The importance of spatial adjustment processes in the labour force: the case of Albania

Federico Benassi and Marco Boeri and Pranvera Elezi and Donatella Zindato

Italian National Institute of Statistics, Health Preference Assessment Group, Albanian Institute of Statistics

October 2016

The importance of spatial adjustment processes in the labour force: the case of Albania

Federico Benassi
Italian National Institute of Statistics (Istat), Rome, Italy
E-mail: benassi@istat.it

Marco Boeri
Health Preference Assessment Group, RTI Health Solutions, Research Triangle Park, NC (USA); UKCRC Centre of Excellence for Public Health (NI), Gibson Institute, Queen's University Belfast, (UK)
E-mail: mboeri@rti.org

Pranvera Elezi
Albanian Institute of Statistics (INSTAT), Tirana, Albania
E-mail: pelezi@instat.gov.al

Donatella Zindato
Italian National Institute of Statistics (Istat), Rome, Italy
E-mail: zindato@istat.it

Using census data on work commuting in Albania – collected for the first time in 2011 – this study examines the spatial adjustment processes between demand and supply of labour across the country. The first part focuses on the spatial adjustment of labour forces that occur within and between Albanian's prefectures. Several statistical indicators, derived using origin-destination matrices, measure the differential levels of attraction and expulsion of each prefecture. Results show a high level of heterogeneity and emphasise the crucial role of spatial contiguity among prefectures on this spatial dynamic. The second part examines the role of the municipality of Tirana. This is first investigated within a three-territorial-units system (the municipality of Tirana, rest of the prefecture and rest of Albania) and then within the prefecture as a closed system. Interestingly, 71.5% of all the commuting flows directed to the Municipality originate from municipalities located very close to Tirana (less than 10 km). We conclude that the spatial structure of the prefecture, reasonably extendable to the whole country, can be defined as monocentric. Further studies should focus on the implied costs of this system to the society and environment of Albania.

Keywords:
work commuting,
census data,
territorial imbalances,
spatial adjustments,
Albania

Introduction

The last decade has witnessed a growing interest in modelling and understanding commuting behaviour, (Eliasson et al. 2003, Schwanen et al. 2004, Frost 2006, Krakutovski–Armoogum 2007, Champion 2009) and the derived urban spatial structure (e.g. monocentric vs. polycentric city models; Bertaud 2003, Knox–McCarthy 2005, Romein 2005, Ding 2007). Particular interest has been devoted to the relationship between rural and urban areas (Champion 2009). Upon analysing census-based data for residents travelling to work, both Champion (2009) and Hincks (2012), suggested that a simple urban–rural dichotomy is not enough to describe the phenomenon of regional commuting to work and spatial labour adjustments.

We focus on the role of territorial units at different levels of aggregation[1] and how the process of spatial adjustment between the supply and demand of labour force is realised by employing data from the 2011 Albanian census, which collected information on work commuting for the first time in Albanian history. We are particularly interested in investigating the role of the municipality of Tirana to describe how commuting takes place in Albania and understand whether the spatial structure of Albania is polycentric or monocentric. As argued in several empirical studies (e.g. Camagni et al. 2002) and defined by the European Commission (EU Commission 1999), a monocentric system is a system that does not allow efficient, balanced and sustainable patterns of spatial development. In particular, the growth of the daily population of the centre (e.g. Tirana) could have negative repercussions in terms of spatial saturation, traffic and air pollution with a decrease in the quality of life of the population that permanently resides in this municipality. The role of the municipality of Tirana is crucial in terms of both attraction and repulsion of work-commuting flows. Finally, the focus on commuting within Albania borders is novel as most of the literature discussing Albanian labour force problems and productivity tackles the issue of focusing on migration rather than commuting (Instat 2014, Lerch 2014).

The methodology used to answer our research question belongs to the macro approaches: a class of approaches focused on territorial units in which spatial interactions are considered as the response to territorial discrepancies between needs (labour force demand) and opportunities (labour force supply) under a cost function (Bottai–Barsotti 2006). In this framework, the labour-force commuting network becomes an effective indicator of the relative economic potential of each territorial unit and its position in relation to the two components of labour market (demand and supply). The distribution of economic activities on a given territory takes place in

[1] The study has been conducted at three different territorial levels of analysis. In the first level, there were 12 territorial units (prefectures); in the second, there were three territorial units (municipality of Tirana, the rest of the Tiranë prefecture, and the rest of Albania); and in the third, there were 29 territorial units (the municipalities of the prefecture of Tiranë). For more details about the territorial level of analysis, see next session.

accordance to the functioning of the economic system. Therefore, the economic space can be defined as a distribution system of production and consumption, and mobility can be interpreted as a response to this economic space as a process in which the worker is both a productive factor and a consumer (Bottai–Barsotti 2006).

Given its mobility, each worker can offer his or her working capacity at different points in space. Such mobility can be achieved either by commuting between the residence and work (on a daily, weekly or monthly basis), by moving the residence or, in some cases, moving both the residence and workplace (Termote 1975, Clark et al. 2003). Commuting from home to the workplace can be considered an adjustment of the sphere of production, as it is a relocation of an individual – a production factor – due to the different territorial distribution of other production factors (Gottdiener 1987). Obviously, changes in the place of usual residence are not merely an adjustment to the domain of production activities, as they also occur for extra-economic reasons (e.g. marriage or improvements in social and housing conditions), as pointed out by several empirical studies (Dieleman 2001, Kim et al. 2005, Feijten et al. 2008). However, changes of residence modify, occasionally even to a great extent, the territorial distribution of labour supply. These changes are prone to become a source of uncertainty and instability (Courgeau–Lelièvre 2006). This study's contribution to the national and international literature is that it is one of the first studies on work commuting in Albania, a country in transition, in which the territorial reorganisation and processes of urbanisation are particularly significant.

In the reminder of the paper, the next section describes the data used and the territorial level of analysis. The following section is devoted to the explication of the analytical framework of reference and the model adopted. The results are presented and discussed in the last two sections. The final section also draws conclusions, discusses the limitations of the study and highlights avenues for future research.

Data used and the territorial level of analysis

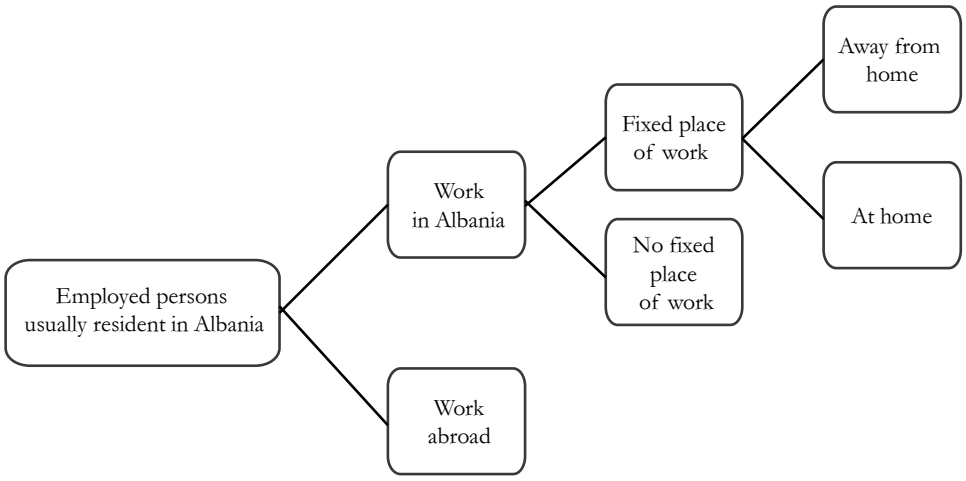
Data

The study is based on the outcomes of the 2011 Population and Housing Census data of Albania, which, for the first time, devoted some questions to the issue of commuting from home to work. Namely, the census collects the following information on commuting for all currently (at the time of the census) employed persons: type of place of work, geographic location of the place of work, mode of transport to work and frequency of travelling from home to work. Information on the workplace location is collected mainly to link it to the place of usual residence in order to establish accurate commuter flows from the place of usual residence to the place of work. In fact, breaking down the currently employed population usually residing in Albania by type of workplace enables us to distinguish employed persons working in Albania from those working abroad and classify the former by

distinguishing those working at home from those working at a fixed place outside their home and those with no fixed place of work (Figure 1).[2]

Figure 1

Logical scheme of the aggregate of employed persons usually resident in Albania in function of the variable 'place of work'



Source: Author's own elaborations.

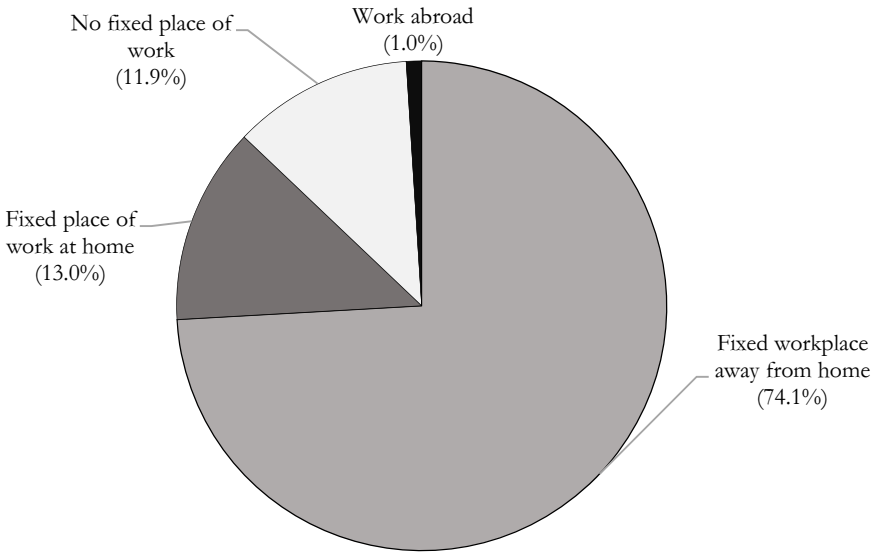
In detail, the category 'Fixed place of work, away from home' includes all employed persons usually resident in Albania that work in a place not coincident with their home. This category comprises persons who do not have a fixed place of work but report to a fixed address at the beginning of their work period (e.g. bus driver), as well as operators of street market stalls that are not removed at the end of the workday. The category 'Fixed place of work, at home', includes all employed persons usually resident in Albania that work at home. 'Home-based workers' refers to persons such as farmers who work and live on their farms and self-employed persons operating shops inside their own home. Finally, the category 'No fixed place of work', includes all employed persons usually resident in Albania whose work involves travelling to different areas and who do not report daily to a fixed address (e.g. travelling salesmen and long-distance lorry drivers), as well as ambulant vendors and operators of street/market stalls that are removed at the end of the workday and construction workers working at different sites during the reference period (Instat 2014a).

[2] The wording of the question on the place of work was 'Where is your place of work? 1) In Albania 2) Abroad'. Those answering 'In Albania' had to choose among the following three options: 1. 'Fixed workplace, away from home', 2. 'Work mainly at home', and 3. 'No fixed place of work'. In case of a fixed workplace away from home, the name of the town/village and code of the prefecture had to be specified. In case the place of work is abroad, the country had to be specified (Instat 2014a).

In the last Albanian census, the total number of employed persons was almost 680,000, excluding 2.8% of the records that could not be classified by place of work due to inconsistent answers. The percentage distribution of employed persons usually resident in Albania by type of workplace is reported in Figure 2.

Figure 2

Percentage distribution of employed persons usually resident in Albania by type of workplace



Source: Author's own elaboration of the 2011 Albanian Census data.

Generally, work commuters are all employed persons who have fixed workplace outside of home, although the destination of the journey from home to work may vary from being within the same town/village of the usual residence to a different country. In this broad sense, three out of four employed persons in Albania may be defined as work commuters. This category includes both workers having fixed a workplace outside home in Albania and those working abroad (Figure 1). Indeed, a small percentage of commuters are individuals who travel on a regular basis across the border to a neighbouring country (1.0% of the overall employed population). If three-quarters of the employed persons may be defined as work commuters (in the above-mentioned broad sense), the remaining quarter is composed almost equally of home-based workers (13.0% of the overall employed population) and workers with no fixed workplace (11.9% of the overall population; Instat 2014a).

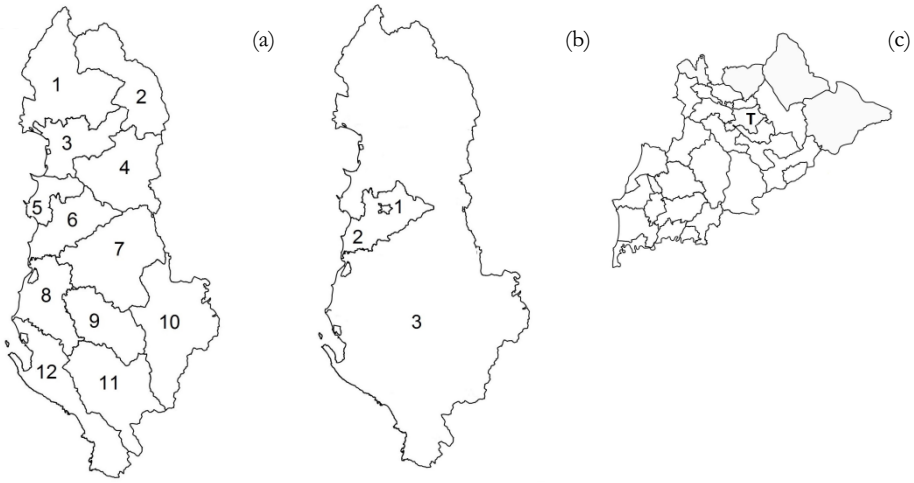
As better defined in the next section, our analysis is focused, at different territorial levels of analysis, on persons who have a fixed place of work away from home (the so-called inner work commuters).

Territorial level of analysis

The issue of selecting the territorial level for studying commuting patterns is crucial, as the results will be directly related to the territorial cut adopted in the analysis. Indeed, the bigger the geographical scale at which we observe work commuting flows, the smaller their volume. For this reason, we start from the highest territorial disaggregation (prefectures) and then gradually decrease the geographical scale and focus on Tirana.

Figure 3

The territorial levels of analysis. Albanian's prefecture (a); municipality of Tirana, rest of the prefecture of Tiranë and rest of Albania (b); and the municipality of Tirana and other municipalities of the same prefecture (c)



Legend (a)
1 Shkodër 2 Kukës 3 Lezhë
4 Dibër 5 Durrës 6 Tiranë
7 Elbasan 8 Fier 9 Berat
10 Korçë 11 Gijrokastër
12 Vlorë

Legend (b)
1 Municipality of Tirana
2 Rest of prefecture of Tiranë
3 Rest of Albania

Legend (c)
T Municipality of Tirana

Source: Author's own elaborations.

In detail, in the first part of the study, we analyse the processes of spatial adjustment of the labour force supply/demand with reference to the highest territorial level of the administrative subdivision – the 12 prefectures (Qarke) that constitutes Albania (Figure 3a). In the second section of the study, we focus our analysis on the role of the municipality of Tirana in the process of spatial adjustment observed in the first part of the study. To do so, we reconstruct the spatial interrelations system that reciprocally links three territorial units: the municipality of Tirana, the rest of the

prefecture of Tiranë and the rest of Albania (Figure 3b). In the final part of the study, to better understand the role played by Tirana in its surrounding areas, we consider the spatial interactions within the prefecture of Tiranë amongst the various municipalities that belong to the same prefectures. With this territorial cut, we can observe the role played by the municipality of Tirana inside its prefecture as well as the role of others municipalities belonging to the same prefecture (Figure 3c).

Analytical framework of reference and mathematical notations

The different spatial-interaction approaches can be split into two large classes at the macro or micro levels. At the macro level, attention is focused on territorial units (e.g. region and municipalities), while at the micro level, the units of observation are the individuals. The macro approaches comprise gravitational models, while micro approaches are based on behavioural models (Bottai–Barsotti 2006). In the macroanalyses, spatial interactions among territorial units of a given economic system are envisioned as the response to locational disequilibria between needs (demand) and opportunities (supply) under a cost function (distance), whereas in the microanalyses, it is the individual's probability of movement that determines the volume of flows (Bottai–Barsotti 2006). As underlined in Bottai and Barsotti (2006), the choice of approach is often conditioned on the availability of data. The greatest diffusion of macro approaches is probably due to the amount of information supplied by official statistics, notably the censuses. In contrast, micro approaches most often need *ad hoc* sample surveys.

The approach applied in this contribution is a macro one. The proposed model of analysis is based on the use of origin-destination matrices, implementing several types of statistical indicators that allow us to measure different dimensions for each territorial unit under observation (i.e. local labour market): degree of self-containment, attraction and repulsions capacity, degree of openness and closure in relation to spatial interactions and contribution (in terms of labour supply/demand) to other local labour markets[3].

To describe our theoretical model, it is necessary to formally define the aggregates of reference and then explain the logic behind the use of origin-destination matrices. Let W^T be the total employed persons usually resident in Albania (in 2011). Taking into account the variable 'place of work', we can define W^T as the sum of four aggregates:

$$W^T = W^{IC} + W^H + W^A + W^{NF} \quad (1)$$

[3] This type of approach has been used in several empirical studies on work commuting and regional economic analysis, see Termote (1975), Barsotti (1986) among others. In particular, the statistical indicators applied here are partially based upon the work of Barsotti (1986).

where W^{IC} represents workers with a fixed place of work away from home (in Albania), the so called inner work commuters, W^{H} represents workers with a fixed place of work at home (in Albania), W^{A} represents workers residing in Albania but working abroad (the so-called abroad work commuters) and W^{NF} is the total number of workers in Albania with no fixed place of work. Let M_t^{IC} be an origin-destination square matrix of order *n* (number of spatial units in a given spatial system) of the inner work commuters (W^{IC}) at time *t*. In M_t^{IC}, each element (w_{ij}^{IC}) represents the inner work commuters who resides in spatial unit *i* at time *t* and commute to spatial unit *j*.

$$M_t^{IC} = \begin{bmatrix} w_{11}^{IC} & w_{12}^{IC} & \dots & W_{i.}^{IC} \\ w_{21}^{IC} & w_{22}^{IC} & \dots & \vdots \\ \vdots & \vdots & \ddots & \vdots \\ W_{.j}^{IC} & \dots & \dots & W^{IC} \end{bmatrix} \quad (2)$$

Note M_t^{IC} that is a square matrix because *i=j* and it varies from 1 to *n*. We can, therefore, define W^{IC} in terms of the mathematical elements that constitute M_t^{IC}. Thus, this can be presented formally as follows:

$$W^{IC} = \sum_{i=1}^{n} W_{i.}^{IC} = \sum_{j=1}^{n} W_{.j}^{IC} = \sum_{i=1}^{n} \sum_{j=1}^{n} w_{ij}^{IC} \quad (3)$$

where $W_{i.}^{IC} = \sum_{j=1}^{n} w_{ij}^{IC}$ represents the total number of inner work commuters residing in *i* and working in Albania (i.e. the supply of labour of economic system *i*); $W_{.j}^{IC} = \sum_{i=1}^{n} w_{ij}^{IC}$ represents the total number of inner work commuters working in *j* and residing in Albania (i.e. the demand of labour of economic system *j*); w_{ij}^{IC} represents the inner work commuters who reside in territorial unit *i* and work in territorial unit *j* (i.e. the quota of supply of labour of economic system *i* absorbed by the demand of economic system *j*); w_{ji}^{IC} represents the inner work commuters who reside in territorial unit *j* and work in territorial unit *i* (i.e. the quota of supply of labour of economic system *j* absorbed by the demand of economic system *i*); w_{ii}^{IC} represents the inner work commuters who reside in territorial unit *i* and work in the same unit (i.e. the diagonal of M_t^{IC}); and *i* and *j* are, respectively, the spatial units of residence (place of residence) and spatial units of work (place of work) at time *t*.

Note that, in our case, the number of spatial units is equal to 12 in the first part of the analysis (12 Albanian's prefectures), 3 in the second part (municipality of Tirana, rest of prefecture of Tiranë and rest of Albania) and 29 in the final part (29 municipalities that form the prefecture of Tiranë).

Moreover, it should be noted that, since the phenomenon of spatial adjustment between supply and demand of labour is analysed through the distribution of inner work commuters (W^{IC}), as enumerated by the 2011 Census by place of residence (*i*) and place of work (*j*), the aggregate 'supply of labour' referred to a territorial unit

includes only the inner work commuters living in *i* who work in *i* or in a *j* area located outside. Therefore, the following area excluded or underestimated: both implicit components (informal employment or underemployment), the unemployed (individuals without work and seeking employment), individuals who work at home (W^H), individuals who work abroad (W^A) and, finally, individuals who do not have a fixed place of work (W^{NF}). Thus, due to the nature of the data, labour supply is not defined as the currently active population (generally synonymous with the labour force) but only as the employed and, more precisely, as the explicit (declared) component of the employed that belong to aggregate W^{IC}.

On the other hand, the aggregate 'labour demand', which comprises all the units that belong to W^{IC} working in *j*, regardless of their place of usual residence (as typically some are usually resident in *j* and others in *i*), ignores or underestimated the part of the demand that is not satisfied due to inadequacy of labour supply as well as the part satisfied by informal employment. Furthermore, 'labour demand' excludes those from *j* who work at home in *j* (W^H) and, by definition, W^A and W^{NF}.

Results

Processes of spatial adjustment at the prefecture level

Before focusing on the results obtained from the indicators, it is important to better understand the spatial structure of the Albanian economy and job market. Albania is an economy in transition, characterised by significant regional disparities in terms of demographic and socio-economic characteristics. The Albanian territory is largely composed of mountains and hills, determining a very low proportion of urban population, with the exception of the expanding urban areas of Tiranë and Durrës. These two prefectures are linked by commuters travelling for work from one to the other, almost creating a single urban area (Benassi et al. 2015). Indeed, these are the only two prefectures with the population density exceeding 200 people per km^2, which is very high compared to the average of 100 people per km^2 (Instat 2015). On the other hand, the lowest population density is found in the most peripheral areas of the country: typically in the north east, particularly in the prefecture of Kukës, and in the southwest, where the prefecture of Gjirokastër has the lowest demographic density of the country, with as little as 25 people per km^2. The Albanian economy is still based mainly on intense agricultural production – sheep and goat farming – and exploitation of mineral resources. The industry, although affected by a technological gap and limited territorial expansion, has obtained good results in recent years, in line with what is expected of a developing country in transition. Furthermore, in recent years, several Italian enterprises have relocated some of their services (mainly remote

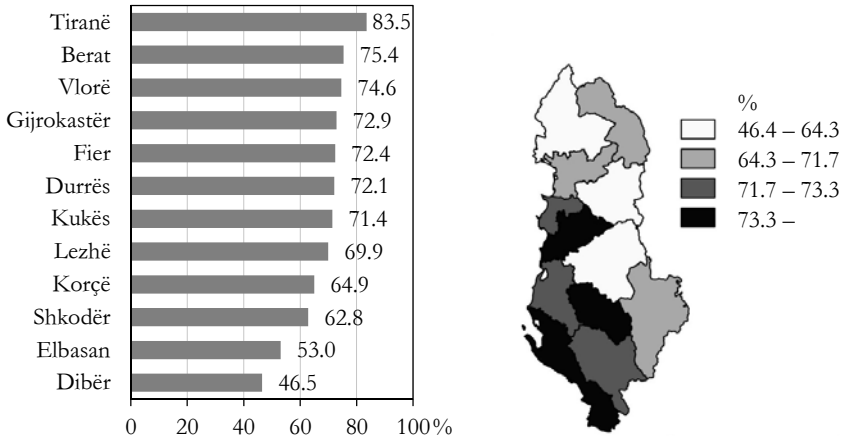
customer services such as call centres) to Albania. Finally, the economy is starting to record growing tourism, mainly to the coastal regions and the seaside. Within this general framework, there are some specific territorial differences to be noticed. According to data in the Albanian Regional Statistics Yearbook (Instat 2015), in 2011, about 35% of the total employment in the public administration sector occurred in the prefecture of Tiranë, emphasising the importance of this prefecture in the Albanian socio-economic structure. This figure becomes even more important when compared to the second prefecture, Elbasan, which has barely 8.5% of the total employment in the administration. Looking at the structure of employment, it is interesting to notice that in 2011, approximately half (48.5%) of those employed in the non-agricultural sector were located in the prefecture of Tiranë, followed by Durrës (12.3%) and Vlorë (7.0%). These figures are very low for other highly agricultural territories such as Kukës (0.8%), Dibër (1.4%) and Gijrokastër (2.5%). On the other hand, as reported in Instat (2015), the share of people employed in the private agricultural sector is comparatively high in the territories of Fier (15.2%), Elbasan (14.9%) and Korçë (11.0%).

Finally, looking at active companies and their growth rates, it is possible to notice the difference in economic dynamism across the country. According to Instat (2015), in 2011, the highest proportion of active companies was in Tiranë (43.4%), followed by that in Durrës (11.6%) and Fier (8.6%). In the same year, territories with the highest rate of new enterprises were Vlorë (14.3%), Shkodër (12.8%) and Tiranë (12.7%). Finally, significant regional variations are detected as a function of the distribution of active enterprises by sector of economic activity. Starting from the primary sector, the highest proportion of active companies is in the prefecture of Vlorë (22.8%), followed by that of Durrës (14.6%) and Shkodër (13.5%). In the secondary sector, the highest proportion of active enterprises is registered in the prefecture of Tiranë (34.9%), followed by that of Durrës (12.9%) and Vlorë (9.7%). Finally, in the tertiary sector, the highest proportion of active enterprises is recorded in the prefectures of Tiranë and Durrës (39.9% and 11.6%, respectively) and Fier (9.0%).

The different spatial structure of Albanian local labour markets (in terms of supply and demand) is highlighted in Figure 4. Here, we notice for each prefecture *i*, the percentage proportion of inner work commuters of the total of those employed by prefecture of residence. As we can see, the prefectures that present comparatively higher values of this indicator are located in the more urbanised areas of the country on the Central-West and Southern-West parts, namely Berat, Tiranë and Vlorë. On the other hand, the prefectures located in the Northern and Eastern part of the country – namely Shkodër, Dibër and Elbasan – register lower percentages of inner work commuters of the total of those employed.

Figure 4

Proportion of inner work commuters every 100 employed persons, Albanian prefectures



Source: Author's own elaboration on the 2011 Albanian Census data.

We now analyse the inner work commuters (W^{IC}) and the sub aggregates ($W_{i.}^{IC}$ and $W_{.j}^{IC}$) in which they can be decomposed. To do this, we used several simple statistical indicators that we explain in detail in the remaining of this section and the next.

At the prefecture level, the labour force supply (demand) not coincident accounts to 19,762 units. This is the number of employed who work in a different prefecture from the one where they usually reside, and it accounts for 4.1% of the inner work commuters (W^{IC}). This means that, at this territorial level of analysis, the process of spatial adjustment of supply-demand between the Albanian prefectures concerns 41 working units for every 1,000 inner work commuters.

Further exploring the process at the prefecture level, for each of the 12 territorial units, we computed an indicator related to the distribution of the work supply (employed) of the Albanian prefectures according to the origin of the demand. This statistical indicator, which shows the proportion of labour supply absorbed by domestic demand, allow us to detect, for each prefecture, the level of self-containment[4] of the spatial interactions due to work reasons. The indicator ($LSADD_i^{IC}$) is calculated as follows:

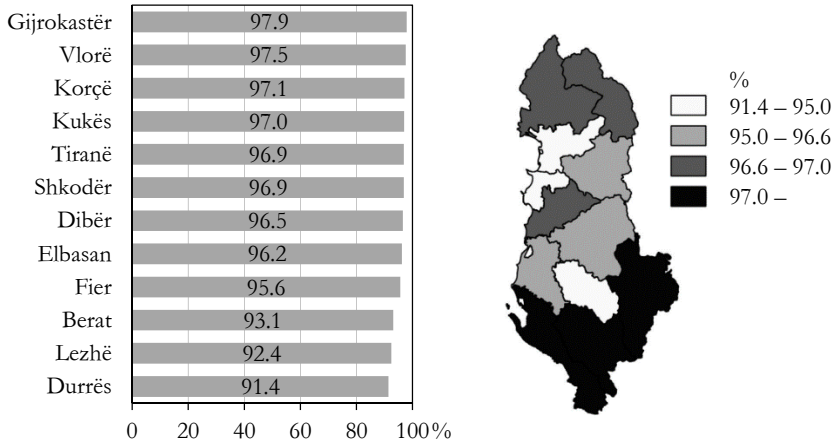
$$LSADD_i^{IC} = w_{ii}^{IC} / W_{i.}^{IC} \qquad (4)$$

[4] With the term 'self-containment', we refer to the capacity of a given local labour system to contain the majority of spatial interaction due to work reasons inside its geographical boundaries.

Looking at the distribution of the indicator in Figure 5, it is noticeable how the value is comparatively lower in the prefectures of Durrës (91.4%), Lezhë (92.4%) and Berat (93.1%). This means that, in these prefectures, the degree of evasion from the supply side, namely the part of labour supply satisfied by extra-prefecture demand, is comparatively high. It is therefore possible to conclude that the labour market in these prefectures is essentially opened. In the remaining nine prefectures, where the value registered by the indicator exceeds 95%, the opposite is true: the labour market is essentially closed because the part of the job offer absorbed by domestic demand is high.

Figure 5

Distribution of the proportion of labour supply absorbed by domestic demand ($LSADD_i^{IC}$). Albanian prefectures



Source: Author's own elaboration on the 2011 Albanian Census data.

The next step to accurately evaluate the degree of opening/closure of the labour market should also consider, simultaneously, the share of demand 'outstanding' from local supply, which is the proportion of demand satisfied by external or extra-areal supply. However, when referring to prefectures, such a measure can only be calculated with regard to the supply-demand relation that develops with other Albanian prefectures (as we consider the overall labour market, namely at the national level, closed). According to Barsotti (1986), one way to measure the degree of opening/closure of each Albanian prefecture, taking into account both part of the supply processed and share of demand outstanding, is to calculate the weighted arithmetic averages of the share of supply absorbed by extra-prefecture demand and that of the demand satisfied by the extra-prefecture supply, taking into account as weights the prefecture consistency of supply ($W_{i.}^{IC}$) and demand ($W_{.j}^{IC}$), respectively.

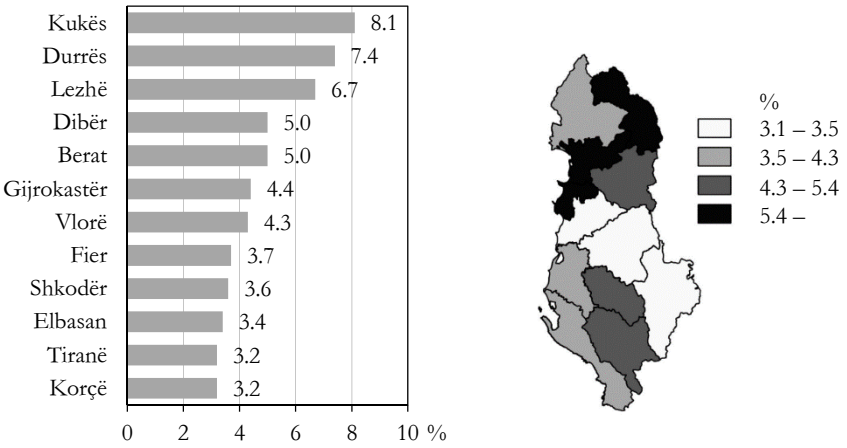
More formally, for each prefecture, the degree of opening/closing (D_i^{IC}) in relation to inner work commuting flows is computed as follows:

$$D_i^{IC} = W_{.j}^{IC} + W_{i.}^{IC} - 2w_{ii}^{IC} / W_{.j}^{IC} + W_{i.}^{IC} \qquad (5)$$

The distribution of this indicator is shown in Figure 6. The prefectures of Kukës (8.1%), Durrës (7.4%) and Lezhë (6.7%) record a less high rate of 'closure' (in these prefectures, the index value of opening/closure is higher: >5.0%). On the contrary, the remaining prefectures – in particular Shkodër, 3.6%, Elbasan, 3.4%, Tiranë, 3.2% and Korçë, 3.2% – record, despite a different gradation, more high rates of 'closure' as the value of the index is comparatively low.

Figure 6

Distribution of the degree of opening/closing (D_i^{IC}) in relation to inner work commuting flows, Albanian prefectures



Source: Author's own elaboration on the 2011 Albanian Census data.

In the next series of results, we further examine the relationship between supply and demand at the level of prefectures to verify whether they are characterised, with reference to W^{IC}, by a surplus of demand over supply ($W_{.j}^{IC} > W_{i.}^{IC}$) or vice-versa ($W_{.j}^{IC} < W_{i.}^{IC}$). To achieve this, following the approach of Barsotti (1986), we have computed five measures for each prefecture. The first indicator represents the extra-areal component of the demand (EAD_i^{IC}) and is computed as follows:

$$EAD_i^{IC} = W_{.j}^{IC} - w_{ii}^{IC} \qquad (6)$$

The second indicator represents the extra-areal component of the supply (EAS_i^{IC}) and is computed as follows:

$$EAS_i^{IC} = W_{i.}^{IC} - w_{ii}^{IC} \qquad (7)$$

The third indicator represents the surplus of demand over supply (SDS_i^{IC}) and is computed as follows:

$$SDS_i^{IC} = (W_{.j}^{IC} - w_{ii}^{IC}) - (W_{i.}^{IC} - w_{ii}^{IC}) \quad (8)$$

However, as evaluating the phenomenon in only absolute terms can be limiting, we have calculated two additional relative indexes. The first, $READ_i^{IC}$, is obtained by dividing the excess of demand over supply of each prefecture by the demand of the same prefecture as follows:

$$READ_i^{IC} = (W_{.j}^{IC} - W_{i.}^{IC}) / W_{.j}^{IC} \quad (9)$$

The second ($READ_i^{IC*}$) is obtained by comparing, in case of positive excess, the surplus of demand over supply of each prefecture to the extra-areal component of the demand and, in case of negative excess, to the extra-areal component of the supply. The formula is as follows:

$$READ_i^{IC*} = \begin{cases} (W_{.j}^{IC} - W_{i.}^{IC}) / (W_{.j}^{IC} - w_{ii}^{IC}) \ if \ (W_{.j}^{IC} - W_{i.}^{IC} > 0) \\ (W_{.j}^{IC} - W_{i.}^{IC}) / (W_{i.}^{IC} - w_{ii}^{IC}) \ if \ (W_{.j}^{IC} - W_{i.}^{IC} < 0) \end{cases} \quad (10)$$

Results are presented in Table 1 and show an excess of labour force demand for seven out of 12 prefectures. It is possible to observe values of some relevance for the prefecture of Vlorë (+1,209), followed by that of Kukës (+807), Gijrokastër (+654) and Tiranë (+288). Among the areas in which there is an excess of demand over supply, Kukës stands out for a comparatively high value: more than 8% of its demand would remain unsatisfied even in the event that the whole supply of the area (the total employed residents in the prefecture of Kukës) worked within the same area. The opposite surplus is geographically less widespread and affect the remaining five areas, amongst which stand out the prefectures of Berat (–1,292), Durrës (–1,073) and Fier (–854). The ratio between the excess of demand over supply and demand is also comparatively high in the prefectures of Gijrokastër (4.0%), Vlorë (3.3%) and Dibër (1.7%). Moreover, an excess of supply is observed for the prefecture of Berat, as 4% of its supply would remain unabsorbed if the demand of the area were to be fully satisfied by indigenous workers (employed residents in the same area).

Table 1

Extra-areal component of the demand (EAD_i^{IC}), extra-areal component of the supply (EAS_i^{IC}) and excess of demand over supply (SDS_i^{IC}). Indices (%) of relative surplus: ($READ_i^{IC}$) and ($READ_i^{IC*}$)

Prefectures	(EAD_i^{IC})	(EAS_i^{IC})	(SDS_i^{IC})	$(READ_i^{IC})$	$(READ_i^{IC*})$
Berat	876	2,168	–1,292	–3.9	59.6
Dibër	796	419	377	1.7	47.4
Durrës	2,646	3,719	–1,073	–2.2	28.9
Elbasan	1,187	1,453	-266	–0.5	8.3
Fier	1,764	2,618	–854	–1.2	32.6
Gjirokastër	948	294	654	4.0	69.0
Korçë	1,227	1,015	212	0.5	17.3
Kukës	1,026	219	807	8.4	78.7
Lezhë	738	996	–258	–1.6	25.9
Shkodër	938	742	196	0.6	20.9
Tiranë	5,610	5,322	288	0.2	5.1
Vlorë	2,006	797	1,209	3.3	60.3

Source: Author's own elaboration on the 2011 Albanian Census data.

The role of the municipality of Tirana in the processes of spatial adjustment

In this section, we evaluate the role of the municipality of Tirana in the process of the spatial adjustment observed above. To do so, we reconstruct the spatial interrelations system that reciprocally links three territorial units: the municipality of Tirana, rest of the prefecture of Tiranë and rest of Albania (Figure 3). In the 2011 Census, the municipality of Tirana recorded the usually resident population of 418,495, which is equal to almost 56% of the total usually resident population in the prefecture of Tiranë (749,365 units). This fact is linked to the urbanisation phenomenon – a process that concerns almost all the countries of the world but assumes particular importance in the less developed and transition countries such as Albania (Henderson 2002). In this study we do not want to analyse this type of phenomenon; however, there is strong evidence for a relationship between urban growth, migratory movement (spatial redistribution of population) and commuting (Pumain 2006).

Table 2 presents results from the analysis, in reference to the aggregate (W^{IC}), of the supply distribution by the origin of work demand. It is possible to appreciate that the municipality of Tirana presents a high capacity of self-containment of its workforce that commutes. Of the inner work commuters residing in the municipality

of Tirana, 96.5% work in the same municipality. The situation changes if we refer to the inner work commuters that reside in the rest of the prefecture of Tiranë; in this case, almost 60% work in the municipality of Tirana, 37% in the rest of the prefecture of Tiranë and 5% in the rest of Albania. Referring to those who reside in the rest of Albania, we notice that 1.2% work in the municipality of Tirana, almost 1% in the rest of the prefecture of Tiranë and 98.1% in the rest of Albania. Considering the total number of employed (inner work commuters) of Albania, we can see that almost 32% work in the municipality of Tirana, 4.4% in the rest of the prefecture of Tiranë and almost 64% in the rest of Albania.

Table 2

Work supply ($W_{i.}^{IC}$) broken down by the origin of demand. Municipality of Tirana, rest of the prefecture of Tiranë and rest of Albania (percentage values)

Origin (place of residence, *i*)	Destination (place of work, *j*)			
	Municipality of Tirana	Rest of the prefecture of Tiranë	Rest of Albania	Albania
Municipality of Tirana	96.5	0.9	2.6	100
Rest of the prefecture of Tiranë	58.0	37.0	5.0	100
Rest of Albania	1.2	0.7	98.1	100
Albania	31.7	4.4	63.9	100

Source: Author's own elaboration on the 2011 Albanian Census data.

Table 3 presents, with reference to the aggregate W^{IC}, the distribution of the demand by the origin of the supply. The share of the inner work commuters that work and reside in the municipality of Tirana is 79.2%; it is 18.5% for those that work in the municipality of Tirana but reside in the rest of the prefecture of Tiranë, while it is 2.3% for those who reside in the rest of Albania. In the rest of the prefecture of Tiranë, the proportions are, respectively, 5.1%, 85.2% and 9.7%. Finally, referring to the total inner work commuters that reside in Albania, we can see that 26.0% work in the municipality of Tirana, 10.1% in the rest of the prefecture of Tiranë and 63.9% in the rest of Albania. From these analyses, it is clear that the role of attraction played by the municipality of Tirana in the Albanian labour market is of primary importance. It is also clear that such a role implies great costs in terms of spatial saturation, mobility, environment and pollution. We will come back to this point in the final part of the paper.

Table 3

Work demand ($W_{.j}^{IC}$) broken down by the origin of demand. Municipality of Tirana, rest of the prefecture of Tiranë and rest of Albania (percentage values)

Origin (place of residence, *i*)	Destination (place of work, *j*)			
	Municipality of Tirana	Rest of the prefecture of Tiranë	Rest of Albania	Albania
Municipality of Tirana	79.2	5.1	1.1	26.0
Rest of the prefecture of Tiranë	18.5	85.2	0.8	10.1
Rest of Albania	2.3	9.7	98.1	63.9
Albania	100	100	100	100

Source: Author's own elaboration on the 2011 Albanian Census data.

To better understand the role played by Tirana, we consider the spatial interactions within the prefecture of Tiranë amongst the various municipalities that belong to the same prefecture. In other words, we want to observe the role played by the municipality of Tirana inside its prefecture as well as the role of other municipalities belonging to the same prefecture. We, therefore, consider the prefecture of Tiranë as a closed system. Starting from the origin (place of residence, *i*) destination (place of work, *j*) square matrix (M_t^{IC}) computed in reference to W^{IC}, we have calculated three ratios. The first one is the inflow ratio (r_j^I) that represents, for a generic location (*j*), the proportion of inflow on the total flow volume of the same generic location (in this case, the municipality of the prefecture of Tiranë). The inflow ratio has been computed as follows:

$$r_j^I = (W_{.j}^{IC} - w_{ii}^{IC}) / (W_{.j}^{IC} - w_{ii}^{IC}) + (W_{i.}^{IC} - w_{ii}^{IC}) \quad (11)$$

The second ratio is the outflow ratio r_i^O that represents, for a generic location (*i*), the proportion of daily outflow on the total daily flow volume of the same generic location (in this case, the municipality of the prefecture of Tiranë). The outflow ratio has been computed as follows:

$$r_i^O = (W_{i.}^{IC} - w_{ii}^{IC}) / (W_{.j}^{IC} - w_{ii}^{IC}) + (W_{i.}^{IC} - w_{ii}^{IC}) \quad (12)$$

The third ratio is the net flow ratio (r_i^N) that represents, for a generic location (*i*), the net proportion of the inflow and outflow compared to the total flow volume of the same generic location (in this case, the municipality of the prefecture of Tirana). The net flow ratio has been computed as follows:

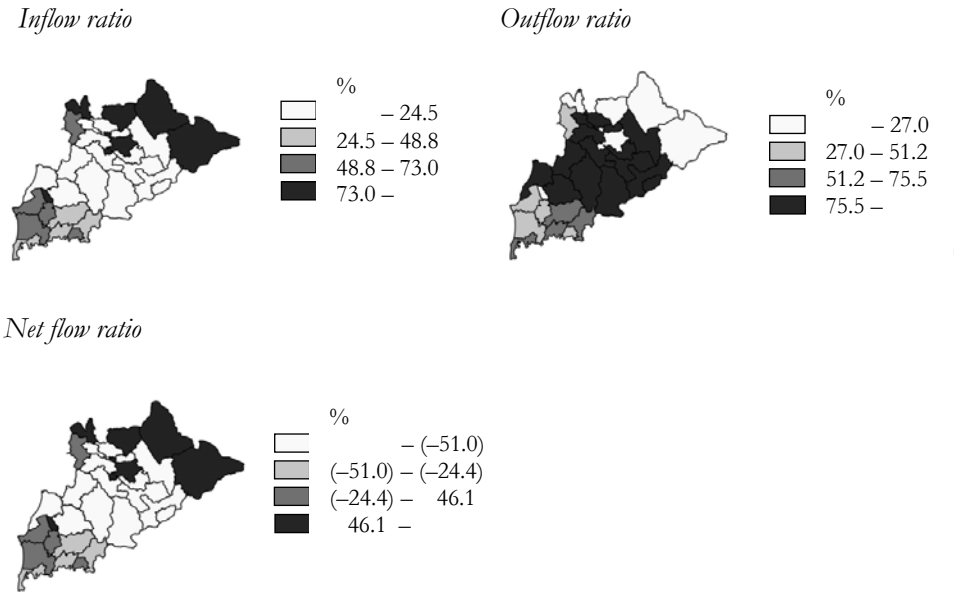
$$r_i^N = (W_{.j}^{IC} - w_{ii}^{IC}) - (W_{i.}^{IC} - w_{ii}^{IC}) / (W_{.j}^{IC} - w_{ii}^{IC}) + (W_{i.}^{IC} - w_{ii}^{IC}) \quad (13)$$

These three measures are presented in Figure 7 and show that the municipality of Tirana attracts inner work commuters mainly from its surrounding areas, especially from municipalities that are spatially contiguous. This dynamic is coherent with the theoretical frameworks in which a core-periphery model is elaborated: people migrate from the core municipality to the surrounding areas and then start to commute to the core municipality and, at the same time, other people migrate from other municipalities, located quite far from the core municipality, to municipalities located in the surrounding area of the core municipality and then start to commute to the core municipality (Termote 1975, Bottai–Barsotti 2007).

Obviously these dynamics, which are 'classic', especially in countries such as Albania where the distance from the municipality of residence (*i*) and municipality of work (*j*) plays a crucial role because the system of transportation is not well developed, imply a lot of risks and costs that are typically connected to a monocentric system.

Figure 7

Municipalities of the prefecture of Tiranë.
Inflow ratio, outflow ratio and net flow ratio.



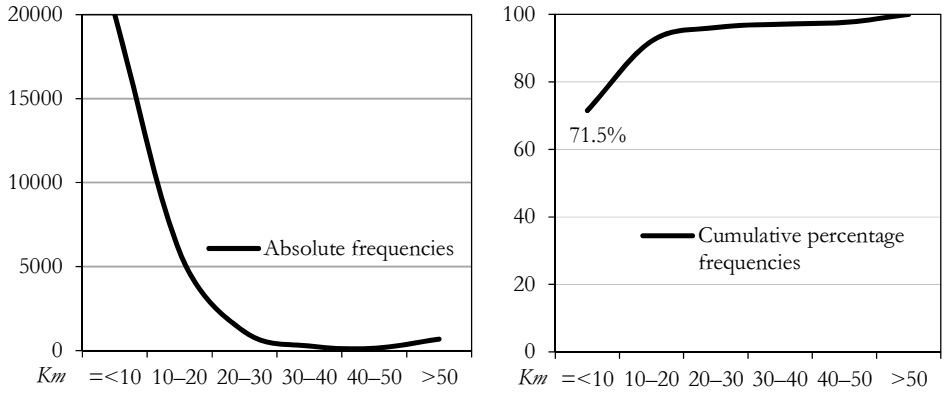
Source: Author's own elaboration on the 2011 Albanian Census data.

Figure 8, in which commuting flows from all the Albanian municipalities are taken into account, reinforces the power of attraction played by the municipality of Tirana. This power of attraction significantly decreases as the distance increases.

In fact, 71.5% of all the commuting flows directed to the municipality of Tirana originated from municipalities that are located very near to Tirana (=<10 km). The weighted distance mean is in fact equal to 11.3 km, whereas the modal distance is 8.3 km.

Figure 8

Distance and commuting inflow. Municipality of Tirana



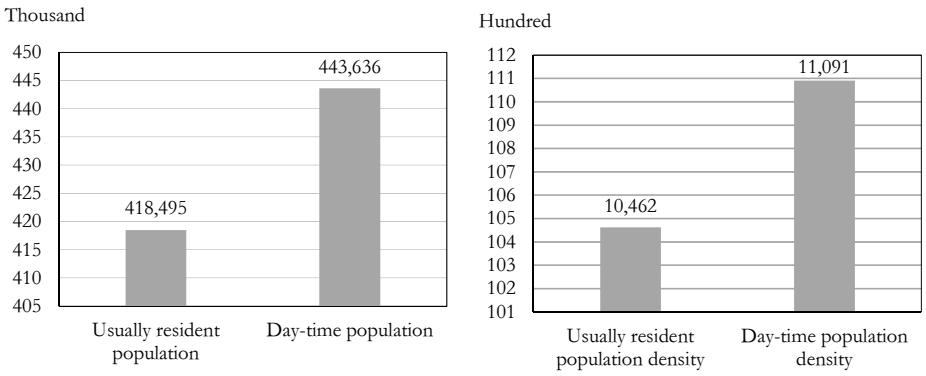
Source: Author's own elaboration on the 2011 Albanian Census data.

The effects of these dynamics are very important in order to better understand the costs of an urban system that qualifies itself as monocentric. The difference between inflow and outflow $(W_{.j}^{IC} - w_{ii}^{IC}) - (W_{i.}^{IC} - w_{ii}^{IC})$, for the municipality of Tirana is positive and equal to +27,076. Even when considering only the daily commuting flows, the difference remains positive (+25,141).

This means that every day the population of Tirana grows from 418,495 units to 443,636 units (+6.0%). Obviously, the population density also increases: the resident population density of the municipality of Tirana, usually equal to 10,462.37 persons per km^2, becomes 11,090.9 persons per km^2 during working day-time (Figure 9).

Figure 9

Municipality of Tirana. Usually resident population and daytime population and usually resident population density and daytime population density



Source: Author's own elaboration on the 2011 Albanian Census data.

Considering the daytime population, the municipality of Tirana represents more than 20% of the total Albanian usually resident population. These data allow us to define the spatial structure of Albania as monocentric; a spatial structure that implies costs for the society and environment (Berry–Kim 1993). European policies have recognised that polycentric configurations in regions and countries can be intended as a means to achieve multiple goals, namely more efficient, balanced and sustainable patterns of spatial development (EU Commission 1999). This is why polycentric development and polycentric spatial structures in regions and countries have become an important analytical concept, as well as a popular normative goal of spatial planning (Camagni 1993, Bailey–Turok 2001, Kloosterman–Musterd 2001, Cattan 2007). The importance of polycentric development has also been stressed in academic debates. Several authors have studied the emergence of polycentric spatial structures and their implications on economies and physical systems (Priemus 1994, Lambooy 1998, Davoudi 2003 Parr 2004, Meijers 2008). Polycentrism is also included in the 'policy aims' identified by the European commission (EU Commission 1999) as a means to be used towards sustainable development of the European Union territory.

Discussion and conclusions

This study is one of the first study on work commuting in Albania and shows how each territorial unit – at different territorial levels of analysis – contributes to the process of spatial adjustment of labour force supply/demand in Albania. Within this framework, the role played by the municipality of Tirana is crucial in terms of both attraction and repulsion of work commuting flows. The daily population of the municipality of Tirana grows significantly due to a positive net between daily inflow and outflow, which defines the spatial structure of Albania as monocentric. This allows us to elaborate on some considerations about the costs naturally implied by a monocentric system. A monocentric system, as argued in several empirical studies and defined by the European Commission, is a system that does not allow efficient, balanced and sustainable patterns of spatial development. In particular, the growth of the daily population of Tirana could have negative repercussion in terms of spatial saturation, traffic and air pollution and a decrease in the quality of life of the population that resides in this municipality. In order to become an effective member of the European Union, territorial planners and policy makers should concentrate on this point, facilitating the development of a polycentric system that could contribute to diminish these negative externalities that traditionally characterise transition countries.

REFERENCES

BAILEY, N.–TUROK, I. (2001): Central Scotland as a polycentric urban region: useful planning concept or chimera? *Urban Studies* 38 (4): 697–715.

BARSOTTI. O. (1986): *Trasformazioni demografiche, mobilità spaziale e offerta di Lavoro* Franco Angeli, Milano.

BENASSI, F.–DEVA, M.–ZINDATO, D. (2015): Graph regionalization with clustering and partitioning: an application for daily commuting flows in Albania *Regional Statistics* 5 (1): 25-43.

BERRY, B. J. L.–KIM, H. M. (1993): Challenges to the Monocentric Model *Geographical Analysis* 25 (1): 1–4.

BERTAUD, A. (2003): *The Spatial Organization of Cities: Deliberate Outcome or Unforeseen Consequence?* World Development Report 2003: Dynamic Development in a Sustainable World, World Bank. Washington.

BOTTAI, M.–BARSOTTI, O. (2006): Daily travel: approaches and models In: CASELLI, G.–VALLIN, J.–WUNSCH, G. L. (eds.) *Demography* Analysis and Synthesis pp. 361–372., Elsevier Academic Press, Burlington.

CAMAGNI, R. (1993): Interfirm industrial networks: the costs and benefits of cooperative behaviour *Journal of Industry Studies* 1 (1): 1–15.

CAMAGNI, R.–GIBELLI, M. C.–RIGAMONTI, P. (2002): Urban Mobility and Urban Form: the Social and Environmental Costs of Different Patterns of Urban Expansion *Ecological Economics* 40 (2): 199–216.

CATTAN, N. (2007): *Cities and Networks in Europe. A Critical Approach of Polycentrism* John Libbery Eurotext, Montrouge.

CHAMPION, T. (2009): Urban–Rural Differences in Commuting in England: A Challenge to the Rural Sustainability Agenda? *Planning Practice & Research* 24 (2): 161–183.

CLARK, W. A. V.–HUANG, Y.–WITHERS, S. (2003): Does commuting distance matter? Commuting tolerance and residential change *Regional Sciences and Urban Economics* 33 (2): 199–221.

COURGEAU, D.–LELIÈVRE, E. (2006): Individual and social motivation for migration In: CASELLI, G.–VALLIN, J.–WUNSCH, G. L. (eds.), *Demography* Analysis and Synthesis pp. 345–357., Elsevier Academic Press, Burlington.

DAVOUIDI, S. (2003): Polycentricism in European Spatial Planning: From Analytical Tool to a Normative Agenda *European Planning Studies* 11 (8): 979–999.

DIELEMAN, F. M. (2001): Modelling residential mobility; a review of recent trends in research *Journal of Housing and the Built Environment* 16 (3): 249–265.

DING, C. (2007): *Urban Spatial Planning: Theory, Method and Practice* Higher Education Press, Beijing.

ELIASSON, K–LINDGREN, U.–WESTERLUND, O. (2003): Geographical Labour Mobility: Migration or Commuting? *Regional Studies* 37 (8): 827–837.

EU COMMISSION (1999) : *European Spatial Development Perspective* Office for Official Publications of the European Communities, Luxemburg.

FEIJTEN, P.–HOOMEIJER, P.–MULDER, C. H. (2008): Residential Experience and Residential Environment Choice over the Life Course *Urban Studies* 45 (1): 141–162.

FROST, M. (2006): *The Structure of Commuting Flows in Rural England: An Initial Report* Birkbeck University of London, London.
GOTTDIENER, M. (1987): Space as a force of production: contribution to the debate on realism, capitalism and space *International Journal of Urban and Regional Research* 11 (3): 405–416.
HENDERSON, V. (2002): Urbanization in developing countries *World Bank Res. Obs.* 17 (1): 89–112.
HINCKS, S. (2012): Daily Interaction of Housing and Labour Markets in North West England *Regional Studies* 46 (1): 83–104.
INSTAT (2014a): *Migration in Albania* Instat, Tirana.
INSTAT (2014b): *Commuting from Home to Work* Instat, Tirana.
INSTAT (2015): *Regional Statistics Yearbook* Instat, Tirana.
KIM, J. H.–PAGLIARA, F.–PRESTON, J. (2005): The Intention to Move and Residential Location Choice Behaviour *Urban Studies* 42 (9): 1621–1636.
KLOOSTERMAN, R. C.–MUSTERD, S. (2001): The polycentric urban region: towards a research agenda *Urban Studies* 38 (4): 623–633.
KNOX, P. L.–MCCARTHY, L. M. (2005): *Urbanization: An Introduction to Urban Geography* Englewood Cliffs, Prentice Hall.
KRAKUTOVSKI, Z.–ARMOOGUM, J. (2007): Daily mobility of the inhabitants of Lille up to 2030 *Population* 62 (4): 759–787.
LAMBOOY, J. G. (1998): Polynucleation and Economic Development: the Randstad *European Planning Studies* 6 (4): 457–466.
LERCH, M. (2014): The role of migration in urban transition: a demonstration from Albania *Demography* 51 (4): 1527–1550.
MEIJERS, E. (2008): Measuring Polycentricity and its Premises *European Planning Studies* 16 (9): 1313–1323.
PARR, J. (2004): The Polycentric Urban Region: A Closer Inspection *Regional Studies* 38 (3): 231–240.
PRIEMUS, H. (1994): Planning the Randstad: Between Economic Growth and Sustainability *Urban Studies* 31 (3): 509–534.
PUMAIN, D. (2006): The urbanization process In: CASELLI, G.–VALLIN, J.–WUNSCH, G. L. (eds.) *Demography* Analysis and Synthesis pp. 318–332, Elsevier Academic Press, Burlington.
ROMEIN, A. (2005): *The Contribution of Leisure and Entertainment to the Evolving Polycentric Urban Network on Regional Scale: Towards a New Research Agenda* The 45th Congress of the European Regional Science Association, 23–27 August 2005, Free University Amsterdam, Netherlands.
SCHWANEN, T.–DIELEMAN, F. M.–DIJST, M. (2004): The Impact of Metropolitan Structure on Commute Behaviour in the Netherlands: A Multilevel Approach *Growth and Change* 35 (3): 304–333.
TERMOTE, M. (1975): The measurement of commuting In: GOLDSTEIN, S.–SLY, D. (eds.) *The measurement of urbanization and projection of urban population* pp. 211–224. International Union for the Scientific Study of Population, Liege.