



HAL
open science

Analyzing the Distribution of Population-Based Employment in France

Jean-Christophe Dissart, Francis Aubert, Denis Lépiciér

► **To cite this version:**

Jean-Christophe Dissart, Francis Aubert, Denis Lépiciér. Analyzing the Distribution of Population-Based Employment in France. *Regional Studies*, 2011, 46 (9), pp.1. 10.1080/00343404.2011.559218 . hal-00694720

HAL Id: hal-00694720

<https://hal.science/hal-00694720>

Submitted on 6 May 2012

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



**Analyzing the Distribution of Population-Based Employment
in France**

Journal:	<i>Regional Studies</i>
Manuscript ID:	CRES-2009-0307.R2
Manuscript Type:	Main Section
JEL codes:	R12 - Size and Spatial Distributions of Regional Economic Activity < R1 - General Regional Economics < R - Urban, Rural, and Regional Economics, R15 - Econometric and Input-Output Models Other Models < R1 - General Regional Economics < R - Urban, Rural, and Regional Economics
Keywords:	population-based economy, services, tourism, location factors, France

SCHOLARONE™
Manuscripts

Cris: note that the authors provided the French abstract

Analyzing the Distribution of Population-Based Employment in France¹

Jean-Christophe DISSART*, Francis AUBERT† and Denis LÉPICIER‡

*Cemagref Grenoble (UR DTM), 2 rue de la Papeterie, BP 76, 38402 Saint-Martin-d'Hères
Cedex, France. Email: jean-christophe.dissart@cemagref.fr

†INRA-Agrosup (UMR CESAER), 26 bd Docteur Petitjean, BP 87999, 21079 Dijon Cedex,
France. Emails: francis.aubert@enesad.inra.fr and denis.lepicier@enesad.inra.fr

(Received October 2009; in revised form January 2011)

1
2
3
4
5
6 Abstract: The objective of this paper is to analyze the spatial distribution of employment in
7
8 population-based services across metropolitan France. The population-based economy
9
10 comprises services that satisfy the demand of both the permanent (residing) and temporary
11
12 (tourists and day travelers) population. Using spatial regression and shift-share analysis at the
13
14 functional economic area scale, several categories of location factors are studied: market
15
16 potential, the propensity to consume locally as well as local attractiveness and access to
17
18 facilities. Results identify structural and geographic factors related to local demand and show
19
20 that the distribution of employment follows an urban-rural gradient except in periurban and
21
22 tourism areas.
23
24
25
26
27
28

29
30 Keywords: population-based economy; services; tourism; location factors; France
31
32
33
34
35

36
37 Titre: Analyser la distribution de l'emploi résidentiel en France
38
39
40

41
42 Résumé: L'objectif de cet article est d'analyser la distribution spatiale de l'emploi dans les
43
44 services à la population en France métropolitaine. L'économie résidentielle regroupe des
45
46 services qui satisfont la demande d'une population à la fois permanente (résidente) et
47
48 temporaire (touristes et excursionnistes). Plusieurs types de facteurs de localisation sont
49
50 étudiés, au niveau des bassins de vie, à l'aide de la régression spatiale et de l'analyse
51
52 structurelle-géographique : potentiel de marché, propension à consommer localement ainsi
53
54 qu'attractivité locale et accès aux équipements. Les résultats identifient des facteurs structurels
55
56 et géographiques liés à la demande locale et montrent que la distribution de l'emploi suit un
57
58 gradient urbain-rural sauf dans les espaces périurbains et touristiques.
59
60

Mots clés: économie résidentielle; services; tourisme; facteurs de localisation; France

JEL classifications: R12, R15

INTRODUCTION AND LITERATURE REVIEW

The increasing weight of the tertiary sector in the national economy has ambiguous economic geography impacts. On the one hand, the development of services to businesses tends to reinforce the concentration of production activities; on the other hand, the development of services to households tends to distribute those services as close as possible to the population. Since the European population is increasingly locating outside major cities and employment centers, taking account of the population-based economy is becoming a critical issue in terms of regional development and territorial cohesion (CEC, 2008). In addition to this counterurbanisation flow that favors periurban areas, there is a demographic surge in more remote areas, which results from people's increasing interest for the environment and attractive residential settings and consequently augments the demand for population-based services.

More specifically, from a regional economics perspective, the increasing share of services in the economy tends to result in a spatial homogenization of location mechanisms at the European scale (DIACT, 2009). Services tend to spread spatially (HOUDEBINE, 1999; MIDELFART-KNARVIK et al., 2000), or at least they do not contribute to the concentration of activities (GAULIER, 2003). However the location of services varies by service type and particularly with respect to tradability and knowledge intensity. Indeed, financial services and

1
2
3 services to businesses are more sensitive to agglomeration and spatial concentration, whereas
4
5 retail trade and transportation services are more scattered (JENNEQUIN, 2008).
6
7

8 In location theory, economic activities are spatially dependent upon both economies of
9
10 scale (agglomeration) and transportation costs (accessibility). The former increase
11
12 agglomeration effects all the more that differentiation limits competition and externalities
13
14 further increasing returns. The latter tend to increase dispersion, especially if population
15
16 density is low and production activities use fixed assets. Economic geography's formal
17
18 framework addresses regional effects of farming and manufacturing activity dynamics, and
19
20 underlines the dominant character of dispersion forces for the former and agglomeration
21
22 forces for the latter. As such, the location of tertiary activities is seldom directly addressed,
23
24 but may be explained by distinguishing two categories of tertiary goods: firm- or household-
25
26 related.
27
28
29
30

31 First, services to firms may be considered intermediate goods that are used by
32
33 manufacturing activities. Their location is related to the industrial sector's by upstream
34
35 relationships (VENABLES, 1996). Consequently, business service firms reinforce the
36
37 cumulative process that tends to concentrate activities in central places (JENNEQUIN, 2005).
38
39 Second, because they are little tradable, the location of services to households follows the
40
41 distribution of demand, and consumers of population-based services are mostly located in
42
43 their region of residence. Consequently, from a location theory perspective, such services are
44
45 part of spatial structures that depend upon household location, i.e. consumers. Conversely, the
46
47 distribution of households conditions market potential, which contributes to the concentration
48
49 of services (though households bear transportation costs).
50
51
52
53

54 In addition, both observation and economic analysis of migration underline the
55
56 sensitivity of households to environmental and amenity factors in their residential location
57
58 decision making process (McGRANAHAN, 2008). Though the geographic concentration of
59
60

1
2
3 employment in cities tends to remain stable or even increase, households tend to choose
4 residential locations that are increasingly distinct and away from employment centers, thus
5 contributing to urban sprawl. Such dynamics are significant in North American and European
6 rural areas. Reducing the household transportation constraint increases location possibilities
7 to satisfy a preference for a non-urban living environment (even for the active workforce with
8 a job located in the urban center). The role of amenities, i.e. factors that are fixed and not tied
9 to production activity but to residential attractiveness, is thereby strengthened, and localized
10 demand becomes a household dispersion factor.
11
12
13
14
15
16
17
18
19
20
21

22 The disconnection between place of residence and place of work results in daily
23 commutes for the employed workforce, thus underlining the trip function of households
24 whose microeconomic basis is given by consumer theory applied to trip decisions
25 (NIEDERCORN and BECHDOLT, 1969). Consumers seek to maximize the utility function
26 of their trips. For a given origin, the utility of trips to a potential destination increases as a
27 function of foreseeable contacts. Consequently, consumption behavior for population-based
28 services is related to both the geographic distribution of services and commuting behavior
29 with respect to, among others, place of work or recreation activities. Multiple-destination trips
30 then become a critical factor for grouping services in some places, thus yielding gravitational
31 phenomena. Consequently, in a given area, the agglomerated population plays a critical role
32 in the location of population-based services. These services follow the spatial distribution of
33 related expenditures, whether made by the local or the outside population. This relation holds
34 for market services but is probably more complex for public or highly administered services.
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

1
2
3 Overall, this paper has two objectives: to present the spatial distribution of population-
4 based services across metropolitan France, and to explain their distribution by household
5 localized demand. The geography of such services is not well known and methodologically
6 tricky due to scarce data and lack of common statistical conventions. In this paper,
7 population-based services are defined as non tradable, tertiary final goods that satisfy
8 household localized demand.² Following location theory, which emphasizes market potential
9 and propensity to consume locally as explanatory dimensions, this paper combines market
10 area analysis and territorial analysis to understand distribution patterns of population-based
11 employment in both urban and more outlying areas. Using spatial regression and shift-share
12 techniques, the analysis is done at the Functional Economic Area (FEA, bassin de vie) scale,
13 which takes into account both household location at the municipality scale and commuting
14 patterns. Therefore, the distribution of population-based services is a function of local
15 potential demand, be it permanent or temporary; tourist (temporary) demand is assumed to
16 complement resident (permanent) demand.
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35

36 The paper is organized as follows. Data and methods are detailed in the next section.
37 Section 3 presents employment density results in both population-based services and tourism
38 services at the FEA scale. The explanatory power of local demand variables is also assessed,
39 and regional differences in the location of population-based services are further analyzed. The
40 conclusion sums up the main results and confirms the critical role of agglomeration factors
41 but also underlines the dispersing role of fixed assets (which impact tourism destinations) and
42 government decisions (which impact the provision of specific services).
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

DATA AND METHODS

Units of analysis and spatial typologies

The geographic scale of analysis for the study is the Functional Economic Area (FEA). FEAs have been used in several European research contexts, including Sweden (KARLSSON and OLSSON, 2006), the Netherlands (CÖRVERS et al., 2009), and France (SCHMITT et al., 2006). Here an FEA (bassin de vie) is the smallest region in which the (permanent) resident population has access to both jobs and the facilities it needs for everyday life (INSEE, 2003). Such facilities comprise four categories: 1) market facilities (e.g. retail stores, banks), 2) non-market facilities (e.g. police, retirement homes, post office, sports facilities), 3) health facilities (e.g. physicians, nurses, hospitals), and 4) education facilities (e.g. primary, high schools). There are 1,916 such sub-regional areas that cover metropolitan France, the majority of which (1,745) are structured around small towns with less than 30,000 inhabitants.

The analysis uses two spatial classification systems: ZAUER and tourism zones. The ZAUER (Zonage en Aires Urbaines et aires d'emploi de l'Espace Rural) classification system divides metropolitan France in two major categories: rural-dominant or urban-dominant. The rural-dominant space comprises both small urban units and rural municipalities; the urban-dominant space is further divided into urban poles, periurban rings (all urban area municipalities except the urban pole), and other periurban municipalities (whose residents commute to several urban areas). Based on both job numbers and commuting patterns, the ZAUER classification of municipalities was adapted to fit FEAs (using the main municipality's position in that typology) and define four spatial categories (urban pole, periurban, rural job pole, and other rural FEAs).

On the other hand, tourism zones are defined on the basis of both geographic context (as defined by the tourism industry: coast, mountain, mountain resort, rural or urban) and municipalities' lodging capacity. For instance, a functional economic area is considered part of the "coast" tourism zone if, among all municipalities that make up the FEA, the greatest

1
2
3 lodging capacity is found in municipalities that belong to the "coast" category identified by
4
5 tourism professionals.
6
7
8
9

10 *Defining the scope of population-based services*

11
12 "Population-based services" is not a standard category of economic activity classification
13
14 systems. This set of services is usually associated with the trade and transportation sectors to
15
16 make up the tertiary sector, which is further differentiated into market (e.g. retailing, real
17
18 estate, finance) and non-market (e.g. education, health, public administration) services. A
19
20 second classification criterion is between household- and firm-related demand, and the
21
22 literature has tended to focus on the latter (see e.g. HOYLER et al., 2008; SOKOL et al.,
23
24 2008). INSEE's work on FEAs suggests yet another classification of activities: those that
25
26 mainly satisfy the needs of the local population (residential sector) vs. those that contribute to
27
28 the production of goods and services meant for a greater market area than the local market
29
30 (productive sector).
31
32
33
34
35

36
37 In this paper population-based services relate to activities that satisfy the needs of the
38
39 population. Since the distinction between household and firm demand is not systematically
40
41 easy to make, the analysis by DE SEZE and ARMAND (2005) is also used. They calculate
42
43 the coefficient of variation of the density of employment in service activities per inhabitant to
44
45 identify the related final demand. A low coefficient of variation, which means a fairly
46
47 homogenous distribution of employment, is a salient feature of population-based services;
48
49 whereas activities that are not directly related to population density are characterized by high
50
51 coefficient of variation values and are excluded from the analysis. Examples of the latter
52
53 include reinsurance, financial intermediation, film production or labor union activities.
54
55
56

57
58 In conclusion, population-based services comprise final tertiary goods production
59
60 activities, i.e. services that directly satisfy the needs of the population (permanent or

1
2
3 temporary). This definition is restrictive with respect to such production activities as
4
5 construction, energy, or firm-related services (which are excluded from the analysis); but
6
7 inclusive regarding public services, which are overwhelmingly included in the study. Thus,
8
9 population-based services comprise diverse activities and jobs, both in the public and the
10
11 private sectors, both market and non-market in nature, and sensitive to different location
12
13 factors. Therefore, the set of population-based services is broken down into four sub-groups
14
15 that are commonly used as intermediate-level aggregations of activities: 1) retailing; 2)
16
17 market services (hotels, restaurants, transportation, financial and real estate activities,
18
19 recreation activities, personal services); 3) administered services (postal mail and
20
21 telecommunication, education, health and social services, associations); and 4) government
22
23 services. The detailed list of study economic sectors is available from the authors at three
24
25 increasingly disaggregated French classification systems: NES 36, NES 114 and NAF 700.
26
27
28
29
30
31
32
33

34 *Estimating tourism employment*

35
36 As listed by the French Ministry of Tourism and following the NAF 700 nomenclature,
37
38 tourism-sensitive activities include (MDT, INSEE, 2005): lodging (tourism hotels with a
39
40 restaurant [551A], tourism hotels without a restaurant [551C], other hotels [551E], youth
41
42 hostels [552A], campgrounds [552C], and other tourism lodging [552E]); restaurants and
43
44 cafés (traditional restaurants [553A], fast-food restaurants [553B], cafés tabacs [554A], and
45
46 bars [554B]); and other activities (cable cars and ski lifts [602C], travel agencies [633Z],
47
48 beauty salons [930E], spa and thalassotherapy activities [930K], and other body care [930L]).
49
50
51
52

53 Using this definition, there is a risk of overestimation of tourism employment because
54
55 all employment in these 15 sectors is not related to tourism. Indeed, as much as jobs in hotels
56
57 may be considered fully dependent on tourists, jobs in cafes and restaurant also depend upon
58
59 the local population. But there is also a risk of underestimation because this list does not take
60

1
2
3 account of other sectors that are impacted by tourism activity. For example, to some extent
4
5 jobs in retailing are impacted by temporary residents (tourists and day travelers).
6
7

8 In this paper, the estimation of tourism employment using the minimum requirements
9
10 technique (DISSART et al., 2009; ENGLISH et al., 2000; LEATHERMAN and
11
12 MARCOUILLER, 1996) aims at both taking account of all tourism-related activities (in
13
14 addition to the above-listed 15 sectors) and counting tourism-related employment only. This
15
16 approach states that within groups of homogenous regions from a demand perspective, the
17
18 region that presents the minimum number of population-based employment per inhabitant is
19
20 considered satisfying the needs of the permanent resident population only. Then, within this
21
22 group, all population-based job values that are higher than this minimum value are considered
23
24 satisfying the needs of the temporary resident population; it is assumed such demand
25
26 corresponds mostly to tourism and recreation demand. Consequently, applying this method
27
28 requires several steps: creating groups of homogeneous FEAs from a population-based
29
30 demand perspective; calculating the minimum requirements value in each group; and
31
32 estimating tourism employment in each FEA. It is further assumed that tourism employment
33
34 is mostly related to the market service sector, which implies that tourism employment is a
35
36 subset of retailing and market service activities, thereby excluding administered and
37
38 government services.
39
40
41
42
43
44

45 Consistent with explanatory variables of the density of population-based services (see
46
47 below), the typology of functional economic areas is based on market potential and household
48
49 propensity to consume locally, with five clustering criterion variables: 1) income; 2) market
50
51 size; 3) proportion of blue-collar workers and 4) retirees; and 5) commuting. Because of
52
53 measurement unit differences, variables are standardized (mean 0, standard deviation 1) and
54
55 their level of correlation analyzed. The clustering algorithm is a k-means method and the final
56
57 number of clusters is decided using several empirical criteria (R^2 included). Then, as the
58
59
60

1
2
3 minimum value in a given cluster may actually be an outlier and since there is no theoretical
4 justification for using systematically the minimum value (KLOSTERMAN, 1990), the 10th
5 percentile value is used, a choice that also reflects the objective to get a moderate estimation
6 of tourism employment density in functional economic areas.
7
8
9
10
11

12 13 14 15 *Variables of population-based and tourism employment density*

16
17 The dependent variables are, on the one hand, number of jobs in population-based services
18 per 1,000 inhabitants (POP_BASED) and its sub-categories regarding retailing and market
19 services (RET_MKT) and administered and government services (ADM_GOV); and on the
20 other hand, number of jobs in tourism-related services (i.e. in trade and market services as
21 estimated by the minimum requirements technique) per 1,000 inhabitants (TOURISM). The
22 choice of employment density as a dependent variable is critical. Indeed, first, it is assumed
23 location factors of employment in services are better analyzed using a density perspective.
24
25 Second, by choosing employment, availability of data is ensured, thus enabling an analysis of
26 the distribution of services across metropolitan France. Third, numbering jobs does not,
27 however, account for issues of establishment location and labor productivity. Unless
28 otherwise noted, all data are for the year 1999, which corresponds to the latest population
29 census available at the time of this research, and do not distinguish part-time or seasonal jobs
30 from full-time employment.
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47

48 Explanatory variables of population-based employment measure the two dimensions
49 that impact such employment, i.e. market potential and the propensity to consume locally:
50 market size (MKT_SIZE), income (INCOME), consumption structure as estimated by the
51 proportion of blue-collar workers (BLUE_COL) and retirees (dropped because of correlation
52 with INCOME), potential for temporary attendance as proxied by lodging capacity
53
54
55
56
57
58
59
60

(LODG_CAP), and (daily work-residence) commuting (COMMUT_IN, COMMUT_OUT, COMMUTE). Details and descriptive statistics for these variables are found in Table 1.

TABLE 1 HERE

The independent variables assumed to influence the level of tourism employment (TOURISM), hence its distribution across metropolitan France, include potential for temporary attendance (LODG_CAP), fiscal potential, accessibility (ACCESS), population density, nature-based sports facilities, farm and agrifood employment, manufacturing employment, and natural amenities. The fiscal potential variable (FISC_POT) is the sum of local direct taxes (lodging, business, developed land, undeveloped land), each multiplied by its average national rate, then divided by the number of inhabitants; it proxies a capacity for action at the multimunicipal scale to finance public infrastructure. The accessibility variable measures the average distance (in minutes) to the closest urban pole. The population density variable (POP_DEN) is also an indicator of the built environment (because of high correlation with artificial surfaces), of tourism attendance (e.g. man-made heritage, museums), and access to services (fast food, etc.). The sports facilities variable (NAT_SPORT) focuses on nature-based activities (e.g. hiking trail, via ferrata, canyoning) that use local natural resources and are more likely to attract external households than other facilities (e.g. soccer fields) that are more directly related to meeting the needs of the local permanent population. The density of employment in farming and agrifood activities (FARM_AGRIF) reflects a potential positive amenity in terms of landscape maintenance, economic activity support, and more generally rural life; whereas the density of employment in industrial activities (MANUFACT) rather reflects a potential negative amenity because such activities may be negatively perceived in terms of landscape and pollution.

1
2
3 Last, the natural amenity variable (NAT_AMEN) is an index consistent with
4 McGRANAHAN (1999) that uses two climate and two landscape feature variables: 1)
5 proportion of water areas (wetland and water body surfaces divided by total FEA area); 2)
6 topographic variation (difference between the FEA maximum altitude and that of the FEA's
7 main municipality's city hall); 3) warm winter (average January temperature); 4) wet summer
8 (average number of July rainy days); the index is simply the sum of the 4 variables, capped
9 for extreme values and standardized (0, 1). From a tourism perspective, this index is likely to
10 offer an incomplete description of amenities because they cover a wide range of features that
11 simply cannot be all captured by 4 variables that explicitly exclude built attributes. For more
12 complete (but not without limitations) definitions, see DELLER (2010) or MARCOUILLER
13 et al. (2004). In particular, the latter use principal component analysis to combine 43 amenity
14 variables (both natural and facility attributes) into 5 tourism-related (land, river, lake, warm
15 weather and cold weather) dimensions. Nonetheless our analysis controls for a subset of
16 tourism-related built attributes (NAT_SPORT).
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38

39 *Methods*

40
41 Data on FEA features and employment density are used to analyze the location factors of
42 employment in both population-based and tourism-related services. In addition to descriptive
43 statistics, cluster analysis and the minimum requirements technique (to estimate tourism
44 employment density), two statistical methods are used successively.
45
46
47
48
49

50 First, spatial regression is used to identify FEA structural characteristics that impact
51 the density of employment in population-based and tourism services. Indeed, the data used in
52 the analysis are explicitly spatial, so it is not unexpected that the location of an FEA has an
53 effect on population-based employment. In other words, it is likely spatial autocorrelation
54 occurs, which means that classic Ordinary Least Squares (OLS) estimators are unbiased but
55
56
57
58
59
60

inefficient and the estimates of the variance of the estimators are biased, thereby impacting the precision of the estimates and the reliability of hypothesis testing (DUBIN, 1998). Moran's I tests confirmed that all OLS models present statistically significant ($p < 0.01$) spatial autocorrelation so we estimate the following spatial autoregressive model with spatial error dependence (ANSELIN, 1988; LE GALLO, 2002):

$$y = \rho W_1 y + X \beta + \varepsilon; \quad \varepsilon = \lambda W_2 \varepsilon + u; \quad u \approx N(0, \sigma^2 I) \quad (1)$$

where y is the $(N, 1)$ vector of dependent variable observations, ρ is the spatial autoregressive parameter for the dependent variable, W denotes a spatial weight matrix, X is the (N, K) matrix of explanatory variable observations, β is the $(K, 1)$ vector of unknown regression coefficients, ε is the $(N, 1)$ vector of spatially autocorrelated error terms, λ is the spatial autoregressive parameter for the disturbance ε , and u is the $(N, 1)$ vector of identically and independently distributed errors with zero expectation and σ^2 variance (I is the identity matrix).

The models are estimated by Maximum Likelihood (ML) using several spatial weight (contiguity and distance) configurations. Lagrange multiplier tests for ρ and λ are used to check model specification. The specification of tourism regression models excludes the independent variables used for clustering functional economic areas because their effect has already been taken into account to estimate tourism employment.

Second, shift-share analysis is used to identify geographic factors that may be associated with specific regional dynamics. By geographic we mean factors that are independent of FEAs' structural characteristics and may be linked to territorial specificity. The method is based on the following classic equality (BERZEG, 1978; JAYET, 1993):

$$r_j = r + s_j + g_j \quad (2)$$

where r_j is employment density in region j , r is employment density national average, s_j is the structural effect, and g_j is the geographic effect.

1
2
3 Extensions of this model by GASCHET (2002) and GAINÉ et al. (2005) are used to
4
5 test the statistical significance of both structural and geographic effects.
6
7
8
9

10 11 12 RESULTS

13
14
15
16
17
18 This section first presents population-based and tourism-related employment densities across
19
20 French functional economic areas, then econometric and shift-share analysis results regarding
21
22 location factors of the two dependent variables.
23
24
25
26

27 *Employment density in population-based and tourism services*

28
29 As defined in this paper, population-based services comprise a total of 11.5 million jobs
30
31 (11,480,056), i.e. 50% of total employment in 1999 (22,800,731). As compared with other
32
33 activity typologies, this figure is close to INSEE's "residential economy" estimation at the
34
35 FEA scale (12,936,593), and lower than the tertiary employment estimation in the classic
36
37 sectoral breakdown (16,378,354 in addition to primary and secondary sector employment)
38
39 thus confirming the somewhat restrictive scope of this analysis.
40
41
42

43
44 These jobs are mostly located in urban centers (over 75%) that comprise 61% of the
45
46 population, and particularly in the biggest cities (about 2 out of 3 population-based jobs are
47
48 located in urban areas over 200,000 inhabitants except Paris). The Paris urban area itself
49
50 comprises 2.4 million jobs in population-based services, i.e. 20% of national employment in
51
52 this sector (vs. 16% of the population). Then, periurban areas rank second with over 1.2
53
54 million jobs. Rural areas comprise less than 1 out of 6 jobs to meet the needs of less than 20%
55
56 of the population; population-based services are particularly concentrated in rural poles (i.e.
57
58 rural towns and their proximate periphery).
59
60

1
2
3 Among population-based services, administered services (education, health,
4 associations, postal service) represent by far the highest share of jobs (45%). Retailing and
5 market services rank second (43%), followed by government services (1.6 million jobs). The
6 balance between market services at large (i.e. including retailing) and administered and
7 government services is relatively constant across space. Paris is unique because market
8 service jobs are almost as numerous as administered and government jobs. In contrast,
9 administered and government jobs tend to be more important in other urban poles, particularly
10 in small- and medium-sized cities.
11
12
13
14
15
16
17
18
19
20
21

22 At the FEA scale, there is an average of 6,000 population-based jobs in French FEAs,
23 and employment is strongly linearly correlated ($R^2=0.93$) with the number of (permanent)
24 residents. Outside Paris, urban FEAs comprise an average of 20,000 population-based jobs.
25 With an average of 1,935 population-based jobs, rural pole FEAs are very different from
26 periurban FEAs (an average of 1,341 jobs, but with greater variability), though the latter
27 present similar population levels (11-13,000 inhabitants) and exhibit the highest population
28 growth rate (close to 1% per year between 1990 and 1999). However, the growth in
29 population-based salaried employment was strongest in periurban areas over the 1999-2005
30 period (2.22% vs. 1.81% at best in other spatial categories), which may indicate that a
31 convergence process in terms of facilities and services is at work in these areas. With fewer
32 than 800 population-based jobs, other rural FEAs seem very small-sized rural markets.
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47

48 In terms of employment density, on average, the density of population-based services
49 is 150 jobs per 1,000 permanent residents but there is great variation depending on the spatial
50 category of the functional economic area (Table 2). FEAs structured around urban poles
51 feature an average density that is almost twice higher than in periurban municipalities (195
52 and 116 jobs per 1,000 inhabitants, respectively). This gap is even greater for the largest
53 urban areas, as exemplified by Paris with an average density that is 61% higher than the
54
55
56
57
58
59
60

1
2
3 national average. Rural areas exhibit a higher density of population-based services than
4
5 periurban areas (around 150 jobs per 1,000 inhabitants), thus showing their greater ability to
6
7 satisfy the needs of their residing population. Moreover, there is little difference between rural
8
9 poles vs. other rural FEAs.
10
11

12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

TABLE 2 HERE

Figure 1 shows that FEAs with low job densities in population-based services are often close to urban poles; such FEAs are mostly located in the northern part of France, from Brittany to Alsace. Functional economic areas with high job densities (> 250) correspond to urban poles (e.g. Caen, Rennes, Vannes, Dijon, Besançon) and significant tourism areas (the Alps in particular).

FIGURE 1

The estimation of tourism employment using the minimum requirements technique applied to structurally homogeneous clusters of functional economic areas yields a total value of 1,486,794 tourism jobs, i.e. 13% of all population-based service jobs. This estimation is higher than BACCAÏNI et al.'s (2006) -894,500 jobs in 2003- but not inconsistent. Indeed, the latter is based upon more precise data (DADS) but limited to salaried employment, whereas this paper's estimation includes sole proprietorships and uses a different method. INSEE's yearly survey of service firms gives average values for salaried and non-salaried employment in tourism sensitive activities. Using these figures, a ratio of non-salaried to total employment of 21% (in 2003) may be calculated. Applying this ratio to BACCAÏNI et al.'s (2006)

1
2
3 estimation, we get a non-salaried employment figure of 186,281 for a total employment figure
4
5 of 1,080,781, thereby bringing the two estimations closer.
6
7

8 This estimation of tourism employment corresponds to an average density of 25
9
10 tourism jobs per 1,000 inhabitants (Table 2), i.e. an average of one sixth of total population-
11
12 based service employment in functional economic areas. As expected, tourism employment
13
14 density is less related to the FEA's spatial position along the urban-rural gradient. Indeed, on
15
16 average, tourism employment density values are similar or even higher in rural area vs. urban
17
18 pole FEAs. Paris presents a unique situation given its strong tourism attractiveness (as a
19
20 worldwide tourism destination).
21
22
23

24 The highest densities of tourism employment are mostly found in Paris and in coastal
25
26 and mountain areas and more generally in southern France (including Corsica, see Figure 2).
27
28 To a significant extent this result matches tourism lodging capacity (number of beds in second
29
30 homes, hotels and campgrounds) which is also mainly located in coastal and mountain (resort)
31
32 areas. Higher-than-average tourism employment densities (25-100) are observed in the
33
34 hinterland of coastal and mountain areas, but also in several FEAs located in eastern France
35
36 (Bourgogne, Jura) as well as southwestern France and Massif Central (Dordogne, Lot,
37
38 Corrèze, Cantal, Aveyron, Lozère). The lowest densities of tourism employment are observed
39
40 in the western part of France, as well as the Nord and Lorraine regions.
41
42
43
44
45
46
47
48
49
50
51
52

FIGURE 2 HERE

53 *Location factors of population-based and tourism employment*

54 Initial OLS estimations showed that variables of market potential and propensity to consume
55
56 locally (Table 3) significantly explain the density of population-based employment ($R^2=0.61$
57
58 for all services). With a strongly significant λ and ρ (statistically) not different from 0, final
59
60

1
2
3 ML estimations show that a Spatial Error Model (SEM), with an inverse distance weight
4 matrix (60 km distance cutoff), is the correct specification to address spatial autocorrelations
5
6
7
8 issues. Moran's I statistics also show that spatially autocorrelated error structures have been
9
10 removed.

11
12 Market potential variables (market size, consumption structure and potential for
13 temporary attendance) have a strong explanatory power (Table 3). In particular, the level
14
15 and/or structure of consumption in heavily blue collar FEAs is associated with a lower density
16
17 of population-based employment even though the income variable is not included in the
18
19 specification. The propensity to consume locally significantly impacts the density of
20
21 employment, mainly via work-residence daily commutes. A greater proportion of the
22
23 workforce that enters the FEA is strongly and positively associated with the density of
24
25 employment in population-based services, thereby increasing FEA market size for such
26
27 services; the opposite association is found for the proportion of the workforce that leaves the
28
29 FEA. This result confirms the role of commuting patterns in explaining the density of
30
31 population-based employment whereby central FEAs capture peripheral income (i.e. of
32
33 households residing on their outskirts) that translates into local jobs. Last, as expected, the
34
35 size of the FEA pole is strongly and positively associated with the density of employment.
36
37
38
39
40
41
42
43
44
45

46 TABLE 3 HERE
47
48
49

50
51 The location factors of employment in administered and government services are
52
53 similar to those in retailing and market services, except for the lodging capacity variable.
54
55 Indeed, attractive FEAs in terms of temporary population tend to have fewer jobs in
56
57 administered and government services than other FEAs, but more jobs in retailing and market
58
59 services, which confirms the mainly private sector impacts of the tourism economy.
60

1
2
3 Moreover, household social characteristics seem to play a significant and negative role in the
4 density of administered and government employment since a greater proportion of blue-collar
5 households is associated with a lower density of such services. This result seems surprising
6 given policy makers' equity objectives in terms of access to public services. It may
7 nonetheless be explained by the relative social differentiation of functional economic areas: in
8 general, periurban areas both provide fewer services and are more "blue-collared".
9
10
11
12
13
14
15
16
17
18
19

20 Like population-based employment models, the variation in tourism employment
21 density is better explained by ML estimation of a spatial error model using an inverse distance
22 weight matrix (Table 4). Analyzing the role of structural variables in tourism employment
23 tells a two-tier story. First, a simple linear regression model with lodging capacity or fiscal
24 potential yields a fairly high coefficient of determination value (0.57 and 0.54, respectively).
25 Therefore, the location of tourism employment is first and foremost impacted by tourist
26 demand (which is not limited to high season because of the increasingly important role of
27 short stays all year long) and the investment capacity of local units of government (Table 4,
28 model 1). A feedback relationship may also be at work, i.e. tourism activity (as illustrated by
29 tourism jobs) brings more wealth locally (following French fiscal policy, both second homes
30 and tourism-related businesses extend the local fiscal base) and puts pressure on
31 municipalities to have more tourism beds (i.e. increase lodging capacity) to match tourist
32 demand.
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52

53 TABLE 4 HERE
54
55
56

57 Second, other independent variables display a level of correlation with tourism
58 employment density that is less than 0.15. This second set of variables (Table 4, model 2)
59
60

1
2
3 addresses local attractiveness issues: accessibility (ACCESS), population density
4 (POP_DEN), density of nature-based sports facilities (NAT_SPORT), other economic
5 activities (FARM_AGRIF, MANUFACT), and natural amenities (NAT_AMEN). Initial OLS
6 estimation showed that model 2 is significant overall, but the R^2 drops from over 60% to 5%,
7 thereby confirming the weaker explanatory power of this alternative specification.
8
9

10
11
12
13
14
15 In model 2, only accessibility is significant and positive; employment density in both
16 farming and agrifood processing and manufacturing is significant and negative; and density of
17 population, density of nature-based sports facilities as well as natural amenities are not
18 significant. In other words, and caution is in order given correlation levels between model 2
19 independent variables and tourism employment density, the positive sign of ACCESS
20 indicates that remoteness positively impacts tourism activity, or at least that rural amenities
21 counterbalance distance costs. Though questionable as a development strategy on
22 environmental sustainability grounds, relative isolation may be considered an amenity for
23 tourism activity. Next, there does not seem to be a production activity effect on tourism:
24 neither farming and agrifood processing employment (though related to landscape
25 maintenance or rural milieu support) nor manufacturing employment is positively associated
26 with tourism employment density.
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42

43
44 As leisure and tourism activities are typically associated with such natural resources as
45 water, elevation or a sunny climate, the (statistical) non significance of the amenity index
46 requires some discussion. The geographic distribution of the index tilts toward southeastern
47 France, which combines a Mediterranean climate (i.e. mild winter temperatures and a dry
48 summer) and coastline with mountain ranges (the Alps and some of the Massif Central). On
49 the contrary, tourism employment is more scattered across metropolitan France, strong in the
50 Paris area, and sensitive to resort effects in coastal and mountain areas (which are also found
51 along the Channel and the Atlantic coasts as well as the Pyrénées). Since the two variables do
52
53
54
55
56
57
58
59
60

1
2
3 not display the same geographic distribution, a weak statistical relation is not surprising. This
4
5 might also be explained by the way the amenity index was constructed, i.e. a focus on climate
6
7 and landscape feature variables which reflects a concern for the natural resource base but
8
9 might give climate too great a role in explaining travel. Though the analysis controls for
10
11 nature-based sports facilities, the amenity index might not sufficiently reflect specific
12
13 recreational amenities that motivate the traveler.
14
15

16
17 In conclusion, lodging capacity density, and to a lesser extent fiscal potential per
18
19 inhabitant, give fairly confident estimations of the density of tourism employment in a given
20
21 functional economic area. Regression models with a more complete specification but not
22
23 including these two variables lose much explanatory power, raising doubts about their
24
25 usefulness. In particular, lodging data seem to summarize several categories of tourism-
26
27 related information: (market or non-market) lodging capacity reflects the attractiveness of a
28
29 given geographic area, which results in jobs in retailing and market services related to the
30
31 presence of tourists. In other words, there is lodging capacity because there are interesting
32
33 resources for tourism, regardless of their nature, and these resources are sufficiently
34
35 accessible and preserved to keep a significant level of tourism employment.
36
37
38
39
40
41
42

43 *Spatial and regional differentiation*

44
45 Shift-share analysis shows how much of the observed difference between values of the
46
47 dependent variable by spatial category and its national average is explained by the geographic
48
49 vs. structural variables identified in previous steps of the analysis.³ Therefore, it shows
50
51 whether employment is sensitive to location (the FEA's spatial category) or not.
52
53
54

55
56 Density of employment in population-based services exhibits spatial sensitivity and is
57
58 particularly impacted by its position on the urban-rural gradient (Table 5): the gap is 75 jobs
59
60 per 1,000 inhabitants below the national average in periurban areas, minus 47 in rural job

1
2
3 poles (minus 61 in other rural FEAs) and plus 21 in urban poles. Every structural variable has
4
5 a statistically significant effect on the dependent variable. In particular, the balance of
6
7 commutes has a negative impact in periurban and rural FEAs, as expected, but also in rural
8
9 pole FEAs. Only urban FEAs benefit from the positive work-residence commuting balance.
10
11 The effect of income is rather unsurprising, with a decreasing impact on the density of
12
13 population-based employment along the urban-rural gradient.
14
15
16
17
18
19

20 TABLE 5 HERE
21
22
23

24
25 With a smaller magnitude, the same observation holds for lodging capacity. Lodging
26
27 capacity contributes positively, albeit weakly, to the density of population-based employment
28
29 in urban FEAs only. Lodging capacity is detrimental to the population-based service economy
30
31 everywhere else, particularly in rural areas (6 jobs below the national average), which means
32
33 that few rural FEAs actually benefit from tourism attractiveness. The geographic effect is
34
35 mainly observed in periurban areas, where it is very negative (-32). Therefore, about half the
36
37 gap with the national average (-75) would be related to inherent features of these FEAs, after
38
39 controlling for both the stronger propensity of their population to consume services in the
40
41 nearby urban pole and their structural lack of lodging capacity. This lag in service provision
42
43 could result from urban sprawl and decision makers' lack of anticipation regarding urban and
44
45 facility planning in fast-growing areas. Rural FEAs structured around a job pole benefit from
46
47 a slight, positive geographic effect (significant at 5%) on the density of population-based
48
49 employment, which partially corrects the negative impact of structural variables. An
50
51 alternative specification excluding Paris from the urban pole category did not produce
52
53 significantly different results.
54
55
56
57
58
59
60

1
2
3 To get a more detailed perspective, shift-share analysis was applied to retailing and
4 market services vs. administered and government services (Tables 6 and 7). Regarding the
5 former, the highest negative gaps relative to the national average are observed, as previously,
6 in periurban and rural FEAs. Overall, the geographic effect is very weak (even in periurban
7 FEAs), which seems to indicate that the private sector may be more reactive in adjusting the
8 provision of market services to changes in local demand. Among structural effects,
9 commuting patterns play a major (negative) role, particularly in periurban areas (multi-
10 purpose trips), followed by income (also negative) in rural areas, with no structural effect of
11 lodging capacity. Second, administered and government services tend to follow the same
12 pattern: a strong negative effect of commuting in periurban and rural areas, followed by a
13 negative income effect in rural areas only; the effect of lodging capacity, though statistically
14 significant this time, remains limited. As hypothesized, the geographic effect is strongly
15 negative in periurban areas (non significant in rural areas), indicating a lag effect for non-
16 market service employment in areas that experience strong population growth. In conclusion,
17 in periurban FEAs, it is likely that both a smaller (per resident) fiscal capacity and a lower
18 level of intermunicipal cooperation limit investment capabilities and service provision. This
19 result clearly raises doubts regarding the assumption that public services (quickly) follow the
20 population and that French citizens have the same level of access to non-market services.
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

TABLE 6 HERE

TABLE 7 HERE

Density of tourism employment, too, varies by FEA spatial category. Several geographic effects (including ZAUER) were tested to explain the density of tourism

1
2
3 employment, but the highest explanatory power of the shift-and-share model was obtained
4
5 with tourism zones. Lodging capacity, fiscal potential and natural amenities are retained as
6
7 structural variables. As Table 8 shows, the explanatory power of the four selected variables is
8
9 fairly high ($R^2=0.58$). Tourism employment is strongly differentiated between tourism zones:
10
11 mountain resorts exhibit an employment density that is almost four times higher than in rural
12
13 areas. Such gaps are largely explained by structural effects, but there is a specific dynamics at
14
15 work in mountain resorts that strongly impacts tourism employment in these areas. On the
16
17 contrary, the "rural" zone presents a value for tourism employment that is significantly lower
18
19 than the national average.
20
21
22
23
24
25
26

27 TABLE 8 HERE
28
29
30
31

32 The effect of the natural amenity index on tourism employment is significant but
33
34 relatively weak as compared with lodging capacity and fiscal potential (in agreement with
35
36 regression results). This, again, may be explained by differences in the spatial distribution of
37
38 the amenity index (whose highest values are found in southeastern France) vs. tourism
39
40 employment (more scattered across metropolitan France). It may also be explained by the
41
42 overriding influence of the tourism zone variable which, by definition, captures specific
43
44 recreational amenities that probably motivate travel more than climate-landscape features.
45
46
47

48 Indeed, the geographic effect is significant regardless of the tourism zone and, again,
49
50 mountain resorts stand out with a high density of tourism employment (about half the density
51
52 value, 66.1, is explained by the geographic variable, 30.3). Using this typology yields an a
53
54 priori counterintuitive result, i.e. a negative (though weakly significant) sign for the "coast"
55
56 category. Actually this result seems to show that tourism employment density in coastal areas
57
58 is similar to the national average (27.6 vs. 25.9) and since the lodging capacity structural
59
60

1
2
3 variable grabs most of the (positive) explanatory power (followed by fiscal potential), the
4
5 geographic effect (negatively) adjusts (followed by the natural amenity index) to yield the
6
7 observed employment density. In conclusion, high tourism employment density is found in
8
9 functional economic areas where mountain resorts are located, as illustrated by the significant
10
11 and positive contribution of the "mountain resort" spatial category. This result matches
12
13 BACCAÏNI et al.'s (2006) who showed that the share of tourism vs. total salaried employment
14
15 is particularly high in mountain resorts. An alternative specification excluding Paris from the
16
17 urban tourism category logically lowered the national average value and its gap with the
18
19 urban category while increasing it for the mountain resort class; the effects of geography,
20
21 lodging capacity and fiscal potential were fairly similar; the amenity variable, however,
22
23 became non significant, except in rural areas: as the amenity effect is already much captured
24
25 by tourism zones (e.g. water by coast), it shows up significant and positive in more
26
27 "common" landscapes.
28
29
30
31
32
33
34
35
36
37
38

39 CONCLUSION

40
41
42
43 Analyzing the location of population-based and tourism services at a fine geographic scale
44
45 (i.e. functional economic areas) shows heterogeneity that, broadly speaking, follows the
46
47 distribution of the population according to an urban hierarchy model: the number and density
48
49 of population-based jobs decreases from major city to rural area FEAs. Two dispersion
50
51 effects, however, dampen agglomeration effects: the presence of resources likely to create
52
53 tourism attractiveness, and political criteria that affect the location of non-market services.
54
55
56

57
58 First, the location of tourism jobs illustrates the dynamics at work in the service sector
59
60 as well as regional development issues. Indeed, total demand for population-based services is

1
2
3 dependent upon both the residing permanent population and the temporary tourism
4
5 population. Enhancing local resources impacts the density of tourism jobs, which are de facto
6
7 maintained by an injection of external income. Conversely, the surplus of demand generated
8
9 by tourism attendance supports a level of service provision that is higher than the local
10
11 consumption potential, and, by crossing ill-defined thresholds, may ensure the maintenance of
12
13 various local services. On the other hand, the potential for jobs induced by tourism activities
14
15 (and more broadly population-based services) in production activities that do not directly
16
17 depend on the local population remains a key question.
18
19
20
21

22 Overall, as local impacts of tourism and recreation remain insufficiently known (not
23
24 only from economic, but also social and environmental viewpoints), a key policy implication
25
26 is that tourism, though often touted as systematically beneficial for the communities it affects,
27
28 cannot certainly be advocated across-the-board as an economic growth and development
29
30 strategy. Accordingly, further research needs consist in exploring the theoretical and
31
32 empirical links between amenities, tourism activity and indicators of local economic
33
34 development that include job professionalization, income distribution, and poverty.
35
36
37
38

39 Second, overall, administered and government service jobs are distributed more
40
41 evenly across the national territory than market sector jobs. Two factors may explain this
42
43 situation. On the one hand, non-market services are located according to spatial equity criteria
44
45 that take account of the population's access to public services regardless of their location and
46
47 local demand level. On the other hand, a lagging effect (particularly in periurban areas) could
48
49 hide ongoing adjustments in services. Because of inertia, non-market jobs located in old
50
51 settlement centers (whether rural or industrial) may last despite significant changes in local
52
53 demographics; whereas periurban areas, characterized by more recent population growth, may
54
55 not experience a short-term adjustment of public services that would be consistent with local
56
57 demand changes. Therefore, research results suggest that more careful service and facility
58
59
60

1
2
3 planning is needed to address the needs (and corresponding equity of access issues) of
4 newcomers to periurban areas. Conversely, excess non-market services in downtown areas
5 may be redistributed to service-lagging areas.
6
7
8
9

10 Three other (spatial and temporal) issues for further work may be highlighted. First, to
11 some extent the choice of functional economic areas as the geographic scale of analysis
12 endogenizes the relation between service location and population location. But it imperfectly
13 accounts for the boundaries of local public action, which may be critical for population-based
14 services via local fiscal policies and public service provision; nor does it enable an analysis of
15 the relations that impact both population-based and productive activities. Second, analysis
16 results showed a relatively weak explanatory power of the natural amenity variable. Further
17 research efforts could focus on a more complete specification of an amenity index that would
18 encompass both natural and built features so as to better reflect specific recreational amenities
19 that are key to tourism trip decision making. Third, a time issue relates to changes in location
20 processes. Indeed, household residential and tourism destination choices directly impact
21 localized demand potential. However location processes also depend upon the sequence of
22 paths that differentiate development possibilities according to choices made by both public
23 and private stakeholders. Using indicators of both population and employment change should
24 help explain the situation of periurban areas and improve the analysis of residential dynamics
25 in rural areas.
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52

53 Acknowledgements: This paper is based on a research project carried out by UMR Cesaer
54 (INRA – AgroSup Dijon) and UR DTM (Cemagref, Grenoble). The project, funded by
55 DATAR (Délégation Interministérielle à l'Aménagement du Territoire et à l'Attractivité
56 Régionale), stemmed from DATAR's working group on regions and the service economy. An
57
58
59
60

1
2
3 earlier version of this paper was presented at the annual congress of the Association of
4
5 European Schools of Planning (AESOP), Liverpool, UK, 15-18 July 2009; the authors thank
6
7 the participants for valuable comments and suggestions.
8
9

10 11 12 13 14 15 NOTES

- 16
17
18
19
20 1. "Population-based" aims at translating as accurately as possible the French *résidentiel*.
21
22 Indeed, the adjective "residential" mainly pertains to housing (e.g. residential
23
24 neighborhood) or health (e.g. residential treatment center) issues. Since this paper focuses
25
26 on services to the population (as opposed to businesses), "population-based" was chosen.
27
28
29 2. Obviously some tourism-related services are more generic than others (e.g., eating at fast-
30
31 food chains vs. snorkeling the Great Barrier Reef) and consequently are more likely to be
32
33 found at various locations. By non tradability we mean that tourism activity is dependent
34
35 upon a specific location because that location features a given attraction (regardless of its
36
37 nature).
38
39
40 3. For technical reasons, the number of structural variables used in shift-share analysis is
41
42 limited to three.
43
44
45
46
47
48
49
50

51 REFERENCES

- 52
53
54
55 ANSELIN L. (1988) *Spatial econometrics: Methods and models*. Kluwer Academic
56
57 Publishers, Dordrecht, The Netherlands.
58
59
60

- 1
2
3 BACCAÏNI B., THOMAS G. and KHIATI A. (2006) L'emploi salarié dans le tourisme: Une
4
5 nouvelle estimation. *Insee Première* n. 1099 (August).
6
7
8 BERZEG K. (1978) The empirical content of shift-share analysis. *Journal of Regional*
9
10 *Science*, vol. **18**, n. 3, 463-468.
11
12
13 CEC (COMMISSION of the EUROPEAN COMMUNITIES) (2008) *Green paper on*
14
15 *territorial cohesion: Turning territorial diversity into strength*. Communication from the
16
17 Commission to the Council, the European Parliament, the Committee of the Regions and
18
19 the European Economic and Social Committee, COM(2008) 616 final, Brussels.
20
21
22 CÖRVERS F., HENSEN M. and BONGAERTS D. (2009) Delimitation and coherence of
23
24 functional and administrative regions. *Regional Studies* vol. **43**, n. 1, 19-31.
25
26
27 DELLER S. (2010) Rural poverty, tourism and spatial heterogeneity. *Annals of Tourism*
28
29 *Research* vol. **37**, n. 1, 180-205.
30
31
32 DE SEZE B. and ARMAND L. (2005) *Economie résidentielle en Ile-de-France: 1.*
33
34 *Déterminants généraux*. Etude de la DREIF/DUSD.
35
36
37 DIACT (2009) *Dynamiques et développement durable des territoires: Rapport de*
38
39 *l'Observatoire des territoires 2008*. La Documentation Française, Paris.
40
41
42 DISSART J.-C., AUBERT F. and TRUCHET S. (2009) An estimation of tourism dependence
43
44 in French rural areas, in MATIAS A., NIJKAMP P. and SARMENTO M. (Eds) *Advances*
45
46 *in Tourism Economics: New Developments*, pp. 273-294. Physica-Verlag/Springer,
47
48 Heidelberg.
49
50
51 DUBIN R. A. (1998) Spatial autocorrelation: A primer. *Journal of Housing Economics* vol. **7**,
52
53 n. 4, 304-327.
54
55
56 ENGLISH D. B. K., MARCOUILLER D. W. and CORDELL H. K. (2000) Tourism
57
58 dependence in rural America: Estimates and effects. *Society & Natural Resources* vol. **13**,
59
60 n. 3, 185-202.

- 1
2
3 GAIGNÉ C., PIGUET V. and SCHMITT B. (2005) Evolution récente de l'emploi industriel
4 dans les territoires ruraux et urbains: Une analyse structurelle-géographique sur données
5 françaises. *Revue d'Economie Régionale et Urbaine* n. 1, 3-30.
6
7
8
9
10 GASCHET F. (2002) The new intra-urban dynamics: Suburbanisation and functional
11 specialisation in French cities. *Papers in Regional Science* vol. **81**, n. 1, 63-81.
12
13
14
15 GAULIER G. (2003) Spécialisation et productivités des régions européennes. *Région et*
16 *Développement* n. 17, 161-180.
17
18
19
20 HOUDEBINE M. (1999) Concentration géographique des activités et spécialisation des
21 départements français. *Economie et Statistique* n. 326-327, 189-204.
22
23
24
25 HOYLER M., FREYTAG T. and MAGER C. (2008) Connecting Rhine-Main: The
26 production of multi-scalar polycentricities through knowledge-intensive business services.
27 *Regional Studies* vol. **42**, n. 8, 1095-1111.
28
29
30
31
32 INRA/CNRS (2008) *Base de données climatiques communales*. INRA UMR1041 CESAER
33 (F-21000 Dijon) / CNRS UMR6049 THEMA (F-25000 Besançon); after Météo France
34 1970-2000.
35
36
37
38
39 INSEE (2003) *Structuration de l'espace rural: Une approche par les bassins de vie*. Rapport
40 pour la DATAR, avec la participation de IFEN, INRA, SCEES.
41
42
43
44 JAYET H. (1993) *Analyse spatiale quantitative*. Economica, Paris.
45
46
47
48
49 JENNEQUIN H. (2005) *La localisation des activités tertiaires: Un enjeu économique majeur*.
50 PhD dissertation, University Paris XIII.
51
52
53
54
55
56
57
58
59
60 JENNEQUIN H. (2008) The evolution of the geographical concentration of tertiary sector
activities in Europe. *The Service Industries Journal* vol. **28**, n. 3, 291-306.
KARLSSON C. and OLSSON M (2006) The identification of functional regions: Theory,
methods, and applications. *The Annals of Regional Science* vol. **40**, n. 1, 1-18.

- 1
2
3 KLOSTERMAN R. E. (1990) *Community analysis and planning techniques*. Rowman &
4
5 Littlefield Publishers, Savage, MD.
6
7
8 LEATHERMAN J. C. and MARCOUILLER D. W. (1996) Estimating tourism's share of local
9
10 income from secondary data sources. *The Review of Regional Studies* vol. **26**, n. 3, 317-
11
12 339.
13
14
15 LE GALLO J. (2002) Econométrie spatiale: L'autocorrélation spatiale dans les modèles de
16
17 régression linéaire. *Economie et Prévision* vol. **4**, n. 155, 139-157.
18
19
20 MARCOUILLER D. W., KIM K.-K. and DELLER S. C. (2004) Natural amenities, tourism
21
22 and income distribution. *Annals of Tourism Research* vol. **31**, n. 4, 1031-1050.
23
24
25 McGRANAHAN D. A. (1999) *Natural amenities drive rural population change*. USDA-
26
27 ERS, Food and rural economics division, Agricultural Economic Report n. 781.
28
29
30 McGRANAHAN D. A. (2008) Landscape influence on recent rural migration in the U.S.
31
32 *Landscape and Urban Planning* vol. **85**, n. 3-4, 228-240.
33
34
35 MDT, INSEE (Ministère Délégué au Tourisme, Institut National de la Statistique et des
36
37 Etudes Economiques) (2005) *Le tourisme en France*. INSEE, Paris.
38
39
40 MIDELFART-KNARVIK K. H., OVERMAN H. G., REDDING S. J., VENABLES A. J.
41
42 (2000) The location of European industry. *European Economy - Economic Papers* n. 142,
43
44 Commission of the EC, DG ECFIN.
45
46
47 NIEDERCORN J. H., BECHDOLT B. V. Jr. (1969) An economic derivation of the "gravity
48
49 law" of spatial interaction. *Journal of Regional Science* vol. **69**, n. 2, 273-282.
50
51
52 SCHMITT B., HENRY M. S., PIGUET V. and HILAL M. (2006) Urban growth effects on
53
54 rural population, export and service employment: Evidence from eastern France. *The*
55
56 *Annals of Regional Science* vol. **40**, n. 4, 779-801.
57
58
59 SOKOL M., VAN EGERAAT C. and WILLIAMS B. (2008) Revisiting the 'informational
60
city': Space of flows, polycentricity and the geography of knowledge-intensive business

1
2
3 services in the emerging global city-region of Dublin. *Regional Studies* vol. **42**, n. 8, 1133-
4
5 1146.
6

7
8 VENABLES A. J. (1996) Equilibrium locations of vertically linked industries. *International*
9
10 *Economic Review* vol. **37**, n. 2, 341-359.
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

Table 1. Variables used for the study (descriptive statistics per functional economic area)

Variable	Detail	N	Mean	St. deviation	Minimum	Maximum
POP_BASED	Density of employment in population-based services	1,916	149.71	73.00	59.51	1,328.65
RET_MKT	Density of employment in retailing and market services	1,916	65.86	59.03	16.65	1,191.35
ADM_GOV	Density of employment in administered and government services	1,916	83.85	31.67	30.25	390.35
TOURISM	Density of employment in tourism-related services	1,900	25.32	57.89	0.00	1,157.34
MKT_SIZE	Number of people living in the pole of the FEA (in thousands)	1,916	15.75	49.81	2.00	500.00
COMMUT_IN	Proportion of the workforce that enters the FEA urban area	1,916	12.86	17.87	0.00	220.84
COMMUT_OUT	Proportion of the FEA workforce that leaves the FEA of residence to work in an urban area	1,916	32.43	21.37	1.08	88.49
COMMUTE	Ratio between the balance of commuters ("in" minus "out" and the employed workforce per FEA	1,916	-19.56	20.41	-77.94	150.32
INCOME	household average net income in 2003	1,916	8,418.03	1,541.22	5,005.96	22,845.96
LODG_CAP	Number of beds in campgrounds (2005), hotels (2005) and second homes (2003) relative to total population in 1999	1,916	926.17	2,277.59	0.00	37,875.20
BLUE_COL	Proportion of blue-collar workers in the total population	1,916	13.93	3.58	2.22	28.87
FISC_POT	Local tax revenues divided by the number of inhabitants	1,916	545.19	317.64	201.96	4,673.92
ACCESS	Average access time (in minutes) from the municipalities of an urban area to the urban pole of the same urban area or the closest one	1,900	27.01	17.04	0.00	119.70
POP_DEN	Population density	1,900	63.25	138.16	1.91	2,483.56
NAT_SPORT	Number of nature-based sports facilities per 1,000 inhabitants	1,900	3.03	16.55	0.00	673.78
FARM_AGRIF	Number of jobs (per 1,000 inhabitants) in farming and food processing	1,900	136.66	130.62	2.30	1,402.33
MANUFACT	Number of jobs (per 1,000 inhabitants) in manufacturing (save agrifood)	1,900	246.11	193.13	14.81	4,705.29
NAT_AMEN	Index based on 4 climate et landscape feature variables	1,900	0.00	2.40	-5.17	10.91

Note: N=1,900 for variables used in tourism models only

1
2
3 *Sources:* all data from INSEE, except: NAT_SPORT (RES database, Ministry of Health and Sports); NAT_AMEN (IGN, Corine Land Cover,
4 INRA/CNRS [2008] databases)
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47

For Peer Review Only

Table 2. FEA employment density in population-based and tourism services according to spatial category (1999)

ZAUER of FEA pole	All pop.-based services	of which trade	of which market services	of which administered services	of which government services	Tourism jobs ^a
Urban pole (except Paris)	^b 195 ^c (46)	41 (8)	40 (23)	87 (21)	27 (11)	27 (28)
Paris	242	38	78	88	39	42
Periurban municipality	116 (42)	27 (27)	23 (12)	52 (19)	13 (5)	15 (31)
Rural pole	156 (93)	34 (15)	37 (71)	68 (27)	17 (8)	33 (84)
Rural municipality	146 (73)	29 (12)	36 (52)	64 (29)	17 (8)	26 (61)
Total	150 (73)	32 (18)	34 (48)	66 (27)	18 (9)	25 (58)

Sources: INSEE, UNEDIC

Notes: ^aEstimated by the minimum requirements technique

^bMean

^c(Standard deviation)

Table 3. Regression analysis of population-based employment density

Variables ^a	All population-based services	Retailing and market services	Administered and government services
Intercept	^b ***220.2891	***70.7327	***144.8594
BLUE_COL	***-3.8020	***-0.8138	***-2.7562
LODG_CAP	***0.0156	***0.0167	***-0.0012
COMMUT_IN	***1.2554	***0.7640	***0.4961
COMMUT_OUT	***-1.5685	***-0.6265	***-0.8947
MKT_SIZE	***0.1187	***0.0574	***0.0668
λ	***0.6044	***0.6872	***0.2732
N	1916	1916	1916
L	-9966.52	-9475.96	-8856.66
LM-Lag ($H_0: \rho=0$)	^c 0.0002	0.0001	0.0003
Moran's I ^d	^b -0.0034	-0.0083	0.0007

Notes: The condition index is 11.88. Adjusted R^2 values for OLS estimations were 0.61, 0.62 and 0.39 for all population-based, retailing and market, and administered and government service models, respectively.

^aINCOME was dropped due to high correlation with the rate of entering and exiting commutes, itself due to the strong differentiation of urban FEAs which concentrate both job and dormitory areas. Spatial category variables were removed due to high correlation with the commuting variables upon which the ZAUER typology is partially based.

^b* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$

^cCritical value for the LM-Lag statistic is 2.71 ($\alpha=0.1$)

^dBased on the residuals from the SEM estimations

Table 4. Regression analysis of tourism employment density

Variables	Model 1	Model 2
Intercept	^a ***-24.1371	***37.1244
LODG_CAP	***0.0116	
FISC_POT	***0.0709	
ACCESS		***0.2793
POP_DEN		0.0090
NAT_SPORT		-0.0203
FARM_AGRIF		***-0.0417
MANUFACT		***-0.0170
NAT_AMEN		1.0870
λ	***0.5216	***0.8708
N	1900	1900
<i>L</i>	-9288.52	-9992.63
LM-Lag ($H_0: \rho=0$)	^b 0.0053	0.1386
Moran's I^c	^a -0.0014	***-0.0447

Notes: The condition index is 5.10 for model 1, 5.84 for model 2. Adjusted R^2 values for OLS estimations were 0.67 and 0.05 for models 1 and 2, respectively. In model 2, some spatial autocorrelation remains despite an 85% reduction in Moran's I value from OLS to SEM estimations.

^a* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$

^bCritical value for the LM-Lag statistic is 2.71 ($\alpha=0.1$)

^cBased on the residuals from the SEM estimations

Table 5. Shift-share analysis of population-based employment density

ZAUER	Pop.-based job density (/1,000 inh.)	National avg. gap (196.18)	Geographic effect ZAUER	Structural effects		
				INCOME	LODG_CA P	COMMUTE
Urban pole	217.64	+21.46	*+2.35	***+4.23	***+1.70	***+13.18
Periurban	120.86	-75.32	***-31.84	***+2.86	***-2.00	***-44.33
Rural job pole	149.12	-47.06	**+9.82	***-18.84	***-6.40	***-31.63
Other rural	135.64	-60.54	+5.03	***-24.20	***-6.46	***-34.90

Notes: Adjusted R²: 0.91; condition index: 9.25.

The gap between the average employment density by ZAUER category and the national average employment density is equal to the sum of the geographic effect and the three structural effects. For example, regarding "Urban pole": $217.64 - 196.18 = +21.46 = +2.35 + 4.23 + 1.70 + 13.18$

*p<0.10; **p<0.05; ***p<0.01

Table 6. Shift-share analysis of population-based market (retailing and market services) employment density

ZAUER	Pop.-based job density (/1,000 inh.)	National avg. gap (83.63)	Geographic effect ZAUER	Structural effects		
				INCOME	LODG_CA P	COMMUTE
Urban pole	92.58	+8.95	-0.06	***+2.81	+0.31	***+6.43
Periurban	51.74	-31.89	***-1.08	***+1.86	***-1.31	***-21.66
Rural job pole	64.00	-19.63	***+0.96	***-12.60	-1.24	***-15.40
Other rural	59.26	-24.37	**+0.77	***-15.79	+0.73	***-17.07

Notes: Adjusted R²: 0.84; condition index: 9.25

*p<0.10; **p<0.05; ***p<0.01

Table 7. Shift-share analysis of population-based non-market (administered and government services) employment density

ZAUER	Pop.-based job density (/1,000 inh.)	National avg. gap (112.55)	Geographic effect ZAUER	Structural effects		
				INCOME	LODG_CA P	COMMUTE
Urban pole	125.05	+12.50	***+2.94	***+1.42	***+1.39	***+6.74
Periurban	69.12	-43.43	***-21.07	***+1.00	** -0.69	***-22.67
Rural job pole	85.12	-27.43	+0.22	***-6.25	***-5.16	***-16.23
Other rural	76.38	-36.17	-2.72	***-8.41	***-7.19	***-17.83

Notes: Adjusted R²: 0.89; condition index: 9.25

*p<0.10; **p<0.05; ***p<0.01

Table 8. Shift-share analysis of tourism employment density

Tourism Zone	Tourism job density (/1,000 inh.)	National avg. gap (25.90)	Geographic effect Tourism zone	Structural effects		
				LODG_CAP	FISC_POT	NAT_AMEN
Coast	27.65	+1.75	*-4.10	***+7.81	***+1.25	***-3.21
Mountain	23.14	-2.76	***-10.81	***+11.24	***-1.98	***-1.22
Rural	17.44	-8.46	***-6.72	***+2.20	***-3.99	+0.06
Mountain resort	66.13	+40.23	***+30.28	***+8.83	***+3.35	***-2.23
Urban	30.38	+4.48	***+6.05	***-5.38	***+2.61	***+1.11

Notes: Adjusted R²: 0.58; condition index: 4.77

*p<0.10; **p<0.05; ***p<0.01

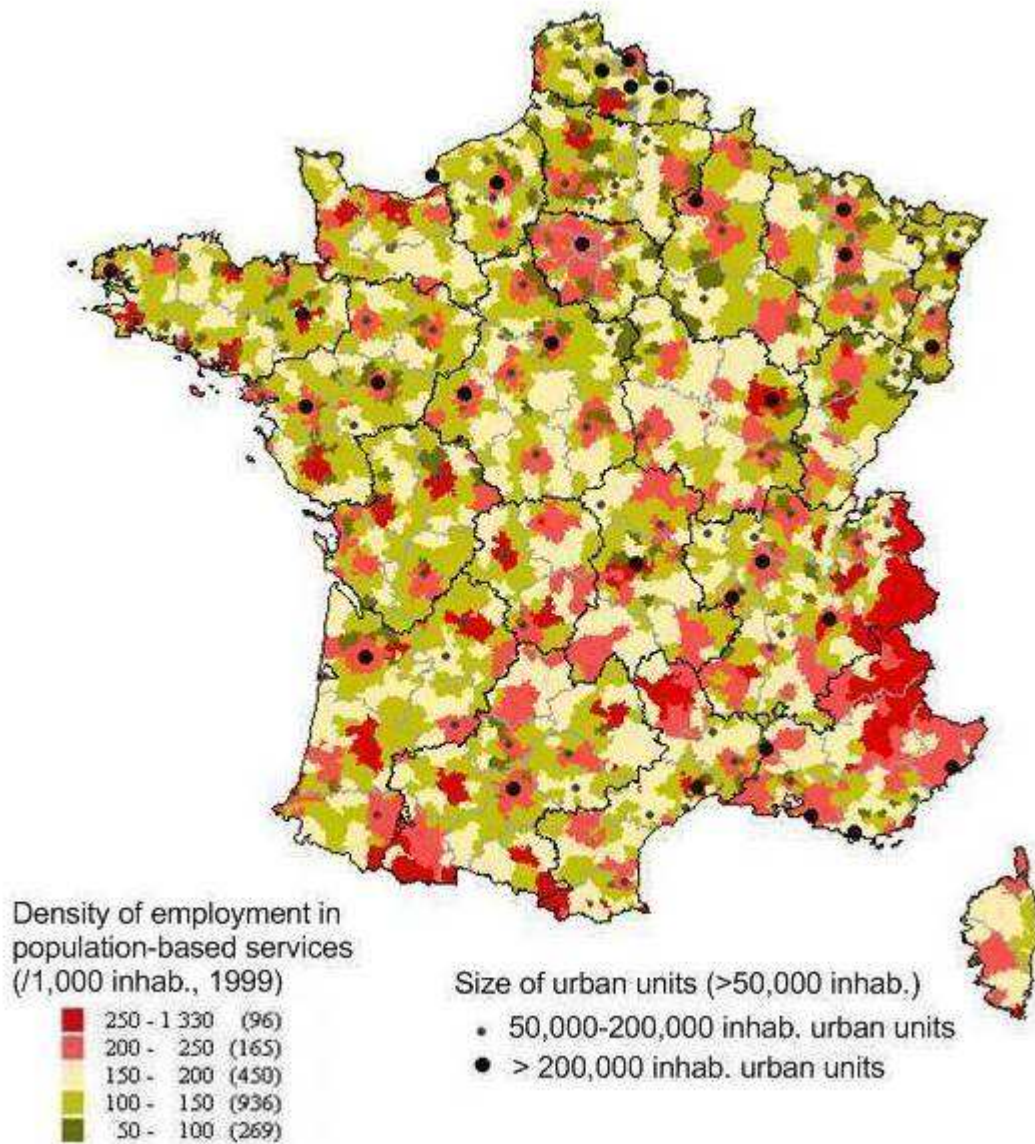


Fig. 1. FEA density of employment in population-based services (1999)

Sources: IGN99, INSEE

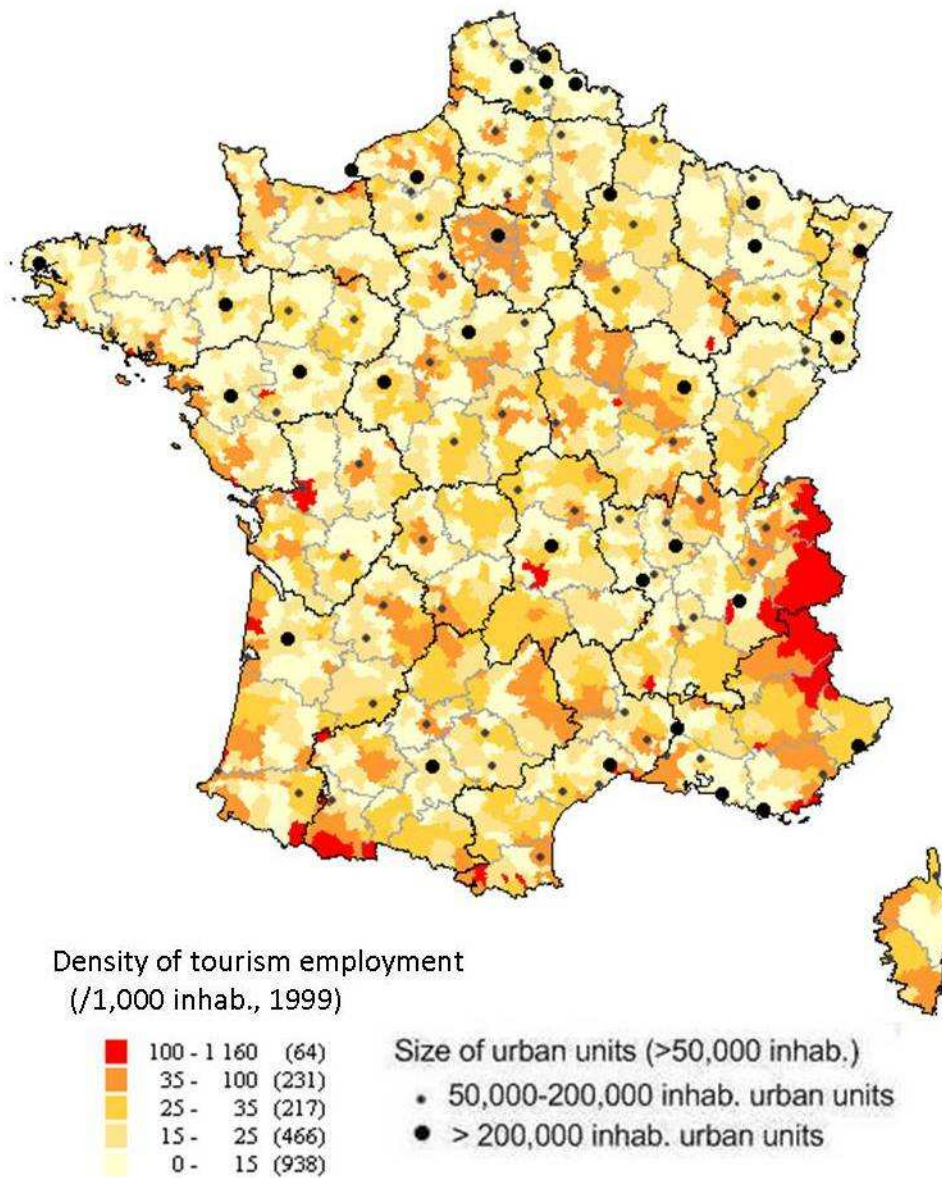


Fig. 2. FEA density of employment in tourism-related services (1999)

Sources: Authors' calculations using INSEE, IGN99 data