AN ECONOMIC ANALYSIS OF INTERNAL MIGRATION IN THE LIBYAN ARAB REPUBLIC

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CHAPTER I

INTRODUCTION

Much emphasis has been placed on internal migration and on factors that influence it in developed countries. Few studies have dealt with the factors which influence migration in developing countries or its effect on per capita income inequality between regions.

One of the characteristics of the labor market in Libya is the movement of people from rural and interior areas to the urban areas such as Tripoli and Benghazi. The existence of such large population movements in Libya can be seen by looking at the growth figures of the population of the two main regions, Tripoli and Benghazi. Table I shows the population of Tripoli and Benghazi regions in 1954, 1964 and 1973, and the growth rate of their population during 1954-1964 and 1964-1973.

From Table I the population of Tripoli region increased from 263,523 in 1954 to 406,356 in 1964 and to 709,117 in 1973, while the population of Benghazi region increased from 134,173 in 1954 to 224,653 in 1964 and 331,180 in 1973. Although part of this increase is due to a high rate of natural increase, an important contributing factor is the substantial migration to these regions. For example, the

TABLE I

THE POPULATION OF TRIPOLI AND BENGHAZI REGIONS IN 1954, 1964 and 1973 AND THE GROWTH RATES OF THEIR POPULATION DURING 1954-1964 AND 1964-1973.

Region (Muhafada)	Population 1954[1]	% of Total Population 1954	Population 1964[2]	% of Total Population 1964	Population 1973[2]	% of Total Population 1973	Growth Rate 1954-64	Growth Rate 1964-73
Tripoli	263,523	24.2	406,315	26	709,117	31.4	4.3	6.9
Benghazi	134,173	12.3	224,653	14.4	331,180	14.6	5.3	4.6
Libya	1,088,889	100	1,564,369	100	2,257,037	100	3.7	4.3

Source: (1) Libyan Arab Republic Ministry of Planning and Scientific Research, "Settlement Pattern Study," Tripoli Macro-Region--A Draft Copy. A Report from the Italconsult, Vol. IV Rome (July, 1975), p. B-1.

(2) Libyan Arab Republic Ministry of Planning, Census and Statistical Department, Statistical Abstract (Tripoli, 1973), p. 10.

percentage natural increase of Tripoli during the period 1964-1973 is 32.4 while the percentage increase of the population in this region during the same period is 74.5.[1] For Benghazi the percentage of natural increase is 34.5, while the percentage increase of its population during the period 1964-1973 is 47.4.[2] Therefore, the role of internal migration in the growth of these two regions is evident at least during the period 1964-1973.

This study will investigate the determinants of internal migration and the impact of the internal migration process on the per capita income inequality between the different regions in Libya.

The Nature of the Problem

Libya like other developing countries has experienced a huge increase in the size of its cities. An important contributing factor has been the movement of people from the surrounding and the interior areas.

The many factors causing this phenomenon can be broken down into two categories: economic and noneconomic. Noneconomic factors include demographic, sociological, and psychological factors. Many of these factors are not

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[1]Libyan Arab Republic Ministry of Planning, "Settlement Pattern Study," Tripoli Macro-Region, A Report from Italconsult. A Draft Copy, IV, Rome (July, 1975), p. B-8.

[2]Libyan Arab Republic Ministry of Planning, "Settlement Pattern Study, " Benghazi Macro-Region, A Report from Italconsult. A Draft Copy, V, Rome (July, 1975), p. B-8.

measurable. It has been found in general that the measurable factors are the economic and demographic factors. This study will examine economic and demographic determinants of and consequences of internal migration in Libya.

Internal migration in Libya is not new. One can trace it back to the nineteen century. However, this migration increased very rapidly in the late fifties and sixties due to the stimulus of the discovery of oil which has increased the economic opportunities in the city.

The study of internal migration is the key component in the study of the labor market in the country. The data and the analysis of migration gives the foundation of a policy of regional development. Internal migration is viewed as a feature of the development process. However, migration in the developing countries leads to the increase in the demand for social services in the urban areas and this leads government officials to convert the development funds from productive investment to the provision of social services.

It is very important in policy making to get quantitative information on the important variables that are expected to explain internal migration and the impact of internal migration on the per capita income differential.

This study measures the variables that are expected to determine migration and expected per capita income differentials in order to understand the migration process and its impact on the expected per capita income differentials

between the regions. This study can be useful to policy makers when making decisions with respect to both internal migration and regional development.

The Purpose of The Study

The study has two objectives: (1) to investigate the main determinants of internal migration in Libya. In other words to test the hypothesis that migration flows from regions with low per capita income to regions with high per capita income. We expect that the migrant will base his decision to migrate in response to income differentials among the regions. Thus a better allocation of resources is achieved and a favorable effect on economic growth is the result[3] and (2) to investigate the effect of internal migration on regional inequality in per capita income. Once we demonstrate that migration improves resource allocation, then we expect that as the process of migration continues, the regional inequality of per capita income will decrease.

Significance of the Study

Since this study investigates the determinants of internal migration and the impact of internal migration on

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[3]Bernard Okun and Richard W. Richardson, "Regional Income Inequality and Internal Population Migration," Economic Development and Cultural Change, 9 (January, 1961), pp. 129.

the inequality of per capita income, its significance stems from the following points:

(1) It is the first study of internal migration and its impact on the per capita income differential in Libya.

(2) The Libyan economy experienced structural changes during the period 1954-1964 and 1964-1973 and this led to a large movement of people from region to region.

(3) This study is different from most of the studies in the developing countries in terms of data of migration. Most of the studies in developing countries used the life time migration--that migration flows accumulated over a long period of time--as the dependent variable. This life time migration is related to explanatory variables at the end of the period. This kind of data may lead to misleading results. This problem is reduced in this study by using the data of migration that sum migration over a ten year period and a nine year period, and thus giving a better indication about what is going on in the real world.

(4) This study differs from other studies in developing countries in employing simultaneous-equation model to determine not only the factors that explain internal migration (as most studies do) but the impact of the internal migration process on the per capita income differential.

(5) This study incorporates the expected per capita income differential [expected per capita income of

region j, for example, is the per capita income of region j adjusted to the probability of obtaining a job in that region][4] rather than the current income differential in the model of migration. The expected per capita income differential may give a better indication about the economic well-being of the individuals of the region.

Organization of the Study

This study is divided into seven chapters. This chapter provides an introduction and the nature and the purpose of the study.

Chapter II deals with the economic background of the country. This background is very important because of the structural changes in the economy that took place during the period of the study. This chapter also presents the historical background of internal migration in Libya from 1943 to 1973.

Chapter III presents the characteristics of the migrants as well as the migration selectivity in Libya.

Chapter IV presents a model of internal migration and expected per capita income differential. The model presents a theoretical explanation of the migration process and its impact on per capita income differential.

Chapter V is devoted to the discussion of the

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[4]For more details see Chapters IV and V of this study.

empirical results.

Chapter VI presents the interpretations of the empirical results of the study.

Chapter VII deals with the conclusions and implications of the study.

CHAPTER II

ECONOMIC AND HISTORICAL BACKGROUND OF INTERNAL MIGRATION

The purpose of this chapter is to summarize the state of the economy of Libya before and after the discovery of oil, in order to provide the background for a discussion of internal migration in Libya from approximately 1943 to 1973. The description of the economy is very important because of the dramatic transformation that has occurred in recent years. The discovery of oil has changed the country from one of the poorest in the world to one of relative affluence. This change has had great effects on internal migration in Libya.

Economic Background

Libya was a very poor country in 1952. The per capita income was estimated at about $40 per year. Most of the population lived at a bare subsistence level. The agricultural sector was sparse and limited by the lack of water and climatic conditions. However, this sector contained about ninety percent of the active population.[1]

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[1] T. C. Parks, "The Impact of Petroleum Industry on the

Mineral resources were considered to be nonexistent. Skilled labor did not exist and businessmen were few in number because Italians excluded Libyans from the educational system and the civil service during their rule.[2]

As a result, the Libyan economy was a deficit economy. The balance of trade was in deficit; the budgets of the states and the municipalities were in deficit. The state of the economy was well described by Rawle Farley: "In fact, the whole economy was operating at a deficit for a decade without the productive power to pull itself from this state of affairs."[3]

Given these circumstances the outlook for economic development in Libya was discouraging. Therefore, prior to the discovery of oil, the Libyan economy was characterized by the same problems which exist in many less-developed countries: a low level of domestic production and consumption; a chronic trade deficit, which is off-set only by foreign aid; a low level of literacy and health; and a lack of natural resources and fertile land.[4]

Economic Development of Libya" (unpub. Ph.D. dissertation, University of Illinois, 1974), p. 15.

[2]International Bank for Reconstruction and Development, The Economic Development of Libya (Baltimore, 1960), p. 7.

[3]Rawle Farley, Planning For Development in Libya, The Exceptional Economy in the Developing World (New York, 1971), p. 109.

[4]United States Department of Commerce, Basic Data on the Economy of Libya (Washington, D.C., OBR, 64-112, 1964), p. 5.

The population of Libya in the early 1950s was one million. Twenty to twenty-five percent of this population lived in the cities, forty-five to fifty percent lived in rural areas, and twenty-five percent lived a nomadic or semi-nomadic way of life.[5] In addition, the Libyan economy was characterized by what is called a "dual economy."[6] The traditional sector were represented by the agricultural sector and the rural areas, while the modern sector was represented by the oil industry and other services that depended on the oil industry in the cities, especially Benghazi and Tripoli.

In the late 1950s, a new source of finance was developed, following the enactment of the petroleum law of 1955. The petroleum sector had become active in exploration, drilling and construction with great repercussions on the rest of the economy. The impact of the oil industry in the late 1950s resulted from the injection of domestic expenditures into the economy in the form of wages and salaries paid by the oil companies. The economy began to grow with an increase in national income because of the increase in the demand for goods and services. The gross domestic product (at current prices) grew from an estimated 15 million Libyan pounds to about 52 million pounds during

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[5]International Bank For Reconstruction and Development, p. 28.

[6]Ibid., p. 3.

the period 1950-1958.[7]

The growth of gross domestic product in the early 1950s was due to technical assistance (foreign aid); growth in the later period was generated by the activities of oil companies in exploring and drilling for oil. The discovery of oil and its exportation has had drastic impact on the economy as well as the society of Libya. For example, the real rate of increase of gross domestic product during the two years following 1962, when the oil exportation began to turn revenues in the country, was 43 percent annually. It is estimated that real per capita income grew at an average rate of 19.8 percent annually.[8]

Table II shows per capita income during the period following the production and exportation of oil. It shows how the economy has changed because of the oil industry.

One of the most important impacts of the increased economic activity on Libya was the drift of population from the most depressed regions (mostly the rural regions) to the most advanced regions, especially the regions of Tripoli and Benghazi.

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[7]Libyan Arab Republic Ministry of Planning and Development, Economic and Social Affairs Department, "Recent Economic and Social Development," A Draft Report, Tripoli (December, 1968), p. 3.

[8]Ibid., pp. 6-7.

TABLE II

GROWTH OF PER CAPITA INCOME 1962-1967
AT CONSTANT 1964 PRICES

	1962	1963	1964	1965	1966	1967
Per Capita Income in Libyan Dinars	118.0	164.2	188.2	239.9	266.0	284.8

The average annual growth (%) 1962-1967=19.8.

Source: Libyan Arab Republic Ministry of Planning and Development, Economic and Social Affairs Department, "Recent Economic and Social Developments," A Draft Report, Tripoli (December, 1968), p. 8, Table 1-2.

Internal Migration: 1943-1954

Because the data prior to 1954 are not available for all of the regions in the country, Benghazi and Tripoli, for which data are available, will be used to provide a description of internal migration prior to 1954. The reasons for using Tripoli and Benghazi are:

1. Some estimated figures of in-migration to Benghazi and Tripoli are available.
2. At that time, Libya was divided into three states. Benghazi and Tripoli were the capitals of the two coastal states and also were the federal capitals of Libya. Furthermore, they were the only big urban

centers in the country.

3. The modern sector of the economy was concentrated in Tripoli and Benghazi. Consequently, opportunities for job improvement were available there.

Before the period 1954-1964, it is very difficult to find a reliable data about migration flows. Some studies estimated migration to Tripoli and Benghazi. The flows of migration to the urban center, at least to Tripoli, began in 1943. This is a reasonable starting point because before 1943 Italian rule restricted in-migration to the cities. Italian rule ended in 1943 and migrants were free to enter the city. The number of in-migrants to Tripoli in 1943 was 3414, and it increased to 5032[9] in 1954.[10]

A socio-economic survey conducted in 1969 in Benghazi showed that out of a sample of 355 in-migrants to Benghazi, 191 came to Benghazi before 1954; 13 percent of the 191 migrants from urban areas and 41 percent of them from rural areas.[11] The survey also indicated that more than one-third

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[9]Yassin Elkhabir, "Assimilation of Rural Migrants in Tripoli, Libya" (unpub. Ph.D. dissertation, Case Western Reserve University, 1972), p. 60.

[10]These figures are life time migration which means that the migration by place of birth and the place of residence at a point of time. Thus the migration data in this case includes the flows over a long period of time. In other words it includes the old as well as the recent migrants.

[11]S. Mukurji and A. Kataifi, "Socio-Economic Survey in Benghazi," Dirassat, The Libyan Economic and Business Review, VI, No. 1 (1970), pp. 6-7 and Table 2, p. 35.

of the migrants came to Benghazi between 1949 and 1958 with nearly the same proportion arriving before 1949.[12]

One reason behind in-migration to Tripoli and Benghazi at that time was--as we noted above--the ending of Italian rule and thus of the restriction on in-migration to the cities. Therefore, people in the rural and interior areas were free to move to these cities and to other towns. The employment opportunities offered by the presence of the foreign military bases provided another reason for in-migration to Tripoli and Benghazi in the early period. The British employed from 7,000-9,000 persons as cooks, launderers and mechanics in 1946.[12] Most of these workers were migrants from the interior and rural areas. The American base employed about 5,500 in the 1950s.[14] These military bases have left Libya recently.

Internal Migration: 1954-1964

Internal migration increased very rapidly during the period 1954-1964. The increase in the volume of internal migration had many causes. Among them were the existence of urban economic opportunities and the increase in urbanization (especially in Tripoli and Benghazi). The most

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[12] Ibid., pp. 6-7.

[13] R. S. Harrison, "Migrants in the City of Tripoli, Libya," The Geographical Review, 57, No. 3 (July, 1967), p. 403.

[14] Ibid.

important stimulus to migration in this period was the exploration for oil and its discovery. The exploration for oil stimulated economic activities in the city which, in turn, strengthened the in-migration flows.

After 1955, the oil companies and the contractors working for them provided employment opportunities in the main cities. Migration was intensified by the growth of employment opportunities in construction and the service sectors. Since they grew as a result of the exploration, production of oil and of public investment (after 1961)[15], the petroleum sector was also an indirect cause of migration as noted by the United Nation Mission to Libya,

> The indirect impact of oil company operations on the economy is to be observed, particularly in Tripoli, in the sharp rise in prices of housing rents, hotel accomodation and other services bought mainly by foreigners, in the almost equally sharp rise in wages and salaries paid to skilled and semi-skilled Libyan workers, in the establishment of many new Libyan and foreign trading and construction enterprises, catering to oil company requirements, in the acceleration of the drift of labor from the land (most conspicuously in Fezzan) and in the general boom in trading and servicing activities of all kinds.[16]

In short, the oil-boom industries, such as construction, transportation and other services grew very rapidly. Such activities need labor. Migrants from the rural and the interior areas of the country supplied this labor.

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[15]Elkhabir, p. 47.

[16]International Bank for Reconstruction and Development, p. 62.

Thus, the prospertiy of the cities which was introduced by oil activities, caused the people to move from the depressed areas to the prosperous cities, particularly Tripoli and Benghazi. If we consider all other regions as agricultural areas with the Tripoli and Benghazi regions as the only urban centers, then the people who moved were moving from the rural areas to the urban areas (Tripoli and Benghazi).[17] These migrants were attracted by the high wages paid by the oil industry and the oil-boom industries in the cities, as F. C. Thomas noted,

> The starting [wage][18] rate is 35 piasters for an eight-hour work day, and the unskilled laborer can soon advance to 42 or even 50 piasters a day, almost twice the amount which the farm laborer is paid for a ten or eleven-hour day.[19]

Table III shows the per capita income of each region and regional per capita income as a percent of national per capita income in 1964 with Figure 1 providing the geographical regions. The regions of Tripoli and Benghazi have the highest per capita income with other regions lagging behind. The Tripoli region, which has the highest per capita income in Libya, has 145 percent of the national per capita income

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[17]The assumption of Tripoli and Benghazi regions as the only urban centers is not far from fact. The population census of 1964 defined Tripoli and Benghazi plus small proportion of Beida and Derna as the urban population in Libya.

[18]Words between brackets were added.

[19]Frederic C. Thomas, "The Libyan Oil Workers," The Middle East Journal, 15 (Summer, 1961), p. 266.

TABLE III

THE PER CAPITA INCOME OF EACH REGION AND REGIONAL PER CAPITA INCOME AS A PERCENT OF NATIONAL PER CAPITA INCOME IN 1964.

Region (Muhafada)	Per Capita Income L.D. 1964	Percent of Libyan Per Capita Income
Derna	87	84
Elkabal Aghdar	90	87
Benghazi	134	128
Musrata	94	90
Khoms	74	71
Tripoli	151	145
Zawai	78	75
Gharian	58	56
Sebha	86	83
Libya	104	100

Source: Libyan Arab Republic Ministry of Planning, Department of Social and Economic Affairs, "Statistical Survey of Most Economic Sectors by Regions," In Arabic (Tripoli, 1968). No page number assigned.

with Gharian region, which has the lowest per capita income, has 56 percent of the national per capita income.

Thus, individuals in the urban centers appear to have benefited most from the exploration and the production of oil. The resident of rural and interior areas benefited

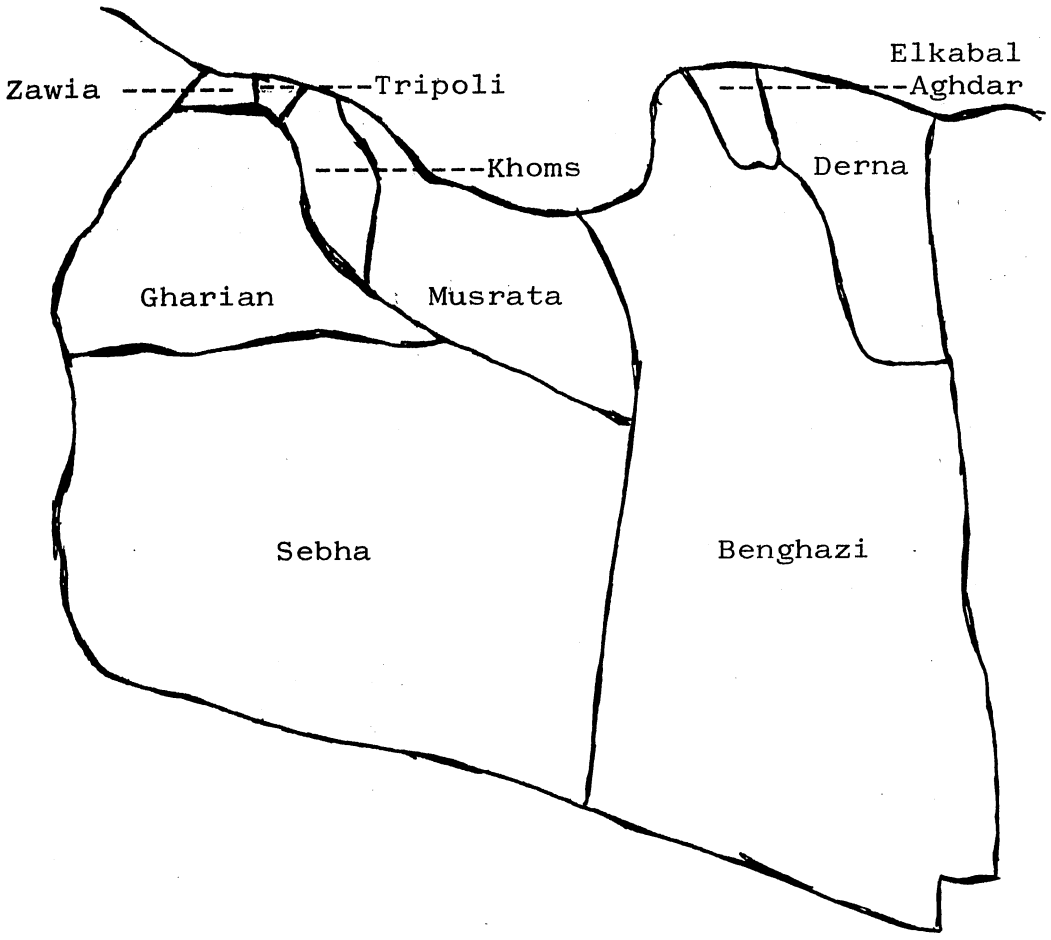

Figure 1. Administrative Regions of Libya (1964)

very little as compared to the urban areas. For instance, John Clarke noted that

> The two cities of Tripoli and Benghazi are far outstripping all other towns. . .In constrast to the growing momentum in the development of Tripoli and Benghazi, most of the other towns of Libya. . .have experienced either stagnation or decline.[20]

The per capita income differential among regions and implicitly the high wages paid by the oil and oil-boom industries would be expected to attract many people from their rural residences to the urban centers. To show the importance of the high proportion of in-migration, the Bank of Libya conducted a survey of the workers working in the industrial establishments of Tripoli and Benghazi. Fifty percent of the 793 workers sampled were from outside Tripoli and Benghazi.[21] During the period 1954-1964, the number of in-migrants to Tripoli and Benghazi was 24,345 and 14,175 migrants, respectively. As seen in Table IV in-migration to Tripoli constituted forty-six percent and in-migration to Benghazi constituted twenty-seven percent of the total migration. In-migration to both cities constituted seventy-three percent of total in-migration. In-migration to all other regions was very low and ranging from 3,000 in Elkabal Aghdar to 700 in Khoms. More

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[20]John Clarke, "Oil in Libya, Some Implications," Economic Geography, 39 (January, 1963), p. 55.

[21]Harrison, p. 406.

TABLE IV

THE NUMBER OF IN-MIGRANTS, OUT-MIGRANTS, NET MIGRATION AND THE PERCENTAGE OF IN-MIGRATION AND OUT-MIGRATION IN ALL THE REGIONS IN LIBYA DURING THE PERIOD 1954-1964.

Region (Muhafada)	Out-Migration	In-Migration	Net Migration	Percentage of In-Migration to Total Number of Migrants	Percentage of Out-Migration to Total Number of Migrants
Derna	3716	2227	-1489	4.24	7.07
Elkabal Aghdar	4418	3552	- 866	6.76	8.41
Benghazi	4255	14175	+9920	26.97	8.10
Musrata	8039	943	-7096	1.79	15.30
Khoms	9502	712	-8790	1.35	18.09
Tripoli	5633	24395	+18762	46.37	10.72
Zawia	5636	4536	-1100	8.68	10.72
Gharian	9972	864	-9108	1.64	18.97
Sebha	1437	1204	- 233	2.29	2.73
TOTAL	52,608	52,608	0	100	100

Source: Libyan Arab Republic Ministry of Planning and Scientific Research, "Settlement Pattern Study," Tripoli Macro-Region--A Draft Copy. A Report from the Italconsult, Vol. IV Rome (July, 1975), Table b.11.1, p. B-23. (The figures in Table IV have been calculated using the distribution of the migrants by the region.)

comprehensive information is summarized in Table IV which gives the number of in-migrants, out-migrants, net migration, and the percentage of in-migration and out-migration in all the regions in Libya during the period 1954-1964.

From Table III and Table IV, it is clear that regions with low per capita income experienced a large out-migration. Gharian was the most depressed region with the lowest per capita income in Libya. It had the largest number of out-migrants (9972) during the period 1954-1964. Khoms was the region with the second lowest per capita income and it had the second largest number of out-migrants (9502 migrants).

These examples indicate that the less-developed regions experienced a high rate of out-migration during the period 1954-1964, while the prosperous regions experienced the highest rate of in-migration during the same period. It is worth noting that the only two regions that experienced positive net migration were Tripoli and Benghazi, the regions with highest per capita incomes.

Internal Migration: 1964-1973

Migration and The Income Per Worker By Sector

It seems that this period is perhaps the most important because internal migration has increased very rapidly, from 52,608 migrants during the period 1954-1964 to 165,143 migrants during the period 1964-1973. The economy also experienced structural changes due to the flow of oil

revenues and government expenditures on development.

The immediate impact of oil was the injection of expenditures into the urban sector.[22] Wages in the urban sector increased very rapidly compared to the agricultural sector wage rate which includes approximately all other regions in the country. Table V shows the income per worker by sector of the economy. From Table V it is clear that the agricultural sector has the lowest income per worker while the oil and oil-boom sectors (such as trade, construction, finance and transport) have the highest income per worker in the economy.

Because of the high wages offered by the urban sector agriculture became a relatively unprofitable occupation. Thus, many of the people who were in the interior and the rural regions began to move. As we noted earlier that these movements began in the fifties but they increased rapidly during the sixties.

Migration and Governmental Policies

The structure of the economy changed during the period. Government expenditures on development increased very rapidly, the growth rate of income per year during the period 1964-1971 was 14.6 percent, and the growth rate of per capita income per year was 10.9 percent. Most of

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[22]Parks, p. 155.

TABLE V

THE INCOME PER WORKER BY SECTOR OF THE ECONOMY

Branch of Economy	Income per Worker in L.D. - one Libyan Dinar (L.D. = $3.37 in 1976)	Percentage of Income in Agriculture
Petroleum	4098	891
Trade	3150	685
Construction	1967	428
Finance	2103	457
Transport	1525	332
Government Services	1470	320
Electricity	832	181
Manufacturing	827	180
Other Mining	485	105
Agriculture	460	100
All Branches	1473	320

Source: Libyan Arab Republic Ministry of Planning and Scientific Research, Demography and Manpower Planning Section, "A Report on Manpower Situation-1974--Past Trends, Present Features and Strategy For the Plan 1976-1980," Tripoli (July, 1975), p. 57.

the regions did not get their fair share of the development expenditures and growth was not evenly distributed.[23] This led to the problem that most of the regions do not have the facilities and public services that are available in Tripoli and Benghazi, and this affects the structure of the income and living standards in these regions.[24]

The governmental policies before 1970 played a large role in encouraging migration from the rural and interior areas to Tripoli and Benghazi. Before 1970 the government had no regional planning. Most of the development budget went to Tripoli and Benghazi, where development expenditures were designed to build housing, health programs and educational facilities. Most of these programs were concentrated in Tripoli and Benghazi.

T. C. Parks noted that "By locating the programs in urban areas, the government further increased the real income differential between the rural and urban sectors."[25]

Another government policy led to the flow of population from the rural and the interior regions to Tripoli and Benghazi regions. This was the employment policy of the government before 1970. After the exportation of oil with oil revenues flowing to the government, it began to create

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[23]Auditing Department (Diwan El-Mohasaba), Annual Report (Tripoli, 1974), p. 139.

[24]Ibid., p. 140.

[25]Parks, p. 155.

new jobs in its own departments to absorb the unemployed people.[26] This policy provided further encouragement to internal migration. One study found that twenty percent of the migrants to Benghazi, who were engaged in agriculture before migration, had jobs with the government and it is most likely they were engaged in unimportant services such as messengers, watchmen, etc.[27]

Thus the government policies at that time not only increased the real income differential but also provided the migrants with unproductive jobs and encouraged them to leave the agriculture and their previous jobs in agriculture. The government also required that all unskilled labor in the petroleum sector had to be hired from the region in which the oil operations were taking place. Thus, when an oil company arrived at a region, it hired the labor force needed; when the work was completed, this labor force would be fired. The effect of this policy was that these people, who were previously satisfied with farming, were no longer interested in it. Even if they returned to their villages, they began to look for a job in either Tripoli or Benghazi. Therefore, the hiring policy or the oil companies encouraged internal migration.

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[26]R. Mabro, Labour Supplies and Labour Stability, A Case Study of the Oil Industry in Libya, Bulletin of the Oxford University Institute of Economics and Statistics, 32 (November, 1970), p. 327.

[27]Mukurji and Kataifi, pp. 14-15.

As Frederic Thomas said:

> For most of the rural population, their first contact with oil industry is when an exploration party moves into the district and hires some labor from the village. . . .But after a while he usually quits the job; or the party moves to another district and he is laid off. He returns to his village but rarely does he go back to farming, especially if his land has not been worked during his absence. Instead of embarking on major task of repairing and irrigation channels, rebuilding fences, and breaking up the soil, he waits for a while and then looks for another job. If another oil party comes into the area, he may be in luck; if not, he may consider going to Tripoli or Benghazi to obtain work.[28]

In 1970 the Revolutionary Command Council issued a new development plan. This plan--for the first time--allocated expenditures for the development of the different regions in Libya (Muhafada). The objective of these expenditures is to build infrastructure in the regions and to narrow the real income differential among the regions, particularly between Tripoli and Benghazi on one side and the other regions on the other side. A careful analysis of the allocation of the actual expenditures will show that these efforts were not enough. For example, the development expenditures for 1972/1973 allocated 348,789,587 L.D. by region.[29] It seems that there was a huge gap in the allocation of the share of each region from these expenditures. As seen in Table VI Tripoli and Benghazi had the

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[28]Thomas, p. 265.

[29]Auditing Department, p. 151.

highest share of these expenditures. The percentage of development expenditures allocated to Benghazi and Tripoli regions constitute 21.7 percent and 33.6 percent of the total expenditures allocated, respectively, while the most depressed regions such as Khoms and Gharian received only 3 percent and 3.8 percent of the total allocation. Thus, most of the allocation actually went to the most prosperous regions.

Most of the actual expenditures on development went to Tripoli and Benghazi. It can be seen from Table VI that of the total allocations of expenditures on infrastructure, which is already more available in Tripoli and Benghazi than in other regions, Tripoli received 35.6 percent and Benghazi received 24.5 percent. Consequently, the other regions received a low percentage of these expenditures.[30]

Thus, more than 50 percent of the total expenditures on economic and services infrastructure went to Tripoli and Benghazi while the regions that lack these kinds of infrastructure expenditures got 44.7 percent of the total expenditures. Fifty-four percent of the total population

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[30]These figures are only for one year. The following years allocations have been increased to other regions and less development expenditures were allocated to Tripoli and Benghazi regions. The reason for using these one year figures is to show the government expenditures and relate them to the movements of the people. We cannot go beyond 1973 because the study covers the period up to 1973.

TABLE VI

THE PERCENTAGES OF THE ACTUAL EXPENDITURES OF THE DEVELOPMENT BUDGET IN 1972-1973.

(Muhafada) Region	Share of the Region From The Total Expenditures %	Share of the Region From Expenditures on Economic Infrastructures %	Share of the Region From The Expenditures on Services Infrastructures %	Percentage of Population
Tripoli	33.6	31.9	35.6	31.4
Benghazi	21.7	19.5	24.5	14.6
Sebha	4.4	5.0	3.7	5.0
Zawia	9.0	11.0	6.6	10.8
Gharian	3.8	4.4	3.1	6.9
Musrata	6.9	7.7	5.8	7.9
Khoms	3.0	2.7	3.5	7.3
Elkalige	6.3	7.9	4.4	4.8
Elkabal Aghdar	6.4	5.5	7.4	5.9
Derna	4.9	4.4	5.4	5.4

Source: Auditing Department (Diwan El-Mohasaba). Annual Report, Tripoli (1974), p. 152. Table 15 (In Arabic).

of the country live in these regions.

The government now is trying to allocate more expenditures to provide the necessary facilities to the rural regions and less to Tripoli and Benghazi. The objective of this policy is to avoid more allocations to the most developed regions and thus provides the people in the less developed regions with more facilities and employment opportunities in order to prevent them from migrating to Tripoli and Benghazi.

Thus, many factors have contributed to widening the real income differential among the regions. Indeed, the per capita income differential between the regions is already very wide and according to Table VII, Benghazi and Tripoli have the highest per capita income, whereas Gharian, Khoms and Musrata have the lowest per capita income in the country. This fact accounts, as in the earlier period, largely for the migration of people from the less developed regions and rural areas to the cities, particularly Tripoli and Benghazi.[31]

Table VIII shows the population of each region, the percentage of each region population to total population of the country and the density of population in each region

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[31]Libyan Arab Republic Ministry of Planning and Scientific Research, Demography and Manpower Planning Section, "Report on Manpower Situation-1974 and Past Trends, Present Features and Strategy for the Plan 1976-1980," Tripoli (July, 1975), p. 57.

TABLE VII

THE PER CAPITA INCOME OF EACH REGION AND REGIONAL PER CAPITA INCOME AS A PERCENT OF NATIONAL PER CAPITA INCOME IN 1973.

Region (Muhafada)	Per Capita Income 1973 L.D.	Percentage of Per Capita Income To Libyan Per Capita Income
Derna	321	95
Elkabal Aghdar	335	99
Benghazi	433	128
Elkalige	274	81
Musrata	297	88
Khoms	226	67
Tripoli	392	116
Zawia	270	80
Gharian	220	65
Sebha	304	90
Libya	338	100

Source: Libyan Arab Republic Ministry of Planning and Scientific Research, "Settlement Pattern Study," A Report from Italconsult, A Draft Copy. Rome (July, 1975), Vols. IV, V, VI and VII, Tables C-5 and C-6, pp. C-8 and C-10.

during the period 1964-1973. It shows that 31.4 percent and 14.6 percent of the population of the country is concentrated in Tripoli and Benghazi respectively. The remainder of the population is located in the other eight regions of the country. Tripoli attracts most of the migrants. The population of Tripoli increased from 406,356 in 1964 to 709,117 in 1973. The percentage increase was 74.5 percent. Most of these migrants came from Gharian which experienced a decrease in its population from 180,883 to 155,162 during 1964-1973. The percentage decrease was 14.3 percent. The Gharian region population as a percentage of the total population of the country decreased from 12 percent in 1964 to 6.5 percent in 1973. The reason is that this region lacks public facilities such as transportation and most of its population is nomadic. The percentage of nomadic and semi-nomadic population was 22 percent of its population.[32]

Thus, during the period 1964-1973 only four regions increased their population because of net migration. They are Tripoli by 54,752; Benghazi by 14,072; Zawia by 5,142 and Elkabal Aghdar by 692. Among the other six regions the out-flow was more than the in-flow with the largest decrease in population due to net out-migration experienced by Gharian (-32,713) and Khoms (-24,459).

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[32]Auditing Department, pp. 140-141.

TABLE VIII

THE POPULATION OF EACH REGION, THE PERCENTAGE OF EACH REGION POPULATION TO TOTAL POPULATION OF THE COUNTRY AND THE DENSITY OF POPULATION IN EACH REGION DURING THE PERIOD 1964-1973.

Region (Muhafada)	Area		Population						
	1000 Square Kilometer	% of Total Area of the Country	Number 1964	Number 1973	% of the Population of the Region to Total Population 1964%	% of the Population of the Region to Total Population 1973%	% of Increase In Population	Density of Population for 100 Km^2 1964	Density of Population for 100 Km^2 1973
Derna	103	6	84,112	123,397	5	5.4	46.7	82	120
Elkabal Aghdar	17	1	90,524	131,071	6	5.9	44.7	535	771
Benghazi	17	1	224,653	331,180	14	14.6	47.4	1324	1948
Elkalige	720	41	80,143	108,451	5	4.8	35.3	11	15
Musrata	148	9	129,917	179,316	8	8.0	38.0	88	121
Khoms	25	1	136,679	162,673	9	7.2	18.8	548	650
Tripoli	3	-	406,356	709,117	26	31.4	74.5	13533	23637
Zawia	7	-	164,277	244,352	11	10.8	48.7*	2843	3490
Gharian	150	9	180,883	155,162	12	6.9	114.3*	121	103
Sebha	559	32	66,825	112,318	4	5.0	68.2	12	20
Total	1,749	100	1,564,369	2,257,037	100	100.0	44.2	89	129

*% of decrease

Source: Auditing Department (Diwan El-Mohasaba), Annual Report (Tripoli, 1974), p. 141, Table 10.

Table IX gives in-migration, out-migration, net migration and the percentage of in-migration and out-migration to the total migration in the country with Figure 2 giving geographic prospective.

From Table IX we can see that about forty-eight percent of in-migration went to Tripoli and 17 percent went to Benghazi regions. Most of the migrants came from Gharian (about 22 percent of out-migration) and Khoms (16 percent of out-migration).

If we compare these figures with the figures obtained in the earlier period (1954-1964), we found that the forty-six percent of in-migration went to Tripoli in 1954-1964 and this percent increased to forty-eight percent in 1964-1973. However, the percent of in-migration to Benghazi decreased from twenty-seven percent during the 1954-1964 period to seventeen percent during 1964-1973. It increased in other regions such as Elkabal Aghdar and Zawia.

Most of the migrants during the earlier period (1954-1964) came from Gharian (about 19 percent of out-migration). However Gharian still is experiencing the highest percent of out-migration during the period 1964-1973 (22 percent).

It is worth noting that Zawia and Elkabal Aghdar regions experienced net positive migration during the period 1964-1973. This net positive migration may be due to establishing a petro-chemical industry in Zawia, and

TABLE IX

THE NUMBER OF IN-MIGRANTS, OUT-MIGRANTS, NET MIGRATION, THE PERCENTAGE OF IN-MIGRATION AND THE PERCENTAGE OF OUT-MIGRATION DURING THE PERIOD 1964-1973.

Region (Muhafada)	Out Migration	In-Migration	Net Migration	Percentage of In-migration to Total Migration	Percentage of Out-migration to Total Migration
Derna	9,574	6,373	- 3,201	3.86	5.80
Elkabal Aghdar	9,479	10,171	+ 692	6.16	5.74
Benghazi	14,776	28,848	+14,072	17.47	8.95
Elkalige	8,531	4,424	- 4,107	2.68	5.17
Musrata	13,064	4,274	- 8,790	2.59	7.91
Khoms	26,647	2,188	-24,459	1.32	16.14
Tripoli	24,445	79,197	+54,752	47.96	14.80
Zawia	16,463	21,605	+ 5,142	13.08	9.97
Gharian	35,808	3,095	-32,713	1.87	21.68
Sebha	6,356	4,968	- 1,388	3.01	3.85
Total	165,143	165,143	0	100.00	100.00

Source: Libyan Arab Republic Ministry of Planning and Scientific Research, "Settlement Pattern Study," Tripoli Macro-Region--A Draft Copy. A Report from the Italconsult, Vol. IV Rome (July, 1975), Table b.11.1., p. 3.22.

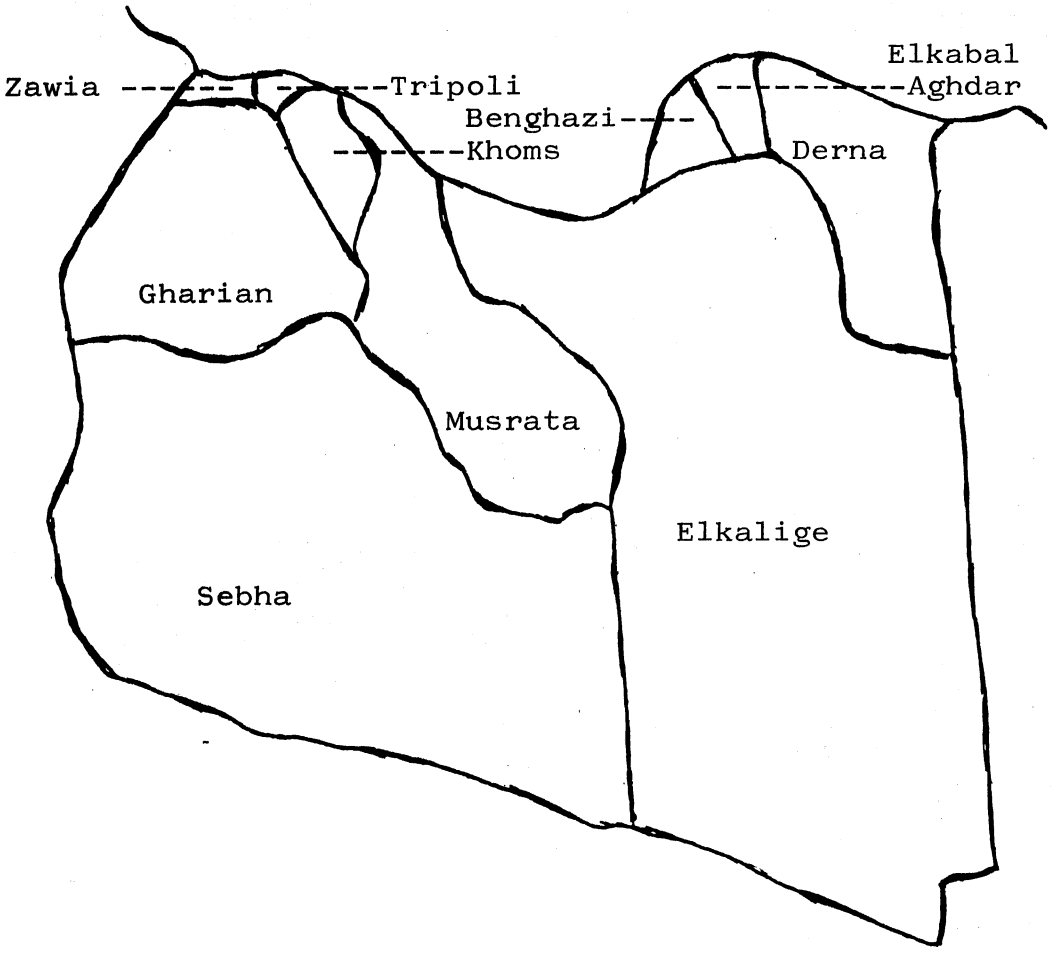

Figure 2. Administrative Regions in Libya (1973)

establishing an agricultural project in Elkabal Aghdar. These two projects attracted people from other regions. The distance between Tripoli and Zawia is only 37 kilometers, which is very close. This close distance may contribute to increased commuting from Tripoli to Zawia and from Zawia to Tripoli particularly after the establishment of the petro-chemical industry in Zawia.

Summary

This chapter gave a summary of the state of the economy of Libya before and after the discovery of oil. It is believed this summary of the state of the economy is very important since it shed light on internal migration in Libya. This chapter also gave the background of internal migration in Libya from 1943 up to 1973. It also provided the main factors that were expected to have caused internal migration in Libya up to 1973.

The figures and data used in this chapter will provide the basis for the specification of a theoretical model and enable us to estimate it empirically.

CHAPTER III

CHARACTERISTICS OF MIGRANTS

The purpose of this chapter is to present a description of the migrants in terms of their characteristics. However, this description of migrants is limited to migrants who came to Tripoli and Benghazi, since only this information is available. The data are obtained from surveys which were conducted in Tripoli and Benghazi in 1969.

A description of migrants by age, educational level, and occupational distribution should give an indication about migration selectivity in Libya. Selectivity of migration is described by Donald J. Bougue as:

> . . .highly selective of younger persons. This arises because each oncoming generation must adapt to the social and economic changes that are taking place. This is the price neophytes must pay to get an acceptable and secure socio-economic "niche" in the social organization. Where these changes require a shift of population, it is the younger, more flexible, and less burdened members who re-examine the distributional imbalance and make the needed movements.[1]

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[1]Donald J. Bougue, "Techniques and hypotheses for the study of differential migration; some notes from an experiment with U.S. data," Proceedings of the International Population Conference, Session 4, Paper No. 114, 2 (1961). As Cited by Bruce Herrick. Urban Migration and Economic Development in Chile (Cambridge, 1965), p. 71.

More precisely Bruce Herrick noted that

> Demographers call migration "selective" in the sense that the migrants do not represent a random sample of the population. This selectivity can be defined either in terms of the population groups from which the migrants come or in terms of those they join at their destination.[2]

In this chapter both comparisons will be used whenever the data are available.

Age

The selectivity of migration is not unique to developing countries, but it also exists in the developed countries. In the United States, for example, the migration is selective, particularly in terms of education and age.[3]

As indicated by Bougue, the general assertion is that the migrants tend to be young. The available studies have concluded the migrants to Tripoli and Benghazi are young[4], a finding consistent with the assertion. R. Mabro, in a study conducted in 1968, found that the majority of all the workers and employees in Tripoli and Benghazi were of rural origin; they were recent migrants and quite young.[5] Table X gives four age categories and the percentage of migrants

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[2]Herrick, p. 71.

[3]Edgar M. Hoover, An Introduction to Regional Economics. 2nd Ed. (New York, 1974), p. 183.

[4]See Elkhabir, pp. 106-108; Mukurji and Kataifi, p. 6; and Mabro, pp. 319-338.

[5]Mabro, pp. 329-331.

in each category in Tripoli. If we consider the younger people as the most productive, to be those people between 21-45, then 86 of 137 migrants fell into this category or about sixty-three percent of the sample consisted of young people. Most of the migrants to Tripoli were young and part of the most productive part of the population. However, the migrants were younger than the city-borns since 56 percent of Tripoli natives fell in the age category of 21-45 compared to 63 percent of the migrants to Tripoli.

The socio-economic survey conducted in Benghazi in 1969 did indeed find that most of the persons migrating to Benghazi also were young and in the working age group.[6] Table XI shows the number and the percentage of migrants and the age the time of migration to Benghazi. According to Table XI 198 of 355 or about fifty-six percent of the migrants fall in productive category mentioned above. Thus, the migration is selective with respect to age since most of the migrants who came to Benghazi and Tripoli were young and in the working age groups.

These figures probably underestimate the actual situation because in Libya the actual working age is from 15 and above and not 21 and above. The 21-45 years age group, as the most productive period of the migrant's life, was chosen because of the availability of data for Tripoli and

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[6]Mukurji and Kataifi, p. 6.

TABLE X

FOUR AGE CATEGORIES AND PERCENTAGE OF MIGRANTS IN EACH CATEGORY IN TRIPOLI

	Age									
	21-25		36-45		46-55		56-75		Total	
	No	%	No	%	No	%	No	%	No	%
Migrants	37	27	49	36	24	17	27	20	137	100
City-borns	17	23	24	33	12	17	20	27	73	100

Source: Yassin A. Elkhabir, "Assimilation of Rural Migrants In Tripoli, Libya" (unpub. Ph.D. dissertation, Case Western Reserve University, 1972), p. 106.

to facilitate the comparison between the migrants who came to Benghazi and those who came to Tripoli. If we include the age groups of 15-20,--at least in Benghazi--then the percentage of the young people will increase to 70.4 percent. Thus the conclusion that migration to Benghazi and Tripoli is very selective in terms of age is strengthened.

This large migration of young people constitutes a heavy subsidy of the richer by the poorer areas. The out-migration area usually bears the costs of the gestation, birth and rearing of the future migrants until they

TABLE XI

THE NUMBER AND THE PERCENTAGE OF MIGRANTS AND THE AGE AT THE TIME OF MIGRATION TO BENGHAZI

Age at Migration	No. of Migrants	Percentage
0-4	9	2.5
5-9	23	6.5
10-14	50	14.1
15-19	52	14.6
20-24	74	20.9
25-29	47	13.2
30-34	30	8.5
35-39	30	8.5
40-44	17	4.8
45-49	8	2.2
50 +	15	4.2
Total	355	100.0

Source: S. Mukurji and A. Kataifi, "Socio Economic Survey in Benghazi," Dirassat, The Libyan Economic and Business Review, VI, No. 1 (1970), Table 2.

leave.[7] It is obvious, from Table XI, that those who migrated during childhood, when much of the rearing and other costs would be incurred after the migration to Benghazi were very few, whereas 70 percent were at or near their working ages when they migrated.

[7] J. Shearer, "Intra and International Movements of High-Level Human Resources," In Spacial Dimensions of Development Administration, Ed. J. Heaphey (North Carolina, 1971), pp. 183-184.

Therefore, most of the costs prior to the beginning of their most productive lives were incurred by the poorer areas from which they migrated (origin region), whereas most of their productive lives would contribute to the destination region.

Education

Many studies argue that migrants are alert to changing opportunities, adapt easily and have higher than average education. It is also argued that the opportunities for education outside the urban centers are very limited, and therefore, the migrants have very little education to help them when they arrive to the destination region.[8]

According to Yassin Elkhabir most of the migrants coming to Tripoli have lower educational level than the native residents.[9] The main results of his study are in Table XII which show the level of education of the migrants to Tripoli and the native residents of Tripoli.

From Table XII, it is clear that the educational attainment in Tripoli are higher than in the interior regions of the country. Seven percent of the total sample of 137 migrants had education beyond the elementary level, whereas 19 percent of the total sample of 73 Tripoli native

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[8]Herrick, p. 77.

[9]Elkhabir, p. 108.

TABLE XII

THE LEVEL OF EDUCATION OF THE MIGRANTS TO TRIPOLI AND THE NATIVE RESIDENTS OF TRIPOLI

Place of Origin	Educational Level									
	None		Koranic		Elementary		Above Elementary		Total	
	No	%	No	%	No	%	No	%	No	%
Migrants	88	64	13	9	27	20	9	7	137	100
City-borns	17	23	7	10	35	48	14	19	73	100

Source: Yassin A. Elkhabir, "Assimilation of Rural Migrants in Tripoli, Libya" (unpub. Ph.D. dissertation, Case Western Reserve University, 1972), p. 108.

residents had education above the elementary level. This result is reasonable since during the period that ended in 1969 secondary schools were limited to the capital cities of the regions. Therefore, anyone who wanted to get secondary education had to seek it in these towns. The situation has changed now and teacher's training institutes are available in most of the towns in the country.

The same results concerning the level the education of the migrants to Benghazi are apparent in Table XIII.

To compare the level of education of the migrants and those who were left behind, let us take the economically active population in Tripoli and Benghazi on one hand and

all other regions on the other. The economically active population is the population in the age group of ten and more.[10] These data will be compared with the educational level of the migrants to both Tripoli and Benghazi which are available in Tables XII and XIII. Although the educational level data are from different years, it is believed that they are at least a good approximation and give an idea about migration selectivity in terms of education. If the educational level of the migrants is higher than the educational level of the population left behind, then we may conclude that the migration is selective. In short, migration constitutes heavy movements of educated people from the origin regions to the destination regions.

Table XIV gives the educational level of the economically active population in 1973 and their percentage in Tripoli and Benghazi regions and outside of these two regions.

From Tables XII, XIII, and XIV seven percent of the migrants to Tripoli had education above elementary, whereas 6.8 percent of the people who were left behind had preparatory and secondary education. With respect to Benghazi 2.3 percent of the migrants to Benghazi attended college, whereas 0.7 percent of the population who stayed behind

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[10] Libyan Arab Republic Ministry of Planning and Scientific Research, Demography and Manpower Planning Section, "A Report on Manpower Situation. . ." Note (2) under Table 13A.

TABLE XIII

THE LEVEL OF EDUCATION OF THE MIGRANTS
AND THE PEOPLE BORN IN BENGHAZI

Place of birth	Educational Level											
	Illiterate		Can read but cannot write		Can read and write but had no schooling		Attended school		Attended college		Had knowledge of foreign language	
	No	%	No	%	No	%	No	%	No	%	No	%
Benghazi	509	33.1	26	1.7	194	2.6	772	46.9	56	3.6	40	2.6
Migrants	511	42.3	26	2.2	113	9.4	518	43.0	39	2.3	40	3.3

Source: S. Mukurji and A. Kataifi, "Socio Economic Survey in Benghazi," Dirassat, The Libyan Economic and Business Review, VI, No. 1 (1970), Table 17. These figures were calculated from Table 17. (Total percentages in any row need not be 100 as multiple entries were made.)

TABLE XIV

EDUCATIONAL LEVEL OF THE ECONOMICALLY ACTIVE POPULATION OF BENGHAZI AND TRIPOLI REGIONS AND OTHER REGIONS

Educational Level	Other Regions		Benghazi		Tripoli	
	No	%	No	%	No	%
Illiterate	126,013	52.94	23,195	37.94	48,352	36.32
Read only	3,215	1.35	1,037	1.70	2,349	1.76
Read and write	74,254	31.19	21,046	34.48	48,981	36.79
Primary certificate	16,806	7.06	7,723	12.63	15,404	11.57
Preparatory and secondary	16,087	6.76	7,070	11.56	15,014	11.28
University and above	1,671	.70	1,072	1.75	3,043	2.29
Total	238,046	100.00	61,143	100.06	133,143	100.01

Source: Libyan Arab Republic Ministry of Planning and Scientific Research, Demography and Manpower Planning Section, "A Report on Manpower Situation-1974 and Past Trends, Present Features, and Strategy For the Plan 1976-1980," Tripoli (July, 1975). The percentages and the figures for other regions were calculated from Table XXI.

had university education. Thus, for migrants to Tripoli only slight evidence exists that the migrants have a higher education level than those who stayed behind, while for the migrants to Benghazi the evidence is conclusive.

Occupation

Higher occupation status is associated with higher migration rates. This phenomenon is not limited to Libya but is also seen in other countries. For example in the United States those who migrated during 1965-1970 with professional, technical and technical workers' occupations in the age groups of 25-34, 35-44 and 45-64 are 46.2, 26.0 and 15.0 percent, respectively.[11] This means that those who migrate are young and skilled labor.

Data on the occupational distribution of the migrants and the natives are available for Tripoli only. For Benghazi the occupational distribution is available only for the migrants. Table XV shows the occupational status of the migrants to Tripoli from other regions and the occupational status of the natives of Tripoli. The migrants had lower occupational status than the native residents of Tripoli. If we consider the skilled and the semi-skilled categories as high-level manpower then 23 out of 119 migrants or about nineteen percent fall into this category. The same argument can be applied to Benghazi. Table XVI

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[11]Hoover, p. 183.

TABLE XV

THE OCCUPATIONAL STATUS OF THE MIGRANTS TO TRIPOLI AND THE OCCUPATIONAL STATUS OF TRIPOLI NATIVE RESIDENTS

Place of origin	Occupation											
	White collar		Skilled Blue collar		Semi-Skilled Blue collar		Unskilled Blue collar		Total		Unemployed	
	No	%	No	%	No	%	No	%	No	%	No	%
Migrants	19	14	12	9	11	8	77	56	119	100	18	13
City-borns	29	40	10	14	7	9	17	23	63	100	10	14

Source: Yassin A. Elkabir, "Assimilation of Rural Migrants in Tripoli, Libya," (unpub. Ph.D. dissertation, Case Western Reserve University, 1972), p. 107.

gives the occupational status of the migrants to Benghazi.

TABLE XVI

THE OCCUPATIONAL STATUS OF THE MIGRANTS TO BENGHAZI

	Occupation							
	Business		Services		Professionals		Labor	
	No	%	No	%	No	%	No	%
Migrants	131	37.5	142	40.7	58	16.6	18	5.2

Source: S. Mukurji and A. Kataifi, "Socio Economic Survey in Benghazi," Dirassat, The Libyan Economic and Business Review, VI, No. 1, 1970. These figures were calculated from Table 10C.

From Table XVI we can see that professionals[12] constitute about 17 percent of the migrants.

R. Mabro studied the skill levels in the urban and the rural areas. He considered those who were born in

[12]Professionals here is from the Arabic word "Mehaneien" and probably the best thing is to say craftsmen instead of professionals since this word includes tailors, bakers, butchers, mechanics, drivers, teachers, engineers, masons, brokers, carpenters, goldsmiths, contractors, electricians and hairdressers.

Tripoli, Benghazi or abroad as being of urban origin. He found that 56 workers out of 268 or twenty-seven percent, and 55 employees out of 132 or forty-two percent fell under the skilled-labor category.[13]

Table XVII gives the occupational status of the urban origin and the rural origin migrants. If we consider drivers and mechanics as skilled labor, then it seems that high proportion of these workers who originated from the rural areas were skilled.

TABLE XVII[14]

THE OCCUPATIONAL STATUS OF THE URBAN ORIGIN AND RURAL ORIGIN

	G	M	S	D	L	T	Total
Urban origin	28	57	31	42	6	43	29
Rural origin	72	43	69	58	94	57	71
	100	100	100	100	100	100	100

Source: R. Mabro, Labour Supplies and Labour Stability, A Case-Study of the Oil Industry in Libya, Bulletin of the Oxford University Institute of Economics and Statistics, 32, No. 4 (1970), p. 331.

[13]Mabro, p. 330.

[14]In Table XVII G stands for guards and ghaffirs (watchmen), M stands for cooks, waiters, houseboys and

R. Mabro noted that

> The labour force is young; the skill endowment is low. Most workers are rural-born and, although recruitment takes place in towns, a large number of labourers are recent migrants. There seems to be a relationship between skills and urban origin.[15]

This means that most skilled laborers are of urban origin, but given that the skill endowment is very low in the whole country, then we can say that a higher proportion of migrants than nonmigrants are highly-skilled.

Summary

Migration in Libya is selective for the following reasons:

1 - Migrants to both Tripoli and Benghazi were young and in their productive ages.

2 - The education level was very low in Libya and illiteracy was common (81.1 percent of the people were illiterate in 1954).[16] Therefore those who attended schools and had elementary education or more were young people. Older people had no chance to get education because during the Italian rule they were denied

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cleaners, D stands for drivers, L stands for labourers with their head men, and T stands for mechanics, carpenters, apprentices, foremen, mobile plant operators, electricians, etc.

[15]Mabro, p. 311.

[16]Farley, p. 82.

their right to education as noted by Rawle Farley: "Libyan children were practically excluded from admission to secondary schools and forbidden to pursue studies abroad."[17]

Therefore it seems that the migration to both Benghazi and Tripoli was selective because those who migrated to these two regions were very young and probably had some education. However, the conclusion about the selectivity in terms of education is not conclusive for Tripoli due to the lack of data. It seems also that the educational opportunities, at least until 1969, were higher in Benghazi and Tripoli relative to other regions of the country. In terms of the skilled level of the migrants, it seems that the migrants possessed some skill and thus migration may benefit the destination regions while it may hurt the origin regions. This selectivity notion and the characteristics of migrants (particularly education) will be utilized in the theoretical and empirical analysis as long as the data are available.

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[17]Ibid., p. 80.

CHAPTER IV

A MODEL OF INTERNAL MIGRATION AND THE EXPECTED PER CAPITA INCOME DIFFERENTIAL

The purpose of this chapter is to specify a model of inter-regional migration and its impact on the expected per capita income differential among different regions in Libya. The model presents a theoretical explanation of internal migration and its impact on per capita income inequalities.

The two equation model includes explanatory variables that are expected to determine both internal migration and expected per capita income differential.

Most of the studies of internal migration in developed countries as well as in developing countries emphasized economic forces that influence internal migration. In a survey in Benghazi which was conducted in 1969 the economic factors were found to be dominant. The model developed in this chapter is based on these findings and the findings in Chapters II and III and other studies of internal migration.

Several studies have used a single-equation model to estimate the determinants of internal migration, many of

them using either migration as reported by the census in one period of time (or life time migration). Most of these studies found insignificant regression coefficients for variables that--at least on a priori basis--are expected to have an important role in the decision to migrate.[1] These results may be due to bias introduced by simultaneity between migration and other explanatory variables as argued by Larry Sjaastad.[2]

Some recent studies used simultaneous equation models between migration and employment or urban growth.[3] The results of these studies are more efficient than the single equation studies. These models have been employed only in the developed countries, particularly the United States. No study has used a simultaneous-equations model to study migration in the developing countries. Therefore, in this

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[1]Michael J. Greenwood and Eric J. Anderson, "A Simultaneous-Equations Model of Migration and Economic Change in Rural Areas: The Case of the South," The Review of Regional Studies, Vol. 4, No. 3 (Winter, 1974), p. 37.

[2]Larry A. Sjaastad, "The Relationship Between Migration and Income in the United States," Papers and Proceedings of the Regional Science Association (1960), pp. 37-64.

[3]See, for example, Greenwood and Anderson, pp. 37-48; Michael J. Greenwood, "A Simultaneous-Equations Model of Urban Growth and Migration," Journal of the American Statistical Association, Vol. 70, No. 352 (December, 1975), pp. 797-810; and Michael J. Greenwood, "A Simultaneous-Equations Model of White and Nonwhite Migration and Urban Change," Economic Inquiry, Vol. XIV, No. 1 (March, 1976), pp. 1-15.

study, a simultaneous-equations model will be employed between the internal migration and the expected per capita income differential.

The model is based on the human capital approach which treats migration as an investment. Migration is explained on the basis of the expected benefits and costs that are derived from moving from region to region. Thus, migration is a form of investment in human capital like investment in education, on-the-job-training, health,. . ., etc. They are all investments and the investors will invest when the net present value is positive. Thus the migrant compares his expected returns of the expected income stream with that of the costs of moving from his origin region to his destination region.

Therefore, according to the human capital approach internal migration can be put in a framework of costs and returns to investment in human capital. However, we have to recognize that internal migration not only depends on purely economic variables but also on interrelated and complex sets of other factors.

The migration decisions can be viewed as part of a generalized capital accumulation approach.[4] Returns of the movement between region i and j consist of a stream of

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[4]Harry Johnson, "Toward a Generalized Capital Accumulation Approach to Economic Development," Economic Development Readings in Theory and Practice. Eds. Morgan and G. Betz (California, 1970), pp. 81-88.

expected income differentials prevailing between the two areas.[5] The migrant will invest (move) if the net present value is positive.

Therefore, the migrants base their migration decisions on what they perceived to be their respective expected net income over time in different locations.[6]

Thus $m_{ij} = f(V_{(t)}, C_{ij})$ (1)

where m_{ij} is the measure of the number of people who move from region i to region j.

C_{ij} is the cost of moving from i to j [These costs include pecuniary as well as non-pecuniary costs.]

$V_{(t)}$ is the present value of the per capita income differential during an average migrant's planning horizon and is equal to[7]

$$V_{(t)} = \int_{o}^{n} (Y_j - Y_i)_{(t)} \, e^{-rt} \, dt. \quad (2)$$

where $(Y_j - Y_i)_{(t)}$ is the per capita income differential between region j and region i at time t,

r is the discount rate, and

n is the number of time periods in a migrant's planning horizon.

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[5]Gene Laber and R. X. Chase, "Interprovincial Migration in Canada as a Human Capital Decision," Journal of Political Economy, 79 (July/August, 1971), p. 797.

[6]Henry Rempel, "Labor Migration Into Urban Centers and Urban Unemployment in Kenya" (unpub. Ph.D. dissertation, University of Wisconsin 1971), p. 9.

[7]Laber and Chase, p. 797.

The migrant will move if his present value is greater than the cost of moving or his net present value is positive. Thus, if we assume that the perceived income is constant and prevails over an indefinite period of time, then from (1) and (2) the net present value (PV) of the average migrant is equal to

$$PV = (Y_j - Y_i)/r_i - C_{ij} \qquad (3)$$

where $Y_{j(i)}$ is the per capita income in region j(i).

C_{ij} is the cost of moving from i to j.

r_i is the discount rate in region i.

If we assume that the costs of moving C_{ij} increases with distance, then we can substitute D_{ij} for C_{ij}, where D_{ij} is the distance between region i and region j. The distance D_{ij} is a proxy for the costs of moving from i to j. We have to keep in mind that the distance is not only a proxy in costs of moving but also for other variables that have no usable measure, such as availability of information about the places and habits and social practices in other regions. Therefore, the distance is a proxy for omitted variables as well as moving costs.[8]

Thus equation (1) can be rewritten as:

$$m_{ij} = f\,[(Y_j - Y_i)/r_i - D_{ij}] \qquad (4)$$

where all the variables are as indicated above.

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[8] R. Beals, M. Levy and L. Moses, "Rationality and Migration in Ghana," Review of Economics and Statistics, 49 (November, 1967), p. 482.

Todaro argued that we should not look only to the prevailing income differentials but rather to income differentials adjusted for the probability of finding an urban job. His rationale for using this probability is:

> The important question to ask in this context is 'how long' does the average migrant have to wait before actually obtaining a job. Even if the prevailing real wage is significantly higher than expected rural income, the fact that the 'probability' of obtaining a modern sector job, say within the next year or two, is very low must certainly influence the prospective migrant's choice as to whether or not he should leave the farm. In effect, he must balance the probabilities and risks of being unemployed or sporadically employed in the city for a certain period of time against the favorable urban wage differential.[9]

Following Todaro the per capita income differential has to be adjusted to the probability of obtaining a job in both the destination and the origin region. For the purpose of this study the probability of obtaining a job will be the employment rate in the region which approximates the demand for labor, because no data on vacancies are available. In region i, for example, the probability of obtaing a job (PE_i) is the employment rate at region i. Therefore, to get the income differential adjusted to the probability of obtaining a job we multipy Y_i by PE_i and Y_j by PE_j. Thus

$$\bar{Y}_j = Y_j \cdot PE_j \text{ and } \bar{Y}_i = Y_i \cdot PE_i \qquad (5,6)$$

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[9]Michael Todaro, "A Model of Labor Migration and Urban Unemployment in Less Developed Countries," American Economic Review, LIX (March, 1969), p. 140.

where $\bar{Y}_{j(i)}$ is the per capita income in region j(i) adjusted for the probability of obtaining a job in region j(i) (or the expected per capita income differential).

If we assume that r is the same in all regions, then equation (4) can be written as:

$$m_{ij} = f[(\bar{Y}_j - \bar{Y}_i), D_{ij}] \qquad (7)$$

If we let $Y_{ij} = \bar{Y}_j - \bar{Y}_i$ then equation (7) can be rewritten as:

$$m_{ij} = f\ (Y_{ij}, D_{ij}) \qquad (8)$$

where m_{ij} is the number of people who move from i to j (can be expressed either in net or gross migration),

Y_{ij} is the expected per capita income differential,

and D_{ij} is the distance from i to j.

Still other variables may be incorporated in the human capital approach to account for costs and returns of migration. One of the variables is the education level in both the origin and the destination region. Education is possibly very important in affecting migration. In developed countries education may account for employment opportunities, while in the developing countries it seems that education not only accounts for employment opportunities but also may be considered as a proxy for reducing the importance of the factors that tend to increase immobility such as traditions and family ties.[10] Therefore, we expect that the larger the number of educated people in a

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[10]Beals, Levy, and Moses, p. 842.

region, the larger the number of people likely to move out of that region. Moreover, for the destination region, people may be attracted to the region with high achievement in education. They want to improve their education. Thus we expect that in-migration to the region will increase with the educational level of that region. Another important variable is past migration. This past migration is a proxy for the flow of information. The greater the number of past migrants from region i to region j the greater would be the flow of information from j to i. This flow of information and the presence of relatives and friends will no doubt ease the decision to migrate.

Still another variable may affect internal migration in Libya. This variable is the urbanization level. It is thought that migrants tend to move to regions that have large urban populations. Thus the urbanization level of the destination region in Libya is important. The urbanization level in the origin region may be used as indicator of the degree of acclamation to the money economy and hence mobility.[11] The urbanization level is used here to account for the cultural and social amenities of the city life. Thus the costs and returns approach can be formulated in the following manner. Returns (R_{ij}) to an average migrant from region i to region j can be written as:

$$R_{ij} = R\ (\bar{Y}_j,\ E_j,\ \ldots .) \qquad (9)$$

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[11] Ibid.

Costs of migration (C_{ij}) may be expressed in the following form:

$$C_{ij} = C\ (\bar{Y}_i,\ E_i,\ D_{ij},\ \ldots) \qquad (10)$$

Consequently the complete migration function can be rewritten in the following form:

$$m_{ij} = f\ (R_{ij},\ C_{ij}) = f\ (Y_{ij},\ D_{ij},\ E_i,\ E_j,\ U_i,\ U_j,\ PM_{ij},\ u) \qquad (11)$$

where m_{ij} is the number of people who move from region i to region j,[12]

Y_{ij} is the expected per capita income differential between i and j,

E_i is the percentage of population who were attending school at region i in 1964 or Libya's school going population age 6-14 in 1973 in region i,

E_j is the percentage of population that is attending school in region j in 1964 or Libya's school going population age 6-14 in 1973 in region j,

U_i is the percentage of population of region i, living in cities with 10,000 or more,

U_j is the percentage of population of region j, living in cities with 10,000 or more,

PM_{ij} is the past migrants from i to j,

and u is an error term.

The above function is called the migration function. In this function migration from region i to region j is a dependent variable whose behavior we seek to explain. The migration function is expected to explain the direction and the rate of internal migration in Libya. The expected per capita income differential, Y_{ij}, is an explanatory variable in the migration function. But the expected per capita income differential may depend on m_{ij}, the migration from

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[12] m_{ij} in this model is used as a general measure. In the following chapter exact specification of m_{ij} will be explained.

i to j. If this is so, then the single equation will not give us unbiased estimates.[13] Thus the simultaneous determinants of internal migration and expected per capita income differential are formulated by allowing internal migration m_{ij} (e.g., net migration from i to j) and expected per capita income differential Y_{ij} to be determined endogenously via a simultaneous equation approach.

To achieve this objective we have to specify another equation that explains the impact of internal migration on the expected per capita income differential and hence on regional inequality in per capita income.

In this case migration from region i to region j is an explanatory variable whose behavior may affect the inequality of per capita income of the different regions. The function in this case will be called the expected per capita income differential and can be written as

$$Y_{ij} = Y\ (m_{ij},\ C_{j/C_i},\ L_{j/L_i},\ R,\ e) \qquad (12)$$

where Y_{ij} is the expected per capita income differential,

m_{ij} is the net migration from i to j,

C_{j/C_i} is the ratio of the number of business establishments in region j to the number of business establishments in region i,

L_{j/L_i} is the ratio of the percentage of the labor force in agriculture in region j to the percentage of the

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[13]Gian Sahota, "An Economic Analysis of Internal Migration in Brazil," Journal of Political Economy, 76 (March/April, 1968), p. 239.

labor force in agriculture in region i,

R is a dummy variable whose value will be one if the region is oil producing, otherwise its value equals to zero,

and e is the error term.

Thus, the migration variable, m_{ij}, in the expected per capita income differential equation is an explanatory variable and expected to affect Y_{ij}, the expected per capita income differential, and thus the disparities of income among the regions. However, there are three competing arguments about the behavior of internal migration and the disparities of the wage levels (or implicitly, the expected per capita income) among the regions.

The first argument may be called a simple neoclassical theory of mobility of resources. This theory suggests that the differences in wage levels (the per capita income levels in this study) among the regions should converge because of the internal migration in response to wage differential[14] (income differentials). This means that migration from region to region tends to increase the supply of labor in the destination region and to decrease it in the origin region. This will have the effect of causing the wage level to decrease in the destination

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[14]Lee Olvey, "Regional Growth and Inter-regional Migration--Their Pattern and Interaction," The Review of Regional Studies, 11 (Winter, 1972), p. 139.

region and to increase in the origin region up to the point where the differentials disappear. George Borts and Michael Greenwood argued that this analysis is valid as long as the demand conditions are not included.[15]

Thus, the second argument will be when demand conditions are included, then the conclusion differs. Greenwood argued that if either the prices of the domestically produced goods and services or the marginal physical product of the labor supplied within the region has a positive response to in-migration and a negative response to out-migration, then the derived demand for labor tends to increase in the destination region and to decrease in the origin region.[16] Indeed, the price level of goods and services that are produced and consumed in the region are sensitive to migration. Thus we expect that the price level of those goods and services to go up in the destination region and to go down in the origin region.

The marginal physical product of labor will go up in the destination region and go down in the origin region if the in-migration induced more investment in the destination region and out-migration induced less investment in

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[15]See George H. Borts, "The Equalization of Returns and Regional Economic Growth," in Regional Economics, Eds. David L. McKee, Robert P. Dean, and William H. Leahy (New York, 1970), pp. 147-175. And Greenwood, "A Simultaneous-Equations Model. . .," (1975), p. 801.

[16]Greenwood, "A Simultaneous-Equations Model. . .," (1975), p. 801.

the origin region. The in-migration will lead to more investment and therefore, an increase in the marginal product of labor in the destination region because the migrants transfer capital when they migrate to this region or the migrants demand capital once they have completed their move.[17] Therefore, as Greenwood put it:

> These adjustments that tend to result in outshifts of the labor demand function in the recipient region and inward shifts in the sending region place upward pressure on wage rates, and income levels in the destination and downward pressure in the origin.[18]

Thus according to Greenwood's argument we may not know whether the demand shifts resulting from migration dominate the supply shifts or the supply shifts dominate the demand shifts or they cancel each other. Thus we cannot expect any sign associated with net migration rate (gross migration rate) in the expected per capita income function.

The third argument is based on Gunnar Myrdal's argument of backwash effects.[19] It is essentially what is called the selectivity of migration (see definition in Chapter III). Myrdal, in his argument, used the term "circular and cumulative causation."

In this context circular and cumulative causation means that the increase in demand or economic activities

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[17]Borts, p. 151.

[18]Greenwood, "A Simultaneous-Equations Model. . .," (1975), p. 801.

[19]Gunnar Myrdal, Economic Theory and Underdeveloped Regions (London, 1957), p. 27.

in a region tends to lead to in-migration to that region from other regions. Since migration is selective, then it tends to increase income disparities between the given region and other lagging regions. This induces more migration which induces further disparities in interregional income. He argued that the migration is selective at least in terms of age. The migrants are those who are young and most productive. Usually the migrants go from the low income region to the high income region and therefore, since they are the most productive, the migration tends to result in an increase of the income in the destination region (the high income region) and a decline of the income in the origin region (the low income region). Thus the migration tends to widen the income inequalities among the regions. More specifically Myrdal said:

> The localities and regions where economic activity is expanding will attract net immigration from other parts of the country. As migration is always selective, at least with respect to the migrant's age, this movement by itself tends to favour the rapidly growing communities and disfavour the others.[20]

Thus, this conclusion is different from the conclusion derived from the traditional theory. According to Myrdal, "The main idea I want to convey is that the play of the forces in the market normally tends to increase, rather than to decrease the inequalities between regions."[21]

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[20] Ibid.

[21] Ibid., p. 26.

From this discussion it appears that there is no strong a priori basis to expect the sign of the migration variable in the expected per capita income differential equation to be negative, positive or zero. However, we will hypothesize that the simple neoclassical theory of mobility of resources is holding and therefore, the migration tends to narrow the expected per capita income differential among the regions.

Another important variable which is expected to affect the expected per capita income differential is C_{j/C_i}, the ratio of the number of business establishments in region j to the number of business establishments in region i.

The reason for using C_{j/C_i} is that the higher the concentration of the economic activities in the destination region, the higher the per capita income will be in that region. Therefore, a higher ratio of economic concentration C_{j/C_i} will widen the per capita income differential and thus increase the per capita income inequality between the regions. By concentration of economic activities we mean the concentration of businesses such as industry, commercial activities, services, etc. that contribute to a higher per capita income in that region.

The other variable included in the income differential function is L_{j/L_i}. The reason for including this variable is that we assume that the productivity in agriculture is low and thus the more concentration of the labor force in agriculture in the origin region, the lower will be the productivity and hence the per capita income.

Let us suppose that a regional production function in the form of $x = f(C,L)$ where x is the product, C is Capital and L is labor. If we assume that this production function is homogeneous of degree one, then the marginal physical product of labor is a function of the capital to labor ratio. Thus if we have two regions i (origin region) and j (destination region), since j is the high income (high wage) region and i is the low income (low wage) region, then the marginal physical product of labor in j is higher than the marginal physical product of labor in i. For simplicity let us assume that i has more labor engaged in agriculture. Therefore, we expect that when the labor force engaged in agriculture is reduced, the productivity in agriculture will go up in the origin i region and go down in the destination j region. Thus a high ratio L_j/L_i will narrow the per capita income differential. Therefore, the decrease in the percentage of the labor force engaged in agriculture will be an improvement in resource allocation and thus increase the per capita income in the origin region.

R is a dummy variable to explain the share of the oil production to the per capita income differential between the regions. It is expected that the region that produces oil has a higher per capita income.

The question now is what is the dependent variable to be used in the migration equation. Is it better to use net migration or gross migration as the dependent variable

in the migration equation?

Many studies argue that net migration is not appropriate variable, particularly if the model is formulated as an investment theory. Sjaastad argued that the appropriate dependent variable in the context of an investment theory is the gross migration rather than the net migration.[22] At the same time most of the studies suggested that if we use net migration rates, many complications will result from this variable. As Alexander B. Jack put it:

> Complications take place if net migration, defined as the difference between emigration and immigration, is made the dependent variable. The model will clearly be more difficult to specify correctly than one which attempts to explain either of the constituent elements of net migration. Moreover, since net migration is the difference between two related quantities, there is obviously the possibility that a net migration equation will contain terms which partially cancel each other out or which are intercorrelated. Both situations complicate the problem of statistical estimation.[23]

We will use both variables, net migration as well as gross migration, as the dependent variables in the migration equation.

Summary

In this chapter a theoretical model has been presented

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[22]Larry A. Sjaastad, "Costs and Returns of Human Migration," Journal of Political Economy, LXX, Supplement (October, 1962), p. 93.

[23]Alexander B. Jack, "A Short-run Model of Interregional Migration," The Manchester School of Economics and Social Studies, XXXVIII (March, 1970), p. 16.

to explain the determining forces that are expected to underlie internal migration and the expected per capita income differential. The model employed a simultaneous equation approach to explain the interaction between the migration process and the expected per capita income differential. The explanatory variables used in this model are mainly economic variables. Those variables are the distance, education level, urbanization, past migration, the ratio of the business establishments and the ratio of the percentage of labor force engaged in agriculture.

This theoretical model will be used in the following chapters to test certain hypotheses about the migratory behavior and the expected per capita income differential.

CHAPTER V

THE RESULTS OF THE NET MIGRATION AND GROSS OUT-MIGRATION RATES

The purpose of this chapter is to present the empirical analysis based on the model presented in Chapter IV. The equations to be estimated and the hypotheses to be tested will be specified with either the net migration rate or gross migration rate and the expected per capita income differential as dependent variables in a two-equation model. These equations will be estimated by ordinary least squares as well as the two-stage least squares methods for two periods, 1954-1964 and 1964-1973. In this chapter the data sources and definitions of the variables used in this study are explained.

Specification

The model developed in Chapter IV presented the factors that are expected to explain both migration behavior and the expected per capita income differential. Based on the model specified in Chapter IV we assume that the relationship between the variables is linear and takes the form shown in equations (1) and (2).

With net migration rate NM_{ij} and the expected per

capita income differential Y_{ij} as the dependent variables the following equations are estimated by ordinary least-squares as well as the two stage least-square methods.

(1) $NM_{ij} = a_o + a_1 Y_{ij} + a_2 D_{ij} + a_3 E_i + a_4 E_j + a_5 U_i + a_6 U_j + a_7 PM_{ij}$ + error term

(2) $Y_{ij} = b_o + b_1 NM_{ij} + b_2 C_{j/C_i} + b_3 L_{j/L_i} + b_4 R$ + error term

NM_{ij} = net migration rate from i to j.

Y_{ij} = the expected per capita income differential.

D_{ij} = the distance between the capitals of region i and region j.

$E_{i(j)}$ = the education level of region i(j).

$U_{i(j)}$ = the urbanization index of region i(j).

PM_{ij} = the past migration from i to j.

C_{j/C_i} = the ratio of the number of business establishments in region j to those in region i.

L_{j/L_i} = the percentage of labor force engaged in agriculture in region i to those in region j.

R = dummy variable to account for the production of oil in the region.

a_o and b_o are constants and a_2, a_3, a_4, a_5, a_6, b_1 b_2, b_3 and b_4 are coefficients.

Using the gross out-migration rate the following linear two equation model will be estimated.

(3) $M = c_o + c_1 Y_{ij} + c_2 D_{ij} + c_3 E_i + c_4 E_j + c_5 U_i + c_6 U_j + c_7 PM_{ij}$ + error term

(4) $Y_{ij} = d_o + d_1 M + d_2 C_{j/C_i} + d_3 L_{j/L_i} + d_4 R$ + error term.

where

M = the gross out-migration rate, other variables are the same.

c_o and d_o are constants and c_1, c_2, c_3, c_4, c_5, c_6, c_7, d_1, d_2, d_3 and d_4 are coefficients.

We wish to test the following hypotheses:

(1) People move from region to region in response to expected per capita income differential (a_1, $c_1 > 0$)

(2) Distance is a deterrent to internal migration (a_2, $c_2 < 0$).

(3) The education level of both the origin and the destination region is positively related to internal migration (a_3, a_4, c_3, $c_4 > 0$).

(4) Internal migration increases with the level of urbanization of both the origin and destination region (a_5, a_6, c_5, $c_6 > 0$).

(5) Internal migration is positively related to past migration (a_7, $c_7 > 0$).

(6) Internal migration (net or gross migration rate) among the regions narrows the expected per capita income differentials among regions (b_1, $d_1 < 0$).

(7) The expected per capita income differential is positively related to the ratio of the business establishments in the destination region to the number of business establishments in the origin region

(b_2, $d_2 > 0$).

(8) The expected per capita income differential is negatively related to the ratio of the percentage of the labor force engaged in agriculture in the destination region to that in the origin region (b_3, $d_3 < 0$).

It is necessary to get data from the origin as well as the destination regions to test the model. The data sources and definitions of the variables are described in the following section.

Data Sources and Definitions of the Variables

The regions are defined in terms of Libyan Administrative districts. Nine regions were defined during the period 1954-1964, for which the data are available. These regions are: Derna, El Kabal Aghdar, Benghazi, Musrata, Khoms, Tripoli, Zawia, Gharian, and Sebha (See Figure 1, Chapter II). Since there are nine regions and eight destinations corresponding to each origin then regressions are based on (9 x 8) 72 observations. In addition, the Elkalige region was added in 1973. Thus, in 1973 the data are available for ten regions in Libya (See Figure 2, Chapter II). During this period (1964-1973) there are (10 x 9) 90 observations. In this study the migration flows data are not limited to men. They include also women. We believe that the inclusion of women will increase the validity of the statistical tests.

The following pages define and disucss the dependent

as well as the explanatory variables used in this study.

Migration

Most of the studies of internal migration in the developing countries have used a migration variable as reported by the population census in one period of time.[1] The migration data obtained from this source have been limited to information about the place of birth and the place of residence of the migrants. This means that the migration variable in this case measures migratory flows over a long period of time. The migration variable according to this measure includes the old as well as the recent migrants. At the same time, the explanatory variables have been measured at the end of the period and therefore they may not reflect the conditions at the time of the migration decision. This may lead to misleading results.[2] The problem is reduced in this study by using a migration variable that sums the migration over a ten-year period instead of life time migration (migration by the place of birth and the place of residence which sums migrations over a long period of time).

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[1] Sahota, pp. 218-245; Beals, Levy, and Moses, pp. 480-486; and Michael Greenwood, "The Determinants of Labor Migration in Egypt," Journal of Regional Science, Vol. 9 (1969), pp. 283-290.

[2] M. B. Levy and W. J. Wadycki, "Lifetime Versus One-Year Migration in Venezuela," Journal of Regional Science, 12 (December, 1972), p. 407.

The data is available for gross migration among the different regions in Libya. The data for the period 1954-64 is obtained from a report which has been made by Ital-consult.[3] The only adjustment that has been made to these data is that the addition of the migratory flows from Elkalige to those of Benghazi, etc. with the assumption that all migrants go to Benghazi region. This adjustment has been made because the Elkalige region is new. The data for other variables (except migration and per capita income) are included in the Benghazi region data. At the same time most of this new region (Elkalige) was a part of Benghazi region before 1970. The migration flows from Benghazi to Elkalige and those of Elkalige to Benghazi are considered as within region migration. The same measure of migration applies to the period 1964-1973. The data for this period are available for the ten regions.

The migration variable in this study is the number of people who migrated from i to j during the period 1954-1964, and 1964-1973. The rate of migration M is obtained by dividing the number of migrants from i to j by the total population of the origin region in 1954 for the period 1954-1964 and in 1964 for the period 1964-1973. The net migration rate is defined as $m_{ij} - m_{ji}$ divided

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[3]Libyan Arab Republic Ministry of Planning and Scientific Research, "Settlement Pattern Study," p. B-23.

by the total population of the origin region i in 1954 for the period 1954-1964 and in 1964 for the period 1964-1973.

Past Migration

The population census classifies the population by the place of birth and the place of residence on the 31st of July, 1964.[4] The past migration variable is obtained by subtracting the migration flows during the period 1954-1964 from the life time migration (the number of people born in i and residing in j on the 31st of July, 1964).

Thus

$$PM_{ij} = m_{ij}{}_{1964} - m_{ij}{}_{1954-1964}.$$

The preliminary results of the population census of 1973 made available to us the number of people who are residing in a region in 1973 and were previously residing in other regions.[5] To get the past migration from i to j, we subtract the migratory flows during the period 1964-1973 from the number of people who are residing now in j and previously resided in i on the 31st of July, 1973.

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[4]Libyan Arab Republic Ministry of Planning, Department of Social and Economic Affairs, "Statistical Survey of Most Economic Sectors by Regions," no page number assigned.

[5]Libyan Arab Republic Ministry of Planning and Scientific Research, Demography and Manpower Planning Section, "A Report on Manpower Situation-1974, Past Trends, Present Features and Strategy for the Plan 1976-1980," Tripoli (July, 1975), Table 6.

That is

$$PM_{ij} = m_{ij}{}_{1973} - m_{ij}{}_{1964-1973}.$$

Expected Per Capita Income

Per capita income for every region in 1964 has been obtained by dividing the total income of a given region by the total population of that region. For example, to obtain the per capita income in region i we divide the total income of region i by the total population of region i.

Total income and per capita income of each region has been estimated by the Department of Regional Planning.[6] They distributed the Domestic National Product (DNP) of Libya according to Mutasurifiah (County). The estimation and the distribution is obtained for each region according to the regional employment and the productivity of labor. The procedures of the estimation are as follows:

	M.L.D.[7]
DNP (at factor cost)	341.3
-income transferred abroad	78.1
GNI (Gross National Income)	263.2

[6]Libyan Arab Republic Ministry of Planning, "Statistical Survey. . .," no page number assigned.

[7]Millions of Libyan dinars.

(a) The income was distributed accordingly:

Agriculture	22.1	
Petroleum	6.3	
Other Minerals	.8	
Industry	11.4	
Construction	14.1	
Transportation	12.5	
Commerce & Banking	28.7	
Other Services[8]	36.9	
Housing	30.4	
		163.2

(b) Not distributed:

Government earnings, additional taxes	97.7	
Capital earnings abroad	2.3	
		100.0
TOTAL		263.2

Once the total income of the region is obtained then the per capita income of the region can be obtained easily.

Calculation of per capita income data for each region in 1973 is straight forward. This data has been derived from the percentage distribution of per capita income in the Italconsult Report.[9] The data of per capita income in 1973 is available as a percentage of the per capita income of Libya in 1973. The report also gave the per capita income of Libya in 1973 as 338 Libyan Dinars. Once the Libyan per capita income in 1973 is obtained, then the per capita income in 1973 for all regions is a straight-forward.

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[8]Includes public services.

[9]Libyan Arab Republic Ministry of Planning, "Settlement Pattern Study," pp. C-8 and C-10.

For example, to get the per capita income of Derna region (Muhafada) in 1973, we multiply the Libyan per capita income in 1973 by the percent obtained from the Italconsult divided by 100 to obtain $\frac{338 \times 95}{100} = 321$ L.D.

In order that the per capita income differential variable reflect the conditions that were prevailing during the period 1964-1973, the average per capita income of 1964 and 1973 will be used. The per capita income in both 1964 and 1973 is available as a percentage of Libyan per capita income in 1964 for the ten regions (including Elkalige region). Thus it is easy to get the average per capita income.

The second step in calculating the expected per capita income differential is to get the probability of obtaining a job. Therefore, to get the expected per capita income differential we need the probability of obtaining a job in each region, and for this we take the employment rate in the region as an approximation for the vacancy rate. The employment rate for 1964 is calculated from William Wedley's study of unemployment in Libya.[10] The calculation procedure is as follows:

(1) Calculate the unemployment rate as a decimal by dividing the total unemployed persons by the

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[10]William C. Wedley, "Unemployment and Under-Employment in Libya," Dirassat, The Libyan Economic and Business Review, II (Autumn, 1966), p. 74.

economically active population (Libyans).

(2) Subtract the proportion of unemployment from one. The result is the employment rate which is the probability of obtaining a job.

For 1973 the unemployment rate is obtained from "A Report on Manpower Situation-1974" which has been made by the Ministry of Planning and Scientific Research.[11] To obtain the employment rate we just subtract the unemployment rate from one. We have to note that the unemployment rate for 1973 is for Libyans and non-Libyans but it seems that the unemployment rate among the non-Libyans is very low since most of them if not all come under contracts. This implies that these figures are reflecting the unemployment of the Libyans.

In order to obtain a better reflection of the conditions that were prevailing during the entire period, we take the average employment rate for 1964 and 1973. The result is taken to be the average probability of obtaining a job during 1964-1973. Because we have only the employment rate for nine regions in 1964, the employment rate of the Benghazi region is taken to be the employment rate for the Elkalige region in 1964, and thus the average is obtained for ten regions during the period 1964-1973. The expected per capita income is obtained by multiplying the

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[11]Libyan Arab Republic Ministry of Planning and Scientific Research, "A Report on Manpower. . .," Table 22.

per capita income of each region by the employment rate of the region.

Education

The measure of the education to be used here is the percent of Libyan population age six and more who were attending schools in 1964. This index of education level have been calculated for both the destination and the origin region. The population aged six or more who have attended schools in 1964 is available in the Statistical Abstract of 1967.[12]

The education index for 1973 is different from the index that has been applied for 1964. Although the indices of education for the two periods are different we believe that they give the same results. For 1973 the index of education is the percent of Libya's school going population aged 6-14. These data are available in "A Report on Manpower Situation-1974."[13]

Distance:

The measure of distance is the road distance between the capitals of the regions. Thus it is the road

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[12]Libyan Arab Republic Ministry of Planning, Statistical and Census Department, Statistical Abstract, Tripoli (1967), p. 8.

[13]Libyan Arab Republic Ministry of Planning and Scientific Research, "A Report on Manpower. . .," Table 22.

kilometers from the capital of region i to the capital of region j.

The Percentage of Labor Engaged in Agriculture

This measure is calculated by dividing the number of the population engaged in agriculture by the economically active population. These data for 1964 are available in the Libyan Arab Republic Ministry of Planning, "Statistical Survey of Most Economic Sectors by Region, 1968."[14] The data for 1973 is obtained from the "Report on Manpower Situation-1974."[15] These data need no calculation; they are available in percentage form according to the regions in 1973.

Business Establishments

The measure of the business establishments is given by the number of business establishments in each region. The data for 1964 are available in the Statistical Abstract of 1967.[16] The index covers all the establishments which are economically engaged in the production of goods and services for others, whether carried on by private sector,

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[14]Libyan Arab Republic Ministry of Planning, "Statistical Survey. . .," no page number assigned.

[15]Libyan Arab Republic Ministry of Planning and Scientific Research, "A Report on Manpower. . .," Table 22.

[16]Libyan Arab Republic Ministry of Planning, A Statistical Abstract, p. 310.

public organizations, or by the government. These data include all the establishments in each region whether small or big establishments. A small establishment is the business that employs less than five persons, while a big establishment is one that employs five persons or more.[17]

The same index of business establishments is applied to 1973. The data for 1973 is obtained from the Preliminary Results of the Population Census of 1973. The data are available for the ten regions in Libya.[18]

Urbanization

The urbanization index to be employed for 1964 is the proportion of population of the region living in urban areas. For 1964, the urbanization index will be the population who live in the capital city of the region divided by the total population of the region. Actually the population census of 1964 include only Tripoli, Benghazi Beida Baldia (municipality) and Derna Baladia (municipality) in its definition of the urban areas. The urbanization definition employed here is different from that of the census since we included the capitals of all the regions.

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[17] Ibid.

[18] Libyan Arab Republic Ministry of Planning, Department of Statistics and Census, Preliminary Results of the Population Census, 1973. The Number of Establishments and Agricultural Holdings (In Arabic) (Tripoli, 1973), p. 1.

The population of the capitals of the regions is obtained from the report of the Libyan Arab Republic Ministry of Planning and Scientific Research, "Statistical Survey of the Economic Sectors by Regions, 1968."[19]

The urbanization index in 1973 is the proportion of the region population living in towns containing 10,000 persons or more. The population in every town is available in the Preliminary Results of the Population Census of 1973.[20] This index is clearly different from that employed in 1964, since for 1973 it includes all the towns in the regions which have populations of 10,000 or more.

A word of caution must be said about the data of 1964-1973 period. First, some of the data are obtained from the census results. These results are preliminary and the final results, particularly on the regional level, may differ. Second, the per capita income figures are obtained from the Italconsult Report. This report is a draft copy and thus the revised report may differ. However, it is expected that the revisions will be in the analysis and not the data. Nevertheless, it is believed that even if there are changes in either the census results or the Italconsult Report, they would be minor and thus will not

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[19]Libyan Arab Republic Ministry of Planning, "Statistical Survey. . .," no page number assigned.

[20]Libyan Arab Republic Ministry of Planning and Scientific Research, Preliminary Results of Population Census of 1963, pp. 1-11.

affect the results of this study.

The Results of a Two-Equation Model, 1954-1964

Net Migration Rate

The results of the ordinary least-squares and two stage least-squares estimates of the relationship between the net migration rate NM_{ij} and the expected per capita income differential Y_{ij} are reported in Tables XVIII, XIX, and XX.

In Table XVIII most of the coefficients are significant at the conventional levels. As far as the net migration equation is concerned the expected per capita income differential is significant at .01 level for ordinary least squares and at .05 for two-stage least squares. However, it seems that there is a multicollineurity between the expected per capita income differentials and the urbanization variables (U_i, U_j) (See correlation matrix in Table XXIV). The urbanization variables in both the origin region (U_i) and the destination region (U_j) are not significant and have the wrong signs. If we removed these two variables (U_i, U_j) in Table XIX the expected per capita income differential became significant at .01 level in both the ordinary least-squares and the two stage least-squares. Distance is not significant and has the wrong sign in both regressions reported in Tables XVIII and XIX.

ORDINARY LEAST-SQUARES (OLS) AND TWO STAGE LEAST-SQUARES (2SLS) ESTIMATES OF THE RELATIONSHIP BETWEEN NET MIGRATION RATE (NM_{ij}) AND THE EXPECTED PER CAPITA INCOME DIFFERENTIAL (Y_{ij}) DURING THE PERIOD 1954-1964.

Independent Variables	Equation For NM_{ij}				Equation For Y_{ij}			
	OLS		2SLS		OLS		2SLS	
	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value
Constant	0.0023	0.4337	0.0024	0.441	12.868**	1.941	11.059***	1.608
Y_{ij}	0.00012*	2.747	0.00011**	1.671				
D_{ij}	0.0000015	0.698	0.0000015	0.710				
E_i	-0.00042***	-1.345	-0.00042***	-1.354				
E_j	0.00037	1.172	0.00037	1.181				
U_i	-0.000021	-0.300	-0.00003	-0.334				
U_j	-0.000075	-1.044	-0.000068	-0.774				
PM_{ij}	0.0000025*	6.131	0.0000025*	5.991				
NM_{ij}					716.470*	3.510	962.323*	3.245
C_j/C_i					8.750*	7.508	8.457*	7.0244
L_j/L_i					-28.959*	-6.346	-26.859*	-5.419
R					8.641***	1.487	6.979	1.155
$\bar{R}^2$ adjusted r-square	.658		.657		.781		.777	
degrees of freedom	64				67			

*, ** and *** mean that coefficients are significant at 0.01, 0.05 and 0.1 levels, respectively.

TABLE XIX

ORDINARY LEAST-SQUARES (OLS) AND TWO STAGE LEAST-SQUARES (2SLS) ESTIMATES OF THE RELATIONSHIP BETWEEN NET MIGRATION RATE (NM_{ij}) AND THE EXPECTED PER CAPITA INCOME DIFFERENTIAL (Y_{ij}) WHEN URBANIZATION VARIABLES ARE DROPPED

(1954-1964)

	Equation For							
	NM_{ij}				Y_{ij}			
	OLS		2SLS		OLS		2SLS	
Independent Variables	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value
Constant	0.00065	0.1223	0.00072	0.1353	12.8684**	1.9415	13.0601**	1.9163
Y_{ij}	0.00011*	4.0775	0.000094*	3.0344				
D_{ij}	0.0000018	0.8604	0.0000021	0.9297				
E_i	-0.00056**	-1.9811	-0.00060**	-2.0597				
E_j	0.00026	0.8479	0.00028	0.8999				
PM_{ij}	0.0000023*	6.0976	0.0000024*	6.0419				
NM_{ij}					716.4701*	3.5103	687.6933**	2.2852
C_{j/C_i}					8.750*	7.5084	8.7843*	7.3519
L_{j/L_i}					-28.9598*	-6.3460	-29.2056*	-5.9126
R					8.6411***	1.4879	8.8356***	1.4732
$\bar{R}^2$ adjusted r-square	0.661		.660		.781		.781	
degrees of freedom	66				67			

*, **, and *** mean that the coefficients are significant at 0.01, 0.05 and 0.1 levels, significantly.

ORDINARY LEAST-SQUARES (OLS) AND TWO STAGE LEAST-SQUARES (2SLS) ESTIMATES OF THE RELATIONSHIP BETWEEN NET MIGRATION RATE (NM_{ij}) AND THE EXPECTED PER CAPITA INCOME DIFFERENTIAL (Y_{ij}) WHEN INCOME-DISTANCE INTERACTION TERM IS INCLUDED (1954-1964)

Independent Variables	Equation For NM_{ij}				Equation For Y_{ij}			
	OLS		2SLS		OLS		2SLS	
	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value
Constant	-0.00046	-0.1046	-0.00032	-0.0720	12.8684**	1.9415	16.2608**	2.3074
Y_{ij}	0.00027*	7.6348	0.000245*	4.6941				
$D_{ij} \cdot Y_{ij}$	-0.00000021*	-5.6378	-0.00000019*	-3.8571				
E_i	-0.0048**	-2.1103	-0.0052**	-2.2099				
E_j	0.0048**	1.9955	0.0049**	2.0384				
PM_{ij}	0.0000015*	5.2611	0.0000016*	5.0017				
NM_{ij}					716.4701*	3.5103	255.312	0.8373
C_j/C_i					8.7600*	7.5084	9.2986*	7.5352
L_j/L_i					-28.9598*	-6.3460	-32.8947*	-6.4731
R					8.6411***	1.4879	11.7572**	1.8991
$\bar{R}^2$ adjusted r-square	0.76		0.76		0.78		0.76	
degrees of freedom	66				67			

*, **, and *** mean the coefficients are significant at 0.01, 0.05 and 0.1 levels, respectively.

The education index of the origin region (E_i) is significant at .1 level in the regression equation of Table XVIII and significant at 0.05 in the regression equation of Table XIX. However this variable has the wrong sign in both regression equations. Past migration is significant and has the expected sign in both regressions presented in Tables XVIII and XIX.

Let us now turn to the expected per capita income differential equation. From Table XVIII and Table XIX all the coefficients except the dummy variable (R) are significant at .01 level. The dummy variable (R) is significant at .1 level in both Table XVIII and Table XIX. Net migration rate (NM_{ij}) is significant at .01 level and has positive sign which is inconsistent with the neoclassical theory. The ratio of business establishments in the destination to that of the origin region is significant at .01 level and has the expected sign. This conclusion also applies to the ratio of the percentage of labor force engaged in agriculture in the destination region to that in the origin region. It is significant at .01 level and possesses the expected sign. The removal of the urbanization variables does not affect the goodness of the fit since the adjusted R-squares stayed approximately the same for ordinary least squares. In the net migration rate equations of Table XVIII and Table XIX the distance variable is not significant. This result may be due to misspecification of this variable. Probably the corrected

specification includes a distance-income interaction term $Y_{ij} \cdot D_{ij}$. This specification is proposed by Robert Schuessler. His justification for using this distance-income interaction term is:

> People are less likely to migrate for a given, known income differential as distance increases, first, because of increasing money and "psychic" costs, and second, because information about economic opportunity declines with distance.[21]

Thus D_{ij} is replaced by $D_{ij} \cdot Y_{ij}$. Then the equations presented in Table XIX are reestimated. The results of the estimation presented in Table XX, when the distance-income interaction term ($D_{ij} \cdot Y_{ij}$) is included, indicate that most of the variables for both ordinary least-squares or the two stage-least squares are significant at .01 level. The only exception in the net migration rate equation is the education index in both the origin region (E_i) and the destination region (E_j) which are significant at .05 level but E_i has the wrong sign. The dummy variable (R) in the expected per capita income differential equation is significant at .05 level for the two-stage least squares equation.

The explanatory power of the net migration rate equation improved with an increase in the adjusted R-squares

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[21]Robert Schuessler, "Migration--A Multi-Regional Approach: A Critique of Net Migration Studies," Program on Regional and Urban Economics. Discussion Paper No. 76, Harvard University (December, 1972), p. 15.

from approximately 0.66 to 0.76 for the ordinary least-squares (Tables XIX and XX).

Gross Out-Migration Rate

This measure is defined as (M), the number of people who moved from region i to region j during the period 1954-1964 divided by the population of the origin region (i) at the beginning of the period (1954). Using this measure enables us to avoid the problems associated with the net migration rate. The only problem in choosing this measure as the dependent variable in the migration equation is whether to choose out-migration or in-migration. But it seems that this is not a real problem since Libya is a closed system as far as inter-regional migration is concerned and thus out-migration from one region implies simultaneous in-migration into other regions. Thus as Alexander Jack put it,

> . . .All population movements between regions can be accounted for if either emigration or immigration is explained. In general, a model which sought to explain both would involve duplication effort.[22]

Therefore, in this study the gross out-migration rate will be used as the dependent variable in the migration equation. In the expected per capita income differential equation, the expected per capita income differential is the dependent variable. Using these two dependent variables

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[22]Jack, p. 16.

to estimate the two equation model, the two-stage least-squares as well as the ordinary least squares will be used in the estimation.

The results of this estimation are presented in Table XXI, Table XXII, and Table XXIII. These tables (XXI, XXII and XXIII) give the ordinary least squares and two stage least squares estimates of the relationship between the rate of out-migration ($M = m_{ij/P_i}$) and the expected per capita income differential Y_{ij}.

From Table XXI most of the coefficients are significant at either at .01, .05 or 0.1 levels for both the ordinary least-squares and the two-stage least-squares. However, the expected per capita income differential is significant at .05 level for the ordinary least-squares while the urbanization variable in the origin region U_i and the urbanization variable in the destination region U_j are not significant and have the wrong signs. When the two-stage least-squares was applied, both the expected per capita income differential and the urbanization variables (U_i and U_j) are not significant and U_i and U_j still have the wrong signs. Thus when the urbanization variables U_i and U_j are dropped, the expected per capita income differential turned to be significant at .01 level for the ordinary least squares and at .01 level for the two stage least squares in Table XXII. It is also significant at .05 in the two stage least squares in Table XXIII. All other variables in the migration equations are

significant at the conventional levels and have the expected signs in all regressions (Table XXI, Table XXII, and Table XXIII).

As far as the expected per capita income equation is concerned all the variables in this equation presented in Table XXI, Table XXII and Table XXIII are significant at either .01 level, .05 level or .1 level and have the expected signs except the migration rate variable which has a sign that is inconsistent with the simple neoclassical theory.

The adjusted R-squares are high and ranges from .76 to .77 in the migration equation and .76 in the expected per capita income equation. The removal of the urbanization variables (U_i, U_j) does not affect the goodness of the fit (Tables XXI and XXIII).

In Table XXIII the distance variable is included in square form (D_{ij}^2). The inclusion of the distance in square form does not change the model very much. The t-ratio declined from 2.4714 (in Table XXII 2SLS) to 2.3244 (in Table XXIII 2SLS). Adjusted R-squares declined from .77 in Table XXII to .76 in Table XXIII. Therefore, it seems that the inclusion of the distance variable in the regular form (D_{ij}) performs better than the square form when the gross out-migration rate is used as the dependent variable.

TABLE XXI

ORDINARY LEAST-SQUARES (OLS) AND TWO STAGE LEAST-SQUARES (2SLS) ESTIMATES OF THE RELATIONSHIP BETWEEN THE GROSS RATE OF OUT-MIGRATION ($M = m_{ij/P_i}$) AND THE EXPECTED PER CAPITA INCOME DIFFERENTIAL (Y_{ij}) (1954-1964)

Independent Variables	Equation For: M				Equation For: Y_{ij}			
	OLS		2SLS		OLS		2SLS	
	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value
Constant	-0.0037	-0.804	-0.0036	-0.7612	16.5218*	2.4496	16.6785*	2.4662
Y_{ij}	0.000085**	2.2607	0.000055	0.9435				
D_{ij}	-0.0000049*	-2.6667	-0.0000048*	-2.5690				
E_i	0.00046**	1.7704	0.00044**	1.6528				
E_j	0.00041***	1.5321	0.00043***	1.5743				
U_i	-0.0000076	-0.1272	-0.000041	-0.5302				
U_j	-0.000038	-0.6201	-0.0000092	-0.1234				
PM_{ij}	0.0000030*	8.6559	0.0000031*	8.5338				
M					479.5983*	2.4493	433.963**	1.8414
C_{j/C_i}					8.9908*	7.4236	9.0489*	7.3988
L_{j/L_i}					-33.9837*	-7.7103	-34.0881*	-7.7132
R					8.1142***	1.2958	8.6250***	1.3406
$\bar{R}^2$ adjusted r-square	0.76		0.76		0.76		0.76	
degrees of freedom	64				67			

*, **, and *** mean that coefficients are significant at 0.01, 0.05 and 0.1 levels, respectively.

ORDINARY LEAST-SQUARES (OLS) AND TWO STAGE LEAST-SQUARES (2SLS) ESTIMATES OF THE RELATIONSHIP BETWEEN THE GROSS RATE OF MIGRATION ($M = m_{ij/P_i}$) AND THE EXPECTED PER CAPITA INCOME DIFFERENTIAL (Y_{ij}) WHEN URBANIZATION VARIABLES ARE DROPPED (1954-1964)

Independent Variables	Equation For: M				Equation For: Y_{ij}			
	OLS		2SLS		OLS		2SLS	
	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value
Constant	-0.00456	-1.0175	-0.0045	-0.9985	16.5218*	2.4496	17.0660*	2.5127
Y_{ij}	0.000078*	3.4325	0.0000667*	2.4063				
D_{ij}	-0.0000048*	-2.6006	-0.0000046*	-2.4714				
E_i	0.00040**	1.6790	0.000358***	1.4506				
E_j	0.00036**	1.3919	0.000381***	1.4561				
PM_{ij}	0.0000029*	9.0766	0.0000030*	8.9584				
M					479.5983*	2.4493	318.2066***	1.3321
C_{j/C_i}					8.9908*	7.4236	9.1965*	7.4829
L_{j/L_i}					-33.9837*	-7.7103	-34.3530*	-7.7386
R					8.1142***	1.2958	9.9207**	1.5351
$\bar{R}^2$ adjusted r-square	0.77		0.76		0.76		0.76	
degrees of freedom	66				67			

*, **, and *** mean that the coefficients are significant at 0.01, 0.05 and 0.1 levels, significantly.

ORDINARY LEAST-SQUARES (OLS) AND TWO STAGE LEAST-SQUARES (2SLS) ESTIMATES OF THE RELATIONSHIP BETWEEN THE GROSS RATE OF MIGRATION ($M = m_{ij}/P_i$) AND THE EXPECTED PER CAPITA INCOME DIFFERENTIAL (Y_{ij}) WHEN D_{ij}^2 IS USED

(1954-1964)

	Equation For							
	M				Y_{ij}			
	OLS		2SLS		OLS		2SLS	
Independent Variables	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value
Constant	-0.0061**	-1.3338	-0.0059**	-1.2958	16.5218*	2.4446*	17.0593*	2.5151
Y_{ij}	0.000078*	3.3942	0.000064**	2.3244				
D_{ij}^2	-3.0952*	-2.5022	-2.9565**	-2.3640				
E_i	0.00042**	1.7362	0.00037**	1.4803				
E_j	0.00037**	1.4127	0.00039**	1.4831				
PM_{ij}	0.0000029	9.2579*	0.0000031*	9.1594				
M					479.5983*	2.4493	311.3067	1.3000
C_j/C_i					8.9908*	7.4236	9.2053*	7.4860
L_j/L_i					-33.9837*	-7.7103	-34.3688*	-7.7389
R					8.1142***	1.2958	9.9979***	1.5438
$\bar{R}$ adjusted r-square	0.76		0.76		0.76		0.76	
degrees of freedom	66				67			

*, **, and *** mean that the coefficients are significant at 0.01, 0.05 and 0.1 levels, respectively.

TABLE XXIV

CORRELATION MATRIX
1954-1964

	M	Y_{ij}	D_{ij}	E_i	E_j	U_i	U_j	PM_{ij}	C_j/C_i	L_j/L_i	R
M	1.000	0.527	-0.393	-0.146	0.392	-0.102	0.590	0.857	0.369	-0.309	0.497
Y_{ij}		1.000	0.004	-0.372	0.373	-0.646	-0.647	0.446	0.671	-0.681	0.575
D_{ij}			1.000	0.182	0.185	-0.124	-0.113	-0.383	0.026	-0.037	0.070
E_i				1.000	-0.125	0.470	-0.051	-0.176	0.023	0.463	-0.080
E_j					1.000	-0.058	0.475	0.385	0.146	-0.480	0.645
U_i						1.000	-0.123	-0.006	-0.360	0.444	-0.095
U_j							1.000	0.604	0.613	-0.357	0.761
PM_{ij}								1.000	0.298	-0.300	0.480
C_j/C_i									1.000	-0.232	0.405
L_j/L_i										1.000	-0.447
R											1.000

The Results of a Two-Equation Model, 1964-1973

In the first period (1954-1964) three forms of regressions were employed when both net migration rate NM_{ij} and gross out-migration rate M were used as the dependent variables in the migration equation. However, a multicollinearity existed between the expected per capita income differential Y_{ij} and the urbanization in both the origin U_i and the destination U_j regions. Therefore, based on the t-ratios the urbanization variables (U_i, U_j) were dropped [This is called "zero restriction" which means that when one drops a variable on the basis of the statistical insignificance of that variable and the equations reestimated].[23] However, dropping the urbanization variables through the t-test and the reestimation of the equations will lead to that the estimates obtained suffer from pretesting bias. Pretesting bias as described by David S. Huang:

> Arises in an estimator when the estimator no longer has the probability distribution implied by the original model. For instance, after a regression equation is estimated by OLS, one may drop a variable, say, because it has a wrong sign, and the regression is rerun. Then the "zero" coefficient for the dropped variable in the second equation is biased because of pretesting.[24]

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[23] David S. Haung, Regression and Econometric Methods (New York, 1970), p. 155.

[24] Ibid.

In order to avoid this problem, the preferred equations in terms of adjusted R-square (the equations with high adjusted R-square after dropping the urbanization variables) will be estimated using the second period (1964-1973) data. The results of this estimation are presented in the following sections.

Net Migration Rate

As before net migration rate is defined as $(m_{ij} - m_{ji})/P_i$ where m_{ij} is the number of people moved from i to j during the period 1964-1973, m_{ji} is the number of people moved from j to i during the same period and P_i is the number of people residing in region i in 1964.

Results are reported in Table XXV. As far as the migration equation is concerned most of the variables are significant at either .01 or .05 levels. The expected per capita income differential Y_{ij} is significant at .01 level for both the ordinary least-squares and two stage least-squares. The distance-income interaction term $(D_{ij} \cdot Y_{ij})$ is significant at .01 level for both ordinary and two stage least-squares. However the education level of both the origin region E_i and destination region E_j are not significant and have the opposite signs. Past migration PM_{ij} which represents the presence of relatives and friends is significant at .01 level for both the ordinary least-squares and the two stage least-squares.

With respect to the expected per capita income

differential equation most of the variables are significant at the conventional levels. The only exception is the dummy variable R which is not significant. Most of other variables are significant and have the expected signs. However the net migration rate NM_{ij} is signnificant at .01 level but has the opposite positive sign to what is expected by the neoclassical theory. Despite this improvement in the specification of the net migration model, the net migration is still not adequate as a dependent variable. Thus gross out-migration rate as the dependent variable is to be presented in the following section.

Gross Out-Migration Rate

The gross out-migration rate is defined as the number of people who moved from region i to region j during the period 1964-1973 divided by the total population of region i in 1964.

The results of the estimation are presented in Table XXVI. Most of the variables in the migration equation are significant at the conventional levels for both the ordinary least squares and the two stage least-squares. The expected per capita income differential is significant and has the expected sign. The distance is significant at .05 level and has the expected negative sign. However the educational level of the origin region E_i is significant at .1 level but the education level of the destination region E_j is not significant even at .1 level. The past

TABLE XXV

ORDINARY LEAST-SQUARES (OLS) AND TWO STAGE LEAST-SQUARES (2SLS) ESTIMATES OF THE RELATIONSHIP BETWEEN NET MIGRATION RATE (NM_{ij}) AND THE EXPECTED PER CAPITA INCOME DIFFERENTIAL (Y_{ij}) DURING THE PERIOD 1964-1973.

Dependent Variables	Equation For NM_{ij}				Equation For Y_{ij}			
	OLS		2SLS		OLS		2SLS	
	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value
Constant	0.0224	0.9068	0.0219	0.873	27.482*	3.679	27.085*	3.600
Y_{ij}	0.00026*	5.487	0.00027*	3.413				
$Y_{ij} \cdot D_{ij}$	-0.00000020*	-4.151	-0.00000021*	-2.910				
E_i	-0.00020	-0.860	-0.00019	-0.724				
E_j	-0.00013	-0.555	-0.00013	-0.568				
PM_{ij}	0.000006*	8.120	0.000006*	6.754				
NM_{ij}					500.100*	3.549	354.026**	1.827
C_j/C_i					12.766*	5.088	13.932*	5.093
L_j/L_i					-39.135*	-11.608	-39.700*	11.576
R					5.385	0.884	5.131	0.836
Adjusted r-squares	0.71		0.71		0.78		0.79	
Degrees of freedom	84				85			

* and ** mean that the coefficient is significant at .01 and .05, respectively.

TABLE XXVI

ORDINARY LEAST-SQUARES (OLS) AND TWO STAGE LEAST-SQUARES (2SLS) ESTIMATES OF THE RELATIONSHIP BETWEEN GROSS OUT-MIGRATION RATE (M) AND THE EXPECTED PER CAPITA INCOME DIFFERENTIAL (Y_{ij}) DURING THE PERIOD 1964-1973.

	Equation For							
	M				Y_{ij}			
	OLS		2SLS		OLS		2SLS	
Independent Variables	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value
Constant	-0.0160	-0.970	-0.0173	-1.059	26.854*	3.469	26.939*	3.478
Y_{ij}	0.000039**	2.129	0.000056*	2.459				
D_{ij}	-0.0000046**	-2.029	-0.0000049**	-2.162				
E_i	0.00016	1.002	0.00022***	1.320				
E_j	0.00012	0.757	0.00008	0.539				
PM_{ij}	0.0000096**	18.543	0.0000094**	17.473				
M					326.455**	2.337	364.309*	2.429
C_j/C_i					13.647*	5.094	13.286*	4.866
L_j/L_i					-40.960*	-11.874	-40.947*	-11.865
R					3.909	0.619	3.838	0.608
Adjusted r-squares	.88		.88		0.78		.78	
Degrees of freedom	84				85			

*, **, and *** mean that the coefficients are significant at 0.01, 0.05 and 0.1 levels, respectively.

TABLE XXVII

CORRELATION MATRIX
1964-1973

	M	Y_{ij}	D_{ij}	E_i	E_j	PM_{ij}	C_j/C_i	L_j/L_i	R
M	1.000	0.474	-0.392	-0.069	0.398	0.938	0.553	-0.253	0.136
Y_{ij}		1.000	-0.00008	-0.402	0.414	0.444	0.678	-0.808	0.129
D_{ij}			1.000	0.083	0.090	-0.370	-0.032	0.003	0.053
E_i				1.000	-0.090	-0.069	-0.303	0.433	0.027
E_j					1.000	0.395	0.537	-0.259	0.205
PM_{ij}						1.000	0.459	-0.234	0.158
C_j/C_i							1.000	-0.442	0.186
L_j/L_i								1.000	-0.034
R									1.000

migration PM_{ij} is significant and has the expected positive sign.

As far as the expected per capita income differential equation is concerned most of the variables are significant at the conventional levels. The only exception is the dummy variable R which is not significant. The migration rate M is significant at .01 and has a positive sign which is inconsistent with neoclassical theory. However the ratio of the number of business establishments in the destination region to those in the origin region C_{j/C_i} is significant at .01 level and has the expected positive sign. The ratio of percentage of the labor force engaged in agriculture in the destination region to the percentage of labor force engaged in agriculture in the origin region is significant at .01 level and has the expected negative sign. The explanatory power of the two equations is very high and ranges from 0.88 in the migration equation to 0.78 in the expected per capita income equation.

Summary

This chapter presented the estimation and the results of a two-equation model of the variables that are expected to explain both the migration behavior and the expected per capita income differential during two periods (1954-1964 and 1964-1973). Included in the chapter also are the description of the data sources and the definitions of the variables.

The interpretation of these results will be presented in the following chapter.

CHAPTER VI

INTERPRETATION OF THE RESULTS

This chapter will introduce the interpretation of the results or the factors that explain both the migration rate and the expected per capita income differential. However, the question now is, do we use the ordinary least squares or the two stage least squares coefficients in the interpretation of the results? Since ordinary least squares is known to give inconsistent estimates[1], then the two-stage least-squares method will be adopted as the preferred method for the interpretation of the results. However, there are differences between the estimates of the ordinary least squares and the two-stage least squares. It is useful to compare their coefficients.

Tables XXVIII and XXIX show the coefficients of both the ordinary least squares, the two stage least squares, and the percentage of the ordinary least squares underestimate or overestimate for net migration rate and gross migration rate respectively.

From Tables XXVIII and XXIX we can see that the

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[1]Carl F. Christ, Econometric Models and Methods (New York, 1966), p. 611.

ordinary least squares estimates have failed to take account of the simultaneity problem and this may lead to the ordinary least squares overestimating many variables and underestimating others. As far as the net migration equation is concerned the highest percentage overestimate is 82.3 (E_i) during the period 1954-1964. However, during the period 1964-1973 the ordinary least squares estimates indicate less overestimation or underestimation. For the expected per capita income differential the ordinary least squares overestimated the migration variable in both periods. The over estimation of this variable is 181 percent during 1954-1964 and 41 percent during 1964-1973. However, it underestimated by less for C_{j/C_i} and L_{j/L_i} during both periods.

As far as the gross migration equation is concerned (Table XXIX) the ordinary least squares overestimated three variables (Y_{ij}, D_{ij} and E_i and the percentages of overestimation are 16.6, 4.3 and 33.3, respectively) and underestimates two variables (E_j and PM_{ij}, the percentages of underestimation are -5.2 and -33.2, respectively). However, during the second period (1964-1973) ordinary least squares gave opposite estimates to the first period. It underestimated three variables (Y_{ij}, D_{ij} and E_i) and overestimated two others (E_j and PM_{ij}). The same thing applied to the expected per capita income differential equation. The highest percentage overestimates came with the migration variable (M) 51 percent during the period

TABLE XXVIII

COMPARISON BETWEEN THE ORDINARY LEAST SQUARES AND THE TWO-STAGE LEAST SQUARES ESTIMATES

Independent Variable	Net Migration Rate Equation							
	1954-1964				1964-1973			
	OLS	2SLS	Difference Between OLS and 2SLS	Percentage of underestimates or overestimates	OLS	2SLS	Difference Between OLS and 2SLS	Percentage of underestimates or overestimates
Y_{ij}	.00027	.00024	.00003	12.5	.00026	.00027	-.00001	- 3.70
$D_{ij} \cdot Y_{ij}$	-.00000021	-.00000019	.00000002	10.5	-.00000020	-.00000021	-.00000001	- 4.7
E_i	-.0048	-.00052	.000428	82.3	-.00020	.00019	.00001	5.2
E_j	.000048	.00049	-.00001	-2.04	-.00013	-.00013	0	0
PM_{ij}	.0000015	.0000016	-.0000001	-6.66	.000006	.000006	0	0
	Expected Per Capita Income Differential Equation							
NM_{ij}	716.470	255.312	461.158	180.6	500.170	354.026	146.074	41.2
C_j/C_i	8.760	9.298	-0.538	- 5.8	12.766	13.932	-1.166	-8.3
L_j/L_i	-28.959	-32.894	-3.935	-11.9	-39.135	-39.700	- .565	-1.4

(-) and (+) means that the OLS underestimates and overestimates the coefficients respectively.

TABLE XXIX

COMPARISON BETWEEN THE ORDINARY LEAST SQUARES AND THE TWO-STAGE LEAST SQUARES ESTIMATES

Independent Variables	Gross Migration Rate Equation							
	1954-1964				1964-1973			
	OLS	2SLS	Difference Between OLS and 2SLS	Percentage of underestimates or overestimates	OLS	2SLS	Difference Between OLS and 2 SLS	Percentage of Underestimates or Overestimates
Y_{ij}	0.00007	.00006	.00001	16.6	.00003	-.00005	-.00002	-40.0
D_{ij}	-.0000048	-.0000046	.0000002	4.3	-.0000046	-.0000049	-.0000003	- 6.1
E_i	.0004	.0003	.0001	33.3	.00016	.00022	-.00006	-27.2
E_j	.00036	.00038	-.00002	-5.2	.00012	.00008	.00004	50.0
PM_{ij}	.000002	.000003	-.000001	-33.3	.0000096	.0000094	.0000002	2.1
	Expected Per Capita Income Differential Equation							
M	479.598	318.206	161.392	50.7	326.455	364.309	-37.854	-10.3
C_{j/C_i}	8.990	9.196	- .2060	-2.2	13.647	13.280	.367	2.6
L_{j/L_i}	-33.983	-34.353	- .370	-1.0	-40.960	-40.947	.0130	.03

(-) and (+) means that OLS underestimates and overestimates the coefficients respectively.

1954-1964. However, during the second period the ordinary least squares slightly underestimated the migration variable and slightly overestimated C_{j/C_i} and L_{j/L_i}.

The results will be interpreted on the basis of the best equations in terms of adjusted R-squares. The equations to be interpreted are presented in Tables XX and XXV for the net migration rate and Tables XXII and XXVI for the gross out-migration rate for both periods.

Migration Equation

The results of the two migration equations are reported in Tables XX, XXII, XXV and XXVI.

The first important variable to be explained is the expected per capita income differential Y_{ij}. This variable is expected to have an important role in determining the Internal Migration in Libya (net or gross migration rates). The theory would lead us to expect that the relationship between migration (either net migration rate or gross migration rate) and expected per capita income differential (Y_{ij}) will be positive. Thus, we expect that migration is occurring in response to the expected per capita income differential among the different regions of the country. The coefficient associated with the expected per capita income differential Y_{ij} is significant in all regressions and has the expected positive sign. The coefficients of Y_{ij} were 0.00024 and 0.00027 for net migration and 0.00006 and 0.00005 for gross out-migration. These coefficients

mean that each one Libyan dinar increase in the expected per capita income differential leads to an increase in the propensity to migrate in Libya (net or gross) by .0002 [two migrants per 10,000 of region i population] and 0.00006 during the ten year period (1954-1964) and by 0.0002 and 0.00005 during the nine year period (1964-1973). Therefore, the migration is responsive to expected per capita income differential.

Rempel, in his study of Rural to Urban migration in Kenya[2], found no conclusive evidence based on his regression analysis that the expected income differential is an important determinant of rural-urban migration in Kenya. However, Laber and Chase, in their study of internal migration in Canada[3], found that the expected income differential is a significant factor in determining interregional migration. Sunday Essang and Adewale Mabawonku[4] in their study in Nigeria found that urban-rural earnings differential is an important factor in determining rural-urban migration in Western Nigeria. These studies were chosen here as examples. Many other studies[5] confirmed

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[2]Remple, p. 75.

[3]Laber and Chase, pp. 795-804.

[4]Sunday M. Essang and Adewale F. Mabawonku, Determinants and Impact of Rural-Urban Migration: A Case Study of Selected Communities in Western Nigeria. East Lansing, Michigan: Michigan State University, Dept. of Agricultural Economics, African Rural Employment Research Network, African Employment Paper No. 10, 1974, p. 16.

[5]For example: Beals, et al., pp. 480-486 and Sahota,

that the income differential is an important variable in determining migration in both developing as well as developed countries.

Laber and Chase found elasticities of migration with respect to expected income differential in the range of about .50 to 1.2 using the gross migration rate as their dependent variable.[6] The elasticities obtained by S. Essang, et al. ranged from 0.13 to 0.15, using the gross migration rate as the dependent variable.[7] The elasticities for our case are calculated at the mean value of migration rates and the expected per capita income differential of the preferred equations and reported in Table XXX.

TABLE XXX

THE POINT ELASTICITIES OF MIGRATION WITH RESPECT TO EXPECTED PER CAPITA INCOME DIFFERENTIAL

Time Period	Net Migration Elasticities	Gross Migration Elasticities
1954-1964	0.26	0.056
1964-1973	0.040	0.005

pp. 218-245.

[6]Laber, et al., p. 802.

[7]Essang, et al., p. 17.

The elasticities obtained in this study are smaller than those obtained by Laber and Chase and approximately the same as those obtained by Essang, et al. However, the elasticities obtained in this study are lower than the elasticities of migration with respect to income obtained by Sahota, who obtained elasticities that range from 1-1.8[8]. This may be due to our using the expected per capita income differential rather than the current income as an explanatory variable in the migration equation. In calculating the expected per capita income differential, the probability of obtaining a job is used in the calculation, and the inclusion of this probability may lead to lower coefficients and thus lower elasticities.[9] Sahota also used the gross migration rather than the gross migration rate as the dependent variable. Another reason for getting lower elasticities of migration with respect to expected per capita income differential in this study may be the use of migration along a ten-year period rather than life time migration as the dependent variable. Using life time migration as the dependent variable may lead to higher elasticities compared to the dependent variable used in this study. This result is confirmed by Mildred Levy and Walter Wadycki in their study of migration in

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[8]Sahota, pp. 230-231.

[9]For more details, see Laber, et al., p. 802.

Venezuela.[10] They found that the coefficients obtained when they used life time migration as the dependent variable were higher than the coefficients obtained when a one-year migration was used as the dependent variable.

Nevertheless, the results and the significant positive coefficients obtained in this study confirm the hypothesis that the probability of migration increases with the increase in the expected per capita income differential in Libya.

Distance is another important variable that is expected to have an important impact on the propensity to migrate in Libya. It is used here as a proxy for costs of moving and is expected to act as a deterrent to migration. Thus, we expect a negative sign associated with the coefficient obtained for the distance variable.

In the net migration rate (NM_{ij}) equation which is reported in Tables XX and XXV, a distance-interaction term was tried to see if it will improve the specification of the net migration rate equation. This distance-income differential interaction term is significant and has the expected negative sign. This means that for a given expected per capita income differential, the propensity to migrate decreases as distance increases. For the gross migration equation reported in Tables XXII and XXVI, the

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[10]Levy and Wadycki, pp. 407-415.

distance-income differential interaction term was tried but did not perform well. Therefore, a regular distance variable (D_{ij}) was used and its coefficient was significant with the expected sign. The results indicate that a one kilometer increase in distance tends to lead to a decrease in the propensity to migrate in Libya by .0000001 Y_{ij} and by .000005 [5 migrants per one million of the population of region i] during (1954-1964) and by .0000002 Y_{ij} and .000004 during (1964-1973). If we substitute the mean value for Y_{ij}, then the distance coefficients will be .00000055 and .00000017, respectively. Therefore, other things being equal, distance is a deterrent to internal migration in Libya.

The results are consistent with other studies. Rempel, Sahota and Sunday Essang, et al. found that the distance variable is significant and an important deterrent to migration. The elasticities of migration with respect to distance in the Essang, et al. study were about 0.15[11], in the Greenwood study .30[12], and in the Sahota study .79[13]. The point elasticities calculated at the mean value of the migration rate and the mean value of the distance

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[11]Essang, et al., p. 17.

[12]Michael J. Greenwood, "An Analysis of the Determinants of Geographic Labor Mobility in the U.S.," Review of Economics and Statistics, Vol. LI (May, 1969), pp. 189-194.

[13]Sahota, p. 237.

between the capitals of region i and region j are presented in Table XXXI.

TABLE XXXI

THE POINT ELASTICITIES OF MIGRATION WITH RESPECT TO DISTANCE

Time Period	Net Migration Elasticities	Gross Migration Elasticities
1954-1964	-0.41	-0.54
1964-1973	-0.05	-0.30

Since the mean distance is about 793 kilometers for the first period, and 769 kilometers for the second period, then these elasticities mean that a 10 percent (or 79.3 or 76.9 kilometers) increase in distance deters migration by 5 percent and 3 percent using gross migration rate results.

The point elasticities of migration with respect to distance obtained here are approximately the same as those obtained by Greenwood. However, the elasticities here are lower than the point elasticity of migration with respect to distance which is obtained by Sahota. This result may be due to Sahota's using the life time migration as

the dependent variable rather than the migration variable used in this study. Another reason for getting lower distance elasticity of migration in this study relative to the elasticity obtained by Sahota may be due to the inclusion of the past migration variable. The distance variable is a proxy for economic as well as noneconomic factors. The past migration variable may pick up the noneconomic factors for which the distance is a proxy and allows the distance to reflect only the transportation costs. This conclusion is confirmed by M. Greenwood in his study of migration in the United States.[14] He found a very high distance elasticity of migration (-.89) when past migration (migration stock in Greenwood's study) is excluded. When he included the past migration variable the distance elasticity of migration dropped considerably (-.30).[15] This result suggests that the distance reflects only the transportation costs.

However the results obtained here are consistent with other studies that distance is a deterrent to migration. This means that as the distance increases, other things being equal, the propensity to migrate declines. Since the distance is used as a proxy for costs of moving, then the results suggest that the costs of moving act as a deterrent to migration in Libya.

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[14]Greenwood, "An Analysis of the Determinants. . .," p. 191.

[15]Ibid.

Past migration (PM_{ij}) is another important variable that is expected to have a significant effect on the propensity to migrate in Libya. This variable seems to be a very important one since M. Greenwood argued that the failure to include such a variable in the models of internal migration causes the true direct effect of most other variables to be obscured.[16]

Past migration is used as a proxy for the flows of information from region j to region i via the presence of relatives and friends who migrated to the destination region j in the past. The presence of the relatives and friends in the destination region not only provides the migrant with all kinds of information but also provides him with food and shelter until he can find a job. Sometimes, they not only do that but also help him to get a job in the destination region. Thus the presence of the relatives and friends has an important role in the decision to migrate.

The coefficients of the past migration (PM_{ij}) are highly significant and have the expected positive sign. The coefficients ranged from .0000016 and .000003 in Tables XX and XXII to .000006 and .000009 in Tables XXV and XXVI, respectively. Rempel in his study in Kenya found elasticities of migration with respect to past migration in the range of 0.169 to 0.297[17], while Greenwood's

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[16]Ibid., p. 189.

[17]Rempel, p. 59.

elasticity is about .52[18] in his study of the United States. The elasticities of migration with respect to past migration calculated in this study at the mean value of past migration is presented in Table XXXII.

TABLE XXXII

THE POINT ELASTICITIES OF MIGRATION WITH RESPECT TO PAST MIGRATION

Time Period	Net Migration Elasticities	Gross Migration Elasticities
1954-1964	1.4	0.73
1964-1973	1.6	0.83

These elasticities seem to be quite high compared to those obtained by Rempel. This may be due to using a two-equation model. The higher elasticities which our study reveals may reflect the idea that the past migration is a more important factor in Libya than in other countries. However, the results obtained here are consistent with the results obtained by Rempel and Greenwood.

[18]Greenwood, "An Analysis of the Determinants. . .," p. 191.

The results obtained in this study confirm the hypothesis that the propensity to migrate increases with the presence of relatives and friends. Therefore, the migrants have a strong propensity to migrate to the regions to which their relatives and friends migrated in the past. Thus we can conclude that the higher the past migration from region i to region j, other things being equal, the higher the propensity to migrate to the j region, because flows of information, particularly about job opportunities, are higher.

Education level of both the origin region E_i and the destination region E_j is expected to affect the propensity to migrate in Libya. The education variables can capture the effect of education on the individual's decision to migrate and the attraction of educational opportunities for migrants.[19] Here we hypothesized that the education level capture only the effect of education on the individual's decision to migrate; namely, that the person who has some education is more likely to migrate. Therefore, we expect a positive sign associated with the education level of both the origin region E_i and the destination region E_j.

For the period 1954-1964, the coefficients (gross

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[19] T. Paul Schultz, "Rural-Urban Migration in Columbia," Review of Economics and Statistics, Vol. LIII (May, 1971), pp. 157-163.

migration rate) obtained for both the origin region education level E_i and the destination region E_j are significant and have the hypothesized positive signs. However, in the net migration rate equation both variables (E_i, E_j) have the opposite signs to what we expected. This result may be due to misspecification associated with net migration rate models.

The significant positive signs of the education variables in the gross migration rate model during the period (1954-1964) indicate that the education level of both the origin region E_i and the destination region E_j have a significant effect on the propensity to migrate in Libya. This means that the higher the education level in both region i and region j, the higher would be the probability to migrate from region i to region j, other things being equal.

In the second period (1964-1973) the coefficient of the education level variable in the origin region E_i is significant and has the expected sign while the education level in the destination region E_j is not significant. The insignificant coefficient of E_j means that the migrants were not responsive to the education level of the destination region during the period (1964-1973). However, they were responsive to the education level of the origin region.

From Table XIV in Chapter III, it seems that the migrants had higher education than those who were left behind. Therefore, those who migrate are those who had

some education. Thus the regression results contradicted the actual data with respect to the destination region. The only explanation available is that the education level in the destination region is explaining other effects as well as those hypothesized in this study.

Therefore, the regression results indicate that both the education variables have a significant effect on the propensity to migrate during the period (1954-1964) and the education level of the origin region has a positive effect on the propensity to migrate during the period (1964-1973). However, the education level of the destination region has no effect on the propensity to migrate during this period. In the last period the education level of the destination region may capture other effects such as achievements in regional differension in the field of education. If so, then the education level of the destination region will not have any effect on migration since after 1969 the educational opportunities were available everywhere in the country while this was not the case during the first period (1954-1964). During this period (1954-1964) the secondary high school education were available only in the capital city of the region. After 1969, the secondary high school education and the teachers training institutes are available almost in every town in Libya.

Expected Per Capita Income Differential Equation

The most important variable in this equation is the propensity to migrate (the migration rate). This variable is expected to play an important role in narrowing the expected per capita income differential according to the neoclassical theory. We expect a negative relationship between the propensity to migrate and the expected per capita income differential.

The expected per capita income differential is used in this study rather than the per capita income differential. It is believed that the expected per capita income differential is more appropriate since it reflects the economic well-being of the region. Burton A. Weisbrod argued that:

> Any measure of economic well-being such as per capita income, based only on current income conditions, is quite incomplete. . .per capita present value of expected future income, which is in a limited way, does recognize explicitly the relevance of the future to present economic welfare.[20]

Therefore, the effect of migration on the expected per capita income differential rather than the per capita income differential will be examined.

The coefficient associated with the migration rate variable is significant in gross migration rate presented

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[20]Burton A. Weisbrod, "An Expected Income Measure of Economic Welfare," Journal of Political Economy, Vol. 70 (August, 1962), p. 367.

in Table XXII. However the coefficient is not significant in the net migration rate presented in Table XX during the period 1954-1964. But both coefficients are significant during the period 1964-1973. The results for the period 1964-1973 are presented in Tables XXV and XXVI. However, in general, the coefficients associated with the propensity to migrate are significant and possess positive signs.

The point elasticities between the expected per capita income and the migration rate calculated at the mean values are reported in Table XXXIII. These elasticities suggest that a 10 percent increase in the propensity to migrate tends to increase the expected per capita income differential by four percent during the period 1954-1964 and by 40 percent during the period 1964-1973 (using gross migration elasticities). As hypothesized, we expect a negative relationship between the propensity to migrate and the expected per capita income differential. However, the sign associated with the propensity to migrate turned out to be a positive rather than a negative. This indicates that the increase in the propensity to migrate from region i to region j leads to widening the expected per capita income differential between regions i and j.

There are two explanations to obtaining a positive migration coefficient rather than the expected negative one. The first explanation is based on the Greenwood's

TABLE XXXIII

THE ELASTICITIES OF THE EXPECTED PER CAPITA INCOME DIFFERENTIAL WITH RESPECT TO MIGRATION

Time Period	Net Migration Elasticities	Gross Migration Elasticities
1954-1964	0.093	0.39
1964-1973	1.03	4.03

argument.[21] Greenwood argued that since the prices of goods and services that are produced and consumed within the region are sensitive to migration, and since this sensitivity is not the same in all regions, then the derived demand for labor increases in the destination region and decreases in the origin region. This tends to pressure the wage rate (income) to go up in the destination region and go down in the origin region and thus the income differential tends to increase rather than decrease as a result of internal migration.

Migration occurs from the low-income region to the high-income region. From the migration equation during both 1954-1964 and 1964-1973 a statistically significant

[21] Greenwood, "A Simultaneous-Equation Model. . .," (1975), p. 801.

positive relationship was found between the expected per capita income differential and the propensity to migrate. In-migration to the high-income regions such as Tripoli and Benghazi increased from 24,845 and 14,175 migrants during 1954-1964 to 79,197 and 28,848 migrants during 1964-1973, respectively. The low-income regions experienced high rate of out-migration. Out-migration from Gharian which has the lowest income in Libya increased from 9,972 migrants during 1954-1964 to 35,808 migrants during the period 1964-1973. Migrants raise the demand for new capital formation in houses, schools, transportation and other services. As noted by Borts, et al.:

> In the short run, the demand for investment is raised more by an influx of N migrants than by the birth of N babies to the indigeneous residents. Babies usually live with their parents and do not start school immediately. Migrants demand additional housing units, and their children demand school space immediately.[22]

Therefore, the increase in the demand for housing, schools, sewage system, transportation, etc. tends to pressure up the wages and hence income in the high per capita income region. Thus, migration tends to lead to an increase in the expected per capita income differential between the regions.

The data on the growth of capital and the changes in the demand for housing in the regions that have the highest

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[22]George H. Borts and Jerome L. Stein, Economic Growth In a Free Market (New York, 1954), p. 56.

income such as Tripoli and Benghazi are not available. However, housing loan activities during the period 1966-1973 give approximation to the demand for housing in the regions in Libya (see Table XXXIV which shows the housing loan activities from 1966-1973). From Table XXXIV the regions that have the highest per capita income and experienced the highest in-migration such as Tripoli and Benghazi have the highest demand for housing loans. Tripoli and Benghazi demanded 36 and 37 percent of the housing loans in Libya during the period 1966-1973. While Gharian and Khoms, which have the lowest per capita income, and experienced high rates of out-migration, demanded 3.3 and 2.2 percent of the housing loans in Libya.

This is only one aspect of the housing activities. However, the high demand for housing loans in the high per capita income regions such as Tripoli and Benghazi suggests that the demand for housing is high in the regions that experienced high rates of in-migration. This tends to induce more investments in the field of housing and other public services and this in turn tends to put upward pressure on wages, and thus per capita income in the high per capita income regions.

Another approximation to the increase in the demand for capital (investment) in housing, transportation and other services due to in-migration in the high-income regions is the growth of employment in the service sector. The workforce in the service sector of Tripoli and

TABLE XXXIV

HOUSING LOAN ACTIVITIES 1966-1973

Region (Muhafada)	Total Number of Loans	Percentage
Derna	1209	3.96
Elkabal Aghdar	1821	5.9
Benghazi	11343	37.2
Elkalige	845	2.8
Musrata	426	1.4
Khoms	684	2.2
Tripoli	10841	35.5
Zawia	1915	6.28
Gharian	1020	3.3
Sebha	412	1.35
Libya	30516	100

Source: Libyan Arab Republic Ministry of Planning, "Settlement Pattern Study," A Report from Italconsult, A Draft Copy, Vols. IV, V, VI and VII, Rome (July, 1975), p. f-12.

Benghazi regions (such as construction, utilities, commerce, transportation and government services) increased during the period 1964-1973 from 56,053 to 132,279 or by 136 percent in Tripoli, and from 32,778 to 71,374 or by 117.8 percent in Benghazi.

The workforce in the same services increased from 13,600 to 18,422 or by 35.5 percent[23] during 1964-1973 in Gharian region which has both the lowest per capita income and the highest rate of out-migration in the country.

The second and the important explanation of obtaining a positive migration sign is that the migration is selective in terms of age and education.[24] Those who migrate are the young, the more productive, and the more educated. The migration then leads to transfer of human capital from the origin region, which is usually the low income region to the destination and the high income region. Thus the migration leads to an increase in the income disparities among the regions. Does this selectivity argument exist in Libya?

Actually the selectivity exists in our assumption of the migration as investment in human capital since this approach is age-selective phenomenon. This is due to the fact that the time period over which the migrant expects to benefit from higher incomes and his costs decrease as age increases. The net benefits of the young migrant will likely exceed those of the older migrant.

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[23]These figures calculated from Libyan Arab Republic Ministry of Planning, "Settlement Planning Study," A Report from Italconsult. A Draft Copy, Vol. IV and V, Rome (July, 1975), p. C-3.

[24]Myrdal, p. 27.

The evidence from Libya shows that the average age of migrants is lower than the average age of the population of Libya. Most of the studies[25] conducted in Libya concluded that the migrants to Tripoli and Benghazi are very young. Sixty three percent of a total sample of 137 migrants to Tripoli were young and in their productive years.[26] In a survey which was conducted in 1969 in Benghazi, about seventy percent of a total of 355 migrants who came to Benghazi fall in the age group of 15 to 45.[27] A survey conducted in 1965 concludes that the majority of males who remained in the survey area were either too old or too young to be considered productive. Most of the young and productive people left the survey area for the urban regions.[28] As far as education level of the migrants is concerned, seven percent of the migrants to Tripoli had an education above the elementary level, whereas 6.8 percent of the people who were left behind had preparatory and secondary education.[29] With respect to Benghazi 2.3 percent of the migrants to Benghazi attended college

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[25]See Elkhabir, pp. 105-106; Mukurji, et al., p. 6; and Mabro, pp. 329-331.

[26]Elkhabir, p. 106.

[27]Mukurji, et al., p. 6 and Table X in Chapter III of this study.

[28]Parks, p. 146.

[29]See Chapter III.

whereas 0.7 percent of the population who stayed behind has a university education.[30] Thus, with respect to Tripoli it is not clear that those who migrated are the most educated, however with respect to Benghazi, the evidence is conclusive at least in terms of age.

It seems that the migration in Libya is selective since those who migrate are the young and the most productive. Therefore, this selective migration tends to widen the expected per capita income differential rather than to narrow it. Thus a positive migration coefficient is obtained because of the migration selectivity in Libya.

This selectivity and demand conditions may work together in Libya to produce the positive migration coefficient and thus result in the conclusion that the probability of migration, other things being equal, tends to widen the expected per capita income differential rather than to narrow it.

The other variable expected to affect the expected per capita income differential is the ratio C_{j/C_i} of the number of business establishments in the destination region j to the number of business establishments in the origin region i. This variable C_{j/C_i} is expected to capture the effects of the concentration of the economic activities in the regions. We expect that the region that

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[30]See Chapter III.

has more concentration of the number of business establishments will tend to have a higher income. Thus the expected per capita income differential tends to increase as this ratio C_{j/C_i} increases. Therefore, we expect a positive relationship between C_{j/C_i} and the expected per capita income differential.

From the results presented in Tables XX, XXII, XXV and XXVI and the expected per capita income differential equation, the coefficients associated with C_{j/C_i} are significant and have the hypothesized positive signs. The results indicate that a one unit increase in C_{j/C_i} will tend to increase the expected per capita income differential by 9.29 and 9.19 during the period 1954-1964 and by 13.93 and 13.28 during the period 1964-1973. Therefore, the concentration of economic activities in the destination region increases the expected per capita income differential.

The elasticities of the expected per capita income differential and the ratio of the number of business establishments in the destination region to those on the origin region at the mean values of these two variables are reported in Table XXXV.

These elasticities mean that a 10 percent increase in C_{j/C_i} tended to lead to increasing the expected per capita income differential by 30 percent during 1954-1964 and 176 percent during 1964-1973. Thus the significant positive sign coefficients and elasticities

TABLE XXXV

POINT ELASTICITIES OF THE EXPECTED PER CAPITA INCOME DIFFERENTIAL AND THE RATIO OF THE BUSINESS ESTABLISHMENTS IN THE DESTINATION REGION TO THE BUSINESS ESTABLISHMENTS IN THE ORIGIN REGION

Time Period	Net Migration Elasticities	Gross Migration Elasticities
1954-1964	3.07	3.04
1964-1973	18.42	17.57

associated with C_{j/C_i} either during the period 1954-1964 or 1964-1973 means that the increase in C_{j/C_i}, other things being equal, increases the expected per capita income differential between region i and region j.

Another important variable included in the expected per capita income differential equation is L_{j/L_i}, the ratio of the percentage of labor force engaged in agriculture in the destination region j to the percentage of labor engaged in agriculture in the origin region i. This variable L_{j/L_i} is expected to reflect the increase in productivity of labor in agriculture due to the movement of people from agriculture to the urban areas. We expect that this will result in narrowing the expected per capita income differential.

Therefore, we expect a negative relationship between

L_{j/L_i} and the expected per capita income differential.

From the results in Tables XX, XXII, XXV and XXVI L_{j/L_i} is significant and has the expected negative sign in all regressions during both periods (1954-1964 and 1964-1973). The significant negative sign of the L_{j/L_i} coefficients indicate that a one unit increase in L_{j/L_i} leads to a decrease in the expected per capita income differential by 32.89 if net migration rate is used or 34.35 if gross migration rate is used during the period 1954-1964 and by 39.70 (net migration rate) or 40.94 (gross migration rate) during the period 1964-1973.

The elasticities calculated in this study at the mean values of the expected per capita income differential and the ratio of the labor force engaged in agriculture in the destination region to the labor force engaged in agriculture in the origin region are presented in Table XXXVI.

These elasticities mean that a 10 percent increase in the L_{j/L_i} tended to narrow the expected per capita income differential by 71 percent during the period 1954-1964 and 471 percent during 1964-1973. Therefore the increase in L_{j/L_i}, other things being equal, lead to a decrease in the expected per capita income differential between region i and region j.

R is a dummy variable included to capture the effects of the petroleum activities on the expected per capita income differential. The coefficient associated with the dummy variable is significant during the period 1954-1964

TABLE XXXVI

POINT ELASTICITIES OF THE EXPECTED PER CAPITA INCOME AND THE RATIO OF THE LABOR FORCE ENGAGED IN AGRICULTURE IN THE DESTINATION REGION TO THOSE OF THE ORIGIN REGION

Time Period	Net Migration Elasticities	Gross Migration Elasticities
1954-1964	- 6.8	- 7.1
1964-1973	-45.7	-47.1

but it is not significant during the period 1964-1973. Thus it seems that the petroleum activities affected the expected income differential during the period 1954-1964 but not during the period 1964-1973. This result is expected since exploration activities were active during the first period.

These results are very significant. Their significance stems from the fact that the expected per capita income differential is persisting despite the flows of migration (which are in the right direction--from the low income region to the high income region). The failure of the flows of migration to narrow the expected per capita income differential is because migration raised the demand for capital formation in the field of the public services in the high income regions, and it is selective

at least in terms of age. The convergence of expected per capita income differential will depend in the future on:

(1) The movement of labor force from the agricultural to non-agricultural activities (increasing L_{j/L_i}).

(2) Directing the business establishments to the low-income regions (decreasing C_{j/C_i}).

Thus, whether the equality of the expected per capita income differential will occur in the future or not depends on the relative strength of these factors.

Summary

This chapter presented the interpretation of the results of the preferred equations during 1954-1964 and 1964-1973.

According to the results obtained during the period 1954-1964, the propensity to migrate is positively related to expected per capita income differential, negatively related to the distance between region i and region j, positively related to the education level of the origin region, positively related to the education level of the destination region and positively related to past migration or the availability of relatives and friends in the destination region. For the period 1964-1973, the only difference is that the propensity to migrate is not related to the education level of the destination region.

As far as the expected per capita income differential,

during both periods 1954-1964 and 1964-1973, the expected per capita income differential is positively related to the propensity to migrate, positively related to the ratio of the number of business establishments in the destination region to the number of business establishments in the origin region, negatively related to the ratio of the percentage of the labor engaged in agriculture in the destination region to the percentage of labor engaged in agriculture in the origin region.

The most important results obtained here are that the propensity to migrate in Libya is occurring in response to the expected per capita income differential and that the migration behavior (the propensity to migrate) is tending to increase the inequalities of the expected per capita income differential among the regions in Libya.

CHAPTER VII

CONCLUSION AND IMPLICATIONS

The purpose of this study was to determine the main factors that enter the decision to migrate and the impact of the migration process on the inequalities of the expected per capita income among the regions in Libya.

The main hypotheses which were tested were that migration occurs in response to the expected per capita income differential; that distance is a deterrent to migration; that educational levels in both the origin and the destination region increase migration; and that the flows of information about job opportunities in the destination region through the existence of relatives and friends who have migrated in the past increases the probability of migration. Also, we have examined the hypotheses that the propensity to migrate narrows the expected per capita income differentials among the regions; that the ratio of the number of the business establishments in the destination region to those in the origin region, which represents the concentration of the business activities in the destination region, tends to increase the expected per capita income differential; and that the ratio of the percentage of the labor force engaged in

agriculture in the destination region to that in the origin region tends to narrow the expected per capita income differential among the regions.

The approach used was to test these hypotheses by employing a simultaneous equation model. Published data are used to estimate this model.

This chapter presents a summary of the results obtained from the estimation of the two equation model in two periods (1954-1964 and 1964-1973).

There is a conclusive answer to the hypothesis that the people move from region to region in response to the expected per capita income differential since in all cases the expected per capita income differential is significant and has the expected positive sign indicating that the propensity to migrate from region i to region j is an increasing function of the expected per capita income differential between regions i and j.

The results obtained on the distance variable (D_{ij}) indicated that the distance is a deterrent to migration. This variable is used as a proxy for the costs of moving. Other studies have found that the distance variable measures more than the economic costs. However, the elasticities of migration with respect to distance obtained in this study indicate that the distance variable measures the transportation costs, while the past migration (PM_{ij}) variable is picking up other costs. In any event, the results obtained in this study give conclusive evidence

that the distance is a barrier to migration in Libya.

There is also conclusive evidence that the presence of relatives and friends in a region eases the decision to migrate to that region. The coefficients and elasticities of the past migration (PM_{ij}), which is used as a proxy for the flows of information about the employment opportunities and the income conditions in the destination regions, are very high indicating that past migration is the most important variable that explains the propensity to migrate in Libya.

The education level in both the origin and the destination regions are important in explaining the propensity to migrate during the period 1954-1964. However, the education level of the destination region is not important in explaining migration in the second period 1964-1973.

With respect to the expected per capita income differential equation, the traditional theory suggests that the propensity to migrate tends to narrow the expected per capita income differential. However, the results obtained in this study indicated that migration tends to widen the expected per capita income differential among the regions rather than narrow it. This result may be due to the fact that the migration is selective at least in terms of age and also because of the migrants' demand, capital formation in public services in regions such as Tripoli and Benghazi more than other regions.

However, the regional disparities of income are not

limited to Libya. The evidence from the literature in this subject indicates that there is a tendency of divergence of per capita income among the regions. John Freedman pointed out that

> The indisputable fact is that regional convergence will not automatically occur in the course of a nation's development history. Impressive evidence has been collected to show why the equilibrium mechanism that has been posited in theory will, in fact, break down. Even with a century and a half of sustained industrialization, the advanced economies of United States and Western Europe continue to be preoccupied with problems of depressed and backward regions inside their national territories.[1]

There are other factors (beside the demand for capital formation and selectivity that mentioned in this study) that contribute to the failure of the world to correspond to theory. Among these factors are: the failure of the diminishing returns to scale to work in the cities.[2] As expected by the theory, the city will stop growing because of social diseconomies of scale in size. However, this diseconomies did not happen and the cities continue to grow. Another reason is the investors' failure to perceive the investment opportunities in rural areas. This is due to the fact that the investors underestimate the profitability of investment at the rural regions relative to urban centers as noted by Albert Hirschman, "The

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[1]John Freedman, Regional Development Policy: A Case Study of Venezuela. (Massachusetts, 1966), p. 14.

[2]Ibid.

external economies due to the poles, though real, are consistently overestimated by the economic operators."[3]

The coefficient with the ratio of the number of business establishments in the destination region to that in the origin region was significant and has the expected positive sign, which indicates that the concentration of business establishments in the destination regions tends to increase the expected per capita income differential among the regions.

Another variable that is expected to explain the expected per capita income differential among the regions is the ratio of the percentage of labor force engaged in agriculture in the destination region to the percentage of labor force engaged in agriculture in the origin region L_{j/L_i}. From the results obtained in this study there is conclusive evidence that the reduction of labor force engaged in agriculture tends to lead to narrowing the expected per capita income differential among the regions.

Policy Implications

From the results of this study, it is clear that internal migration will continue between the regions in

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[3]Albert O. Hirschman, The Strategy of Economic Development. (New Haven, 1958), p. 185.

Libya. Why will migration increase?

First: The migration is occurring in response to the expected per capita income differential, which it is anticipated will widen according to the results obtained from the expected per capita income differential equation, probably due to the selectivity of migration.

Second: One of the important variables that explained migration is the past migration to the destination regions. Hence, the increase in the future in the migration leads to an increase in the size of past migration in every period, and thus the flows of information about job opportunities and income conditions will increase, this will lead to additional flows of migration.

(1) Therefore, the most important implication of this study is the need for narrowing the expected per capita income differential among the regions in Libya. One of the most important factors that explains the expected per capita income differential is the ratio of the business establishments in the destination region to that of the origin region. This ratio approximates the concentration of economic activities. Thus, in order to narrow the expected per capita income differential, there is a need for decentralization and distribution of the economic activities into the low income regions. The current distribution of business establishments tends to

widen the expected per capita income differential which in turn will lead to additional migration. There is a need for a development strategy that encourages business activities (either private sector or public sector) to locate in the more needy areas such as Gharian and Khoms. Therefore, it would be unrealistic to expect that the migration will be reduced as long as the expected per capita income differential exists among the regions.

(2) Another implication is produced by the results obtained on the distance and the past migration variables which indicate that the migrants try to minimize their costs. Therefore, a decentralization of industries and economic activities toward the rural and interior regions may lead to the creation of job opportunities, may reduce the costs of migration, and thus may lead to a reverse in the flows of migration.

(3) If migration flows continue at this rate, and since migration tends to raise demand for capital formation at least in housing, then the rent and price of land will go up in the regions that have high rates of in-migration, such as Tripoli and Benghazi. This is actually what has happened. The price of a square meter of land in the suburbs of Benghazi increased from about

5 Libyan dinars to 10 Libyan dinars during the period 1971-1975. This result in itself tends to lead to widening the expected per capita income differential by directing more business to selling land and building more houses.

(4) Since migration is selective in terms of age, then it is the old people who are left behind working in agriculture. Thus, migration may lead to lower agricultural output[4] and higher costs and thus higher prices for agricultural goods. However, this problem is solved by hiring foreign labor.[5] But these hired labor do not work permanently and once they feel that they saved some money they stop working.

(5) Another implication derived from the results of the study is that since those who migrate are those who are young, potentially more productive and the better educated, then the quality of the labor force may decline in the origin region due to migration. This may reduce the productivity of labor force in that region and this may deter

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[4]Lower agricultural output not in absolute terms but in terms of the relative share of the agriculture to the gross national product.

[5]The employment of non-Libyans in the agriculture sector has increased during the period 1964-1973 to 12,400 or 12.4 percent. See Libyan Arab Republic Ministry of Planning, "Manpower Situation. . .," p. 11.

investment from being attracted to this region.

Thus, unless there are corrective measures, migration will continue, and with it the quality of the labor force will decline and thus the differential between regions will widen more and more.

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