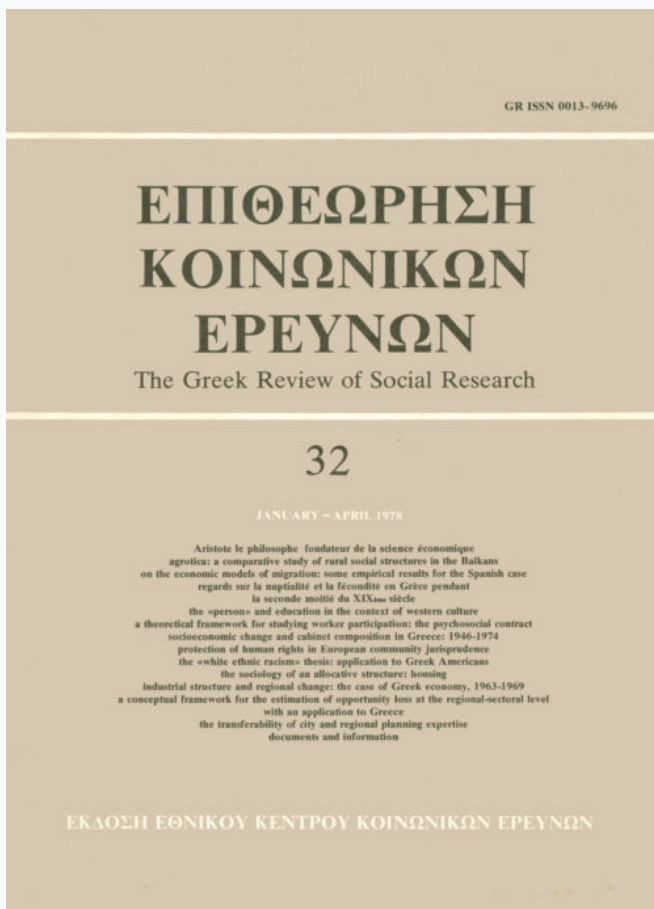


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On the economic models of migration: Some empirical results for the Spanish case

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on the economic models of migration

Some Empirical Results for the Spanish Case

by

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I. introduction

With the different fields of the economic science, the theory of economic development is probably the one with the most rapid evolution (both theoretically and empirically) over the last two decades.

Not long ago, the «two sectors» growth models, which focused on the maximization of total output, dominated the economic world. Emphasis was placed on traditional economic variables, such as output growth rates, terms of trade, savings and investments, or relative efficiency. It was assumed that if poor countries (or poor regions within countries) were able to raise savings and investments, to take control of their birth rates, and to borrow capital and technology from the developed countries, then their growth path (following the Western model) would be practically guaranteed.

In general, the allocation of human resources between countries and between sectors, if discussed at all, was viewed as a natural outgrowth of a self-adjusting mechanism which functioned to equate sectoral marginal productivities. That view resulted in the «neoclassical dual models» which claimed that the zero marginal productivity of the labor in agricultural sectors was the main cause of the lack of output growth. Consequently, the faster one country got rid of its surplus labor in agriculture, the more successful and «potentially» developed it became. Additionally, labor and capital movements also provided a self-adjusting mechanism that guaranteed the reduction of income inequalities and led to a convergence pattern of wages.

The discouraging record of the last two decades, however, particularly in relation to the rapid urbanization and growing levels of urban unemployment in developing nations, plus the fact that comparative data on wage rates show that urban-rural differentials are slightly increasing over time in absolute terms, has underlined the inadequacy of treating migration as a phenomenon of secondary importance. As a matter of fact, the selective characteristics of the migration process are precisely what many scholars claim to be the key reasons for the perpetuation of underdevelopment in poor areas.

The main purpose of this study is to analyze the internal development process that has been taking place in Spain (probably the very last country to follow the Western model with success) in the logic of the above scheme. Did both internal and external migration lead to a wage convergence between sectors and between regions? Did income and capital grow faster in the poor regions? Our study tries to provide answers for these related questions using a macro-aggregate model with migration as a key variable.

II. economic models of migration

Without question, the phenomenon of accelerated rural-urban labor migration has been the principal cause of both the high rates of urban population (since the level of rural-urban migration has been and will continue to be the principal determinant of the supply of new job seekers) and the rising levels of urban unemployment.

Since it is generally accepted as a fact that limited capability of the industrial sectors in less developed countries absorbs both urban population growth and rural migration (Morawetz, 1974; Bairoch, 1973) and that migration tends to be the key determinant of the urban labor supply, a better understanding of the nature and causes of the migration process is a basic ingredient for those government policies intended to ameliorate urban unemployment and poverty in developing areas. For policy planning, several questions are of immediate interest:

1. What factors influence a person's decision to move?
2. Is urban migration responsive to policy instruments so that present flows can be changed?
3. Is deliberate interference with present migration flows justified?

The literature on the determinants of migration is useful in addressing the first two questions. With these studies, discussed in the following sections, we can examine the characteristics of migrants; factors affecting the decision to move; and the likelihood that government policies and programs whether specifically directed at migration or not will change migration flows. The third question whether governments should try to change migration flows is more difficult to answer. A judgement is required as to optional migration levels, given a particular country's characteristics and governmental objectives; and not only the individual but also the social costs and returns associated with existing migration levels would need to be estimated. Something that no one has tried so far.

II. 1. Models of Migration as an Investment in Human Capital

These models are based on the neoclassical theory investment and have appeared largely in the works of the Chicago school, in particular Sjaastad (1962) and Schultz (1962). Within this theory, internal migration is viewed in a costs-and-returns framework such that, for an individual to migrate, his expectations must be that the costs of migration are equal to or less than the difference in the present discounted values of the streams of benefits in the source and receiving areas.

In other words, for the discrete time period case, migration occurs if:

$$\sum_{t=0}^T \frac{W_u}{(1+i)^t} - C(0) - \sum_{t=0}^T \frac{W_r}{(1+i)^t} \geq 0 \quad (1)$$

where

W_u = expected annual wage in the urban sector
 W_r = expected annual wage in the rural sector
 T = time horizon
 i = rate of discount
 C = costs of migration

Some conceptual problems (also related with the abundance of data) show up when we try the measurement of the differential between opportunity cost and economic returns.¹ First there are *nonmarketed components* of rural and urban income including good and services produced by households for self consumption, which are of particular significance in rural areas, and public goods provided by the government, which are of relatively greater importance in urban areas. Second, to determine the urban income that yields a level of economic welfare equivalent to specific income in the rural areas poses an *index number problem* if there are differences in relative prices between rural and urban areas. Third, the use of *discounted values* introduces a measurement problem. The discounted values of urban and rural income streams over the time horizon T is

$$WD_u = \sum_{t=0}^T \frac{W_u}{(1+i)^t} \text{ and } WD_r = \sum_{t=0}^T \frac{W_r}{(1+i)^t} \quad (2)$$

where i is the discount rate. Since precise information on time horizons, discount rates, and change in income over time are not available for most of the less developed countries, there is no way to use equation (1) without experimenting with different levels for these factors.

In general, the literature of empirical investigations of the human capital model is very extensive and generally successful in explaining the direction and stages of migration as well as determining who migrates.² However, it presents serious methodological problems.

1. In general, variables defined for the end of the period are frequently used to explain migration that occurred over the period (*misspecification of variables*).

1. See, Barnum and Sabot (1976).

2. Among others, see Bowles (1970), Schultz (1971) and Sahota (1968).

2. Perhaps the most striking factors of these studies, is the *lack of policy implications for planning*. Indeed, these models answer only the first of the three questions posed at the beginning of this work; consequently, though methodologically correct, their practical shortcomings are obvious when one tries to extract policy recommendations from the empirical results.

Directly related to that is a very important policy question: Is migration caused by pull or by push factors? For some economists who have applied the human capital model to migration studies, the approach that divides factors influencing the decision to migrate into those that «push» individuals out of the rural areas and those that «pull» them into the urban areas is frequently only a crude version of the human capital theory.³ They argue that labelling push factors, such as low rural wages or lack of availability of land as strong, is roughly equivalent to stating that the *opportunity costs of migration* are low. To say that pull factors (such as high urban wages and the availability of work) are strong is roughly equivalent to stating that the expected gross returns to migration are high. As a consequence the point of view that *rural conditions* alone influences migration rates is rejected on the basis not only of the theoretical analysis but also on the historical evidence that countries with relatively rich agricultural sectors have had relatively high rates of outmigration to the urban sector.

On the other hand, other scholars have considered the decision to migrate as a two-dimensional process.⁴ The first dimension involves the decision of whether or not to relocate, while the second dimension concerns the question of exactly *where* to relocate.⁵ Within this approach, the personal characteristics of a migrant, particularly age and education tend to influence the first phase of the migration decision significantly. The second phase, on the other hand, tends to be a function of the labor market characteristics, such as higher relative wage rates, lower unemployment rates and so forth. According to this approach, then, a *complete model of the migration decision should encompass both the personal characteristics of migrants and the labor market characteristics of the destination area*.

Certainly, the distinction between push and pull factors is a delicate one and, because of the problem of dealing with aggregate data (such as happens in the Spanish case), it is very difficult to formulate op-

erational tests of the hypothesis that the migration was caused by one factor or the other. One piece of evidence, by all means, would be a finding that migration occurred more in regions which did not offer the highest potential returns to migrants. Another would be to find that certain regions have the highest internal migration rates as well as the highest outmigration rates. Another would be to find that land tenure characteristics affect migration patterns and so on.

II. 2. The Todaro Model

In the spirit of the permanent income hypothesis, Todaro (1969) suggested a modification of the migration model by making the decision to migrate a function of two variables: (1) the urban-rural income differential and (2) the probability of obtaining an urban job. Through analytical development of the model, Todaro suggests certain policy implications for developing countries in order to reduce the size of the urban traditional sector, mainly based on concentrated efforts of governments at making rural life attractive, and concludes:

«...as long as the urban-rural income differential continues to rise sufficiently fast to offset any sustained increase in the rate of job creation, then even in spite of the longrun stabilizing effect of a lower probability of successfully finding modern sector employment, the lure of relatively higher permanent incomes will continue to attract a steady stream of rural migrants into the ever more congested urban slums.»⁶

Todaro's work represents, therefore, the most notable exception within migration's literature. By realizing the inability of the urban sector to absorb not only its own natural growth but also migrant flows from rural areas (a fact that is now accepted by many scholars), Todaro presents for the first time a very realistic picture of the consequences of the rural urban migration process in today's less developed countries: *increasing urban unemployment rates*. Its relevance for policy at this time lies in the fact that, if empirical data verified the model at the micro-level, then the policy implication is that investment is needed to increase rural income and employment opportunities rather than attempting to add urban jobs.

As a matter of fact, given the existence of chronic urban unemployment and the substantial urban-rural real income differentials that characterize most developing nations, Todaro (1976) develops analytically the conditions under which an autonomous increase in urban job creation can, in fact, lead to an increase level of urban unemployment. As a consequence, Todaro does not foresee a strictly urban

3. See Barnum and Sabot (1976), p. 16.

4. See Navratil and Doyle (1977).

5. Of course, these dimensions are often inseparable. A decision to relocate is most often made simultaneously with the decision to relocate to a specific area.

6. Todaro (1969), p. 147.

solution to the urban unemployment problem and strongly supports rural development as the only way of alleviating the employment problem in developing countries.

II. 3. *Determinants of Migration: Limitations of the Studies and Empirical Results*⁷

The empirical studies of migration within developing and developed countries is very diverse; and the type of study undertaken has often depended more on what data were available than on their relevance for policy making. As a consequence, the reliability of many of the studies is reduced by small samples and the poor measurement of the relevant variables. However the relatively sheer number allows certain generalizations:

1. The migration literature provides strong empirical support for the *importance of economic incentives* in the decision to migrate. Econometric work in the decision to migrate shows, for example, that migrants tend to move from places of lower economic opportunities to areas with higher potential opportunities.
2. Econometric migration functions (which have a heavy economic bias) typically explain well over 50 percent of the migration rates variances and in some cases between 60 and 70 per cent! The *young and more educated*, who dominate the migration flows, have strong economic incentives to move; urban places seem to have an attraction over and above narrow, employment - related opportunities; but, in general, it is difficult to separate the «bright lights» effect from the income effect.
3. While in the past a large fraction of migrants found jobs in reasonably short periods, this trend is seriously threatened by the increasing rates of urban unemployment that characterize the existing situation in less developed countries as has been pointed out by the Todaro model.

The basic equational form of the migration function which has been used for econometric estimation is as follows:

$$M_{ij} = f(W_i, W_j, U_i, U_j, Z_i, Z_j, d_{ij}, C, E) \quad (3)$$

The independent variables used to explain migration include wage levels (W, either monetary or expected, using the Todaro approach); unemployment rates (U); proportion or size of urban population

(Z); distance (d); costs of information (C) and the error term (E).

Several limitations of the econometric function should be kept in mind. First, the *level of aggregation* since, as some authors have shown, the determinants of migration are sensitive to different levels of aggregation.⁸ Second, the *migration variable used* in some of the studies presents conceptual and econometric difficulties. Explaining cumulative migration flows up to a recent year t with variables measured for only the year t will probably result in a *simultaneous equation bias* since past migration levels may be influencing present wage and employment levels. As a matter of fact, wages and employment both affect and are affected by migration. Third, most of the time the independent variables are poorly measured; income estimates especially (either per capita income or average earnings) are very difficult to obtain particularly in rural areas. Additionally, very little attention has been devoted to the fact that «proxy» variables are frequently used instead of the true variables (e.g., years of schooling to measure years of education); and it is important to note that, except in cases where the proxies fall into the category of pure error in variables, it does not follow that using even a poor proxy is better than using none at all.⁹

III. some empirical results for the Spanish case

This section deals with the consequences of internal migration movements in Spain and their effects on employment generation and regional income distribution within that country. The general hypothesis is that, due to the selective characteristics of the internal migration process (see Table 1), an unequal development pattern between regions has occurred from which the in-migration regions have greatly benefited. In order to test this hypothesis, this section has been organized in three parts. The first part provides both the theoretical and empirical analysis of how movements of capital and labor may not have to wage equalization when the restrictive assumptions of the neoclassical model are relaxed, specially when—as happens in the Spanish case—labor and capital move in the same direction.

The second part presents an analysis of inter-provincial wage differentials in Spain using the «hedonic» wage approach. The need for such an approach is based on the fact that changes in wage-differential indices over time ought to be adjusted for changes in the characteristics of the regional labor

7. An excellent revue of the empirical results of the migration models, may be seen in Yap (1977).

8. See, Navratil and Doyle (1977).

9. See, Maddala (1977), pp. 158-162.

TABLE 1. *Migrants' Structure by Region during the Period 1961-1970*

Regions	Percent								
	In-migrants (1)			Out-migrants (2)			(1) - (2) = (3)		
	Males	15-24 years	Active population	Males	15-24 years	Active population	Males	15-24 years	Active population
1. Galicia	52	18	36	54	26	44	-2	-8	-8
2. Cantabrico	53	20	37	52	15	33	1	5	4
3. West Duero	51	17	32	53	22	37	-2	-5	-5
4. East Duero	51	15	31	54	24	40	-3	-9	-9
5. Madrid	53	23	38	52	17	36	1	6	2
6. West Tajo - Guadiana	52	16	33	53	23	38	-1	-7	-5
7. East Tajo - Guadiana	52	15	33	54	22	40	-2	-7	-7
8. West Ebro	53	19	36	53	19	36	0	0	0
9. East Ebro	52	18	42	52	20	41	0	-2	1
10. Northeast	54	25	43	52	18	40	2	7	3
11. Levante	52	18	35	52	17	36	0	1	-1
12. East Andalucia	52	18	32	53	25	39	-1	-7	-7
13. West Andalucia	51	19	31	53	25	39	-2	-6	-8
14. Canarias	53	19	37	52	18	34	1	1	3

Source: INE, *Las Migraciones Interiores en España: Decenio 1961-70* (Madrid, 1974), pp. 122-131.

force. Considerable evidence is presented to support the hypothesis that the personal and locational characteristics of wage earners (mainly type of occupation and level of education) are important sources of variation in worker's wages in Spain. Even when provincial wage indices are adjusted for changes in the characteristics of the labor force, there is no evidence of any trend toward equalization of wages over the period 1960-1970.

The third part presents the estimation of a theoretical model of migration that tries to overcome the shortcomings mentioned above by allowing for simultaneous relationships between the main variables involved in the migration process: in- and out-migration, employment and unemployment growth, and regional income distribution.

III. 1. *Interregional Movements of Capital and Labor and the Equalization of Returns*

In an excellent work, Borts (1960) developed the theoretical conditions under which equalization of returns (as was hypothesized by the neoclassical theory) was only an exceptional case as a consequence of extremely naive initial conditions. As soon as these initial conditions are relaxed, the equalization process may not occur. As a matter of fact there is considerable historical evidence of this process in many capitalist countries.¹⁰

10. Borts performed several tests for the United States for three different periods (1919-29, 1929-48, 1948-53), and only for the period 1929-1948 did the empirical data support the convergence hypothesis. For the other two periods, a strong divergence pattern appeared; see Borts (1960), p. 328.

The empirical evidence for the Spanish case during the period 1957-1973 is by no means conclusive. Using the variability coefficient (V_k) which essentially measures the deviation of the regional per capita income from the national average income, Ferrer Andreu obtained the following results:

Periods	V_k , using provinces	V_k , using regions
1947-1960	0.4394	0.2745
1947-1970	0.4140	0.2755
1961-1970	0.3860	0.2765

Using another variant of the *variability coefficient* (V_k^*)-basically the standard deviation of regional incomes per capita divided by the national mean—for the different provinces, the pattern of convergence becomes more evident as can be seen in the following table:

Years	V_k^*
1955	0.3950
1957	0.3714
1960	0.3335
1962	0.3414
1964	0.3406
1967	0.2990
1969	0.3084
1971	0.2918
1973	0.2743

However this tendency towards convergence may be more a consequence of an increase in the national mean than of an increase in the relative income of the low-income provinces. Having this in mind, a very

TABLE 2. Annual Average Wage per Worker in the Provinces with Higher Out-and In-Migration Rates during the Period 1957-1971

Provinces	Thousands of pesetas						
	1957	1960	1962	1964	1967	1969	1971
Highest in-migration rates							
Alava (306.2)	48.5	52.7	63.5	93.1	131.0	164.5	224.0
Madrid (263.5)	66.2	75.4	87.2	121.9	170.0	192.2	255.6
Barcelona (225.8)	52.2	64.8	80.0	106.9	150.3	177.5	231.2
Vizcaya (225.8)	69.6	71.4	85.8	117.0	157.9	196.4	267.0
Baleares (166.7)	40.6	45.3	52.5	80.5	116.9	146.7	197.6
Alicante (148.4)	26.8	39.2	51.9	73.5	105.4	133.1	173.4
PIR	50.6	58.1	70.1	98.3	138.6	168.4	224.8
Highest out-migration rates							
Cuenca (-289.0)	33.0	32.7	46.7	57.0	80.7	92.3	112.9
Badajoz (-280.5)	35.2	38.0	42.8	49.1	78.5	92.6	121.2
Caceres (-264.9)	25.8	29.0	36.2	44.5	67.4	84.3	101.7
Jaen (-244.0)	21.5	35.2	43.3	44.2	64.8	88.6	124.2
Teruel (-244.0)	27.2	30.2	39.3	57.1	73.8	104.3	124.2
Ciudad Real (-243.0)	29.6	34.9	43.1	58.4	83.4	110.3	127.2
POR	28.7	33.3	41.9	51.7	74.7	95.2	118.2
$\frac{PIR}{POR} = d$	1.76	1.74	1.67	1.91	1.85	1.76	1.90

Source: Own computations from data from «La Renta Nacional de España y su Distribución Provincial», Banco de Bilbao, 1957-1971.

different picture appears if we look at the results of Table 2, where the average wages per worker of the provinces with the higher out- and in-migration rates are shown. According to that Table, the ratio of annual average wage per worker between the provinces with the highest in-migration rates (that also show higher values of per capita income) and those with the highest out-migration rates (d) show an uneven trend with a slight tendency to increase in comparison with the beginning of the period, contradicting somewhat the wage convergence hypothesis.

According to Mochón (1975), the theoretical equilibrating process does not take place because, while labor movements follow the direction suggested by the neoclassical theory shifting from low-wage provinces, capital flows also follow the same direction as labor flows benefiting the rich provinces where the rate of profit of capital is relatively higher. In spite of its reduced framework and some statistical shortcomings,¹¹ the Mochón model emphasizes that the theoretical equilibrating process may not be reached due to the relative immobility of capital and concludes that the provincial equalization of factor prices from a neoclassical perspective will only hap-

pen when the presence of agglomeration diseconomies (increasing social costs in overpopulated areas) makes it more profitable for capital to move towards the relatively poorer provinces. But once again, the time period might be rather long.

III. 2. Analysis of Interprovincial Wage Differential in Spain

One issue of considerable importance when one deals with the consequences of migration movements within a country is how interregional and intersectoral wage differentials have changed during the migration process and whether or not migration has tended to diminish them.

According to Table 3, the intersectoral wage differential ratio (B) increased slightly in Spain during the period 1963-1974. Furthermore, and according to Table 2, the ratio of annual average wage per worker between the provinces with the highest in-migration rates (that also show higher values of per capita income) and those with the highest out-migration rates (d) also show an uneven trend with a slight tendency to increase in comparison with the beginning of the period. Could we infer from these figures that internal migration movements have tended to widen the intersectoral and interregional wage differentials within the country?

The question of how wage differentials have changed over time has to be answered with some care

11. The model is estimated only for the year 1971, and also has some statistical flaws of relative importance, such as the high multicollinearity pattern in the aggregate production function between employment and capital stock ($r_{E,K} = 0.988$) which can affect considerably the value and the sign of the coefficients, see Garcia-Ferrer (1977b).

TABLE 3. *Real Wages in the Agricultural and Nonagricultural Sectors in Spain*

Years	Pesetas per day		
	Wages in non-agricultural sector (WNAS)	Wages in agricultural sector (WAS) ¹	$\frac{WNAS}{WAS} = B$
1963	167.84	—	—
1964	175.76	—	—
1965	196.96	113.63	1.73
1966	222.72	124.67	1.78
1967	247.36	135.60	1.82
1968	264.48	144.21	1.84
1969	292.56	159.10	1.84
1970	320.72	174.37	1.94
1971	348.72	178.90	2.00
1972	367.84	184.00	2.04
1973	411.84	201.44	2.04
1974	473.28	244.36	1.93

1. The wages in the agricultural sector given by the *Yearbook of Labor Statistics* are listed in pesetas per hour. To make them comparable with the WNAS data, an average of eight hours per day of work was assumed. Since the average number of working days in agriculture is less than in nonagriculture, the WAS estimations are considerably overvaluated.

Source: International Labor Office, *Yearbook of Labor Statistics*, 1974, pp. 601-749.

because regional wage indices need to be adjusted for changes in the characteristics of the regional labor force (e.g. age, sex, education, civil status, type of economic activity, etc.). The way to approach this is to estimate «*hedonic wage*» functions for different points in time in order to construct a set of adjusted regional wage indices which would serve as a basis for answering the questions mentioned above. Following this approach we have estimated these functions for the Spanish case for 1960 and 1970, following the methodology used by Antos and Rosen (1975). From such estimation we can draw the following conclusions:¹²

1. Considerable empirical evidence supports the fact that the *personal and locational characteristics of wage earners are important sources of variation in workers' wages in the Spanish case*. As a matter of fact, more than 90 percent of the total variance for 1970 and 75 percent for 1960 are explained by the variables included in the wage equation.
2. A substantial portion of wage variation is due to differences in the type of occupation, specially between the industrial sector and the remaining sectors of the economy. As expected, rural location of economic activity is associated with lower wage levels and is, therefore, a powerful explanatory variable of rural migration flows.
3. The youngest and oldest groups of the labor force

12. The methodology used, sources of data and the regressions' results may be seen in Garcia-Ferrer (1977a, pp. 48-77).

tend to receive lower salaries than the remaining age groups. So far, this effect has been offset by the internal migration movements that compensated for the loss of young migrants by the percentage increase of older workers in provinces with high out-migration rates. However, the fact that the population of out-migrants provinces have become older, as a consequence of the migration movements witnessed during the last two decades¹³ will worsen their relative situation in the wage scale and will probably increase wage differentials in the future.

4. Another important portion of wage differential is due to differences in educational variables. While intermediate education (1-7 years) does not seem to affect wage differentials among provinces significantly, illiterate (no education at all) and secondary education (more than 7 years) clearly affect wage variation.
5. Differences between corrected wage indices (ΔW^*) and observed wage indices (ΔW) by provinces are rather small. As a matter of fact the pattern followed by ΔW^* (as happened with ΔW) shows no signs of a wage convergence pattern among provinces, for the period 1960-1970.

III. 3. *Interactions between Internal Migration Employment Growth and Income Distribution in Spain*

Larry Sjaastad, one of the pioneers on migration research, recognized fifteen years ago the inadequacy of many migration studies to provide proper policy recommendations:

«Migration research has dealt mainly with the factors which affect migration and how strongly they have affect it but little has been done to determine the influence of migration as an equilibrating mechanism in a changing economy. The movements of migrants clearly are in the appropriate direction, but we do not know whether the numbers are sufficient to be efficient in correcting income disparities as they emerge. There is a strong presumption that they are not.»¹⁴

In general, this has been true in most of the migration studies. Although, some of them have successfully explained the causes of the migration process, few of them have tried to explain at the same time both the causes and consequences (and their interrelations) within the same theoretical model. Furthermore, and from an econometric point of view there have been estimation problems caused by the use of nonequational models. The results of that in

13. In the absence of rural migration movements, the active rural population might have had 48.2% of its 1970 population older than 40 years instead of the 54.7% that it actually had; see Leal, Naredo, Leguina, and Tarrafeta (1975).

14. Sjaastad (1962, p. 80)

many cases, have been «wrong» signs or insignificant coefficients on variables *a priori* thought to play a crucial role on the potential migrant's decision. This has been the main reason for using a simultaneous equation model (see Appendix) for the Spanish case in which we have included both out- and in-migration rates, but also the rate of income growth and the rates of employment and unemployment growth among the endogenous variables.

The model was estimated using Three Stage Least Squares (3SLS) for the period 1960-1970. We can draw from such estimation the following conclusions:

1. The empirical results validate the simultaneous relationship of the model's structure. The present study shows that in-migration not only causes greater employment growth in urban areas but also induces greater income growth in these areas.
2. Moreover, the empirical results of the model does not seem to suggest that greater out-migration rates will foster greater income growth such that regional income differentials will narrow through interregional migration as predicted by the neo-classical theory. On the contrary, *out-migration seems to depress such income growth as well as to depress employment growth.*
3. Another finding relevant for policy provided by the empirical model is the *validation of Todaro's paradox* about employment elasticities. If in-migration to urban areas is so highly responsive to employment creation in these areas¹⁵ and if considerable wage differentials still prevail between sectors, the creation of new jobs in a situation (such as the existing one) of surplus labor in urban areas will indeed cause greater unemployment rates in these areas.
4. Our study also provides empirical support to the conjecture that *both origin and destination characteristics are important factors* in the potential decision to move. Consequently, push and pull factors are separable and can be identified for respective policy purposes.

IV. conclusions

In general, the consequences of both international and internal migration have never been evaluated. Such an evaluation would demand an answer to some painful political questions including: How many migrants are necessary? Are there any other alternatives for the surplus labor in agriculture? What kind of institutional and individual adjustments would be necessary to maintain labor in rural areas? Could

labor-intensive technology be a profitable alternative in the long run?

Even if policy-makers had wanted to formulate aggregate cost-benefit analysis of the consequences of migration, they would have discovered that the welfare analysis of migration is virtually nonexistent and that it has been always overlooked because of the conclusions of the «free trade theorems».¹⁶ One of the most crucial assumptions of the trade theorems is to suppose that *individuals have enough information to make rational decisions.* Consequently, «if exchange is socially rational, then any voluntary exchange which actually occurs must be mutually profitable, since rational individuals do not commence unprofitable transactions». Since migration has been seen as something desirable and economically profitable for the migrant, the need for policy evaluation, consequently, has been neglected.

Finally, a very interesting policy conclusion can be extracted for developing countries characterized by a dualistic economy with surplus labor in the agricultural sector, as was Spain at the beginning of the 1960's. So far, Spain has been *quite successful in achieving high overall growth rates with reasonably low levels of urban unemployment.* This has been more the result of extremely favorable external conditions—which, among other things, absorbed 10 percent of the Spanish labor force in a situation of excess of labor supply—rather than the consequence of a well-planned developmental strategy. Unfortunately for developing countries in Asia and Latin America, the possibilities of international migration are extremely small; and for these in Africa, which is closer to Europe, the likelihood for such migration does not seem much better under the existing circumstances. In addition, the *Lessons from Western Europe suggest that labor migration may not be a viable solution* to unemployment problems. Most of the evidence suggest that there are short term benefits but longer term costs to both the sending and receiving societies: in times of recession the migrants become a social burden, not wanted at home while also aggravating social tensions abroad.

With limited possibilities for migration abroad, increasing internal rural migration movements, and high birth rates, the existing situation of urban unemployment is not surprising. This situation stems from the fact that industry has been regarded as the local point of economic development, with agriculture playing the role of a resource reservoir. It will be necessary to reevaluate this policy attitude for the future.

15. Elasticity of employment; $N_y = 2.635$.

16. I owe this terminology to a personal phrasing by Professor Philip Martin.

APPENDIX: Structure and Variable's Definitions of the Internal Migration Model for Spain

- Outmigration Rate $OMR = f_1 (IMR, \Delta INC, \Delta EMP, \Delta UNR, INC_{60}, UNR_{60}, EDU_{60}, CDI, AGE, u_1)$ (5.1)
 Inmigration Rate $IMR = f_2 (OMR, \Delta INC, \Delta EMP, \Delta UNR, INC_{60}, UNR_{60}, PROBE, IURB, DEN, u_2)$ (5.2)
 Income growth $\Delta INC = f_3 (OMR, IMR, INC_{60}, IURB, \Delta BK, \Delta EDU, DEN, DWS, u_3)$ (5.3)
 Employment Growth $\Delta EMP = f_4 (OMS, IMR, INC_{60}, IURB, DEN, DWS, NIP, u_4)$ (5.4)
 Unemployment Growth $\Delta UNR = f_5 (OMR, IMR, \Delta INC, UNR_{60}, NIP, DEN, DWS, CDI, u_5)$ (5.5)

where each exogenous variable is defined below:

- INC_{60} = income per capita of person residing in province i in 1960
 UNR_{60} = rate of unemployment in province i in 1960
 EDU_{60} = total number of student registered in highschool divided by total population in province i in 1960
 AGE = percentage of people in the age group 15 - 24 over the total population
 CDI = degree of agricultural land concentration (proxy for degree of rural latifundia)
 $PROBE$ = probability of finding an urban employment in province i
 $IURB$ = index of urbanization in province i
 ΔEDU = rate of education growth in province i
 ΔBK = rate of increase of capital benefits (proxy for private investment) in province i
 NIP = natural increase of population
 DEN = regional dummies
 DWS = regional dummies
 $u_1 \dots u_5$ = error terms

BIBLIOGRAPHY

Antos, J.R and S. Rosen (1975), «Discrimination in the Market School Teachers», *Journal of Econometrics*, Vol. 3. No 2, 1975, pp. 123-151.
 Bairoch, P. (1973), *The Employment Problem in Developing Countries*, International Labour Office, Geneva, 1973.
 Barnum, H.N. and R.H. Sabot (1976), *Education Employment, Opportunities and Rural Urban Migration in Tanzania*, OECD, Development Research Center, Paris, 1976.
 Borts, G.H. (1960), «The Equalization of Returns and Regional Economic Growth», *American Economic Review*, vol. 50, 1960, pp. 319-347.

Bowles, S. (1970), «Migration as Investment: Empirical Tests of the Human Investment Approach to Geographical Mobility», *Review of Economics and Statistics*, 52 (Nov. 1970), pp. 356-362.
 Ferrer Andreu, V. (1975), «Distribución regional de la renta en España, (1947-1970)», *Revista Española de Economía*, Año V, Sept-Dec. 1975, pp. 89-102.
 Garcia Ferrer, A. (1977a), *Rural Internal Migration, Employment Growth and Inter-Regional Wage Differentials in Spain*. Unpublished Doctoral Dissertation. University of California, Berkeley, 1977.
 Garcia Ferrer, A. (1977b), «El Problema de la Multicolinealidad en los Modelos Lineales de Regresión: Algunas Soluciones Posibles», *Revista Española de Economía*, Año VII, April - June 1977.
 Jorgenson, D.W. (1969), «Testing Alternative Theories of the Development of a Dual Economy», in I. Adelman and E. Thorbecke, eds., *The Theory and Design of Economic Development* (Baltimore: John Hopkins Press), pp. 45-60.
 Leal J.J. Naredo, J. Leguina and L. Tarrafeta, *La Agricultura en el Desarrollo Capitalista Español, 1940-1970*, Madrid, Siglo XXI, 1975.
 Maddala, S. (1977), *Econometrics*, New York, McGraw Hill, 1977.
 Mochón, F. (1975), *Movimientos Interprovinciales de Trabajo y Capital: Una Aplicación a la Economía Española*. Unpublished Doctoral Dissertation. Universidad Autónoma de Madrid, 1975.
 Morawetz, D. (1974), «Employment Implications of Industrialization in Developing Countries», *Economic Journal*, Vol. 84, Sept. 1974.
 Myrdal, G. (1957), *Economic Theory and Underdeveloped Regions* (London, Duckworth, 1957).
 Navratil, F.J. and J.L. Doyle (1977), «The Socioeconomic Determinants of Migration and the Level of Aggregation», *Southern Economic Journal* (April 1977), pp. 1547-1559.
 Sahota, G.S. (1968), «An Economic Analysis of Internal Migration in Brasil», *Journal of Political Economy*, Vol. 76, March 1968, pp. 218-245.
 Schultz, T.W. (1962), «Reflections on Investment in Man», *Journal of Political Economy*, 70, October 1962, pp. 1-8.
 Schultz, T.P. (1971), «Rural-Urban Migration in Colombia», *Review of Economics and Statistics*, Vol. 53, May 1971, pp. 157-163.
 Todaro, M. (1969), «A Model of Labor Migration and Urban Employment in Less Developed Counties», *American Economic Review*, 59, March 1969, pp. 138-148.
 Todaro, M. (1976), «Urban Job Expansion, Induced Migration and Rising Unemployment», *Journal of Development Economics*, 3 (1976), pp. 211-225.
 Yap, L. (1977), «The Attraction of Cities: A Review of Migration Literature», *Journal of Development Economics*, Vol. 4, Sept. 1977, pp. 239-264.