

Determinants of Rural Out-migration :  
Agro-Manitoba, 1961 - 1981

By

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presented to the University of Manitoba  
in partial fulfilment of the  
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## ABSTRACT

Outmigration has been recognized as a major regional problem contributing to disparity in Agro-Manitoba. Since the 1960s, both the federal and provincial governments have attempted to solve this problem mainly through economic-oriented initiatives. These initiatives include the land and water resources programmes, not to speak of the agricultural and non-agricultural programmes. It has been the intention of governments to resolve the migration problem by stimulating regional economic growth. The latter, in turn, aims to narrow the gap in the level of development among the rural municipalities in Agro - Manitoba. However, despite more than two decades of governmental attention, regional disparity was still very much in evidence in 1981. This may reflect an absence of adequate understanding of the outmigration phenomenon. Therefore, the objective of this research is to examine the major determinants of outmigration for Agro-Manitoba in a longitudinal study through two time periods, 1961-1971 and 1971-1981, so as to shed light on future regional development planning for the 112 rural municipalities. Past studies indicated that outmigration is not only a result of economic, social and environmental forces, but it, too, affects regional economic growth in terms of the level of income and employment opportunities. Mutual interaction relationship between outmigration and regional

growth has thus been well realised. If the real mechanism underlying outmigration is to be understood, then, the two-way interaction relationship ought to be examined, and that purpose has been accomplished in this thesis. Thus, a simultaneous-equations model which allows for the incorporation of the two-way interaction between outmigration and the regional growth variables is constructed for each time period. Outcomes of the model indicate that outmigration is a disequilibrium process, having the effect of widening regional disparity in the more recent period. This reaffirms the vital role of governments in tempering regional disparity. Besides, this study shows that the economic dimension should still be the primary focus of regional development. In short, more attention should be paid to the non-agricultural sector because of its capacity for providing more employment opportunities to the localities. At the same time, the model indicates that improvements in the quality-of-life would complement the implementation of economic initiatives because individuals are increasingly concerned with the availability of public services and the betterment of housing conditions.

## CHAPTER ONE

### IMPORTANCE OF MIGRATION

Migration is an on-going important issue for academic researchers and regional policy-makers for its role as the major factor leading to demographic change, economic development and improvement of quality-of-life among regions through the redistributing process of population (Stone, 1969; Lewis, 1982).<sup>1</sup> Accordingly, this chapter attempts to make a case for the importance of migration in affecting demographic characteristics, economic development and quality-of-life.

#### 1.1. Migration and Demographic Change

The very first thing that is associated with migration is the demographic changes effected, firstly, in population size, and secondly, in population structure.

With respect to the former, Canadian and U.S. studies have reflected the fact that migration was the major component for population growth rather than natural increase (Anderson,

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<sup>1</sup>Economic development or economic growth refers to an increase in the total value of income, employment or farm productivity in a region; while quality-of-life refers to the more subjective satisfaction concerning the social and environmental amenities or well-being of individuals.

1965; Canada Manpower and Immigration, 1977; Berry and Dahmann, 1980; Foot, 1982) and migration will create fluctuations more than stabilization of population size. For instance, in the period of 1951-1961, the provinces of Ontario and British Columbia, in Canada, experienced the highest rate of population growth but, at the same time, they happened to be the provinces with the lowest rate of natural increase (Anderson, 1965). And for the United States, in the decade of 1970-1980, among the highest population growth rate states, migration accounted for 83% of population growth in Nevada, 76% in Arizona, 92% in Florida and 70% in Wyoming (United States Bureau of Statistics, 1984). Between 1940 and 1970, half of the counties in the United States lost population as a result of outmigration (Lee, 1977). Besides, in 1970-1975, American central cities experienced an absolute population loss of nearly two million, or approximately 3% of their total number of residents (Berry and Silverman, 1980). All these researchers magnify the importance of migration in contributing to net gain or net loss of population to the respective regions with the belief that net zero-growth is rare.

In respect of population structure, the highly selective process of migration will inevitably undermine the existing age and sex-ratio characteristics of the related regions. The potential movers are mostly young adults (Lee, et al., 1957; Beale, 1964). As a consequence, the gaining regions would have a larger proportion of young-adult population. At the

same time, the losing regions are left with a large proportion of elderly people ( McDonald, 1968; White, 1980). Indeed, the rural non-metropolitan counties of the U.S. Great Plains, which experienced high outflows of migrants; had percentages of population over 65 years of age twice those of the metropolitan counties (Fuguitt, 1978). As far as sex-ratio is concerned, some people would argue that males are likely to be more mobile than females (Jones, 1965). Nevertheless, this argument is not supported by much evidence. On the contrary, various researchers have demonstrated that either gender may prevail, depending on circumstances. What is certain, however, is that migration will affect the balance in the structure of sex-ratio characteristics in the regions.

### 1.2. Migration and Economic Development

As Kuznets (1964) states, population redistribution and economic development are inexorably linked together through the mechanism of economic growth. Migration, as an underlying force of population redistribution, becomes the under-current pointing towards economic development. It will contribute to the changes in the pattern of economic growth and in the development level of those growing economic activities. Nevertheless, different directions of flow, that is, immigration or outmigration, will differently contribute to the receiving and sending regions.

### 1.2.1. Immigration

Historically, immigration has been seen as a contributor to industrialization and other economic activities in the 'well-developed' countries. The most generally accepted statement about the effects of immigration is to the effect that rural-to-urban migration can supply the required amount of labour that makes industrialization possible. With a lack of mobility of labour, the industrialization process in many urban settings will be impeded (Willis, 1974). For instance, England's industrialization in the 19th century was definitely a result of migration from rural areas (White and Woods, 1980). In fact, the economic development of Western Europe and North America has often been described in terms of the continuous transfer of economic activity and people from rural to urban areas, both within and between countries (Todaro, 1985). For example, it is documented that prior to the 1970s, the Baxter County of Arkansas in the Ozark-Quachita Uplands, was controlled by the waxing and waning of one industrial component. But in the 1970s, because of the great influx of migrants into the region, the County's economic structure was transformed, becoming furnished with manufacturing, wholesale and retail trade, construction, personal and professional services (Dailey and Campbell, 1980).

Besides, immigration is both theorized and observed to have positive effects upon productivity of the labour force, its income level and employment growth. It is undoubtedly

recognized that the persons who possess, or have acquired, special skills are not necessarily born or educated at the site where their talents are needed (Bogue, 1959). Immigration, with its capability of maximizing the utility of labour, transfers this skilled manpower to the places where it can be most fully or adequately utilized (Hicks, 1940; Sjaastad, 1962). Through this selective process, migration provides the regions with large pools of labour that are young, more educated and skillful than those existing elsewhere (Anderson, 1965). Productivity of labour in the receiving regions will be raised to a higher level and, in so doing, contribute to further economic development.

In this context, Borts and Stein (1964) theorized that a rise in labour supply induced by migrants will lead to a rise in employment; assuming that the labour demand curve for a given locality is perfectly elastic. More immigrants will mean more investment expenditure; consequently, the labour demand curve will shift upwards and lead to a rise in wages. Some researchers seem to sustain Borts and Stein's claim, although many others are sceptical about this theory (Greenwood, 1981). After studying 31 states of the United States for the period of 1969-1977, Peterson and Mueller (1980) found that 23 out of the 31 states with above average population gains had also benefited from average gains in income. For the period 1950-1960, Burrows and his associates (1971) found that doubling of the population size would increase future employment by a factor of 2.72 in the counties



of the United States. Kleiner (1984) also found in his cross-sectional research for 1971, 1973 and 1975 that U.S. immigration was positively and significantly correlated with employment change by industry in the Standard Metropolitan Statistical Areas (SMSAs).

Doubts have not only been cast upon Borts and Stein's theory for its underlying assumptions, but also on the ability of immigration to raise income levels and employment in the receiving regions. In fact, a virtual consensus view is that most immigrants will enter lower income jobs. They would assert downward pressure on the income level of the existing poor; thus, this will either create or aggravate the unemployment rate of the receiving regions (Kogut and Longoni, 1975; Chalmers and Greenwood, 1985). Wrage (1981) concluded, in his research for the five economic regions of Canada from 1960-1971, that, to a certain extent, immigration of labour has a retarding effect on the rate of growth of wages; and, moreover, the immigration will cause a rise in unemployment. Chalmers and Greenwood (1985) carried out similar research for the United States counties for the same decade with the findings that the unemployment rate will increase with an influx of labour.

Those contradictory findings reflect only a limited view of the migration situations. A more appropriate and overall conceptual view of the economic functions of immigrants to the receiving regions should be one which looks into the economic

characteristics of the immigrants in relation to the economic needs of the receiving region rather than simply as a 'numbers' problem. To a region which has had abundant availability of capital investment and fast pace of industrialization, the influx of migrants will serve to further its economic development process. On the other hand, a region which is experiencing a shrinking economy or having a slow pace of industrialization, may not be able to digest the vast number of immigrants. The absorption capacity of its economy cannot cope with the urbanization needs of the newcomers; therefore, the 'negative' economic effects of migration are virtually inevitable. The economic endowment of the immigrants sometimes can make up for the economic deficiency of the receiving regions. Besides the skills and manual labour that they possess, the migrants may bring with them their savings which can be transformed into investments in the receiving regions. Immigrants can be a blessing or a curse to the economic development of the receiving region; it all depends upon the economic characteristics of the immigrants in relation to the economic opportunities open to them (Lee, 1977; White, 1980).

#### 1.2.2. Outmigration

Relative to the economic 'gains' of the receiving regions of immigrants, the sending region will have to face the consequences of losing population in terms of retrograde

economic development. Some researchers reflect that the outmigrants may impede industrialization and hamper the development of other activities by lowering labour productivity, income and the employment levels of the sending regions. The Maritime provinces of Canada offer a salutary example.

With the understanding that many rural Maritime people (or human resources) moved to the metropolitan areas of other provinces instead of within the Maritime provinces, McDonald (1968) imputed to them the fact that the rate of capital accumulation and the pace of industrialization were both less favourable in the Maritime Provinces. His conclusion related outmigration to economic activities by claiming that outmigration inhibits the extent to which the regions can capitalize on the economic advantages of agglomeration for industrial development. Some other researchers suggested the idea that migration robs the sending regions of valuable human resources that are young, educated, skilled, and ambitious for innovation and modernization. What is evident from this is that the sending regions are destined to retain the elderly, undereducated, unskilled labour force ( Myrdal, 1957; Lansing and Mueller, 1967; McDonald, 1968; Addo, 1974). Even in the agricultural sector, the prospects are mediocre. The net outcome will be a high average age of workers in the farm family, with a lower productivity and stagnant economic growth of the sending communities (Hathaway, 1964) and lower per capita income (McDonald, 1968).

What is more, through the chain reaction of the multiplier effect, in the first place, outmigrants reduce the level of expenditure of the sending region by carrying away their transfer payments, including unemployment insurance. Secondly, the lowered aggregate demand of the region will induce further unemployment. Vanderkamp (1970) indicated that, in the years from 1951 to 1961, every five unemployed people leaving the Canadian Maritime Provinces adds another two previously-employed people to the unemployment rolls. In a study of the rural communities in Normandy (France), White (1980) found that 45.2% of the reduction in agricultural employment between 1962 and 1972 could be directly ascribed to the effect of outmigration.

Counter-arguments to the demerits to the sending regions are also forthcoming. In this view, the sending regions are not net losers but, instead, they are 'gainers' in the sense that the great outflow of migrants reduces their labour pressure on land and provides a new environment conducive to changing rural productive techniques. Modern labour-saving techniques become feasible and economical for the first time. The smaller number of skilled labour will probably increase agricultural productivity and will have higher monetary returns than before (Todd, 1980; Oberai, 1984). The neoclassical economists will further theorize that the outmigrants will reduce the excessive labour supply of the sending regions; the supply of the remaining labour now equalizes with the level of local demand, so wages will tend

to rise (Willis, 1974; Courchene, 1974; Canada Manpower and Immigration, 1977). Courchene (1970) showed that the interprovincial outmigration rate in Canada was negatively correlated with the amount of unemployment insurance for the period of 1952-1967. This implies that, as the outmigration rate increases, the number of unemployed people will decrease. Outmigration then results in a lowering of the unemployment rate. Wrage(1981) presumed that the outmigration rate decreased the unemployed by as much as 34.6% in the five economic regions of Canada in the period 1961-1971; while other factors such as per capita investment and human capital contributed to 30% and 12% of the reduction rate of unemployment. In respect of income level, empirical studies are inconsistent, with both positive and negative effects being documented.

To conceptualize these contradictory views, the threshold perspective is singled out to shed light on this issue (Whitby et al., 1974). The theories and empirical studies seem to suggest that whenever the outflow of migrants goes beyond the threshold level required for self-sustained economic growth, the sending regions cannot avoid the adverse economic fate of recession, in the very short run, or depression, in the longer run. The sending regions will be further afflicted with the loss of productive labour and capital investment. The already shrinking economy may impose pervasive negative influences on those who still remain. Besides, the stream of human outflow is difficult to halt. Therefore, chronic outmigration will be

destructive to economic development, which is tied with other social elements, of the sending regions.

### 1.3. Migration and Quality-of-Life

Migration is a symptom of basic social change (Bogue, 1959). At the same time, its impacts on environmental changes are more easily felt by the residents of any region. In contrast to the theoretical analysis in economic development, empirical studies have substantiated the importance of migration to social and environmental changes. They can be influenced in two ways: positively and negatively.

#### Positive Relationship

It has been stated that the influx of migrants will bring social and environmental advancement to sparsely-populated regions in the sense that expanded population size can now enable the existing and future services or facilities to attain economies to scale, that is, they can be offered at a lower average unit cost (Alonso, 1975). In the United States prior to the 1970s, social services, public health, income support and personal health care were heavily concentrated in the north-eastern part of the country and in urban areas of high population density. In the southern part of the country, however, only inadequate levels of these services were provided. The situation of the southern country started to

change with the great inflow of immigrants after the 1960s. More and better social services and facilities accompanied them. The tax base had been enlarged and unit costs for social services and facilities had been lowered (Keyes, 1981). By way of contrast, during the late 1960s and mid-1970s, at least a dozen musical-dance-theatre companies were established in the rural communities in Maine, largely through the work of newcomers to the state (Guptill, 1977). There was also renewed interest in the local newspaper in Maine (Ploch, 1980). A prima facie case exists, then, for supposing that cultural and social life in these rural communities has been enriched and maintained.

At the same time, it is also believed that the out-flow of migrants will benefit the sending region which is densely populated by improving the ratio of resources to population size and by the return of social services and facilities to their 'efficient' level of production that will optimize social costs and benefits (Davis, 1977). The reduction in population will then imply the slow-down in the rate of environmental or ecological deterioration of the sending region. Prior to the 1970s, the north-eastern part of the U.S. reported the greatest environmental stress in air and water pollution. Since the 1970s, the out-flow of migrants to the south and west has lessened the rate of pollution, while the rate of pollution 'disperses' widely within the nation (Keyes, 1981).

### Negative Relationship

The very last observation of Keyes brings out one of the problems of the immigrants. The other negative effects may include the exertion of heavy pressure on the infrastructure of the receiving regions with respect to water and electricity supply, mass-transportation facilities, fire protection services, refuse collection and social or public institutions such as schools, hospitals, post offices, welfare centres, housing management and recreation centres (Dailey, et al., 1980; White, 1980; Murdock and Lerstritz, 1980). It has been observed that Baxter County of Arkansas, U.S.A., had faced such an in-flow of migrants and heavy traffic along the principal thoroughfare (Highway 62) that the local government was compelled to construct a bypass to ease the stress (Dailey, et al., 1980). The most imminent effect of all this of the receiving region will be the rise of housing prices under the pressure of abrupt increase in demand and the driving of the lower-income residents into housing plight (Riew, 1973; Beegle et al., 1979). As in Maine, most of the immigrants came to settle down along the coastal areas; inland migration was increased because of lower land and housing values there (Ploch, 1980). As far as the environment is concerned, under the condition of low population density, human waste can be dumped into a river and natural purification will occur; but, with the increase of population density, the waste-degrading ability of the river will



decrease (Ehrlich and Ehrlich, 1972). Furthermore, clean air will diminish with the gradual increase in population density and absolute size. A historical report for the 1952 London fog showed that some 4,000 deaths were directly attributable to the continuous inhaling of smog which, in turn, resulted from heavy consumption of coal for heat by the crowded residents (Akkermann, 1982).

In respect of human interaction, the immigrants who are of different cultural or ethnic background may be received with hostility by segments of the local population. Social conflicts become the undercurrent of social advancement. As revealed by Ploch (1980) in his study of the social conflicts between the newcomers moved from northern to southern Maine and local residents, the young immigrants were often accused of aggressiveness and were perceived as threats to local potential leadership.

Not only have immigrants been observed as a cause of trouble to the receiving regions but they also leave problems in the regions which they have left. They create a situation where the 'stayers' have to bear high costs of services provisions which have not been reduced in step with the population fall. At the same time, the change in demographic structure will create new demand in some other sectors which also have to be sustained by the remaining taxpayers. Under the selective process of migration, it is most likely that the sending regions are left with the elderly who need the greater

proportion of social services; thus, the tax burden is bound to fall on the shoulders of the 'stayers' (White, 1980).

In some other cases, the loss of population below the required self-sustaining socio-economic growth level will mean the withdrawal of schools, banks, shops, post-offices, professionals and the like from the communities (Whitby et al., 1974; Lewis, 1982). The residual population may have to depend heavily upon the more distant centres for their basic needs or services (Lewis, 1982). For example, Saskatchewan had removed the raison d'etre of many communities because of the rural outmigration of farmers (Todd, 1980). Meanwhile, certain cultural or social traditions or customs would fade away owing to the lack of supports in terms of both the number of organizers and size of audiences. Ploch (1980) once again documented the fact that, in Maine of the 1960s, few children in the remote outmigration-prone communities had ever experienced a live dramatic or musical performance. In short, culture and quality-of-life will deteriorate with a shrinking community life and economy.

Nevertheless, basic relationships between migration and social or environmental well-being can be asserted. The net consequence of inter-regional migration is either a promoting or dampening of the activities of the social, public and private institutions in the respective regions. Therefore, the effects of migration on the emergence or withdrawal of those institutions depends upon the number of migrants

involved as well as the social, ethnical and economic characteristics of the migrants.

#### 1.4. Conclusion

The importance of migration has been revealed in the foregoing descriptions of the relationship between migration and demographic changes, economic development and social or environmental well-being. In the absence of uniformity of conclusions, two statements are self-evident. The importance of migration is reflected through, one, the absolute volume of human flow, and two, the socio-economic characteristics of the migrants (Lee, 1977; White, 1980). The former has comparatively greater influences upon demographic changes and the quality-of-life of both sending and receiving regions. It can be easily understood that the basic needs of rich and poor are very much the same at least in quantities, although there may be differences in quality. Therefore, certain basic social or public and private institutions or facilities are required by all sections of the community, regardless of the abilities or social status of the migrants. Thus, their growth and decline are susceptible to the absolute volume of migrants concerned. On the other hand, the socio-economic and ethnic characteristics of the migrants have greater importance to regional economic development than does absolute number of migrants. The process of economic development is selective in respect of human resources. On one occasion, the quality of

migrants is more important than the quantities of migrants; a well 'qualified' migrant (in terms of his/her education level, training, available capital investment and health) will be more valuable than ten or more under-qualified migrants in the promotion of economic development. The effects of the absolute volume of human flow cannot be self-explanatory; instead, they have to depend upon the economic absorption capacity and the stage of development of the region. Without, for instance, the skill or the capital investment brought by or generated by some of the migrants, the economic capacity and the stage of development may not be able to advance further. It is not surprising to note that as far as the quality of the migrants is concerned, various governments generally attach some discriminative rules and regulations to their immigration policies. All these reflect the tight relationships between migration with the socio-economic and ethnic elements of the respective region, and its policy implications.

After all, while uncertainty still surrounds the formulation of adequate theories of regional economic development, demographic structure and social/environmental well-being, it is clear that migration analysis has an important part to play in them. The understanding of the forces behind migration is a necessary complement to the understanding of the direction and magnitude of regional development.<sup>2</sup> Therefore, it is an interesting topic that requires careful and serious inquiry and the intent of this

work is to do just that using Agro-Manitoba as the framework for analysis.<sup>3</sup> Before the relevance of migration to Manitoban regional development can be fully addressed, a thorough grounding in the evolution of regional policy is called for and is done in Chapter 2. In the same chapter, a review of the 'problem region' characteristics pertaining to Agro-Manitoba is both required and submitted so as to place policy in context. For its part, Chapter 3 reverts to the migration theme, and provides a review of models germane to the principal task of this thesis, that is, the modelling of Agro-Manitoba migration determinants applicable for the 1961-1981 period. Chapter 4 essentially calibrates the model deduced in the previous chapter, while Chapter 5 ponders the significance of the results so obtained. Finally, Chapter 6 considers the value of migration analysis for regional development planning, especially in light of the findings inferred for Agro-Manitoba. The regional situation is now on the agenda, and accordingly, it is timely to commence with Chapter 2.

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<sup>2</sup>Regional development is defined as the qualitative or quantitative process of economic and quality-of-life change of lasting characteristic.

<sup>3</sup>Agro-Manitoba is defined as the southern part of the Province of Manitoba in which agricultural activities are dominant. This term will be used interchangeably with rural Manitoba and southern Manitoba. For details of the study area, see APPENDIX IV.

## CHAPTER 2

### REGIONAL DISPARITY AND DEVELOPMENT IN AGRO-MANITOBA

#### 2.1. Policies and Programmes

Regional disparity within provinces has long been the most politically-crucial issue in the Canadian scene (Livingston, 1979). The province of Manitoba is no exception to this general statement. An extremely high degree of regional disparity has been recognized within Manitoba at least since the 1960s (TED, 1969). Such conditions denote the existence of serious imbalances in economic opportunities as well as inequitable distribution of education, health, social development services and housing for many areas within Manitoba (TED, 1969; Guidelines, 1973a). As a matter of fact, imbalances of economic opportunities and quality-of-life are particularly acute within Agro-Manitoba. It is not uncommon to find that the Interlake and the Parkland region, or the solely farming or smaller (less than 1000 people) rural communities have particularly low income and high unemployment rates (Manitoba Economic Advisory Board, 1971; TED, 1969). Underlying these economic conditions are the equally serious problems of maldistribution of housing, medical, education, retail and recreational services (TED, 1969). Thus, in the 1960s, there was widespread agreement that this disparity was too great to be acceptable and needed government initiatives

and development programmes to address it.

Since the 1960s, both the federal and provincial governments have been actively involved in reducing regional disparity within Agro-Manitoba. In a sense, regional disparity can be a problem of social injustice: as long as substantial regional disparity continues, all Canadians do not enjoy an equal opportunity to improve their well-being. Its related hidden problem is the failure to ensure full and efficient use of the resources endowed in each and every region. In this context, regional disparity can serve as an indicator of underdevelopment of the resources in many potential areas where they are not being used to their best possible advantage (TED, 1969). Experience overwhelmingly suggests that the problem of unbalanced regional development cannot be solved by market forces. For example, in the 1950s and 1960s, the Canadian economy enjoyed rapid economic growth but regional differences in income and employment became more apparent than ever (Duncan, 1984). Meanwhile, Manitoba's economy as a whole shared the overall rapid growth rate; while, at the same time, the intra-regional economic imbalance became much more acute than before. All these trends have suggested that some form of government 'intervention' is required to handle the problem of regional disparity directly. Fortunately, some efforts have been made at both federal and provincial levels to attend to this very problem.

## 2.1.1. Historical Perspective of Provincial Regional Development

### 2.1.1.1. Introduction

Over the past twenty years, the Progressive Conservative Party (PC) and the New Democratic Party (NDP) had alternately been in power in the Manitoba Parliament: yet, their policy towards regional development in Agro-Manitoba was very much in line with each other; with an exceptional change in emphasis for the 1971-1977 NDP government. All those governments recognized that regional disparity was/is the major problem in Agro-Manitoba. With the belief that economic development would contribute social benefits (Guidelines, 1973a), they began to initiate and direct the development of agricultural, manufacturing and tertiary industries (particularly tourist industry) in Agro-Manitoba. The catchword for the programmes implemented was efficiency; that is, the efficient use of the endowed resources of the respective localities.<sup>4</sup>

On the issue of regional industrial development, the Committee on Manitoba's Economic Future (COMEF) suggested in 1963 that manufacturing should be located where there are the best economic advantages, that is, in those areas either with

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<sup>4</sup> This emphasis on efficiency in regional development is evident in many of the documents (which will be discussed in the next section) published by different political parties as well as the statement of regional development policy released by the Department of Regional Industrial Expansion.



the economic conditions necessary to attract new manufacturing or providing the basis for growth of existing firms. These can be the areas with adequate supply of raw materials, labour, easy accessibility and large regional markets (COMEF, 1963). On the issue of rural communities and service development, the COMEF (p.XI-4-2) suggested that 'the consolidation that is taking place in the rural communities is not necessarily bad because, like the consolidation of farms, it generally results in a more economic unit which can perform its functions better'. Together, the consolidation of manufacturing as well as service industry was believed to not only provide efficient productive activity, but it was thought likely to offer new employment opportunities to the people in the surrounding towns. Thus, communities within the region would continue to reap benefits from these consolidated economic activities (COMEF, 1963).

The Report of the Commission on Targets for Economic Development (TED) by the PC government also suggested that government policy must be based upon what is both feasible and economically efficient and incentives must be based on the best available knowledge concerning the total benefits and costs of attracting people or industry into a particular location. Despite the fact that, after the publication of 'Guidelines for the Seventies', there is no explicit statements or documents concerning regional development policy, the governments' stated policy on fiscal restraint and streamlined assistance for economic development indicate an

emphasis on the efficiency of economic development. Programmes supporting social development have been reduced or eliminated and the development of many depressed regions has been de-emphasized (Johnston, 1979). This is evident from the consolidation of new hospital facilities and major housing programmes in the principal regional towns (Johnston, 1979).

The temporary break in the emphasis of economic development based on the principle of efficiency came in the years of the NDP government from 1971-1977. The NDP government shifted the basic principle of regional development from efficiency to equity and the development policies were documented in 'Guidelines for the Seventies'. Unlike its predecessors, the Guidelines stressed not only economic development but also social development as the strategies for reducing regional disparity in terms of greater equity in income and in access to social services and economic opportunities between regions and occupational groups. Besides, the Guidelines emphasized decentralization as opposed to centralization. It was hoped that through decentralization, the public sector itself could be a useful vehicle for implementing the 'principles of Guidelines' and such a programme would constitute a positive step in the direction of balanced regional development. To comply with the policy of decentralization, the government's administration offices were distributed to fifteen towns in Northern and Southern (Agro-) Manitoba (Johnston, 1979). As far as the farmer clientele was concerned, it was suggested that most government services should be situated no more than

thirty minutes travelling time from a Department of Agriculture centre. Similarly, facilities for health care, basic social services and education were to be readily accessible (Todd and Brierley, 1982).

In effect, then, there were initially only fairly broad statements concerning the direction of regional development. This situation was endemic to Canada. It was not until 1969 that a more direct approach towards regional development was established. In 1969, a federal regional development government agency known as the Department of Regional Economic Expansion (DREE) was formed to promote direct goals, and substantial programmes contributing to greater regional growth were eventually implemented. Nevertheless, in 1983, it was reorganised and combined with the Industry, Trade and Commerce Department to form a new department called the Department of Regional Industrial Expansion (DRIE). This new department's goal was more or less the same as that of the DREE: to reduce regional disparity through various direct programmes. However, its focus has been shifted from public effort to private effort (particularly the private small business) as a means for stimulating regional development (DRIE, 1984a). It was on the verge of eclipse in late-1987 with the announcement of government intentions to create a Western Canada-wide development agency.

#### 2.1.1.2. The Evolution of Provincial Initiatives of Regional Development for Agro-Manitoba

Provincial regional development policies concerning Agro-Manitoba were well illustrated in three major documents; namely, the COMEF (1963), TED (1969) and Guidelines (1973). Since 1973, no explicit statement of rural policy from the successive provincial governments has emerged. Thus, to have a better understanding of Manitoba's rural development policies, a review of each of those three documents is in order. They are discussed in chronological order.

##### 2.1.1.2.1. COMEF (1963)

This is a comprehensive regional planning document initiated by the PC government (led by Duff Roblin), which held power from 1958-1967, and was aimed to accelerate economic development so as to provide employment opportunities for the growing labour force in the province. It identified the problems of the rural areas and attempted to solve those problems.

It intimated that many rural areas, particularly the rural towns, were facing the problems of low income and high unemployment. These problems had been a result of technical change arising out of mechanization and consolidation of farms, and improvements in transportation. The former had resulted in the decline in farm population in many rural

communities. Automobiles and better roads, resulting in improved transportation, enabled the farmers to travel further to larger cities and towns which offered a wider variety of goods and services than neighbouring smaller towns. For their part, the favoured communities experienced simultaneous increase in demand for goods and services and might end up with the promotion of employment opportunities. On the other hand, smaller communities might face a decline in business and fewer local employment opportunities to the effect that unequal distribution of economic opportunities became more pronounced. The small communities continuously lost population to the larger communities. Those larger communities were virtually growing at the expense of the smaller rural communities. Furthermore, communities which hitherto had grown through consolidation of services, in turn, might fall victim to still larger and more aggressive communities.

Since growth by redistribution did not seem to be a promising answer, the need for new employment opportunities to encourage people to come in, or remain in, the vulnerable communities was aired. In order to provide new employment opportunities, COMEF suggested new industry must be attracted to the rural areas or communities. The COMEF (1963) also considered several ways of attracting new industries into those target areas. Although some towns in rural Manitoba looked pleasing in appearance and had excellent banks, schools, libraries, streets, stores and other facilities, many

towns were still behind in service quality and quantities. On this account, they became unattractive to prospective new firms. Therefore, in order to attract new industries (economic activities) to the region, the infrastructure or the community facilities ought to be improved or installed. In supporting this solution, COMEF reflected that the development of Norwich, England, would present a good example for unified efforts to improve the appearance of the existing business districts in many rural towns. The artistic touch in selection of colours, awning material, sign lettering, etc., did much to transform the area into an attractive business district, and the result was reflected in increased business activities. New industries could also be attracted, as the COMEF (1963) suggested, through the development of Standard Industrial Parks in the communities. In this respect, the availability of sites and buildings became an increasingly important consideration affecting future industrial expansion in rural Manitoba. Therefore, communities should ensure the ready availability of properly-zoned, adequately-serviced and reasonably-priced sites: that is, provide 'standard' industrial parks or districts in order to stimulate industrial development in the rural areas.

Additionally, the COMEF suggested that properly-organised and directed regional planning organisation could work towards increasing opportunities for agricultural processing and other types of manufacturing. In recognizing that many of the problems facing rural Manitoba were regional in nature, this

approach offered individual communities the mechanism for attacking these problems on a united front. The regional organisation could be especially effective in dealing with problems of initial concern such as the development of water and other resources, the establishment of regional parks, adjustment in agriculture to encourage new crops and livestock enterprise, and the promotion of industry and tourism development on a broad front.

Despite the fact that the COMEF (p.XI-4-3) made many recommendations on regional development in the rural areas, it conformed to 'laissez faire' thinking in the sense that it earmarked responsibility for development onto the local communities, suggesting 'action by individuals and communities are key to rural development'. At the same time, it declaimed 'the Province cannot be expected to carry the full load of publicizing and promoting Manitoba. Although it can provide assistance, the real responsibility for the development of Manitoba lies with the individual in communities throughout the province'. Therefore, it suggested that the banks, the railways, the gas and electric utilities, the telephone system, the agriculture extension service, and other organisations with staff stationed throughout the province should participate in the economic development of the rural areas; only then could a real contribution be made to the development effort. Such 'laissez faire' attitudes are also explicitly expressed in dealing with the problematic rural communities. For the development of those problematic or

declining rural communities, the COMEF (XI-4-2) concluded that, 'which communities grow, and which decline, need not be left to chance. Local initiative action can determine the course of future community growth'.

#### 2.1.1.2.2. TED (1969)

During 1968-1969, a commission was established under the PC government led by Walter Weir which was charged with defining the goals for Manitoba's overall development for the period of 1969-1980. The product of the commission was the report entitled 'Report of the Commission on Targets for Economic Development' (TED). In fact, many conservative politicians refer to it as a 'guide book' for Manitoba's future.

The major challenge confronted by the report was to define the governmental policy of regional development as balanced growth throughout the province. Unlike the COMEF (1963) report which emphasized technical change and outmigration as the crucial factors affecting regional problems, the TED suggested that the failure of the rural areas or communities to adjust to technical change was the fundamental reason for regional imbalances. It stated that:

In large measure, substantial economic disparity in the quality-of-life experienced in rural Manitoba is the result of the slowness of adjustment to the massive and rapid technical changes that are transforming life all over the world. Such changes are essential to modern growing economies, but they demand a high degree of adjustment from both individuals and regions. They penalize



those who cannot adjust or who adjust more slowly than the rest of the society (TED, 1969, p.435).

Nevertheless, this report did not deny the fact that outmigration and regional disparity were highly correlated. It saw that outmigration might not be detrimental to the economic development of the regions or communities if these rural communities could make rapid structural adjustment to the changes. Outmigration had led to the loss of human resources, including a major proportion of rural educated youth. The report had also estimated that roughly 40% of the disparity in average income between Manitoba regions resulted from regional variations in population-age structure and labour force participation. Also, lower-income regions tended to have a lower proportion of their total population in the working age group. The remaining 60% of the disparity in average income between Manitoba regions in 1961 resulted from variations in levels of regional productivity.

TED asserted that technical change and outmigration is a natural outcome. Therefore, 'regardless of what course of action chosen, Manitoba's farm population will continue to shrink and the smaller rural centres will continue to disappear. By 1980, it is conceivable that there will be 20,000 farms, as opposed to roughly 37,000 at present and that there will be fewer than 40 agricultural centres in Manitoba's rural regions, compared to more than 60 at present' (TED, 1969, p.431). Such a natural trend was deemed difficult to

halt unless the regions or communities can rapidly adjust themselves to these changes. For instance, TED (1969) pinpointed the main concern of Manitoba's agricultural industry as the challenge of adaptation to the modern industrial state. Adjustments in management, farm inputs, farm capital and marketing procedures were as urgently required as adjustments in farm members and farm population. And the rate of adaptability of this key industry would, in large measure, dictate the rate of evolution of total regional incomes, employment and service industrial development. In other words, since the farm population would continue to decline, the critical question was the rate at which total farm cash income, farm purchases and farm family income could rise and thereby could stimulate development throughout Manitoba. As for the residents of the service centres faced with declining population, they should assume the centres' role to be residential areas or tourist centres for survival. Otherwise, these declining centres would enter the 'slowdeath' option in which the process of economic and social erosion would continue remorselessly.

Like the COMEF report, TED also emphasized the importance of regional planning. Nevertheless, this report averred that most Manitoba regions were at the primary stage of regional development. At this stage, a strategy of research, of informing the people of a region about their development opportunities, of developing necessary links between people of a region and the senior levels of government had to be called

for.

Interestingly, TED (1969) adopted a less 'laissez faire' attitude towards regional development than that stated in the COMEF. Instead, it laid emphasis on the coordination of all levels of government, particularly the involvement of federal and provincial governments in the development of rural Manitoba. It had claimed that the process of research, consultation and development of an agreed-upon plan would require at least two years and probably cost between \$150,000 and \$200,000. All of these expenditures should be financed by the senior governments. Besides, the federal and the provincial governments should assume virtually all the cost involved in regional upgrading because most Manitoba regions were incapable of financing their own development projects. The report finally concluded that on the basis of past experience, major regional development was unlikely unless the federal government was prepared to finance at least 60% of the total cost.

#### 2.1.1.2.3. Guidelines for the Seventies (1973)

In 1973, the NDP government (led by Edward Shreyer) laid down its economic development policy in the report entitled 'Guidelines for the Seventies'. The Guidelines (1973) accepted that technical change and outmigration were the major factors responsible for regional imbalances in Manitoba's rural regions. But it was strongly against the view that

outmigration is a natural course and cannot be changed. Rather, the Guidelines saw outmigration as a result of inappropriate government policies in rural development. As it asserted, 'frequently... migration is the coerced result of world and national economic forces often reinforced by inadequate or inappropriate policy such has been involuntary, cruel and wasteful' (Guidelines, 1973a, p. 14).

In respect of technical changes, the Guidelines believed that such benefits to the rural areas could be realized by improving transportation and communications, and by providing more leisure time for farmers through farm consolidation and mechanization. However, the adverse effects were also recognized; namely, the improvement in transportation, communication and farm consolidation and mechanization would bring great disadvantages to many rural areas in encouraging large-scale outmigration. Residents of the smaller rural communities might opt to purchase more goods in the nearest sizable centres because of easier transportation; and that would lead to the shrinking of the business services in the small towns. Farm consolidation and mechanization would also squeeze out large numbers of surplus labour from the rural communities. All these resulted in higher unemployment rates in the rural communities as people sought better economic opportunities in the larger centres. Guidelines noted that, between 1966 and 1971, farm and non-farm population had decreased by about 20,000.

To the Guidelines, outmigration is not an end in itself. Outmigration would further depreciate the economic and social environment of the communities and thus cause generally more outmigration. This would be so because outmigration would:

- 1) reduce the market of commercial and retail establishments, creating a negative multiplier in the local economy;
  - 2) result in underuse of publicly-supported services such as schools, hospitals, telephone lines and the road network, causing increased taxes and declining standards of service for those who remained;
  - 3) remove from the population the youngest and most able members of the work force; and
  - 4) add to the expense of the receiving towns and cities by requiring the construction of expensive additions to the infrastructure.
- Furthermore, it reduced the quality-of-life by over-burdening public services (Johnston, 1979).

In fact, both technical change and outmigration are responsible for regional imbalances. But the Guidelines recognized that technical change was a natural phenomenon and it is necessary for modernization of rural areas. Furthermore, there is no doubt that it did improve the quality-of-life of the community by improving productivity

(and, hence, incomes) and providing more leisure for the rural population. But on the other hand, though outmigration itself is a consequence of technological change, it is not a natural course that cannot be halted. People left because they were poor or were confronted with no economic opportunities or because of the deteriorated social environment. Therefore, if economic opportunities and social benefits were both available, the outmigration trend would be curbed and balanced regional development might have the chance of attainment.

Under such a rationale, the Guidelines (1973) placed the 'stay option' as its central theme of regional policy in rural Manitoba. The main objective of the 'stay option' is to provide significant opportunities in all regions in rural Manitoba so that people can find a satisfying life in the region of their choice. The Guidelines suggested that such a policy is vital for curbing outmigration since history has shown that, in its absence, large numbers of people have been leaving the countryside to take advantage of opportunities elsewhere. Therefore, this 'stay option' represented a determined effort by the government to reverse, or to slow down, trends of outmigration which came about as a result of the system of agricultural modernization.

In its term of office, the NDP government implemented a variety of programmes dwelling on both the development of economic and social opportunities in support of the 'stay option'. These include:

- 1) employment and industrial development through job creation, upgrading of skills, financial assistance, and taxation benefits;
- 2) agricultural stabilization through encouraging increased farm outputs, diversification and financial management assistance;
- 3) improvement of social goods and services through community health centres, new housing and housing repairs programmes, as well as maintaining rural schools; and
- 4) decentralization of government offices and services to all parts of southern Manitoba (Johnston, 1979).

In pursuing these programmes, the Guidelines favoured the widening participation of all levels of government as well as individuals. It particularly encouraged the involvement of citizen representatives as elected officials or members of local area development boards, farmers' organisations and Chambers of Commerce in the government process, be it with regard to health, education, social services, or any of the major public programmes directly affecting rural Manitoba.

Perhaps the rural development policy in Guidelines is best summed up by its four basic principles:

- 1) maximization of the well-being of all

Manitobans;

- 2) greater equality in incomes and in access to social services and economic opportunities between regions and occupational groups;
- 3) implementation of the stay option, that is, the provision of government services and resources to allow rural dwellers to remain on their farms and in small centres if they so desired; and
- 4) the provision of public participation in the process of development.

The two successive governments, the PCs led by Sterling Lyon (1977-1981) and the NDPs led by Howard Pawley (1981-present) did not have any particular blueprint concerning the issue of regional development policy. In the absence of explicit statements, we can only detect policy through the major provincial initiatives. One of these is the Jobs Fund programme initiated by the Pawley government in 1981. This programme does not directly address the development of Agro-Manitoba. Rather, it is an all-round provincial programme concerning all parts as well as all economic sectors of Manitoba. The programme was, in fact, a response of the provincial government to the economic depression triggered in 1981. As the programme indicates,

The Manitoba economy was in disarray, businesses were being forced into bankruptcy in increasing numbers, segments of the economy



which had traditionally been strong contributors to stability and growth were reeling, and thousands of Manitobans, young and old alike were suddenly without jobs and without prospects for new ones (Manitoba Economic Development Cooperation, 1984, p.2).

Therefore, the Manitoba Jobs Fund was established to meet the need of job creation.

As far as Agro-Manitoba is concerned, the Municipal Community Assets Programmes under the Manitoba Jobs Fund provides capital assistance for construction, rehabilitation and renovation of small-to-medium-sized community projects. In the short term, it is hoped to meet the cyclical concerns of high unemployment, while broadening and strengthening the communities' economic foundation in the long run. Job Funds emphasized local participation in asset provision (construction) and job creation. So far, through the efforts of the Manitoba Job Fund and the co-operation and participation of local governments, community organisations and the private sector, many construction projects have been undertaken: and new firehalls, health centres, theatres, services and water projects and schools have been added.

Importantly, however, the government has recently emphasized Federal-Provincial co-operation in ensuring that their policies are complementary and mutually reinforcing with those of the federal government. The NDP government led by Pawley is different from its predecessors on regional development policy in that it does not stress the role of rural outmigration in rural development. Rather, it is

interested in the current problems of rural areas: economic depression and unemployment. In fact, rural outmigration is a deep-rooted and long-term problem that needs particular attention. Furthermore, previous governments have emphasized the development of manufacturing in dealing with the rural problems. In contrast, within the Jobs Fund Programmes, the construction industry is given pride of place. It is hoped that through the expansion of the construction industry, more jobs can be provided and the environmental amenity of the rural areas can be improved. Yet, like its predecessors, the government points to the role of local community organisations and the private sector in rural development.

Since the 1960s provincial governments have expressed great concern about regional development in Agro-Manitoba. The three documents published by the provincial governments holding sway during the years 1968 to 1973 recognized that outmigration (induced by technical change) was a major problem of the rural areas. The suggested solution of the PC government in the early 1960s to this problem was to encourage growth in different economic sectors. Conversely, the PC government of the late 1960s encouraged the rural communities to adjust themselves to this secular trend of migration through exploration of their own potentials for economic development. In other words, these two governments stressed the stimulating of economic growth of the rural areas to cope with outmigration. Meanwhile, the NDP government of the 1970s had a somewhat different emphasis in dealing with this

problem. Not only did it endorse economic development, but it also believed that, if only the social well-being could be improved, then the people would be willing to stay in their original locations. There are no particular statement for regional development policy published by the two successive governments in the most recent years, yet it seems quite clear that the interest of the current provincial government has focused not only on the economic growth of the areas, but also on the environmental amenity of the locale through the development of infrastructure. Put explicitly, the recent provincial government is concerned with the quality-of-life of the population.

#### 2.1.2. Institutional Perspective of Regional Development--- The Joint Involvement of the Federal and Provincial Governments

Prior to 1969, no centralized and co-ordinating agency responsible for regional development was in existence. By that time, regional development programmes were carried out by various agencies or departments with their own targets, which were usually overlapping. Only in 1969 was DREE formed to handle the long-term, large-scale, and integrated development programmes. Nevertheless, throughout its existence, DREE was severely criticized for its inefficiency. As recounted, in 1983, it was formally reconstituted as DRIE. The effects of these institutions on regional development can be consolidated

into three distinct phases. They are: the period prior to 1969, from 1969 to 1982, and the period from 1982 to the present.

#### 2.1.2.1. Prior to 1969

Prior to 1969, many rural problems had been addressed and attended to by different government departments; nevertheless, these issues were treated in an 'ad hoc' manner. Different departments just tried to solve the problems which came under their 'rural' jurisdictions. At the federal level, the Department of Industry, and the Department of Agriculture, together with the Forestry and Rural Development Departments, were primarily responsible for rural issues. The federal Department of Industry was particularly concerned with the areas suffering from high unemployment, low income, or areas in decline. The Area Development Agency (ADA) which was mandated by the Department, was aiming at the provision of incentives for manufacturing industries to locate in these areas (Walker, 1975). The federal Department of Agriculture had also set up its own programmes such as those implicit in the Agricultural and Rural Development Act (ARDA), encompassing a wide range of rural issues, from soil problems through farm reorganisation to rural education (Walker, 1975). In general, the federal and provincial governments were handling rural problems independently through separated departments. Yet on occasion, they would joint together to

initiate joint programmes that shared common interests. The establishment of the Fund for Rural Economic Development Act (FRED) of 1966 was a salutary example. The tasks of administration and co-ordination of the FRED were divided between the federal Forest and Rural Departments, and the Manitoba Department of Agriculture.

At the provincial level, the Department of Agriculture and the Department of Industry and Commerce were primarily responsible for rural issues. In 1963, the former had a total of 47 members of staff; of which 43 were agricultural representatives and four were agricultural extension engineers. At the same time, the Department of Industry and Commerce had a crew of nine members; with six town planners and three rural development officers. The staffing structure more or less reflected the functions of those two Departments. A preliminary review of the approaches of these institutions to dealing with rural issues would readily corroborate the over-lapping of the provincial and federal programmes (Canada : Economic Council of Canada, 1977). At the same time, some aspects would have been neglected by both levels of governments because effective co-ordination was apparently lacking and an overall thrust was hardly attained (Canada DREE, 1973b).

Therefore, in the late 1960s, it was generally felt that a central department was necessary not only to consolidate and to co-ordinate the federal and provincial administration

functions, but to direct its own efforts towards reducing regional disparity. Against such a background, the Liberal Party was selected to form the government in 1968. Under the premiership of Pierre Trudeau, the new Department (DREE) was established in July 1968, with the noble aim of encouraging 'economic expansion in regions of Canada where the growth of employment and income have been lagging' (Walker, 1975, p.208). In other words, the policy of reducing regional disparity was to be centralized under one roof.

#### 2.1.2.2. From 1969-1982

##### 2.1.2.2.1. The Organizational Structure of DREE

The formation of DREE was an attempt to integrate and co-ordinate sets of policies for regional development that depended upon the reduction of disparity in economic opportunities between the regions of Canada. At the same time, when it was set up, DREE consisted of planning, programming, implementation and incentives components under four assistant deputy ministers plus the necessary administrative and technical support functions. However, criticism of DREE in those early years crystallized round the fact of over-centralization. Consequently, a major policy review was launched in 1972. The review concluded that regional development required the effective co-operation of many federal, provincial and private agencies; such that the DREE should decentralize its operations and that federal-

provincial co-operation might be achieved more readily through broad, flexible and enabling agreements with each province. Following the recommendations of the review, DREE was restructured to facilitate its decentralization. Subsequently, the department amalgamated planning and programming components under one assistant deputy minister (planning). At the same time, the implementation function, previously under one assistant deputy minister, was reallocated on a regional basis --- Atlantic (Moncton), West (Saskatoon), Quebec (Montreal), and Ontario (Toronto) - (Canada DREE, 1973b). The management of the incentive programme remained under an assistant deputy minister (Incentive). The Department operated offices in each provincial capital headed by a director. The directors in the provinces reported to the assistant deputy minister for operations in Ottawa. In so doing, the federal staff were decentralized to the regions in order to encourage better first-hand knowledge and a greater sensitivity to attitudes across the country. Later, the provincial offices were given power to make incentive grants for smaller projects within their areas (Walker, 1975). They could authorize grants for projects with capital costs between \$500,000 and \$1,500,000 and likely to create up to 100 jobs (Canada DREE, 1975).

#### 2.1.2.2.2. Programmes Initiated by the DREE

On its formation, DREE had drawn together existing programmes like the PFRA (1935), FRED (1966) and ADIA (1965). At the same time, it also issued new programmes like RDIA (1969) and ARDA (1972): all of which had some bearing on the development of rural Manitoba. These programmes were of two kinds. Some were industrial incentives where the strategy was to create productive employment by making investment in viable industry more attractive in relatively slow-growth regions. Examples of such ventures are the ADIA and RDIA. Others were infrastructure assistance programmes in which the objective was to provide the additional social capital necessary to facilitate economic expansion and social adjustment in the areas requiring special measures. Examples of these measures are the PFRA, FRED and ARDA.

Nevertheless, in the early years of DREE, its programmes were also open to criticism. The policy review of 1972 recognized that a wide range of provincial and federal policies and programmes that were dealing with underdeveloped regions lacked a unified direction and these policies and programmes needed particular federal and provincial co-operation (Canada DREE, 1975). Furthermore, the early DREE programmes had also been criticized for too much emphasis on the overall sectoral growth rather than the overall growth of individual regions. Therefore, the importance of development of the depressed regions was often undermined (Walker, 1983).



As a remedial action, the federal government signed the General Development Agreements (GDAs) of ten-year duration with each province (except Prince Edward Island which was immersed in a 15-year plan dating from 1969). Five-year GDAs were later signed with the Yukon in 1977, and with the North West Territories in 1979 (Canada DREE, 1980a). For Manitoba, the GDA was signed on 5 June 1974 by the federal Minister of Regional Economic Expansion and the provincial Minister of Mines, Resources and Environmental Management (Canada DREE, 1980a). The GDA not only provided for better federal-provincial co-operation through a combined federal-provincial funding (shared on a 40-60% basis) and co-managed subsidiary agreements over a wide range of programmes concerning economic development, but it also covered all elements of the economy as well as spatial issues concerning desired regional patterns within a province (Walker, 1983). Interest in sectoral as well as regional programmes can be evidenced through the subsidiary agreements for Manitoba. In the manufacturing sector, there was the Industrial Development Act signed in 1978 (for 1979-1983); for the agricultural sector, there was the Value - Added Cropped Act signed in 1979 (for 1979-1984) and for the tertiary sector, the Tourism Development Act was formulated in 1979 (for 1979-1984). The GDA's scope covered all regions in Manitoba and is exemplified by the Manitoba Northland Agreements (for 1979-1982), Winnipeg Core Area Act (for 1981-1986), and Agro-Manitoba Act (for 1974-present). As far as the development of Agro-Manitoba is concerned, the

programmes could be divided into three broad categories according to their functions:

- 1) land and water resources programmes: PFRA (1936-present), FRED (1967-1977) and ARDA (1972-1977);
- 2) agricultural industry programmes: Value - Added Cropped (1979-present);
- 3) non-agricultural industry programmes: ADIA and RDIA (1963-1980), Tourism Development Subsidiary Act (1979-1985).

To conclude, DREE's initiatives were, by and large, economic-oriented. They were implemented to promote regional economic growth in Agro-Manitoba in the hope that both desirable economic and quality-of-life conditions of the population would be brought about and regional disparity narrowed. Furthermore, the criterion for development assistance in this period of time was very much based on efficiency rather than equity. The underdeveloped areas ( in terms of income and employment opportunities) that had the relative advantages in resource endowments would have received the earliest attention of the government rather than the disadvantageously-endowed counterparts. The 'solution' to regional disparity became a 'natural process of growth' which was supposed to spread outward from the first type of area. Based on the efficiency criterion for development assistance, it is not difficult to perceive that the original intention of the federal government to create DREE was to promote 'sectoral

growth' more than 'regional growth'.

#### 2.1.2.3. 1983-present

##### 2.1.2.3.1. The Downfall of DREE and the Rise of DRIE

In its early years, DREE had received much acclaim from provincial officials. Particularly after the introduction of the GDAs, many provincial governments became its strong supporters. In the first place, they were the principal clients of the DREE. At the same time, the GDAs had offered a number of attractive features to them. It meant new discretionary spending in a high profile field - economic development. They had the provincial government actually delivering the initiative and thereby monopolizing the credits. By and large, it was the provinces that came forward with proposals and the federal government responded. As well, there were very few trade-offs demanded from provincial governments in return for federal funding of provincial-packaged and implemented initiatives (Savoie, 1984). Nevertheless, this provincial or regional approach had upset many federal officials. For one thing, many federal officials felt that, on the one hand, there was through DREE an instrument being substantially financed with federal funds; yet on the other, this instrument was clearly favouring the political profile of provincial governments; and the DREE programming was simply an extension of provincial government programmes (Savoie, 1984). In fact, many senior officials

were opposed to the transfer of federal discretionary spending to support initiatives from provincial line departments rather than their own. DREE would sign subsidiary agreements with provincial governments in such sectoral areas as agriculture and forestry while other federal ministers were being denied funds for new initiatives for these very same sectors by their own Treasury Board. The federal Minister of Agriculture in fact remarked that, 'DREE, it is just a give-away budget... they (DREE - officials) turn off half - informed on agricultural programmes' (Savoie, 1984, p.6). As a result, DREE was criticized for its provincial or regional approach and lacked integration with the federal interests. Most crucially, however, this regional approach contradicted the sectoral approach of the federal government; hence the aforementioned disaffection of federal department officials. To the federal officials, regional concerns were decidedly secondary to their own sectional interests. In criticizing the negligence of DREE in sectoral growth, a former, DREE Minister Pierre Debane, added publicly that he 'would be surprised if 10% of Canadians are aware that DREE grants to business account for 20% of the Department's total budget, the rest going to the provinces' (Savoie, 1984, p.5).

Finally, another force working against the agency came from those who argued that DREE simply lacked the resources and the instruments necessary to launch a sustained effort at promoting regional development. Pierre Debane wrote to the Prime Minister shortly after he was appointed Minister

suggesting that 'DREE's responsibility - to ensure that all Canadians have an equal chance to make a living with dignity - can't be handled by one department with 1% of the federal budget' (Savoie, 1984, p.8). Pierre Trudeau, the Prime Minister at the time, also pointed out that, 'it is no longer enough that one department alone is primarily responsible for regional economic development' (Savoie, 1984, p.1).

Under these criticisms, DREE was disbanded in early 1982 and another organisation, the complex merger of elements of the Department of Industry, Trade and Commerce and Regional Economic Expansion into an entirely new department - the Department of Regional Industrial Expansion (DRIE) began. As its name denoted, its objective is to promote industrial, commercial and tourism sectors. The institutional structure is then reorganised to facilitate the sectoral approach of development. The federal level has gained more direct links and control over the provincial or regional development strategies. Previously, DREE was independent in planning, programming, and operation. But the new DRIE, comparatively speaking, has lost much of this independence because it is now under the Minister of State for Economic and Regional Development (MSERD). As compensation, it gains the benefits of having regional concerns elevated to a top-priority position in all economic-decision-making at the cabinet level (Simpson, 1985). The DRIE department itself is headed by the Minister of Regional Industrial Expansion with assistance from the Minister of State for Tourism and the Minister of State for

Small Business. At DRIE headquarters, the assistant deputy ministers (ADMs) consider the national perspective for their specific sectors (capital and industrial goods, consumer goods, services and resource processing, crown investments and special projects, small business and tourism) and provide a policy framework and administrative support on matters of regional economic development.

Like the previous regional offices of DREE, the ten regional offices of DRIE focused on development in particular regions. A regional executive director is in charge of operations in each province. These regional executive directors possess some powers of fund distributing. For example, in the Industrial Regional Development Program (IRDP), with few exceptions, applications are reviewed and analyzed in the DRIE regional offices; decision-making for small cases involving contributions of up to \$100,000 in crown support has been decentralized to these offices (Canada DREE, 1984b). Again, at this provincial level, in order to ensure full co-ordination between the federal and provincial governments, a federal economic development co-ordinator is set up in each province encouraging cohesiveness among policies and programmes of various government departments. These federal economic development co-ordinators chair councils of senior economic officials in each province, report regularly to the Federal-Provincial Relation Office (FPRO) and provide feed-back on regional responses to matters on the federal agenda of particular interest to the regions (Canada

DREE, 1984a;1985). Furthermore, regional executive directors and headquarters' ADMs often come together to ensure that departmental regional and sectoral policies concur. Hence, it is quite clear that the DRIE has tried to avoid the mistakes committed by the DREE in the way of poor integration within the federal government. The transformation of DREE into DRIE is then an indicator of a shift of interest from the mainly provincial - regional approach to a stronger federal - provincial integrated and sectoral approach towards regional development.

### 2.1.3. Summary

Provincial documents of different political parties indicate that regional disparity is the major problem in rural Manitoba. These documents have suggested that the disparity is mainly a combined result of technical change and rural outmigration. Despite the fact that regional disparity has long been recognized by many governments, it was only in 1969 that a more direct approach towards regional development materialized, that is, with the formulation of DREE. Since then, governments have attempted to reduce disparity through largely economic-oriented programmes focusing on land and water resources and sectoral incentives. Particular emphasis was, and continues to be, placed on the regions and sectors with highest potential for growth. Efficiency is seen as the catchword of growth. The underlying rationale is the

assumption that growth would be spread from the assisted areas or sectors to problem regions via the operations of backward or forward linkages. Nevertheless, the institutional organisations did not display co-ordination in their objectives and strategies for development. Consequently, in the early 1980s, DRIE was formed in order to ensure a stronger federal and provincial co-ordination approach towards regional development. Though the organisation has changed to ensure stronger federal and provincial integration in regional development, the DRIE's aims towards rural development, the types of programmes adopted, and the efficiency approach largely remain unchanged from the discredited predecessors.

Consider, then, the regional backcloth. In the last 20 years, government policies have been directed towards reducing regional disparity within Agro-Manitoba. In order to evaluate the effectiveness of the policies and programmes in reducing regional disparity, an assessment study is undertaken in the next section for the period of 1961-1981 highlighting the outcome of the regional development strategies in southern Manitoba.

## 2.2. An Investigation into Disparity of Development in the Rural Economy of Agro-Manitoba

As mentioned in section 2.1., both the federal and the provincial governments have attempted to solve the problem of regional disparity in Agro-Manitoba over the past 20 years.



In this section, the degree of disparity in regional development within Agro-Manitoba will be assessed for the year 1981 to highlight the efficiency of government policy in reducing regional disparity in the past 20 years. Since agriculture is the fundamental economic activity in rural Manitoba, therefore, an examination of the major underlying dimensions of its agricultural economy may highlight the level of development in the whole region. In this case, the principal component technique is used to identify the major characteristics underpinning the rural economy. Furthermore, the component matrix was subject to varimax rotation to simplify orthogonal structure and maximize the loadings of the variables (Hodge, 1970). Meanwhile, the scores which are derived from each of the principal components are used as the index for development for each rural municipality of Agro-Manitoba. Finally, the existence of regional disparity will be assessed. In due course, this section will be divided into two subsections. The first will focus on the discussion of the various aspects of farm structure, farmer or operator characteristics, technological characteristics and physical characteristics in contributing to the prosperity of these rural regions. The second will focus on the identification of the major characteristics underlying the rural economy and the degree of disparity in terms of agricultural development in 1981.

### 2.2.1. Structural Characteristics

#### 2.2.1.1. Physical Environment and Agricultural Productivity

Spatial difference in climate, topography and soils are the fundamental elements contributing to intra-regional differences in relation to agricultural productivity. Temperature, rainfall and the duration of the frost-free period are important factors affecting the types of crop grown and the regular use of land which are vital elements for determining productivity of land and efficiency in farming. For instance, each plant grows best under certain climatic conditions. Some varieties of wheat germinate at 3°C to 4°C and grow to maturity in as little as 90 days in temperature averaging 18°C to 21°C; as do barley and rye. But field corn germinates at a higher temperature of 12°C to 13°C, and grows and matures in a high temperature of approximately 24°C in a longer growing period, that is, of 140 to 150 days (Robinson, 1972). Nevertheless, a more favourable climate allows the growth of a wider range of crops, ranging from cereal crops to vegetables and allows diversification of cropping in the rural economy. Also, a more favourable climate allows for the permanent or regular use of land for the growth of crops and, therefore, increases land productivity and the more efficient use of land. In the extreme climatic regions, only a limited number of crops can be grown in the usually short period of mild climate; therefore, the land returns will be strictly

limited. As a result of low levels of production, the farmers' earning power is severely curtailed.

The importance of topography to agricultural prosperity lies in its influence on land quality and scale of farming. For instance, flat relief favours soil accumulation. It has low susceptibility to soil erosion when cultivated. It permits adequate drainage and is readily adaptable to various field layouts and mechanized activities (Highsmith and Northam, 1968). Flat relief is usually highly productive while rugged relief limits the use of machinery and farm size (Robinson, 1972). The nature of soil varies in structure, texture workability and fertility and, in turn, affects the types of crop grown too (Lowry, 1948; Robinson, 1972). Very heavy wet clays may not be suitable for farming for they are often sour; hence, they are commonly laid down for grass. Light, porous sandy soils which warm up easily are well-suited to market gardening (Robinson, 1972). In summary, aspects of the geographical environment like climate, topography and soil are vital to the economic prosperity of the region in as much as they affect its farming productivity.

#### 2.2.1.2. Farm Structure

The structure or organisation features of the farm include: farm size, ownership arrangement and non-farm residence. Each will be considered in turn.

## - Farm Size

In a rural context of disparity, farm size is a fundamental factor affecting agricultural production and should not be overlooked (Todd, 1979a). It has long been recognized that size enlargement is a crucial element in raising agricultural output particularly in the advanced countries. It is also found that the boundaries between small farms put a large proportion of land outside the possibility of effective cultivation or economic development. And small farm-holding also causes inefficient use of human supervision and of capital and machines because it makes necessary duplication of all these human and capital resources. And, what is more, the small plots are difficult to work with modern machines such as tractors (Husain, 1979). By way of contrast, the larger farms suffer less from excess labour (employee or family) or under-utilization of machinery and equipment. This tends to give them higher output per unit of input. A study of farm productivity made by the Economic Development Committee in 1973 showed that among the sample of the 133 farms in England and Wales, those classed as highly productive were of an average size of 290 acres, while those categorized as being of low productivity were of an average size of 157 acres. Furthermore, Britton and Hill (1975) also found that the productivity increase was most marked in the transition from 20 to 150 acres; it was still quite perceptible between 150 and 400 acres; but beyond 400 acres, there was no further

consistent upward movement. Hefferman and Green (1986), on examining the relationship between farm size and estimating soil loss in mid-western counties in the United States, concluded that the larger the farms, the less the soil loss. Small farms cannot preserve the environment as well as large-scale farms because of environmental and institutional constraints.

Despite the well-documented positive relationship between farm size and productivity, some researchers have not been disposed to accept the unlimited enlargement of farms in achieving higher productivity. They claim that the enlargement of farms will be tempered by the unavailability of managerial expertise, problems of co-ordination of large organisations, the question of capital and labour supply and the increasing risk factor which accompanies business expansion (Krause and Kyle, 1960). Based on the concept of economy of scale in farm size, Moore (1973) suggested that below a certain size, farms are too small to give the lowest possible cost per product unit, while above another point on the size scale, farms or firms are too large and use resources less economically than they would if they were small. In coping with the controversy over the productivity of the large scale farms, Todd (1979a, p.268) suggested 'farm sizes, in themselves, are indicative of the consolidation of farms at the appropriate optimum size for the function undertaken as well as its comparative advantages'. In an examination of the relationship between farm size and productivity in 1961-1976

in Manitoba, it is found that farm size is highly correlated with farming types. There is strong relationship between large farms and cattle rearing, medium-size farms and grain and mixed farming, and small farms linked to local markets. Furthermore, it is also found that these farming types are highly localized (Todd, 1979a). Todd's study indicates that, in fact, the largest farm size is not necessarily associated with the greatest productivity. Rather, if the farm scales best represent farming types and locational advantages, then the productivity of farms will be high. In other words, all kinds of farm scales can achieve equally high productivity if their functions are well-fitted to their sizes.

So far, farm size has been referred to solely in terms of its contribution to productivity, efficiency or the economic health of the region either positively or negatively. In fact, as well as being a product of social forces, farm size is also important in affecting the social aspect of the life of the rural people. Goldschmidt (1978) asserted that the scale of farm operation determined the quality-of-life in rural communities. For instance, Constandse et al. (1968), in examining the social implications of farm enlargement in rural Louisiana communities, found that farm enlargement resulted in more income for the farm family but less time for involvement in social and community affairs. Linder (1970) also noted that highly-productive people earned higher income, their work time increased and their consumption time decreased with intensive agricultural work. The high-income earners often

discovered that, even though their increased productivity yields them a higher income, they were unable to find the time to enjoy the added income. However, these findings were not without contention. Lionberger (1954a;1954b) found in his studies of rural life that prominent citizens in rural communities were usually operators of large farms. These farmers were generally more active in all types of formal social organisation for civic and educational improvement. Straus (1956) also concluded from his study that wives of farmers who operated the larger, more mechanized farms were more socially active in the community than wives of the operators of smaller, less mechanized farms. Studies by Bertrand (1951) and Wilkening (1950;1952) complement these latter findings, lending additional support to the conclusion that operators of large farms have a positive participation in social affairs.

#### - Farm Tenancy

Land tenure also has fundamental effects on the well-being of the agricultural sector. It may be closely related to the fertility of soil. Generally speaking, where the land is owned by farmers themselves, it will be better managed and kept in better condition with, in consequence, a greater yield in output (Robinson, 1972). On the other hand, where the land is rented, it will have poorer management and is often closely related to rapid depletion of soil. The interest of the

tenant in maximizing his profits while returning an absolute minimum to the land often results in rapid soil erosion, breakdown of soil structure and rapid loss of its fertility. A farmer planting soil-building crops allowing land to be fallowed in order to accumulate moisture is sacrificing his own benefits for that of his successors. Moreover, to practice contour ploughing and strip cropping is a burden and not a benefit to the tenant especially with a short lease. He may serve his immediate interests much better by ploughing across terraces than along them. Fertilizers cannot be used profitably unless contributions can be harvested during the period of the lease; and soil-building organic fertilizers are of no use whatsoever under these conditions (Schuler, 1938; Smith and Zopf, 1970). Recent adoption-diffusion studies indicate that tenancy is usually found to be inversely related to the adoption of improved tillage practices and other agricultural technologies (Albrecht and Thomas, 1986).

Land tenure also affects the amount of capital accumulated and reinvested in the farms. The farmer's expenditure for land must compete with his expenditure for equipment, and other operating needs. If much of a man's capital is tied up in land, he may have inadequate funds with which to provide suitable power sources, implements and supplies; and as a consequence, be unable to achieve farm surplus. Therefore, in some areas, there is a close relationship between the extent of farm tenancy and the degree to which farming is commercialized ; where tenancy is highest, the average value



of a farm is highest, because farm operators are least able to acquire prosperity or are least willing to render themselves 'poor' by tying up the greater part of their capital in expensive real estate (Smith and Zopf, 1970). Finally, tenancy may affect the social commitment of the rural people (Bertrand, 1958). In areas where family farms or ownership type of tenure is dominant, the satisfaction or the commitment of the rural people to the area is greater. They have lots of chances to exercise the management and proprietorial functions. They are also able to transfer to their children their attitudes, aptitudes and skills, and new technology can be adopted. On the contrary, where tenancy is high, the satisfaction or the commitment of the people to the society will be much lower. This is supported by many studies concluding that levels of tenancy result in problems for communities because tenants are less involved than owners in all types of community activity (Albrecht and Thomas, 1986). In fact, all these studies seem to bring out the fact that tenancy has an adverse effect on agricultural productivity as well as social satisfaction.

Recent researchers, however, contradict that received wisdom in indicating that the tenants are more productive and are better involved in the community than the land owners. Albrecht and Thomas (1986), in a study of Texas crop producers in 1983, found that farmers who rented most or all their farmland had the largest and the most productive farms, used better farming practices and were more involved in community

affairs. They then suggested that the recent changing role of tenancy in a rural economy is a result of the changed values of farmland, interest rates and the economic climate of agriculture. During the 1970s, the inflationary trend of the value of farmland made it excessively expensive for the earnest farmers but attractive to non-farmer investors. Nevertheless, more recently, high interest rates and unfavourable cost-price relationship have led to substantial declines in farmland values across the U.S.A. (Albrecht and Thomas, 1986). Falling land values have pushed some farm debt-to-asset ratios to dangerously high levels. These trends may have caused the purchase of farmland to be less desirable than in years past and made renting a more attractive alternative for the farmers.

The changing economic climate of agriculture may have also resulted in other changes that led to a different tenancy structure. If farmers are working towards the end of income gain rather than ownership, in many cases, it makes economic sense to rent land rather than buying it because renting conserves capital. Likewise, if a farmer has fixed machinery costs, and this machinery cost can be utilized over more (that is, rented) land, it may result in greater profits for the farmers (Albrecht and Thomas, 1986). As a result, renting land has now come to be an advantage for prosperous farm operators.

Finally, the elimination of many tenant farmers in an

earlier period may be a factor contributing to the changing role of tenancy. The numerical decline of the tenant farms begins as technological developments result in fewer and larger farms. As it becomes possible for the individuals to operate larger acreages, many tenant farmers are no longer needed. The tenant farms least likely to survive are the smallest and the most socially and economically disadvantaged. Consequently, the tenant farmers of today may be affected by the actions of predecessors simply because the most disadvantaged tenants were eliminated.

#### 2.2.1.3. Operator Characteristics and Technical Advance.

##### - Ethnicity

The spatial form of cultural segregation has an important role to play in determining the economic attitudes and ensuing performance of economic activities among regions (Todd and Brierley, 1977). Kindleberger (1965) points out that it is the cultural attitudes which condition the attitudes of a people towards their occupation and, hence, income earning. In fact, the impact of differences in farmers' cultural background on agricultural activities is widely documented (Flora, 1985). McQuillan (1970) indicated great disparity in agricultural performance for French Canadians, Ukrainians and Mennonites. Salomon (1985), in his study of two ethnic farming counties (German and British), found that, despite

similar farm sales and a separating of only 20 miles, significant differences existed between the communities in terms of farm size and agricultural types. German farms are smaller and diversified with dairy, hogs and beef and grain while the British are focussed on monoculture and are mostly grain operators. Moreover, the British are more individualistic and concerned more with profits. Thus, if success is measured by scale, the British farmers may be more successful. Bachtel and Molnar (1980), for their part, examined the perception of the black and white rural leaders on the development of rural-based industry. The black leaders are most favourably disposed towards labour-related activities while the white leaders are more concerned about the expansion of technologically-advanced industries.

#### -Age and Farm Residence

The distribution of the level of development varies with the age of the farmers. In the early career stage, the young farmers may thrive on economic aspiration and work towards a personal vision of success. In later years, they may place more emphasis on family ties and informal interaction with other farmers (Molnar, 1985). Many may think that young farmers must be more productive than their older counterparts. However, Ervin, et al. (1980) noted that age is negatively related to soil loss and this suggested that the younger farmers may have success only with the land endowed with more

eroded soil. As for farm residence, it is likely that those farmers who are resident on the farms may have greater commitment to farming. Therefore, their farm productivity will be greater.

#### - Technological Advance

Technological innovations like the use of tractors, threshers and harvesters are important in boosting labour productivity (Andreae, 1981; Berardi, 1981). Mechanization saves labour cost particularly in the harvesting period. Production costs are markedly lower so that a competitive advantage for the farming operator is obtained (Andreae, 1981). With mechanization, the previously uncultivable land with heavy clay soil becomes workable. The working conditions of labour have also been improved, resulting in a shorter working day as well as less 'drudgery' (Berardi, 1981).

For several decades, the use of fertilizers and other soil amendments have been used by many farmers to maintain or improve soil productivity (Highsmith and Northam, 1968). This growing use of fertilizers has greatly improved the world's or the region's cropland output in the last three decades (Highsmith and Northam, 1968).

To conclude, the foregoing reviews have reflected the complexity of the underlying components of the rural economy which contributed to the level of development (particularly

agricultural development). In the following section, the major components underlying the rural economy of Agro-Manitoba in 1981 will be identified by means of principal component analysis and the level of development among the rural municipalities will be examined in detail. The study units include the 108 rural municipalities in Agro-Manitoba. A total of 23 variables in the categories of farm structure, operator characteristics and technological advance were chosen. A listing of the 23 variables can be found in Appendix V.

#### 2.2.2. A Principal Component Analysis of the Level of Development in Ago-Manitoba

In this analysis, four components were derived, accounting for 53.08% of the variance in the data matrix (Table 1). Component 1, responsible for 16.74% of the variance, is named the 'large-scale British farming dimension' and is the most important factor contributing to the level of development in Agro-Manitoba. The variables therein that load both highly and positively are '% of farms with size between 1120 and 2239 acres' (0.83) and '% of farms with size between 560 and 1119 acres' (0.82). The other variable that has a sizeable positive relationship on this dimension is '% of population British' (0.66). At the same time, the negative loadings are '% of farms with size between 10 and 248 acres' (-0.85),

Table 1  
Principal Component Analysis with Varimax Rotation of  
Agro-Manitoba Data for Rural Municipalities

Variable	Component			
	1	2	3	4
F2544				-0.41
F60				
BRI	0.66			
FREN	-0.35			-0.51
GER	-0.33	0.44	0.45	
UKR				0.74
S10	-0.85			
S249	-0.45			0.55
S560	0.82			
S1120	0.83			
CATT			0.64	
MILK			0.52	
HEN	-0.56			
WHEAT		0.87		
BAR		0.82		
PEA			0.44	
SEED		0.79		
OWN	-0.46		-0.42	
RES			0.71	
NONRES		0.37	-0.73	
AMTCH		0.66		-0.40
Y65				0.62
Y2544				-0.47
eigenvalue	3.85	3.34	2.65	2.37
% of variance explained	16.74	14.52	11.52	10.30
cumulative var. explained.	16.74	31.26	42.78	53.08

'number of hens and chicken' (-0.56), '% of farms owned' (-0.46), '% of farms with size between 249 and 559 acres' (-0.45), '% of population French' (-0.35) and '% of population German' (-0.33). As its name suggests, this dimension is characterized by the dominance of large-scale farms. Furthermore, the major ethnic group which dominate these large-scale farm units is the British. Also, rented farms are common as is indicated by the small number of owned farms on this dimension. Possibly, some of the farms on this dimension are owned by large corporations rather than the domestic farmers. But interestingly enough, these large-scale farms do not stand out as being prominent in any type of farming such as crop growing or animal rearing. The loadings on this dimension only show that hens and chickens are very rarely found in these large-scale farms which are dominated by the British. This may suggest that either the British or, more likely, the large-scale farming are rarely related to the keeping of poultry.

As far as the spatial distribution of the component scores is concerned, the rural municipalities with above average scores on this component are mainly located in the South-west part of Agro-Manitoba except Ellice and Rosedale (Figure 1). Some scattered patches with above-average scores are found in the North-west corner of the Parkland region and along the eastern shore of Lake Manitoba in the Interlake region; while, the below-average scores are mainly found in the eastern portion of Agro-Manitoba. These areas include a large part of

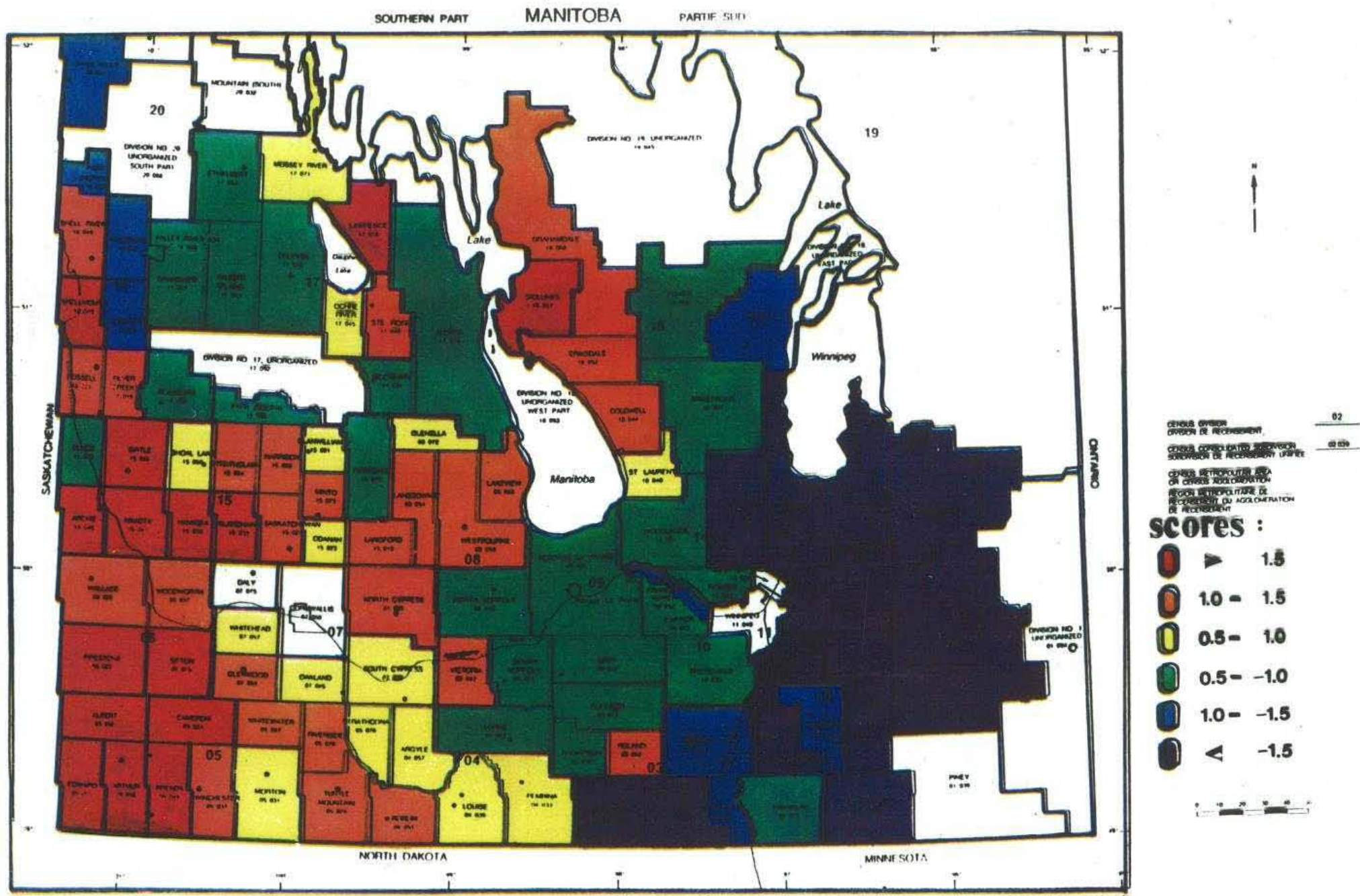


the Central Plain, Pembina Valley, Interlake, and the whole area of East Manitoba. Particularly low scores are concentrated in Eastern Manitoba and the southern part of the Pembina Valley.

Accounting for 14.52% of the total variance, the 'commercial crop farming' dimension constitutes the second most important dimension in describing the level of development in Agro-Manitoba. The highest positive loadings are 'bushels of wheat' (0.87), 'bushels of barley' (0.82), and 'bushels of rapeseed' (0.79) while the other noteworthy loadings embrace variables for 'amount of chemicals used' (0.66), '% of population German' (0.44) and '% of non-residential farmers' (0.37). As indicated by the statistics, this dimension is most characterized by the growing of various kinds of commercialized crops. Wheat and barley are the dominant crops while the growing of rapeseed is also important. The use of large amounts of chemicals in fertilizing the soil to ensure higher productivity is a common practice. Most of the farmers are German and they usually reside elsewhere other than on the farms.

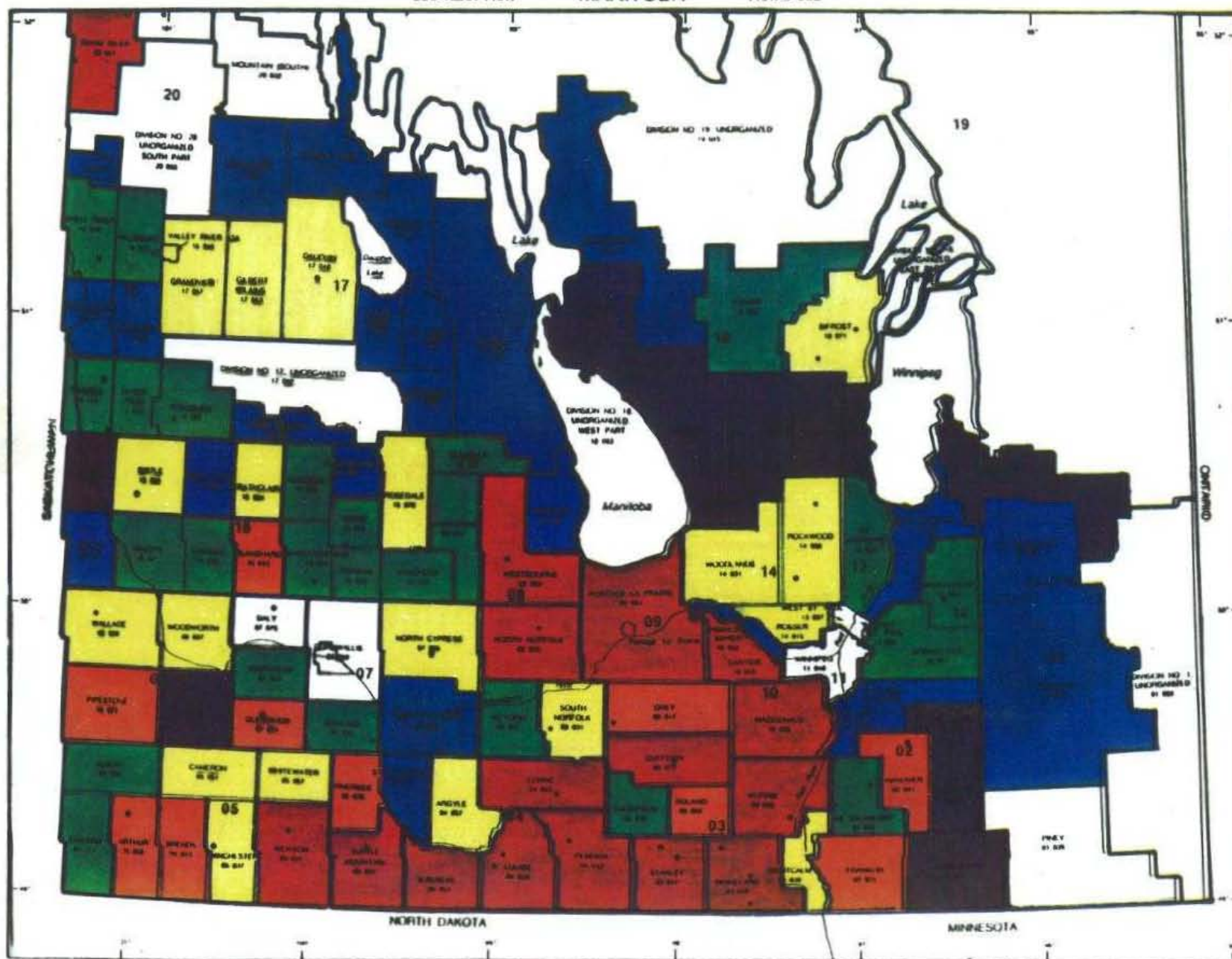
The rural municipalities which score highly on this component are mainly concentrated in the South-central and the South-west fringes of Agro-Manitoba (Figure 2). These areas include almost all of the Pembina Valley (except Thompson which has a below-average scoring), the southern part of the Central Plain and some parts or the southern fringes of South-

# Figure 1 : Component 1





SOUTHERN PART MANITOBA PARTIE SUD



CENSUS DIVISION  
DIVISION DE RECENSEMENT

CENSUS CONSOLIDATED SUBDIVISION  
SUDIVISION DE RECENSEMENT AGGREGÉE

CENSUS METROPOLITAN AREA  
OR CENSUS AGGLOMERATION

REGION METROPOLITAINE DE  
RECENSEMENT OU AGGLOMERATION  
DE RECENSEMENT

scores :

- $\geq$  1.5
- 1.0 - 1.5
- 0.5 - 1.0
- 0.5 - -1.0
- 1.0 - -1.5
- $\leq$  -1.5



west Manitoba. Low scores are mainly found in the eastern and North-west parts of Agro - Manitoba. These areas include Eastern Manitoba, the northern Interlake, a large part of the Parkland region and South-west Manitoba. It is quite interesting to note that many of the low scores are found in the French municipalities of St. Anne, La Broquerie, Tache, de Salaberry and St. Clements in Eastern Manitoba. This may be due to the fact that many of the economic activities in these French communities are non-farm activities such as service industries. As a result, they record particularly low scores on this dimension. However, the lowest scores are concentrated in the northern part of the Interlake; possibly owing to the fact that the northern Interlake is mainly a cattle rearing region.

The third dimension accounted for 11.52% of the variance and can be labelled as a 'livestock rearing dimension'. The principal positive loadings are '% of residential farmers' (0.71), 'number of cattle' (0.64), 'number of milk cows' (0.52), '% of population German' (0.45) and 'bushels of peas' (0.44). The variables with negative loadings are '% of non-residential farmers' (-0.72) and '% of owned farms' (-0.42). Overall, this dimension is characterized by the dominance of livestock rearing together with some practices of vegetable gardening. Its dominant ethnic group is Germans. Though these farmers are living on the farm, they may not be the owners of their farms. It is highly likely that most of them are tenant-farmers. This dimension, meanwhile, can best

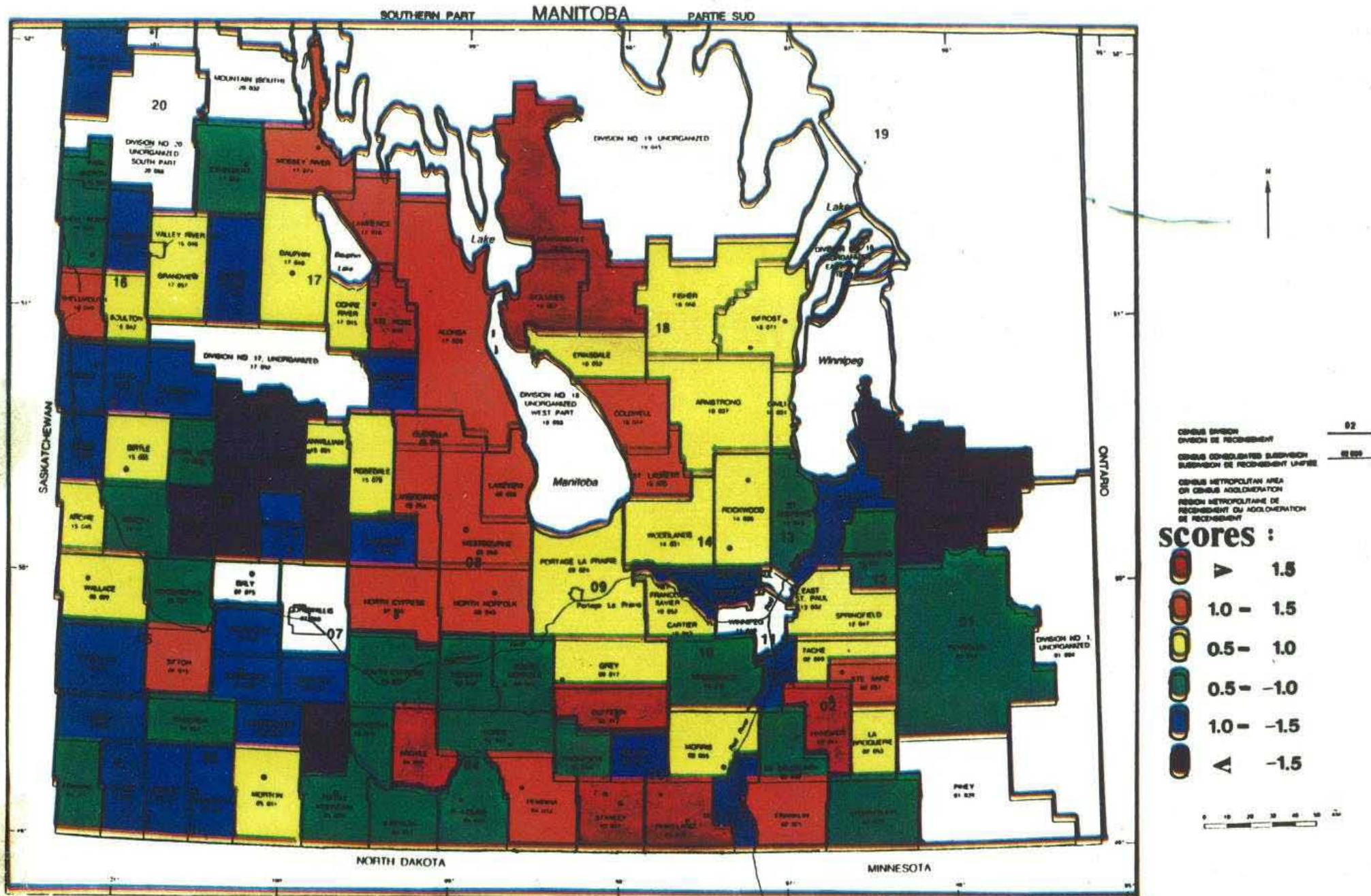
illustrate the effects of governmental efforts in diversifying the agricultural sector in Agro-Manitoba in the past 20 years. Not only is the keeping of cattle encouraged, but the activities of dairying as well as market gardening are encouraged too.

On examining the spatial distribution of the component scores, one finds that the areas with above-average scores are widely scattered all over Agro-Manitoba, though the Interlake area is still the dominant area on this dimension (Figure 3). It is quite interesting to note that in many of the rich soil areas like the Pembina valley, the keeping of livestock is popular. This indicates that it is no longer true that only those areas with poor soil and drainage will practise livestock keeping. The areas with below-average scores are quite scattered too. Nevertheless, the lowest scores are mainly to be found in the north-central part of South-west Manitoba.

The dimension accounting for 10.30% of the total variance is the 'Ukrainian farming' component. This dimension has positive loadings for '% of population Ukrainian' (0.74), '% of population over 65 years old' (0.62) and '% of farms with size between 249 and 559 acres' (0.55). The negatively-loaded variables are '% of population French' (-0.51), '% of population less than 25 years old' (-0.47), '% of farm operators less than 25 years old' (-0.41), and 'amount of chemicals used' (-0.40). This 'Ukrainian farming dimension' is



Figure 3 • Component 3



characterized by an ageing population. As a result, where this dimension is dominant, the number of people aged over 65 is unusually high. Correspondingly, the number of young people, or young farmers that are below 25 years of age, are disproportionately low. In comparison to the British group, the Ukrainians in general occupy smaller-sized farms. Moreover, the Ukrainian farmers seldom used chemicals or fertilizers in their farming practices. Also, the French are seldomly found to reside in the Ukrainian municipalities.

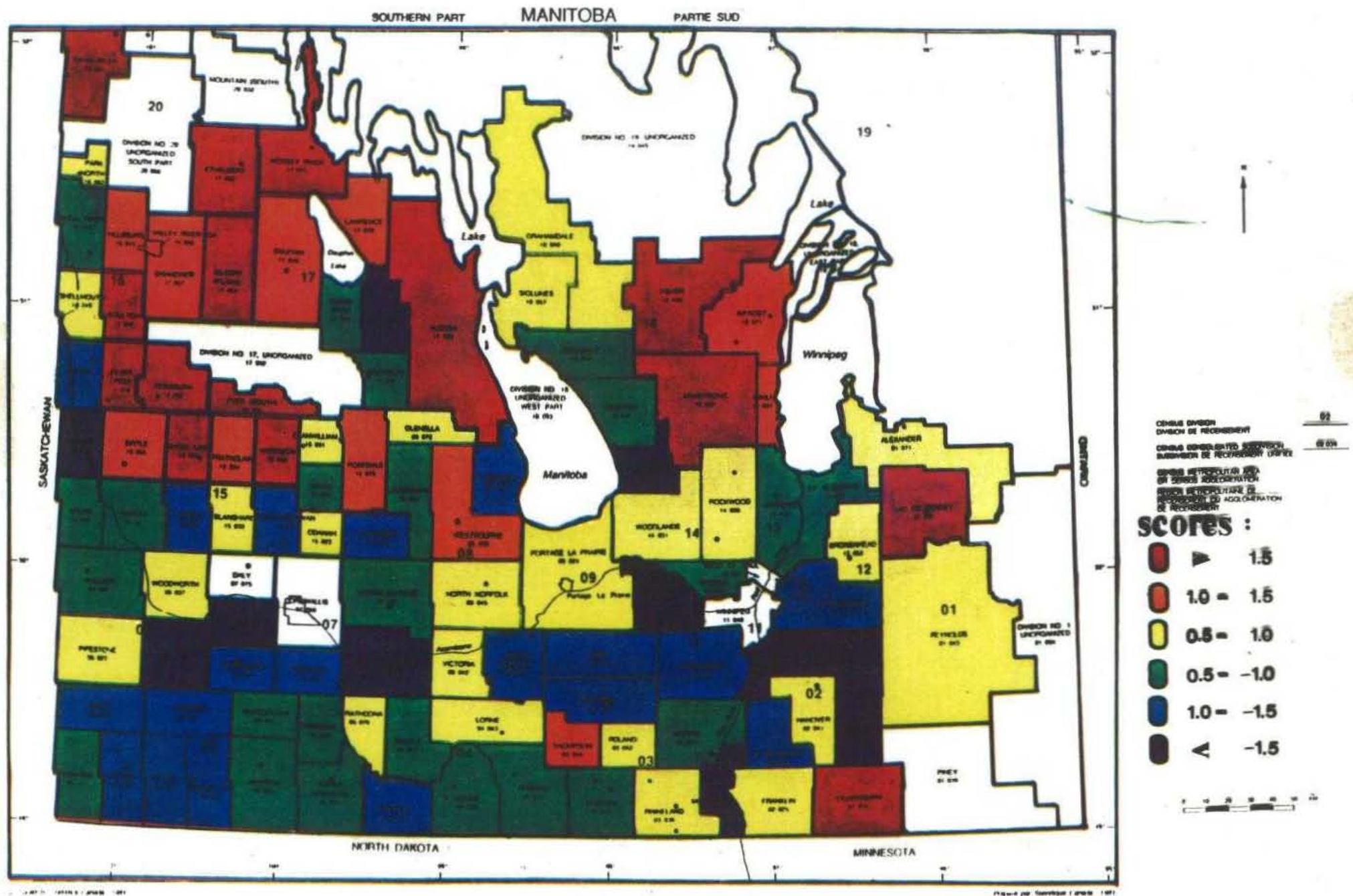
As indicated by the component scores, the areas which gain high values on this dimension are quite scattered (Figure 4). Nevertheless, the areas with the highest scores are mainly concentrated in the northern portion of Agro-Manitoba. They include a large part of the Parkland region and North-east Interlake. The lowest scores are mainly found in the South-west and the northern portion of the Pembina Valley. It is quite obvious that this 'Ukrainian farming dimension' represents a less prosperous level of development when compared with other farming dimensions as can be inferred from its large proportion of ageing population, its inefficient farming practices and its unfavourable location in the northern fringes of Agro-Manitoba.

### 2.2.3. A Spatial Index of Development

The component scores can be combined to give a comprehensive index of development for each of the rural



**Figure 4 : Component 4**

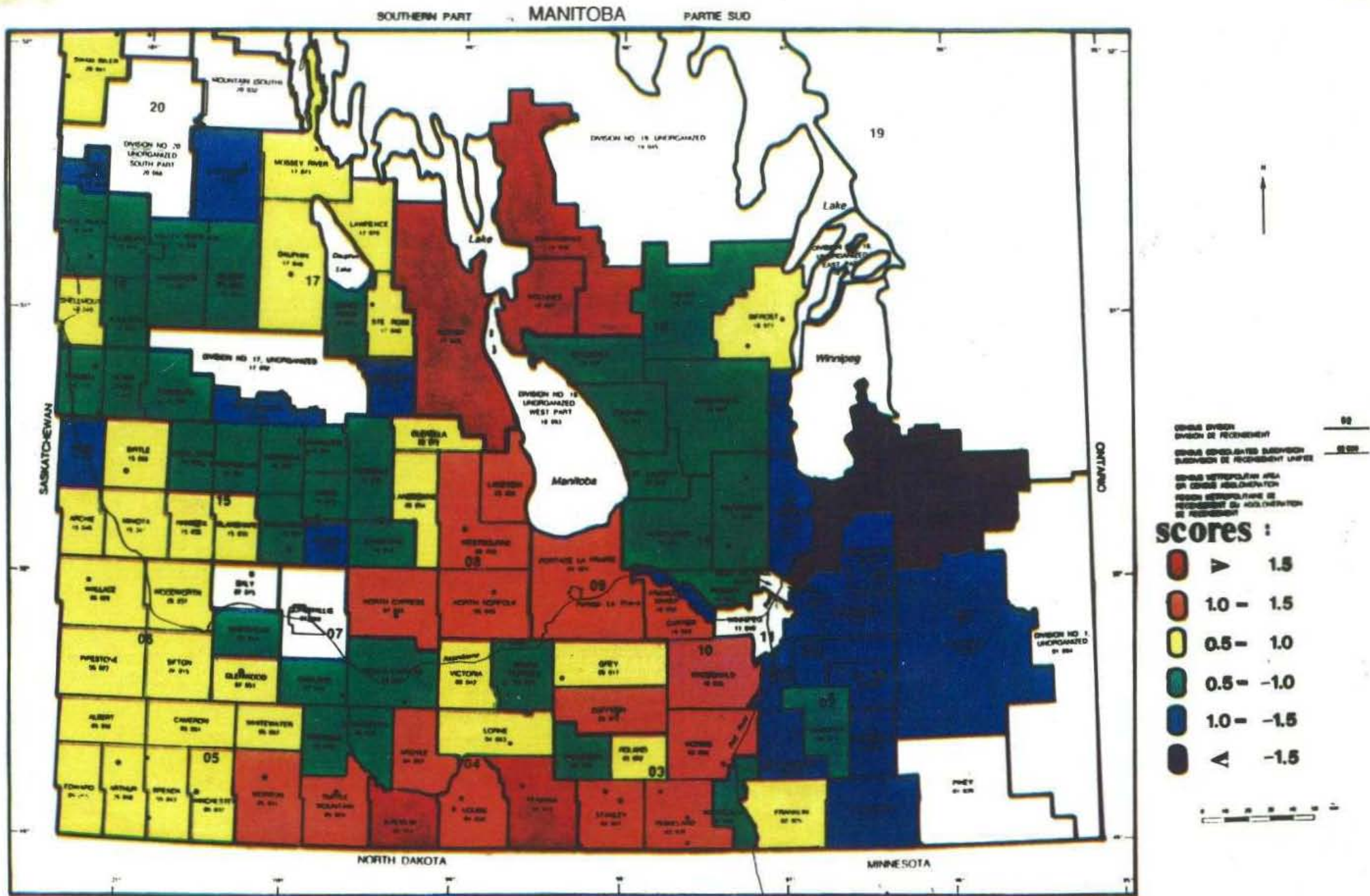




municipalities in the region. The scores represent the spatial distribution of system explanation embodied in the dimensions and, therefore, aggregation of the scores provides an indication of the degree to which each of the rural municipalities participates in the total system explanation. Those municipalities which possess low or negative scores are considered to be 'underdeveloped'; whereas those rural municipalities with high positive scores are considered to be 'developed'. Thus, when these scores are mapped, a pattern of intra-regional spatial disparity of development can be discerned (Figure 5). In order to maintain consistency of interpretation, the 'Ukrainian farming' dimension, which indicates poverty, will not be included in the formation of the development index. That is, only those dimensions which can affirm prosperity in the rural economy will be included. As a result, the other three dimensions only are included.

The above-average index scores are mainly found in the Central Plain and the Pembina Valley. Nevertheless, the areas with the highest level of development are quite scattered. For instance, Grahamdale and Siglunes in the Interlake, northern Alonsa in the Parkland region, southern Alonsa in the Central Plain region, Pembina in the Pembina Valley and Roblin in South-west Manitoba, are all examples of high scores. This indicates that the Central Plain and Pembina Valley and the western portion of South-west Manitoba are by far the most prosperous regions in terms of the level of development, although some exceptional highly-developed municipalities are

# Figure 5 : DEVELOPMENT INDEX



also found in the Interlake and Parkland region.

By way of contrast, below-average scores are mostly concentrated in the eastern portion of Agro-Manitoba ; places such as the Interlake and Eastern Manitoba, a large part of the Parkland region and the North-east part of South-west Manitoba (except North Cypress). The very lowest scores are concentrated in three rural municipalities located at the northern end of Eastern Manitoba; namely, St. Clements, Alexander and La du Bonnet. As suggested by Brierley and Todd (1976, p.61), ' the eastern margins are to a greater or lesser extent located on the Canadian Shield which provides obvious hurdles for the practising of agriculture; and where alternative economic activity is insufficient to offset the deprived primary base of this area. Hence, the outcome is a lagging subregion in Southern Manitoba'. A few other rural municipalities with depressed levels of development are found dispersed across the region. They are Park North, Park South, Ethelbert and McCreary in the Parkland region and Ellice and Odanah in South-west Manitoba.

In conclusion, these index patterns clearly underscore the fact that disparity of development is evident in Agro-Manitoba. The highly-developed areas in terms of the level of agricultural development are mostly concentrated in the Central Plain and the Pembina Valley, while the most depressed regions are Eastern Manitoba and a large part of the Parkland. This implies that despite twenty years of regional

development policy in Agro-Manitoba, a significant degree of regional disparity still persists in the rural economy. As indicated in the previous section of this chapter, most governments have recognized that outmigration is the major problem of Agro-Manitoba which leads to the widening of regional disparity. Consequently, several programmes have been set up to handle the problem of outmigration so as to prevent further widening of the level of development among regions. Nevertheless, as the pattern of the development scores clearly attests, regional disparity remained a force to be reckoned with in 1981. This suggests that though both the federal and provincial governments have made efforts to deal with the outmigration problem, the lack of in-depth understanding of outmigration determinants is a major hindrance to the incorporation of more powerful or appropriate programmes for coping with this problem. Therefore, a full understanding of the forces underlying outmigration is in fact necessary to complement more effective government policy on regional development. To that end, this thesis attempts to investigate the determinants of outmigration in Agro-Manitoba by constructing a simultaneous-equations model expressly geared to unravelling them. As a point of departure, and the subject of the next chapter, the issue of migration modelling is addressed.

## CHAPTER 3

### REVIEW OF MIGRATION MODELLING STUDIES

The study of migration determinants within the realm of rural or intra-regional studies has long been a popular subject in the academic field. Despite the fact that approaches to the question of migration are highly diversified, most of these studies are largely based on the push-pull concept and the twin economic concepts of spatial equilibrium and spatial disequilibrium theories. The former push-pull concept suggests that migration is a resultant phenomenon of economic, social and environmental differentiation or imbalances of regional development between places. Migrants are pushed away from the unfavourable conditions prevalent in the places of origin or are attracted to destinations with more favourable conditions. The latter economic concept views migration as either a process which widens the economic gaps among regions or a process which narrows the regional gaps. Numerous empirical studies are theoretically grounded in either one or other of these two concepts. Multiple regression techniques are commonly employed in push-pull studies while simultaneous-equations techniques are largely used by those researchers favouring the spatial economic equilibrium or disequilibrium concepts.

In using the multiple regression technique, the researchers are provided with the means of identifying the major dimensions which affect migration. Meanwhile, many other researchers are focusing on how migration has affected the local economy and how the economy, in turn, has influenced the process of migration again. The primary focus of the latter researchers is to investigate the two-way interaction relationship of migration and regional economic growth. In the following sections, these two basic concepts concerning migration determinants and their related empirical studies will be reviewed so as to provide a clear picture of the past studies and to shed light on the present study.

### 3.1. The Conceptual Background of Migration Determinants

#### 3.1.1. The Push-Pull Concept

As early as the late 19th century, Ravenstein (1885, 1889) observed that people tend to travel towards the areas which look relatively attractive to them and to move from areas which are less attractive. Later in the early 1900s, Herberle (1938) identified two complementary forces that would encourage a person to move from one place to another; namely, the 'pull' forces and the 'push' forces. Owing to the 'discouraging' factors existing in the place where the person is now staying, he/she will be 'pushed' away from the place of origin. If another place seems to be better endowed, he/she

will be 'pulled' away from the place of origin to that other place. Herberle(1938) went on to argue that the varying intensity of migration is scarcely dependent on the variation in the strength of the push factors; it is rather decisively influenced by pull factors, such as the presence of industrial districts where high wages and more favourable living conditions can be found. Consequently, Herberle's ideas suggest that the 'pull' factors at the place of destination are in fact the dominant forces that determine migration.

Lee (1966), through incorporating the ideas of Ravenstein and Herberle, generated a theory of migration. He classifies the forces of migration into four major categories :

- 1) factors associated with the area of origin;
- 2) factors associated with area of destination;
- 3) intervening obstacles and
- 4) personal factors.

Lee's framework does not particularly place emphasis on the importance of the 'pull' factors at the place of destination; instead, he claims that migration is a result of comparison or differentiation of the factors or forces at origins with those at destination by the individual potential migrants. If the 'pull' factors at place of destination are strong enough, then the individuals will move to that destination. But if the 'pull' factors at place of destination are weak, then the individuals will stay in the place of origin and will not contemplate a move to the place of potential destination. The

same is held true for the 'push' factors. Furthermore, Lee(1966) suggests that a simple calculus : 'positives' for the 'push' and 'minuses' for the 'pull' factors cannot decide the act of migration. The balance in favour of the move must be enough to overcome the natural inertia such as distance or some other physical barriers (or political boundaries). Besides, different persons have different characteristics, such as sex, occupational, age, education background, intelligence and the like ; and so the same environmental factor may have varied implications to different persons. Thus, a high local property tax used to finance a good school system may be counted as a 'plus'-sign by a parent with young children; but it could be a 'minus' sign to the couples without any children. At the same time, the situation will be regarded with indifference by the individuals who are not subject to the property tax at all. In brief, Lee's idea seems to suggest that migration is not only a result of the 'push' and 'pull' forces, it is also a result of the cost imposed by migration and the social-economic status of the potential migrants.

Despite the fact that both Herberle(1938) and Lee(1966) have emphasized the 'pull' and 'push' forces in the individual's decision to migrate, they did not further identify the types of 'pull' and 'push' factors that are commonly affecting migration. In response to this, Bogue (1969) tries to list the situations at the place of destination and at the place of origin that may cause



migration. For the push factors, Bogue (1969) identified them as follows :

- 1) decline in a national resource or in the price paid for it; decreased demand for a particular product or the services of a particularly industry, exhaustion of mines, timber or agricultural resources;
- 2) loss of employment resulting from being discharged following a decline in the need for a particular activity or from mechanization or automation of tasks previously performed by more labour-intensive processes;
- 3) oppressive or repressive discriminatory treatment because of political, religious or ethnic origin or membership;
- 4) alienation from a country because one can no longer subscribe to prevailing beliefs, actions or mode of behaviour either within one's family or within the community;
- 5) retreat from a community because it offers few or no opportunities for personal development, employment or marriage;
- 6) retreat from a community because of catastrophe - floods, fire, drought, earthquake or epidemic.

At the same time, Bogue(1969) shows that the pull factors should be :

- 1) superior opportunities for employment in one's occupation or opportunities to enter a preferred occupation;
- 2) opportunities to earn a larger income;
- 3) opportunities to obtain desired specialized education, or training such as a college education;
- 4) preferable environment and living conditions- climate, housing, schools, other community facilities;
- 5) dependency-movements of other persons to whom one is related or betrothed, such as the movement of dependants with a bread-winner or migration of a bride to join her husband;
- 6) lure of new or different activities, environment or people, such as the cultural, intellectual or recreational activities of a large metropolis for rural and small-town residents.

Bogue(1969) suggests that the poor economic conditions that stem from lack of employment opportunities in the primary or agricultural sector, along with the social-cultural factors associated with ethnicity and religion, marriage, and the environmental conditions like natural hazards are the major

forces in pushing people out of a region. At the same time, the prosperous economic conditions deriving from better employment opportunities and higher income; together with more favourable social, and environmental conditions like the availability of high education opportunities, housing and recreational facilities are the major forces in attracting people to a destination. In brief, Bogue expressly claims that the economic, social, and environmental forces at both the places of origin and destination are in fact the major forces determining the movement of people from one region to another.

To conclude, primarily, people tend to move towards areas where they can improve their economic status; where the unemployed individuals can obtain a job or where the employed can be hired for a job with higher income than that at the place of origin. They may also move to areas where the amenities fit them most, such as a 'pleasant' climate and abundant recreational opportunities; and where there exists a variety of professionals and services of the kind found in many large agglomerations and which are not available in their original residing areas. Nevertheless, costs entailed in moving must also be directly taken into account. Despite the push-pull theory's elegant abstraction of the specific forces generating migration, a number of researchers, such as Thomas(1954), inter alia, have criticized it as an oversimplification of a highly complex process. This oversimplification of migration process implies a lack of in-

depth conceptual understanding of the migration determinants. As a matter of fact, the migration process is not only an end in itself, it is also a major force in affecting regional economic growth and these changes in local economic conditions will in turn affect migration again. That is to say, the push-pull concept only specifies different economic, social and environmental explanations for migration, but it fails to account for the effect of migration itself. In response to the oversimplification of the push-pull concept on the process of migration, the economic concepts which viewed migration as an equilibrium or disequilibrium process have been employed by many researchers as the basic concepts for the more recent migration determinant studies, and it is to them that we now turn.

### 3.1.2. The Concept of Traditional Equilibrium

According to traditional equilibrium theory, migration is a convergence of spatial equilibrium in terms of regional output and, as such, operates very much like wages. Convergence is defined as the process in which the net effect of locational shifts combined with differential regional growth may reduce regional inequalities in economic output and welfare ( or inequalities in regional development) (Schwind, 1971). Spatial equilibrium is then defined as the condition in which no single firm or household is able to shift its location without reducing the output of the whole economic

system (Friedmann, 1966). This is the situation in which a firm or a household has maximized its profits or satisfaction so that any mobility will be unnecessary or costly.

One common approach which considers migration as a convergence process is the factor-price adjustment mechanism or mobility concept.<sup>5</sup> This suggests that free mobility of factors of production between different regions tend to equalize the prices of productive services (like wages) in different regions under the following assumptions<sup>6</sup>:

- 1) workers are presumably homogeneous in educational background, skill training, personal ability and hence efficiency, ages and the like;
- 2) the market is subject to perfect competition in which oligopoly (in which the market is controlled by a few firms) or pure monopoly (the state in which the market is controlled by one firm) are absent;
- 3) there is full employment;
- 4) the technology used is operating at constant returns to scale;

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<sup>5</sup>The other approaches include the spatial price theory and the general locational theory. For details, see Richardson (1973).

<sup>6</sup>The factors of production refer to land, capital, labour and technology. In this chapter, they generally refer to labour and capital.

5) the psychic, information and transportation costs are assumed negligible (Borts and Stein, 1964; Richardson, 1973).

In fact, the concept of factor-price mobility adapts theorems developed in international trade theory to an inter-regional context (Richardson, 1969). Mundell (1957) showed that in a situation where factor mobility was perfect but commodity mobility was not, and given inequality in factor prices between countries, then factors would move in such a way as to equalize factor prices, eliminating factor movement and equalizing commodity prices. Samuelson (1949), on the other hand, showed that in the case of two goods and two factors, factor-price equalization would result from trade in the absence of factor movements by establishing a unique relationship between factor and commodity prices. Mundell (1957) and Samuelson (1949) both suggest that under the specific circumstances of either commodity trade in the absence of factor mobility or factor mobility in the absence of commodity trade, the outcome will be convergence of regional factor prices of comparable inputs.

As far as migration (as the mobility of the labour factor of production) is concerned, Borts and Stein (1964) further explain how the perfect mobility of factors of production can achieve equalization in prices of production among regions. They applied the equilibrium concept to show that those regions with the highest proportion of capital to labour will

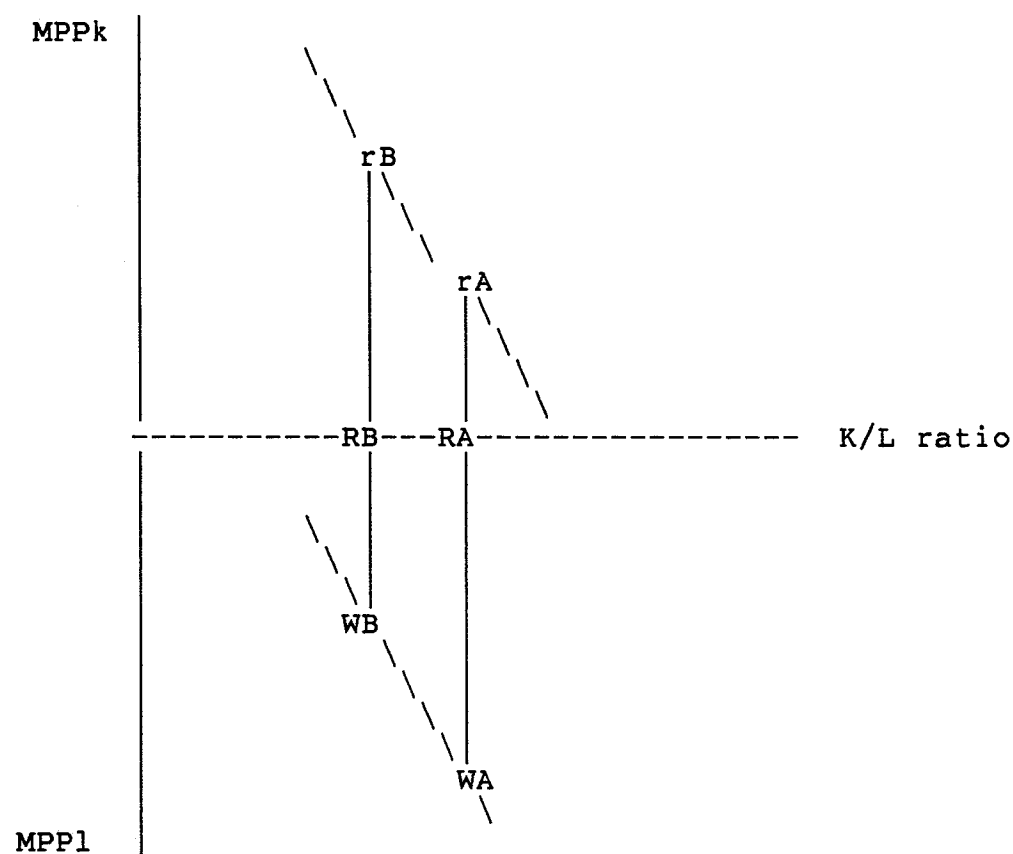
evinced the highest real wage and the lowest marginal product of capital such that, in a free market, capital will move from high-wage to low-wage areas. Consequently, the low-wage areas experience higher ratios both of growth of capital and of the return to labour. And, if the regional wage differentials are large enough initially, labour will migrate from the low-wage to the high-wage areas. This migration will yield the same equilibrating effect on the return to capital and labour, although the effects on the growth of output in each region will appear somewhat different.

In Figure 6, Borts and Stein (1964) demonstrate that factor flows among regions may lead to convergence through the mechanism that marginal physical product of capital,  $MPP_k$ , falls and the marginal physical product of labour,  $MPP_l$ , rises with a rise in the capital/labour,  $K/L$ , ratio.

The  $MPP_k$  is negatively sloped; so as the  $K/L$  ratio increases,  $MPP_k$  falls. On the other hand, the  $MPP_l$  is positively sloped; so that  $MPP_l$  increases as the  $K/L$  ratio rises. Because of perfect competition, the  $MPP_l$  equals the real wage (measured in units of physical output). As each region produces a homogeneous output with an identical production function, the region with the higher  $K/L$  (Region A or RA) has the higher real wage  $W_A$  and the lower  $MPP_k$ , that is,  $r_A$ . Conversely, region B, which has a lower  $K/L$  ratio  $R_B$ , has the lower real wage  $W_B$  but the higher  $MPP_k$ . Thus, this mechanism predicts that capital will flow from high to low-

wage regions, since the latter offer higher returns to capital, while labour will tend to flow from low-wage areas to high-wage areas. Therefore, low-wage, low-income regions should experience the higher growth rate of capital and the greater increases in wages.

Figure 6 : Convergence of the K/L ratio  
Differentials



source : Borts and Stein (1964)



Eventually, when equilibrium is reached, there would be no differentials in the returns of labour ( $W$ ) and capital ( $r$ ) between the two regions, RA and RB; such that the MPP<sub>k</sub> curve and MPP<sub>l</sub> would be horizontal. Thus, Borts and Stein have inserted the  $K/L$  ratio into the factor mobility adjustment process. Yet, if the focus is on the effects of migration on labour markets, then the result of the migration process is the same, albeit as a result of different causes. In this case, labour is usually assumed to be a mobile factor and it is responsive to wage differentials among regions. Therefore, labour will migrate from the low-wage region to the high-wage region. As a consequence, outmigration from the low-wage region will put upward pressure on wages in the high-wage region; while immigration to the high-wage region places downward pressure on wages until wage equalization occurs.

### 3.1.3. The Concept of Disequilibrium

In disequilibrium theory, migration is considered to be a divergence process which results in spatial disequilibrium in terms of regional output measured through wages, employment opportunities and other social or environmental amenities. Divergence is defined as the process in which the net effect of locational shifts combined with differential regional growth may increase regional inequalities in economic output and welfare (Schwind, 1971). The spatial disequilibrium is

then defined as the condition in which regional development levels are unequal and firms or household locational shifts increase the aggregate as well as individual output and/or welfare (Schwind, 1971). As a matter of fact, this is the situation in which a firm or a household may migrate to seek better opportunities elsewhere so that they can maximize their own advantages. The concept of disequilibrium is composed of a number of various approaches of regional development concepts. These different approaches include Myrdal's (1957) cumulative causation principle, Hirschman's (1958) polarization concept, Friedmann's (1966, 1969) core-periphery theory as well as Borts and Stein's (1964) general comments that follow from the relaxing of some of the basic assumptions of traditional equilibrium theory.

#### 3.1.3.1. The Principle of Cumulative Causation

Using his cumulative causation principle of growth, Myrdal (1957) suggests that migration should be deemed and handled as a disequilibrium process. According to this principle, 'the play of forces in the market normally tends to increase, rather than to decrease the inequalities between region' (Myrdal, 1957). Underdevelopment tends to reinforce itself and thus intensify further regional stagnation. The places with the advantage of past economic prosperity and growth are likely to be the places of future expansion. As Myrdal (1957, p.13) suggests, 'in the normal case a change does not call

forth contradicting forces, but instead, supporting changes, which move the system in the same direction but much further'. That is, a build-up of activities may have started originally because the agglomeration regions had a competitive advantage derived from an exceptional resource endowment or good facilities (such as mineral resources or a port). Growth has become self-sustaining because of ever-increasing internal and external economies in the region. Internally, the already expanding economy will expand at ever accelerating rates. Externally, it is likely that 'new increments of activity and growth will tend to be concentrated in the already-expanding regions because of the derived advantages' (Keeble, 1967, p.258). In this way, growth in these agglomeration regions will become self-perpetuating. Conversely, the backward regions fail to attract new industries because their advantages, perhaps cheap labour, do not exert sufficient attractive forces to outweigh those external economies found at the centre of agglomeration. For this reason, the lagging regions then fail to attract lines of development that generate self-sustaining growth. Their growth has to be dependent on that diffused by the expansion effects in the prosperous regions.

According to Myrdal, these induced effects can be classified into two categories : the spread effects and the backwash effects. Spread effects refer to the favourable impacts of growth in the lagging regions. The region around a nodal centre of expansion tends to gain from increasing

outlets of agricultural products and may feel the benefits of stimuli to technical advance. Raw material sources in quite distant regions may also benefit, even to the extent of permitting the growth of consumer goods industries in those areas. Backwash effects refer to the unfavourable impacts of growth including the draining away of well-qualified personnel and capital from the lagging regions. Nevertheless, existence of counter-balance forces of spread and backwash effects do not imply an equilibrating process in regional growth. On the contrary, the benefits will normally be outweighed by adverse backwash effects. Even the special case where the two effects balance each other is not a stable equilibrium and only a temporary one since any change in forces will generate a cumulative upward or downward movement (Myrdal, 1957). Lankford (1972, p.16) demonstrated the principle of cumulative causation by a simple illustration of a small city relying for employment mainly on one plant:

Given an external 'shock' such as change in technology, shift in national demand, or even an act such as a major fire, the plant closes. The forces of a negative circular-cumulative process begins. Significantly increased unemployment leads to decreased local demand. The slack in local retail markets leads to more unemployment and lower incomes. As the process continues, other local business collapse. Workers migrate to areas with better employment market conditions with a corresponding unfavourable shift in age structure for the city. If the market forces continue unhampered, the circular cumulation process will continue downward unless other external 'shocks' reverse the process. If allowed to continue the forces normally lead to greater inequality among regions.

Migration has been considered a major divergent process in accelerating the negative cumulative causation effects. Under the principles of cumulative causation, capital and labour flow into the developed centres, and trade advantages accrue to this growing region as it develops at the expense of other regions. The migration process draws young workers from the more underdeveloped areas, leaving them with a population typified by poor age distribution structure. Capital, too, moves to the more developed regions because the demand for new investment in a growing region will exceed available supply and the very favourable rate of return will draw upon the capital of other regions. As a result of increased capital investment, the income of the developed regions increases. This increased income will generate more savings for additional investments, but the increasing demand for capital will always outstrip supply (Myrdal. 1957). As the region develops, comparative trade advantages will accrue to the region; regional industries become more efficient, and regional markets expand.

But, migration may have harmful repercussions on the age distribution of the population in the depressed regions; the capital market will deflect savings from poor regions where the effective demand for capital is low to the prosperous regions where returns on capital are high and less risky; free trade favours the highly developed industrial regions, and the trade patterns of poorer regions are distorted to benefit the rich and to prevent industrialization. Perhaps more

importantly, economic backwardness results in non-economic influences harmful to growth - low levels of education, lack of aspiration and other social attitudes incompatible with high rates of economic development and conducive to deterioration in social capital. In sum, migration is a negative cumulative process in that it drains the depressed regions of their crucial elements for production (capital and labour) and pre-emptes markets for local secondary and tertiary sectors. Hence, Myrdal's views of cumulative causation on migration have been summarized to mean only growing inequality among regions. Migration, then, is a disequilibrating and has the divergent effect on regional development in accelerating gaps among regions.

### 3.1.3.2. The Concept of Polarization Effects

Hirschman (1958) in his concept of polarization effects suggests that migration is a disequilibrating process that leads to spatial disequilibrium. The term 'polarization effects' is similar to Myrdal's backwash effects used in his principle of cumulative causation. It means the unfavourable impacts of growth in the lagging regions since growth tends to polarize in the advanced regions and at the expense of the lagged regions. As Hirschman (1958, p.186) suggests, 'once growth takes a firm hold in one part of the national territory, it obviously sets in motion certain forces that act on the remaining parts'. These advanced regions are usually

associated with abundant infrastructure, and scale and agglomeration economies. In this way, growth in advanced regions become self-perpetuating. It is responsible, however, for a number of harmful effects on the lagging regions. First of all, local industries in the lagging region may become depressed by the considerably more competitive industries in the advanced regions. Hence, the less-efficient and high-cost producers in the lagging region will have their market areas severely curtailed, if not eliminated, by the large-scale regional producers located in the growth point. Most seriously of all, according to Hirschman, migration, which is a consequence of large regional differences resulting from polarization effects, is likely to drain away the most qualified labour force which is vital for further regional development. Thus, it is obvious that under the effects of polarization in the advanced regions, the lagging regions will lack self-sustaining growth capability. What little growth occurs in these regions is mainly the result of a force known as 'trickling down effects'. This force is equivalent to Myrdal's (1957) 'spread effects'; namely, the favourable impacts of growth in the lagging regions. The trickling down effects may take the form of purchases by the growth region of inputs supplied from the lagging region, or of the supply of investment from the growth region to the lagging region, or even of the absorption of the lagging region by the growth region. In sum, the advantages in the developed region are so evident that they will partially 'spill over' or 'trickle

down' to the benefit of the lagging region.

Under this concept of polarization, Hirschman then suggests that migration is a process that reinforces the polarization effects which lead to greater disparity among regions and is undesirable from the regional point of view. By using the Northern U.S. to represent the growth region and the Southern U.S. as the declining region, Hirschman observed that the polarization effects are dominant in the flow of migrants between the two regions. Instead of absorbing the unemployed, Northern progress may denude the Southern region of its key technicians and managers. Thus the first shock to the South will be the loss of highly - qualified people to the North; the continued process will then lead to the situation that whatever little capital the South generates, is subsequently lost to it as investors opt to locate their assets in the North and so follow the trail blazed by skilful Southern migrant labour.

#### 3.1.3.3. The Core-Periphery Concept

In his core-periphery theory, Friedmann (1969) considers migration to be a process of divergence since migration tends to reinforce the dominance of the core regions while denuding the periphery of its human resources. According to Friedmann (1969), the core region contain the major centres of innovation change or, more specifically, they are the 'territorially organised subsystem of society which have a



high capacity for generating and absorbing innovative change, while the periphery region is the subsystem whose development path is determined chiefly by core-region institutions with respect to which they stand in a relation of substantial dependency' (p.93). In this core-periphery concept, it is suggested that, in effect, the 'core-periphery' relationship is a 'colonial' system in which the periphery's main role is to serve the core region's economic, social and political interests. The key to the development of such a core-periphery relationship is a series of innovations which occurs in certain points of the spatial system at certain periods of time.<sup>7</sup> These series of elementary innovations then become organised into innovative clusters and finally into large-scale systems of innovations. Individual innovations may be technical or institutional in nature. The latter may be usefully subsumed under the customary categories of social, economic, political and cultural (Friedmann, 1969). They will accord to the core a status of dominance over the periphery through six processes : the dominance effect, information effect, psychological effect, modernization effect, linkage effect and production effect. The first refers to steady weakening of the peripheral economy by a net transfer of natural, human, and capital resources to the core. The information effect is the increase in potential interaction

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<sup>7</sup> A spatial system is a territorially-organised social system or a communication field in which the probability of information exchange may vary from 0 to 100, forming a spatial frequency distribution (Friedmann, 1969).

within a given core region resulting from its own growth in population, production and income. Among other things, this effect will tend to induce a higher rate of innovations. The psychological effect is the creation of conditions favourable to continued innovations at the core, such as rendering the opportunities for innovations more visible, reducing the risks of innovations through imitation, and creating expectations for further innovations. The modernization effect is the transformation of existing social values, behaviour, and institutions in the direction of greater acceptance of rapid cumulative change through innovations. The linkage effect is the tendency of innovations to breed other innovations by creating new service demands as well as new markets for the services the core region is itself able to supply to other areas. The production effect is the creation of an attractive reward structure for innovative activity operating through the exploitation by innovators of their temporary monopoly position, the appearance of linked systems of innovations, and growing specialization. All these will tend to increase economic returns, while increasing external economies to scale and urbanization economies (for instance, greater efficiency in the use of social overhead capital) will tend to reduce the cost of innovations. In sum, these cumulative effects or process of successive innovations conspire 'to transform the established structure of society by attracting creative or innovative personalities into the enclaves of accelerated change; by encouraging the formation of new values, attitudes,

and behaviour traits consistent with the innovations; by fomenting a social environment favourable to innovative activity; and by bringing into existence yet further innovations' (Friedmann, 1969, p.87).

Indeed, these cumulative effects of innovations are very similar to the outcomes posited by Myrdal's cumulative causation and Hirschman's polarization concepts in that they all stress the highly concentrated nature of growth in certain regions. However, in Friedmann's (1969) core-periphery concept, the role of innovations in the path of growth is emphasized. Like Myrdal (1957) and Hirschman (1958), Friedmann's core - periphery theory implies that while the core (the more advanced region) can generate self-sustaining growth with these cumulative effects of innovations, the periphery (the lagging region) can only have induced growth which originates from the core. Friedmann then suggests that the counter-flow of information from the core towards the periphery is the major impetus of growth in the lagging regions. As Friedmann (1969, p.95) states, 'sustained contact with the core region will tend to arouse portions of the peripheral population, not only to possibly new ways of life, but also to their own comparative disadvantages in gaining access to them'. Nevertheless, these awakenings of the peripheral population can only lead to a policy of limited decentralization of economic activities like the build up in the periphery of new subsidiary plants. Overall, the dominance of the core region will still persist, but to a lesser degree.

Migration is regarded, under the terms of the core-periphery concept, to be a process reinforcing the dominance of the core while depriving the periphery of its valuable resources for growth. Friedmann (1966) suggests that it is generally the case that the most productive members of the labour force migrate in response to greater factor returns (wages) elsewhere. As a result, the lagging regions are left with unproductive labour which possesses very limited innovative personality traits. Furthermore, in response to the traditional equilibrium tenet that the rate of return (wages) should rise in areas of outmigration and decline in the more advanced regions, Friedmann goes on to suggest that migration is incapable of putting a downward pressure on the wage rates in the more advanced regions. He maintains that wage rates tend to rise more rapidly in the high-wage target areas of migration. As a consequence, these target regions also receive the bulk of investment arising from the rapid increase in wage rates. This continued phenomenon of high rates of capital or investment growth appears to have more influence on the structure of wage rates than the process of labour transfer. Hence Friedmann (1966) concluded that 'where investment opportunities tend to be consistently overvalued for the urban regions (the core), this tendency of wage rates to respond to capital flows contributes to a gradual divergence in the average returns to labour (rate of wages) between the centre of national development (the core) and its periphery' (p.33).

All told, Myrdal , Hirschman and Friedmann together lend their support to the disequilibrium view of the migration process through their regional growth theories. Moreover, Borts and Stein, the formulators of a factor-price adjustment model based on equilibrium outcomes, also unintentionally support the disequilibrium theory by vigorously attacking the unrealistic assumption of labour force homogeneity in the traditional equilibrium theory and by putting the migration process in a more realistic setting. They argue that migration is a process which may lead to wage or employment divergence among regions on the grounds that labour is heterogeneous rather than homogeneous. It is generally the case that the low-wage rural zones are the regions where labour supply grows faster as a result of higher birth rates. This internal growth of labour supply prevents a rise in the ratio of capital to labour, and therein prevents wage rises. Furthermore, the two authors suggest that if labour which migrates out of the low-wage region is relatively well endowed with human capital compared to that remaining behind, the marginal product schedule (productivity of labour) of the remaining workers could shrink owing to the loss of a complementary input of productive labour. This consequence would be especially likely if the migrants were members of the entrepreneur class. Outmigration from the low-wage region, therefore, can be expected to result in decreased employment. In putting the process into a more realistic setting, Borts and Stein (1964) then suggest that migration is a contributor

to divergence in wages as well as employment among regions.

Despite the fact that great controversy exists between the equilibrium and disequilibrium concepts concerning the migration process, they are more appropriate approaches than the push-pull model in the study of the determinants of migration. First of all, both theories suggest that migration is a result of differential endowment existing among regions, be they economic (e.g. resource base endowments such as mining and forestry) or noneconomic (e.g. innovative advantages). Thus, the push-pull theory which suggests that migration is a result of economic, social or environmental forces, can be easily incorporated into any equilibrium or disequilibrium theory. More importantly, the essence of equilibrium and disequilibrium theory allows for the cause-and-effect of the migration process to be fully incorporated into the model. Both theories have pinpointed the fact that migration is not an end in itself; it has great impact on regional economic growth in terms of wages and employment opportunities, which are supposed to be the crucial elements in affecting the migration process itself. In brief, both theories imply that there is mutual interaction between migration and regional growth. If the real mechanism underlying migration is to be understood, the two-way interaction relationship ought to be examined.

In the following section, the empirical studies which are based on either the push-pull concept or equilibrium and

disequilibrium theories will be discussed so as to give a more profound understanding of the working of the determinants of migration in the regions of advanced-industrial countries as well as to shed light on the designing of the specific model of outmigration determinants for Agro-Manitoba.

### 3.2. Empirical Studies of Migration Determinants

#### 3.2.1. Defining the Spatial Scope of Review

Empirical studies of migration determinants have been characterized by the diversity of scales concerning the study units. These studies cover different levels of administrative regions or natural regions, from country to country, or from city to city, or from rural to urban dimensions. As far as the scope of this thesis is concerned, only those studies of small regional units such as counties are considered relevant and will be reviewed. It is important to define the study unit because the same migration determinant might have contradictory effects upon small and large areas. Schwind (1971) suggests that smaller areal units such as counties may, as a consequence of migration, exhibit a trend towards income divergence while larger units such as states and major census regions may experience a trend towards convergence. For instance, the income variable is an important determinant of migration; however, it might have a negative relationship with the rate of outmigration at the county level while displaying

positive relationship at the state level. In evaluating the effects of various socio-economic and spatial determinants of migration on Tyneside, England, between 1961 and 1966, Willis (1972) found that occupational structure was the principal determinant of migration flows, but whether it bore a positive or negative relationship depended on whether the direction of the flow is inter-(among) or intra-(within) regions. It was found that the proportion of specific occupation to regional employment was positively associated with gross in- and outmigration, but negatively related to the magnitude of intraregional migration. Put otherwise, to define the level of spatial aggregation in migration analysis is very important because the relative significance and direction of the independent variables (determinants) of migration are contingent on the size of the study units. Furthermore, since this thesis is particularly interested in the outmigration situation among the rural municipalities of Agro-Manitoba, those migration studies utilising equivalent units are singled out for review.

### 3.2.2. Empirical Studies of the Push-Pull Concept

#### 3.2.2.1. Empirical Verification

In a push-pull framework, Kariel (1963) suggests that migration is the result of socio-economic imbalances among areas. He applied multiple regression analysis to the



migration model based on 572 counties in 48 states of the U.S.A., for the period of 1950-1960. The dependent variable is 'positive net migration rate' ; the independent variables are : 'change in family income', 'proportion of professional, technical and kindred workers', and 'size of the employed civilian labour force'. The primary results of such an overall and non-stratified regression showed that these four variables could only explain 47% of the positive net-migration rate and all were positively related to the dependent variable. Yet, examination of the regression coefficients indicated that only two had statistical significance ; namely, the 'size of the employed civilian labour force' ( $b=0.68$ ) and 'change in the number of employers in manufacturing' ( $b=0.0001$ ). Kariel then stratified the counties into two groups on the basis of recordings above or below the mean winter temperature of  $7.22^{\circ}\text{C}$ . The multiple regression results showed that the explanatory power of the independent variables were raised to 79% for the warmer region. With those findings, Kariel concludes that the amounts of population growth due to net migration of an area appears to be more closely related to economic than to non-economic factors. However, he also suggests that the climatic variable also plays a significant role in affecting migration.

In response to Kariel's study, Tarver et al. (1965) also assert that the economic factors rather than non-economic factors are more vital in determining migration rates at the county level. In examining determinants of the net migration

rates for the 3091 counties in the U.S. in the same period as Kariel's study, Tarver et al. found that the independent variables of their multiple regression model accounted for about 30% explanatory power. Five out of their seven independent variables explained an appreciable amount of the variability of the rates of net mobility; that is to say: 'census division' (dummy variable), '% of population nonwhite' ( $b=0.15$ ), 'median family income' ( $b=0.006$ ), '% of population under 20 years of age' ( $b=1.09$ ) and '% of employment in construction' ( $b=2.15$ ). The other two variables; namely, the 'median years of school completed' and '% of population completing four or five years of high school', were statistically insignificant. Among the five significant variables, the employment variable, '% employment in construction', was by far the most important in explaining the variation and was positively related to net migration. Tarver et al. reasoned that this finding complies with the fact that large capital investment in industrial and residential structures and proportional large numbers of construction workers are concentrated in the counties with rapid growing populations.

Rutman (1970) focused on 55 counties in West Virginia for the same period of 1950-1960. He reaffirms the findings of Kariel (1963) and Tarver et al. (1965) that economic factors are dominant in accounting for migration. The independent variables of his multiple regression model are : 'increase in number of 18-year olds', 'net change in mining employment',

'net change in manufacturing employment' and 'net change in service employment'. They explained 99% of the variance of the net migration rate. Consistent with the findings of Tarver et al. and Kariel, the employment variables, particularly the variable, 'change in construction employment' ( $b=4.15$ ), are found to be the most 'influential' variables in affecting net migration rate.

Another interesting study, the one by Willis mentioned above, also reaffirmed the findings of the aforementioned researchers. He used a higher-power technique to examine the determinants of 'internal migration rate' (or net migration rate) for the local authorities' areas of Tyneside, England, in 1961-1966. By employing stepwise techniques, Willis (1972) distinguished three dimensions that would have contributed to net migration rate, that is, the economic, social and spatial structural variables.<sup>8</sup> The results indicated that the economic and social dimensions were more statistically-significant than the spatial-structural dimension (e.g. size, shape and form of the local authorities) in terms of explanatory power to net migration rate. Among the significant economic and social variables, 'occupation index' was found to be the most significant : it alone accounted for 55.8% of the explanatory power of the variation

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<sup>8</sup> Stepwise regression is a sequential approach to multiple regression. Variables are either entered - forward stepping - or removed - backward stepping - one at a time depending on the effects of a particular variable or for identifying multicollinearity.

in net migration rate. Moreover, it was positively related ( $b=5.49$ ) to net migration.

As far as these empirical studies are concerned, attention is mainly focused on the total population of the regions. However, other studies have focused on certain segments of the population. These studies include those of Stinner et al. (1969) and Shin (1979) which concentrate on the black population in the U.S. In a study of the migration determinants of the black populace in 150 southern counties of the eight Southern States of the U.S.A. in 1950-1960, Stinner et al. categorized the determinants of black net migration into several dimensions : economic activity and urbanization, white traditionalists, non-white poverty and non-white home ownership. The black population was also divided, in this case into four age groups : 25-34, 35-44, 45-54 and 55-64 years. The explanatory power of the dimension varied among these age groups and ranged from 22% to 66%. The explanatory power, in general, was greater in respect of younger age groups than their older counterparts. Not all variables were persistently significant for all age groups. Indeed, only the variable 'absolute change in non-primary industry' happened to be statistically-significant across all age groups; although it had the highest coefficient value (0.61) for the age group between 25-34 years. At the same time, the 'non-white overcrowding' and 'non-white poverty' dimensions were consistently statistically insignificant.

Another county-level study of 'black' migration was performed by Shin (1979). The research covered 405 selected counties of the deep South of the U.S.A. for the 1960-1970 period. The model consisted of four dimensions (economic, social, cultural, demographic) for explaining the net migration rate. The aggregate explanatory power of the multiple regression accounted for 52% of the variance of the black net migration rate. Several variables were significant. The 'personal income' variable (with  $b=3.15$ ), had the greatest effect upon the migration rate; it was followed by '% of the labour force in agriculture' ( $b=-0.28$ ), '% of black population' ( $b=-0.21$ ), '% urbanization' ( $b=-0.18$ ), '% of labour force in manufacturing' ( $b=-0.14$ ) and '% white collar workers' ( $b=0.14$ ). Like the aforementioned studies, Shin again confirmed the fact that economic variables are playing the leading role in effecting migration. Nevertheless, his study is different from the others in that its findings indicate that employment opportunity is no longer the most important variable affecting net migration rate; rather, the income variable has become the most important variable.

Hitherto, we have reviewed cross-sectional studies for the period between 1950-1970. The findings of these studies are generally consistent with each other, that is to say, the economic variables, particularly employment opportunities (except for the study of Shin), are playing the leading role in determining migration. Discussion of the longitudinal push-pull studies which covers the more recent period, the

1970s, is now addressed. Heaton et al. (1981) aimed at discerning the determinants of net migration rates for the counties of the U.S.A. over the three time periods of 1950-1960, 1960-1970, and 1970-1975. They began by stratifying the population into two groups: those aged under 65 years and those of 65 and over. They found that the five dimensions of 'economic', 'urbanization', 'amenities', 'income' and 'environmental amenity' accounted for from 27.6% to 52.4% of explanatory power of the variance for the net migration rate of the 'younger' population for the three time periods. At the same time, these dimensions accounted for between 29.7% and 37.4% of the explanatory power of variance for the net migration rate of the older population. It is also noted that, in time, the explanatory power of the economic determinants diminished for the 'younger' sector of the population. The economic forces as represented by the traditional economic base (proportion of labour force in agriculture, services, and manufacturing industry) and median family income, were by far the most influential determinants for the 1950s, but less so in the 1970s. In contrast, recreational development and, to a lesser extent, mild temperature, emerged as important determinants of population growth through migration. But in respect to the 'older' population, only in the period of the 1960s was there a significant decline in the negative effects of traditional economic base (especially agricultural) variables. Meanwhile, the effects of pure amenity variables as well as environmental

amenity variables were relatively stable across the other two decades. Overall, it can be asserted that for both the younger and older population, there was a relative decline in the importance of economic variables while, at the same time, the amenity variables were becoming increasingly important in the course of time, especially for the younger population.

Another study parallel to Heaton et al. was done by Murdock et al. (1984). They examined the relative effects of a set of economic variables, such as demographic, public services and governmental, on age-specific net migration rates for Texas counties for the two periods of time of 1960-1970 and 1970-1980. The model could explain from 32% to 55% of the variance of different age groups for the period of 1960-1970. For this period, the results showed that economic variables seemed to be relatively dominant in their influences upon migration. The deletion of economic variables caused the largest drops in  $R^2$  value for all age groups except for the 40-49 years-old group and the 70 or over years-old group. However, deletion of the demographic variables led to the largest  $R^2$  value changes for the 40-49 age group whereas the deletion of the socio-economic variables had the largest  $R^2$  value changes for the 70 years and over group. The service determinants were the least powerful predictors for net migration of all age groups. The 'power' of the model for the period of 1970-1980 slightly improved over that pertaining to the earlier decade. For the later period, the aggregate model explanatory power ranged from 34% to 61% of the variances of

net migration for the same age group. But, the economic variables were only most powerful in predicting the migrants for the age groups over 40 years old. For their part, socio-economic variables were most powerful for the younger categories, that is, for the groups of ages 10-19 and 20-29 years. The demographic variables provided the best predictors for the age group of 30-39 years. Generally speaking, then, the importance of economic variables had given way before the non-economic variables in the more recent period of time.

It is quite interesting to note from these longitudinal studies that, in the period prior to 1970, the economic variables are the dominant factors in explaining migration in the rural areas. These findings are consistent with the many cross-sectional studies of the same period. However, both longitudinal studies considered here have explicitly conveyed the fact that, despite remaining dominant, economic variables have been progressively eclipsed by other factors in accounting for rural migration. Put otherwise, social, environmental and quality-of-life variables are increasing in importance in explaining the phenomenon of migration.

#### 3.2.2.2. The Implication for Regional Development

All these studies based on the push-pull concept seem to confirm the thinking that prior to the 1970s people in the rural areas migrated mainly because of economic reasons, largely to seek better employment opportunities elsewhere and,



secondarily, to seek higher income. Since the 1970s, however, quality-of-life has emerged as a major consideration. As Shaw (1975, p.101) suggests, 'it may be that as an economy progresses towards an urban-industrialized state, the role of pecuniary considerations ... declines in importance as (a) motive (s) to migrate'. In other words, as a result of increasing urbanization and industrialization, the standard of living will increase with a rising number of 'floating population' which can settle where it pleases and which can act upon its desires (Morrison and Wheeler, 1976). The actions of this 'floating population' in searching for better quality-of-life is evident in the 'migration turnaround' phenomenon in the 1970s.

'Migration turnaround' is commonly used to refer to the process where nonmetropolitan areas cease being losers of population through net migration and become gainers (Poston and Coleman, 1983). This phenomenon was initially recognized by Beale (1975) whose study shows that those nonmetropolitan counties growing the fastest between 1970-1973 were the more rural counties located at some distance from metropolitan centres. A year later, the 1970-1974 data confirmed these findings and Beale (1976) further noted that many of the growing nonmetropolitan counties were experiencing heavy net immigration of people at retirement age. The U.S. Bureau of the Census of 1980 shows that between 1970 and 1978, the average annual change rate due to net migration for the nonmetropolitan areas was more than 900% greater than that for

the metropolitan areas (0.61 versus 0.06% per year respectively) (Poston and Coleman, 1983). In Canada, too, the period 1971-1976 displayed the startling new demographic phenomenon of the nonmetropolitan spurt in population (Todd, 1980). Reverting to the U.S. situation, Litcher and Fuguitt (1982) found that about two-thirds of the nonmetropolitan counties experienced more rapid rural than urban growth rates during the 1970-1975 period. During the 1950s, this was true of only about one-quarter of the nonmetropolitan counties. Poston and Coleman (1983) also indicate that of the 1,896 counties and county-equivalents in the U.S. that lost population through net migration between 1960-1970, no less than 1,073 experienced 'turnaround' between 1970 and 1978 and gained population through net migration. Most strikingly, Ritcher (1985) found that rural areas accounted for over 80% of aggregate U.S. nonmetropolitan population change in the 1970-1980 decade.

A variety of explanations have been advanced to account for this 'rural renaissance'. To date, research evidence exists to suggest that each of the following is at least partially involved in the new migration patterns : employment growth resulting from industrial decentralization; super-suburbanization or exurbanization with transportation improvement; the movement of urban elderly to rural retirement areas; the development of rural recreational areas and industries; growth in opportunities for higher education in nonmetropolitan areas; changing residential preferences and

especially preferences for amenities located in remote rural areas, and growth associated with extractive industries (William and Sofranko, 1979). All these forces have been summarized by Todd (1980) such that the waning of the age of metropolitan dominance (age of migration turnaround) has been attributed, on the one hand, to structural changes in the economy and, on the other, to the final realization of people's preferences for small-town (rural) life styles.

To sum up, all of the above suggested, on the one hand, that people movement from the metropolitan areas to the rural areas is a result of rural attractions deriving from increasing urbanization and industrialization. On the other hand, it is equally a result of the rising of living standards and, therefore, the increasing preference for quality-of-life improvements by the increasing number of 'floating population' in the metropolitan areas. With such a background, therefore, Zelinsky (1977, p.176) suggests that 'the economic-cum-metropolitan sprawl explanatory strategy collapses when we confront those hundreds of remote, thinly settled, and emphatically bucolic counties for whose recent demographic resurgence there is no half-way plausible economic rationale'. Consequently, it is also no surprise to see that emphasis on quality-of-life, as opposed to more strictly economic consideration, seems to be assuming increasing importance as a motivation both in the decision to move and in the choice of destination for the metropolitan or urban migrants (Goldstein, 1976). Putting all these components into a rural context

requires the reverse notion that as the rural or nonmetropolitan areas become more urbanized or industrialized with higher living standards, then the preference for upgraded quality-of-life will be heightened as a factor accounting for people's decisions to migrate.

These considerations are of great importance in so far as the regional development of Agro-Manitoba is concerned. As indicated in Chapter 2, both the provincial and federal governments have evinced great interest in formulating programmes to cope with the problem of outmigration which is believed to be a major component in inducing regional disparity. Most of these programmes are economic-oriented and include the resources (mainly the land and water) development, together with secondary and tertiary sector schemes. In the past few decades, the main effort of governments has been put into the stimulation of economic growth in order to counter the problems of outmigration and regional disparity. They have been less concerned with the social or quality-of-life indicators of development. However, if empirical studies are to be believed, these are precisely the issues which should be addressed in regional development programmes.

### 3.2.3. Empirical Verification of the Equilibrium/Disequilibrium theories

Since the late 1960s, many researchers have employed equilibrium/ disequilibrium concepts which are grounded in the

interaction effects between outmigration and regional economic growth so as to examine the underlying mechanism of migration. Most of these studies have focused on the metropolitan/urban areas or are inter-regional in scope. However, there are also a small number of studies based on rural or nonmetropolitan units. In conformity with the interest of this thesis, only those studies that concern rural or intra-regional themes will be considered.

Mead (1982), for instance, examined the interaction relationship between the migration rate and economic growth for 69 U.S. nonmetropolitan State Economic Areas over the period of 1960-1978 by employing simultaneous-equations system techniques. The findings supported the claim that there is a significant link between the patterns of economic growth and migration rate within the nonmetropolitan areas. Mead reported that the wage growth had a negative effect upon outmigration rate ( $b=-1.16$ ), and so a decline in wage growth would lead to a considerable outmigration and vice versa. At the same time, the outmigration rate evidenced a negative effect upon wage growth as well ( $b=-0.20$ ). Such an interaction between outmigration rate and wage growth has partially supported the assertion that migration (in this case, outmigration) is a disequilibrium process widening economic disparity among the nonmetropolitan areas in the U.S. Another piece of evidence substantiating this relationship is the finding that agricultural employment growth and the outmigration rates were negatively interacting with one

another to the extent that a change in employment growth would lead to a 35% decline in outmigration rate ( $b=-0.35$ ), and a change in outmigration rate would lead to a 40% decline in employment growth ( $b=-0.40$ ). This four-equation system has a minimum  $R^2$  value exceeding 0.60, that is, the explanatory power of the predetermined variables to the dependent variable was at least 60% in all instances. The outmigration function had the highest  $R^2$  value of 0.80; the two lowest explanatory powers were found in the non-agricultural and agricultural employment growth equations with  $R^2$  values around 0.60.

In their five-equations simultaneous analysis, Chalmers and Greenwood (1985) also concluded that there is a significant relation between net immigration rate and the market forces, which together determined regional (economic) growth among 350 counties in the U.S.A. in the period of 1960-1970. Their study showed that there is a mutual interaction between net immigration rate and both the labour force participation rate and employment rate, and with unemployment rate and the level of earnings. In respect of the employment rate variable, it indicated a statistically significant and positive influence upon the net immigration rate for both the male ( $b=1.0$ ) and female ( $b=0.6$ ) groups. Reciprocally, the net immigration rate also statistically-significantly determined the rate of employment of the female population ( $b=1.2$ ) but was not applicable to the male counterpart ( $b=1.1$ ). In reference to the labour force participation rate variable, it showed a statistically-significant and positive influence upon the net

immigration rate of the male group ( $b=0.11$ ) but negatively upon the female group ( $b=-0.89$ ). Meanwhile, the net immigration rate was only positively and statistically-significantly related to the female labour force participation rate ( $b=0.11$ ) but again was not influential for the male group ( $b=0.21$ ).

Concerning the level of earnings, it was once again affirmed that it was a significant and positive influence on the female net immigration rate ( $b=0.55$ ) but not the male counterpart, which was in negative relationship to it ( $b=0.46$ ). On the other hand, net immigration rate registered a significant positive influence on the male level of earnings ( $b=0.68$ ) but was not found significant in the female case ( $b=0.76$ ). Meanwhile, in respect of unemployment rate, it proved to be statistically - significantly and negatively related to both the male net immigration rate ( $b=-0.22$ ) and the female equivalent ( $b=-0.56$ ). Reciprocally, net immigration also significantly affected the unemployment rate of both males ( $b=0.179$ ) and females ( $b=0.50$ ). In sum, the study of Chalmers and Greenwood indicated that there exists a mutual relationship between net immigration rate and market forces, the latter of which were represented by the labour force participation rate, employment rate, level of earnings and unemployment rate. If the whole study is to be put into an 'outmigration' context instead of that of immigration, the same mutual relationships would continue to hold but with the proviso that all the 'signs' of the relationships would be

reversed.

Put otherwise, in an 'outmigration' context, the outmigration rate and employment rate would have been negatively and mutually related. The labour force participation rate would be negatively affecting the male outmigration rate and positively influencing the female counterpart; whereas, the net outmigration rate would be negatively affecting female participation rate and positively affecting that of the male. Level of earnings would be negatively related to female net outmigration rate and positively to the male rate; at the same time, net outmigration would have a negative influence upon both male and female levels of earnings. Finally, the unemployment rate would have been positively influencing male and female outmigration rates; while, at the same time, the outmigration rate would have borne a negative effect upon the male and female unemployment rates. Above all, the results showed that migration would be an equilibrating process because net migration was positively related to employment rate and the participation rate of the female population.

There is another study, performed by Todd (1980), investigating the interaction relationship between outmigration and regional growth; in this case focusing on the 114 rural municipalities in Southern Manitoba for the period of 1966-1971 employing the simultaneous-equations technique. Todd particularly emphasised the effects of agricultural



development on outmigration. As a result, the agricultural development variables such as farm size, farm capital, farm sales and farmers' characteristics were the main concern of his study. As far as the two-way interaction relationship between outmigration and regional growth is concerned, the study found that the linkages between outmigration and the variables concerning regional growth, such as rural economic health and agricultural components of the milieu, were rather weak and indirect since statistically no significant two-way relationship was found between net outmigration and the average family income and the level of agricultural development in the study region. The net outmigration could not be explained by the average family income variable as well as the large farm sales variable. Net outmigration was significantly related only to the 'no schooling' ( $b=1.41$ ), 'family size' ( $b=1.51$ ), 'distance to Winnipeg' ( $b=0.67$ ), 'the size of rural population' ( $b=-0.96$ ) and 'distance to urban centre' ( $b=.28$ ) variables. The results also showed that net outmigration did not have direct influence on the median family income, rather it was affected by the '% of Ukrainian in the population' ( $b=-0.05$ ), the 'lagged outmigration' variable ( $b=-0.03$ ), 'population size' ( $b=0.16$ ), 'distance to Winnipeg' ( $b=-0.04$ ), 'employment in manufacturing' ( $b=0.03$ ) and '% of population Mennonite' ( $b=-0.02$ ). Finally, the large farm size equation could not be significantly explained by net outmigration as well. This equation was significantly explained by the 'value of fixed farm capital' ( $b=1.68$ ), '% of

employment in services' ( $b=.22$ ), '% of Ukrainians in population' ( $b=-0.11$ ), '% of population Mennonite' ( $b=-0.09$ ), 'high school education level' ( $b=-0.25$ ) and 'no schooling education' ( $b=-0.36$ ).

Another interesting study was performed by William (1981). He was not particularly interested in the interaction relationship between migration and the regional economic growth. Rather, within a framework of simultaneous equations, he looked into the shifting of the importance of the economic variables in explaining migration in the 'migration turnaround' period. Then by comparing the results of significant regression coefficients in affecting outmigration of the 1955-1960 and the 1965-1970 periods, he concluded by rejecting the hypothesis that the importance of economic variables is diminishing in the course of time in contrast to an emerging quality-of-life dimension; at least in relation to the 91 nonmetropolitan State Economic Areas of the U.S. Midwest. William showed that employment growth was a crucial determinant of outmigration in both time periods. Furthermore, the absolute effects of employment change in terms of standardized coefficients were larger in the 1960s than in the 1950s. This implied that employment change has become more important in explaining outmigration. The quality-of-life variable (represented by % of land under forest) was insignificant in explaining outmigration for both time periods. However, results showed that the quality-of-life dimension is relatively more important in the later

period than the earlier period in effecting outmigration, although this was inferred indirectly through the 'employment rate'. Among the three simultaneous equations for the early period of 1955-1960, the employment change function had the highest explanatory power ( $R^2=0.82$ ) among the independent variables. The other two equations, for immigration and outmigration, were less well explained; both of them recording  $R^2$  values slightly below 0.60. Meanwhile, for the period of 1965-1970, all three equations performed reasonably : the employment change function remained supreme among the independent variables ( $R^2=0.86$ ), while the other two equations maintained  $R^2$  values of about 0.60.

In sum, most of the spatial equilibrium/disequilibrium studies are interested in reviewing the nature of the two-way interaction relationship between outmigration and regional economic growth. The latter phenomenon is often expressed in terms of income (wage) and employment (unemployment) variables. The foregoing studies have consistently demonstrated the existence of a two-way inter-relationship between outmigration and regional growth, although it might be 'weak and indirect' (Todd, 1980). However, the results were inconclusive in identifying the migration process (or the outmigration process) as an equilibrium or a disequilibrium process. Mead (1982) affirmed that outmigration is a disequilibrium process by showing that the outmigration rate was negatively affecting wage growth. In contrast, the results of Chalmers and Greenwood (1985) showed that their net

immigration rate was positively affecting the employment and participation rate of the female population, which would signify an equilibrium process. In attempting to identify the major forces behind outmigration, William (1981) demonstrated that the economic dimension remains predominant in explaining the motive and hence the process of outmigration; yet, there is some sign that the quality -of-life dimension is gaining in weight in explaining outmigration as well.

### 3.3. An Evaluation of the Modelling Techniques among the Empirical Studies

The early theoretical studies of migration( or outmigration) determinants mainly followed the 'push-pull' theory. Migration, in them, is regarded as either being 'pushed' by the unfavourable factors of the place of origin or being 'pulled' by the attractive factors of the place of destination. They examine the 'push factors' at the original areas rather than the 'pull factors' at the destination, justifying their stance by the unavailability of data for the 'destination' at the county or nonmetropolitan level. Multiple regression has been the most commonly used technique in these studies. More recently, based on the economic theory of equilibrium/ disequilibrium, advanced studies have focused on examining the two-way interaction relationship between outmigration and the regional economic growth indicators. The simultaneous-equations technique is widely used for these

latter researches.

As a matter of fact, the multiple regression technique is subject to severe criticisms when applied to discerning the determinants of migration. The cardinal fault of multiple regression lies with the problem of multicollinearity. The existence of multicollinearity violates the crucial assumption of the ordinary least square (OLS) technique that the independent variables, together with the error term, are independent of each other, to the effect that the original sources of interaction with the dependent variable can be identified or isolated. In reality, there is often a high degree of inter-relatedness among the independent variables (Bogue et al., 1953). For instance, employment growth and income growth, which are the major determinants of migration, may be highly correlated with each other. Although multicollinearity will not affect the 'best linear unbiased estimator' (BLUE) properties of the OLS, yet it will contribute to unexpected signs as well as unreliable regression coefficients. Though some authors (such as Willis, 1972) have resorted to the stepwise regression technique in reducing the seriousness of collinearity within the data set, such a procedure is yet weakened by the tendency for highly-interrelated variables to eliminate each other. Only when there are prior theoretical guidelines, and the number of variables is small can the stepwise procedure be used effectively (Lewis, 1982). A better technique for confronting the problem of collinearity is the simultaneous-equations

regression methodology.

Meanwhile, an overview of the multiple regression technique repays the effort of enquiry. It is a procedure whereby the effects of one or more independent variables can be assessed on a control or dependent variable. The dependent variable is expected to be functionally regulated by the independent variables and it is 'explained' to various degrees by the combination of the independent variables. This will work perfectly well under the assumption that there is a one-way effect from the independent variable(s) to the dependent variable. However, many researchers have recognized that there will be a two-way interaction relationship between the dependent variable on one hand, and the independent variables on the other. For instance, migration is determined by various economic, social and environmental variables, while at the same time, these independent variables are instrumental in affecting later migration (Meyers, 1978). Willis (1975) noted that most migration studies explain migration by using economic variables such as income differentials, the unemployment rate and wage rates as explanatory variables : all factors which, equally, are affected by migration. Todd (1979) also reasserted that a true model of migration must allow for the feedback effect of the dependent variable on the independent variables. Thus, conceptually and technically, multiple regression analysis is out of place in the construction of an effective migration model.

The simultaneous-equations technique, for its part, can provide a framework for monitoring effects of variables contained in one equation as they feed back into variables contained in other equations. Therefore, allowance for a number of variables dependent to some degree on the other variables scattered throughout the equations necessitates an elaboration of terminology over and above the division between dependent and independent variables in classical least squares regression. This is accomplished when we distinguish between those variables that are truly independent and those that depend on other equations in the model for their solution. The truly independent variables are known as exogenous variables or those which are given and not determined by the model. On the other hand, those which are to be explained by the model and its constituent equations are termed jointly dependent or endogenous variables. In fact, the number of equations in the model is limited to the number of endogenous variables, for each of these variables must have its accompanying right-hand side independent variables. Yet, an endogenous variable may appear on both sides of the equations system, either occupying the dependent variable position in the regression equation set up solely to explain its variations, or acting as an independent variable in other equations of the model. Indeed, a lagged endogenous variable (the phenomenon measured at a previous time period and therefore known) can appear as an independent variable in the equations containing the same, though unlagged, phenomenon as

dependent variable. Lagged endogenous variables along with exogenous variables are lumped together as predetermined variables. This distinction between endogenous and predetermined variables is essential because the endogenous variables can appear anywhere in the equation system, given the interdependent nature of phenomena( Todd, 1979b).

In sum, in a system of simultaneous equations, migration (or outmigration) is then viewed as a circular, interdependent and self-modifying system in which the effects of changes in one part has a ripple effect throughout the whole system. By conceptualizing migration as a system, it is therefore possible to identify the interacting elements, their attributes and their relationship (Lewis, 1982). Within a system of simultaneous equations, migration and the explanatory variables could be viewed as interdependent processes, each acting both as dependent and independent variables. As a result, this technique allows for the incorporation of the two-way interaction of migration and the other variables into the model and allows deeper understanding of the forces that contribute to migration. Moreover, since the interacting (or endogenous) and the truly independent variables (exogenous) variables are identified, this can avoid the problem of multicollinearity and the inconsistent results of the OLS regression coefficients. To reiterate, not only is the simultaneous-equations technique a conceptually more satisfying way of viewing the process of migration and its causation, but, in addition, this approach reduces the



multicollinearity error in the single-equation regression model commonly used in previous migration determinant studies.

In order to provide a clear picture of the real mechanism underlying the phenomenon of migration, most of these studies have focused on the interdependent relationship between migration and the economic variables. Except for the study of William (1981), little attention has been paid to the investigation of the increasing importance of the quality-of-life variables (which is a major theme of the multiple regression model studies) through longitudinal studies. Hence, these studies can only provide limited insight into future regional growth or development. Furthermore, except for the study of Mead (1982), all these studies seem to indicate that models are often more powerful in explaining the regional growth variables rather than the migration or mainly the outmigration functions; that is to say, the outmigration function is often not as well predicted as the employment, wage or income functions. This may be due to the fact that the number of exogenous variables are not adequate in explaining the outmigration function. Moreover, in spite of being based on nonmetropolitan or county studies which are largely characterized by agricultural activities, several of these studies have not incorporated the major agricultural themes or the level of development of this fundamental economic activity into the model. Hence, the  $R^2$  value in the outmigration models are generally low. Therefore, it seems that the addition of a development index which shows the

prosperity of the local economy may perhaps help to improve the explanatory power of the outmigration functions.

#### 3.4. Hypotheses to be Tested

In light of the above empirical studies, a simultaneous-equations model was set up for both the time periods of 1961-1971 and 1971-1981 for the 112 rural municipalities in Agro-Manitoba to test for the following hypotheses :

- 1) the economic variables ( particularly the employment opportunities variables) are the fundamental determinants of outmigration in Agro-Manitoba in the periods of 1961-1971 and 1971-1981;
- 2) there is an increasing importance attached to the quality-of-life variables in explaining outmigration in the period of 1971-1981 compared to the period of 1961-1971;
- 3) there is a two-way interaction relationship between outmigration and regional growth (as measured by service employment growth and employment income growth);
- 4) outmigration is a disequilibrium process which lowers the service employment growth and the growth of employment income;
- 5) the development index is a function of

outmigration.

## CHAPTER 4

### A SIMULTANEOUS-EQUATION MODEL OF OUTMIGRATION DETERMINANTS

There are two major technical problems which need to be overcome before the equations in a simultaneous system are acceptable. Firstly, there is the identification problem which is concerned with uniqueness of each of the structural equations in explaining each of the specified relationships in the simultaneous system. In short, identification is about the adequacy of the predetermined variables in explaining each of the endogenous variables. If there are enough predetermined variables to explain any particular endogenous variable, then that set of predetermined variables are unique in explaining that particular phenomenon but not any of the other phenomena. This structural equation is said to be identified, otherwise the structural equation is said to be unidentified and results in invalid model construction. Secondly, there is the consistency problem which is concerned with the underlying assumptions of the simultaneous equations. Put more explicitly, if the assumptions of the simultaneous-equations are not met, there will be strong mathematical bias in the model which may lead to very inconsistent or invalid results. Therefore, in the following section, these problems

will be discussed in conjunction with the construction of the simultaneous model for outmigration.

#### 4.1. The Identification Problem and its Solution

In addition to providing the foundation for a realistic model, the purpose of a priori information is to rule out most hypotheses that are inconsistent with observed facts. It is inherently reasonable to suppose that any set of observed facts can be explained in many different ways. The ideal is to find only one acceptable hypothesis which makes sense in terms of both the model and the facts, that is, one hypothesis consistent with both. A structure is identified with respect to a given model and a given type of data if, and only if, there is exactly one structure that belongs to both the data-admissible set of structure and the model (Christ, 1966). A structural equation is identified if, among all the structural equations compatible with the data, there is only one that is also compatible with the restrictions imposed by the model on that equation. In essence, the structural equation is only identifiable when it can be shown that it is impossible to produce a different equation of the same prescribed form by linear combination of all equations in the model. Consequently, the problem of identification is said to occur in those situations where any set of observed facts can be explained in a number of ways, that is, several hypotheses can be coined to account for a given set of relationships. The

problematic aspect emerges when one tries to disentangle the single, 'best' hypothesis from the multiplicity of possible explanations. In effect, the problem of identification summarizes to a question of whether the observations will enable the analyst to measure each and every equation in the simultaneous system ( Todd, 1979b). In order to fulfil the requirement of full identifiability, two conditions must be met : (a) the order condition, and (b) the rank criteria for identifiability.

#### 4.1.1. Order Condition

To be identified, all equations in a model of G number of equations must exclude at least (G-1) number of variables from the equation. The number of variables to be excluded is represented by the difference between the total number of variables (including both endogenous and predetermined) in the model (K) and that of the number in the respective equation (M). The order condition of identifiability can then be stated as :

$$(K-M) > (G-1).$$

When  $(K-M) > (G-1)$ , then the respective equation in the model is said to be overidentified. If  $(K-M) = (G-1)$ , then it is just identified. If  $(K-M) < (G-1)$ , then it is underidentified. In order to carry out the ongoing regression analysis, each and every equation of the model ought to be either overidentified or just identified. Underidentified equations

should then be discarded from the model or be re-formulated.

In respect of the model in hand (see later sections of this chapter), it has three equations ( $G=3$ ) and 10 variables (including endogenous and predetermined). The basic number of variables to be excluded from each of the three equations ( $G-1$ ) is two (or  $3-1=2$ ). Elaborating on the first equation, the number of variables it has excluded ( $K-M$ ) is two ( $10-8=2$ ); therefore, it is just-identified because  $2=2$  or  $(K-M)=(G-1)$ . Elaborating on the second equation,  $K-M=10-6=4$  and as  $4>2$ ; it is overidentified because  $(K-M)>(G-1)$ . The third equation, has  $(K-M) = 10-6=4$ ; hence  $(K-M)>(G-1)$ , and it is overidentified as well.

#### 4.1.2. Rank Criteria For Identifiability

While the order condition helps to classify the identifiability of the structural equations, their identification properties have also to be endorsed by a subsequent test for the rank condition. The order criterion only serves as a necessary condition whereas the rank purports to be both a necessary and sufficient condition to the identification problem. The rank criterion for identification states that, 'in a system of  $G$  equations, any particular equation is identified if and only if it is possible to construct at least one non-zero determinant of order  $(G-1)$  from the coefficients of the variables excluded from the particular equation but contained in the other equations of

the model' (Koutsoyiannis, 1986, p.353). The rank test will start with 'the row and column array of coefficients in the model, omit all columns not having a prescribed zero in the equation, and omit the row coefficients of that equation' (Willis, 1975). The test, which has been attached in Appendix I, shows that there are more than one non-zero determinant of order (G-1) for the model specified in this chapter.

#### 4.2. The Problem of Consistency and the Two-Stage Least Squares

The crucial difference between OLS and simultaneous-equations estimation lies in the assumptions underlying the regression mechanism. For a regression equation, such as :

$$Y = BX + U,$$

The assumptions for OLS regression are :

- 1) X is a (NxK) random matrix of sample observations on the independent variables (fixed numbers such as constant terms and dummy variables are also admissible);
- 2) U is random disturbance vector of N elements, each element being independent of the sample observations in X;
- 3) the distribution of U is normal in accordance with the central limit theorem and has the properties of :



-zero mean  $E(U)=0$

-constant variance  $E(U^2) = \sigma^2$

-zero covariance  $E(U_m U_n) = 0$ .<sup>9</sup>

The zero mean assumption signifies the absence of any systematic component in the random disturbance affecting the dependent variable (regressand), whereas the zero covariance assumption implies that the elements of the disturbance terms are uncorrelated. Thus the independent variables (regressors) are not only independent of each other but are independent of the disturbance term too. Moreover, the elements of the disturbance term are supposed to be independently distributed. In fact, these assumptions of independence do not bear up in models utilizing endogenous as well as predetermined variables. By definition, endogenous variables are not independent entities within the linear system of simultaneous-equations and so conflict with the independence assumption. The disturbance terms for the system of equations are not independent either. On the contrary, the principle of interdependence between the dependent and the disturbance term of other equations in the model applies throughout the simultaneous-equations system. Therefore the application of OLS estimates to these models conceptually would be

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<sup>9</sup> The Central Limit Theorem states that if random samples of  $n$  observations are drawn from a population with finite mean,  $U$ , and standard deviation,  $\sigma$ , then, when  $n$  is large, the sample mean,  $\bar{y}$ , will be approximately normally distributed with mean equal to  $U$  and standard deviation  $\sigma/\sqrt{n}$ . The approximation will become more and more accurate as  $n$  becomes large (Mendenhall, 1979).

inappropriate because they would provide inconsistent results; in effect, they would offer no meaningful solution at all.

The way to surmount this problem and ensure consistent results is to utilize reduced-form equations whereby the original structural equations are transformed to express the endogenous variables as functions of exogenous variables and disturbances only (an example of the reduced-form of the equations can be found in Appendix II). If a simultaneous-equations system satisfies the conditions of identification, then the reduced-form of its structural equations can be used as the basis for the derivation of consistent regression estimates. The methods to achieve this (reduced-form) include : two-stage least square (2SLS) and three-stage least square (3SLS). Undoubtedly, 2SLS is the most straight-forward means, and is at least as good as, if not superior to, other more complicated methodologies (Todd, 1979b). Furthermore, the 2SLS has comparative advantages over the 3SLS in that the 3SLS are only appropriate for models containing more than 20 predetermined (exogenous) and lagged endogenous variables; whereas the 2SLS is not subject to this limiting total number of variables (Todd, 1979b). Therefore, the 2SLS is preferred in this thesis for the purpose of analysis. The operations involved in 2SLS can be summarized in the following manner :

- 1) select one endogenous variable from those in the model to act as the target dependent variable;
- 2) (first stage least squares) determine the

- OLS estimates of the reduced-form equations for the remaining endogenous variables in the equation using all the predetermined variables in the model (that is, in all equations, not just the one of interest);
- 3) replace the observed values for these remaining endogenous variables by their estimated values from step (2);
  - 4) (second stage of 2SLS) perform OLS regression of the target dependent variables made up of the reduced-form parameter estimates for the remaining endogenous variables (step 3) and the original, observed values for these predetermined variables present in the equation of interest;
  - 5) repeat steps 1-4 for each target dependent variable in the model (Todd, 1979b).

In sum, 2SLS is used in this study to solve the problem of inconsistency. It is an equation - by-equation procedure for handling the simultaneous-equations system which has the advantage of producing consistent parameter estimates for all equations that are just-identified, or as is the more usual case, over-identified. The property of consistency implies that the 2SLS regression coefficients converge in probability to the true parameter values as the sample size of the set of observations approaches infinity.

#### 4.3. Model Specification

The study model consists of a three-equation simultaneously-determined system. It defines employment income growth level, service employment growth and net outmigration, as the three critical dependent variables to be solved within the simultaneous system. The model is specified as follows:

$$Y_1 = \beta_1 + a_1 Y_2 + a_2 Y_3 + a_3 X_1 + a_4 X_2 + a_5 X_3 + a_6 X_4 + a_7 X_5 + E_1 \quad 1$$

$$Y_2 = \beta_2 + b_1 Y_1 + b_2 Y_3 + b_3 X_1 + b_4 X_2 + b_5 X_6 + E_2 \quad 2$$

$$Y_3 = \beta_3 + c_1 Y_1 + c_2 X_1 + c_3 X_2 + c_4 X_3 + c_5 X_7 + E_3 \quad 3$$

where

$Y_1$  is net outmigration from 1961-1971;

1971-1981,

$Y_2$  is employment income growth 1967-1972; 1971-1981,

$Y_3$  is service employment growth from 1961-1971;

1971-1981,

$X_1$  is % of population with university education,

1961; 1971,

$X_2$  is distance to Winnipeg,

$X_3$  is population growth, 1961-1971; 1971-1981,

$X_4$  is % of dwelling owned, 1961; 1971,

$X_5$  is development index, 1961; 1971,

$X_6$  is % of employment growth in primary industry,

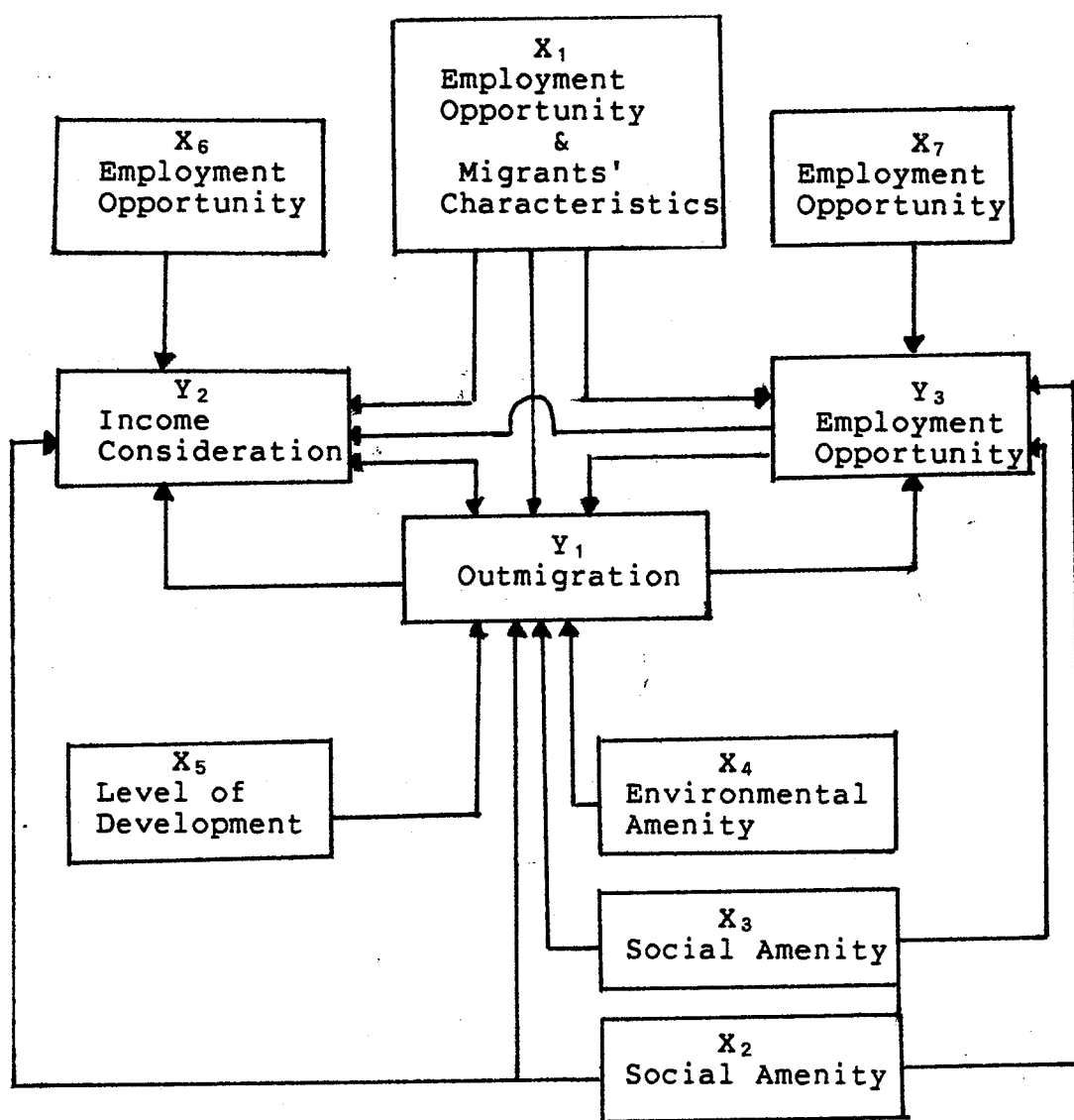
1961-1971; 1971-1981,

$X_7$  is service employment level, 1961; 1971.

All the  $Y$ s represent variables endogenous to the system

whereas the  $X_s$  are exogenously determined and the  $E_s$  are the disturbance terms. Equations 1, 2 and 3 represent a complete set of equations in that their number equals the number of endogenous variables. To reflect their mutual interdependence, the variables representing net outmigration, service employment growth and employment income growth level are expressed both as dependent and independent variables within the simultaneous system of equations. To facilitate the comprehension of the whole system, Figure 7 (next page) is drawn to indicating the dimensions that each and every variable is going to represent. In order to establish whether there has been a reduction in the importance of economic determinants in affecting outmigration, this study is performed longitudinally for two time periods, 1961-1971, and 1971-1981. Thus, a comparison study can be made between these two time periods to see if there is a shift in the sensitivity of outmigration to quality-of-life factors and to see if there is a shift in importance of the economic variables affecting outmigration. By and large, variable selection is influenced by the spatial equilibrium and spatial disequilibrium concepts of outmigration and the findings of the previous empirical studies of simultaneous-equations migration analysis outlined in the previous chapter.

Figure 7 : The Interdependence of Outmigration and Economic Development.



### Equation 1

The first equation of the model is known as the net outmigration function ( $Y_1$ ). It is the outcome of two dimensions; namely, the objective economic conditions of the labour market and the subjective forces concerning the quality-of-life of the rural population. The variables used to represent the economic aspect of outmigration are : 'employment income growth' ( $Y_2$ ), 'service employment growth' ( $Y_3$ ), '% of population with university education' ( $X_1$ ) and the 'development index' ( $X_5$ ). The variables representing the quality-of-life dimension are : '% of dwelling owned' ( $X_4$ ), 'population growth' ( $X_3$ ) and 'distance from Winnipeg' ( $X_2$ ).

The 'employment income growth' variable ( $Y_2$ ) has a dual interpretation concerning its effects on outmigration. According to economic models, and hence the aggregate level, high income growth areas are deemed to be the centres attracting immigrants and reducing the flow of outmigrants; while, areas of low income growth may encourage outmigration and discourage immigration at various scales. The two-part proposition is inspired by examining the disaggregate level of the population/migrants. Numerous disaggregated studies suggest that those in highly - skilled occupations and those that are well-educated tend to be more migratory (Shaw, 1975) : both education and occupation status are highly correlated with the growth of income and thus those with higher incomes should be more migratory. As far as this thesis is concerned,

the 'employment income growth' variable, which is an aggregate, is hypothesized to have a negative effect upon outmigration, that is, the higher the level of employment income growth, the lesser the chance of outmigration.

Employment opportunity is definitely a factor encouraging (if expanding) or discouraging (if decreasing) the voluntary movement of people. The 'service employment growth rate' ( $Y_3$ ) is used to represent this aspect. It is chosen for two main reasons. Firstly, as far as the study unit of this thesis is concerned, Agro-Manitoban rural municipalities, it has been averred that service industry is a vital sector in providing employment opportunities, particularly of the non-farm kind, for the region's populace. Secondly, the service industry has been instrumental in providing a major economic base to many rural municipalities. The growth of employment opportunities is here considered to be a proxy for the expansion of job opportunities in an area and is expected to reflect growing labour demand (Greenwood, 1973). It is generally expected that outmigration will be lowered in areas where the growth of employment opportunities is more rapid. William (1981) found that the outmigration rate is adversely affected by the growth of employment rate for the period of 1950-1960. Mead (1982) also demonstrated the existence of a negative relationship between agricultural employment growth and outmigration ( $b=-0.36$ ). Furthermore, a positive relationship is found between employment opportunities and net immigration rate (the reverse of net outmigration rate) and others for the



relations between immigration and the growth of employment rate for both male ( $b=0.65$ ) and female ( $b=0.60$ ) populations for the period of 1960-1970 (Chalmers and Greenwood, 1985). In this study, it is hypothesized that a large proportionate decline in any of the economic sector's share of labour will spur outmigration while a rise in the economic sector's share of the labour force should reduce outmigration. The model expects to confirm a negative effect of 'service employment growth rate' on outmigration.

The variable of '% of population growth with university education' ( $X_1$ ) has a dual character relating to outmigration. It serves to represent the characteristics of the migrants as well as employment opportunities. However, its influence upon outmigration is inconclusive. It has been hypothesized that higher growth of education level means greater employment opportunities at the original locality of the subjects; and so the subjects do not have to migrate elsewhere to seek employment. This implies that outmigration would be lowered in the area where education attainment is higher; thus, higher education level has a negative effect upon outmigration. Nevertheless, at the disaggregated level, it has been found that well-educated people are usually more migratory than the less educated. According to this latter finding, the hypothesis would be recouched to imply that the growth of education attainment of the individuals may have a positive effect upon outmigration. The rationale behind this positive hypothesis may owe much to the fact that employment

information and opportunities are both expected to increase with increased education (Greenwood, 1973). Individuals with high levels of education are likely to have more employment opportunities elsewhere, possibly in better areas; and may face lower risk when moving and consequently, are more likely to move than those with less education (Renas and Kumar, 1983). Moreover, education may reduce the importance of tradition and family ties and increase an individual's awareness of other localities, with the consequences that the forces that hold him to his present locality are weakened (Greenwood, 1973). Therefore, an area in which educational attainment is high may experience a large amount of migration. Indeed, William (1981) and Mead (1982) found that there is a positive relationship between higher educational level and outmigration rate for the period of 1960-1970 among the nonmetropolitan areas in the U.S. On the contrary, Todd (1980) found a positive relationship between lower education level and outmigration among the 114 rural municipalities in southern Manitoba for the period of 1971-1976. For this study, no definite positive or negative relationship is hypothesized; rather its determination will await empirical analysis.

The general level of development of the locality will affect the intention of the population to move or stay. The 'development index' ( $X_5$ ), which is mainly compiled from agricultural variables by means of Principal Component Analysis (see Appendix V), is used to characterize the level

of development in the rural economy of Agro-Manitoba. It is observed that simultaneous-equations analysis studies of rural or nonmetropolitan areas would result in a low explanatory power ( $R^2$ ) for the migration equation if there was the omission of an index or variable representing the level of development for the studied areas or regions. Todd (1980, p.446) has suggested 'the rationale for rural outmigration is inexorably bound up with the standing of the local economy...'. For the purpose of this study, the development index is hypothesized as negatively affecting outmigration; the better the development index the fewer the ensuing outmigration.

In an effort to tap the quality-of-life dimension of Agro - Manitoba's outmigration, the variables of 'population growth' ( $X_3$ ), 'distance from Winnipeg' ( $X_2$ ), and '% of dwellings owned' ( $X_4$ ), are included in the outmigration function. In general, higher population growth indicates larger tax base, and thus better provision of public services such as transportation facilities, schools, and hospitals and, thereby, fewer incentives for outmigration. Smaller population growth or negative growth means a shrinking tax base and, therefore, the declining provision of public services and boosted outmigration in consequence. In this respect, 'population growth' ( $X_3$ ) is a measure of social amenities. For this thesis, 'population growth' ( $X_3$ ) is hypothesized to have a negative effect upon outmigration: thus, the larger the population size, the lesser the

outmigration will be.

Another way to look at social amenity is from the indirect effects of distance separating the rural municipality from the urban centre. Proximity to the larger metropolitan centre implies the higher degree of availability of goods and services and hence the greater satisfaction of the rural municipality residents. The variable 'distance from Winnipeg' ( $X_2$ ) is used to represent this aspect. The closer the rural municipalities to metropolitan Winnipeg, the greater the degree of professional and shopping services and other facilities will be available. As a result, it is hypothesized that 'distance from Winnipeg' ( $X_2$ ) is positively influencing outmigration. Lastly, environmental amenity is a factor which ought to be considered by migrants before deciding to move or to stay. If the '% of dwellings owned' ( $X_4$ ) is great, then this may imply that the environmental amenity of the respective locality would be good. Thus, once rural residents become home-owners in such localities, they will be less inclined to move. It can then be hypothesized that '% of dwellings owned' ( $X_4$ ) is negatively affecting outmigration.

#### Equation 2

Equation 2 is known as the employment income growth function. It tries to signify that there is a feedback effect from outmigration ( $Y_2$ ) to employment income growth ( $Y_3$ ) as well as to isolate other major factors contributing to

employment income changes. Besides accounting for the feedback effect from outmigration ( $Y_1$ ), this function has two other dimensions; namely, the employment opportunities variables and social amenity variable.

Based on the traditional economic equilibrium concept, outmigration means an outflow of labour. If the labour is considered as 'surplus', then, although there may not have been a pressure on wage rates, the income per capita of the area/region will definitely be higher than before as a direct result of outmigration. If the outflow of labour has contributed to a shortage of labour, then the wage rates would have been driven upwards; in effect, wage income of the area will be higher. Accordingly, outmigration will increase the wage income (either in per capita or absolute terms) of the sending region. By way of contrast, the disequilibrium concept sees outmigration as a factor shrinking the size of the local market. As a result, output would have to be cut back; unemployment will set in; with the effect of the income growth lowered. Taking these two opposing themes into consideration, this thesis intends to argue that the feedback effect of outmigration to income is inconclusive. Three variables are used to measure the employment opportunities dimension; namely, the 'service employment growth', 'growth of labour force in the primary industry' ( $X_6$ ) and 'growth of population with university education' ( $X_1$ ). It is apparent that the greater the employment opportunity in the original locality, the greater the corresponding income growth. In

that light, these variables are hypothesized as having a negative effect upon income. Singling out the last variable, 'growth of population with university education' ( $X_1$ ), Greenwood (1975) argued that at the disaggregate level, increased education will facilitate upward mobility and occupational transference; in turn this will usually mean an improvement in income. He also argued in an earlier paper (Greenwood, 1973) that at the aggregate level, increased educational level will imply an increase in labour productivity, and hence an increase in labour demand. Given that labour supply is not perfectly responsive to wage changes, increased labour demand will result in a greater than ever increase in income growth. The 'distance from Winnipeg' variable ( $X_2$ ) is again used to represent social amenity. According to the notion of spread or trickling-down effects, the rural municipalities which lie close to the large metropolitan areas in general would gain a greater share in the infrastructure of the metropolitan areas than those further away; and they might be benefited by receiving and attracting the outreaching investments of the expanding metropolitan areas. In short, it is expected that 'distance from Winnipeg' is negatively affecting the income growth of the rural municipalities, that is, the shorter the distance from Winnipeg, the higher the income growth of the rural municipality.

### Equation 3

Finally, Equation 3, which is known as the service employment growth function, depicts the feedback effect of outmigration ( $Y_1$ ) as well as the other factors contributing to service employment growth; namely, 'growth of population with university education' ( $X_1$ ), '% of labour force in service industry' ( $X_7$ ), 'population growth' ( $X_3$ ), and 'distance from Winnipeg' ( $X_2$ ).

The traditional economic theory of equilibrium suggests that outmigration might help to redistribute labour from the surplus areas to the deficient areas, or to drive the unemployed to seek for employment in some other areas. By the same token, when outmigration is magnified, then some jobs may become vacant in the sending areas. In this respect, outmigration creates relatively plentiful employment opportunities for those who stay. This equilibrating process has been contradicted by another argument. The disequilibrium argument asserts that outmigration is likely to lower the employment level as well as to leave the depressed area in a position of being less able to revive itself than before the movement took place so that less employment will be 'created'. Mead (1982) found a statistically-significant negative effect of outmigration rate to non-agricultural employment growth for 1960- 1970 ( $b=-0.40$ ). Chalmers and Greenwood (1985) found a positive effect of female net immigration rate (the reciprocal of outmigration rate) to the growth of female

employment rate in 1960-1970 ( $b=0.50$ ). To be more objective, there is no specific sign to be expected from the feedback effect of outmigration to employment growth rate for this thesis. It all depends on the actual situation of the area being studied.

As far as attributes are concerned, service employment growth will be positively affected by the 'growth of population with university education' ( $X_1$ ) in the way that service industry requires a highly literate or well-trained labour force. In terms of the accelerating cumulative causation principle, service growth is also determined by '% of labour force in the service industry' ( $X_7$ ), that is, the greater the proportion of the labour force in a certain sector, the greater the growth it will experience. Thus, it is expected that level of employment in the service industry is positively affecting its growth rate. Besides, a higher population growth will imply a greater demand for services, which means a greater growth in the service sector. In other words, 'population growth' is positively affecting service employment growth. Lastly, as stated before, as a consequence of the spread or trickling-down effects, the closer the rural municipalities are to the metropolitan centre, the greater will be the stimulation of employment growth. Thus, 'distance from Winnipeg' ( $X_2$ ) is negatively affecting service employment growth.



## CHAPTER 5

### ANALYSIS OF THE SYSTEM OF EQUATIONS

The coefficients for the simultaneous-equations systems are estimated according to the two-stage least squares procedure outlined in Chapter 4, and the results are presented in Table 2 and Table 3.

#### 5.1. Analysis for the 1961-1971 Period

The seven independent variables in the outmigration equation explained 16.88 % of the variance in the net outmigration equation of the 1961-1971 period. Only two variables are significantly affecting the net outmigration in a statistical sense; namely, 'population growth' ( $b=-0.37$ ) and 'growth of population with university education' ( $b=-124.60$ ). The statistically insignificant variables are, by default: 'service employment growth', 'distance from Winnipeg' and '% of dwellings owned'. The most significant variable affecting outmigration in Agro Manitoba is 'growth of population with university education'. It is found to be negatively affecting outmigration; which is to say, the greater the increase of population with university education, the lesser the

Table 2  
Two Stage Least Squares Estimates, 1961-1971  
Equation for

		Y <sub>1</sub>	Y <sub>2</sub>	Y <sub>3</sub>
Y <sub>1</sub>	b:		-0.000072	0.000063
	t:		-0.54	0.37
Y <sub>2</sub>	b:	-7310.65	0.54	
	t:	-0.04	0.27	
Y <sub>3</sub>	b:	1483.53		
	t:	0.32		
X <sub>1</sub>	b:	-124.60	-0.89	1.60
	t:	-1.37*	-0.39	1.60*
X <sub>2</sub>	b:	-0.84	-0.0016	-0.0008
	t:	-0.17	-0.77	-2.1***
X <sub>3</sub>	b:	-0.37		0.000033
	t:	-2.82***		0.53
X <sub>4</sub>	b:	-2.09		
	t:	-0.37		
X <sub>5</sub>	b:	-56.72		
	t:	-0.12		
X <sub>6</sub>	b:		-0.0012	
	t:		-0.40	
X <sub>7</sub>	b:			-0.73
	t:			-2.02***

R <sup>2</sup>	0.1688	0.0411	0.2822
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\*\*\* at 0.01 level of significance  
 \*\* at 0.05 level of significance  
 \* at 0.10 level of significance

Table 3  
Two Stage Least Square Estimates, 1971-1981

	$Y_1$	$Y_2$	$Y_3$
$Y_1$ b:		-0.0006	-0.0001
t:		-1.51*	-2.40*
$Y_2$ b:	717.29		
t:	0.91		
$Y_3$ b:	-963.12	-2.05	
t:	-0.57	-0.996	
$X_1$ b:	-2614.31	2.66	0.12
t:	-0.81	1.40*	0.76
$X_2$ b:	-2.85	0.0020	-0.0008
t:	-0.96	0.63	-2.77***
$X_3$ b:	-0.24		0.000046
t:	-1.75*		2.27***
$X_4$ b:	-25.00		
t:	-1.50*		
$X_5$ b:	2292.03		
t:	1.63*		
$X_6$ b:		0.01	
t:		1.41*	
$X_7$ b:			-0.81
t:			-4.42***
$R^2$	0.3278	0.1022	0.6405

\*\*\* at .01 level of significance  
 \*\* at .05 level of significance  
 \* at .10 level of significance  
 (one-tailed)

outmigration; and the lower the increase of population with university education, the higher the outmigration. This result is consistent with the hypothesis that a high growth of educated population in general will be forthcoming with wider employment opportunities as a result of the better competitive advantages offered by the educated individuals. By the same token, the hypothesis that highly-educated individuals are more migratory than the less-educated is not applicable in this case. The finding indicates that in regions where the educated population has been increasing rapidly, or in areas where the educated population are dominant, the outflow of migrants is very low. At the same time, in the areas either where the highly-educated people are rare or the growth of the educated population has been very slow, the outmigration is high. This finding also gains substance from Todd's(1980) study which inferred that the 'no school' variable is positively correlated with net outmigration in the 1966-1971 period; that is, in rural Manitoba, the less-educated people are more migratory than the educated population.

Another significant variable which affects outmigration from the rural municipalities in Agro-Manitoba is the 'population growth' variable which has the expected negative sign. Put otherwise, if the population growth of the rural municipalities becomes greater, the scale of outmigration will be low. On the other hand, in areas where the population growth rate is lower, the tempo of outmigration from the regions will be greater. The reason for this is readily

apparent: higher growth of population indicates larger increases in tax bases and, as a consequence, the availability of many public social amenities like transportation facilities, hospitals, schools, post offices and recreational centres are likely to increase so as to meet the increase in demand. Because of such adequate provision of social amenities, in regions where population growth is high, the flow of large-scale outmigration is rare. In contrast, in regions where the population growth or the increase of tax base is insignificant, large-scale outmigration will be a commonplace event.

The second equation, the employment income growth equation, is composed of five variables. Only 4.11% of the variance in the dependent variable is to be explained by these five predetermined variables. Moreover none of them are found to be statistically - significant contributors to the 'employment income growth' variable. As a matter of fact, the 'employment income growth' variable is not a well-constructed variable; owing to data paucity it is a measure of the ratio of the 'employment income' of the 1972 and the 1967 period instead of that for the 1971 and 1961 period. As a result, the independent variables, particularly the 'growth' variables such as the 'service employment growth' and 'the growth of primary industry employment' which are based on a ten-year period of 1971 and 1961, cannot predict this five-year-based variable successfully. Suffice it to say that this five-year-based employment variable was used only with reluctance since

other income data covering the 1961, 1971 and 1981 periods are not available.

The third equation is known as the 'service employment growth' equation and consists of five independent variables together explaining 28.22% of the variance in the dependent variable. In this equation, three variables significantly affect service employment growth. These variables are 'growth of population with university education' ( $b=1.60$ ), 'distance from Winnipeg' ( $b=-0.0008$ ) and 'level of service industry employment in 1961' ( $b=-0.73$ ). Meanwhile, the variables of 'net outmigration' and 'population growth' are found to be insignificant in explaining the employment growth of the service industry. Yet, the variable 'growth of population with university education' is found to be a significant regressor affecting service employment growth. As expected, this variable positively affects service employment growth. In other words, the more the growth of highly - educated population, the greater the service employment growth. It accords with the fact that the growth of service industries requires large numbers of well-educated individuals in the labour force. Hence, in areas where there are abundant well-educated workers or in areas where the educated population has been growing rapidly, or where there are adequate supplies of well-qualified labour, the growth of service industries will also be enhanced and so will the employment opportunities.

As a point of fact, it is quite unexpected to find that

this lagged service industry employment level variable is negatively associated with service employment growth. This suggests that in areas where the level of the service employment is high in 1961, the subsequent growth of service employment opportunities will be low. On the other hand, in areas where the level of service employment is low in 1961, the growth of service employment opportunities will be high. This finding seems to reject Myrdal's (1957) cumulative causation notion that a change in general will not call forth contradicting forces; instead, it will summon the supporting forces which will move the system in the same direction and much further. Nevertheless, this breaking away from the cumulative causation principle on the issue of service employment opportunities is not without explanation for the case of Agro-Manitoba. As indicated in Chapter 2, since the 1960s great efforts have been made by the federal and provincial governments to increase employment opportunities in the lagging regions where the employment levels are low. As a consequence, those areas which had very low employment opportunities in the 1960s had become the targets of attention. Because of the various regional development programmes implemented precisely for the purpose of stimulating employment opportunities, it was these lagging regions that experienced the greatest growth of employment opportunities rather than the areas with previously higher level of service employment opportunities. Indeed, this finding signifies the importance of the role of governments in

intervening in the negative cumulative causation process of regional development. In other words, if the intervention of governments is absent, it will be likely that only those regions which have a higher level of service employment opportunities will experience on-going higher service employment growth, while the growth of the service employment opportunities in the lagging regions will remain stagnant or occur at a very low rate.

As indicated by the statistics, another variable affecting service employment growth is 'distance from Winnipeg'. As expected, this variable is negatively associated with service employment opportunities growth, that is to say, the greater the distance of the rural municipalities from Winnipeg, the lower the service employment opportunity growth. This negative relationship indicates that proximity to Winnipeg is an advantage, serving to attract more investment because of the sharing of many social amenities with the metropolitan centre. Therefore, more employment opportunities can be provided for the rural municipalities adjoining or relatively close to the region's capital.

## 5.2. Analysis for the 1971-1981 Period

The seven independent variables in the net outmigration equation can explain 32.78% of the variance in the dependent variable. Three variables are statistically-significant.



They are 'population growth' ( $b=-0.24$ ), 'development index' ( $b=2292.03$ ) and '% of dwellings owned' ( $b=-25.00$ ). The insignificant variables include 'employment income growth', 'service employment growth' and 'growth of population with university education'. In contrast to the 1961-1971 results, the 'development index' is the most statistically-significant variable affecting net outmigration. However, it is very unexpected to find that this 'development index' bears a negative relationship with net outmigration. This negative relationship suggests that in areas where the agricultural sector has been prosperous, the outmigration is generally high; whereas in areas where the agricultural development is less prosperous, the outmigration is lower. The reason for this seemingly anomalous finding may be that the prosperous agricultural areas are usually associated with the capitalization of farming as expressed through wholesale mechanization and rapid expansion of farm size. As a consequence, large numbers of farm labourers are squeezed out and have to seek employment opportunities elsewhere. Evidently, the reciprocity of the higher the index of agricultural development and the greater the outmigration results is an equilibrating process contingent upon farm rationalization.

The variable '% of dwellings owned' is also found to be a significant determinant of outmigration. As expected, this indication of environmental amenities bears a negative relationship with outmigration. In areas where the

environmental amenities are more favourable or more satisfying, outmigration is rare. However, in areas where the housing conditions are less favourable, the individuals in those localities are likely to migrate.

The last significant variable affecting net outmigration is once again 'population growth' : an echo of what applied for the 1961-1971 period. As expected, 'population growth' is found to have a negative relationship with net outmigration, which indicates, on the one hand, that the higher the population growth, the lesser the flowing out of migrants; and on the other, that the lower the population growth the greater the outflow of migrants to other places. This finding again suggests that the availability of social amenities or public services is an important underlying force which affects outmigration throughout the two periods of time under review.

The second, 'employment income growth' equation, consists of five independent variables explaining 10.22% of the variance in the dependent variable. Three out of the five independent variables are found to be statistically significant. They are 'net outmigration' ( $b=-0.0006$ ), 'growth of primary industrial employment opportunities' ( $b=0.01$ ) and 'growth of population with university education' ( $b=2.66$ ). The two insignificant variables are 'service employment growth' and 'distance from Winnipeg'. It so transpires that 'growth of population with university education' is the most statistically-significant variable affecting the income growth

variable. Unsurprisingly, this determinant has a positive effect on income growth. It suggests, then, that educational attainment is a vital determinant of income growth. Put otherwise, the higher the growth of population with university education, the greater the income growth.

'Growth of primary industrial employment opportunities' is another variable which is found to be statistically significant in regulating the income growth equation. As hypothesised, this variable has a positive effect on income growth. One can thereby infer that the higher the development of the primary industry, the greater the employment opportunities for the individuals; hence, income growth is more rapid. However, in areas where the employment opportunities are few or there is low development of primary industries, the income growth is bound to be lower.

As expected, 'net outmigration' has an adverse effect on the 'employment income growth' variable. This finding is consistent with the hypothesis that outmigration, in fact, is a disequilibrium process which has the capability of lowering income growth of the regions and therein further enhancing divergence among the regions.

The third equation is styled the 'service employment growth' equation and consists of five predetermined variables. They account in total for 64.05% of the variance in the 'service employment growth' endogenous variable. Four out of five regressors show statistically - significant relations

with this employment opportunities growth variable. They are 'previous service employment level' ( $b=-0.81$ ), 'distance from Winnipeg' ( $b=-0.0008$ ), 'net outmigration' ( $b=-0.0001$ ) and 'population growth' ( $b=0.000046$ ). Once again it is found that the previous level of service employment bears an adverse relationship with the service employment growth variable. This suggests that wherever the previous level of service employment is high, the growth of service employment will be low. As suggested in the aforementioned paragraphs, this may be the result of the sustained governmental effort in stimulating employment growth in the regions with low levels of employment opportunities in the 1970s. As a result, a negative relationship is found between these two variables, and the hypothesis of a negative cumulative causation process affecting the service sector is rejected.

'Distance from Winnipeg' is another variable which emerges as a major determinant of service employment growth. In accordance with expectations, this variable is negatively related to service employment opportunity growth. This again indicates that the closer the rural municipalities occur in relation to Metropolitan Winnipeg, then the greater is the growth of service employment opportunities. This phenomenon, in fact, reinforces Myrdal's spread effects, Hirschman's trickling-down effects and Friedmann's 'counterflow of information flow from the core'. Essentially, they all assert that the near-by areas of the more advanced or developed regions will benefit from sharing the infrastructure or social

amenities or information with those more developed regions. Therefore, more investment and industries will be attracted to the region and the awareness of individuals on the prospects of regional development will be increased. All these forces will coalesce to enhance regional development and, in turn, will generate even more employment opportunities. In contradistinction, the employment opportunities are less likely to grow in the more remote rural municipalities.

In this equation, 'net outmigration' ( $b = -2.40$ ) is also a major force underlying service employment growth. However, it bears a negative relationship with service employment growth. This finding is consistent with the disequilibrium concept and its proposition that outmigration is a divergence process which will lead to the lowering of the growth of employment opportunities in the lagging regions.

Finally, the last variable affecting service employment opportunity growth is 'population growth'. As anticipated, this variable bears a positive relationship with service employment growth. Specifically, it implies the higher the population, the greater the growth of the employment opportunities. This finding reinforces the fact that higher population growth in general implies a greater demand for existing services or provokes the expansion of the service market. As a result, the service sector grows in concert with the rise in service employment opportunities.

### 5.3. Summary

The longitudinal study for the two periods of time, 1961-1971 and 1971-1981, confirms the 'traditional' or 'fundamental' role of the economic dimension in determining population movement. In the first period, the statistical results show that the migrants are very sensitive to the availability of employment opportunities. At the same time, it appears that most of the migrants mainly belong to the less well-educated segment of the rural population. The statistical results of the second period elicit the fact that the migrants are mainly the 'squeezed-out' labourers from the rural municipalities, made redundant as a consequence of mechanization and size consolidation in the farm sector. Hence, these findings establish Hypothesis 1 which suggests that employment opportunity is the fundamental determinant of outmigration in Agro-Manitoba.

Notwithstanding the economic dimension, the quality-of-life dimension also plays a vital role in affecting outmigration in Agro-Manitoba during both periods of time. Statistical results show that, in the first period, many migrants moved in search of better quality and/or quantity of public/social services. In the second period of time, the results suggest that migrants will not only concern themselves with the level of provision of public/social services but also will care much about the betterment of their housing conditions.

Meanwhile, the statistical results also convey the picture that the quality-of-life dimension has arisen in importance as a factor determining the outflow of migrants from Agro-Manitoba. This may be regarded as a sign for the advancement in the level of development of the rural economy and society in general. On comparing the results between the periods of time, the growing importance of the quality-of-life dimension can be seen from the increase in the number of statistically-significant variables of this dimension in the whole simultaneous-equations system. In not so many words, then, Hypothesis 2 is confirmed.

In respect of the dual or the two-way interaction between outmigration and its endogenous variables, the results of the recent simultaneous-equations system do not strongly support the third Hypothesis. In the first period, the system shows that the endogenous variables of 'employment income growth' and 'service employment growth' are not statistically-significant determinants of outmigration. In the second period, it is found that outmigration is statistically affecting the two endogenous variables; but, this result does not hold true for the reverse interaction. In short, this study affirms but a vague interaction relationship between outmigration and the regional growth variables. Thus, Hypothesis 3 is only weakly substantiated. Besides, at an aggregate level, the study shows that outmigration is a disequilibrium process. The effects of such a process are more apparent in the second period of time. Therein,

outmigration exhibits a detrimental effect on both income growth and employment growth of the lagging rural municipalities, and the development index is negatively related to outmigration. It may then be concluded, that Hypothesis 4 is supported in the empirical study, and is especially pronounced in the second period of time.

For its part, Hypothesis 5 is weakly supported by the study because the 'development index' appears to significantly explain outmigration only in the second period of time, and is irrelevant in the first one.

In comparison with other empirical studies, this study has reasserted the role of the quality-of-life dimension and, further, shows its importance to outmigration in the course of time. Additionally, this study reaffirms, though weakly, the proposition that outmigration can be a function of the development level. But unlike many equilibrium or disequilibrium migration models, this study does not grant full support to the two-way interaction between outmigration and the regional growth variables. As a matter of fact, in measuring the efficiency of this model in terms of  $R^2$ , it is found that the simultaneous equations in both time periods are only moderately successful in predicting the endogenous variables. In the simultaneous-equations system of the 1961-1971 period, the per cent  $R^2$  ranged from 4.11 to 28.22. The service employment growth equation attained the highest predictive value while the employment income growth equation



had the lowest predictive value. In the 1971-1981 period, the  $R^2$  value ranged from 10.22 to 64.05. Again, the service employment growth equation emerged with the highest predictive power while the employment income growth equation was associated with the lowest predictive value. A comparison of the service employment growth and the employment income growth equations of the two time periods indicated that the two outmigration equations only achieved medium predictive values of 16.88 and 32.78 respectively. It seems that the simultaneous-equations models in both time periods are more successful in predicting the service employment growth, but least successful in predicting the employment income growth equations. As mentioned before, this outcome may be due to the fact that the employment income is a complex phenomenon and not so easily predicable as other income variables. Hence, it is suggested that other income variables like the median family income or wages index should be used in any future research concerning Agro-Manitoba. Furthermore, in comparison with other empirical studies, the service employment equation is only moderately predicted. Again, this outcome suggests that the service employment growth variable may not be a very satisfactory endogenous variable in representing the total employment growth of rural municipalities. Substitution of variables such as the total employment rate or the unemployment rate (as they are used in Greenwood and Chalmers' study) may furnish the employment growth equation with higher predictive power. Nevertheless,

as stated above, it is unfortunate that the employment rate or the unemployment rate are both unavailable for all the three time periods, that is, 1961, 1971 and 1981. Hence they are not used in this study. In short, it is suggested that better endogenous variables concerning regional economic growth should be used if a more powerful simultaneous-equations model for outmigration determinants is to be achieved.

## CHAPTER 6

### CONCLUSION

Despite the specification errors contained within the models, these simultaneous-equations systems still retain their validity for regional development planning. As the employment and service employment growth equations of the 1971-1981 period indicate, outmigration is indeed a disequilibrium process which leads to the widening of disparity: a phenomenon which, in turn, needs particular governmental attention, especially for the more recent period. These two equations have clearly demonstrated that outmigration will significantly lower the employment income growth, as well as the service employment growth of the lagging rural municipalities. On the issue of determining the triggers of outmigration, the two outmigration equations for both time periods have provided insights into future regional development programmes needed for coping with the problem of outmigration. One can infer from these two equations that governments must not only focus on the economic-oriented programmes which are aimed at stimulating economic growth of the localities, they must also show more concern for the programmes which are related to the quality-of-life of individuals. In the outmigration equation of the earlier

period, it is found that 'population growth' is significantly affecting outmigration. This finding suggests that the availability of social amenities or public services is a vital determinant of outmigration. Most of the individuals of the rural municipalities migrate in search of better social amenities or public services elsewhere. In the 1971-1981 outmigration equation, this trend of seeking better social amenities or public services has not abated. Furthermore, there is an increasing number of individuals migrating in order to seek better environmental conditions, particularly as expressed through better housing amenities in other rural localities. These results add credence to the notion that if outmigration is to be halted, both the federal and provincial governments should pay more attention to those programmes which are concerned with the social or environmental amenities of the rural population. Put otherwise, the programmes directed at the provision of public services and housing are particularly important to rural areas if outmigration is to be hampered and regional disparity is to be reduced.

The two outmigration equations in this study further indicate that the economic-oriented programmes are crucial as well. In the earlier period, it is noted that 'growth of population with university education' is negatively impinging on outmigration. This relationship implies that in areas where there is a high growth of educated personnel, there is usually an increase of employment opportunities and conditions of economic betterment commensurate with a viable life style.

Therefore, individuals in these areas are less likely to migrate. Perhaps paradoxically, in the more recent period, the 'development index' has been positively associated with outmigration. This finding indicates that the prosperity of the agricultural sector, which is based on the continuation of mechanization and farm consolidation, is likely to squeeze out sizable numbers of surplus workers who will then be forced to migrate out of their rural municipalities to seek employment opportunities elsewhere. It also implies that the agricultural sector is incapable of providing more employment opportunities for the rural population. By the same token, if more employment opportunities are to be provided, the non-agricultural sectors must be expanded. In brief, the results of these outmigration equations for both time periods suggest that employment opportunities are the basic economic force affecting Agro-Manitoba outmigration in the past twenty years.

As a matter of fact, not only do the two outmigration equations have significant implications for regional development, but the service employment growth equations also shed light on future economic development prospects. The previous level of service employment in both time periods was found to be both highly significant and negatively related to service employment growth. Therefore, it is reasonable to conclude that if employment opportunity growth is to be stimulated in these lagging regions, both the federal and provincial governments must be pressed to continue with active development initiatives. In other words, these lagging

regions should not be left to their own devices if regional disparity is to be reduced. Another variable 'distance from Winnipeg' is also found to be significantly affecting service employment growth for both time periods. This implies that the spread effects or the trickling-down effects of the more developed regions to the lagging regions are very obvious in Agro-Manitoba. Put otherwise, it suggests that those areas which have the highest potential of employment growth should receive the first priority in governmental attention of any sort so that their growth effects can further trickle down or spread to the less-developed regions in a process of contagion.

The service employment growth equation of the earlier period shows that the growth of educated population is a vital determinant of employment opportunities, that is, the higher the education level of the population, the greater the employment opportunities. Nevertheless, in the later period, this education variable has become insignificant. Instead, the variables of 'net outmigration' and 'population growth', which related to the market size of demand for services, have played a more significant role in affecting the service employment growth. These results imply that in the more recent period, the size of market has acted as the major stimulus of service employment growth. As far as the type of economic programmes is concerned, these results suggested that if employment opportunities are to be expanded, more measures aimed at the expansion of market size must be contemplated.

In short, this study has provided three major directions for future regional development on the issue of coping with the problem of outmigration. First of all, the results of this study also indicate that it is the more objective forces that are the most fundamental underlying determinants of outmigration. In other words, longstanding economic-oriented regional policies have been correct in focusing on the most critical aspect of rural Manitoba. Clearly, this substantiates their importance as key underlying elements and endorses continuance of them, or something like them. Furthermore, the DRIE should be made to emphasize the programmes which have the greatest potential for providing more employment opportunities. As made abundantly clear in this study, the agricultural sector is incapable of providing more employment opportunities for rural dwellers. Hence, the development of non-agricultural jobs in the secondary and tertiary sectors is a vital task confronting regional planners. In other words, diversification of economic activities is a key goal for rural municipalities if more employment opportunities are to be provided for the rural population.

Secondly, in addition to promoting non-agricultural sectoral development programmes, this study suggests that the DRIE should devote increasing attention to economic initiatives which are conducive to the expansion of the markets for rural-based consumer goods and services. In no uncertain terms, the empirical model evinced that the

expansion of market size is a crucial force in widening employment opportunities.

Finally, in the case of Agro-Manitoba, all governments must become cognizant of the fact that the quality-of-life dimension is important in affecting outmigration. As indicated in Chapter 2, past policies followed by DREE and DRIE are mainly centred on economic-oriented programmes which are basically biased to land and water resource development as well as the sectoral development measures of the agricultural, manufacturing and tourism industries. As far as Agro-Manitoba is concerned, there are no particular schemes geared to providing for better public services or housing amenities in these regional development agencies. Nevertheless, results in this study show that if the problem of outmigration is to be solved or regional disparity is to be reduced, the DRIE must direct more resources towards the subjective satisfaction of individuals which arise from improved social or environmental amenities in the rural localities. In other words, if a really successful rural development is to be achieved, better public facilities or services must be provided, and the quality-of-life or quantity of housing conditions must be improved.

In fact, there are not a few difficulties in the way of integrating these quality-of-life concerns into the initiatives of DRIE. Firstly, there is the problem of budget constraint. Under the present system of given budget, it is



likely that the inclusion of quality-of-life initiatives will only come about at the expense of the original economic-oriented programmes. Clearly, this scenario could be self-defeating. Secondly, there is the problem of overlapping of programmes with other departments. Public services such as transportation services (for example, highway construction or maintenance) or housing have been the responsibility of federal Transportation Canada, the provincial Department of Transportation, The Canada Mortgage and Housing Corporation (CMHC) and the Manitoba Housing and Renewal Corporation (MHRC). Without interdepartmental co-ordination, the proposed quality-of-life initiatives would likely founder if left solely in the hands of DRIE. Perhaps what can be done at this stage is to improve the co-ordination between DRIE and the other departments as a preliminary step in the long, hard task of realizing regional development in Agro-Manitoba.

At the provincial level, the present trend is more desirable. The recent provincial government though has not provided any blue prints concerning the direction of regional development in Agro-Manitoba, many of the provincial programmes do indicate that the recent NDP government has attempted to not only promoting economic growth but also enhancing the quality-of-life of the localities. One very good example is the attempt of the provincial government in promoting the construction industry. The expansion of construction not only can provide higher employment opportunities for the individuals, it can provide better

housing conditions in the localities, hence the quality-of-life. However, the provincial government should note that economic growth should be remained as the primary concern of regional development in coping with the problem of outmigration. In this case, the economic programmes should deserve a higher share of the available fundings. On the other hand, the provincial government should continue to reinforce or issue the quality-of-life programmes which are capable of complementing regional economic growth. Finally, it should be noted that regional development is an on-going concern that needs clear and definite future direction. In this sense, it is the responsibility of the provincial government to provide black-and-white guidelines for the forthcoming regional development programmes.

## APPENDIX I

### Identification Problems

	$Y_1$	$Y_2$	$Y_3$	$X_1$	$X_2$	$X_3$	$X_4$	$X_5$	$X_6$	$X_7$
1st equation	1	$b_{12}$	$b_{13}$	$a_{11}$	$a_{12}$	$a_{13}$	$a_{14}$	$a_{15}$	0	0
2nd equation	$b_{21}$	1	$b_{23}$	$a_{21}$	$a_{22}$	0	0	0	$a_{26}$	0
3rd equation	$b_{31}$	0	1	$a_{31}$	$a_{32}$	$a_{33}$	0	0	0	$a_{37}$

The coefficient for the endogenous variables is denoted by  $b_{ij}$  ; where :

$i$  = the order of the equation in the model,

$j$  = the assigned number to the variable.

For instance, variable  $Y_1$  will have a coefficient in equation two designated as  $b_{21}$ ; and in equation three as  $b_{31}$ . The coefficient for the predetermined variable is denoted as  $a_{ij}$ ; where :

$i$  = the order of the equation in the model,

$j$  = the assigned number to the variable.

For instance, variable  $X_1$  will have a coefficient of  $a_{11}$  in the first equation,  $a_{21}$  in the second equation, and hence,  $a_{31}$  in the third equation. If any variable does not appear in any of the equations, it will be signified by a zero. The variable of each equation will be assigned a numerical value of 1.

## 2. Extending the Equations

- (i) To extend the first equation, a) strike out the row of coefficients of the first equation; b) strike out the columns for those with non-zero coefficients.

The outcome is a table of parameters of excluded variables, as follows :

	X <sub>4</sub>	X <sub>5</sub>
2nd equation	a <sub>26</sub>	0
3rd equation	0	a <sub>37</sub>

Determinant :

$$\begin{aligned}
 | D | &= \begin{vmatrix} a_{26} & 0 \\ 0 & a_{37} \end{vmatrix}, \\
 &= a_{26} \cdot a_{37} - 0 \\
 &= a_{26} \cdot a_{37} .
 \end{aligned}$$

Provided  $a_{26}$  and  $a_{37} \neq 0$ , then  $| D | \neq 0$ .

- (ii) To extend the second equation, and to perform the same procedures as for first equation, we obtain a table of parameters of excluded variables, as follows :

	X <sub>3</sub>	X <sub>4</sub>	X <sub>5</sub>	X <sub>7</sub>
1st equation	a <sub>13</sub>	a <sub>14</sub>	a <sub>15</sub>	0
3rd equation	a <sub>33</sub>	0	0	a <sub>37</sub>

$$| D_1 | = \begin{vmatrix} a_{13} & 0 \\ a_{33} & a_{37} \end{vmatrix} = a_{13} \cdot a_{37} - 0;$$

provided  $a_{13}$  and  $a_{37} \neq 0$ , then  $|D_1| \neq 0$ .

$$\begin{vmatrix} D_2 \end{vmatrix} = \begin{vmatrix} a_{14} & 0 \\ 0 & a_{37} \end{vmatrix} = a_{14} \cdot a_{37} - 0 = a_{14} \cdot a_{37};$$

provided  $a_{14}$  &  $a_{37} \neq 0$ , then  $|D_2| \neq 0$ .

$$\begin{vmatrix} D_3 \end{vmatrix} = \begin{vmatrix} a_{15} & 0 \\ 0 & a_{37} \end{vmatrix} = a_{15} \cdot a_{37} - 0 = a_{15} \cdot a_{37};$$

provided  $a_{15}$  &  $a_{37} \neq 0$ , then  $|D_3| \neq 0$ .

In other words, there is at least one determinant for the expansion not equal to zero.

(iii) To extend the third equation, we can construe the following table of parameters of the excluded variables,

	$Y_2$	$X_4$	$X_5$	$X_6$
1st equation	$b_{12}$	$a_{14}$	$a_{15}$	0
2nd equation	0	0	0	$a_{26}$

$$\begin{vmatrix} D_1 \end{vmatrix} = \begin{vmatrix} b_{12} & 0 \\ 0 & a_{26} \end{vmatrix} = b_{12} \cdot a_{26} - 0 = b_{12} \cdot a_{26};$$

provided  $b_{12}$  and  $a_{26} \neq 0$ , then  $|D_1| \neq 0$ .

$$\begin{vmatrix} D_2 \end{vmatrix} = \begin{vmatrix} a_{14} & 0 \\ 0 & a_{26} \end{vmatrix} = a_{14} \cdot a_{26} - 0 = a_{14} \cdot a_{26};$$

provided  $a_{14}$  and  $a_{26} \neq 0$ , then  $|D_2| \neq 0$ .

$$\begin{vmatrix} D_3 \end{vmatrix} = \begin{vmatrix} a_{15} & 0 \\ 0 & a_{26} \end{vmatrix} = a_{15} \cdot a_{26} - 0 = a_{15} \cdot a_{26};$$

provided  $a_{15}$  and  $a_{26} \neq 0$ , then  $|D_3| \neq 0$ .

In other words, there is at least one  $|D_i| \neq 0$ , where  $i = 1, \dots, n$ .

## APPENDIX II

### The Reduced Form for the Three Equations

Transposition of the three equations :

$$\begin{aligned} Y_1 - b_{12}Y_2 - b_{13}Y_3 &= b_10 + a_{11}X_1 + a_{12}X_2 + a_{13}X_3 + a_{14}X_4 + a_{15}X_5 \\ -b_{21}Y_1 + Y_2 - b_{23}Y_3 &= b_20 + a_{21}X_1 + a_{22}X_2 + a_{26}X_6 \\ -b_{31}Y_1 + 0 + Y_3 &= b_30 + a_{31}X_1 + a_{32}X_2 + a_{33}X_3 + a_{37}X_7. \end{aligned}$$

The matrix equation becomes :

$$\begin{vmatrix} 1 & -b_{12} & -b_{13} \\ -b_{21} & 1 & -b_{23} \\ -b_{31} & 0 & 1 \end{vmatrix} \begin{vmatrix} Y_1 \\ Y_2 \\ Y_3 \end{vmatrix} = \begin{vmatrix} b_10 + a_{11}X_1 + a_{12}X_2 + a_{13}X_3 + a_{14}X_4 + a_{15}X_5 \\ b_20 + a_{21}X_1 + a_{22}X_2 + a_{26}X_6 \\ b_30 + a_{31}X_1 + a_{32}X_2 + a_{33}X_3 + a_{37}X_7 \end{vmatrix}$$

Applying Cramer's Rule, the reduced-form equation for  $Y_1$  is as follows :

$$Y_1 = \llbracket c_{10} + c_{11}X_1 + c_{12}X_2 + c_{13}X_3 + c_{14}X_4 + c_{15}X_5 + c_{16}X_6 + c_{17}X_7 \rrbracket / D$$

$$\text{where } c_{10} = b_10 + b_{12}b_20 + b_{12}b_{23}b_30 + b_{13}b_30,$$

$$c_{11} = a_{11} + b_{12}a_{21} + b_{12}b_{23}a_{31} + b_{13}a_{31},$$

$$c_{12} = a_{12} + b_{12}a_{22} + b_{12}b_{23}a_{32} + b_{13}a_{32},$$

$$c_{13} = a_{13} + b_{12}b_{23}a_{33} + b_{13}a_{33},$$

$$c_{14} = a_{14},$$

$$c_{15} = a_{15},$$

$$c_{16} = b_{12}a_{26},$$

$$c_{17} = b_{12}b_{23}a_{37} + b_{13}a_{37},$$

$$D = 1 - b_{12}b_{21} - b_{13}b_{31}b_{23} - b_{13}b_{31}.$$

Reducing  $Y_2$  by Cramer's Rule, we may get :

$$Y_2 = \langle c_{20} + c_{21}X_1 + c_{22}X_2 + c_{23}X_3 + c_{24}X_4 + c_{25}X_5 + c_{26}X_6 + c_{27}X_7 \rangle / D$$

where,  $c_{20} = b_{20} + b_{23}b_{30} + b_{21}b_{10} + b_{31}b_{23}b_{10} + b_{13}b_{21}b_{30} - b_{13}b_{31}b_{20},$

$$c_{21} = a_{21} + b_{23}a_{31} + b_{21}a_{11} + b_{31}b_{23}a_{11} + b_{13}b_{21}a_{31} - b_{13}b_{31}a_{21},$$

$$c_{22} = a_{22} + b_{23}a_{32} + b_{21}a_{12} + b_{31}b_{23}a_{12} + b_{13}b_{21}a_{32} - b_{13}b_{31}a_{22},$$

$$c_{23} = b_{23}a_{33} + b_{21}a_{13} + b_{31}b_{23}a_{13} + b_{13}b_{21}a_{33},$$

$$c_{24} = b_{21}a_{14} + b_{31}b_{23}a_{14},$$

$$c_{25} = b_{21}a_{15} + b_{31}b_{23}a_{15},$$

$$c_{26} = a_{26} - b_{13}b_{31}a_{26},$$

$$c_{27} = b_{23}a_{37} + b_{13}b_{21}a_{37},$$

$$D = 1 - b_{12}b_{21} - b_{13}b_{31}b_{23} - b_{13}b_{31}.$$

Reducing  $Y_3$  by Cramer's Rule, we may have :

$$Y_3 = \langle c_{30} + c_{31}X_1 + c_{32}X_2 + c_{33}X_3 + c_{34}X_4 + c_{35}X_5 + c_{36}X_6 + c_{37}X_7 \rangle / D$$

where ,  $c_{30} = b_{30} - b_{12}b_{21}b_{30} + b_{12}b_{31}b_{20} + b_{31}b_{10},$

$$c_{31} = a_{31} - b_{12}b_{21}a_{31} + b_{12}b_{31}a_{21} + b_{31}a_{11},$$

$$c_{32} = a_{32} - b_{12}b_{21}a_{32} + b_{12}b_{31}a_{22} + b_{31}a_{12},$$

$$c_{33} = a_{33} - b_{12}b_{21}a_{33} + b_{31}a_{13},$$

$$c_{34} = b_{31}a_{14},$$

$$c_{35} = b_{31}a_{15},$$

$$c_{36} = b_{12}b_{31}a_{26},$$

$$c_{37} = a_{37} - b_{12}b_{21}a_{37},$$

$$D = 1 - b_{12}b_{21} - b_{13}b_{31}b_{23} - b_{13}b_{31}.$$

## APPENDIX III

### The Study Area and Units

The study area subjected to research is known as Agro-Manitoba, and is defined as the southern part of the Province of Manitoba in which agricultural activities are dominant. To be more exact, the area stretches southward to the national boundary with the U.S.A.; to its west and east, there lies the provincial boundaries with Saskatchewan and Ontario respectively; to its north, the 53° latitude (Brierley and Todd, 1985). The total area amounts to 14.2 million ha.

Agro-Manitoba has been much troubled by the problem of outmigration in the past as well as the more recent period. Between 1961 and 1971, all the 114 rural municipalities in Agro-Manitoba lost population through outmigration. In the period of 1971-1981, it is found that 17 of the 112 (redefined) rural municipalities gained population through net migration. In other words, 15.18% of the rural municipalities had gained population while 84.4% of them continued to lose population through the process of outmigration. Therefore, in the past 20 years, rural Manitoba is quite rightly considered to be one of the problem regions in the Province of Manitoba. Moreover, both the federal and the provincial governments have attempted to solve this regional problem through various



programmes aimed at stimulating economic growth.

Rural municipalities (or county equivalents) are used as the study units. According to Statistics Canada (1981), 'municipality refers to an area with corporate status government by Provincial and Territorial Acts. These acts differ from province to province and vary in name, status, and administrative powers'. As noted by Bogue (1959) and Lee (1950), the county (or rural municipality) is a meaningful unit for studying migration. Indeed, it is the smallest areal unit for which comparable data are available for the entire study area - Agro-Manitoba.

Prior to 1981, there were 114 rural municipalities in Agro-Manitoba. In 1981, the Northern Fisher and Southern Fisher units were combined to form one unitary municipality, as were Northern Alexander and Southern Alexander. Since 1981, then, there are 112 rural municipalities. For the ease of comparison and analysis of migration determinants of the time periods for 1961-1971 and 1971-1981, the data of Northern Fisher and Southern Fisher or Northern Alexander and Southern Alexander are regarded as if they have been combined in the 1961-1971 period. Among these 112 rural municipalities, Cornwallis, Daly, Mountain North and Mountain South are considered to be the outliers and are excluded from this study owing to their extremely high turnover of net outmigration in the past two decades. Hence in this study, only 108 rural municipalities are involved (see APPENDIX IV).

## APPENDIX IV

### Rural Municipalities of Agro-Manitoba

Albert  
Alexander  
Alonsa  
Archibald  
Argyle  
Armstrong  
Arthur

Bifrost  
Birtle  
Blanshard  
Boulton  
Brenda  
Brokenhead

Cameron  
Cartier  
Clanwilliam  
Coldwell

Dauphin  
de Salaberry  
Dufferin

Edward  
Ellice  
Eriksdale  
Ethelbert

Fisher  
Franklin

Gilbert Plains  
Gimli  
Glenella  
Glenwood  
Grahamdale  
Grandview  
Grey

Hamiota  
Hanover  
Harrison  
Hillsbery

La Broquerie  
Lac du Bonnet  
Lakeview

Langford  
Lansdome  
Lawrence  
Lorne  
Louis

MacDonald  
McCreary  
Miniota  
Minitonas  
Minto  
Montcalm  
Morris  
Morton  
Mossey River

North Cypress  
North Norfolk

Oakland  
Ochre River  
Odanah

Park North  
Park South  
Pembina  
Pinawa  
Pipestone  
Portage la Prairie

Reynolds  
Rhineland  
Ritchot  
Riverside  
Roblin  
Rockwood  
Roland  
Rosedale  
Rossburn  
Rosser  
Russell

Saskatchewan  
Shell Mouth  
Shell River  
Shoal Lake  
Sifton  
Siglunes  
Silver Creek  
South Cypress  
South Norfolk  
Springfield  
Stanley  
Strathclair

Strathcona  
Stuartburn  
St. Andrews  
St. Clements  
St. Francois Xavier  
St. Laurent  
St. Rose  
Ste. Anne  
Swan River

Tache  
Thompson  
Turtle Mountain

Victoria

Wallace  
Westbourne  
Whitehead  
Whitewater  
Winchester  
Woodhaven  
Woodlands

APPENDIX V  
Variable Names

Category	Code	Name
<b>Farm Structure</b>		
1. Farm Size	S10	% of farms with size 10-248 acres
	S249	% of farms with size 249-559 acres
	S560	% of farms with size 560-1119 acres
	S1120	% of farms with size 1120-2239 acres
2. Animal Rearing	CATT	No. of cattle
	MILK	No. of milk cows
	Hens	No. of hens and chickens
Crop Farming	WHEAT	Bushels of wheat
	BARLEY	Bushels of barley
	PEA	Bushels of peas
	SEED	Bushels of seeds
3. Residency	RES	% of residential farmers
	NONRES	% of non-residential farmers
4. Tenancy	OWN	% of farm owned
<b>Farm Operators</b>		
1. Ethnicity	BRI	% of population of British origin
	FREN	% of population of French origin
	GER	% of population of German origin
	UKR	% of population of Ukrainian origin
2. Age	F2544	% of farmers 25-44 years old
	F60	% of farmers over 60 years old
	Y2544	% of population 25-44 years old
	Y65	% of population over 65 years old
<b>Technical Advance</b>		
	AMTCH	Amount of chemical used

## Glossary

ADA	Area Development Agency
ADIA	Area Development Incentive Act
ARDA	Agricultural and Rural Development Act
BLUE	best linear unbiased estimator
COMEF	Committee on Manitoba's Economic Future
DREE	Department of Regional Economic Expansion
DRIE	Department of Regional Industrial Expansion
ERDA	Economic and Regional Development Agreement
FRED	Fund for Rural Economic Development Act
GDA	General Development Agreement
IRDP	Industrial Regional Development Programmes
RDIA	Regional Development Incentives Act
TED	Targets for Economic Development

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