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INTERURBAN MIGRATION FLOWS IN FRANCE 1975-1982

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Our previous studies have exemplified the processes of changes in the relative positions of cities in the socio-economic structure of an urban system. It was shown that most of quantitative and qualitative changes in the urban system were common to all cities, whereas slight but persistent differences in the speed of adoption of innovations during this diffusional process were responsible for progressive modifications of the structural features of the urban system (Fumain, Saint-Julien, 1984). The aim of this paper is to describe interurban migration as one component of the process of change in an urban system. The main question is about the endogeneous or exogeneous character of urban change. Is migration merely a passive process which would be predictable from the actual state of the urban system? How do cities operate a selection of given subpopulations among migrants? Is this selection oriented towards the maintenance of their actual functions in the urban system or towards a change? To what extent do selective migration explain urban change?

In most studies, the relationships between migration flows and the characteristics of their places of origin or of destination have been analysed in order to explain and predict the number and the composition of migration flows (for example Stone, 1979, Greenwood, 1981, or Shaw, 1985). The effects of migrations on urban population changes have been less often studied.

Those questions will be examined here through the analysis of the number and composition of migration flows between a hundred of french cities (larger than 50 000 inhabitants) during the 1975-82 period. Comparisons with previous periods will assess the stability of results.

1- A DECREASE IN MOBILITY BUT A MORE SELECTIVE MIGRATION PROCESS

In France as in many other countries, migrations from rural areas were mainly responsible for the fast urbanization process and for the high urban population growth rates during the thirty years period following the second world war. As rural surplus population decreased, urbanization entered in its phase of saturation (urbanization rate is now about 73% in a strict sense, when urban population is computed in the framework of urban agglomerations, and 90% when metropolitan areas are defined in geographical units which are more suitable to the new spatial forms of urbanization today: the "zones de peuplement industriel et urbain"). Then interurban migrations became relatively more

and more important in population moves (table 1).

Meanwhile, migration is no longer the main source of urban growth. The share of net migration in urban growth fell dramatically during the last four census intervals: 58% in 1954-62, 54% in 1962-68, 32% in 1968-75, and has become negative since 1975: the loss of population due to migration takes out of the cities an amount of population equivalent to half of their natural growth.

However, migration keeps a significant role in the dynamics of cities, since its effects are more and more discriminant: the statistical dispersion of migration rates is higher than the one of natural growth rates; moreover, net migration rates are becoming more and more unequal, whereas on the contrary natural growth rates tend to equalize their values among cities (table 2). Finally, there is also a growing tendency towards a persistancy of low or high net migration rates in the same cities: correlation between their values measured on successive census intervals has increased from about 0.3 to 0.7 during the last thirty years. It seems then that migration could reveal more than before about the selective aspects of change in the urban system.

2- SOURCES OF INFORMATION ABOUT INTERURBAN MIGRATION

Since France does not have any register of population, information about spatial mobility is available from population censuses. For the first time in 1962 a question was asked concerning the place of residence at the date of the previous census in 1954. The same question was asked at the following censuses in 1968, 1975 and 1982. Answers were exploited to produce migration tables, in an exhaustive way for the 1954-62 period and from samples for the others (with various rates: 1/4 in 62-68, 1/5 in 68-75 and 1/20 in 75-82), for all the urban agglomerations having more than 50 000 inhabitants. All data are computed for urban agglomerations in their geographical delimitation of the last census date, for each period.

This kind of statistical source provides information only about migrants (people having changed their residence between two dates and surviving at the last date -with their children counted as migrants even if they were born after the move) but not about migrations -that is, the total number of residential changes that really occurred during the period: multiple migrations, migrations of people who died between the two censuses and migrations ending by a return to the place of departure are neglected. Thus, there is a systematic underestimation of spatial mobility when studied from this source of data, and the intensity of underestimation increases with the length of the census interval.

Fortunately, rather detailed information is provided from this source as regarding the age and social status composition of migratory flows. When using this source to study the composition of the flows of migrants, problems of interpretation are however still more difficult. The social status of a migrant is only known at the date of the last census, without any indications about the possible changes in his profession which may have occurred at the moment, or after his change in place of residence.

For instance, an out-migrant, having left an agglomeration and counted as an active person in 1982, could have been in 1975, in this agglomeration, an active person in the same social group, or belonging to another social group, or an inactive person (in the case of young people). How is it then possible to evaluate the "loss" that occurred in this agglomeration due to the departure of that migrant? The same problem appears with in-migrants, but less severely, since those persons do belong to the agglomeration in 1982 and can be considered as a real contribution of migration to a given social group. There is then a fringe of approximation when considering the in-migrants counted by the census as representing populations who were really attracted by the city, and out-migrants as a loss of potentially actives or non-actives persons that were not retained by the agglomeration. However, consistency of results over time seems sufficient to justify the use of such an imperfect statistical source.

3- THE GRAVITY MODEL STILL EXPLAIN MOST OF THE GEOGRAPHY OF MIGRATION FLOWS

Between 1975 and 1982, about 1 850 000 persons changed their place of residence from one city with more than 50 000 inhabitants to another. This corresponds to a mobility level of 5.5% for seven years. The slight decrease in the mobility level which occurred during that period (between 1968 and 1975 it was 5.8%) has the same magnitude than the one observed at other geographical levels at that time. It is a reversal in the previous more than secular tendency to an increasing mobility, which was also observed in other countries (Courgeau, Pumain, 1984).

The main flows of migrants between cities have been represented on figure 1. Every flow of more than 10 000 migrants has its origin or destination at Paris. A few flows of more than 5 000 persons have been exchanged by very close and very large cities. Size of cities and the distances between them are the more important explanatory variables of the inequalities in interurban migratory flows. A gravity model, either in its Pareto or in its exponential formulation, predicts more than 90% of their variance (table 3). Another interesting remark is about the deterrence effect of distance on migration, as it is measured by the exponent of the Pareto function. Its values may be compared at different points in time when it is computed on the same subset of cities. Table 3 shows that these values follow the same tendency than the general mobility level: the deterrence effect of distance was decreasing between 1954 and 1975, and has slightly increased since that date. Both ending of rural out-migration and the crisis context may be invoked as explanations, and only the future evolution will allow to discriminate between two possible interpretations: a durable reversal, or, more probable, a momentaneous fluctuation.

4- GEOGRAPHICAL SELECTIVITY IN MIGRATORY FLOWS

The gravity model with a Pareto formulation has been adjusted to the interurban migration matrix. Differences between observed flows, and flows computed by using this gravity model (that is, city sizes and intercity distances) are residual flows. Positive residuals from one city to another means a preferential move in

that direction, whereas a negative residual may be attributed to some barrier effect. The algebraic sum of all the residual flows directed towards a city, weighted by the size of the city, represents its attractivity level: if it is high, migrants are more numerous to come to this city than expected from the main hypothesis of the model, (which are the relative situation of places in the population potential surface and the average interurban mobility behaviour). This indicator is a better measure of the relative attractivity of a city than a simple immigration rate, since it not only includes the effect of the size of the city but also of its geographical situation in the whole urban network.

The map of the attractivity ("pull index", figure 2) is not surprising: it shows the well-known differential in regional migratory preferences, which progressively emerged since the end of the sixties: the southern and western part of France have become the most attractive, whereas northern cities and large cities like Paris and Lyon have ceased to attract as many migrants as they used to in the previous decades. However, it is interesting to observe that a few cities of the north-eastern part (Nancy, Metz, Strasbourg, Dijon...) keep a rather high level of attractivity.

The sum of residual outflows from the same gravity model provides an index of repulsion (push index, figure 3), whose interurban repartition is more unusual. It shows that out-migration is larger than expected from Paris agglomeration, but also from many other cities, not only in regions where economic crisis is severe like in Lorraine, but also in attractive regions of the western and south-western part of the territory. The map also shows that the northern cities, despite the severity of their economic crisis and their low attractivity level, can however retain their resident population with a rather high intensity.

The sum of the two indexes gives a global push-pull index, whose geographical distribution is very similar to the map of net migration rates (figure 4). The pattern is very clear: almost all cities of the southern part of France are attractive and almost all cities of the northern part are repulsive. This "shift towards the south" has received many interpretations. It is true that considerations about the quality of the environment, and especially climatic ones, can express themselves when economic activities are more mobile and when managers can influence their choice in location. But to be really effective, the climatic advantages of the south had to be reinforced in a more complex process leading to improve the general "image" of those regions in the mental representations of entrepreneurs and of potential migrants. Advertising campaigns like the one for "Montpellier la surdouée" illustrate well the need of enlarging the basis of attraction and of giving a more up-to-date image to this southern part, which was until recently a little backward, economically.

5- QUALITATIVE SELECTIVITY IN MIGRATORY FLOWS

Since migrations are the main factor of differentiation in the quantitative growth of the population of the cities, one may also consider which kind of qualitative selections occur in migration

flows to and from cities, and how they contribute to the changes in the socio-économique structure of the urban system. The composition of the total flow of in- and out-migrants to and from each city has been studied by age (9 age groups) and by social status (7 socio-professionnal categories). Migratory flows being here considered are not only interurban, but also include people having come from other origins or gone to other destinations (like rural communes or small towns). International migrations are not included, since the census source does not provide information about external out-migration.

If the demographic and social composition of migratory flows which enter in a city or leave it are very similar, and resemble the composition of the non-migrant population, the main effect of migration would be to reproduce the demographic and social structure of the city. On the contrary, differences mean on the long term that this structure will be transformed. The reproduction process maintains identic the relative positions of the cities and the structure of the urban system remains stable, whereas differences allow its transformation by changing the relative positions of cities.

Between 1975 and 1982, as for previous periods (Pumain, 1980) for french cities, and as demonstrated in other countries (Stone, 1979, Shaw, 1985), one of the well-known "law of migration" by Ravenstein is verified, even for sub-populations: each flow generates a counter-flow. The correlation coefficient between the number of in-migrants which entered in a city and the number of out-migrants which left it is larger than 0.9 for each age group or social categorie. Of course this high correlation level could be only a reflection of the large inequalities in population sizes, since the magnitude of migratory flows is roughly proportional to the size of the cities (however, a tendency towards a decrease in in-migration or out-migration rates with increasing size categories of cities can be observed).

In order to make comparisons, all things being equal regarding the size of cities, we computed the proportions of each age group or each social categorie in each subpopulation of immigrants, outmigrants, and non-migrants. It appears that the effects of migrations are not the same on the age structure and on the social composition of urban populations.

6- MIGRATIONS REPRODUCE THE SPATIAL DIVISION OF LABOUR

There is a high degree of resemblance between the proportions of each social group in the in-migrants and out-migrants subpopulations, and the composition of those migration flows is also very similar to the composition of the non-migrant population of cities. Correlation coefficients are always positive and highly significant, with most values of about 0.7 or 0.8 (table 4). It means for instance that larger proportions of workers are entering and leaving industrial cities, whereas more senior executives are also coming to or going out of cities which already had more of this categorie.

The spatial structure of social groups in migratory flows almost entirely follows the spatial pattern of social categories

in urban agglomerations. A multivariate analysis of the composition of the three subpopulations shows those similarities in a striking way (figure 5). The social composition of migratory flows entering or leaving a city is then to a large extent predictable from the social profile of the city. Migrations contribute then to maintain the existing pattern of the spatial division of labour and to the conservation of the interurban social segregations.

This result is not only valuable for the 1975-82 period, but was already verified for the previous period (1968-75). Comparison is difficult because the definition of the social categories has changed, but correlations seem even to be higher now than they used to be before.

7- MIGRATIONS REINFORCE THE SEGREGATION BY AGE

The results for the comparison of age structure between the three subpopulations are slightly different. Because of the rather large incertitude about the age at which the migration occurred, they are given here merely as first indications, to be completed by more detailed investigations. Correlations are systematically positive for all age groups of less than 20 or more than 40 years old; for groups of 40 and more, correlations increase regularly with the age. The higher is the age of the population in a city, and more the aged persons tend to be numerous in the in- and out-migration flows of this city. In that case, migration contribute to maintain the level of aging in the urban populations.

Regarding the age groups of young adults, between 20 and 40 years, correlations are sometimes slightly positive, but in most of the cases they are zero or negative. The geographical selection, inducing new urban segregations, concerns those age groups mainly (figure 6). Cities which receive the highest proportions of migrants aged 20 to 30 are mostly large university cities, or smallest towns in their vicinity. Cities which loss by out-migration the highest proportions of young adults are mainly characterized by a deep and durable crisis of their economy, but are maintaining rather high fertility levels (for example: Béthune, Lens, Douai, in the northern mining region). Geographical selections for the 30-40 years group are different: the cities where this group is important in the out-migration flow, are the ones which also have a large immigration of younger adults in the age groups just below (the cities with universities); the group of 30-40 has high proportions in the in-migrant flows for smaller or medium-sized towns.

8- MIGRATION DIFFERENTIALS AND CHANGE IN URBAN STRUCTURES

The differences between in- and out-migration rates, or net migration rates, when measured for each category of population, depends heavily on the total net migration rate: when cities are attractive, they generally attract more of all type of populations. To evaluate the specific aspect of selective migrations on the age and social structure of urban populations, one has to measure a migration differential, all things being equal as regarding the global attractivity level of cities. The coefficient of migration differential for one categorie of

population is computed by dividing the ratio: number of in-migrants of one group upon the number of out-migrants of the same group by the ratio between the total number of in- and out-migrants.

Migration differentials by age group have a higher probability of transforming the structure of the urban system than those by social groups: the values of the coefficients for the age groups are very different from one city to another, whereas there is a rather little statistical dispersion of the proportions of age groups in resident populations of cities.

Cities have been classified, according to their coefficients of migration differentials, in homogeneous classes (figure 7). The pattern of interurban segregation by age selection in migrations is clear. Migrations induce a selection of aged persons in about thirty cities, which are almost all located in the northern region, or along the mediterranean coast. Migrations then tend to reinforce the aging of those cities. Whereas the aging process due to migration differentials is a regional process, the rejuvenating process concerns more dispersed nodes of the urban network. The tendency to retain young populations, children with adults on one hand and young adults on the other hand, benefits to two types of cities. The first type is made of 14 medium-sized towns, dispersed over all the territory, from Agen to Tarbes, Arles to Macon, Forbach to Armentières. The second type is made of about twenty large cities whose university functions attract young adults and often keep them during the stage of their first job. All other cities have less specific migration differential and do not select migrants on an age basis.

Effects of migration are less sensible on the social segregation, but they reveal a few aspects of the functioning of the system of cities. Coefficients of migration differential are used to classify the cities (figure 8). This classification confirms cities of the mediterranean coast in their function of rest-centers for retired people; there is no longer high migratory differentials for workers, except in two old mining cities (Forbach and Montceau-les-Mines); cities of the West, of the Paris Basin, of the northern Alps and of the Rhône valley tend to retain the executives and the employees. Almost all large cities reject executives: this is an expression of their function of production of this high skill group of population.

There is apparently very few relationships between those social migration differentials and the relative social change which has been observed in cities during the same period. For instance, it is well known that the largest cities have increased their relative concentration of very qualified population. The correlations between the partial migration differentials (or even partial migration rates) and the changes in proportions of the corresponding social groups in the resident population of cities are very low. Despite of some selective aspects, migrations appear then more as a passive than an active process in urban socio-economic change and more as a regulating factor than as a transforming one in the evolution of the urban system. This conclusion however has to be modulated by all the approximations which were mentioned regarding the accuracy of the source and the indirect way of measuring the effects of migration on urban change.

REFERENCES

- Alperovitch G. Bersaman J. Ehemann C. 1977: An Econometric Model of Migration Between United States Metropolitan Areas. *Urban Studies*, 14, 1, 135-145.
- Boudoul J. Faur J.P. 1986: Trente ans de migrations intérieures. *Espace, Population, Société*, 2, 293-302.
- Courgeau D. 1970: les champs migratoires en France. Paris, PUF, Travaux et Documents de l'INED, 58, 158p.
- Courgeau D. Lefebvre M. 1982: les migrations internes en France de 1954 à 1975. *Population*, 1.
- Courgeau D. Pumain D. 1984: Baisse de la mobilité résidentielle. *Population et Sociétés*, 179.
- Greenwood M.J. 1972: The determinants of Migration between Standard Metropolitan Statistical Areas. *Demography*, 9, 665-82.
- Le Bras H. 1972: les migrations interurbaines de 1954 à 1962. Caen, Colloque national de Démographie.
- Forell F.W. 1982: Intermetropolitan Migration and Quality of Life. *Journal of Regional Science*, 22, 137-58.
- Puig J.P. 1981: Le rôle des villes dans les migrations intérieures d'actifs. *Economie et Statistique*, 133, 57-75.
- Pumain D. 1980: Contribution à l'étude de la croissance urbaine dans le système urbain français. Université de Paris I, Thèse de Doctorat d'Etat.
- Pumain D. 1982: Composition des flux migratoires et structure socio-économique des villes. Szekesfehervar, Colloque de l'AISSRU.
- Pumain D. 1986: les migrations interrégionales de 1954 à 1982: directions préférentielles et effets de barrière. *Population*, 2, 378-389.
- Pumain D. 1988: Interregional migrations in France, in: Weidlich W. Haag G. ed: *Interregional Migration. Dynamic Theory and Comparative Analysis*. Berlin, Springer Verlag, 131-153.
- Pumain D. Saint Julien 1984: Evolving structure of the french urban system. *Urban Geography*, 5, 4, 308-325.
- Saint Julien T. 1987: L'attraction migratoire des villes et l'évolution récente du système urbain français. *Bulletin de l'Association des Géographes Français*, 3, 221-232.
- Shaw R.P. 1985: *Migrations intermétropolitaines au Canada*. Toronto, NC Press, 285p.
- Stone L.O. 1971: on the correlation between metropolitan area in and out migration by occupation. *Journal of the American Statistical Association*, 336, 693-707.
- Stone L.O. 1979: la composition professionnelle des migrations au

Canada. Ottawa, Ministère des Approvisionnements et services, 128p.

Yap L.S. 1977: The attraction of cities: a Review of the Migration Litterature. Journal of Development Economics, 4, 239-64.

Table 1

CHANGES IN THE COMPOSITION OF MIGRATION FLOWS FROM AND TOWARDS LARGE CITIES

ORIGIN OR DESTINATION	1954 - 62		1962 - 68		1968 - 75		1975 - 82	
	I	O	I	O	I	O	I	O
<u>in %</u>								
Rural communes	43	28	31	24	30	28	21	34
Towns < 50 000	30	27	28	27	25	29	41	39
Cities > 50 000	27	45	41	49	45	43	38	27
Total	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>
<u>in number of migrants</u> <u>(in thousands) :</u>								
Rural communes	830	444	687	442	898	876	817	1733
Towns 50 000	602	412	607	465	1069	923	1562	1993
Number of cities	79		79		100		112	

I = in-migrants
O = out-migrants

Table 2

COMPONENTS OF URBAN GROWTH

(cities larger than 50 000 in habitants)

Mean annual rates in % :

PERIOD	NET MIGRATION		NATURAL INCREASE	
	average	standard-dev.	average	standard-dev.
1954-62	1.51	0.94	0.89	0.38
1962-68	1.34	1.22	0.96	0.37
1968-75	0.60	0.97	0.93	0.42
1975-82	- 0.48	0.73	0.67	0.37

Table 3

ADJUSTMENT OF A GRAVITY MODEL TO INTERURBAN MIGRATION MATRICES

PERIOD	Number of interurban migrants	mobility rate (%)	Exponent of Pareto function a	Adjustement quality (R ²)
1954-62	778.964	3.8	- 0.94	0.924
1968-75	1.488.990	5.8	- 0.81	0.937
1975-82	1.489.504	5.5	- 0.87	0.949

Model = $M_{ij} = K P_i P_j d_{ij}^{-a}$
 for the same sample of 79 large cities

Table 4 : SIMILARITY IN THE COMPOSITION OF MIGRATION FLOWS AND URBAN POPULATIONS.

Correlation coefficients between :		In-migrants and non-migrants	Out-migrants and non-migrants	Immigrants and out-migrants
Age groups	0-19	0.7	0.8	0.5
in % :	20-24	0.3	- 0.1	- 0.7
	25-29	0.6	0.0	- 0.0
	30-34	0.1	0.6	- 0.2
	35-39	0.2	0.7	0.1
	40-49	0.5	0.7	0.6
	50-59	0.4	0.3	0.6
	60-64	0.6	0.3	0.4
	64	0.8	0.8	0.8
Social groups				
in % :	Merchants craftsmen	0.7	0.7	0.5
	Managers	0.8	0.8	0.7
	Executive staff	0.5	0.6	0.6
	Employees	0.8	0.3	0.5
	Workers	0.8	0.8	0.8
	Retired	0.8	0.6	0.7
	Inactive persons	0.8	0.7	0.5

Table 5

Migration differentials (1)

Age groups	Mean	Standard deviation
0 - 19 years	0.96	0.09
20 - 24	1.61	0.83
25 - 29	1.17	0.24
30 - 34	0.84	0.14
35 - 39	0.85	0.15
40 - 49	0.96	0.15
50 - 59	0.87	0.19
60 - 64	0.87	0.38
> 64	1.15	0.31

Social groups

Merchants, craftsmen	0.77	0.23
Managers	1.00	0.19
Executive staff	0.91	0.10
Employers	1.10	0.16
Workers	1.10	0.17
Retired	1.00	0.35
Inactive persons	1.00	0.07

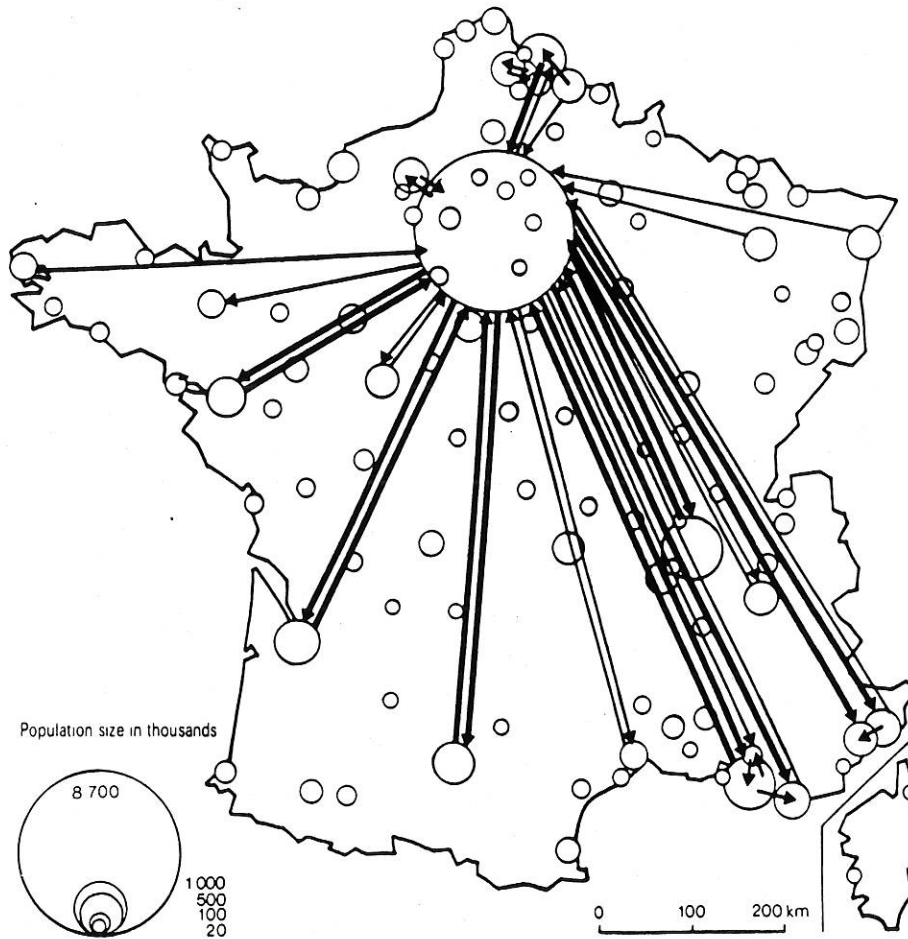
(1) Coefficient = $I_i/I_t / O_i/O_t$

I = inmigrant flow i = group t = total

O = out migrant flow " "

Figure 1

MAIN MIGRATION FLOWS 1975-1982

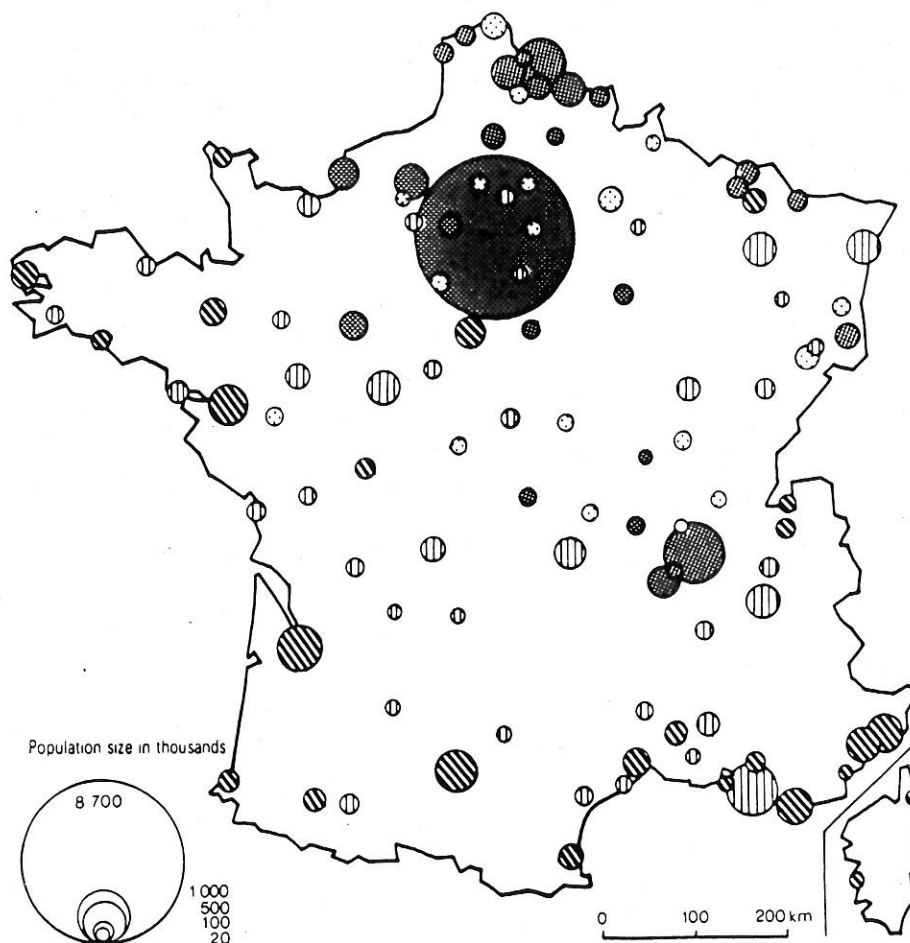


NUMBER OF MIGRANTS

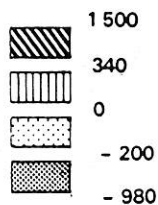
- 5 000 - 10 000
- 10 000 - 20 000

Figure 2

PULL-INDEX



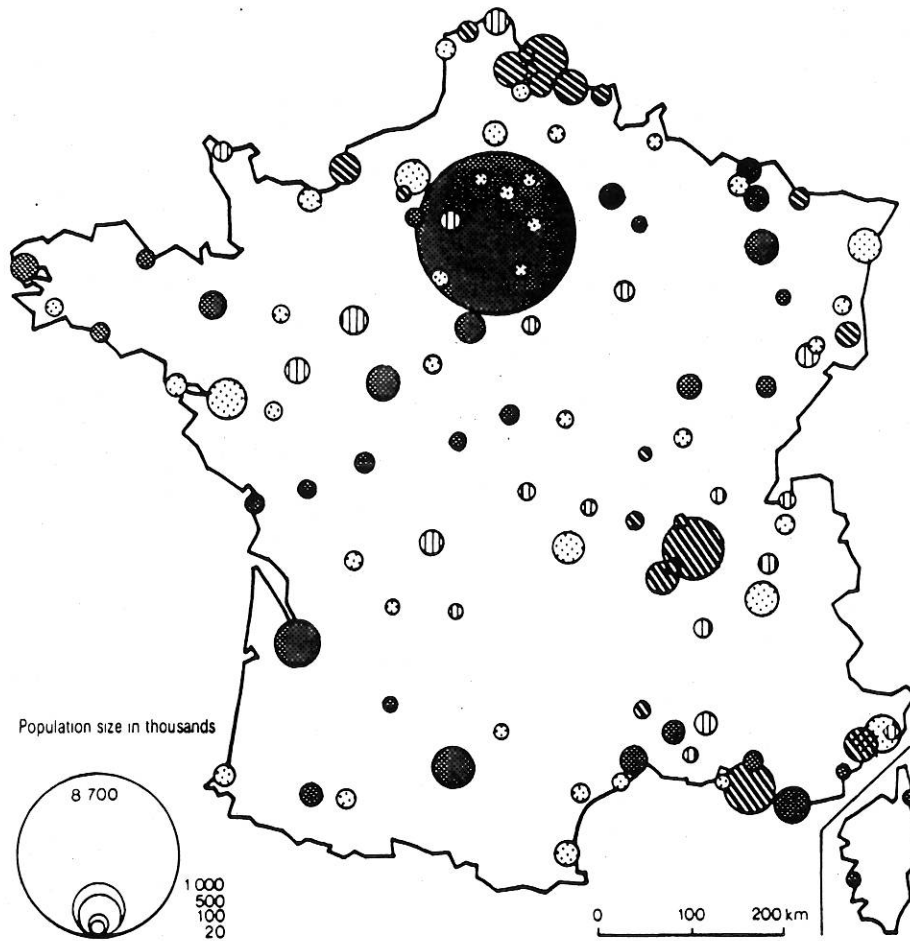
1975 - 1982 INDEX



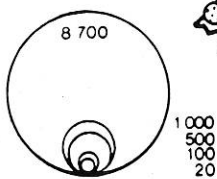
Sum of weighted deviations between observed in-immigration flows and computed from a gravity model.

Figure 3

RÉPULSION INDEX

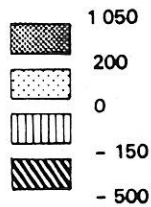


Population size in thousands



0 100 200 km

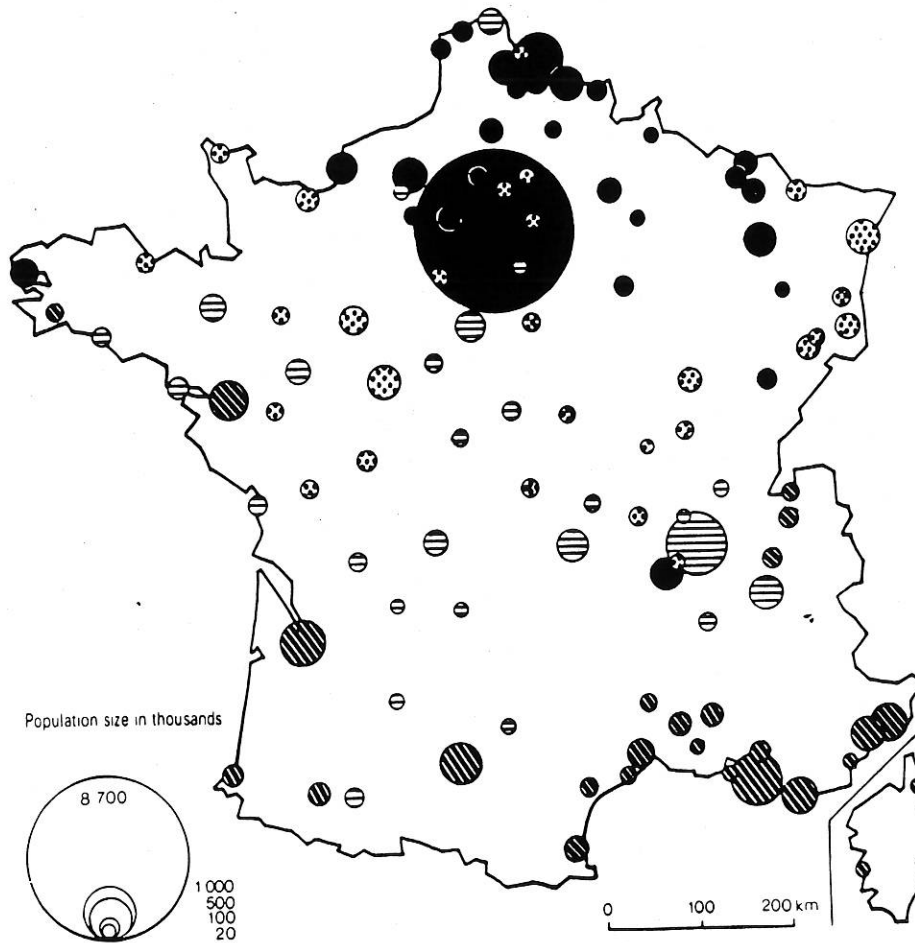
1975 - 1982 INDEX



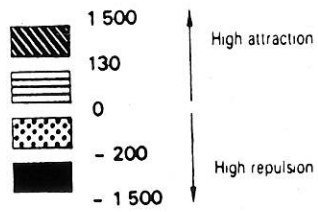
Sum of weighted deviations between observed out-migration flows and computed from a gravity model.

Figure 4

PUSH-PULL INDEX



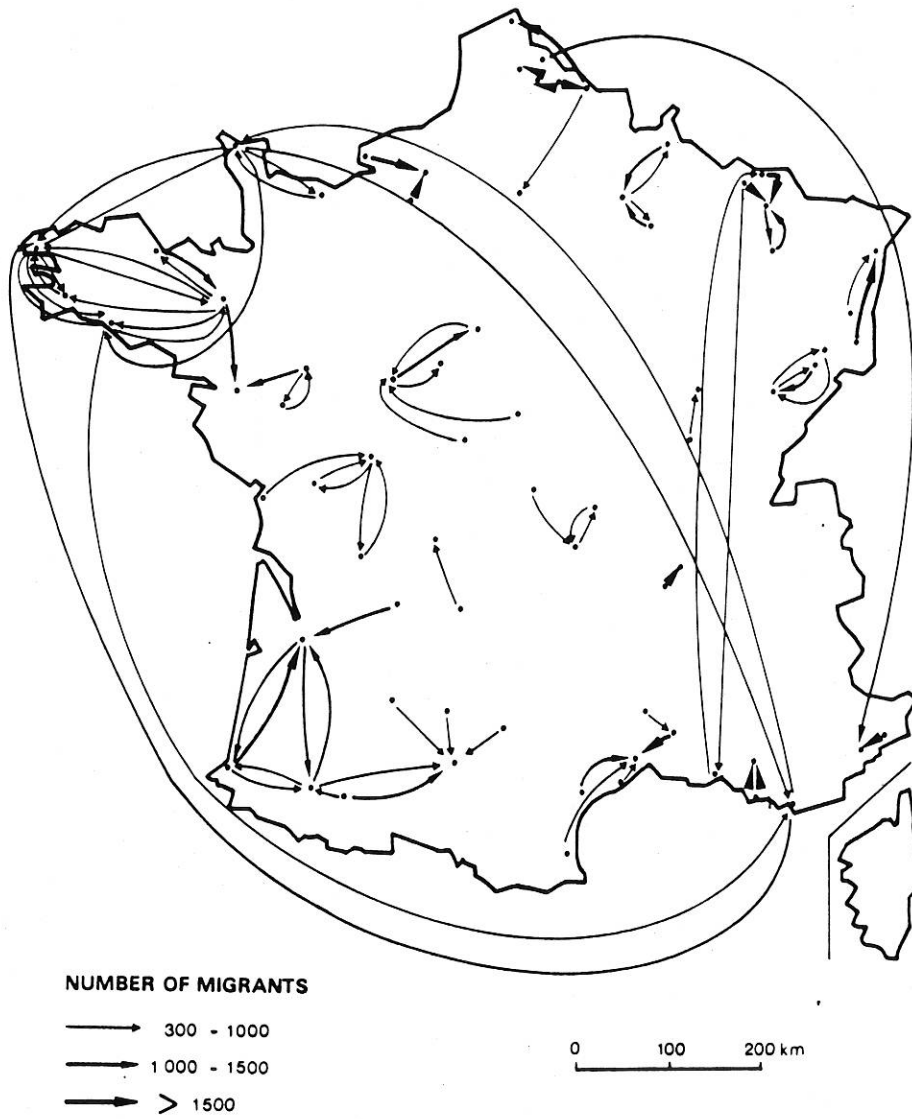
1975 - 1982 INDEX



Difference between pull and push indexes.

Figure 5

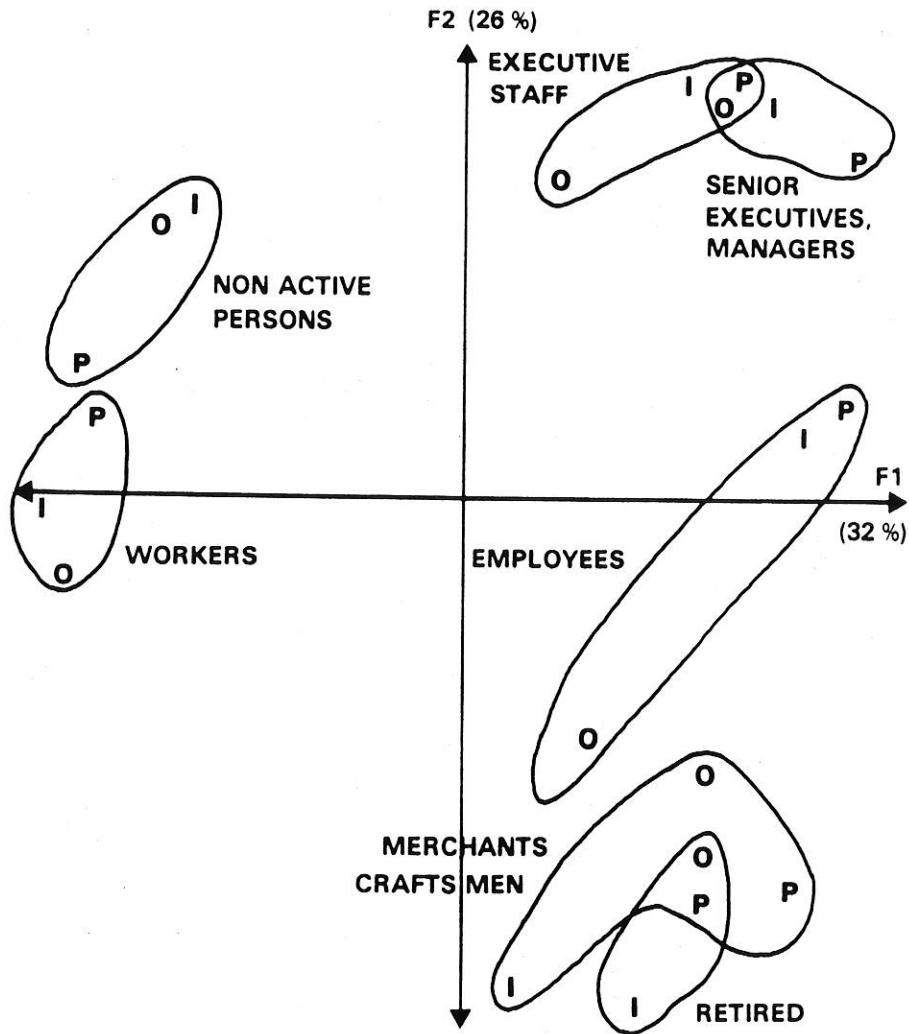
PREFERENTIAL MIGRATORY FLOWS



Residual flows (those with Paris are excluded) computed after adjustment by a gravity model.

Figure 6

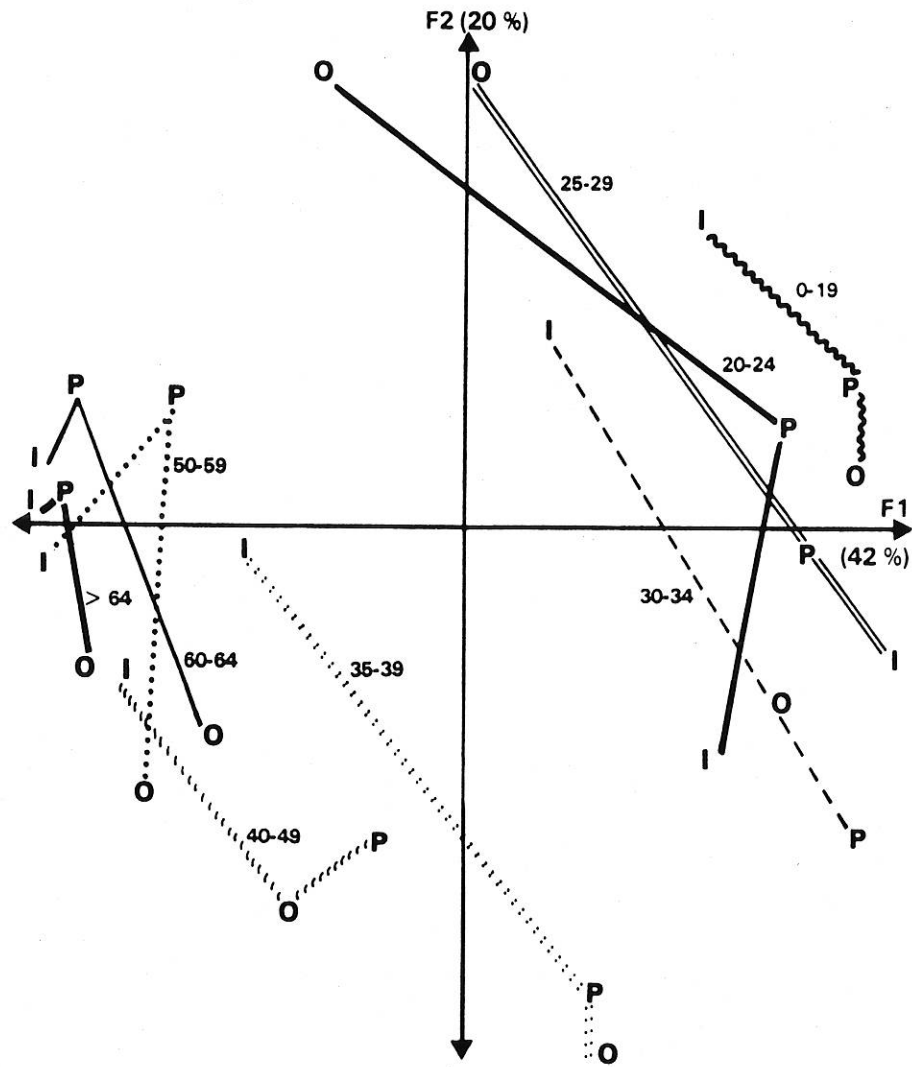
SPATIAL DIVISION OF LABOUR IS REPRODUCED BY MIGRATION FLOWS



First two axes of a principal component analysis upon the composition by social groups of in-migrant flow (I), out-migrant flow (O) and non-migrant population (P) for 112 urban agglomerations larger than 50 000 inhabitants (1975-1982).

Figure 7

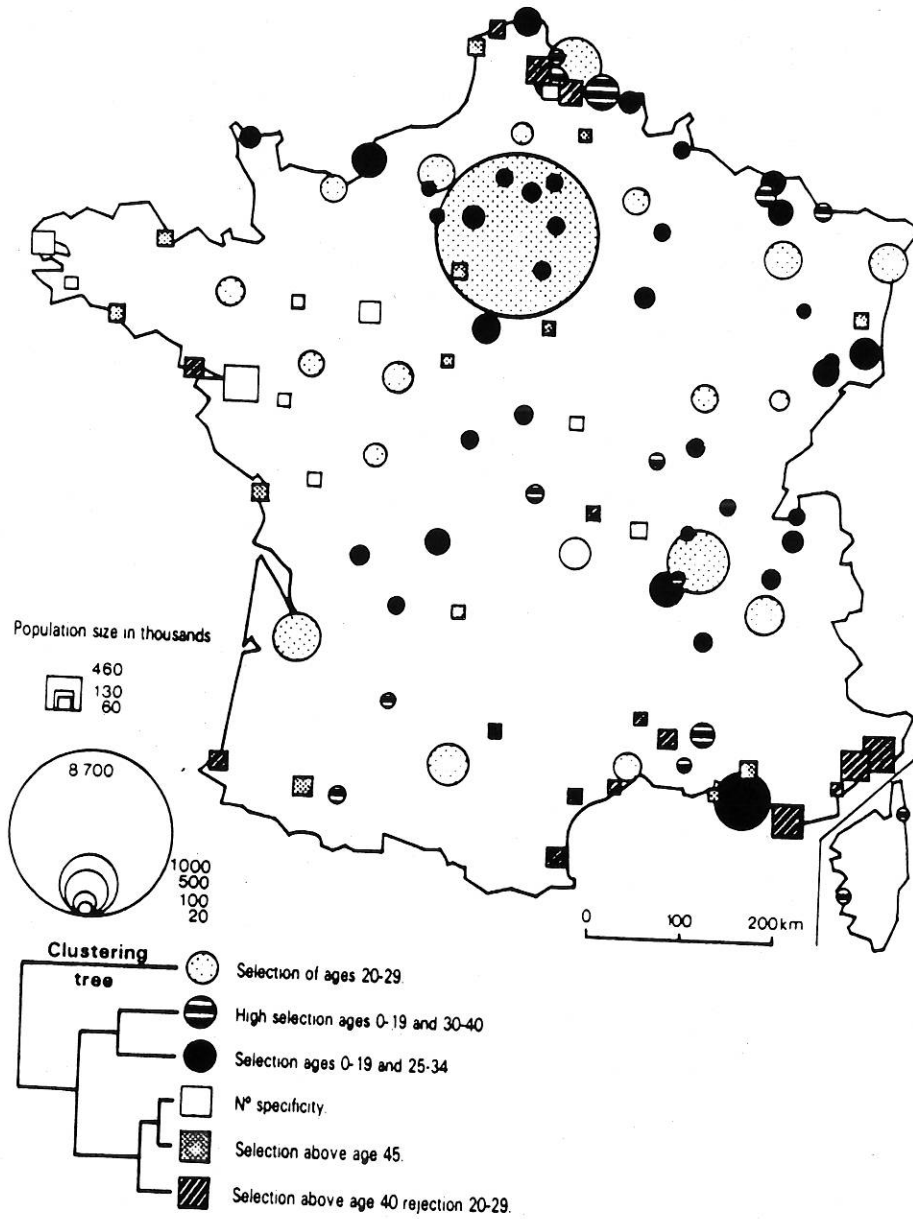
SEGREGATION BY AGE IS REINFORCED BY MIGRATIONS



First two axes of a principal component analysis upon the composition by age of in-migrant flow (I), out-migrant flow (O) and non-migrant population (P) for 112 urban agglomerations larger than 50 000 inhabitants

Figure 8

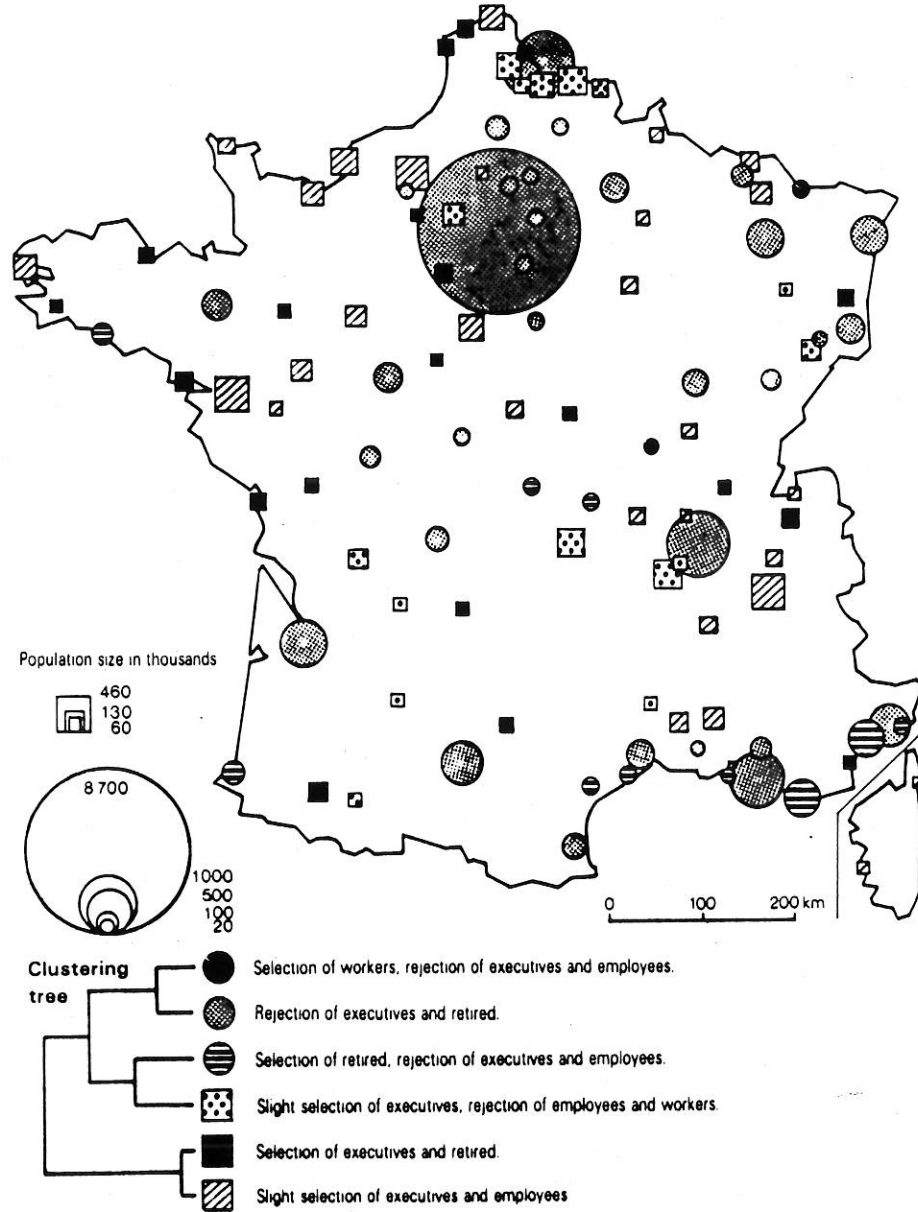
MIGRATION DIFFERENTIALS BY AGE



Hierarchical classification upon the coefficients of differential migration by age.

Figure 9

MIGRATION DIFFERENTIALS BY SOCIAL GROUP



Hierarchical classification upon the coefficients of differential migration by social groups.