centre or market town. It was inferred from this that many "nodes of attraction" existed outside the major metropolitan centres.

The publication of data from the 1971 census, which introduced questions on residence one year and five years prior to census night, has allowed the estimation of net migration trends between areas in New Zealand. Initial investigation of trends indicate that at the regional level only Central Auckland and Canterbury are gaining population through migration (Rowland, 1975). The south to north trend and the particular importance of movement to Central Auckland is confirmed with all other regions losing population to that area. A gravitational affect may also be noted with most migrants to Central Auckland coming from the north of the North Island. The only

movement south, from Nelson to Canterbury and from Taranaki to Wellington, may be associated with migration to the major metropolitan centres within these regions.

Migration in the intercensal period 1966-1971 was more important in its effect on South Island population growth rates than its effect on the North Island. The South Island population grew by only 3.5 percent against an expected increase of 5.6 percent. On the other hand, migration added only .9 percent to the North Island's expected growth rate of 7.6 percent.

Migration and Regional Development

The major migration trends in New Zealand including rural to urban population movement, migration from towns to cities and in particular Auckland, plus the general drift north have generally been viewed as a response to economic differentials. It has been suggested, however, that economic disparities between regions are minimal with, for example, rural poverty being "of a sporadic and individual nature without class or regional significance" (Franklin, 1975, 144). Similarly, it has been suggested that the only region showing decline is the West Coast of the South Island and that growth regions such as the Bay of Plenty and Central Auckland do not have either average income or living standards disproportionately above those of the rest of the country (Marshall, 1972).

In many respects the New Zealand space economy has retained the characteristics of its early development as a two-tier regional system (Cant and Johnston, 1973). The system developed with the lower level being charac-

terised by homogeneous regional primary industries while at the higher level Auckland, Wellington, Christchurch and Dunedin performed the metropolitan functions. While the general pattern remains there have been a number of changes at both levels. Changes have occurred in primary production patterns with, for example, localised developments in forestry and contract horticultural production (Le Heron and Warr, 1976). There have also been changes in the relative importance of the metropolitan centres with Auckland increasing its dominance of the national space economy balanced by the decline in the other major centres and in particular Dunedin (Le Heron, 1977).

A number of regional development indices have been quantified which illustrate the general trend of changing relationships between areas plus the increasing dominance of Auckland and the Central Auckland region as a whole (e.g. McDonald, 1969).

Data from the mid 1960's show that of the 21 Income Tax Districts in New Zealand[1] 17 had income levels below the national average (Jensen, 1969). More recently, it has been noted that there is an income dichotomy in New Zealand with a situation of "Auckland and Wellington versus the Rest" (Johnston, 1976, 156). Metropolitan dominance of income levels is interpreted as being due to the different occupation mix and the supply and demand ratio being in favour of the labour component in these areas.

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1 There are now 22 Income Tax Districts.

Recent evidence would suggest that the historical trend of population and labour movement to the North Island and especially Auckland is likely to continue (McDonald, 1969). While employment patterns have uniformly strong relationships with population size throughout New Zealand this in effect means that Auckland has, and will continue to increase its share of, the bulk of the national labour force.

The similar movement of manufacturing firms from south to north has been conceptualised as an attempt to increase business potential by moving within the spatial margins of the Auckland market (McDermott, 1973). As an example of the benefits of proximity to the Auckland market it can be seen that profit margins may be increased with the reduction of transfer costs, especially when transfer costs represent a major proportion of final product value. The Auckland region offers both low transportation costs with proximity to a large market and imported manufacturing inputs plus numerous inter industry linkages. As a result, the development of backward and forward linkages within the Auckland regional space economy, in turn, perpetuate the locational attractiveness of this area.

Analysis of the location patterns of major commercial concerns for the mid 1960's showed the importance of the metropolitan areas (Johnston and Rimmer, 1967). Of the top 100 companies, based on total assets, Auckland contained 37.36 percent of total company assets with Wellington, the next highest, having 25.27 percent. The situation a decade later shows that Auckland has increased its share to 50.94 percent of total company assets (Le Heron,

1977). Similarly, Auckland and Wellington are the headquarters of 70 percent of those interregional companies included in the survey. This trend, which follows the general trend of metropolitan advantage, represents an appraisal of locational differentials by decision makers at the company level tending toward the consolidation of those areas which are both accessible and have proven business potential.

From the above it can be seen that a number of recent developments in the national space economy have worked toward the concentration of population, employment, manufacturing and commercial structures in the Auckland region. Coupled with this is the decline in relative importance of the other regions. With these trends Johnston and Rimmer suggest that there may now be justification for considering the national space economy within a four tier system (Johnston and Rimmer, 1973). This has also been suggested by Taylor who, after isolating factors of rural disadvantage, affluence and possessions, growth, and economic depression identified a four tier system of regional economic status (Taylor, 1976). It seems likely, therefore, that if present trends continue in the absence of government intervention and major incentives to relocate in alternative areas variation between Central Auckland and the other regions will continue to become even more pronounced.

DEFINITION OF THE RESEARCH PROBLEM

The observed polarisation of growth and attendent regional disparities justify the conceptualisation of the national space economy within a core - periphery

framework. This framework may be related to the conceptualisations of interregional migration discussed earlier. It was suggested that migrant perception of alternative locations is a response to a number of push-pull factors. These factors have generally been accepted in New Zealand as being economic differences between areas. It is expected, therefore, that peripheral regions are the areas of net outmigration with core regions gaining population through migration. Similarly, within regions it may be expected that urban areas are the cores which gain migrants at the expense of peripheral rural areas.

In addition to push-pull factors, a key element in the modelling of migrant response to alternative locations is population size as modelled in the gravity model. Variation in population size generally shows that the areas of large population are areas of net inmigration while areas of smaller population may gain fewer migrants or be sources of net outmigration. It seems likely that the disaggregation of regional populations may, therefore, elucidate patterns that are obscured with aggregation.

It may be expected that with the disaggregation of regions to the county level and the isolation of urban areas economic variation between areas will increase so that migrant response to locational advantages may also differ. It is also likely that rural-urban differences in response to migration correlates will emerge.

Thus, the research problem has two foci. Firstly, an attempt will be made to explain patterns of population redistribution by examining the relationship between net

migration and a number of accepted conventional migration correlates which have remained largely untested in New Zealand. Secondly, in addition to further examination of the validity of the selected conventional migration correlates at various levels, it is hoped that with the disaggregation of data to the county and urban area levels some generalisations may be made about core-periphery variation in patterns of net migration.

Migration Correlates

The parameters of spatial economic and demographic variation in general constitute a set of positive and negative correlates of net migration. Some of the most common correlates have been selected to quantify relationships between net migration and employment, unemployment, income and population.

Employment is generally seen as an index of job opportunity so that those areas with larger employment bases offer greater potential employment opportunities. The disaggregation of employment to employment in specific groups also allows the identification of those employed in growth or stagnant sectors of the economy. It is assumed, for example, that employment in agriculture is negatively correlated with net migration while there is a positive relationship with employment in a growth sector such as the tertiary services.

High levels of unemployment are generally perceived by migrants as an index of regional unattractiveness. When levels are high and there are few alternative employment opportunities people may be forced to migrate in search of employment. As a result, unemployment is a

negative correlate of net migration.

Another major correlate of net migration is income. It is assumed that when migration is voluntary and not forced, in the case of the unemployed searching for employment, migrants respond to income differentials between areas. Thus, voluntary moves are characterised by migration from low wage to high wage areas (Raimon, 1962). The positive relationship between income and net migration, as with the other correlates, is strongest when there are marked differences between areas.

Population size is probably the most commonly used variable in the modelling of aggregate migrant behaviour and is a positive correlate of net migration. This relationship may be explained to a great extent by the nature of the differences between various population levels. As size increases the area adopts not only specialised urban functions which provide a more diverse occupation mix but also social, cultural and tertiary educational facilities are more numerous. Thus, migrants may perceive larger city areas as those places where opportunity in general is greatest. At the same time, smaller rural towns can provide only limited employment and social opportunity. With these kinds of restrictions only a limited number of people can be absorbed into the community, so that for young adults, in particular, migration may offer the only alternative.

OPERATIONALISATION OF THE RESEARCH PROBLEM

Population migration is generally defined as a permanent or semi-permanent change of address (Lee, 1966). Within such a broad definition it is obvious that the

determinants of migration will be different as distance from the origin increases. A number of levels of migration may be discerned.

It is an accepted migration generality that population relocation most commonly involves only short distances such as a move from one part of a city to another. The correlates of intra-urban migration differ from those which involve movement over greater distances; it may be seen, for example, that whereas a change of house may be the most important factor in intra-urban migration it is unlikely to be important in movement to another region.

Similarly, correlates of international migration differ from those of intranational migration in that greater intervening obstacles such as high transportation costs, language and cultural differences as well as political boundaries must be overcome. With so many great intervening obstacles it is clear that very strong pull factors would be necessary to overcome residential inertia and, therefore, initiate international migration.

The reasons for migration are diverse at any level, however, in defining the scale of this research at the regional and sub regional levels it is hoped that some generalisations may be made about the determinants of internal migration in New Zealand.

It will be noted that having defined the research problem at the regional and subregional scale, the data sets for the dependent and independent variables at each of the regional, county and urban area levels are for total populations. Thus, as there has been no sampling of the population, formal statistical testing is inappro-

priate as an aid in the solution of the research problem.

The testing of migration correlates is dependent on the availability of source materials. Of the alternative migration data bases gross migration, which can only be calculated from a continuous inventory of migrant behaviour, offers the greatest range of approaches and testable hypotheses. Net migration on the other hand, represents an approximation of migration where, in effect, gross outmigration is subtracted from gross inmigration. Net migration data restrict investigation into migrant characteristics and with no indication of origin and destination the calculation of directionality for either migrant streams or counterstreams is excluded.

The recent publication of net estimates of population relocation between specific areas in the census opens a number of areas for further migration research in New Zealand. This data set was not available when the research for this thesis began.

NET MIGRATION DATA

Net migration data in New Zealand have been generated using vital statistics (McCaskill, 1964; Rowland, 1975), life survivorship rates (Heenan, 1968; Poulsen, 1970), electoral rolls (Anderson, 1964; Keown, 1971), and census data (Rowland, 1975). Electoral rolls have only been used at the intraregional level. This may be explained by the nature of the technique, which traces the movement of registered adults, creating data handling problems at the larger scale. The first two techniques generate net migration data as a residual of population growth and as such are inexact in their approximation with, for example,

no indication of multiple moves within any specified time period. Net migration data can be estimated using vital statistics as:

$$NM = (P_2 - P_1) - NI$$

where NM = net migration

P_2 = population at time 2

P_1 = population at time 1

NI = natural increase.

This technique gives similar results to those obtained by using life survivorship methods. Both methods have been used in the generation of net migration data sets. The vital statistics method has been used to estimate urban area net migration where, with uniformly high levels of population increase, this technique is more appropriate. The life survivorship methods, however, have an advantage in that they provide some insight into the age and sex characteristics of the migrants. As a result, a life survivorship technique has been preferred in the generation of net migration data at the regional level and geographic county level so that some generalisations may be made about age and sex characteristics of migrants throughout all areas of New Zealand.

Life Survivorship Rate Techniques

Life survivor techniques work on the assumption that the net migrants are the residual of the subtraction of an estimated surviving population over a time period from the observed population at the end of the time period, thus:

$$NM = P_2 - rP_1$$

where NM = net migration

P_2 = population at time 2

P_1 = population at time 1

r = survivorship rate.

This formula, known as the forward survival rate method, reduces the population at the beginning of the time period by an estimated cohort survival rate for a five year period. As the migrant population is reduced by the deaths and added to by the births occuring among migrants, inmigration is over estimated and outmigration is under estimated.

The reverse survival rate formula,

$$NM = \frac{P_2}{r} - P_1$$

(notation as above),

over estimates outmigration and under estimates inmigration by assuming that all those in the migrating cohorts who die during the period have migrated (Siegel and Hamilton, 1952). An alternative approach, which has been used to estimate net Maori migration (Poulsen, 1970), is a combination of the two formulae so that

$$NM = \frac{(1 + r)}{2r} (P_2 - rP_1)$$

(notation as above).

This average survival formula assumes that half of the number of deaths among migrant cohorts occur after migration. Implicit in this technique is the assumption that migration flow is constant through the time period.

In view of the lack of published material on net

migration for the total population of New Zealand using life survivor methods and with no indication of variation in migrant behaviour during the period 1966-1971 the forward survival method has been adopted.

HYPOTHESES

A number of hypotheses have been selected to test with a national data set whether strongly supported migration correlates are valid in New Zealand. These data are then disaggregated, where possible, to reexamine the correlates for rural and urban areas. In addition, two relationships have been selected to gain a general understanding of the characteristics of the migrant population.

General Hypotheses

1 That the majority of migrants are young adults.

2 That females are more migratory than males.

Regional Hypotheses

That there is a:

3 positive relationship between income levels and net migration;

4 positive relationship between total employment and net migration;

5 negative relationship between employment in agriculture and net migration;

6 negative relationship between employment in manufacturing and net migration;

7 positive relationship between employment in wholesaling and net migration;

8 positive relationship between employment in transport and net migration;

9 positive relationship between employment in community services and net migration;

10 negative relationship between employment in mining and net migration;

11 positive relationship between employment in construction and net migration;

12 positive relationship between employment in finance and net migration;

13 negative relationship between employment in electricity supply and net migration;

14 negative relationship between unemployment and net migration;

15 positive relationship between population size and net migration.

Not all of the relationships selected at the regional level can be tested at the geographic county level as not all the data can be disaggregated. As a result, only hypotheses 3 and 15 can be tested at this level. This reduced set of hypotheses are retested within specific groups of counties categorized by population size.

At the urban area level the employment hypotheses, which were omitted from the geographic county set, have been included so that hypotheses 3-13 inclusive and hypothesis 15 are tested.