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.

Chapter 2

GENERAL AND ECONOMIC ASPECTS OF REGIONAL NET MIGRATION IN NEW ZEALAND

The research problem has been defined within an essentially economic framework. It is important however, that consideration be given to some general aspects of the migrant population. Thus, in addition to an examination of economic correlates of net migration some relationships regarding age and sex characteristics of the migrant population will be discussed at the regional level.

REGIONAL NET MIGRATION

During the intercensal period 1966-1971 percentage net migration gains were experienced in Central Auckland, Canterbury, and Marlborough regions (Figure 1). Of the other regions the greatest net migration losses were in Westland, Taranaki, and East Coast. These net migration changes may be compared with the percentage change of the total population which ran at an average of 6.9 percent during the period (Figure 2). It is clear from this comparison that migration exerts a strong influence on the rate of regional population change. In some of the regions where there were net migration losses population actually decreased. Similarly, regions of net immigration had the greatest total population increase.

The maps also show the importance of net migration in determining the variation in population growth of the North and South Islands. Thus, whereas South Auckland/ Bay of Plenty, Hawke's Bay and Wellington are areas of

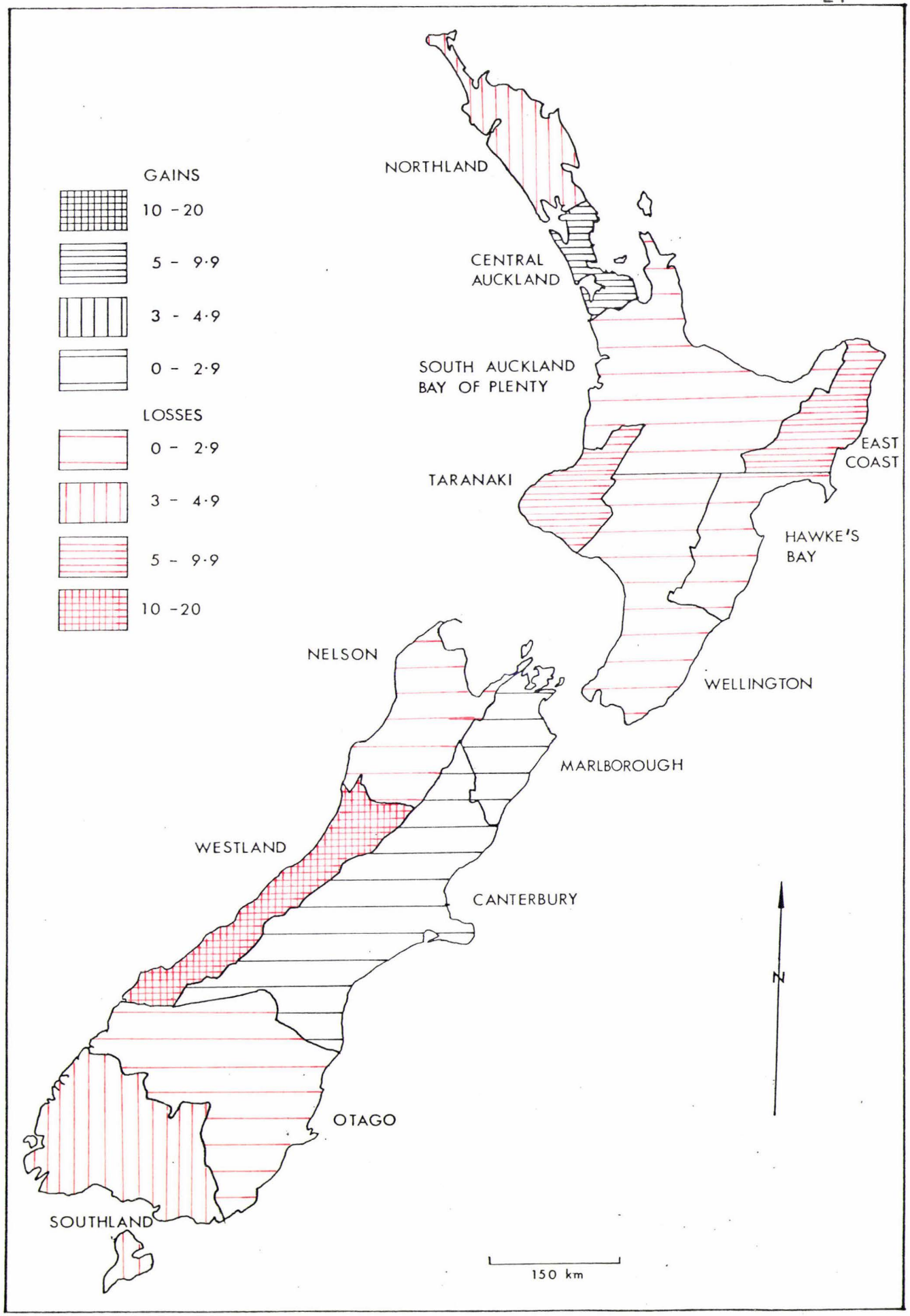


Figure 1

Regional Percentage Net Migration Change,

1966 - 1971

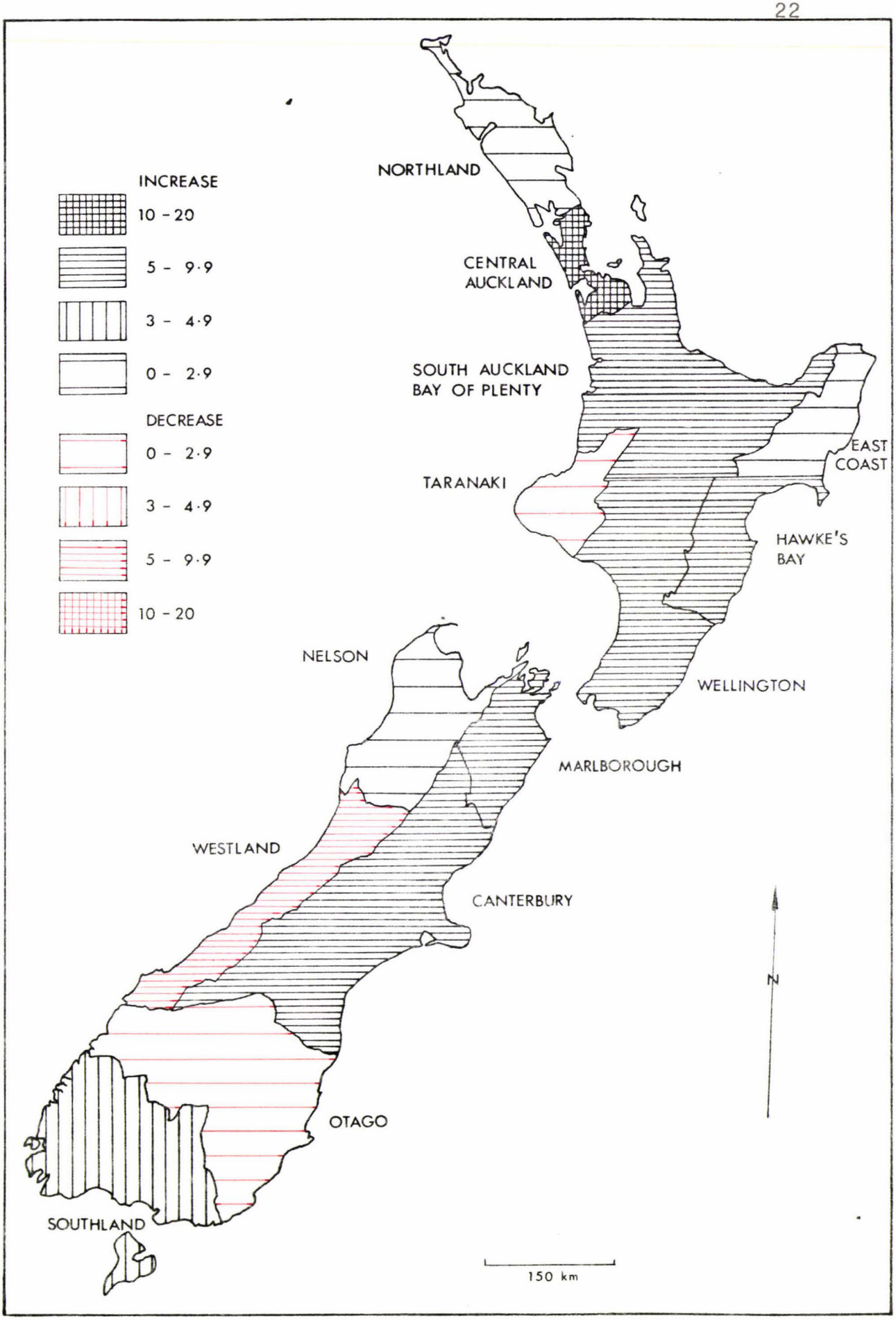


Figure 2

Regional Percentage Total Population Change,

1966 - 1971

Source: N.Z. Census 1971.

net outmigration they still show an overall population increase. At the same time, only Canterbury and Marlborough of the South Island regions show comparable rates of population increase; with the other South Island regions having rates of population change lower than the national average.

General Characteristics of Migrants

A number of empirical generalities exist concerning the relationship between age and migration. There is a peak in mobility among young children who migrate as dependents. The curve tails off among adolescents to peak again in the early 20s when lack of community ties, preschool children (if any) and little likelihood of seniority in employment mean residential inertia is more easily overcome. Migration rates decline thereafter until a small increase associated with retirement to warmer and sunnier climates (Rogers and Willekens, 1976). In an attempt to make some generalisations about the age characteristics of migrants in New Zealand the general research hypothesis is:

1 That the majority of migrants are young adults.

It is generally accepted that female mobility rates are higher than those of males. As distance increases, however, males tend to dominate in number. The nature of the relationship between distance and sex specific migration cannot be accurately defined using net data, however, as interregional migration in New Zealand will generally reflect moves through a relatively confined space the general research hypothesis is:

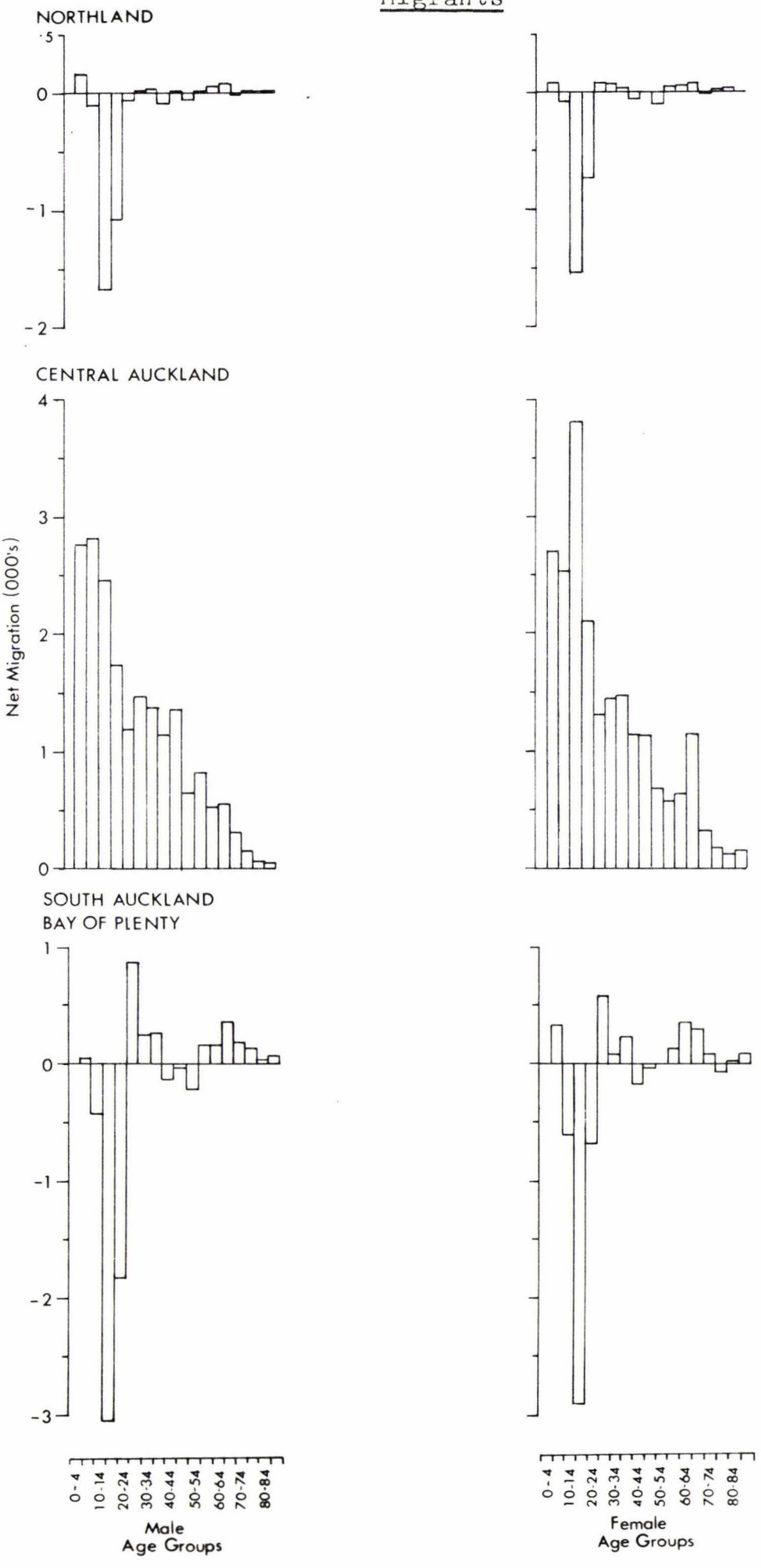
2 That females are more migratory than males.

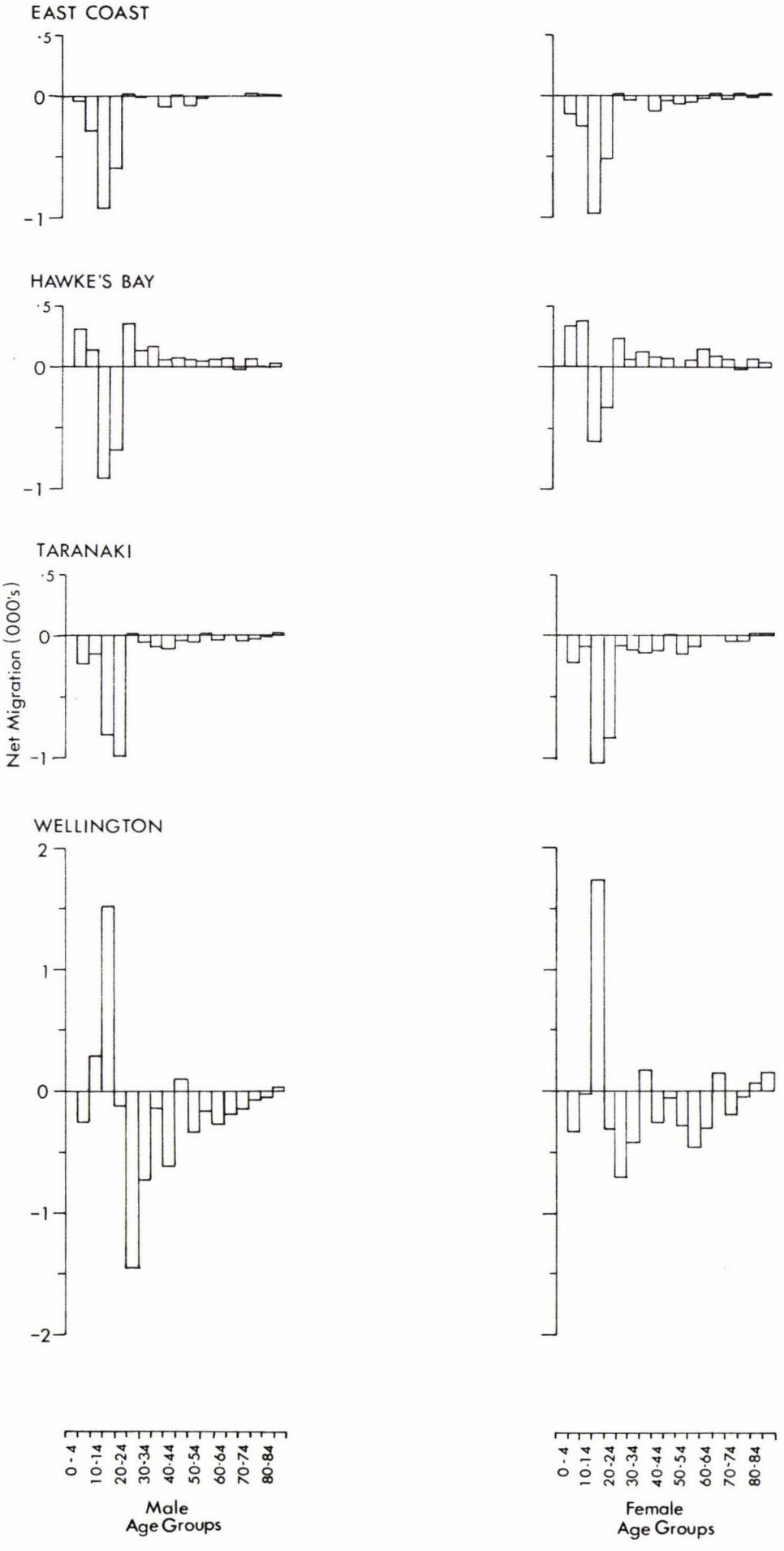
The age and sex data show the marked regional differences in volume of net migration (Figure 3). Clearly the Central Auckland region stands out as the only region gaining in all age and sex cohorts and for the total number of migrants. The only other regions to show more net inmigration than net outmigration in the majority of age and sex cohorts are Canterbury and Hawke's Bay. Most regions are losing migrants with only minimal inmigration in some age groups. The regions which show major net inmigration in some age groups while also losing heavily are South Auckland/Bay of Plenty, Wellington and to a lesser extent Otago.

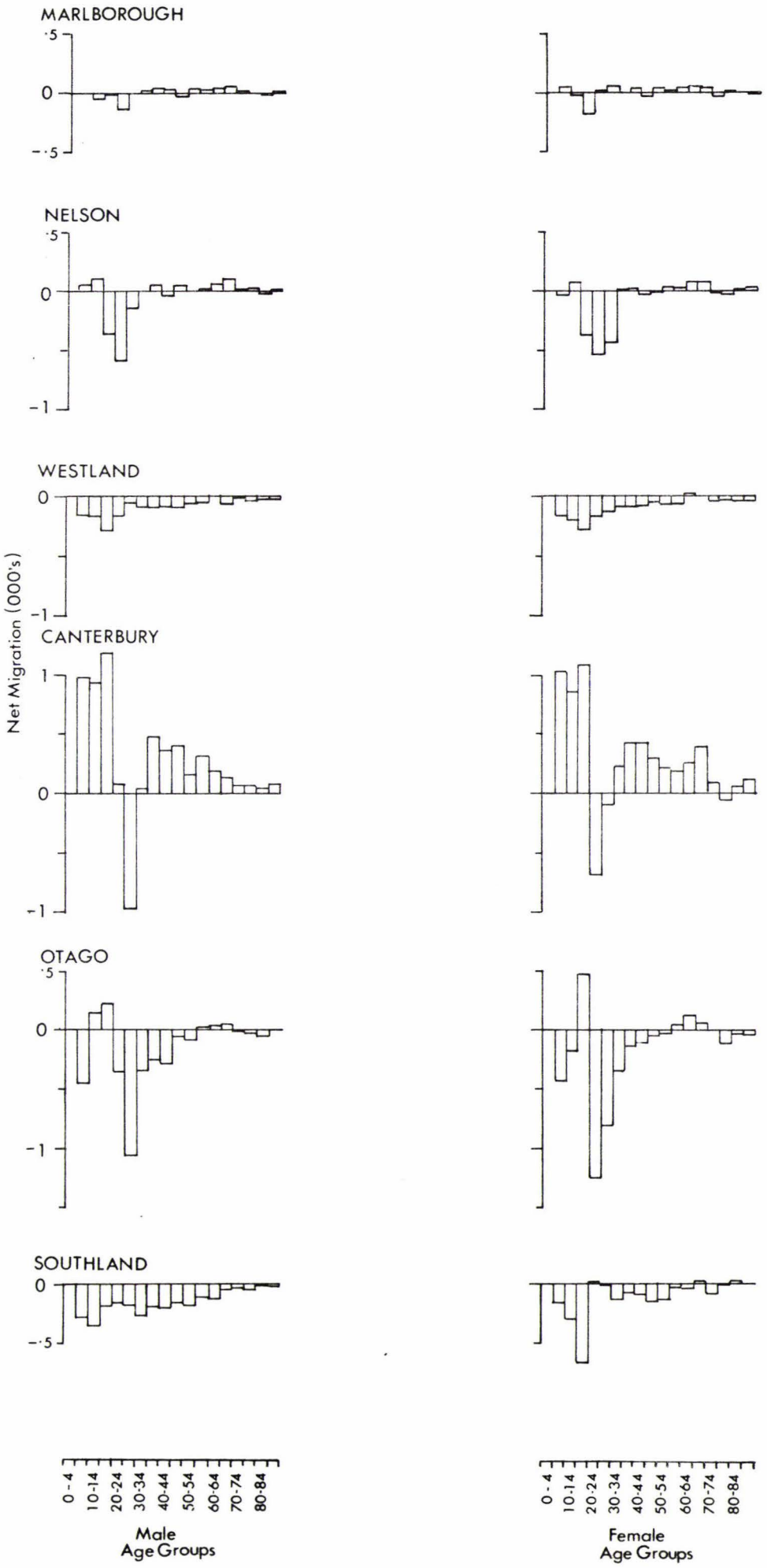
It is clear that young adults dominate net migration in New Zealand. In most cases the 15-19 year age group is the most mobile. At the same time, the metropolitan regions of Central Auckland, Wellington, Canterbury, and Otago show high mobility in the older 20-24 and 25-29 year age groups. In addition to the prospect of this migration being associated with changes in the career cycle (Keown, 1971), it is likely migration through the urban hierarchy in general is also important.

Some directionality may be inferred from the mobility patterns of the age-sex cohorts. The net inmigration of the 15-19 year old age group for the four metropolitan regions implies that these regions exert important pull forces on this age group. This may reflect age specific perception of locational advantage favouring those areas where there is not only increased social, cultural, employment and tertiary education opportunity but also opportunity in general may be perceived to be greatest.

Figure 3: Regional Age-Sex Structure of Net Migrants




EAST COAST
HAWKE'S BAY
TARANAKI
WELLINGTON
Net Migration (000's)
·5
0
-1
2
1
-2
0-4
10-14
20-24
30-34
40-44
50-54
60-64
70-74
80-84
Male
Age Groups
Female
Age Groups


MARLBOROUGH
·5
0
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NELSON
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SOUTHLAND
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Net Migration (000's)
0-4
10-14
20-24
30-34
40-44
50-54
60-64
70-74
80-84
Male
Age Groups
0-4
10-14
20-24
30-34
40-44
50-54
60-64
70-74
80-84
Female
Age Groups

Male and female net migration levels follow similar patterns within age groups. It can be seen from the regional age and sex histograms (Figure 3), however, that female rates are generally higher. The mean number of net migrating females for all age groups is 802, while for males it is only 287.

The expected differences in the volume of age and sex specific mobility have been confirmed for regional net migration in New Zealand. Young adults in the 15-19 and 20-24 year age groups are the most mobile and constitute the greatest proportion of all net migrants for both sexes. The hypothesised relationship that females are more migratory than males must also be accepted.

While general age and sex characteristics of the migrant population have been defined regional variation in volume of net migration has also been observed. In the next section the selected regional correlates of net migration will be tested to see if they are of value in explaining the observed patterns of population redistribution.

ECONOMIC AND DEMOGRAPHIC CORRELATES

In this section it is assumed that migrants respond to economic and demographic variations in the space economy. Thus, in order to assess the relationship between net migration and the selected correlates the nature of regional variation within the selected parameters will also be discussed.

Income

The research hypothesis is:

That there is a positive relationship between

income levels and net migration (Hypothesis 3)

Income variations have been noted in New Zealand at both the Income Tax District and regional levels (Jensen, 1969; Johnston, 1976). Mean income levels have been observed to be not only increasing but also that the majority of regions fall below the national average.

Johnston's analysis of regional incomes for 1966 showed that there were a number of regional groupings. It was found that Central Auckland and Wellington, of the regions which contain metropolitan centres, had fewer low and high income earners than was the case nationally. The comparable South Island regions of Canterbury and Otago were dominated by low income earners. Southland and South Auckland stood out as the most prosperous, with Nelson, East Coast and Hawke's Bay as the relatively deprived. Westland had the most concentrated income distribution while Taranaki and Northland had bimodal distributions with few middle income earners.

In comparison, an examination of percentages within wage groups for the 1971 data show a very similar pattern. The rankings of the regions within the wage classes show the most prosperous regions are Southland and Wellington (Table 1). Central Auckland and South Auckland are also prosperous with few low income earners and more middle and high income earners than is the case nationally. Northland, Taranaki, Hawke's Bay and to a lesser extent Marlborough, have similar distributions with some high income earners but remaining nearer the national average in most cases. The South Island metropolitan regions, Canterbury and Otago, are dominated by low and middle-

TABLE 1: Rankings of Regions within Income Groups, 1971

REGION	INCOME GROUP																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Northland	7	7	4	5	4	5	9	11	12	10	10	7	6	6	4	2	11
Central Auckland	9	5	6	12	12	12	12	9	1	2	3	3	4	4	6	7	8
South Auckland/ Bay of Plenty	11	11	12	11	9	11	11	12	10	4	4	4	5	4	5	4	6
East Coast	8	6	5	6	2	2	5	13	13	13	13	11	11	10	11	9	2
Hawke's Bay	6	8	10	13	11	8	7	7	6	6	6	9	7	6	8	6	3
Taranaki	4	10	9	9	7	9	8	6	8	7	5	4	3	3	2	3	5
Wellington	10	9	7	2	13	13	12	8	1	1	1	1	1	2	3	5	8
Marlborough	5	4	8	4	1	1	3	5	9	9	8	9	9	8	12	9	4
Nelson	1	1	3	7	3	4	2	2	11	12	12	13	12	11	8	13	12
Westland	13	13	11	9	8	3	1	1	7	11	11	12	13	13	13	12	13
Canterbury	3	3	2	3	5	7	6	2	3	5	7	6	9	11	8	9	8
Otago	2	1	1	1	6	6	4	4	5	8	9	8	7	9	7	7	6
Southland	12	12	13	10	9	10	10	10	4	3	2	2	2	1	1	1	1

Key to Income Groups ($)

1. 1 - 199
2. 200 - 599
3. 600 - 999
4. 1000 - 1399
5. 1400 - 1799
6. 1800 - 2199
7. 2200 - 2599
8. 2600 - 2999
9. 3000 - 3999
10. 4000 - 4999
11. 5000 - 5999
12. 6000 - 6999
13. 7000 - 7999
14. 8000 - 8999
15. 9000 - 9999
16. 10000 - 14999
17. 15000 and over

income earners with few high income earners relative to the rest of the country. East Coast, Nelson, and Westland emerge as the most deprived regions.

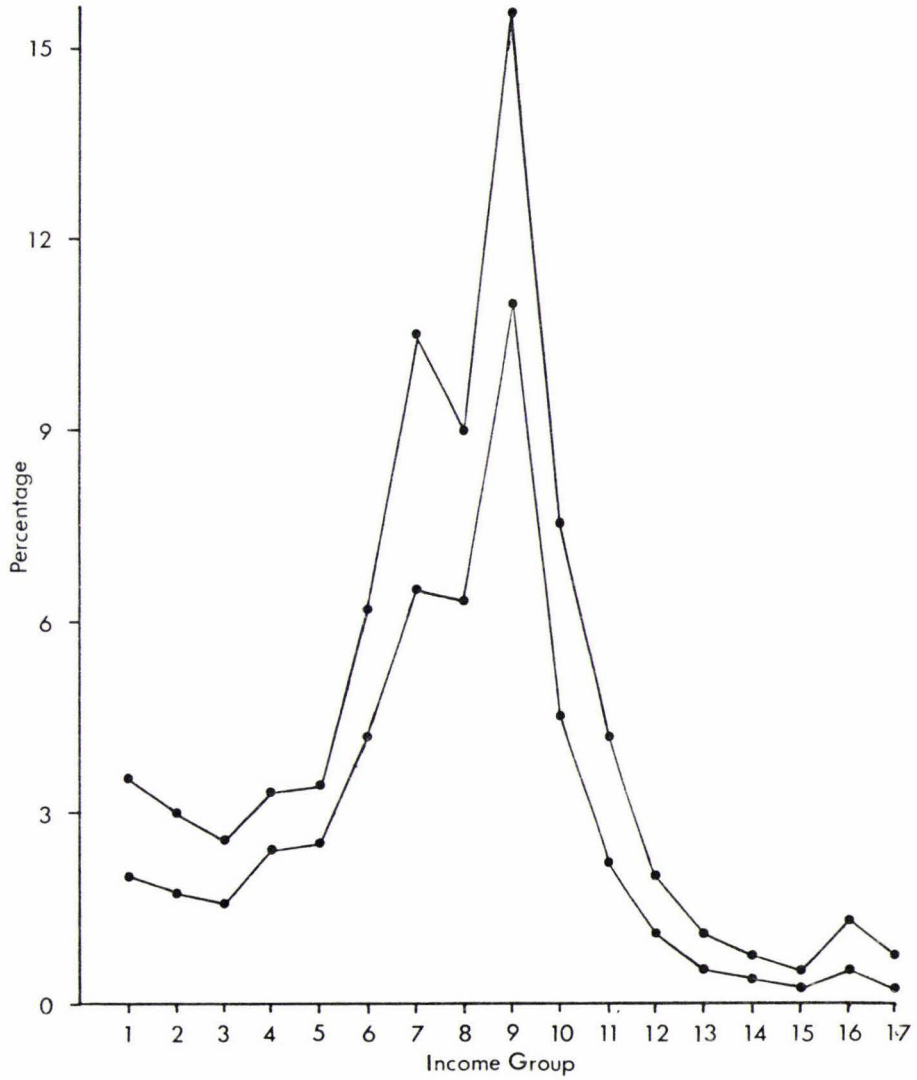
Analysis of regional incomes by relative position within income groups indicates that a number of regional groupings may be made ranging from those which are most prosperous to those which are relatively deprived. Within some wage groups there are marked regional differences between the maximum and the minimum percentages within each income group, (Figure 4).

An alternative approach to the estimation of regional income variation using two different income indices shows that regional positions change when the mean of those male who earned an income is converted to a per capita estimate for all males (Appendix A). This latter estimate, which gives some indication of dependency changes, for example, the Central Auckland region which falls from the fourth ranking region for mean income to thirteenth for per capita income (Table 2).

Clearly, there are dangers in using male income as a correlate of female net migration. However, as it is generally accepted that the majority of migrants are dependents it is assumed that moves will be initiated by spatial variation in male rather than female or total income levels.

It is clear that the greatest income variation is among mean incomes ranging from Southland with $3252 to Nelson with $2844. The variation is not great and is considerably less than the $600 variation found by Jensen among Income Tax Districts in the mid 1960's (Jensen, 1969). The introduction of dependents reduces the re-

Figure 4: Maximum and Minimum Regional Variation in Male Income Groups, 1971



Income Groups ($)

1	1 - 199	10	4000-4999
2	200 - 599	11	5000-5999
3	600 - 999	12	6000-6999
4	1000-1399	13	7000-7999
5	1400-1799	14	8000-8999
6	1800-2199	15	9000-9999
7	2200-2599	16	10000-14999
8	2600-2999	17	15000 and over
9	3000-3999		

Source: N.Z. Census, 1971.

TABLE 2: Regional Income Levels, 1971

Region	Mean Income	Rank	Per Capita Income	Rank
Northland	3125	8	2137	12
Central Auckland	3287	4	2042	13
South Auckland/ Bay of Plenty	3319	3	2603	3
East Coast	3203	6	2312	10
Hawke's Bay	3164	7	2455	5
Taranaki	3235	5	2634	2
Wellington	3401	2	2445	6
Marlborough	3020	10	2464	4
Nelson	2844	13	2218	11
Westland	2967	12	2396	7
Canterbury	3054	9	2320	9
Otago	3001	11	2391	8
Southland	3487	1	3252	1

gional income estimates so that variation is further minimalised.

A positive relationship was hypothesised between income and net migration but only weak relationships emerge for both income indices (Table 3).

TABLE 3: Correlation Coefficients for Regional Income and Net Migration

	Mean Income	M. P/capita
Male	-.412 (.058)	-.459 (-.271)
Female	-.242 (.123)	-.443 (-.229)

Note: Correlation coefficients in brackets are with Central Auckland region excluded.

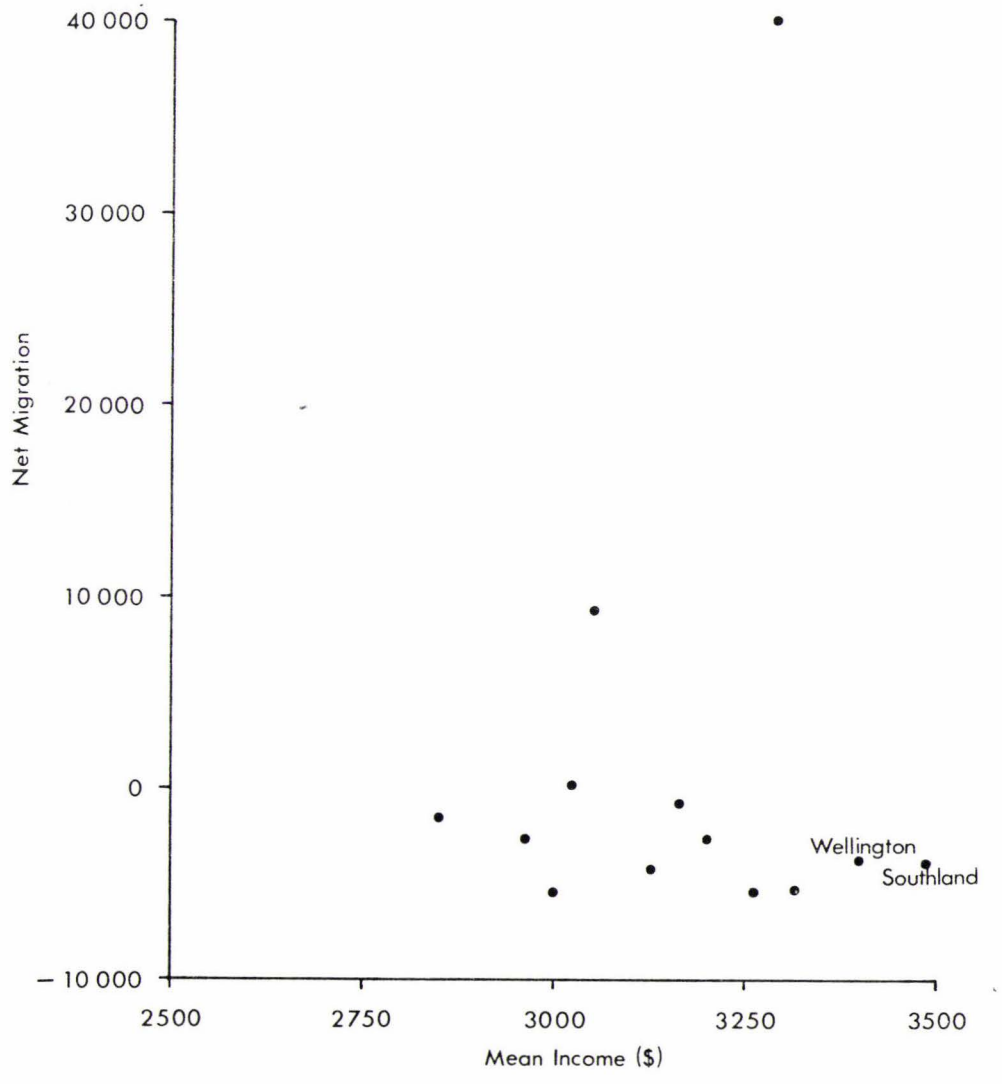
The relationship between income and net migration for all regions is negative but very weak; with the omission of Central Auckland, which appears as the largest residual in the scattergram (Figure 5), the correlation coefficients approach zero.

An examination of the scattergram suggests a number of factors which may explain the unexpectedly poor relationship between net migration and income. Firstly, it may be inferred that as regional income variation is not great migrant perception of alternative regions is unlikely to be affected by purely economic considerations. Similarly, it can be seen that the regions with the highest income levels, Southland and Wellington, are areas of net outmigration. Conversely, Central Auckland, the region with greatest net inmigration does not have the highest income level.

In addition, however, to the subjective interpretation of the scattergram it seems likely that the nature of regional composition has an affect. There are marked differences between regions both areally and in population size. Thus, whereas Central Auckland region is small in size and contains few rural areas the Otago and Wellington metropolitan regions are by comparison much larger and contain numerous small rural counties. As a result, only Central Auckland retains the characteristics of an urbanised population.

As it is generally accepted that rural to urban mobility is one of the most important trends in internal migration in New Zealand, it may be expected that in those regions which have comparatively large numbers of rural

Figure 5: Regional Mean Income and Net Migration, 1971



areas a false picture of unrelieved net outmigration is being created.

Thus, while it is unclear whether the unexpected lack of relationship with income is due to minimal variation between regions or to the nature of regional data aggregation it must be concluded that there is no relationship between income and net migration at this level.

Employment

A number of relationships have been selected to test the nature of the relationship between employment and net migration. The relationships may be divided into the effect of total employment and specific employment groups on net migration.

The research hypothesis is:

> That there is a positive relationship between total employment and net migration (Hypothesis 4).

Migrant behaviour is assumed to be positively related to job opportunity. In this case, job opportunity has been modelled as total employment so that as the size of the employment base increases it is expected that there will be more employment prospects.

Regional employment bases in New Zealand are strongly related to the size of the population (McDonald, 1969), so there are marked differences between regions ranging from 192233 males in employment in Central Auckland to 6705 in Westland and from 94164 females in employment in Central Auckland to 2168 in Westland.

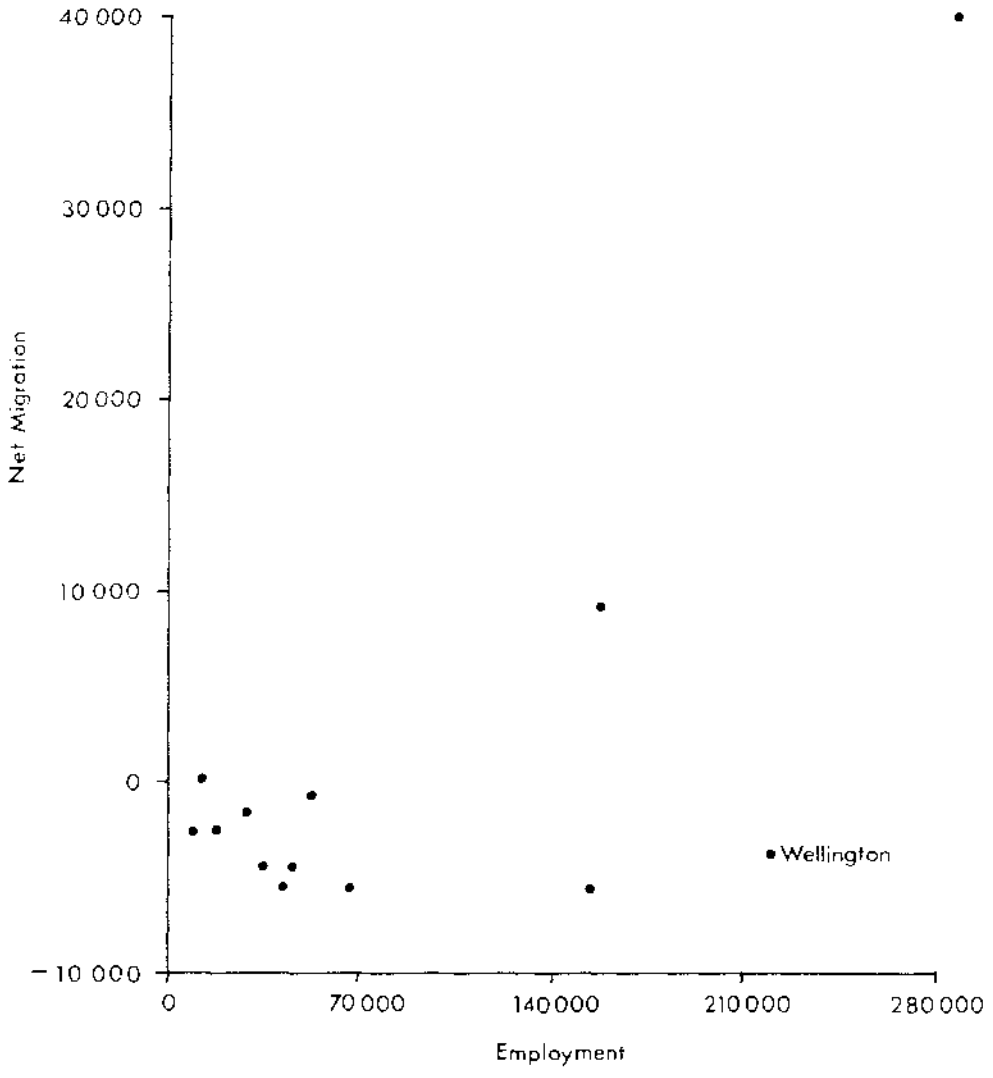
There is a good relationship between sex specific employment and net migration with r = .628 for males

and r = .726 for females. The scattergram for employment and net migration shows (Figure 6), however, there are anomalies with, for example, Wellington having not only a large employment base but also net outmigration. The relationship is drastically reduced when Central Auckland, which has by far the largest values for both the dependent and independent variable, is omitted. Without Central Auckland, r is reduced from .628 to .078 for males and from .726 to .277 for females. Thus, r^2 is reduced from 39.5 percent to .6 percent for males and from 52.7 to 7.7 percent for females.

Obviously both the size of the employment base and volume of net inmigration to Central Auckland is affecting the nature of the relationship to such an extent that its exclusion reduces the explanatory power of the independent variable to near zero. It is also apparent that the correlation technique must be used with caution for with one or two large values, such as those of Central Auckland, an artificially high correlation is created. As a result the regression line as a predictive device is of no use in this instance.

It seems likely that the lack of relationship between total employment and net migration may be partially accounted for by the homogeneous regional employment bases relative to population size. As a result it may be assumed that job opportunity is relatively evenly distributed. In addition, however, both areal aggregation of the regional net migrants plus aggregation of essentially urban based occupation mixes may also be responsible. Clearly there are weaknesses in the correlation of data

Figure 6: Regional Employment and Net Migration, 1971



where the bulk of the independent variable is drawn from urban areas and the dependent variable represents a rural/urban mix where the rural component is characterised by widespread outmigration.

At this level of aggregation it must be concluded that there is no useful relationship between total employment and net migration.

Net Migration and Employment in Economic Sectors

A number of generalities exist regarding the relationship between net migration and employment in specific sectors of the economy. Positive relationships are expected between net migration and employment in growth industries and negative relationships between net migration and employment in those industries which are either static or in decline.

The research hypotheses are numbers 5 to 13 inclusive as outlined in Chapter 1. These relationships have been tested for both males and females and for regions with and without Central Auckland (Table 4).

From this evidence and the scattergrams for net migration and specific employment categories it is obvious that the majority of the hypotheses cannot be accepted (Figure 7). The omission of Central Auckland reduces the relationships, with the exception of sex specific net migration and male employment in electricity supply (hypothesis 13) and female employment in manufacturing (hypothesis 6), from weak to near zero for most variables. The relationships which remain with some explanation - male employment in electricity supply and female employment in manufacturing - are still very weak with r^2 being only

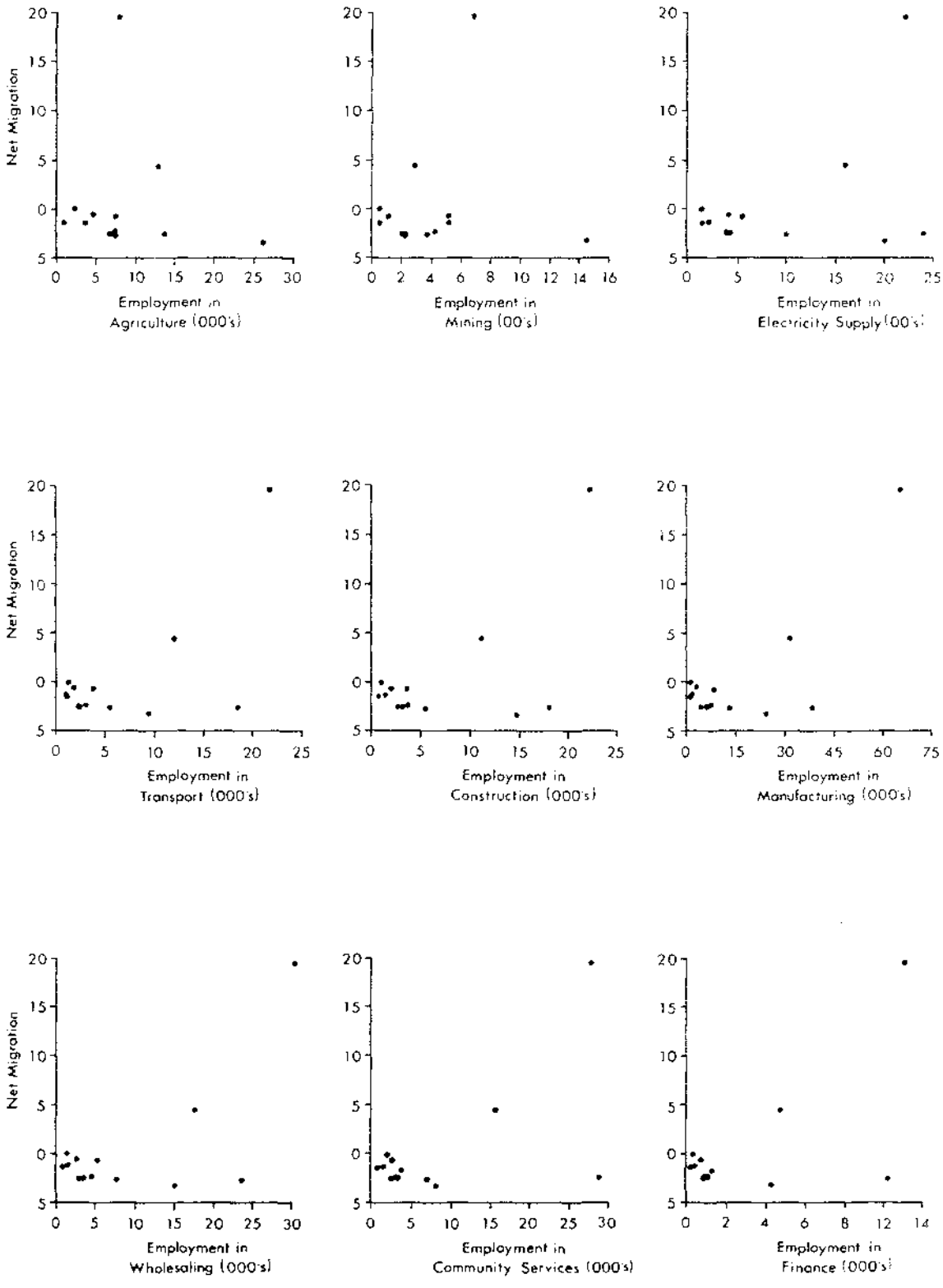
TABLE 4: Correlation Coefficients for Regional Sex Specific net Migration and Employment in Economic Sectors

Employment Category	Male r	Minus C.Auckland	Female r	Minus C. Auckland
Agriculture	-.06	(-.12)	.10	(-.14)
Manufacturing	.47	(-.05)	.87	(.43)
Wholesaling	.67	(.13)	.70	(.28)
Transport	.65	(.12)	.68	(.19)
Community Services	.57	(.08)	.64	(.26)
Mining	.12	(-.33)	.23	(-.17)
Construction	.60	(-.02)	.72	(.12)
Finance	.62	(.02)	.65	(.20)
Electricity Supply	.38	(.48)	.47	(.22)

23 percent and 18 percent respectively. It is noticeable that a positive rather than the expected negative relationship emerged for employment in electricity supply. This may be accounted for by the employment category including those employed in major development schemes rather than just maintenance and small scale development. As a result the employment category is likely to include a number of perpetual migrants who follow power scheme developments. Similarly, the relationship between net migration and female employment in manufacturing is positive rather than negative as expected. This may be accounted for the fact that manufacturing represents a major source of female employment.

It was expected that the employment correlates would be important in explaining patterns of interregional net migration in New Zealand. It has been shown, how-

Figure 7: Regional Employment in Economic Sectors and Net Migration, 1971



ever, that there is little relationship between net migration and either total employment or specific employment groups. The size of the Central Auckland dependent and independent variables has affected all relationships so that with its inclusion artificially high correlations are produced. With the exclusion of this region all relationships are unimportant in their capacity for explaining net migration.

It seems likely that the areal aggregation of regions is important in explaining the lack of relationship between employment and net migration. This factor is further illustrated with employment in specific categories as the data for the independent variable of, for example, the tertiary services are almost entirely urban based while the dependent variable remains a mixture of rural and urban net migration. As a result, arbitrary regional boundaries have, in this case, altered the general character of the regions with all regions except Central Auckland being very similar in their relationships with the conventional correlates. Within this system of classification there remains, however, no useful relationship between any of the employment categories and net migration.

Unemployment

Unemployment may be considered as an index of population stagnation or even decline (Rosenberg, 1973). This situation may arise in a regional space economy where an overrepresentation of slow growing industries which are unable to sustain high employment levels lead to unemployment and outmigration in search of employment. As a result unemployment is generally conceptualised as an

index of regional unattractiveness. The research hypothesis is:

> That there is a negative relationship between unemployment and net migration (Hypothesis 14).

Unemployment data vary according to the definition used. A definition may, for example, exclude females who are classified as housewives but are still in search of employment. Similarly, seasonal fluctuations in freezing works and dairy factories along with student unemployment may act to temporarily swell estimates of unemployment. The census classification of unemployment shows that there has been little change in levels during the four census periods 1956-1971. Throughout this period unemployment was running at less than one percent.

Unemployment levels by region for 1971 show a strong relationship between unemployment and population with the highest levels in Central Auckland and the lowest in Marlborough and Westland (Table 5). In all cases, however, regional unemployment is no greater than one percent of the regional population.

The uniformly low levels of regional unemployment may explain why $r = .019$ for males and $r = .128$ for females in the relationship between unemployment and net migration when Central Auckland is excluded. With the inclusion of Central Auckland a good positive relationship of $r = .697$ for males and $r = .659$ for females is produced. It is clear from the scattergram that the Central Auckland data, which are the highest for both the dependent and independent variables, are again creating an artificially

strong positive relationship (Figure 8).

TABLE 5: Regional Unemployment Levels, 1971

Region	Number Male Unemployed	Percent	Number Female Unemployed	Percent
Northland	476	1.0	395	.8
Central Auckland	2463	.7	1821	.5
South Auckland/ Bay of Plenty	1514	.7	1457	.7
East Coast	237	1.0	224	.9
Hawke's Bay	397	.6	397	.6
Taranaki	259	.5	279	.6
Wellington	1462	.5	1170	.4
Marlborough	87	.5	82	.5
Nelson	174	.5	132	.4
Westland	103	.9	69	.6
Canterbury	1070	.5	815	.4
Otago	329	.4	320	.3
Southland	186	.3	250	.5
Total	8757	.6	7411	.5

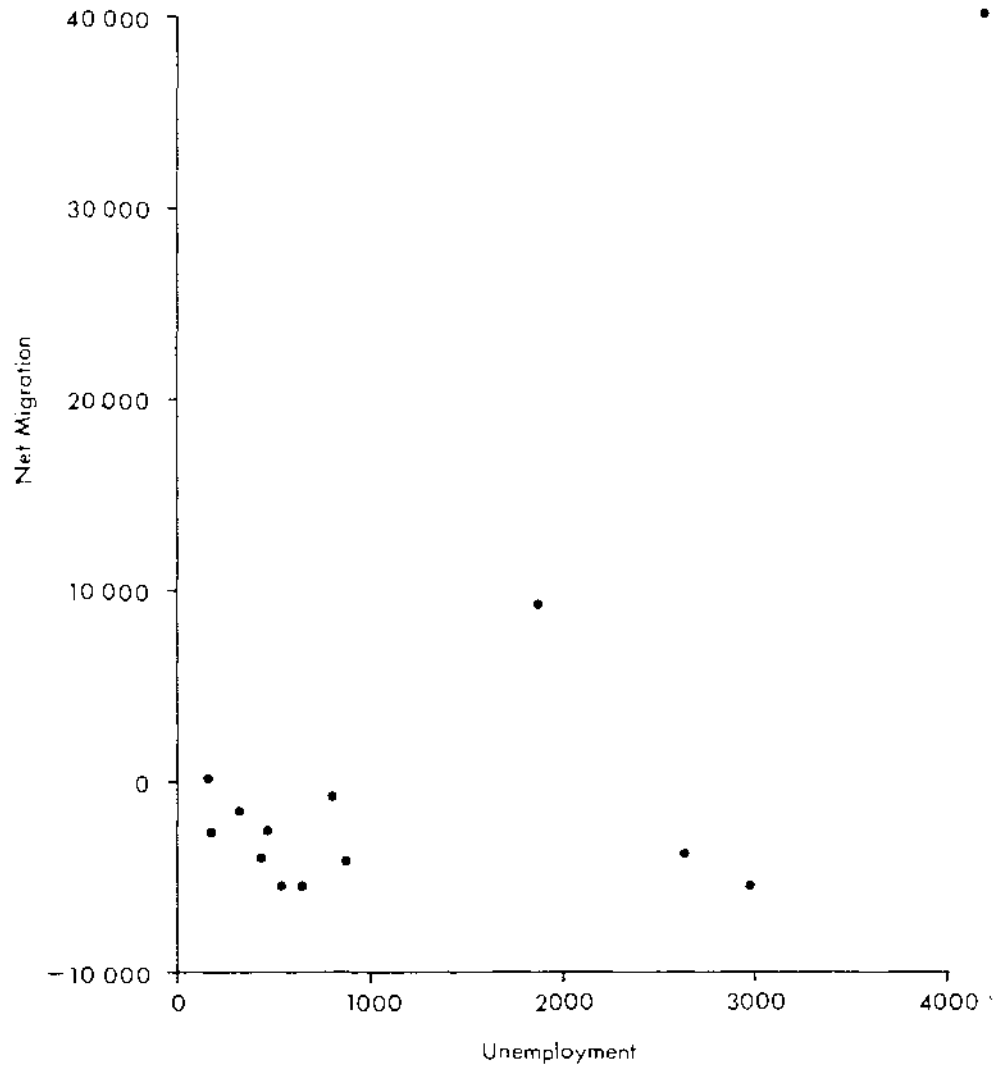
Source: New Zealand Census, 1971.

In the absence of marked regional variation in unemployment levels it is not surprising that there is no relationship between this variable and net migration. Thus, while the same problems of regional aggregation discussed in relation to the previous correlates remain it must be concluded that the unemployment variable is unimportant in explaining patterns of population redistribution during the period.

Population

The research hypothesis is:

Figure 8: Regional Unemployment and Net Migration, 1971



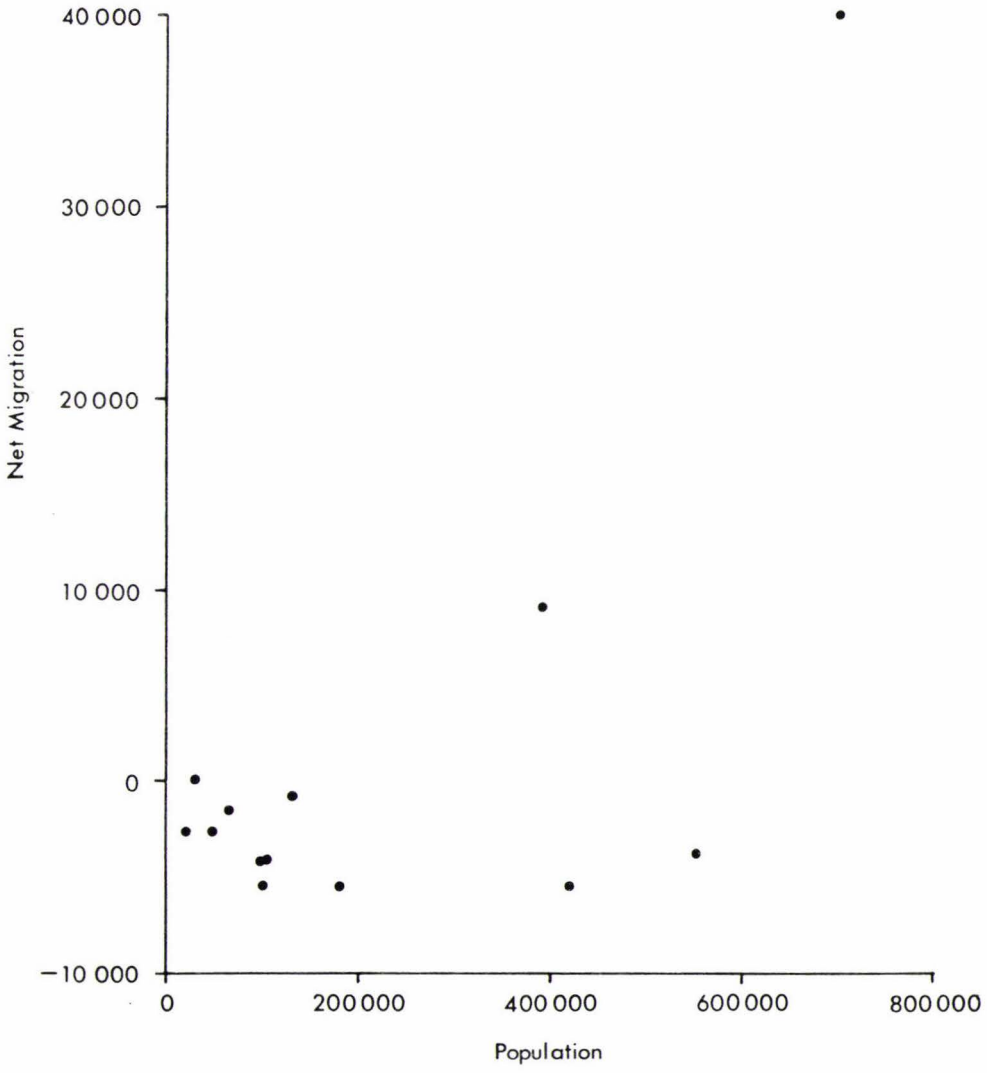
That there is a positive relationship between population size and net migration (Hypothesis 15).

There is marked variation in the populations of regions in New Zealand ranging from 698400 people living in Central Auckland to 22861 living in Westland. Having conceptualised population size as being indicative of economic, social and cultural advantage it is expected that those regions of greater population will be attractive to migrants. On the other hand it is expected that the regions of small population will be the areas of net outmigration.

The relationship between sex specific net migration and population is poor when Central Auckland is omitted falling from r = .623 to r = .07 for males and from r = .687 to r = .282 for females. Again the scattergram shows the effect of Central Auckland on the relationship (Figure 9).

From this evidence it may be suggested that population size, as with the other selected conventional migration correlates, is of little value in explaining patterns of regional net migration in New Zealand. There remains, however, the problem of aggregation of data to the regional level for both the dependent and independent variables. It may be, therefore, that a comparative overrepresentation of rural net outmigration within a region is obscuring some of the explanatory power of the conventional correlates. In view of this, the correlates will be examined in following chapters with individual sets for both rural and urban areas.

Figure 9: Regional Population and Net Migration, 1971



Chapter 3

ECONOMIC AND DEMOGRAPHIC ASPECTS OF COUNTY NET MIGRATION

The geographic counties represent, for the most part, the rural areas of New Zealand (Appendix B). It is generally recognised that rural to urban migration is one of the most common demographic trends in New Zealand and this is confirmed with all but 27 of the 109 counties showing net outmigration (Figure 10). The comparison with total population change in the counties shows that those counties with greatest inmigration are the only areas to grow at more than 6.9 percent - the national average rate of population growth (Figure 11).

It will also be noted that most geographic county net inmigration is associated with proximity to urban areas and may reflect not only movement from within the region and from other regions but also outmigration from city centres. The net inmigration in the exceptions to this generalisation - Coromandel, Thames, Taupo, Lake, McKenzie, Stewart Island and Chatham Islands counties may, with the exception of the Islands, be associated with specific developments such as hydro-electric power schemes, tourist development and retirement provisions making these counties more attractive to migrants. On the other hand, the areas which are losing population through migration are generally the remote inland rural areas.

Few geographic counties show high levels of either net in - or net outmigration with most areas neither gaining nor losing more than 1000 migrants (Figure 12).

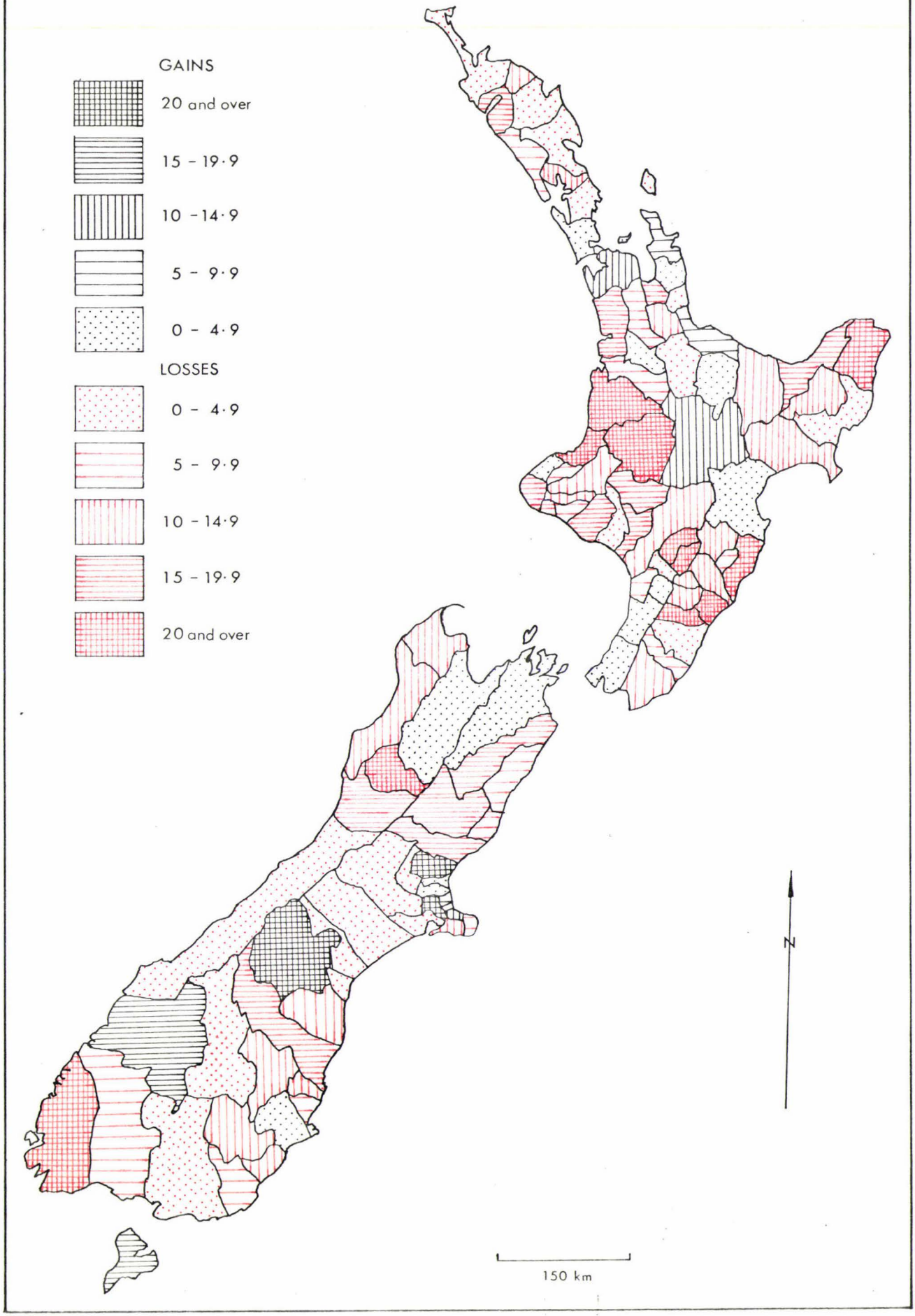


Figure 10

Geographic County Percentage Net Migration Change, 1966 - 1971

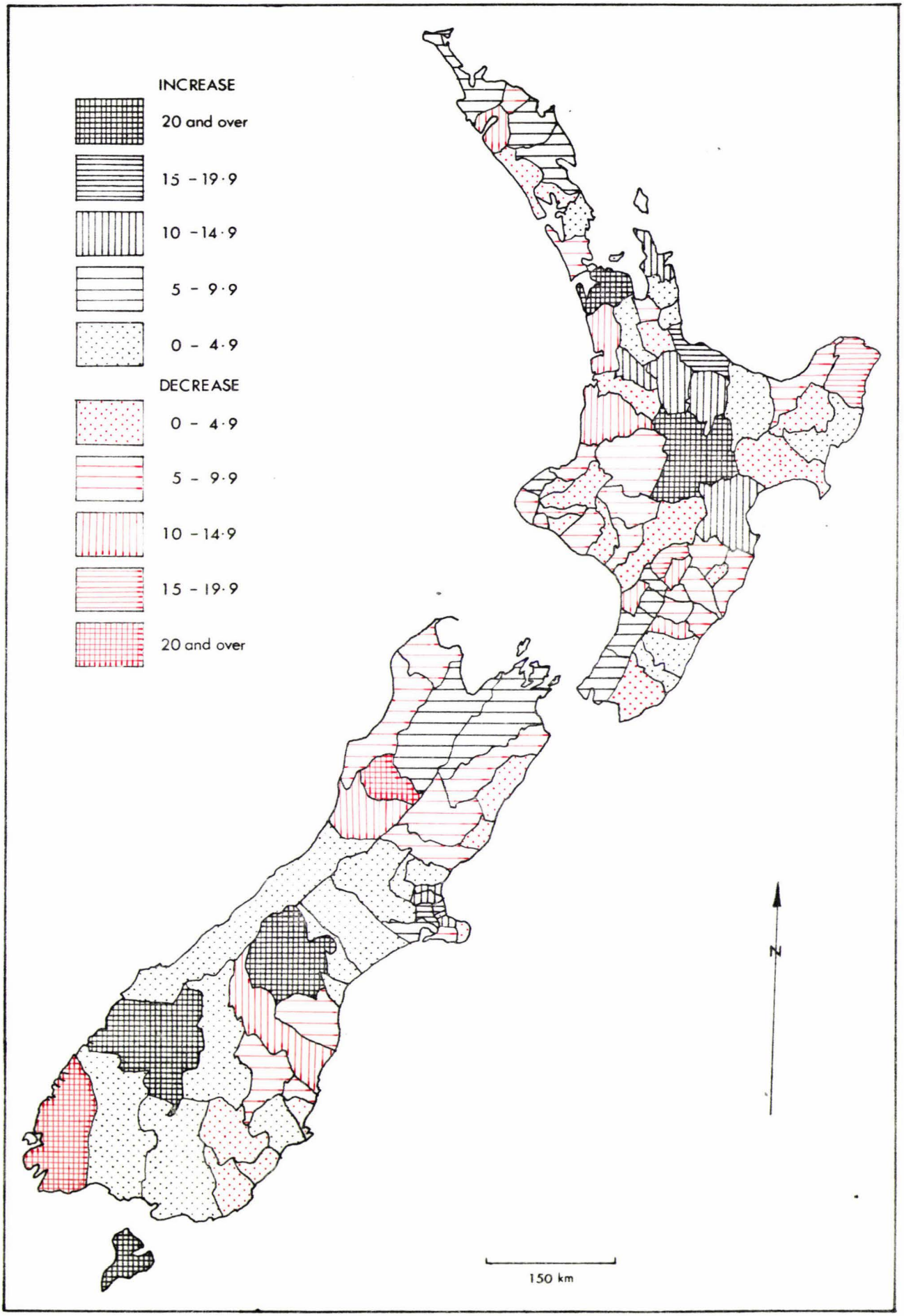


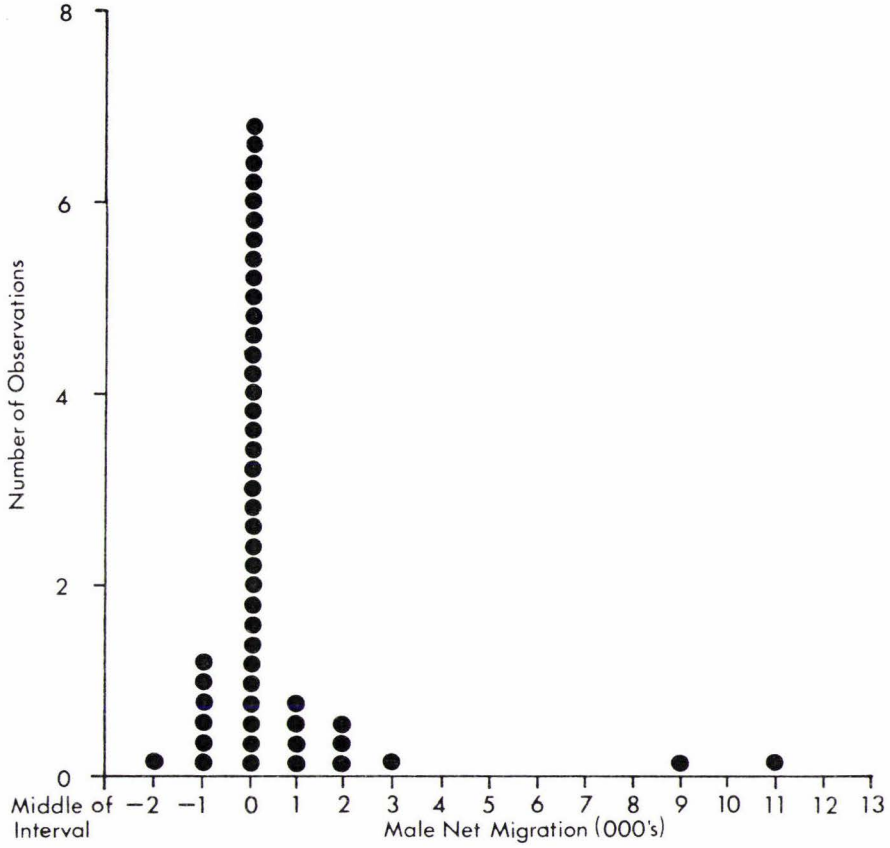
Figure 11

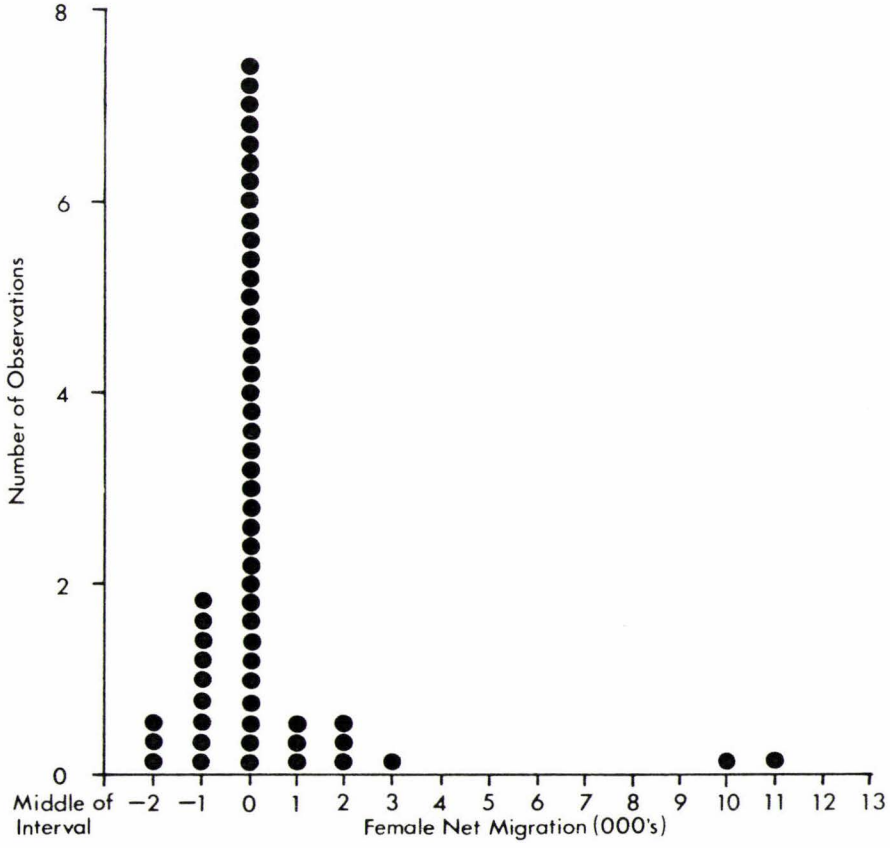
Geographic County Percentage Total Population Change, 1966 - 1971

Source: N.Z. Census 1971.

Figure 12

Volume of Geographic County Sex Specific Net Migration, 1966-1971





The distributions for male and female net migration are similar although female rates are slightly higher than those of males.

INCOME AND POPULATION CORRELATES

At this level the examination of the correlates is reduced as not all data can be disaggregated. As a result, only relationships between net migration and the correlates of income and population have been tested.

Income

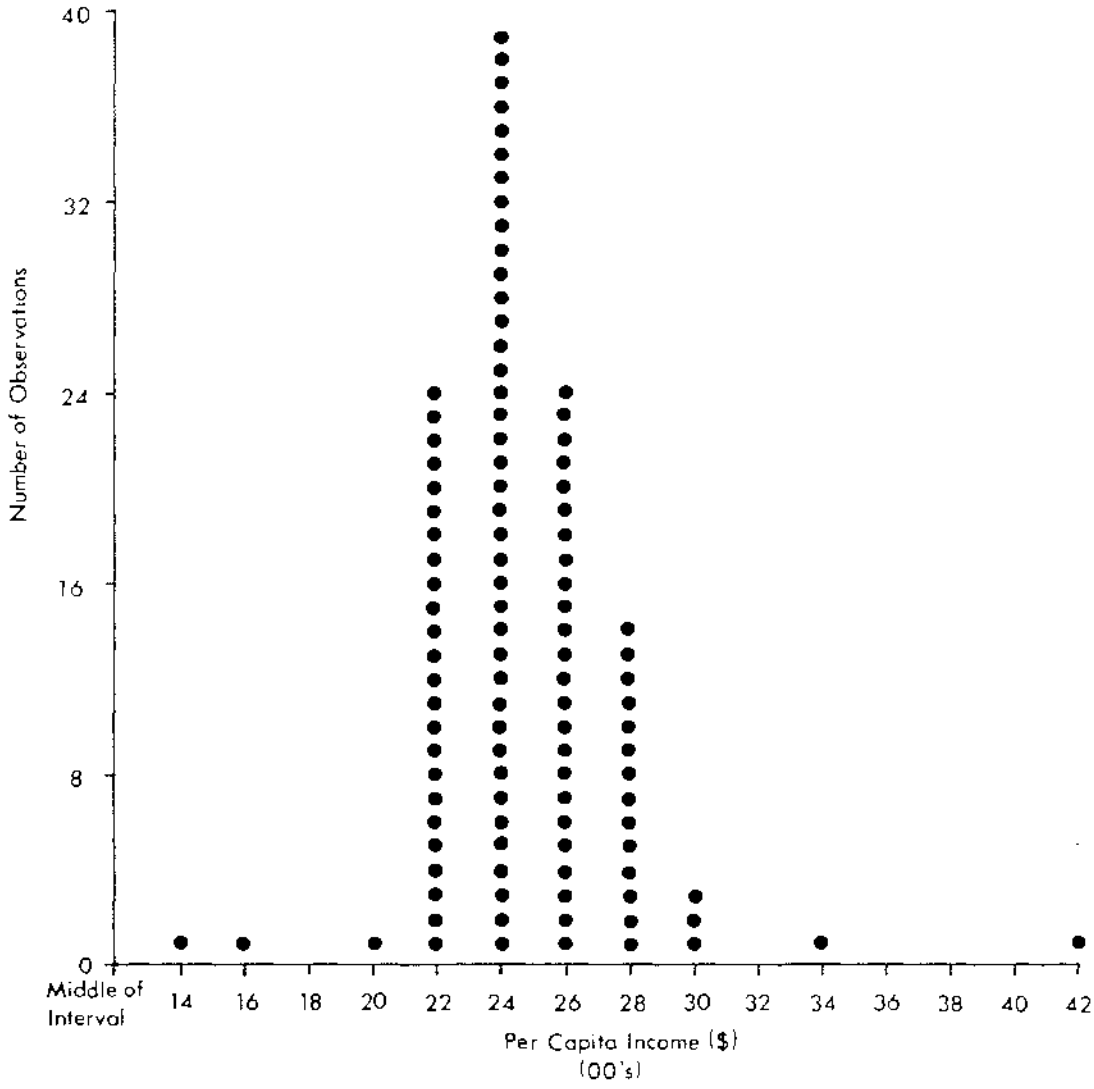
With expected higher dependency ratios in rural areas only a per capita estimate of income has been made (Heenan, 1967). The income levels range from $1354 in Great Barrier County to $4115 in Fiord County. These levels are exceptions with the majority of county per capita incomes being concentrated around $2400 (Figure 13).

A positive relationship was anticipated between per capita income and net migration. There is, however, no relationship with r = .09. An examination of the scattergram suggests some factors which may be responsible for the unexpectedly poor relationship (Figure 14). It is clear that the majority of counties have similar income and net migration coordinates, while on the other hand, those counties which have the widest income variation have similar levels of net migration. Similarly, the counties which have the highest net inmigration of population, Waitemata and Franklin counties, have income levels which are only average.

It must be concluded, therefore, that net migration at the county level is independent of variations in income levels.

Figure 13

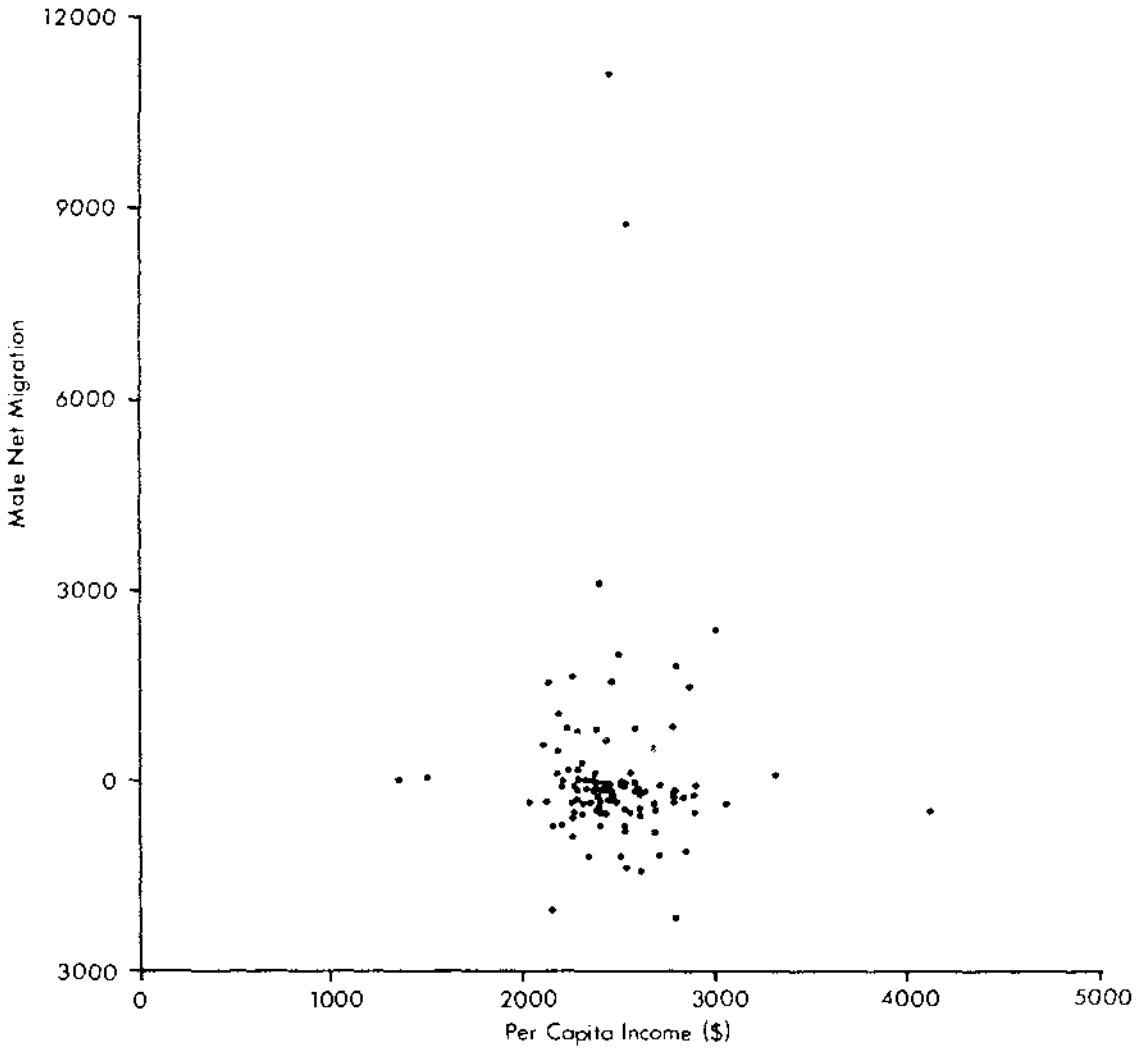
Geographic County Per Capita Incomes, 1971



Source: N.Z. Census, 1971.

Figure 14

Geographic County Per Capita Income and Net Migration, 1971



Population

As a number of data sets which were used to test hypotheses at the regional level cannot be disaggregated to allow further testing at the county level it is assumed that migrant response to population size will reflect not only perception of increased employment opportunity but also social and cultural advantages.

The smallest county in 1971 was Fiord with a population of 129 males and 6 females while the largest was Waitemata with a population of 240552 males and 250367 females. As expected there is a positive relationship between population and net migration with $r = .691$ for males and .734 for females. Similarly, with $r^2 = 51.1$ percent for the relationship between total population and total net migration the regression line is of some predictive value (Figure 15).

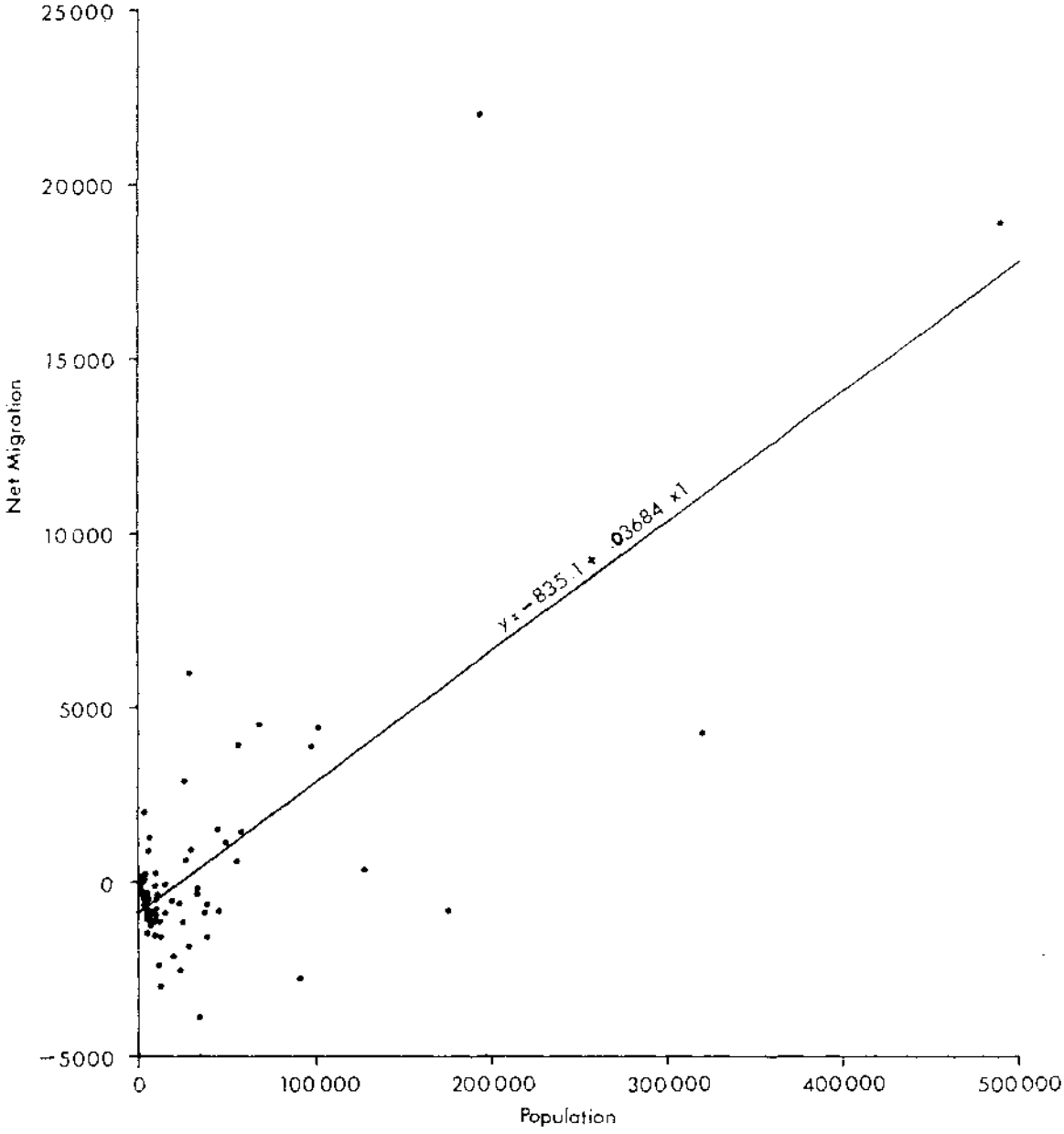
It can be seen that population size is important in determining net migration at the county level, with the counties of smaller populations losing migrants to larger counties and presumably urban areas. However, with so many counties and such a great range in the populations of the counties it is likely that some relationships are being obscured. In view of this, the nature of county net migration has been further examined within discrete groups of counties categorised by population size.

NET MIGRATION DIFFERENTIALS WITHIN COUNTIES CATEGORISED BY POPULATION SIZE

The categorisation of geographic counties by their population size shows that the most populous counties are around urban areas and are mostly within the North

Figure 15

Geographic County Population and Net Migration, 1971



Island (Appendix C). It is clear that the counties of least population are remote rural areas; so that it may be expected that the categorisation of the counties reflects a rural-urban hierarchy which constitutes a continuum of areal attractiveness to migrants. As a result, it is anticipated that the counties within the categories of lower population will be characterised by net outmigration which decreases in magnitude as population increases to show as net inmigration in the larger counties.

Population Category 1, 0-4,999 Population

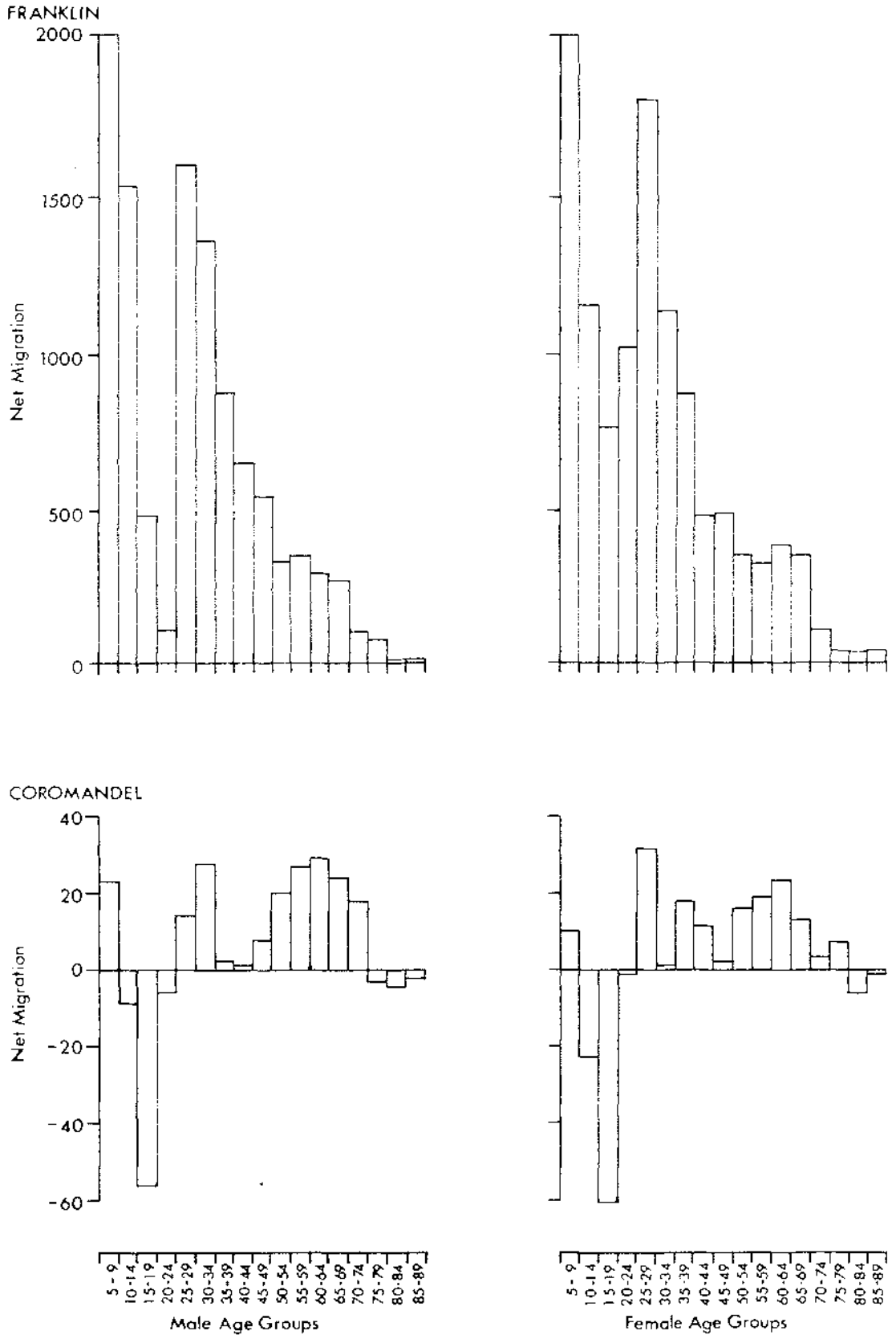
Within this group of counties eight of the thirty-seven counties experienced net inmigration - Great Barrier, for males only, Waiheke, Coromandel, Ashley, Eyre, Mount Herbert, Chatham Islands and Stewart Island. It was expected that this group of counties would be characterised unanimously by net outmigration. The nature of the counties and the characteristics of the migrants themselves offer possible explanations of why this expectation has not been met.

It seems likely that Great Barrier and Waiheke, being both close to Auckland and popular resort areas, have attracted migrants who have moved to warmer and sunnier climates. This would also appear to be the major reason for migration to Coromandel county whose profile of migrant age characteristics reveals the importance of the older age groups among the total migrant population (Figure 16).

These profiles, which may also be calculated as a percentage of total net migration movement indicate that over 25 percent of all net migration to and from Coromandel

Figure 16

Age and Sex Structure of Net Migrants in Coromandel and Franklin Counties, 1966-1971



county is net inmigration among the over 60 year age groups. In addition over 60 percent of male net migration and over 45 percent of female net migration is inmigration among those over 50 years old. These data may be compared with the profiles for Franklin with less than 15 percent of inmigration among the over 50 year age groups (Figure 16).

Of the other counties which gained more migrants than they lost in this group, all but Chatham Islands and Stewart Island counties are very close to Christchurch city. It may be expected, therefore, that these counties are gaining migrants who are moving from the city centre but are remaining within commuting distance. In the absence of more specific data it can only be assumed that net inmigration to the Island counties is related to specific employment opportunities or other perceived advantages.

In view of the fact that most of the counties in this group are losing migrants and that those counties which are gaining population have strong relationships with specific types of migration it is not surprising that there is no relationship between net migration and either of the selected correlates with $r = -.148$ for the relationship with income and $r = -.352$ for population.

Population Category 2, 5000-9999 Population

Three of the 29 counties whose population was between 5000-9999 in 1971 - Thames, McKenzie and Lake counties, were areas of net inmigration. Of these counties, the inmigration and high percentage population change in general for Lake and McKenzie counties can be

accounted for by specific employment opportunites offered by hydro-electric power schemes. The remaining county with net inmigration, Thames, has an age structure of net migrants which strongly suggests retirement migration is the greatest single reason in explaining population gains (Figure 17).

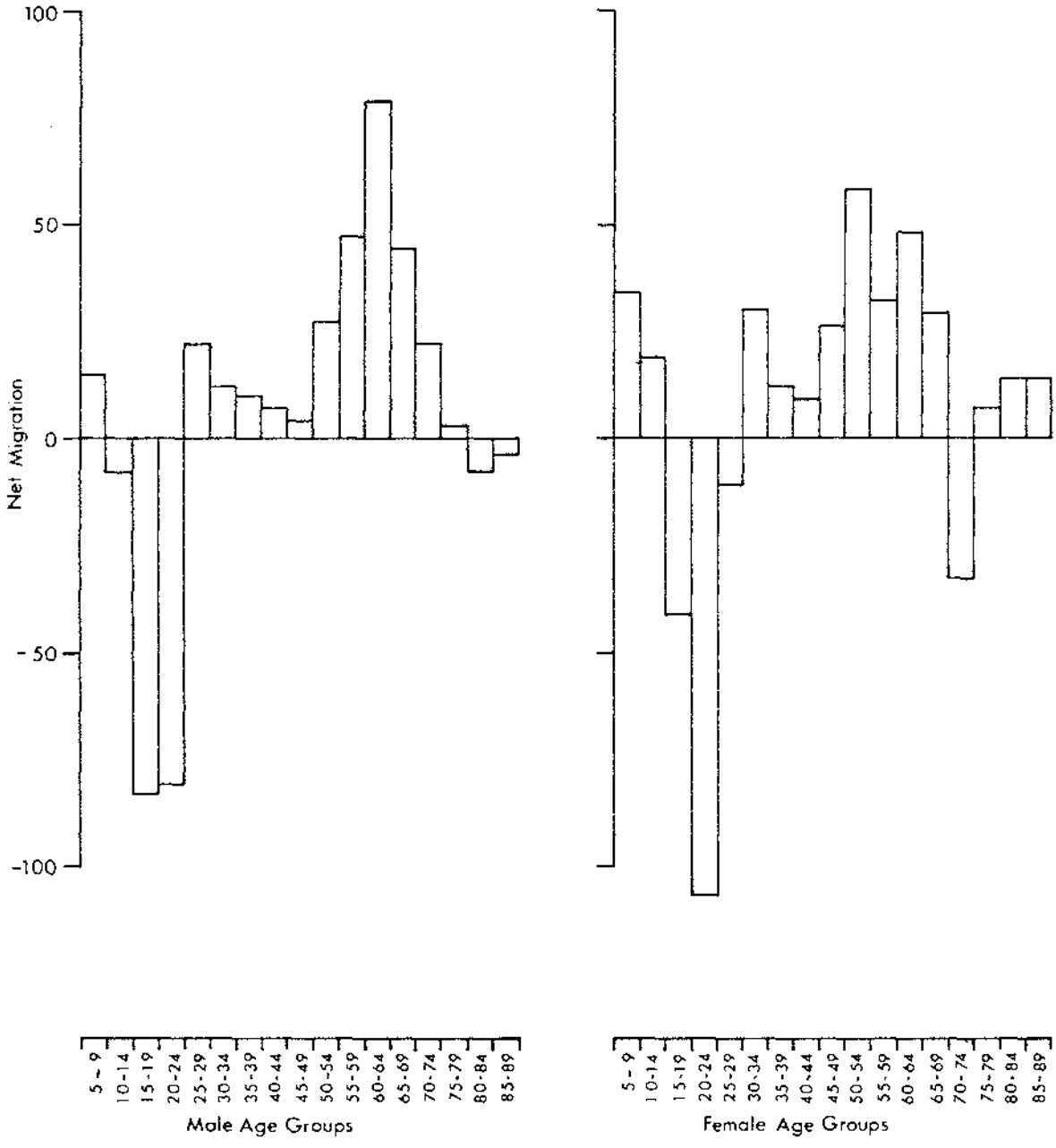
Over 50 percent of total migration change among males in Thames is due to the inmigration of those over 60 years old. Female inmigration in these age groups is also important being over 35 percent of total female net migration change. If over 50 year age groups are included 77.25 percent of total male net migration and 68.86 percent of total female net migration change occured among these age groups. With the importance of the older age groups in determining the rate of migration change in Thames County it seems likely that appraisal of non economic factors such as climate rather than economic variables are the most important reasons for inmigration to this county. This county, along with Coromandel in the previous category are representative of age-group specific perception of space preferences. This concept in general remains largely unexplored in New Zealand and in particular the association between noneconomic space preferences and migration. The general inferences made here are, however, in line with what work has been done on space preferences in New Zealand which show a favouring of coastal, sunny climates (Maunder, 1962; Vellekoop, 1968; Johnston, 1971b).

As was found at the previous level of county categorisation by population size, income and population differences are not important in explaining net migration

Figure 17

Age and Sex Structure of Net Migrants

in Thames County, 1966-1971



with r .066 for the relationship between income and net migration and r-.226 for the relationship with population size. Thus, it may be concluded that at this level population change through migration is independent of these traditional correlates and that rather net outmigration from these counties may be associated with rural depopulation in general and perception of urban places as areas of greatest opportunity. The counties which emerge as exceptions to this general trend at this level have either unique employment opportunities or factors which create a space preference for older age groups which manifest themselves in counterstreams of migrants.

Population Category 3 - 10,000-19,999 Population

Of the 14 counties included in this group only Rangiora experienced net inmigration. This county is the only one which is close to a major urban area so that it is likely that it gained population from the central city areas. The other counties in this category are characteristically rural based economies that include small subregional service towns (Appendix C). With net outmigration from all but one of the counties, the correlations are poor indicating that migration from rural areas of this population size cannot be differentiated by levels of population or income, with r = -.122 for the relationship with population and r = -.442 with income.

Population Category 4 - 20,000-49,999 Population

The majority of counties in this group lost more migrants than they gained. The greatest inmigration is recorded in Paparua county with 6091 net inmigrants and

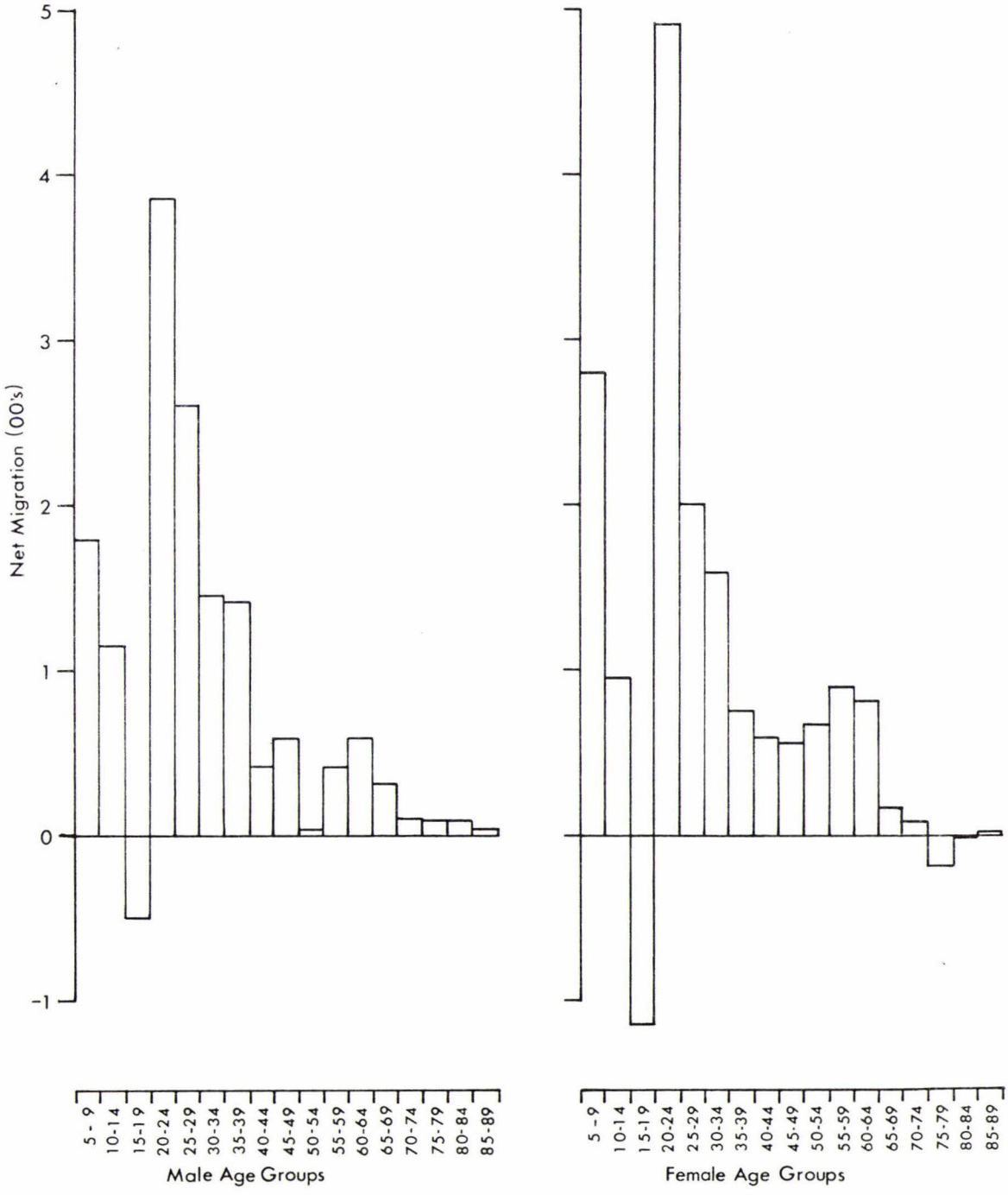
the greatest loss in Waitaki with 3883 outmigrants. Five counties, including Paparua gained population through migration - Rotorua, Taupo, Taranaki, Horowhenua and Marlborough. All of these counties are associated with urban centres. In addition, however, to the importance of proximity to urban areas as a major reason for inmigration, climate and specific employment opportunities may also be important. The latter reason may account for over 60 percent of total migration change in Taupo being the inmigration among the 20-39 year age groups (Figure 18). This is likely to be associated with hydroelectric power schemes creating a number of job opportunities. It is also likely that this type of employment brings transitory workers so that as development projects are completed the workers move again.

Even with an increase in population size over the previous levels the correlations of r = .099 for population and r = .031 for income, show that within this group there is no relationship between net migration and the selected variables. It was expected that as population size increased there would be some relationship between net migration and the selected variables. Rather, it is emerging that even to this level of population no differentiation can be made between the counties within each category. On the other hand, there is a continuum of net outmigration which is gradually decreasing as population size increases, so that the smaller counties are losing the most migrants and the larger counties losing less. This trend is doubly important when it is considered that even small changes in a county of small population can have a great effect on total population

Figure 18

Age and Sex Structure of

Net Migrants in Taupo County, 1966-1971



growth. As a result, it may be inferred that in terms of development prospects the small rural counties are seriously disadvantaged, if not in relative economic terms, but in the way they are perceived by migrants as being unattractive with only those areas which are close to cities, offer specific and possibly transitory employment opportunities and retirement centres showing any population gain through migration.

Population Category 5, 50,000-99,999 Population

Of the six counties in this population category - Tauranga, Hawke's Bay, Kairanga, Waimea, Waimairi and Southland only the latter lost population through migration. These counties differ from those previous in that they are more urbanised and are associated with major urban areas. At this level, therefore, in addition to movement out from the city centres these counties may be selected by migrants from other areas as the most desirable places to live.

It will be noted that with only six counties in this group a large residual can have a marked effect on the nature of the overall relationship. Thus, while the correlations for the group are poor, they are improved with the omission of Southland data so that a good relationship emerges between female net migration and female population and a strong relationship between net migration and income (Table 6). The strength of the female relationship with population can be explained by the higher levels of female inmigration within this category although even with Southland data omitted only 32 percent variation is explained by the population variable.

In comparison, the income variable accounts for 52 percent variation in the relationship between income and net migration. This is further strengthened when income is related to only male net migration with r^2 = 67 percent.

TABLE 6: Correlation Coefficients of Selected Correlates with Net Migration, Population Category 5, 50,000-99,999

Correlate	Male r	Female r	Total r
Income	.11 (.82)	.06 (.63)	.08 (.72)
Female Population	-	-.06 (.56)	-
Male Population	-.33 (.37)	-	-
Total Population	-.27 (.36)	-.13 (.57)	-.19 (.49)

Note: Coefficients in brackets are with Southland data omitted.

There is clearly a strong relationship between income and net migration within this group of counties when Southland County is omitted. The omission of Southland strengthens the relationship not only because it is the only county at this level with net outmigration but also because it has the second highest income levels, a factor which reflects the general prosperity of the Southland region as a whole. It may also be suggested that migration to the other counties in this category reflects the relative status of their associated urban areas, especially if it is accepted that in addition to migration out from city centres migration from other areas is also important. As the source and directionality of

migrant streams can only be guessed at with net migration data, this hypothesis cannot be tested. Although with further testing of the traditional correlates at the urban area level, in the next chapter, some added insights may be gained.

Population Category 6, 100,000-500,000 Population

At this level of population the counties are associated with the country's largest urban areas. Only Heathcote county experienced net outmigration with the remaining counties - Waitemata, Franklin, Waipa, Hutt and Taieri all gaining more migrants than they lost. It may be assumed that the majority of internal migrants to these areas come from one of three different sources; many will have come from within the general city area with the high levels in the Auckland counties undoubtedly reflecting movement from the central city areas, from rural areas and through the urban hierarchy.

Again, with only six counties in this group, it can be seen that the correlations are susceptible to large residuals. Within the group the correlations with net migration are poor for income with r = .308 and weak for population with r = .52. What is more important among this group of counties is the variation in population increase ranging from the very high rate of population change in Franklin of 27.5 percent to the low rate of the two South Island counties Heathcote and Taieri of no more than 2.5 percent. These rates of growth have a very strong relationship of r = .943 with net migration. From this it is clear that the high rate of population growth in the North Island counties, which is far greater than

the 6.9 national average, indicates that migration has been most important in populating these areas.

It may also be inferred from these findings that the general characteristics of county net migration change will reflect the changes occuring within the adjacent urban areas. This suggestion will be further tested in the next chapter, where urban areas are isolated from their peripheries.

Chapter 4

ECONOMIC AND DEMOGRAPHIC ASPECTS OF URBAN AREA NET MIGRATION

It was suggested that one of the major reasons for the poor correlations at the regional level may be the nature of the areal compositions where rural depopulation obscures urban net migration gains. Similarly, at the county level it was apparent that the urban areas are the destinations for the majority of migrants. In this chapter, the urban area data are isolated to see if the conventional correlates are of value in explaining net migration at this level.

URBAN AREA NET MIGRATION

The majority of the population of New Zealand live in urban areas. The trend toward the urbanisation of the population has been observable since the beginning of this century and continues with population increase for urban areas running at an average of 10.4 percent compared with the national average population increase of 6.9 percent. The 24 urban area divisions[1] range in percentage population change from 32.2 percent in Southern Auckland to -.5 percent in Wanganui. In addition, however, seventeen of the urban areas grew at a faster rate than the national average so that it may be inferred that

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1 There are 18 urban areas when the Auckland and Wellington urban divisions are not treated individually.

migration, manifested in movement through the urban hierarchy and in rural to urban migration, has played an important part in determining the high levels of urban population change.

Using vital statistics it is possible to estimate how areas may have grown had it not been for migration. The variation between expected and observed population size may be regarded as being due to migration. The urban areas whose populations are less than expected are; Central Auckland, Wanganui, Lower Hutt, Wellington, Masterton, Timaru, and Dunedin (Table 7).

With the majority of urban areas gaining more migrants than they lose, it can be seen that there are a number of areas to which migrants are attracted. In comparison with the regional pattern, where it was found that the majority of regions were losing migrants, it is obvious that high levels of rural depopulation have in fact obscured the urban gains.

A number of spatial patterns emerge from the areal distribution of percentage net migration gains (Figure 19). The greatest gains are in the North of the North Island, Hawke's Bay, and also around Wellington. In comparison, the South Island metropolitan centres have minimal gains in the case of Christchurch and net outmigration in the case of Dunedin. Overall, South Island centres are growing more slowly than those in the North Island.

A second pattern is the decline in population of the central city areas. Both Central Auckland and Wellington are areas of net outmigration and this may also explain the pattern of net migration change in the

TABLE 7: Urban Area Net Migration and Population Change, 1966-1971

Urban Area	Net Migration	% Net Migration	% Population Increase
Whangarei	846	2.48	9.8
N. Auckland	15599	14.45	25.1
W. Auckland	8917	9.91	18.7
C. Auckland	-14220	-4.96	2.0
S. Auckland	31372	19.01	32.2
Hamilton	7504	9.28	18.0
Tauranga	4145	10.27	19.3
Rotorua	3772	9.49	18.3
Gisborne	65	.21	7.3
Napier	2515	5.77	13.6
Hastings	1993	4.38	11.9
New Plymouth	588	1.51	8.7
Wanganui	-2881	-7.58	-.5
Palmerston North	996	1.74	8.9
Upper Hutt	1658	5.35	13.1
Lower Hutt	-2558	-2.78	4.1
Porirua Basin	7585	15.85	27.2
Wellington	-4524	-3.31	3.6
Masterton	-315	-1.56	5.4
Nelson	1104	2.9	10.3
Christchurch	318	.11	7.2
Timaru	-954	-3.3	3.6
Dunedin	-5384	-4.85	2.1
Invercargill	436	.86	8.0

Source: N.Z. Census, 1971.

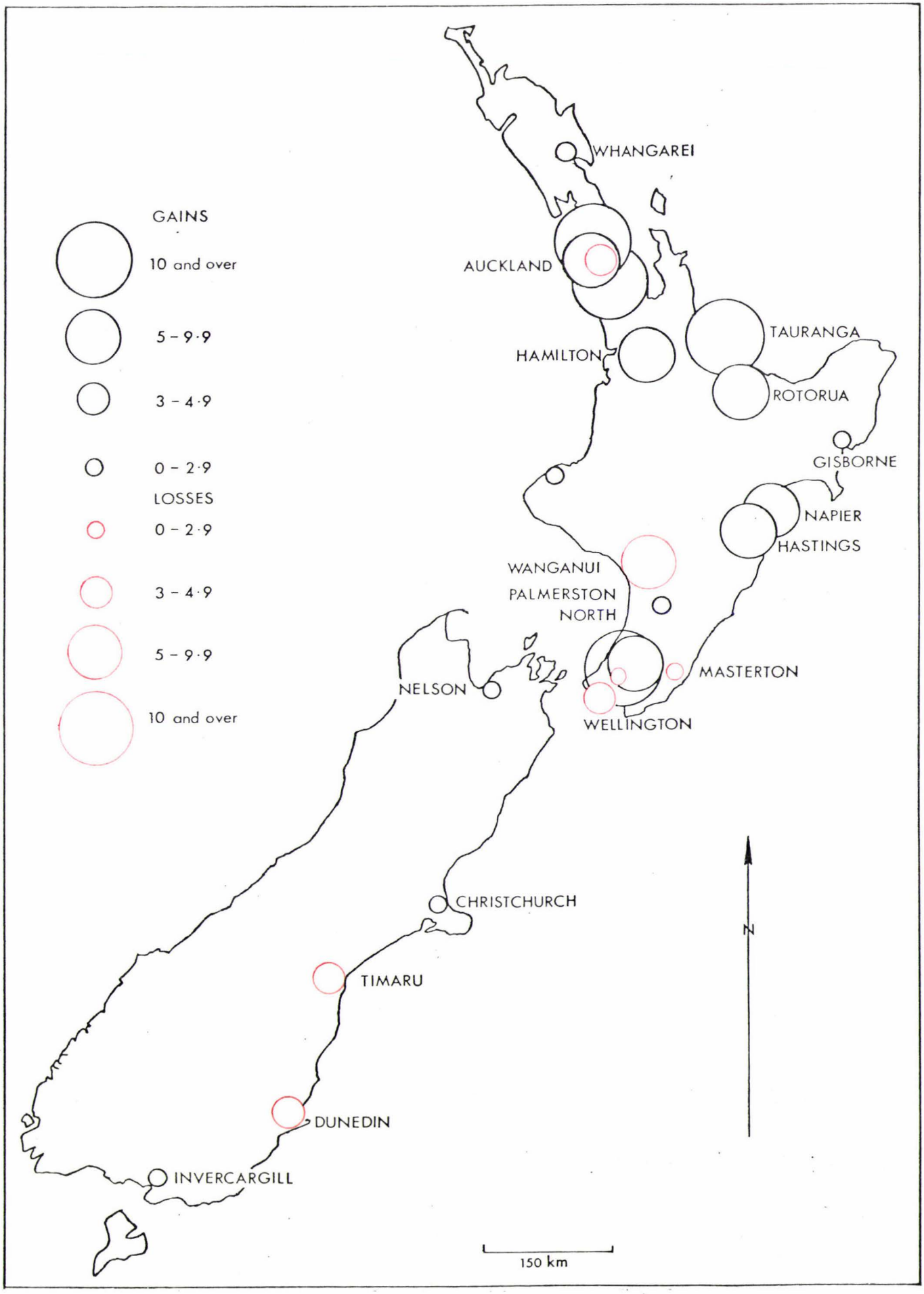


Figure 19

Urban Area Percentage Net Migration Change,

1966 - 1971

comparable South Island centres. This trend, which may be conceptualised within central place theory, is to be expected for with the high costs associated with central locations the more attractive residential developments are taking place in the peripheral areas. As a result, the net migration gains in other parts of Auckland and in the Porirua Basin may be the result of intra urban migration as well as migration through the urban hierarchy.

ECONOMIC AND DEMOGRAPHIC CORRELATES

To examine the conventional migration correlates at the urban area level the same assumptions employed at previous levels, regarding migrant response to spatial variation, have been adopted.

Income

The pattern of urban area income follows the regional trend with the highest incomes among the urban areas of Invercargill, Wellington and Auckland (Table 8).

It can be seen that, with the exception of the South Island city of Invercargill, the North Island metropolitan centres have the highest income levels. At the same time, however, only the Wellington and Lower Hutt urban divisions have income levels that are much higher than all other areas.

The lack of any great variation in urban area income levels is shown in the scattergram (Figure 20).

The lack of variation may also explain the low correlation coefficients for the relationships with the income indices with $r = .169$ for mean income and $r = -.228$ for per capita income. When the central city areas are

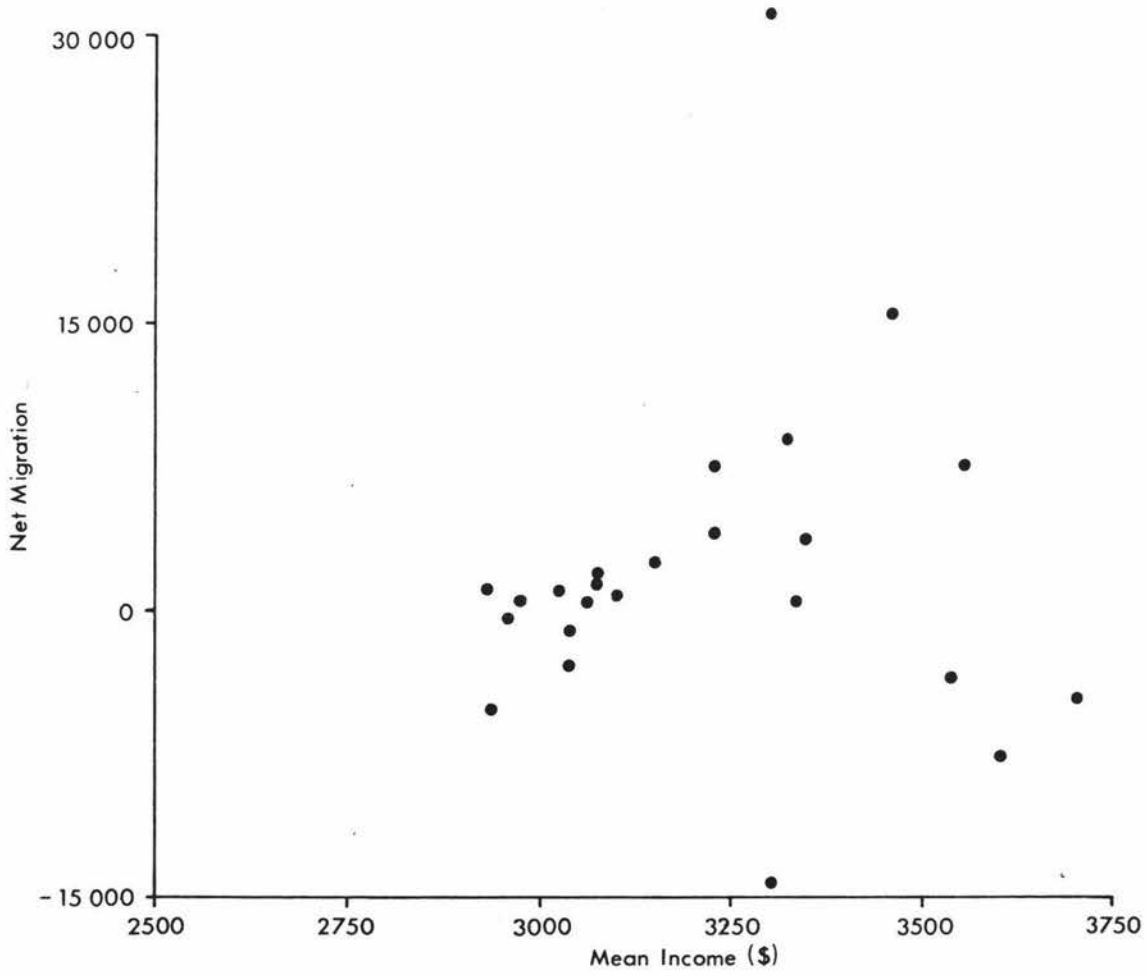
TABLE 8: Urban Area Income Levels, 1971

Urban Area	Mean Income	Per Capita Income
Whangarei	3101 (14)	1827 (20)
N. Auckland	3460 (5)	2186 (4)
W. Auckland	3327 (7)	1901 (16)
C. Auckland	3308 (8)	2255 (3)
S. Auckland	3294 (10)	1870 (19)
Hamilton	3231 (11)	2012 (7)
Tauranga	3228 (12)	1957 (11)
Rotorua	3351 (9)	1923 (13)
Gisborne	2972 (21)	1721 (24)
Napier	3154 (13)	1915 (14)
Hastings	3084 (15)	1900 (17=)
New Plymouth	3083 (16)	1998 (8)
Wanganui	3039 (19)	1792 (22)
Palmerston North	3029 (20)	1964 (10)
Upper Hutt	3536 (4)	2178 (5)
Lower Hutt	3603 (2)	2306 (2)
Porirua Basin	3551 (3)	1900 (17=)
Wellington	3703 (1)	2662 (1)
Masterton	2959 (22)	1742 (23)
Nelson	2930 (24)	1795 (21)
Christchurch	3059 (17)	1980 (9)
Timaru	3040 (18)	1926 (12)
Dunedin	2935 (23)	1908 (15)
Invercargill	3334 (6)	2081 (6)

Note: Rankings for the regions are in brackets.

Figure 20

Urban Area Mean Income and Net Migration, 1971



omitted from the relationships the relationships remain poor with r = .315 for mean income and r = .036 for per capita income. The omission of all divisions of the four metropolitan centres strengthens the relationships to r = .566 for mean income and r = .46 for per capita income. Even with these omissions there remains virtually no useful relationship between income and net migration outside the major centres. Thus with little variation between areas it must be concluded that prediction of aggregate migrant behaviour cannot be made from spatial variation in income levels.

Employment

Initial investigation of the relationships between employment and net migration in urban areas show that neither total employment nor employment within specific sectors of the economy provide any explanation of variations in net migration (Table 9). It is clear, however, from the scattergram of employment and net migration that the central city areas of the metropolitan centres have the most numbers in employment and yet show net outmigration (Figure 21). The omission of the data for Central Auckland, Christchurch, Dunedin and Wellington changes almost all relationships from poor to quite strong with r^2 for total employment and net migration being 64.8 percent.

The omission of the four metropolitan centres, including the four divisions of Auckland and Wellington, reduced the strength of the relationships although the correlations with construction and financial services are still strong with over 45 percent explained variation.

Figure 21

Urban Area Employment and Net Migration, 1971

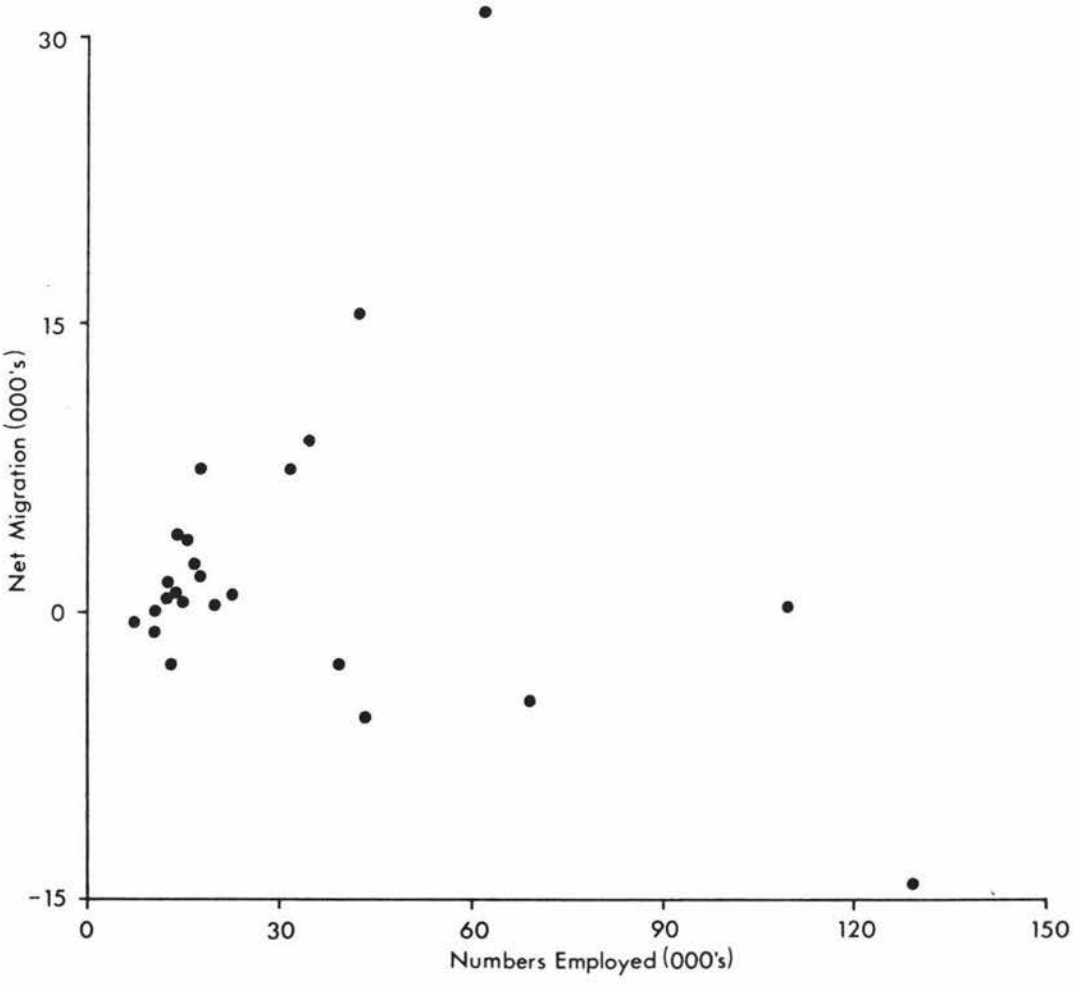


TABLE 9: Urban Area Net Migration and Employment Correlation Coefficients

Independent Variables	All Urban Areas	Minus Metropolitan Centres	Minus Metropolitan Areas
Agriculture	.35	.457	.463
Mining	.203	.730	.181
Manufacturing	-.054	.791	.437
Construction	-.029	.827	.712
Electricity Supply	-.14	.639	.514
Wholesaling	-.214	.744	.655
Transport	-.195	.769	.597
Community Services	-.208	.7	.63
Finance Services	-.246	.643	.69
Total Employment	-.143	.805	.671

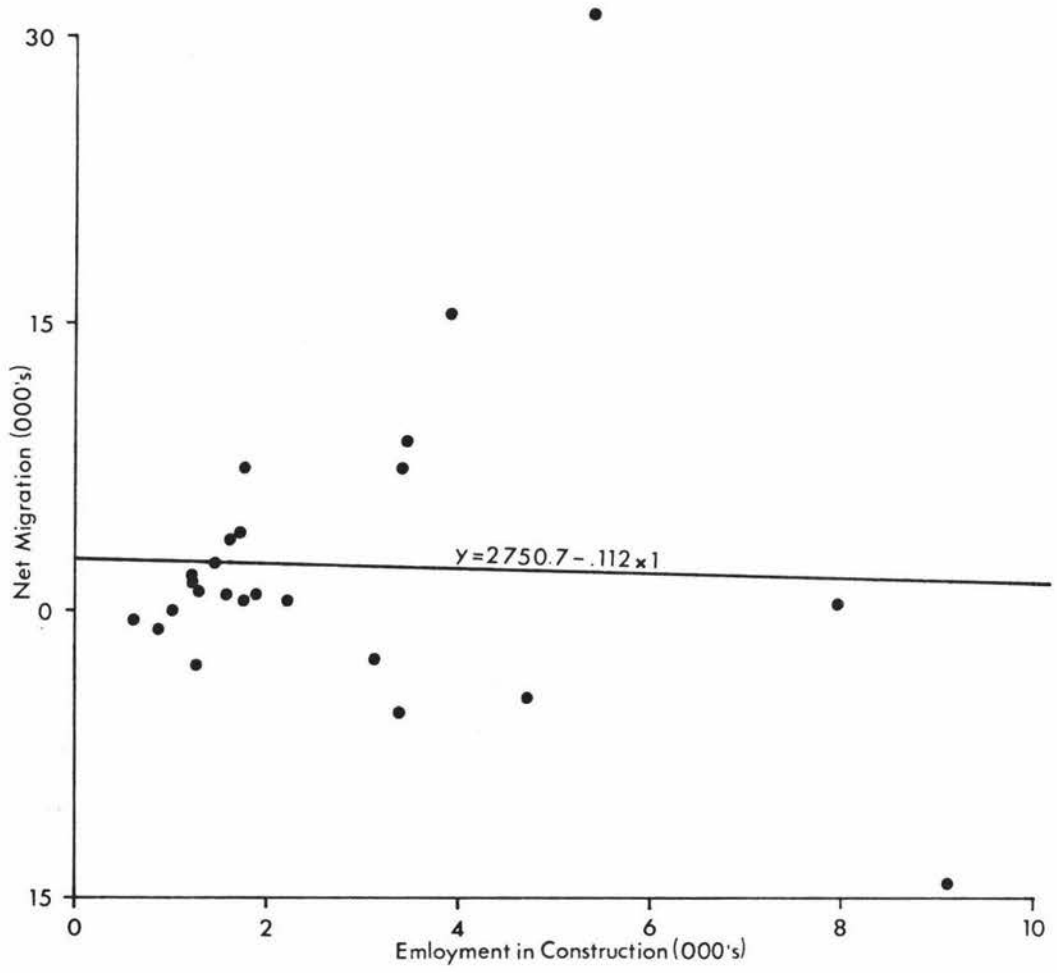
There are also good relationships with wholesaling activities, community services and total employment.

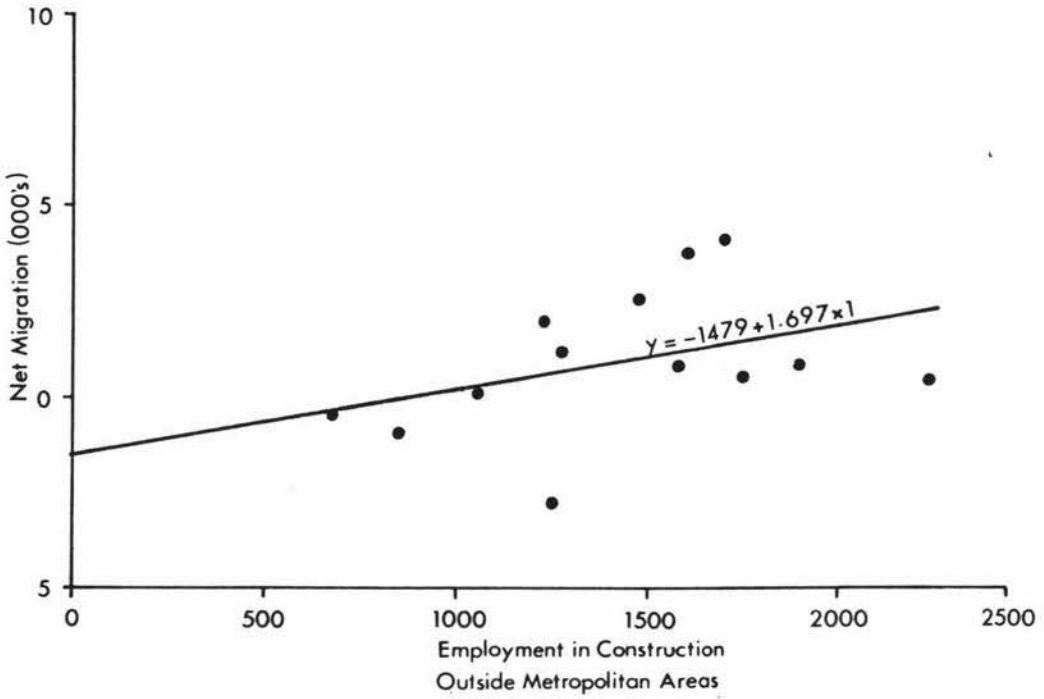
The change in the nature of the relationships when the metropolitan data are omitted can be seen in the example of the scattergram where employment in the construction industry is plotted against net migration (Figure 22). The large number employed in the metropolitan centres, which have net migration outwards from the city centres and large numbers of net inmigrants, create a misleadingly poor relationship. The isolation of the other urban areas indicates that some prediction of migrant behaviour can be made from the independent variables in these areas.

On the other hand there are problems of definition which may lead to a degree of auto correlation in the relationships. It is well known that migration is generally associated with movement to larger urban areas;

Figure 22

Urban Area Employment in Construction and Net Migration, 1971





similarly, international immigration is generally concentrated at major urban centres (Thomson and Trlin, 1970). While, with the omission of the metropolitan data the latter problem is relieved to a certain extent, it remains that net migration is a surrogate of population growth. As a result, it is unclear whether the relationships in fact show areal attractiveness or are merely reflecting the increased growth of larger centres.

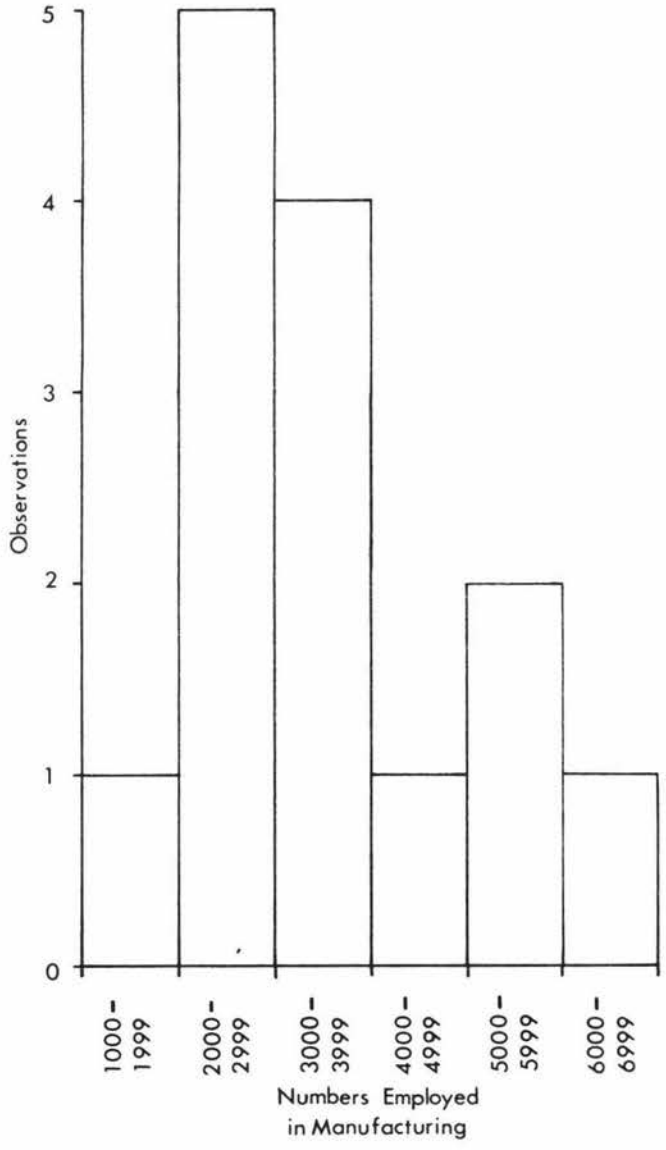
Those relationships which remain poor, with less than 25 percent explained variation, lack any great variation in the specific employment groups. At the same time it may be noted that, with the exception of employment in manufacturing, the relationships are with employment in essentially nonurban activities - agriculture, mining and electricity supply.

There is apparent marked variation in employment in manufacturing with the metropolitan areas dominating this function. This is illustrated by the fact that employment in manufacturing in these areas accounts for 22 percent of the total urban area workforce. Whereas manufacturing has large numbers employed in the metropolitan areas the other urban areas show much less variation (Figure 23), which is to be expected considering the strong relationship between manufacturing employment and population size.

It can be seen that net migration can be predicted, to a certain extent, from a number of employment categories and total employment. It remains, however, unclear whether these relationships are a reflection of net migration as a surrogate of population growth. On the other hand, with thebest relationship outside the metropolitan

Figure 23

Numbers Employed in Manufacturing Outside Metropolitan Areas, 1971



areas, between net migration and employment in construction, explaining only 50 percent variation it is obvious that urban area net migration cannot be predicted solely from employment variables.

Population

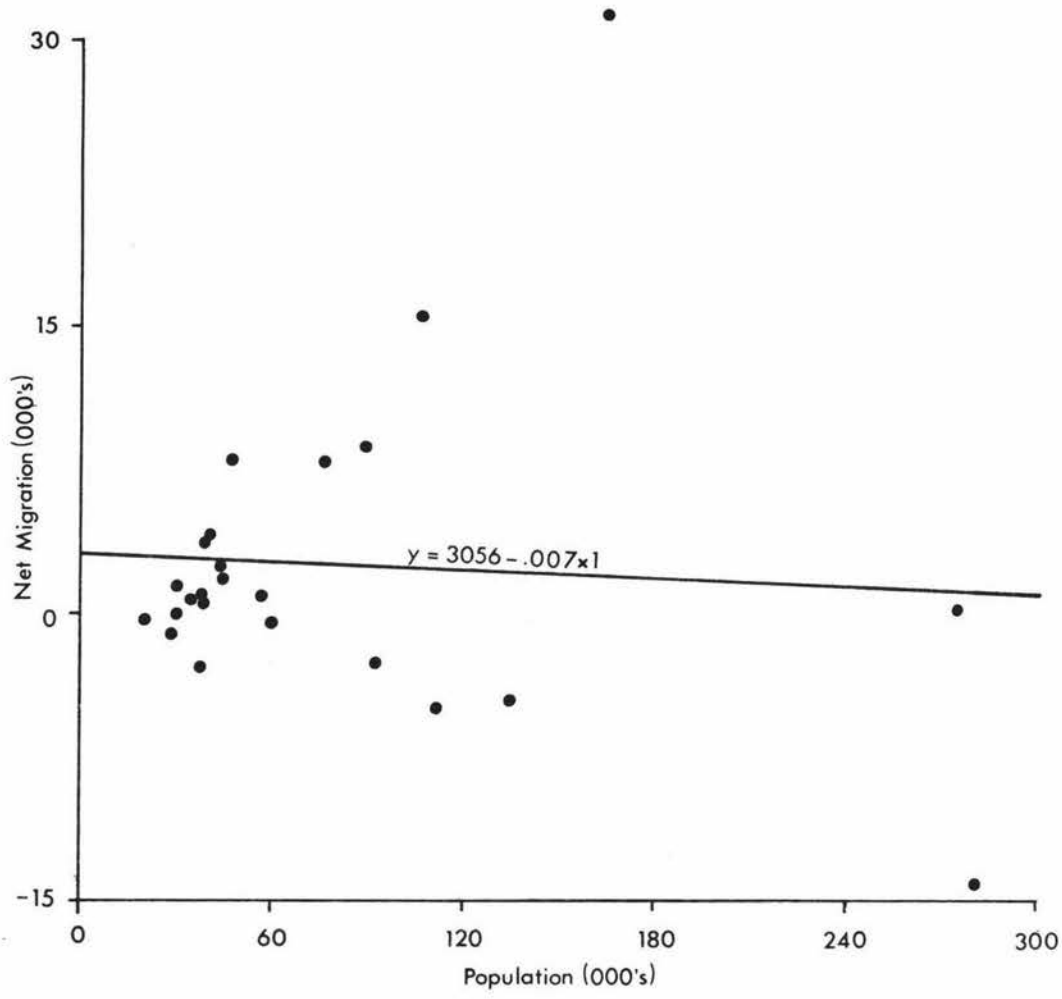
The population of the urban areas range from 286,287 in Central Auckland to 20,147 in Masterton; this range is considerably increased with the combined Auckland urban divisions having a total population of 649,746 people in 1971. It was shown earlier, however, that the areas of greatest population - the metropolitan central city areas - are showing either net losses or gaining very few migrants.

This situation largely explains the poor correlation coefficient between population size and net migration with $r = -.006$. The scattergram shows plainly, however, that the central city areas are the exceptions in what would appear to be an otherwise strong relationship (Figure 24). The exclusion of these data from the relationship strengthens the correlation to $r = .849$. Even with the omission of all metropolitan data the relationship is good with $r = .686$ (Figure 25).

It is an accepted generalisation that the larger centres are the most attractive destinations for prospective migrants. It was suggested earlier that this relationship may be largely explained by the increased social, cultural and economic opportunities as well as opportunity in general. As a result, however, if it is accepted that natural increase is constant, by definition net migration is the major source of population growth of

Figure 24

Urban Area Population and Net Migration, 1971



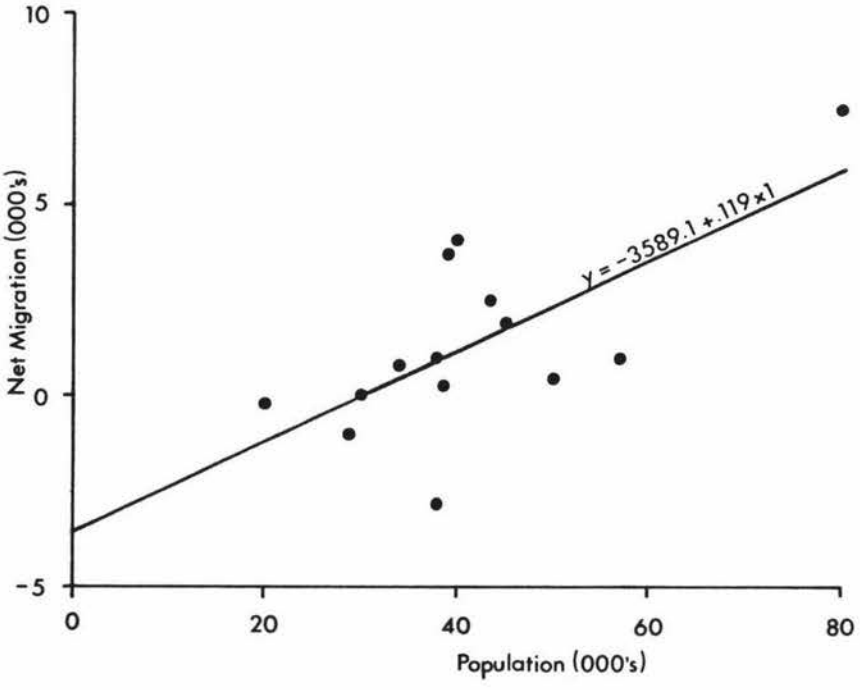


Figure 25

Urban Area Population and Net Migration Outside Metropolitan Areas.

areas. This is most clearly shown in the relationship when only the central core areas are omitted with over 72 percent explained variation. Thus, when the metropolitan data are omitted the correlation may in fact reflect a slower rate of population change in urban centres of lesser population size. In view of this, it is likely that there is a degree of auto correlation in the relationship between population size and net migration.

It must be concluded, therefore, that while some prediction of variation in net migration outside the metropolitan centres can be made, it is unclear to what extent the relationship reflects the increased rate of population change of larger urban centres.

Chapter 5

CONCLUSION

It was found that there are a number of problems associated with the explanation of aggregate migrant behaviour with a national data set in New Zealand. The most obvious problem concerns the nature of the migration data itself as only net estimates can be made. While publication of migration data following census questions on residence one year and five years prior to census night provides an extensive set of estimates of population relocation this data was not available when this research was operationalised. As a result the research problem was operationalised with a residual estimate of net migration being used. The weaknesses of net migration data in general and residual techniques in particular are well known where, in effect, an assessment of the difference between gross inmigration and gross outmigration is produced.

In addition to the general problems associated with net estimates it is clear that levels of aggregation are of major importance in determining the nature of net migration for specific areas. This problem is greatest at the regional levelwhere rural depopulation obscures the net migration gains of the majority of New Zealand's urban areas. As a result, the considerable variation in size and consequently the variation in numbers of rural areas within individual regions produces a situation where only Central Auckland, Canterbury and to a much lesser extent Marlborough are regions of net in-

migration.

With these data limitations accepted the most common New Zealand internal migration generalisations including the locational attractiveness of the north of the North Island and in particular Auckland, rural depopulation and the increasing urbanisation of the population have been confirmed. Similarly, broad age and sex characteristics of New Zealand migrants follow accepted patterns with the most mobile groups being females and the young adults of both sexes. It is, however, in the examination of a number of conventional migration correlates, which have remained largely untested in New Zealand, that the most important and in some cases unexpected results have emerged.

Migration in New Zealand is generally assumed to be a result of migrant response to economic variation in the space economy. These assumptions follow accepted migration generalisations where the parameters of, for example, regional development constitute a set of positive and negative correlates of net migration. The results of this research indicate that the correlates either do not apply with, for example, insufficient variation within the parameters or that data limitations have inadequately measured the relationships.

While for the full regional data set strong relationships emerged it is clear from the scattergrams that Central Auckland's high values for the dependent and independent variables are creating artificially high correlations. With the omission of Central Auckland from the relationships the correlations approach zero so that no prediction of migrant behaviour can be made from the

regression line.

As indicated above a number of factors may be responsible for the uniformly poor correlations at the regional level. It has been suggested that regional economic variation is minimal (Marshall, 1972; Franklin, 1975). This has been confirmed for the selected parameters, for while there is some variation in the absolute numbers of, for example, employment these differences remain relative to the population size of the regions (McDonald, 1969). It may be suggested, therefore, that as there is insufficient variation between regions migrant perception of alternative locations is unrelated to the conventional correlates. Thus it seems likely that migrant perception of regional attractiveness may in fact be based on a subjective appraisal of noneconomic differences.

On the other hand, it has been shown that the regional aggregation of net migration data creates a false impression of unrelieved population losses. The isolation of county and urban area populations indicates that in general the rural areas are losing population while the urban areas are gaining population. As a result, an over-representation of rural population within the defined regions may lead to an impression of overall regional outmigration whereas the urban areas may, in fact, be gaining migrants. The Wellington region is a prime example of this effect where rural depopulation offsets the gains in the greater Wellington metropolitan areas and Palmerston North. At the other extreme, the small area of the Central Auckland region excludes rural areas so that it retains metropolitan characteristics.

Similarly, one must have reservations about the adequacy of the regional framework for the testing of relationships where the data for the dependent variable are generated from a combination of both rural and urban areas while the data for the independent variables reflect concentrations within urban areas. Thus, while it may be concluded that migrant behaviour cannot be predicted from the selected correlates it is unclear if this is due in fact to non response by migrants to economic differences between regions or because of the nature of the regional data sets.

In order to overcome the limitations of regional aggregation and to further test the migration correlates the relationships were reexamined at the county level. Population size is an important correlate of county net migration and as such may reflect migrant response to not only increased employment opportunity but also perception of the social and cultural advantages of urban areas. Considering that the majority of migrants are young adults it is likely that areas of small population and rural areas in particular can offer only limited opportunity before migration offers the only alternative.

In the categorisation of the counties by population size it is clear that, with the exception of those counties whose population is between 50,000-99,999, within group income and population differences are unimportant. What is more important within the groups of counties is the general rural to urban continuum with levels of net outmigration decreasing through the categories so that the two largest groups of counties are characterised by

net inmigration.

Within the groups of counties there are a number of unexpected areas of net inmigration. It was expected that rural areas and centres of small population would be characterised by net outmigration when in fact a number of areas of low population are attractive to migrants. The most common explanation for this can be related to proximity to major urban areas so that the net inmigration levels represent the movement of people from the central city areas. This observation is further substantiated at the urban area level where it is found that the central areas of the metropolitan centres are areas of net outmigration.

In addition to the movement from the city centres and possibly movement through the urban hierarchy to the fringes of the major centres special employment opportunities and noneconomic space preferences are important in explaining inmigration to smaller centres. The most common source of special employment opportunities in the smaller centres is associated with hydro-electric power schemes. An examination of the age structure of migrants in these areas shows the high levels of inmigrants among the 25-39 year age groups. If it is accepted that these migrants are associated with hydro-electric schemes it is likely that population growth may not be sustained with the migrants moving to follow other schemes as they arise.

The net inmigration which cannot be explained by either proximity to urban areas or special development projects tends to reflect age specific noneconomic space preferences. In comparison with other areas and the

general nature of the age characteristics of migrants in New Zealand it can be seen that the age characteristics of migrants in some counties differ markedly from all other counties. Counties such as Thames and Coromandel have a much higher proportion of those over 50 and 60 relative to all other counties thus suggesting the importance of retirement migration to those areas of warmer and sunnier climates.

At the urban area level, the relationships with the migration correlates in general follow expected trends. Migrant response to locational differentials show that some prediction of aggregate migrant behaviour can be made from the selected correlates of income, employment and population size. This indicates that, whereas at the regional level aggregate migrant behaviour could not be predicted from economic and demographic correlates, these indices have sufficient variation at the urban level to affect migrant perception of locational advantages. Similarly, the advantages of larger urban centres is shown within the specific categories of employment where growth sectors of the economy are most numerous. Thus, the more diverse occupational mix creates a demand for labour which is reflected in higher incomes and the strengthening of interindustry linkages. These trends in turn perpetuate the locational advantage of larger centres.

It must be noted, however, that there is likely to be a degree of autocorrelation in the relationships. This situation arises due to the fact that migration is a major component of population change and is of partic-

ular importance in determining the rate of population change in urban centres. Thus, as it is well known that larger centres attract the most internal migrants as well as absorbing the majority of overseas immigrants, it is unclear whether the relationships reflect the areal attractiveness of larger centres or the higher levels of population growth which are expected in these areas.

In addition, however, there is sufficient unexplained variation among the selected correlates to suggest that noneconomic factors are of some importance in determining migration streams. This factor is most clearly seen in the relative depopulation and low rates of population growth of the inner city areas of the metropolitan centres. These central areas, while apparently sustaining the highest economic levels are also areas of residential decline in the face of increasing costs and commercial competition for land, so that in real terms they are both economically and aesthetically unattractive. This observation, in addition to the growth of centres such as Nelson, which is relatively disadvantaged in terms of the specified indices, suggests that space preferences are of importance in explaining population redistribution in New Zealand.

Net migration data exclude the quantification of directionality in aggregate migrant behaviour although a number of trends may be inferred. It is obvious that rural depopulation and attendent urban area growth is a reflection of rural to urban migration. What remains unclear, however, is whether the process is stepwise within the source region or if it is direct to the major urban areas. Similarly, the growth of Auckland may be

due to a combination of rural to urban migration, movement through the urban hierarchy and more specifically through the metropolitan hierarchy. With the present data set these hypotheses remain untested at a national level and present scope for further research. It is likely, however, that in the absence of a continuous inventory of individual migrant behaviour these hypotheses will remain untested.

Thus, it has been shown that the nature of available migration estimates and appropriate levels of data aggregation are important in the prediction of aggregate migrant behaviour from correlates which have been accepted although largely untested in New Zealand. The nature of regional aggregation is in many ways inadequate for migration research so that it remains unclear if the conventional correlates are inadequate in New Zealand or the problem has been inadequately measured. Similarly, at the county and urban area levels little prediction of net migration can be made with confidence from the conventional correlates.

In many respects the census estimates of migration do not relieve the problems which have been encountered with residual estimates of net migration. While some indication of interaction between locations is given the data record only movement at two time periods so that the intervening moves remain unknown. Thus, as a net estimate and with similar levels of data aggregation this data set can provide only limited scope for additional research of this nature.

It remains, therefore, that with present data limi-

tations the accepted economic and demographic correlates do not allow prediction of migrant behaviour in New Zealand. This indicates that the most common explanations of reasons for observed patterns of internal migration are without foundation with possibly the most important reasons being noneconomic space preferences. Similarly, if present trends of increasing economic variation between Central Auckland and all other regions continue, the limited variation between the other regions means conventional migration correlates will remain inappropriate for the prediction of migrant behaviour in New Zealand.

APPENDIX 'A'

Income data at the regional, geographic county and urban area levels are tabulated in the census by numbers within specific income categories. As a result, an assessment of areal income variation may be made by computing a mean from the group means thus:

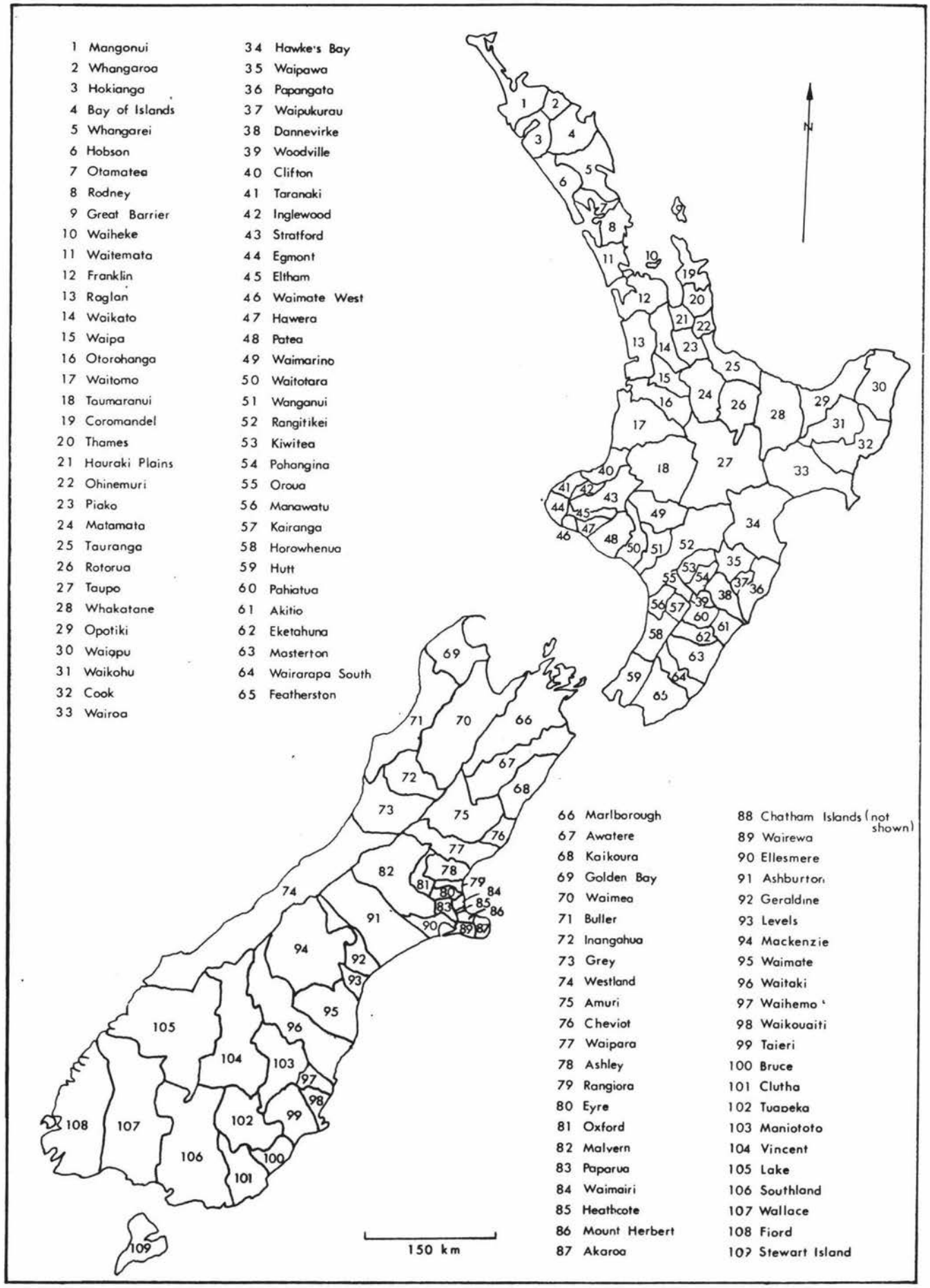
$$\bar{x}_t = \frac{N_1\bar{x}_1 + N_2\bar{x}_2 + \ldots + N_k\bar{x}_k}{N_1 + N_2 + \ldots + N_k}$$

where $\bar{x}_t$ = mean of combined groups

N_1, N_2, N_k = number of cases in groups 1, 2, and K

$\bar{x}_1$, $\bar{x}_2$, $\bar{x}_k$ = means of groups 1, 2, k.

APPENDIX 'B'



Geographic Counties

APPENDIX 'C'

Population Category 1, 0-4999

Whangaroa	Waikohu	Waimarino
Hokianga	Papangata	Wanganui
Great Barrier	Waipukurau	Kiwitea
Waiheke	Woodville	Pohangina
Coromandel	Clifton	Pahiatua
Waiapu	Waimate West	Akitio
Eketahuna	Waipara	Chatham Islands
Awatere	Ashley	Wairewa
Kaikoura	Eyre	Waihemo
Golden Bay	Oxford	Maniototo
Inangahua	Mount Herbert	Fiord
Amuri	Akaroa	Stewart Island
Cheviot		

Population Category 2, 5000-9999

Otamatea	Hauraki Plains	Eltham
Rodney	Opotiki	Patea
Raglan	Waipawa	Manawatu
Otorohanga	Dannevirke	Wairarapa South
Thames	Inglewood	Featherston
Hobson	Egmont	Buller
Westland	Mackenzie	Tuapeka
Malvern	Waimate	Vincent
Ellesmere	Waikouaiti	Lake
Geraldine	Bruce	

Population Category 3, 10,000-19,999

Mangonui	Piako	Grey
Bay of Islands	Wairoa	Rangiora
Waitomo	Stratford	Clutha
Taumaranui	Hawera	Wallace
Ohinemuri	Oroua	

Population Category 4, 20,000-49,999

Whangarei	Cook	Marlborough
Waikato	Taranaki	Paparua
Matamata	Waitotara	Ashburton
Rotorua	Rangitikei	Levels
Taupo	Horowhenua	Waitaki
Whakatane	Masterton	

Population Category 5, 50,000-99,999

Tauranga	Waimea
Hawke's Bay	Waimairi
Kairanga	Southland

Population Category 6, 100,000-500,000

Waitemata	Hutt
Franklin	Heathcote
Waipa	Taieri

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