

# Internal migration flows: a comparison between Italian and foreign population using social network analysis

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**Abstract:** Migrating population establishes networks between territorial areas. It is interesting to analyse the migratory movements per origin-destination at a local level, especially in a country such as Italy in which the production system mainly includes small and medium enterprises with very deep-rooted local realities.

These migratory networks reveal the dynamic productive poles that attract people and the areas that push people to move. They also show how the population adopts “territorial” strategies to improve their life quality or to find a job.

The aim of this study is to examine the migratory flows at local labour market areas (LLMA) territorial level comparing Italian and foreign population patterns.

**Keywords:** Migration; social network analysis

## 1. General framework

The changes of residence source, which Istat carries out every year, highlights synthetically the main aspects, quantity and characteristics of the migration flows. This administrative source, based on individual forms, reports both the origin and the destination of the flows, as well as some of the main socio-demographic characteristics of the migrants, such as age, citizenship, place of birth, gender and education degree.

Since the 1960s', the mobility within Italy followed a decreasing trend over the years, going from 43 changes of residence per every thousand inhabitants in 1962 to 30 changes per every thousand inhabitants in the following decade (Pugliese, 2006; Rossi and Strozza, 2007; Istat, 2005).

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Since the second half of the last decade, the mobility within Italy has been on the increase again. In a large part this increase is due to the high internal mobility of foreigners. At the same time, though, the internal migration model underwent another important change. The long-distance transfers, between different regions, progressively decreased while the percentage of short-distance ones, within the same region, on the total of transfers significantly increased; while the short-distance transfers accounted for 65 percent of the total at the beginning of the 1960s', they now exceed and even remain stably over 70 percent (in 2006, they accounted for 75.3% of the total).

Italy counted about 3 millions of resident foreigners on 1 January 2007 (Istat, 2008). About 75% of the foreign population was concentrated in the medium-large and large demographic Local labour market areas, areas with more than 100 thousand inhabitants in 2001. Given that foreigners generally relocate more easily than Italian residents, their mobility on the territory greatly contributes to the increase of internal migrations, especially on some routes. In 1998 the 5.7% of the changes of residence involved foreigners; in 2007 foreigners account for almost 15% of the movements (Table 1).

**Table 1** - Changes of residence by citizenship, 1998-2007

<b>Years</b>	<b>Italians</b>	<b>Foreigners</b>	<b>Total</b>	<b>% foreigners</b>
1998	1131017	68866	1199883	5.7
1999	1144770	73961	1218731	6.1
2000	1183826	88052	1271878	6.9
2001	1039989	93017	1133006	8.2
2002	1114947	108611	1223558	8.9
2003	1101207	114609	1215816	9.4
2004	1149005	161531	1310536	12.3
2005	1136442	185268	1321710	14.0
2006	1164439	203859	1368298	14.9
2007	1175628	203903	1379531	14.8

Source: Istat data

Here the data of changes of residence (average 2006-2007) are exploited using the Local labour market areas grid<sup>2</sup>.

Observing the flows between LLMA's with more than 100 changes of residence, it is possible to enucleate nine routes in which the foreigners account for more than 40%: Guastalla-Suzzara, Montebelluna-Bassano del Grappa, Zocca-Modena, Arzignano-Vicenza, Guastalla-Reggio nell'Emilia, Bergamo-Chiari, Guastalla-Carpi, Brescia-Milano and Urbino-Pesaro.

Considering the 10 main trajectories involved in the changes of residence, in most cases the same pairs of LLMA's are listed both for Italians and foreigners (Table 2). The

<sup>2</sup> The Local labour market areas are groups of neighbouring municipalities (though not necessarily part of the same region or province) constructed by analysing the population's daily work commuting that is surveyed through the Population Censuses. In addition, a local labour system is a functional region defined as a "self-containment" area of commuting flows: it identifies a group of municipalities linked by important inter-dependence relationships. This document will refer to the 686 Local labour market areas that have been identified using the 2001 Census data. This territorial grid makes it possible to analyse the economic and social geography at a detailed level by means of a territorial division that derives from the self-organisation of the relational dynamics, especially as regards residence and workplace (Istat, 2006).

big cities (Rome and above all Milan) are in the first ranks of the list especially as points of origin of the flows.

**Table 2** - First ten trajectories of changes of residence by citizenship, LLMA ordered by absolute and weighted values (average 2006-2007)

Rank	Italians				Foreigners			
	Order by absolute values		Order by weighted values		Order by absolute values		Order by weighted values	
	Out	In	Out	In	Out	In	Out	In
1	Milano	Seregno	Palermo	Bagheria	Milano	Seregno	Vestone	Salo'
2	Napoli	Aversa	Pisa	Pontedera	Milano	Bergamo	Guastalla	Suzzara
3	Roma	Latina	Parma	Langhirano	Milano	Busto Arsizio	Prato-vecchio	Bibbiena
4	Milano	Busto Arsizio	Porto ferrario	Porto Azzurro	Milano	Lodi	Verona	Bovolone
5	Milano	Vigevano	Trapani	Custonaci	Milano	Vigevano	Tiene	Schio
6	Milano	Bergamo	San Remo	Taggia	Seregno	Milano	San Giovanni Ilarione	San Bonifacio
7	Seregno	Milano	Catania	Acireale	Milano	Como	Langhirano	Parma
8	Milano	Lodi	Milano	Seregno	Roma	Latina	Schio	Tiene
9	Milano	Pavia	Torino	Cirie'	Milano	Pavia	Zocca	Modena
10	Latina	Roma	Ischia	Forio	Busto Arsizio	Milano	Fondo	Cles

Of course this evidence is a consequence of the demographic dimension of the LLMA.

For this reason, it seems interesting to remove the influence of the demographic dimension of both the LLMA of origin and destination, using weighted indicators through a gravitational model-based approach<sup>3</sup>. Considering this indicator the results completely change: different trajectories are pointed out for Italians and foreigners. For the Italians many Southern LLMA are listed in the first ranks; in the case of the foreigners none of the Southern LLMA is included in the first ten trajectories; the most relevant origin-destination pairs are constituted by North-eastern LLMA. Another im-

<sup>3</sup> Each change of residence within the origin-destination matrix among local labour market areas was recalculated according to this formula:

$$\overline{T}_{SLLx-SLLy} = \frac{T_{SLLx-SLLy}}{\sqrt{P_{SLLx} * P_{SLLy}}} * 100.000$$

$\overline{T}_{SLLx-SLLy}$  weighted average transfers, for the period 2006-2007, between LLMA x and LLMA y assuming a same population equal to 100,000 inhabitants in both LLMA;

$T_{SLLx-SLLy}$  effective average transfers for the period 2006-2007, between LLMA x and LLMA y.

$P_{SLLx}$  average population, for the period 2006-2007, of the LLMA x

$P_{SLLy}$  average population, for the period 2006-2007, of the LLMA y

Unlike in the gravitation model, it does not consider in the weighting process the distance, since in this analysis it will be used in a next step to highlight the different types of movements.

portant difference raises using weighted values is that the big cities, for the Italians, play a very important role while, for the foreigners, they disappear from the first ten trajectories.

## 2. Main results

It is possible to gather synthetically the existence of migratory networks on the territory, and overcome the “two by two” viewpoint of the origin-destination matrix. The social network analysis (SNA) representations (graphs) are particularly useful to visualize the existence of specific types of networks linked with the different socio-economic characteristics of the different territories. SNA develops a number of indicators that focus on the relationships between the nodes considering for example the number of direct relations a node has with other nodes in the network, the centrality of the node in the network, the distance between nodes.

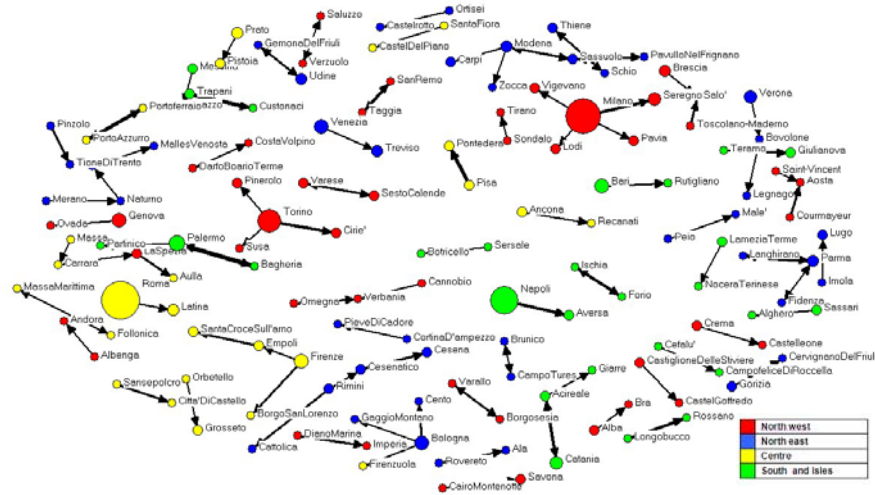
Other studies applied these techniques to migration flows data (Maier G., Vyborny M., 2005); for the Italian case the analyses are recently carried out (Istat, 2007; Istat, 2008).

Considering the internal mobility of Italians the plot of the networks shows some important aspects.

To make it easier to understand, only the main movements -based on threshold weighted values- are represented.

Focusing on Italian population, the individuated networks involve few nodes and mainly short-distance flows all over the country. Big cities play the role of sending nodes (Figure 1).

**Figure 1** - Networks of Italian population changes of residence between Italian Local labour market areas – Average 2006-2007 (weighted values) (a)



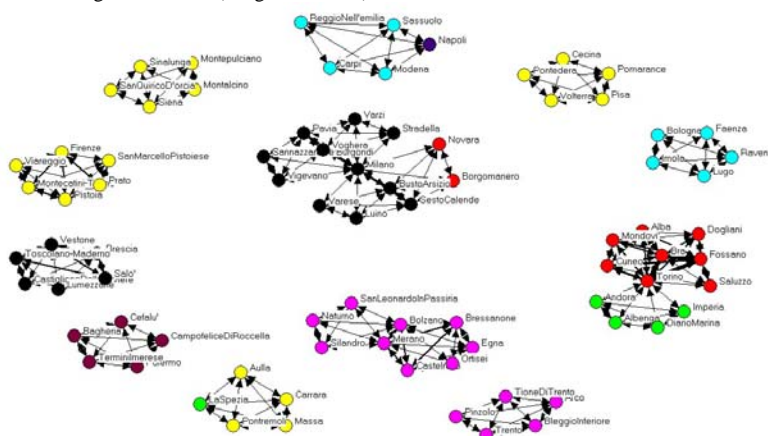
Source: Istat data

(a): In the graph are represented only the pairs that register a weighted value over 250.

In order to individuate cohesive subgroups, sub-sets of a network in which the actors are more closely and intensely tied to one another than they are to other members of the network, it is useful to carry out a cliques analysis<sup>4</sup>.

The analysis individuates 24 cliques. Some of these cliques share one or more nodes, so it is possible to gather the single cliques in 12 networks (Figure 2). Generally the nodes (cliques) grouped in a network belong to the same region or to near territories. Only in one case, it is possible to find a node of the South (Naples) in the same clique with nodes of the North-west (Reggio nell'Emilia, Sassuolo, Carpi, Modena).

**Figure 2** - Cliques of Italian population changes of residence between Italian Local labour market areas – Average 2006-2007 (weighted values)



Source: Istat data

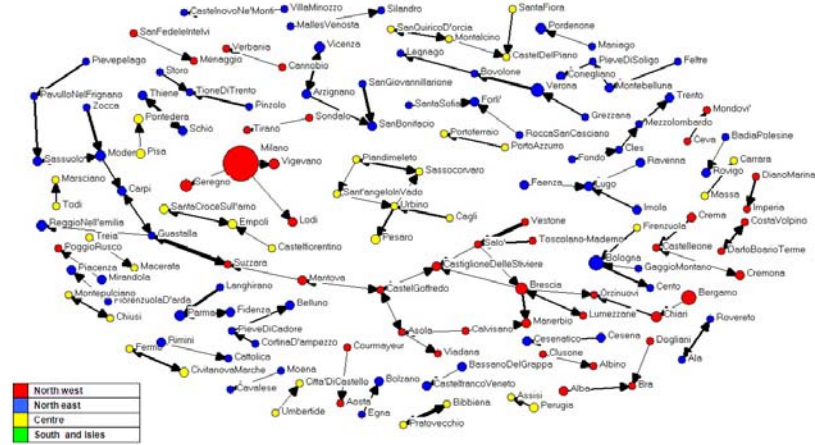
The first evidence, considering the networks of foreign population, is that in this case, the role of big cities (with the exception of Milan) seems less relevant than for the Italians' networks (Figure 3). The South of the country is completely excluded from the graph, whereas the North appears particularly dynamic.

Considering the foreign population movements, 17 cliques are individuated. It is possible to gather these cliques in 8 networks (Figure 4). The richest is the one constituted by nodes belonging to Emilia-Romagna, Lombardy and Tuscany.

The other networks collect nodes belonging to the same region: Veneto (two networks), Umbria (one network), Marche (two networks), Trentino-Alto Adige (one network), Veneto (one network), Lombardy (one network).

<sup>4</sup> To analyze the cliques it is necessary to dichotomize and symmetrize the matrix. In the case of Italians value 1 has been attributed to the cells with weighted values over 25. It has been decided to take into account only cliques that gather at least 5 LLMAs. In the case of foreigners value 1 is attributed if the weighted values is over 15. Only cliques formed by at least 4 nodes have been considered. The used softwares are Ucinet 6.0 and Netdraw (Borgatti, Everett, Freeman, 2002).

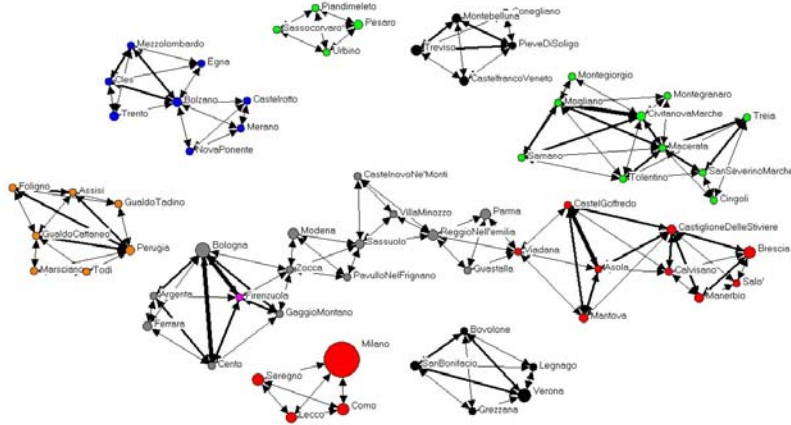
**Figure 3** - Networks of foreign population changes of residence between Italian Local labour market areas – Average 2006-2007 (weighted values) (a)



Source: Istat data

(a): In the graph are represented only the pairs that register a weighted value over 65.

**Figure 4** - Cliques of foreign population changes of residence between Italian Local labour market areas – Average 2006-2007 (weighted values)



Source: Istat data

Among the measures that it is possible to calculate, one of the most interesting for our analysis is centrality<sup>5</sup> (Table 3) (Cordaz, 2005).

**Table 3** – Centrality measures of Italian and foreign populations changes of residence between Local labour market areas – Average 2006-2007 (weighted values) (a)

<b>Indicators</b>	<b>Italians (weighted value &gt;=1)</b>	<b>Italians (weighted value &gt;= 25)</b>	<b>Foreigners (weighted value &gt;=1)</b>	<b>Foreigners (weighted value &gt;= 15)</b>
Out-degree (maximum)	374	31	109	10
In-degree (maximum)	345	14	92	9
Out-degree (centralization)	70.2	6.1	20.4	1.7
In-degree (centralization)	63.6	2.2	16.6	1.5

Source: Istat data

Dichotomizing the matrix<sup>6</sup> Italians show both the highest out-degree (largest number of destination nodes) and in-degree (larger number of sending nodes) and values of centralization greater than Foreigners. If we consider higher weighted values for dichotomize the matrix, obviously the results change; in any case Italians show higher in and out-degree statistics values.

## Conclusions

The absolute values of the changes of residence are influenced by the demographic dimension of origin and destination territories. Therefore, using the absolute values in order to analyze the internal mobility, the LLMA of the big cities result the most important nodes (especially as territories of origin) both for Italians and foreigners. If weighted values are calculated the situation changes and it is possible to individuate different and specific trajectories for Italians and foreigners. In the last case, smaller LLMA also appear as important territories of leaving and arrival.

A more complete picture of the trajectories followed by the Italians and foreigners is given by the use of network analysis. This technique makes it possible to draw systems of LLMA that have relations, in terms of migrations, among them. Also in this case substantial differences between Italian and foreign population are underlined. Even if the foreigners' demographic behaviours have become progressively similar to the Italians ones, the migration choices seem still very different for the two populations.

The next step of the project will be to carry out different analysis for short and long distance mobility (over 300 kilometres).

<sup>5</sup> The network degree centralization measure is  $S(c_{max} - c(v_i))$  divided by the maximum value possible, where  $c(v_i)$  is the degree centrality of vertex  $v_i$ .

<sup>6</sup> In the first case Value 1 is attributed to all cells presenting a weighted value equal or over 1. In the second case Value 1 is attributed to all cells presenting a weighted value equal or over 25 for Italians and equal or over 15 for Foreigners.

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