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Introduction

This dissertation examines agglomerations in the Italian context, analyzing and measuring their extent and their patterns of change during the five-year period characterized by the Great Recession. Indeed, we believe not only that a comprehensive quantitative survey of which industries tend to agglomerate and which ones tend to disperse, has not been done yet for Italy, but also that the implementation of recently explored distance-based methods could provide much more meaningful results than more conventional measures. Such an accurate measure of agglomeration for Italy would be by and of itself a significant attainment, but even more so when considering that it provides the opportunity to understand how geographic patterns are changing and what is driving them. Moreover, if the slight geographical approximation we will be forced to accept in order to reduce the otherwise unmanageable amount of computational intensity required to produce results for our measure of choice – Marcon & Puech's *M* (2010) – will prove to be acceptable, this would open up immense possibilities to explore agglomeration in other years and also in other countries all over the world. Indeed, as we will show in the second chapter, computational hardships have limited M's use to extremely restricted areas and industries, preventing its application for measuring agglomeration at a national level. The opportunity to circumvent such computational difficulty and to work with distance-based measures would surely provide a more accurate and reliable picture of spatial economic patterns and of their development in time.

A more precise measurement of agglomeration shall not be considered a mere academic exercise, but would instead constitute a significant contribution to those in charge of legislating economic and social matters. A prominent example is represented by agglomeration rents, which several authors have identified as taxable (Jofre-Monseny, 2013): in a world where capital mobility is limiting the ability of governments to increase corporate tax rates, the identification of agglomeration rents allows jurisdictions to impose higher taxes without fearing immediate capital outflow in response (Koh, Riedel & Böhm, 2013). Indeed, whereas, on average, high corporate income taxes constitute a deterrent for new firms, such a relationship has been proven significantly weaker in the most spatially concentrated industries (Brülhart, Jametti & Schmidheiny, 2012) and districts (Crabbé & De Bruyne, 2013). On the other hand, a more accurate identification of agglomeration could also help in the management of those disadvantages that originate from it, ranging from pecuniary diseconomies (such as high land rents) to traffic congestion and pollution (Richardson, 1995): such diseconomies have a negative social and economic impact and shall be certainly taken into consideration and dealt with. Furthermore, as specifically concerns the Italian context, the measurement of agglomeration within its different macro-regions and not only on a country-wise level might contribute to define political actions aimed at overcoming the long-lasting North-South divide that splits – economically but also socially - the country in (at least) two parts, fueling instability and uncertainty for Italy as a whole.

The first chapter consists of a literature review, where the theory behind spatial economic distribution is reconstructed from the pioneering works of Von Thünen, whose studies have seen renewed interest during the last half a century. After outlining the first theories of localization, we shift the focus onto the dichotomic distinction between Marshall's economies of agglomeration – notably consisting of *knowledge spillovers*, *labor pooling* and *cost advantages*, which materialize when firms belonging to the same area of activity locate close to each other – and Jacobs' economies

of urbanization – consisting in the advantages that firms belonging to *different* industries are able to exploit when they locate in a highly diversified area, such as a large city. Finally, we turn to more recent and synthesizing approaches, such as New Economic Geography and Evolutionary Economic Geography. This reconstruction allows us to build a common ground for definitions and concepts. In fact, it is important to highlight how processes as different as concentration and specialization do not necessarily go hand in hand[1], as oftentimes inadvertently - but sometimes intentionally as well - is assumed.

The second chapter begins with a synthesis of an innovative set of methods known as distance-based measures, that have grown to prominence in the last two decades thanks to the works of several authors, notably among them Duranton & Overman (2005) and Marcon & Puech (2003). Distance-based measures rely on the actual distance between points in order to avoid the issues originating from their aggregation within pre-defined geographic areas: these issues are collectively identified as the *Modifiable Areal Unit Problem*. We then compile a review of empirical studies measuring agglomeration in different countries of the world - mostly with so-called *K-measures* - in order to understand what they have found and what their strengths and weaknesses might have been. Then, we describe our datasets and we paint a picture of the Italian economy, before exploring our index of choice – Marcon & Puech's *M* - and our methodology. Finally, we show the results obtained when computing Marcon & Puech's M for Italian industries in 2007 and 2012, focusing on those that are either most or least agglomerated and on the most significant changes occurred between 2007 and 2012 – that is, the years when the Great Recession developed – while also trying to understand their dynamics and their possible determinants. Considering that <<*there is no theoretical treatment of the relationship between firms' characteristics and the structure and evolution of business clusters*>> and how little <<*is known about whether the mechanisms at the basis of agglomeration economies influence firms' characteristics*>> (Cainelli, Iacobucci & Morganti, 2006, p. 508), we believe this is an interesting purpose by itself, and especially so in a country notably endowed with a wide array of Industrial Districts and during a period – the Great Recession – that has seen them undergoing through significant transformation (e.g.: the globalization-driven reduction of districts' firm population; the diversification of the local production structure and the change in its relationship with the social structure; the weakening of relations between firms), with the consequence of dismantling <<*the Marshallian model that once characterized*>> them (De Marchi & Grandinetti, 2014)[2].

In the third and final chapter, we divide the country in four areas: the rich continental North, strongly interconnect with Central Europe, and endowed with a prosperous and advanced economy; the more heterogeneous peninsular part of the country, consisting in the relatively wealthy Center and in the South, where some of the least productive parts of Europe can be found; and the two major islands of Sardinia and Sicily. In accordance to Porter (1994, p. 38), who claimed that <<*the relevant economic area is smaller than many nations*>>, we aim to verify whether determinants behind agglomeration results obtained nationally, might actually be hidden by opposite-sign patterns that would instead become apparent when areas are treated separately. Indeed, as stated by Iammarino (2005, p. 497), <<*the literature on geographical systems of innovation has*

[1] Aiginger & Rossi-Hansberg (2006, p. 1) rely on <<*two data sets on manufacturing industries across US States and EU member countries to show specialization and concentration do not develop in parallel*>>, contradicting <<*the contention of other models and many empirical papers*>> that they <<*should move in parallel*>>.

[2] Such a view has recently received <<*indirect*>> support also by Cainelli, Ganau & Jiang (2020, p. 441).

traditionally shown a "national-bias" that has strongly affected the identification of actors, relationships and attributes operating at the sub-national scale>>.

The inevitable limits of a work based on such an immense amount of data are both methodological and analytical, and we aim to confront them in future research. Indeed, although the results are surely interesting and provide a useful ranking of agglomeration for Italian industries, the next step will necessarily involve the estimation of its statistical significance. Such a task is certainly beyond the scope of this dissertation, because of the massive amount of time and processing capabilities required to perform the necessary tests. Assessing the significance of the results will certainly help when performing a deeper analysis of agglomeration determinants and when studying the change occurred during the Great Recession. Finally, we also aim to assess the reliability of our methodology by computing M without any approximation whatsoever for an area that might be large enough to be economically representative, but small enough to be computationally dealt with: we believe that the area of choice could be our land, Sardinia.

Chapter 1

Literature Review

1.1 Introduction

It is a known enough fact that economic activity tends to localize in specific areas, and that seems true on almost every scale, time and place[3], to the point that it was not an economist, but an archaeologist such as Petrie (1923, pp. 3-4) to acknowledge <<*how remarkably similar the distances are between the early Nome capitals of the Delta (twenty-one miles on an average) and the early cities of Mesopotamia (averaging twenty miles apart). Some physical cause seems to limit the primitive rule in this way. It is not the limit of central storage of grain, which is the essential form of early capital? Supplies could be centralized up to ten miles away; beyond that the cost of transport made it better worthwhile to have a nearer center*>>, in what certainly sounds as an early anticipation of the agglomerating and dispersing forces we will discuss.

Moving to our days and shifting the focus towards Italy, it is noteworthy that Lombardy takes up only 7.91% of the total surface and its population amounts to 16.59%[4], but its share of national GDP in 2017 was 21.81%. On a smaller scale, Milan urban area accounts for 10% of national GDP, although its population is just slightly over 5% of the entire country and its area is less than 1%.

On a European scale as well, five NUTS-2 regions[5] that cover a negligible area and house just 8% of the EU population, make up almost 15% of the entire European Union GDP.

The situation is even more remarkable in the United States, where California (which itself makes up about 15% of the country's GDP) shows paramount concentration of its economy in the two metropolitan areas of Los Angeles and San Francisco, representing about 80% of its GDP and 70% of its population in less than a third of its surface; that sounds even more impressive if we take into account that a large chunk of some of the counties that make up the two conurbations, are actually rural areas, thus leaving an even smaller part that actually contributes to said phenomenon.

On the same side of the Atlantic Ocean, Behrens & Bougna (2015, p. 1) underline how <<*Ontario and Quebec, for example, are home to about 60 percent of Canadian GDP and 75 percent of manufacturing employment […]. Within those two provinces, the Toronto metropolitan area, about 0.06 percent of Ontario's provincial surface, concentrates 45 percent of Ontario's GDP; whereas the Montreal metropolitan area concentrates almost 35 percent of Quebec's GDP on about 0.04 percent of Quebec's provincial surface*>>.

The afore-mentioned figures show us what we might describe as a *known fact*: that is, that people are geographically concentrated, but economic activities even more so.

Another somehow related fact is that firms that either belong to the same industry or to industries that are related to each other (and – some would argue - even firms that belong to industries that are not related at all) tend to co-locate and to form spatial clusters (Malmberg, Sölvell & Zander, 1996).

[3] Fujita & Krugman (2004, p. 140) remark that <<*agglomeration or the clustering of economic activity occurs at many geographical levels, having a variety of compositions*>>.

[4] All data, if not specified differently, originate from ISTAT if related to Italy and from EUROSTAT if related to Europe.

[5] Ile de France (France), Lombardy (Italy), Upper Bavaria (Germany), Southern and Eastern Ireland (Ireland) and Rhône-Alpes (France). The figures would be even more significative if including the United Kingdom, since the latter region would be substituted by Inner London – West, by far the richest NUTS-2 region in Europe in terms of GDP per capita.

Concentration, either industrial or geographical, does not necessarily result in specialization, as many large metropolises demonstrate by relying on a varied economy based on multiple industries: that is the case, for example, with New York or Paris. On the other side, it is undeniable that some areas specialize indeed, as is the case with Hong Kong and its financial industry, or, notably, San Francisco and the adjacent Silicon Valley centered around San Jose. In Italy, the particular phenomenon of industrial districts emerged <<*after the years of the so-called "economic miracle"*>>, with <<*small and medium sized enterprises clustered in districts and specialized in light industries*>> (Becattini & Dei Ottati, 2006, pp. 1139-1140)[6].

There are two main forces behind the spatial concentration of jobs: the *economies of scale*, related to the individual activity of the firm, and the *agglomeration economies*, represented by the advantages guaranteed by locating physically closer to other firms. Our review tries to reconstruct how agglomeration economies were understood and studied in the last two centuries.

The two *known facts* discussed above – the regional concentration of economic activity in general and the spatial clustering of economic activities in particular – are geographic phenomena that would not suffice to constitute the foundation of an entire discipline, were it not for another *known fact.* Such a known fact, probably more historical than geographical, is the inertia that characterizes industrial location choice: path dependence. Indeed, strictly geographical features could not explain agglomerations by themselves: similar regions oftentimes show very different production structures, and - following traditional economic theory - firms would be better off by locating far from each other, in order to decrease product and factor market competition (Ottaviano & Puga, 1998).

What mentioned above led to the study of agglomeration economies, a term that is actually used to define two different types of economies: those related to regional and urban concentration and enjoyed by all firms and all industries located in the area (leading to the emergence of conurbations and so-called manufacturing belts) and those related to single industries that find their hotspot in a particular area.

The first type of agglomeration economies are those behind the US manufacturing belt that spans from the upper eastern shore of the Mississippi river (north of Saint Louis, Missouri) to the Atlantic ocean in the North-East, or those behind the so-called Blue Banana that extends from London, Paris and the Benelux southwards across the Ruhr area in Germany and Switzerland to Northern Italy (and, arguably, completes the "banana shape" through the French riviera, ending up in Barcelona).

The second type of agglomeration economies is commonly seen as the reason behind the development of specific industries, such as Dalton (Georgia) or the already mentioned Italian industrial districts, such as those that will emerge as the most agglomerated in the analysis performed in this dissertation: the *footwear* and the *musical instrument* industries in southern Marche, the *clay* industry in Emilia, the *textiles* industry around Biella and Prato, and the *jewelry* industry in Valenza (Piemonte), Arezzo and Vicenza.

[6] In a peculiar and interesting observation of Italian industrial districts, Dunford (2006, p. 27) describes them as <<*parts of an interdependent geographic division of labor that includes magic circles and delocalized zones of dependent manufacturing*>>.

Many possible reasons for the emergence of both types of agglomeration economies have been studied and will be covered by this literature review, ranging from social interactions – which surely have an impact on the development of at least the smallest scale agglomerations, but are subject to rapid "decay" as distance increases (Ottaviano & Puga, 1998) - to various types of externalities. Concerning social interactions, Gordon & McCann (2005, p. 529) suggest <<*that the geographical proximity of SME's is a necessary criterion for the development of mutual trust relations based on a shared experience of interaction with decision-making agents in different firms*>>, and literature has reviewed both the influence of small firms (Granovetter, 1973) – notably and unsurprisingly more reliant on external economies of agglomeration than internal economies of scale - and big firms, that are endowed with a greater opportunity of R&D spending (Schumpeter, 1942).

Externalities, on the other hand, are one of the major influences in the literature, where they are usually distinguished between *technological* externalities (or - better yet and in a broader definition - *knowledge* externalities) and *pecuniary* externalities (Scitovsky, 1954). The former type manifests itself through non-market interactions directly influencing the innovations made available to firms and/or the utilities of individuals. Pecuniary externalities, on the other hand, are the result of market interactions, that is, they only affect the agents concerned by the transactions, such as new firms generating larger demand by increasing the existing level of income. Whereas technological externalities have been regarded with particular importance by geographers and urban planners in order to capture the role of non-market institutions (Pyke, Becattini & Sengenberger, 1990), economic theory has focused relatively more on pecuniary externalities. Indeed, these arise in a setting where the paradigm of perfect competition does not hold, otherwise prices would always reflect the social value of products. In the real world nevertheless, perfect competition is not a real thing and both types of externalities need to be accounted for.

An important dichotomy in the field has distinguished proponents of so-called Marshallian externalities on one side and Jacobs' externalities on the other. Marshallian externalities consist of knowledge spillovers, labor market pooling and cost advantages guaranteed by the sharing of industry-specific inputs: such externalities lead to economies of specialization, where the geographical proximity of same-industry firms leads to advantages for all of them. On the other side, Jacobs' externalities consist of inter-industry spillovers that give rise to economies of urbanization, with cities prospering thanks to the incentives guaranteed by competition. Such a dichotomy has been eased up by the emergence of Evolutionary Economic Geography, which allowed to move <<*beyond the traditional specialization-urbanization debate*>> (Caragliu, de Dominicis & de Groot, 2016, p. 89) and has shifted the focus towards the implications of related and unrelated variety (Boschma & Frenken, 2011).

This literature review aims to briefly reconstruct the path that, after almost two centuries, has led from initial studies of the economies of localization and successive development in the understanding of the dynamics of agglomeration, to the development of New Economic Geography and Evolutionary Economic Geography.

1.2 Theories of localization

Pioneering research into modern location economics is usually attributed to Von Thünen and his breakthrough manuscript, The Isolated State (1826), where he tried to identify patterns in agricultural activities around German cities of his own time.

Von Thünen hypothesizes an "isolated State", as the title of his works suggests, which revolves around a central city surrounded by wilderness. The land is homogeneous, flat and presents no natural obstacle such as mountains or rivers, and the soil guarantees the same yield everywhere. The only place where consumption occurs is the city in the center of the State and each farmer is a standard *homo oeconomicus*, perfectly rational and willing to maximize his/her profit.

According to Von Thünen, land use is determined by the cost of transporting different products to the city located at the center of the economic area, with the most productive activities being able to afford locations closer to the center, whereas relatively less productive activities are constrained to more peripheral locations. The result is a *ring structure* that revolves around the central city, with each ring being afforded a different kind of production, and outer rings afforded less and less productive activities. Such a ring structure has been acknowledged by Hall (1966, pp. xxi) as the "*world's first economic model*"[7] and has also been shown to have empirical relevance in the actual world[8].

A "*stripped-down version*" of the model is provided by Samuelson (1983, p. 1470):

> *All labor is alike, free to move either to country or town. All land is alike except for distance from town. All people (laborers or landowners), wherever they permanently reside, have identical (homothetic) tastes at all income levels, involving a city-produced good (cloth) and two country-produced goods (vegetables dear to transport, and grain cheap to transport).*
> *I ignore the fact that the city good might require for its production raw materials from the countryside. To keep all capital out of this Act 1, I assume cloth is produced instantaneously by labor alone at constant returns to scale. Each farm good has its smooth first-degree-homogeneous production function that is concave in its labor and land inputs […]. Three possibilities are of interest: both farm goods have the same labor/land intensities; grain is the more land/labor intensive of the two goods at all wage/rent ratios; grain is the less land/labor intensive in the above sense.*
> *The simplest version of Thünen's rings of specialization is then supposed to follow:*
> *1. Immediately around the town comes a circle where only hard-to-transport vegetables can bid successfully for the limited nearby acres of land.*
> *2. Outside of this first ring comes an annulus in which easier-to-ship grain is grown. (With more farm goods, Thünen envisages more distinct zones of specialization. Also for him, the same product may have to be produced farther*

[7] Such a statement would be dismissed by Samuelson (1983, p. 1481) as <<*a pardonable exaggeration*>>.
[8] Rutherford, Logan & Missen (1967) found a similar structure for agricultural activities in Australia, noting an unplanned "*rolling wave*" around Sydney.

out by a different and more "land intensive" method.)
3. At the farthest extremity of cultivation comes the endogenously determined external margin, where land rent has fallen to zero, because the cost of transporting town cloth outward and farm products inward has lowered farm-goods' prices relative to prices for city-goods and has reduced the economical density of labor to land. Beyond this frontier land is a free good.

It is interesting to note that - although Von Thünen is widely acknowledged as the "*founding god*" (Samuelson, 1983, p. 1468) of location theory and Schumpeter (1954, p. 466) even defined him as "*one of the patron saints of econometrics*" - his merits in an early description of agglomeration economies are usually forgotten[9].
Indeed, Von Thünen advanced various hypotheses about both centrifugal forces from the city – such as high land rents and food prices – and centripetal forces, described in the following excerpt, translated by Wartenberg (1966, pp 287-290):

The following factors, on the other hand, favour the location of industries in large towns:

(1) Only in large-scale industrial plants is it profitable to install labour-saving machinery and equipment, which economise on manual labour and make for cheaper and more efficient production.

(2) The scale of an industrial plant depends on the demand for its products […].

(4) For all these reasons, large-scale plants are viable only in the capital in many branches of industry. But the division of labour (and Adam Smith has shown the immense influence this has on the size of the labour product and on economies of production), is closely connected with the scale of an industrial plant. This explains why, quite regardless of economics of machine-production, the labour product per head is far higher in large than in small factories […].

(7) Since it takes machines to produce machines, and these are themselves the product of many different factories and workshops, machinery is produced efficiently only in a place where factories and workshops are close enough together to help each other work in unison, i.e., in large towns. Economic theory has failed to adequately appreciate this factor. Yet it is this which explains why factories are generally found communally, while, even when in all other respects conditions appear suitable, those set up by themselves, in isolated places, so often come to grief. Technical innovations are continually increasing the

[9] As much as his merits in economics in general: Samuelson (1983, pp. 1468-1469) declared that Von Thünen <<*not only created marginalism and managerial economics, but also elaborated one of the first models of general equilibrium and did so in terms of realistic econometric parameters*>> and is also eager to recognize that a single passage of Von Thunen would suffice to earn him <<*first-rank fame in the annals of economic theory*>>. The passage - that Samuelson believes anticipated the shift from the implicit marginalism in Ricardian theory to neoclassical marginal productivity and that is included in a translation by Douglas (1934, pp. 36-37) – recites: <<*The significance of capital we have measured by the increase in the product of the labor of a man which results from an increase in the capital with which he works. Here labor is a constant, capital a varying magnitude. When, on the other hand, we consider capital as remaining constant and the number of workers as varying, we realize in a large business that the significance of labor and the share of labor in the product which results from the addition of another laborer*>>.

complexity of machinery; and the more complicated the machines, the more the factor of association will enter into operation.

Von Thünen's theory of monocentric spatial economy is so advanced that Fujita & Krugman (2004) believed it could pass as a typical model of new economic geography.

Were that not enough to acknowledge Von Thünen's early anticipation and understanding of the dynamics of agglomeration, the following passage from Thünen, J. H. V., Wartenberg, C. M., & Hall, P. (1966, p. 295) could certainly convince even the skeptics:

It is worth noting that railway construction will rob of all their force the arguments against the development of the capital, and will strengthen those in favour of such growth. Thus we may say with certainty that railways will make an important contribution to the development of the large towns, and that, but for the fact that railways will promote also the prosperity of the rural districts surrounding the provincial towns, the latter would decay in consequence.

Fujita & Krugman (2004, p. 155) would acknowledge this very statement as coinciding <<*with one of the most important theoretical findings of the new economic geography: that is, (contrary to the intuitive belief of most people) the development of transport technology […] will strengthen the agglomeration of economic activities […] in the core regions or in large cities*>>.

However - and keeping in mind how early Von Thünen's model was produced - it is arguably limited by its own initial assumptions:
1. There is only one central business area[10];
2. There are no trades with external locations;
3. The area is homogenous, entirely usable and equally productive[11];
4. Transport costs only depend on the type of product and the distance from the center.

The main drawback of Von Thünen's model is the reliance on perfect competition, which makes it hard to deal with the scale economies that Von Thünen himself had recognized as necessary for understanding agglomeration. However, it would be over 100 years after its first printing, that The Isolated State began to attract widespread attention among scholars[12], becoming at the same time the object of some criticism[13]. One that seems worth reporting is offered by Sinclair (1967), who acknowledges that Von Thünen's theory and predictions actually held, even 150 years after their formulation, but only for areas that were not industrialized. Sinclair, indeed, states that urban sprawl determines an inverse pattern, with rings of growing land use intensity as distance from the city increases.

[10] Such an observation is actually not entirely honest, since Von Thünen relaxes such this assumption in the second part of his work, explicitly mentioning a system of cities of different sizes.
[11] Nonetheless, it has been shown by von Boventer (1963) that many of Von Thünen's results still hold, even when this assumption is relaxed.
[12] This is not to imply that Von Thünen had not been acknowledged meanwhile, especially by German economists such as Hermann, Schuz, Roscher and Predohl.
[13] After acknowledging Von Thünen's huge merits in the field, Samuelson (1983, p. 1469) himself does not spare him some critics, as when he states that those historians <<*that parrot the phrase that Thunen was the first to apply the differential calculus to political economy*>> should also recognize that he <<*was also one of the first to misapply it*>>.

Von Thünen's model would be organically extended by Alonso, who would apply it to urban contexts. In his book "Location and land use", Alonso (1964) returns to a monocentric city model with one central business district, which is surrounded by a residential area[14]. Four years earlier, Alonso (1960, pp. 149-150) had already highlighted that a peculiarity of land purchases is that the purchaser *<<acquires two goods (land and location) in only one transaction […]. He could buy the same quantity of land at another location, or he could buy more, or less land at the same location […], one encounters, as well, a negative good (distance) with positive costs (commuting costs); or, conversely, a positive good (accessibility) with negative costs (savings in commuting)>>*.

In his model, the fact that land rents decrease as distance increases results in the presence of taller buildings in the Central Business District and in comparatively smaller ones in the surrounding area. Moreover, those industrial activities that depend on high intensity of land use are located at an even larger distance from the Central Business District, in a ring that surrounds the residential area (which supposedly necessitates smaller tracts), whereas those that do not need much land to be exploited are located in a ring immediately surrounding the retail and service area.

Alonso's model had the limit of an *a priori* assumed monocentric spatial structure, where all production is supposed to be located at the given center, that is the Central Business District of the city, which happens to be surrounded by the residential area inhabited by workers who then commute to the central location. Such a limitation would be later overcome by Ogawa & Fujita (1980), who developed the first non-monocentric urban models. This kind of models featured firms and households (with the latter consisting of workers and consumers at the same) entirely free to choose their location within the city. The obvious consequence of this new assumption is that the number and the location of business centers become endogenous and are the result of interactions between firms and households in an environment that features competitive land and labor markets. These models have communication externalities as the centripetal force that attracts workers to the city.

The Central Place Theory

Christaller (1933) is the founder of the Central Place Theory, that Berry (1964, p. 152) identified as *<< perhaps the only one concerning systems of cities that was at all well developed>>* and that would subsequently be widely followed in German regional planning (Fischer, 2011).

Christaller was able to derive a concept which could explain the location, the size and the interactions of urban entities, and he probably was the first to study them as part of a unitary system with an internal functional hierarchy, instead of treating them as single separate units. Indeed, he believed that urban phenomena could not be explained by geography alone, but economic theory was needed.

And through economic theory, he would be able to understand that capital requirements were the reason behind the *central places* he referred to. *Central places* is the term Christaller used to define

[14] A similar model had already resulted from an empirical study, performed by Park and Burgess (1925) on the City of Chicago, combining in a map all existing information about physical features, any kind of artificial development, political boundaries and zoning. Such a map would later become the basis for several maps on the social characteristics of the city.

those settlements that provide surrounding areas with *central goods*, that is hospitals, schools, stores, and all those goods that are needed everywhere, but that can reasonably be produced only in certain locations.

Christaller's world is only at first sight similar to Von Thünen's (a homogeneous and flat land), but they differ on many aspects: whereas in Von Thünen's isolated state, there would be only one inhabited place surrounded by locations devoted exclusively to agriculture, Christaller assumes a dispersed population dwelling all over the area and, therefore, needing to travel to the nearest *central place* in order to consume *central goods*. A fundamental implication is that, although everybody has theoretically the same purchasing power, deriving from the same income, those who live further away from the *central place* will have to destine some of their budget to travel in order to consume, thus not everybody can spend the same budget on *central goods*.

Beckmann (1958) used Christaller's central place system and his conclusion that a city size is proportional to the population it needs to serve and that each city has a number of satellite cities of a lower rank, in order to develop a system of multipliers that is able to estimate city size. In a later research, Beckmann & McPherson (1970) built a more generalized version where the number of satellite cities is not assumed *a priori* and varies from level to level.

Although it has also been verified empirically in some cases[15], Christaller's hierarchy of urban settlements has some limitations. Firstly, although his assumption of consumers tending to the closest location has actually had a major influence and become standard in competitive location theory (Eiselt & Laporte, 1989), it does not take into account what is known as *multi-purpose shopping*, that is the tendency to satisfy different needs at the same time by preferring higher-order places over lower-order ones. An example of this tendency is offered by medical services, which are organized hierarchically and, indeed, fit Christaller's assumptions, with people tending to larger regional hospitals over local clinics, even when they have a minor health issue that would not necessarily need the medical assistance provided by the former to be dealt with. As anticipated by Christaller himself, this phenomenon leads to an even stronger hierarchy than the model predicts.
Lösch (1940) generalized Christaller's theory of hierarchically structured central places to a more flexible system, although he claimed not even knowing Christaller's book at the time of his own writing (Fischer, 2011). Actually, whereas Christaller's work could be defined as a minimization of the number of marketplaces serving an area, Lösch's aim is to maximize it, since he tries to identify how competition leads to smaller and smaller market areas.

Lösch built a spatial model of monopolistic competition that includes increasing returns, after his consideration that scale economies were necessary to explain spatial economics. In fact, under non-increasing returns and homogenously distributed resources, each location becomes an autarky, since goods can be produced at any scale and there is no incentive to trade; trade, indeed, would only be reasonable if resources were not uniformly distributed, as taught by the neoclassical theory of international trade[16].

[15] Wyckoff (1989) found it to be true for the service sector in Colorado, somehow confirming a previous consideration by Von Böventer (1963), who argued that, whereas Von Thunen's theory can be applied to the primary sector and Lösch's theory holds true when analyzing manufacturing and production, Christaller's applies to the tertiary sector.
[16]However, trade alone would appear as an insufficiently satisfactory explanation behind specialization and trade (Fujita & Thisse, 1996).

The result is a general equilibrium originating from the maximization of both individual utility and the number of independent economic units, and it is defined by the following five conditions:

1) The location of each individual is assumed to be the one that leads him to the highest possible profit;
2) The space is assumed to be entirely covered;
3) Abnormal profits cannot last and prices must become equal to costs;
4) All areas where production and sale occur must be as small as possible, otherwise new units would enter the market;
5) On the boundaries between different economic areas, it is indifferent to belong to one or the other.

Lösch also demonstrated that the presence of a large number of producers in a specific area decreases total transportation costs and contributes to normalize their profits and – differently from Christaller - in Lösch's system, smaller centers can also serve larger ones. Lösch verified himself the applicability of his theory to actual cases and studied the spatial structures of location in the United States. However, his approach produces a less regular pattern than Christaller's, whose theory is therefore more commonly adopted.

1.3 Theories of agglomeration

Hoover (1948, p. 3) stated that <<*Even in the absence of any initial differentiation at all, i.e., if natural resources were distributed uniformly over the globe, patterns of specialization and concentration of activities would inevitably appear in response to economic, social, and political principles*>>, recognizing three types of economic agglomerations: economies of localization, economies of urbanization, and internal returns to scale. Internal returns to scale mean that <<*larger firms reach a certain threshold of efficiency in production*>> and depend on the firm's intrinsic characteristics more than geography; economies of localization imply <<*that firms locating in agglomerated regions and producing along similar lines in the same industry enjoy easier knowledge transfer, skilled labor pooling, etc.>>;* finally, economies of urbanization <<*refer to the extent to which firms in a dense region reap benefits from other coagglomerated firms not belonging to the same industry*>> (Caragliu, de Dominicis & de Groot, 2016, p. 92).

The theories described in the previous section treated space as a barrier and as a box that passively undergoes through agents' decisions and choices. However, space has also been interpreted as an economic resource itself, providing externalities and rents and leading to innovation. Indeed, Fujita (2010, p. 3), after acknowledging how <<*Thünen's theory represents a great achievement in the history of spatial economics as well as in general economic theory*>>, recognizes that <<*in Thünen's entire theory, it is assumed a priori that all manufactured goods are to be supplied from the town*>>, wondering <<*What are, then, the agglomeration forces and economic mechanisms that keep all manufacturing activity in the town?>>.*

Weber (1909) was the first to introduce the term "*agglomeration*", in his essay Theory of the Location of Industries, where he tried to understand why and where several units involved in the production of the same commodity will agglomerate, forming a generalized theory of agglomeration that has remained somehow unchanged[17].

According to Weber - among the several forces that determine location - natural factors (climate, topography, natural resources) are undoubtedly as much relevant, and possibly more, as social factors (labor, capital, technology, culture, transportation) are: so much so that he focuses on atmospheric humidity as one of the most important features that affect the location choice[18]. However, his focus on externalities is stronger than previous location theorists, and he might be regarded as one of the first scholars to shift his attention from almost purely geographic conditions to a more economic framework.

Weber studies what happens when a group of people settles in previously uninhabited and undeveloped land and establishes an isolated economy. Initially, they organize subsistence agriculture to produce what is needed for their survival, forming the geographical foundation for

[17] Phelps (1992). However, Isard (1949) challenges its adequacy, claiming that the model <<*fails to get at the rule or rules governing structure and provides no common denominator in terms of which all the forces stemming from the various interrelations can be expresses and evaluated, and by means of which a net effect could perhaps be deduced. This is the task of a general theory of location and space-economy*>>.

[18] Weber (1909) argues that atmospheric humidity increases depreciation cost, by causing machines to rust more frequently. As an example, he argues that Hokkaido's cold climate and the increase in capital expenditure for facing such a harsh climate is a major factor in preventing firms from locating there.

further development. Then, a primary industrial stratum is formed in order to supply the first agricultural system, which becomes his locus of consumption. A third stratum, consisting of ever smaller several substrata, then forms. Weber also identifies a fourth stratum, consisting of officials, businessmen, professionals and rentiers and located either arbitrarily or according to other strata (Isard, 1949, p. 482). Finally, a fifth stratum is dependent on the fourth, as the third stratum was connected to the second.

Weber studied transportation costs for both input by suppliers and output to consumers, in order to understand the optimal location of a plant in a competitive market with indivisible activities. He then comes to the conclusion that the center of agglomeration is to be found in one of several possible points where the transportation costs are the lowest in relation to the total output. Weber's concern with transaction costs - and especially potential transportation costs savings originating from agglomeration – would later lead Hoover (1948) to decompose such costs into fixed and variable components according to the several modes of transportation.

Weber's analysis somehow anticipates many concepts that will be later pivotal to Marshallian externalities , such as when he mentions "*marketing factors*" and economies resulting from "*general overhead costs*", which is arguably equivalent to understanding how internal fixed costs are reduced when they are spread among many firms located close to each other. Also, the so-called "*development of the labour organization*" and the "*development of the technical equipment*" are <<*reminiscent of Marshall's description of localized linkages*>>, as highlighted by Phelps (1992, p. 36).

Economies of localization and economies of urbanization

A common limit of location theories and Weber's theory is represented by a lack of consideration of history: since plants are already present in a location, relocating somewhere else would involve opportunity costs amounting to foregoing the use of already existing facilities, and these must necessarily be taken into account when analyzing their choices.

A few years later, such an issue would be dealt with by Marshall (1920, p. 271), who understood that <<*When an industry has thus chosen a locality for itself it is likely to stay there long; so great are the advantages which people following the same skilled trade get from near neighbourhood to one another>>.*

Marshall is commonly acknowledged as the first to understand that location and proximity of economic agents to each other do not only condition the location choices of such agents, but are also factors themselves that contribute to economic productivity.

Concerning agglomeration, Marshall was able to identify three forces:

1. Knowledge spillovers;
2. Labor market pooling;
3. Sharing of industry-specific non-traded inputs that lead to cost advantages.

Knowledge spillovers rely on one of the most relevant characteristics of information, that is its public good nature: its use by an agent does not reduce its future availability for other agents, or, as put by Marshall himself, "*the mysteries of commerce are […] as they were in the air*". Therefore, when

information spreads out between firms, benefits generally develop for all and, when information is different for each firm, the higher the number of firms involved, the higher the benefits received by all of them. Moreover, information usually decays with distance, providing better benefits for firms that locate closer to each other. The other two points are just as intuitive as the first: a large pool of workers allows the firm to choose those who better suit its needs, without the need to pay a conspicuous amount of money in exchange for their job, whereas the presence of many firms allows them all to save on transport of intermediate goods necessary for production.

Duranton & Puga (2004, pp. 2-3) noted that although the three aforementioned forces certainly represent an interesting starting point[19], they are not useful enough for developing a taxonomy of theoretical mechanisms. Indeed, they highlighted that a model in which agglomeration facilitates the matching between firms and inputs could be presented as a formalization of either one of Marshall's three forces, but it would capture only one mechanism. Such a consideration led them to distinguish three types of micro-foundations, namely *sharing*, *matching* and *learning* mechanisms. Sharing mechanisms deal <<*with sharing indivisible facilities, sharing the gains from the wider variety of input suppliers that can be sustained by a larger final-goods industry, sharing the gains from the narrower specialization that can be sustained with larger production, and sharing risks*>>; matching mechanisms are those <<*by which agglomeration improves either the expected quality of matches or the probability of matching, and alleviates hold-up problems*>>; finally, learning mechanisms are those <<*based on the generation, the diffusion, and the accumulation of knowledge*>>.

Marshallian externalities can provide *pecuniary incentives* or, alternatively, *technological incentives* (Cotelo, Hermann & Goldbaum, 2015): the sharing of industry-specific inputs clearly involves the former (a mere reduction of the cost of inputs for a firm, without their productivity being affected), whereas knowledge spillovers provide technological incentives (an increase in the productivity of inputs, without reducing their cost). Labor market pooling could be argued to provide both: a firm obtains access to a more productive workforce but also maintains the advantages offered by wage competition.

In sharp contrast with Marshall, Jacobs (1969, p. 59) believed that the driving force behind agglomeration and economic innovation was not specialization, but diversity, since <<*the greater the sheer number of and variety of division of labour, the greater the economy's inherent capacity for adding still more kinds of goods and services*>>.

Whereas the so-called Marshall-Arrow-Romer model – as formalized by Glaeser et al. (1992) - implies that knowledge spillovers <<*only occur among firms of the same or similar industry, and thus can only be supported by regional concentrations of the same or similar industries*>> (Beaudry & Schiffauerova, 2009, p. 19), Jacobs not only believed that they might also operate between different industries, but actually argued that inter-industry spillovers are the most conducive to innovation and growth, giving rise to urbanization externalities (also called *Jacobs externalities*). As put by Mameli, Faggian & McCann (2008, p. 353), <<*Ideas developed in one sector can be fruitfully applied in other sectors generating a sort of cross-fertilization of ideas*>>.

[19] It is to highlighted however that other forces have been identified, such as <<*home market effects, where the concentration of demand encourages agglomeration, and economies in consumption, where cities exist because people like the bright lights*>> (Rosenthal & Strange, 2004, p. 2123).

As a consequence, Jacobs believes competition is desirable for growth as it is an incentive for firms to innovate, whereas Marshallian models perceive monopoly as a better incentive, since it allows exploitation of rents from innovation. Indeed, Jacobs believes that competition for ideas is a stronger incentive than the capability to appropriate rents, and it is determined by an industry firm-employment ratio: <<*the more firms per employee, the better individuals are enabled to pursue and implement new ideas*>> (Van der Panne, 2004, p. 595). Whereas Feldmann & Audretsch (1999) have found local competition to affect innovation positively, Van Oort (2002) obtained opposite results for Netherlands. Paci & Usai (1999, p. 389) find that Jacobs' externalities <<*play a different role depending on the nature of the local district (whether it is a metropolitan area or not) and on the type of industry (high vs low tech sectors)*>> and that <<*such externalities appear more powerful in high tech sectors and in metropolitan areas*>>.

Some authors have argued that it is diversification indeed that fosters regional innovative activity: Feldman & Audretsch (1999) found that new product announcements tend to be lower in industries that locate in cities specialized in a specific economic activity. Many studies have confirmed diversification externalities, with Kelly & Hageman (1999, p. 39) observing that R&D seems to be <<*determined more by the location of other sectors' innovation than by the location of its own production*>> and Paci & Usai (2000, p. 250) highlighting that <<*when diversification across industries in the local district is higher, Jacobs externalities are at work and innovative capacity is, consequently encouraged*>>.

Paci & Usai (1999, p. 389) underlined that Marshallian and Jacobs' externalities <<*are not necessarily opposed, since specialization is a particular feature of a certain sector within a local system whilst diversity is a characteristic of the whole area. Therefore we may have a huge number of combinations between different levels of specialization in a local sector and degrees of diversity in the area*>>.

Circular and Cumulative Causation

The Marshallian concept of external economies arising from the "*atmosphere*" is acknowledged by both Myrdal and Hirschman as behind their theories and is a fundamental basis for the concept of *cumulative causation*: that is, quoting Myrdal (1957, p. 13), the possibility that changes in a specific variable in a social system do <<*not call forth countervailing changes but, instead, supporting changes, which move the system in the same direction as the first change but much further*>>. Such a concept would be prominent in development economics during the 1950's and 1960's, but had already been pivotal for institutional, monetary and macro-economic theorists since the very beginning of the century (Andersson & Klinthäll, 2012), although the first to formalize it was Young (1928), who noted that any advance in production, notwithstanding its nature or cause, generates a change in industrial activity and, consequently, a chain of unsettling and cumulative responses. Myrdal himself acknowledges his debt towards Knut Wicksell for directing him towards cumulative processes.

Cumulative mechanisms are the result of a tension between backwash effects of trade and capital flows promoting inequality, and spread effects that mitigate it. Backwash effects are those internal and external economies, such as innovation or economies of scale, that allow producers to decrease the need for inputs and to increase their output. On the other hand, spread effects occur when local

input in underdeveloped regions are acquired by foreign investors, allowing also for the transfer of knowledge from the more productive area to the less productive one.

If Hirschman perceived spatial inequality as not only inevitable, but as a driver for growth itself, Myrdal did not believe as well that an equilibrium could exist for long and certainly that it would not be a natural state, since cumulative processes would always push towards (and often lead to) polarization. However, whereas Hirschman (1958) was convinced that polarization would have trickling-down effects that would lead regions to convergence, Myrdal (1957) was skeptical about such compensative effects[20]. In fact, Myrdal acknowledged that Marshallian external economies are concentrated in certain successful regions, that are then destined to become poles of attraction for the most productive workers from more unfortunate places, where the disadvantage is perpetuated not only by deprivation of the workforce, but more generally and durably by the skewed age structure (Andersson & Klinthäll, 2012).
Thus, what Myrdal believes is that Marshallian forces not only drive success in fortunate regions, but they also put unfortunate places at even more of a disadvantage[21] and, indeed, the greater the original disparity between the regions, the more likely are the backwash to dominate over the spread effect, hampering any real reduction of inequality. Even when there is a productive shift that increases the value of the poorer region's resources, the presence of agglomerations in the richer region could still slow down the advance of the former because the latter still offers higher returns.

Furthermore, and descending somehow into ethics, Myrdal believes that the reason behind disparities between rich and poor regions could well depend on single events that occurred a long time ago and originated different paths for growth or lack thereof, implying some sort of exclusion of actual responsibility[22].

Growth Poles

As can be inferred from his appreciation of a quote originally from Morgenstern reciting <<*there is no road leading from L. Walras to reality*>>, Perroux (1980, p. 156) based his analysis on the belief that neoclassical economics had forced itself to irrelevancy after the choice of neglecting what he deemed as the most important features of economic behavior, chiefly the asymmetry of power that characterizes any market interaction. Perroux's contribution stems from his belief that agglomeration is a consequence of the way power is exercised in a geographical space, leading to a firm's profit being the result <<*of its output, of its inputs, and of the output and inputs of another firm*>> (Perroux, 1955, p. 96).

[20] Myrdal believes that the spread effect warranted by foreign investment is usually limited to the employment of only low-skilled labor, and that knowledge transfer is also hampered by cultural differences and local issues.
[21] Myrdal (1970, p. 279): <<*a country superior in productivity and incomes will become more superior, while a country on an inferior level will tend to be held down at that level or even to deteriorate further – as long as matters are left to the free unfolding of market forces*>>.
[22] Myrdal (1957, p. 27): <<*the power of attraction of a center today has its origin mainly in the historical accident that something was once started there and not in a number of other places where it could equally well or better have been started, and thtat the start met with success. Thereafter the ever-increasing internal and external economies – interpreted in the widest sense of the word to include, for instance a working population trained in various crafts, easy communication, the feeling of growth and elbow room, and the spirit of new enterprise – fortified and sustained their continuous growth at the expense of other localities and regions where, instead, relative stagnation or regression became the pattern*>>.

On a larger scale - that also considers interrelations between different industries - Perroux (1957) theorized that industrial clusters (*growth poles*) would result from the attraction existing between *motor industries* (sometimes also translated as *propulsive industries*) and *driving industries*. Specifically, his view was that small firms (driving) are attracted by a large firm (motor) because they aim to save on shipping costs and to share a large and specialized labor market. Growth pole theory is thus an abstract conceptualization that Rossi (2009) perceives as stemming from the commonly-held belief that, as put by Hirschman (1958, p. 183) <<*an economy, to lift itself to higher income levels, must and will first develop within itself one or several regional centers of economic strength*>>.

The three requisites that Perroux deems as necessary in order for an industry to become a growth pole are: (1) large size[23], (2) a potential for economic leadership, and (3) faster growth rate than the local economy where it is located.

Perroux clearly pays homage to the Schumpeterian view, according to which <<*development proceeds […] by the direct and the indirect effects of innovations that are able to take an economy away from a stationary equilibrium (both sectoral and spatial). This means that the newer and more efficient industries in which innovations take place grow at a faster pace compared to the older and more static industries*>>.

Perroux's framework is essentially abstract and theoretical[24], but other scholars have tried to convert it for practical applications, sometimes drawing on functional urban theory[25]. Among them, Jacques Boudeville (1961) employed regional operational models and input-output matrices in order to ask for the establishment of planned growth poles all around France through public investment in services and incentives to private industry.

Outside France as well, Perroux's ideas were discussed in order to set up strategies oriented to actual practical development, such as in South America[26] and in other countries all over the world[27] attracting much skepticism, as Rossi (2009, p. 5) acknowledges:

> <<*According to critics, the concept of "growth center" has exceeded the original conceptualization of the Perrouxian "growth pole" […]. In particular, three weaknesses have been identified within those theoretical efforts attempting to spatialize growth pole theory and to apply it to specific geographic and policy contexts. First, critics have questioned the basic assumption that the growth pole in geographic space (the "growth center") was simply a variant of the growth pole in economic space; second, critics expressed skepticism about the main assumption underlying the geographic translation of growth pole theory, that is, the idea that the "natural" growth pole existing in geographic space could be automatically replicated in the form of a planned growth pole; third, they lamented the loss of*

[23] Rossi (2009, p. 4) notes that <<*Discussions about the critical size of the city for being a "growth center" were central […] with the 250,000 population figure being seen as the conventional threshold*>>.

[24] Perroux (1950) himself insisted that pecuniary externalities originating from a propulsive firm might or might not be confined to a geographical space, and that is the reasony why refers to an economic space instead.

[25] Berry (1972) theorized a hierarchical system of cities organized on the basis of the functions performed by each.

[26] Richardson & Richardson (1975) discussed similar strategies for Argentina, Bolivia, Brazil, Chile, Colombia, Mexico, Peru and Venezuela.

[27] Kuklinski (1972) applies the growth pole concept to Canada, India, Libya, Poland, Sweden and Tanzania.

the original neo-Schumpeterian attention toward economic innovation and signaled, on the contrary, a prevailing emphasis being laid on firm size with its multiplier potentials as a distinguishing feature of growth centers and poles>>.

Growth poles theory was extremely relevant also in the political field in the decades following the 2nd World War and until the oil crisis of the 1970's. Indeed, many countries implemented development strategies revolving around such a theory, although with mixed success (Christofakis & Papadaskalopoulos, 2011).

1.4 Synthesizing approaches

Combining Christaller's central place theory with Weber's results on production location and with Von Thünen's results on agricultural location, and integrating them into the framework of neoclassical economics, Isard developed a general location theory that embraces <<*the total spatial array of economic activities in an economy*>> (Isard, 1949, p. 505).

Isard decided to relax the assumption of a uniformly distributed population, resulting in market areas whose shape and size vary depending on the population density. He considered that the prevailing and traditional paradigm of general equilibrium analysis, as developed by the likes of Walras and Pareto, is lacking because it does not account for spatial dimensions, and their assumption of perfect competition cannot comprehend the consequences of transport and spatial costs on the spatial distribution of economic activities. Indeed, spatial relations inevitably imply monopoly elements that cannot but result in a *general theory of location and space* economy being identical to a *general theory of monopolistic competition*.

General equilibrium is heavily criticized by Isard (1949), who dismisses Hicks' rejection of monopolistic competition models in favor of perfect competition, and Schumpeter's defense that transport cost is implicitly a part of the entire production cost. Indeed, Isard (1949, pp 477-478) replies that <<*production theory […] cannot justifiably treat certain production costs explicitly and other important ones implicitly in order to avoid the obstacles to analysis which the latter present. For a balanced treatment, the particular effects of transport and spatial costs in separating producers from each other must be considered. They are too vital to be sidestepped through implicit treatment, as Hicks and others may be interpreted as having done*>>.

Finally, in order to incorporate dynamic relations into the theory, Isard (1949) repeatedly calls for what he defines as an "*evolutionary approach"*. Half a century later, Fujita (1999, p. 378) would side with him, explaining that the spatial configuration of an economy must be considered <<*as an historical outcome of the recurrent sequence of balance and overbalance of two opposing forces of centripetal drive based on increasing returns and centrifugal effects of diminishing returns*>>.

Just a few years after Isard's general location theory, Arrow & Debreu (1954) introduced a model, where space would be integrated with general equilibrium analysis, assuming that a commodity is defined not only by its physical characteristics but also by the place where it is made available (Thisse, 2019, p. 8)[28]. They hypothesize a competitive economy, where firms are characterized by a set of production plans, each one describing a possible input-output relation. Consumers are identified by a relation of preference, by shares in the profits of the firms and by a bundle of initial resources. Concisely speaking, in such a model all markets clear and each agent chooses according to his preferences at the equilibrium prices; supply equals demand, firms maximize their profit conditional to their possible technologies, and consumers maximize their utility conditional to their

[28] The identification of a commodity by its location - in addition to its essential features – would be considered ineffective by Isard and other like-minded scholars. Among them, Koopmans & Beckmann (1957) focused on indivisibilities – which they perceive as fundamental to explain urban location problems in general, and the absence of a competitive equilibrium specifically. Thus, a model such as those pertaining to traditional general equilibrium analysis, cannot capture the impact of transport and spatial costs on the distribution of economic activities, since these are assumed to originate from said indivisibilities.

budget constraint (defined as the value of their initial endowment and their shares in the profits of the firms).

The emergence of New Economic Geography

Arrow-Debreu model, however, was uncapable of explaining economic agglomerations in a homogenous space, because, as well put by Starrett (1978) in what is defined as the *Spatial Impossibility Theorem*[29], transport costs would balance out to zero in a spatial competitive equilibrium, with the consequence that no cities or even trade are needed in such a framework.[30] Therefore, it is necessary to violate at least one of the assumptions of the theorem, allowing for the emergence of comparative advantages, agglomeration externalities and imperfect competition.

New trade theory (Krugman, 1980) originated after observing that countries with similar factor endowments and comparable technologies still had high and growing levels of trade. Balassa (1966) had already understood that some countries do not produce every product they would be able to, because they exploit economies of scale by specializing in a few products. Many traditional trade theory's assumptions were thus relaxed, and economies of scale, imperfect competition and differentiated goods were introduced, as well as a focus on domestic market size (i.e.: local labor force). When goods are tradeable, economies of scale lead production to concentrate in a single country and, unsurprisingly, it will be the one with the larger domestic market, so that trade costs are minimized (because a smaller proportion of goods will be subject to trade costs).

Comparative advantage models rely on exogenous local asymmetries such as specific natural features and are generally implemented by traditional trade theory. Their major limit is that they cannot explain why similar regions with similar initial endowments and similar geographical settings, still decide to trade with each other. Comparative advantage was helpful enough to explain trade patterns during the first age of globalization (Gaspar, 2020), where countries with different factor endowments would trade heterogenous products with each other. Nevertheless, those same theories would not suffice to describe the new international trade patterns that emerged after World War II, often consisting in <<*exchanges of similar products between similar countries, exemplified by the massive two-way trade in automotive products between the United States and China*>> (Krugman, 2009, p. 561).

Agglomeration externalities explain increasing returns occurring outside the individual firm, but the latter is still assumed to operate under constant returns and perfect competition, as in traditional trade theories, where trade and location are determined exogenously (Vogiatzoglou, 2006) and depend on countries' technological levels and factor endowments.

Models that recognize imperfect competition can assume either *oligopolistic* or *monopolistic* competition. In the first type - oligopolistic competition - a few large actors interact strategically with each other. Hotelling (1929) and then Kaldor (1935) were the first to explicitly state that the

[29] If agents and locations are finite, space is homogenous and there are costs involved with transporting goods, each location has an incentive to operate as an autarky, in what is generally defined as *backyard capitalism*. However, Starrett (1978, p. 27) himself notes that introducing non-perfect divisibility of economic activities, would necessarily imply that <<*a sufficiently complicated set of interrelated activities will generate transport costs*>>.

[30] It is to be noted, though, that Ellickson & Zame (1994) claim that introducing moving costs in a dynamic setting could explain how competition arises in such an environment.

nature of spatial competition is oligopolistic, but a few years had to pass before such a message would be understood, in the light of the recently developed game theory (Gabszewicz & Thisse, 1986). Kaldor argued that consumers buy after considering "*full price*" (that is, the product price plus the cost of transportation to the desired location for usage) and, therefore, each producer is in actual competition with only a few neighboring firms, notwithstanding the total number of firms in the industry. The logical consequence of such an argument, as expressed by Thisse (2019, p. 27) is that the global market must therefore be <<*segmented into several sub-markets formed by consumers who are more or less captive because their mobility is confined to an area determined by their residence and the firms they patronize. Such a market description is known as spatial competition*>>. Just a few years earlier, Hotelling had hypothesized a spatial duopoly with consumers uniformly distributed along a line (dubbed *Main Street*) and with two stores selling an identical good. Some simple game theory would tell us that the two stores would have an incentive not to locate at the position that minimizes total transport cost by consumers, but rather "back to back" at the center of the street, in order for the competitor not to exploit an advantage that would enable him to "steal" a share of potential customers. According to Hotelling, such a location choice, though not an optimum for consumers, but perfectly rational for firms competing in what can be perceived as a non-collaborative game, is what provides a rationale for the agglomeration of firms even when customers are dispersed[31].

It is easy to understand that oligopolistic models require a high level of complexity in order to deal with the game theory behind firms' decisions. Monopolistic competition models have therefore been generally preferred, because strategic interaction is left aside, with increasing returns to scale at the plant level and transport costs becoming essential to understand spatial distribution. In monopolistic competition, firms have some sort of monopoly power – since their competitors' products are only *imperfect* substitutes – but they still act unilaterally and do not get involved in cartels or price collusion. This is the best way to implement increasing returns and economies of scale, without ending up with a one-firm-supplies-all model. In fact, when people prefer to enjoy more products of different varieties rather than more of the same variety, different firms are needed to overcome setup costs that offset the economies of scale. Monopolistic competition would be pivotal for Dixit & Stiglitz (1977), who gave it <<*a much sharper-edged formulation*>> (Fujita & Krugman, 2004, p. 143).

On the other hand, Paul Samuelson (1954), a notable exponent of traditional trade theory, advanced the idea of treating transportation services differently than other industries – where *independent* capital and labor are necessary to produce the required output – and instead imagined free shipping of goods, with the transport cost being some sort of "melting" of part of the product during the transit. Such a simplification allows not to get involved in analyzing another industry (transportation, that is) and results in a more immediate description of price setting by monopolistic firms. *Iceberg costs* allowed Krugman to identify the so-called *home market effect*, whose implication is that firms focus more than proportionally on large markets in order to minimize transport costs.

[31] We shall not be fooled by thinking that such an argument has come to us undisputed. Actually, it has been the focus of much criticism: most notably, d'Aspremont, Gabszewicz & Thisse (1979), after assuming quadratic travel costs (rather than linear) in order to capture the idea that marginal cost of time increases as travel length increases, showed that firms would actually choose to locate at the two extreme points of Main Street, in order to relax price competition.

New Economic Geography relaxes the exogeneity of the market size still hypothesized by new trade theory. Market size endogeneity implies that firms' location itself is entirely endogenous and depends on either market size spillovers or input-output linkages between industries, leading to circular processes of agglomeration (Vogiatzoglou, 2006). New Economic Geography shall not be perceived as an interdisciplinary explanation of the distribution of economic activities: indeed, it is undoubtedly a branch of economics proper, featuring typical economic concepts such as increasing returns to scale, transportation costs and, in the words of Meardon (2001, p. 26) <<*productive factors that are partly fixed and partly footloose*>>. Its defining issue, in the words of Fujita & Krugman (2004, p. 140), is <<*how to explain the formation of a large variety of economic agglomeration (or concentration) in geographical space*>>.

Whereas previous studies explained the dis-homogeneous distribution of economic activities across space through geographical barriers, climate and uneven distribution of resources, Krugman (1991) and the New Economic Geography relied on the distance of economic agents from one another. This is sometimes perceived as some sort of reconciliation of what were until that moment seen as separate sub-disciplines of economics: trade theory and location theory, or international economics and regional economics; indeed, Fujita & Krugman (2004, p. 144) made it clear that <<*be it urban economics, location theory or international trade, it's all about where economic activity takes place and why*>>, not too differently from what had been acknowledged half a century earlier by Isard (1977, p. 159) when he wrote that there was <<*a continuing discussion on the interrelations of trade and location theory – whether location theory is a special case of trade theory, whether trade theory is just a special case of a general location theory, or whether they are one and the same thing*>>, concluding that they <<*are one and the same thing. They are as the two sides of the same coin*>>.

In a paper that does not spare any criticism to the discipline, an interesting view of New Economic Geography is provided by Neary (2001, p. 536), who described its key contribution as a <<*framework in which standard building blocks of mainstream economics (especially rational decision making and simple general equilibrium models) are used to model the trade-off between dispersal and agglomeration, or centrifugal and centripetal forces*>>, with such an approach providing <<*a choice-theoretic basis for a "propensity to agglomerate"-only a propensity, since agglomeration is a possible outcome but not an inevitable one*>>.

New Economic Geography essentially relies on three assumptions:

a) A seek for variety;
b) Increasing returns to scale at firm level;
c) Reduction of transportation costs;

Agglomerating (or centripetal) forces are market size effect (so-called *linkages*), thick labor markets, and pure external economies (such as knowledge spillovers), whereas dispersing (or centrifugal) forces are immobile factors, land rents (and commuting), and pure external diseconomies (such as congestion).

Although Fujita & Krugman (2004, p. 156) recognize that <<*all have at least some bearing on almost any real-world issue in economic geography one might discuss*>>, New Economic Geography decided <<*to simplify matters*>, focusing only on linkages as a force towards agglomeration, and factor immobility as a force against. In particular, knowledge spillovers are not dealt with because the authors felt like it would necessarily need a dynamic framework and also because they <<*leave no*

paper trail by which they may be measured or tracked>> (Krugman, 1991, p. 53). Fujita & Krugman (2004, p. 161) admit that, at least in the short-run, proximity certainly plays a role in the diffusion and generation of ideas, but convergence would then occur in the long-run, and whatever externality may have arisen will quickly wear out. Thus, in order to incorporate knowledge spillovers, there is the need for a new growth theory where heterogeneous knowledge fields in different areas are endogenously generated and do not disappear because knowledge workers cyclically migrate.

Goods' differentiation incentivizes on one side producers to locate as close as possible to the market in order to reduce price competition, and, on the other, consumers to reduce transportation costs (that is, increase their real wage) by locating closer to their suppliers. Following the assumption that consumers seek variety, their real income rises when they locate in the center rather than in more distant places, leading to migration of consumers/workers, and to a demand increase for goods. More firms will then locate near the center, increasing variety. Therefore, forward linkages (greater variety of goods, increasing workers' real income) and backward linkages (greater number of consumers, attracting more firms) will push for agglomeration of firms and workers. Scale economies and increasing returns will then follow.

The Core-Periphery structure starts with workers choosing their locations and with production being set up according to population patterns. When transport costs are sufficiently high, shipment of goods is expensive and firms have an incentive to disperse in order to focus on local markets; on the other hand, when transport costs become sufficiently low, such a pattern loosens up and producers have an incentive to locate in a single region that becomes the *core* of the economy, leaving only agricultural production in what then becomes the *periphery*. Increasing returns are then exploited by selling more in the larger market without losing much in the periphery, where goods can still be shipped to thanks to low transportation costs and to increased demand in the core, where migrants have moved. However, when transport costs become extremely low, the positive home market effect obtained when locating in the less productive area (an increase in sales) will still decrease, but more slowly than the decrease of the opposite-sign effect of paying higher real wages than the most productive area: finally, the wage effect and the market effect will balance each other out, and there will be no specialization again, as in the initial scenario with high transportation costs. The contrast with neoclassical models is apparent, since their assumption of constant returns and perfect competition would predict convergence only, whereas the Core-Periphery structure allows to predict divergence as well.

Such a U-shaped curve linking concentration and transport costs is not unanimously shared. Indeed, an alternative model shows increases in concentration and decreases in specialization at the same time, both resulting from improvement in transport technology leading to lower transport costs, leading the author, Rossi-Hansberg (2005, p. 258), to acknowledge that <<*Specialization is favored by agglomeration, de-concentration by better market access for the periphery. Changes in concentration and specialization patterns with the same sign happen in rare cases, specifically for changes in transport costs that eliminate some industrial clusters altogether*>>. Another alternative model was built by Ricci (1999), who concluded that increased agglomeration reduces specialization, whereas a reduction in trade costs might reduce agglomeration (or even reverse its pattern) instead of boosting it. Ricci would also show that when trade costs decrease, the incentives to locate in the larger market and in the more productive market increase, thus reducing agglomeration whenever most firms are initially located in a region that is the larger market but not

the most productive one; in fact, in the presence of factor immobility, the productivity advantage might be stronger than the market size effect, thus leading firms to move to the small more productive region.

Cotelo, Hermann & Goldbaum (2015, p. 10) summed up the reasons behind New Economic Geography's success:

> *Krugman's genius was to build a model that is neoclassical in the sense of a general equilibrium model – "you know where the money comes from and know where it goes" (Krugman, 2011, p. 8), but is also:*
>
> 1. *Fully microfundamented, resulting from the interaction of individuals maximizing utility;*
> 2. *There is no "dormitive properties". Referring to the doctor part of Molière, which triumphantly says that opium puts people to sleep because of their dormitive properties. It's the same as saying that agglomerations occur because of agglomeration economies and this is a tautology. Agglomeration economies should be derived from the deeper layers of human actions.*
> 3. *Presents certain distance between the assumptions and conclusions. If the logical passages are few and obvious one must distrust the obviousness of the results. It's no fun to see the magician disappear with the tape on a tube if you can see the other end of the tape.*
> 4. *More than one result. For reasons both aesthetic and from a historical point of view, a model that gives as a result the cities that appeared and grew as well as those that did not prosper or not arrived to emerge is desirable.*
> 5. *The model has to be treatable in the sense that it can at least be simulated on a computer, if it is impossible to obtain an analytical response.*

New Economic Geography developments and its critics

Many models have been developed by other authors who appreciated and followed Krugman's approach, with the common point being a framework consisting of monopolistic competition, iceberg transportation costs and various degrees of factor mobility[32]. Behrens & Robert-Nicoud (2011, p. 216) noted that <<*post-Krugmanian contributions*>> have been <<*incremental*>>, sticking <<*to a relatively narrow framework that closely follows Krugman's initial setup*>>, with Robert-Nicoud (2005) dubbing them all as "*identical twins*". Krugman (1993) himself had extended the original Core-Periphery model to a so-called "*racetrack economy*" consisting in twelve regions located at the same distance around a circumference, in order to analyze spatial distribution in a multi-regional setup without being limited to the original two regions. Helpman (1998) removed the assumption of immobile labor and added a housing sector to the model instead: in this model, integration leads to dispersion rather than agglomeration, since workers are able to move between

[32] A notable exception is Ottaviano, Tabuchi & Thisse (2002), who built a model with quasi-linear utility over preferences with quadratic sub-utility over differentiated manufactures, and additive transportation costs, but still leading to predictions similar to the standard Krugman's Core-Periphery model.

different regions[33]. Krugman & Elizondo (1996) had already provided a solution to the problem, by substituting immobile labor for commuting costs, in an attempt to identify congestible non-tradeable resources as the centrifugal force that prevents all workers from locating in the same region. Another solution is provided by Murata (2003), who built a model where all workers are mobile, but their preferences are heterogeneous as concerns residential location. Puga (1998) modified Krugman's model including intersectoral labor in order to show the role of labor supply elasticity. He demonstrates how a higher elasticity of labor supply allows manufacturing firms to attract workers from the agricultural sector, increasing agglomeration in their own zone. In fact, impossibility for firms to attract workers from other areas annihilates the role of any other incentive, and results in a total lack of agglomeration.

One of the most widespread accuses towards New Economic Geography is that it accounts for some spatial costs while neglecting others without a stated and understandable reason.

In sharp contrast with the New Economic Geography, which implements a traditional economics approach to geography, the geographer Martin (1999, p. 83), who wished to differ on assumptions and methodology of NEG (and, more generally, of mainstream economics) wrote:

> *For the vast majority of economists, there are just two levels at which economic processes operate and at which theoretical exposition is needed: the micro-level of individual households and firms, and the macro-level of nation states. These two levels constitute "the economy". In reality, economic life is conducted in and across space (local, regional, national and global): it is organized geographically, and this spatial organization has a crucial bearing on how the economy functions, on performance of individual firms and on the welfare of individual households. It is not merely a case of recognizing that the mechanisms of economic development, growth and welfare operate unevenly across space, but that those mechanisms are themselves spatially differentiated and in part geographically constituted; that is, determined by locally varying, scale-dependent social, cultural and institutional conditions. This is the stuff of economic geography proper.*

It is the method itself that is in question, because New Economic Geography is accused to deal with issues that have already been solved by geographers in the past (Cotelo, Hermann & Goldbaum, 2015). Such consideration led Martin (1999, p. 67) to claim that what he dubs "*new geographical economics*" <<*is not that new, and it most certainly is not geography*>> and to object that its mathematical formalism leads to the neglection of "*real places*". This is somehow ironic, provided that Krugman had claimed that formalism in economics was holding back progress until the "*Dixit-Stiglitz era*" that opened up to modelling imperfect competition.

Neary (2001) provides a critical review of New Economic Geography foundations and offers some interesting insight. His main criticism is aimed at how the model deals with:

- Increasing returns;
- Firms' strategies;

[33] Such as within most countries, albeit with significant differences: <<*In a given year, a resident of the United States is roughly twice more likely to move to a different home than is a resident […] of western Europe*>> (Ellickson, 2012, p. 373)

- Transport costs;
- Space.

In particular, the hypothesis of "*completely footloose firms*" - derived from a lack of sunk costs - does not make much sense except in the long run, and <<*hysteresis or lock-in arises only from pecuniary (market-mediated) externalities in the new economic geography, not from technological externalities or local public goods (such as R&D spillovers)*>> (Neary, 2001, p. 550)[34].

The issue with transport costs, following Neary (2001), concerns the "*iceberg*" assumption described earlier in this section, that is the technology used to transport a good is the same that is used to produce it. For Neary, special cases aside (e.g.: the grain fed to the horse that pulls the wagon), such an approach had never led to easily summarizable results and had already been abandoned by most authors. Furthermore, it sounds as an irony to Neary that a field that revolves around the importance of increasing returns, fails to allow for fixed cost in an industry, such as transportation, that tends to feature very high fixed costs compared to variable costs[35]. Neary also points out that it is unrealistic to assume that transport costs only apply to manufacturing, and not to agricultural produce. Quoting Davis (1998), he notes that empirical review has shown that the latter is just as high as the former and that could be enough to neutralize the home-market effect.

As in the words of Neary (2001, p. 550), <<*the absence of these considerations makes the model less relevant to current debates on industrial location than it at first appear*>>. Neary rejects the notion that knowledge spillovers do not play a significant role in the agglomeration process[36], and is also skeptical about New Economic Geography's dismissal of factor-endowments-based explanations for country-level development. Neary (2001, p. 550) concludes his review noting that <<*Models such as these, which strip away the superfluous to focus on a single feature, are essential for understanding the world […]. But no one monocausal model can hope to capture the complexities of any applied problem, certainly not a model where space is one-dimensional, firms are identical and infinitesimal, and every function in sight is either constant-elasticity or a rectangular hyperbola*>>.

In an interesting review of the dispute between New Economic Geography and Economic Geography, Cotelo, Hermann & Goldbaum (2015) relate the issue to the dichotomy between epistemology and hermeneutics. Garretsen & Martin (2010, p. 128) clearly state that <<*The fundamental question in economic geography is how to explain the riddle of uneven spatial*

[34] It is interesting to note that such an objection is widespread and has already been answered by Fujita and Krugman (2004, pp. 155-156), who stated that <<*it was a deliberate choice. That is, such a narrow focus […] was designed in order to establish a firm micro-foundation of geographical economics based on modern tools of economic theory. It does not mean that the new economic geography is limited to such a narrow range of models and issues. On the contrary, its framework is widely open to further development*>>.

[35] It is, however, noteworthy that Isard (1999, p. 384), replying to Fujita, had already suggested dropping the assumption of iceberg transport cost, since <<*as I have observed transport rates of actuality whose structure contrasts sharply with the iceberg (natural transport rate) type of notion, I had to discard this notion (essentially a trick from mathematics) in my effort at evolving models for applied research. There are major indivisibilities and both increasing and decreasing returns in transportation activity of reality, which then affect the nature of increasing and decreasing returns in other activity. Ignoring these indivisibilities is ignoring a basic aspect of space as it realistically impinges upon activity*>>.

[36] Krugman (1991): <<*How far does a technological spillover spill?*>>. Convincing answers, following the path signalled by Neary, had already been provided by Audretsch & Feldman (1996), who had shown that such effects not only exist, but can be measured and they seem to be very localized.

development. For more than half a century geographers have sought to explicate the role that space and location play in economic development, and how the economic landscape changes over time>>.

Evolutionary Economic Geography

An important objection to New Economic Geography stems from a position that dates back to Behavioral Geography – that is, the rejection of the neo-classical notion of rational actors showing optimal behavior (Boschma & Lambooy, 1999), and the belief that economic agents do not possess perfect information and cannot predict accurately future developments. Therefore, and following Simon's (1955) concept of bounded rationality, their behavior is all but optimal and is actually based on routines. As a consequence, locational choices cannot be inferred through models based on neo-classical assumptions, but the focus should be on mechanisms through which organizational routines diffuse.

Routines are organizational skills, that cannot be reduced to the sum of individual skills, and consist mainly of experience knowledge and tacit knowledge, which make them difficult to copy by other firms. Firms slowly adapt to external circumstances and seek to exploit opportunities and, in doing so, they sometimes change their routines, not randomly but as a consequence of existing routines, in a path dependent process (Boschma & Frenken, 2003).

Nelson & Winter (1982) are commonly acknowledged as the first to provide a comprehensive evolutionary theory of economic change (Boschma & Frenken, 2003), that allowed evolutionary economics to develop as a discipline (Andersen, 1996). According to their theory, each firm operates through a number of interdependent routines performed by its employees, with the major driving force being process, product and structural innovations. Since <<*the basic starting point of evolutionary economic geography is […] to understand firm behavior as being guided by "routines"*>>, and since routines <<*are likely to be spatially distributed and to co-occur in specific combinations in specific organizations*>>, <<*the key question then becomes through which mechanisms organizational routines diffuse and cluster spatially when a new industry emerges*>> (Boschma & Frenken, 2003, p. 184). Such mechanisms are spin-offs and spillovers.

Arthur's (1994) spin-off model describes industry creation as a sequence of firms giving birth to firms that give birth to other firms, and so on (Klepper, 2001): notably, this was the case for the Silicon Valley (Saxenian, 1994)[37]. The model assumes several regions starting off with one firm each, and each firm having a fixed probability to give birth to a spin-off that will locate in the same region as the parent company. The resulting spatial distribution will be highly skewed, because of regions that will have had a higher number of spinoffs early on by pure chance. Since the process has multiple possible outcomes, <<*the spatial concentration that emerged in a particular region could as well have emerged in any other region*>> (Boschma & Frenken, 2003, p. 187). It is evident that the entire model relies on the assumption that spin-offs locate in the same region as the parent company, which is however described by Boschma & Frenken (2003, p. 187) as <<*empirically quite robust*>>. Such a model has been subsequently integrated by Klepper (1996) with a product life-cycle model <<*by making five additional assumptions, which makes it a more explicit evolutionary*

[37] But Boschma & Frenken (2003, p. 187) provide other examples: <<*the German packaging machine industry near Stuttgart*>>, <<*the U.S. automobile industry in the Detroit area*>>, and <<*the game software industry in Dundee, Scotland*>>.

model: routines are heterogeneous, more successful firms grow faster due to increasing returns to R&D, larger firms produce more spinoffs, spin-offs inherit the routines of parent firms, and less performing firms are forced to exit due to competition>> (Boschma & Frenken, 2003, p. 188).

The second model (Arthur, 1994) assumes that firms start up independently, instead of being spin offs of existing firms, and thus their location is the result of a choice. In this model, each industry is made up by various types of firms, each having preference for locating in one specific region. This model allows Marshallian agglomeration economies: the larger the number of firms that locate in a region, the more diversified the labor market becomes and the stronger the impact of agglomeration economies in general. Therefore, <<*agglomeration economies can cause the industry to concentrate in one region even though the individual firms have different individual preferences. Once one region has attracted slightly more entrants than other regions, a critical threshold is passed, and suddenly all firms will opt for this one region as to profit from the higher agglomeration economies: a case of spatial lock-in*>> (Boschma & Frenken, 2003, p. 190).

The spin-off model clearly differs from neoclassical approaches, which ignore the micro-dynamics of firm entry and exit and assumes each firm to start off from scratch, notwithstanding any previous activity by its founder and which do not account for different competencies and technology featured by firms in the same industry. The agglomeration model, on the other hand, shows more resemblance to New Economic Geography, although it explicitly accounts for knowledge spillovers that New Economic Geography chooses to leave out of the discussion.

Spin-offs and agglomeration economies provide different explanations for the spatial distribution of economic activities, but they might also work together, sometimes even reinforcing each other: a region's spin-off rate might depend on agglomeration economies, which in turn are reinforced by a higher rate of spin-off creation. Evolutionary Economic Geography thus moved <<*beyond the traditional specialization-urbanization debate*>>, with such dichotomy being perceived as <<*ill defined*>> (Caragliu, de Dominicis & de Groot, 2016, p. 89). Indeed, Van Oort (2015, pp. 12-13) found <<*that for Dutch urban regions, the positive results of knowledge spillovers are higher in regions with related variety, while regions characterized by unrelated variety are better hedged for economic shocks (portfolio effect […])*>> with similar results being reported for a variety of countries, ranging from Great Britain and Italy to Germany and Finland, and from the United States to Europe as a whole.

1.5 Conclusion

This literature review aimed to explore theories regarding spatial distribution of economic activities that have developed during the last two centuries. Our review starts with Von Thünen, who was the first to explain the pattern of land use around a city, and the authors who followed him in the exploration of economies of localization. Such theories show why geography is fundamental for spatial distribution, but we cannot delude ourselves by thinking that it is the ultimate factor: indeed, Fujita & Krugman (2004, 147) highlighted that <<*New York is New York because of a canal*>> although that canal has not been economically relevant for the last 150 years, and <<*Silicon Valley, as we know it, exists because of the vision of one Stanford official two generations ago*>>. Therefore, although geography is surely significant, there must be other contributing factors behind the spatial distribution of economic activities. Indeed - Fujita & Krugman argue - <<*once a new centre has become established, it grows through a process of self-reinforcement, and may thus attain a scale at which the initial advantages of the location become unimportant compared with the self-sustaining advantages of the agglomeration itself*>>.

The classical dichotomy has identified two main types of spatial economies: economies of localization and economies of urbanization. The first type has been interpreted as a consequence of Marshallian externalities, consisting in knowledge spillovers, labor pooling, and cost advantages originating from the sharing of industry-specific non-traded goods. On the other hand, economies of urbanization originate from Jacobs externalities, relying on the existence of a vast array of diverse industries in the same area: indeed, according to Jacobs (1969), heterogeneous industries not only do provide spillover to each other, but such spillovers may prove the most conducive to innovation and growth. The same dichotomy also provides different predictions for what is best for innovation and firms' survival: Jacobs believed that competition for ideas is the strongest incentive, whereas the Marshall-Arrow-Romer model (Glaeser, Kallal & Scheinkman, 1992) identifies the capability to exploit rents offered by the lack of competition as a significant factor behind growth.

In the recent decades, however, Evolutionary Economic Geography has labeled such a dichotomy as <<*ill defined*>> (Caragliu, de Dominicis & de Groot, 2016, p. 89), shifting the focus instead on the dynamics inside each firm and industry. These dynamics are analyzed through two models (Arthur, 1994): the spin-off model and the agglomeration model. The first model describes industry creation as a sequence of firms giving birth to firms that give birth to other firms, with a resulting spatial distribution that is necessarily skewed, because some regions will – almost certainly - have had a higher number of spinoffs early on by pure chance. On the other hand, the agglomeration model assumes that firms start up independently and their location is the result of a choice, allowing for Marshallian agglomeration economies.

The reconstruction of economic geography's most important historical frameworks allowed us to identify routes for studying the Italian economy - and its evolution during the Great Recession – through industrial agglomeration.

Chapter 2
Location patterns of Italian industries through the Great Recession

2.1 Introduction

Economic activity tends towards concentration and localization, both on a world scale and locally. In Italy, the most productive region, Lombardy, constitutes less than 8% of the country's total area, but its share of national GDP is well over 20%. And, even when shifting the focus on a more localized scale, Milan urban area does not even cover 1% of the country's surface, yet it accounts for 10% of Italy's GDP[38].

The geographic concentration of economic activity – that is, economic agglomeration - does not necessarily come with specialization: although some strongly agglomerated areas – Hong Kong and its financial industry, or the Silicon Valley that gravitates towards San Francisco and, more specifically, San Jose – surely might be regarded as specialized, other areas are just as much agglomerated but their economy is diversified and relies on a multitude of different industries.

A peculiar case that has been investigated for decades, is the Italian phenomenon *of industrial districts*. Industrial districts are highly specialized territories, usually – but not necessarily – outside the reach of the largest urban agglomerations. An interesting interpretation has been provided by Dunford (2006, p. 27), who identifies them as <<*parts of an interdependent geographic division of labor that includes magic circles and delocalized zones of dependent manufacturing*>>: the term "*magic circle*", borrowed by the author from Vittorio Giulini, president of the Associazione Italiana Industriali Abbigliamento e Maglieria (National Association of Clothing and Knitwear Manufacturers), is originally used to describe the fashion system revolving around the fashion capital of Milan, based on activities ranging from textile manufacturing to cosmetics, with all the related material and immaterial service activities, apparently only remotely connected.

Rabellotti, Carabelli & Hirsch (2009, pp. 24-26) acknowledge that <<*Several studies have focused on the positive effects of geographic agglomeration on firm performance […] when controlling for structural features such as size and the local level of development*>>, so we tried to check whether some correlation appears between *agglomeration* and *productivity*. Becattini & Dei Ottati (2006, p. 1156-1157) found that, generally, <<*data relating to economic change (employment, per-capita value added […)] highlight the relatively better performance of the IDPs*>>, however noting that <<*a certain loss of momentum in the production and exports of many Italian industrial districts*>> was <<*already evident*>>, attributing such a slowdown to many interrelated causes, among them <<*a socio-economic model which is suitable for riding brief crises, but […] less suitable in longer recessions (such as the current one)*>>.

It is therefore undeniable that studying agglomeration is essential to understand economic phenomena and patterns of growth.

[38] Of course, this phenomenon is not limited to Italy and is actually even more remarkable overseas, where California contributes to 15% of the United States' GDP and its two largest metropolitan areas – Los Angeles and San Francisco – account for about 80% of its GDP, although they cover only 30% of the State's area. On an even more localized scale, the largest part of the counties that constitute the two conurbations are actually rural areas: thus, production actually takes place within an even more limited zone.

The aim of this chapter is indeed to analyze agglomeration in Italy through the Great Recession that hit the entire world after the financial crisis of 2007-2008, and which deeply changed the country, both socially and economically.

Our analysis might be declined through three different goals:

- Measuring agglomeration patterns across Italian sectors;
- Assessing their change during the Great Recession;
- Identifying possible determinants behind such patterns.

Traditionally, agglomeration studies have relied on measures such as Gini, Theil or Herfindahl indices, until the development of the so-called *dartboard approach* by Ellison & Glaeser (1997), which allowed to weight the actual distribution of activities against a theoretical distribution.

However, all these measures are biased by what is commonly referred to as the *Modifiable Areal Unit Problem*[39]. The Modifiable Areal Unit Problem affects all quantitative studies of spatial phenomena (Openshaw & Taylor, 1979) that rely on territorial aggregates - such as regions, provinces, municipalities, counties, etc. - as unit of analysis. Indeed, since these aggregates are constituted by pre-defined borders, we have no way to distinguish spatial associations originating from the simple aggregation of data and actual associations existing in the individual data irrespective of such spatial aggregation (Openshaw, 1984).

A solution to the MAUP would be proposed by Duranton & Overman (2005), who introduced *distance-based methods* - agglomeration indices whose measurement relies not on geographical aggregates, but on actual units, such as firms or plants. Their innovative K_d, has been chosen by many scholars to measure agglomeration in a variety of countries all around the world. However, since K_d is an absolute measure, results cannot be compared across studies. A further improvement in this direction would then be offered by Marcon & Puech (2010), who developed a new cumulative measure, who they called *M*. M has many interesting features: it is a relative measure, its units of analysis can be weighted, and it accounts for both local and overall agglomeration.

However, a major drawback that has limited[40] the use of such an excellent measure is its computational intensity: indeed, computation time is necessarily proportional to the squared number of points (Marcon & Puech, 2017), which - understandably - becomes huge when analyzing entire regions. The other major difficulty - the availability of micro-geographic data - has been increasingly managed in recent years, with this type of data becoming more and more available (Arbia, 2001), despite still facing confidentiality and technical issues.

The availability of ASIA - a comprehensive dataset, built by a reliable source not less than ISTAT and including precise information for every single plant in Italy - gave us the chance to work with distance-based methods in the pursuit of our aim of measuring agglomeration and its change in time. Indeed, in order to exploit the opportunity given by the exact geographic localization of productive units – that is, not only the firms' headquarters, but even single establishments and plants where production actually occurs – we had to find a way to overcome the issue posed by the

[39] The term was coined by Openshaw & Taylor (1979), but many aspects of the issue had already been explored over half a century earlier by Gehlke & Biehl (1934).

[40] Although Marcon & Puech (2017, p. 17) note that <<*the M function has been rapidly transferred to other scientific fields*>>, such as geography, ecology, biology and seismology.

afore-mentioned technical complexity, that would have otherwise required an unthinkable amount of computations in order to account for almost 5 million plants for each year. The solution that allowed us to bypass such an issue was the approximation of the plants' locations to the centroids of the municipalities where they are located, reducing the number of total spatial interactions to slightly less than 2.500.000 – still a huge figure, but manageable. At first sight, such an approximation might seem counterintuitive when one is handling complex distance-based methods in order to pursue accuracy, but, as well expressed by Marcon & Puech (2017, p. 30) themselves, <<*cumulative functions are insensitive to errors at smaller scales than the distance they consider: if the uncertainty is a few hectometers, the number of neighbors up to a few kilometers is known with no error except for the more distant ones, which are a small proportion*>>. Indeed, it must be noted that we are not merely aggregating data, since each plant is indeed counted separately. Rather, we are approximating the geographical location of the plant, and by no more than a few kilometers. It is irrelevant that our methodology allows to simplify computations by numerically aggregating employees, since this would occur even when relying on distance methods without declaring any sort of approximation: employees are not exactly located in the same spot on the map where the plant is geo-localized, and moreover they are certainly not piled up on top of each other, but separated by a necessary physical distance. This unaccounted distance might be more relevant than a few meters when considering workplaces such as airports or large warehouses. Since nobody would argue that distance measures shall take into account this obvious and physiological separation between people in the same working area, the real question should be whether our approximation magnitude is too large and whether it makes the implementation of distance measures useless in the pursuit of more precise results than aggregated data might provide. Such a question is clearly legitimate and will surely find a proper answer in a future study, where we aim to compare results obtained through this approximation and through non-approximated computations for a localized and circumscribed region, such as Sardinia.

Another interesting opportunity provided by ASIA consists in the availability of comprehensive data regarding service industries, and not only manufacturing. Indeed, as reported by Barlet, Briant & Crusson (2013, p. 339), <<*the service industry plays an increasing role in terms of employment and added-value in modern economies*>>, but <<*the literature has almost exclusively dealt with the location patterns of manufacturing industries*>>.

All the afore-mentioned features lead us to think that our contribution might be important in extending the work recently begun by Cainelli, Ganau & Jiang (2020) and consisting in the detection of spatial dynamics during a peculiar period such as the Great Recession. Indeed, the great width and depth of data provided by the ASIA dataset allows us to extend the analysis well beyond single-plant firms and to also cover Sicily, Sardinia and the smaller islands, with a resulting number of plants about 30 times larger for each year.

We begin this chapter by trying to put into context what distance measures are and how they are useful for analyzing agglomerations, referring to authors who have used them for empirical assessments of agglomeration in ways that might be somehow reminiscent of our study. We then proceed to describe our datasets and the methodology we followed for our analysis. Finally, we analyze our results and the change occurred between the two years, trying to assess the possible determinants behind the figures we have obtained.

2.2 Theoretical and empirical background

2.2.1 Distance-based methods and the MAUP

Distance-based methods are a relatively recent introduction to the field of spatial economics: since Duranton & Overman's (2005) seminal paper, they have been increasingly used to analyze spatial structures and agglomerations continuously, rather than relying on an approximation of space as discreet. Indeed, unlike previous measures[41], they do not rely on any predefined zoning (i.e.: neighborhoods, municipalities, communes, provinces, counties, regions), but on the distance between points of interest, notwithstanding the geographical aggregation they – maybe temporarily - belong to.

Quoting Lang, Marcon and Puech (2020, pp. 246-247):

> *The idea of distance-based methods is to detect whether there is an attraction or a repulsion between plants, based on an analysis on the bilateral distance between establishments. In order to understand the basic ideas of distance-based methods, let us consider for more clarity the case of the textile industry.*
>
> *We first need to choose a null model for the density of textile plants everywhere in the area under investigation: the choice of the model will be detailed below. It defines the type of spatial concentration that is investigated: any departure from this null model is assumed to be due to interactions between plants. If there are locally more textile plants around textile plants than expected under the null model, distance-based methods will detect spatial concentration ("textile plants attract textile plants"). On the other hand, if there are fewer textile plants in the surroundings of the textile plants than expected, we identify a phenomenon of dispersion (in which case "textile plants repel textile plants"). Alternatively, if there is no relationship between the entities, independence is accepted ("textile plants are randomly and independently distributed").*

Since they study spatial distribution through the actual position of the target entities (such as individual plants or shops) and not through intermediary aggregates, distance-based methods can be a useful improvement when compared to conventional spatial measures. Indeed, they are the only reliable way to overcome those issues that arise from referring to predefined zoning: geographic units are not necessarily homogenous, neither geographically nor economically, thus final values are dependent on the shape and size of the aggregation unit (since the distribution inside each area is lost through aggregation, and units at the opposite end of the same area are treated the same way as neighboring units). Such an issue is commonly described as the *Modifiable Areal Unit Problem*[42].

[41] Such as Gini (1912) or Ellison & Glaeser (1997) indices.

[42] Wong (2004, p. 572) notes that <<*Even though Gehlke and Biehl (1934) discovered certain aspects of the modifiable areal unit problem (MAUP), the term MAUP was not coined formally until Openshaw and Taylor (1979) evaluated systematically the variability of correlation values when different boundaries systems were used in the analysis*>>.

In order to overcome the *Modifiable Areal Unit Problem*, Duranton & Overman (2005) decided to treat space as continuous. Specifically, they measured the distribution of geographical distances between pairs of firms in an industry and compared such distributions with a randomly generated distribution of firms. The distance measure they used is the following:

$$\widehat{K}_d(r) = \frac{1}{n\,(n-1)} \sum_{x_i \in R} \sum_{x_j \neq x_i,\, x_j \in \aleph} k\big(\|x_i - x_j\|, r\big) \quad (1)$$

where n denotes the total number of points, x_i are the reference points and x_j are its neighbors, with $k(\bullet)$ as a kernel estimator whose total sum is an estimate of the number of neighbors of x_i at the selected distance r

Their results showed 43% of UK industries to be localized and 22% to be dispersed, which is strikingly different from previous results and from those that would have obtained by using the EG index – that is, 94% would exhibit some localization and only 6% would be found to be dispersed[43].

While researching distance-based methods, Duranton & Overman (2005) proposed five characteristics for sound distance measures:

1) It should be comparable across industries;
2) It should control for overall agglomeration trends across industries;
3) It should separate spatial concentration from industrial concentration;
4) It should be unbiased with respect to the degree of spatial aggregation;
5) It should provide an indication of the significance of the results.

2.2.2 A taxonomy of distance-based methods

A few years after its first introduction, Duranton & Overman's Kd was still the measure of choice when dealing with by then "booming" distance methods, as well as the one that probably respected the largest number of properties listed above (Marcon & Puech, 2010). However, Marcon & Puech (2010) noted that an important property of distance-based methods had not been discussed in the economic literature yet[44]: that was the difference between probability density functions and cumulative functions. *Density functions* measure agglomeration at a specific distance from a reference point, whereas *cumulative functions* measure it up to a specific distance.

Marcon & Puech (2010) identified another dimension of distance-based methods: they can be either *topographic*, *relative* or *absolute* measures, according to the reference value used to compare the distribution.

A *topographic* reference uses physical space as a benchmark: the number of neighbors on a disk of radius *r* for a *cumulative function*, or on the ring at distance *r* for a *density function*. Topographic functions might simplify space treating it as homogenous, or alternatively take <<*into account the many inhomogeneities of the geographical space (Lang, Marcon, and Puech 2015). The reason is that the landscape is characterized by different patterns of human settlement, but not every location*

[43] <<*Dispersion here is precisely defined as having fewer establishments at distance d than randomness would predict. In other words, the distribution of a dispersed industry is "too regular"*>> (Duranton & Overman, 2005, p. 1086).
[44] With the exception of a short note by Duranton & Overman (2005) in the conclusion of their paper, where they argue that probability density functions reveal more information than cumulative functions do.

is suitable for the creation and development of economic activity (Sweeney and Feser 1998). For instance, industrial plants are inhomogeneously distributed because of rivers, mountains and town-specific regulations (parks, residential zones, etc.)>> (Kukuliač & Horák, 2017, p. 200).

A *relative* reference may use any other benchmark that is not physical space (e.g.: the distribution of plants that belong to every industry as a benchmark for the distribution of plants belonging to one specific industry).

Finally, in the case of no reference, an *absolute* measure is defined, such as the absolute number of plants located at or within a given distance from a given one.

As stated above, at least in economics, the most used distance-based method has been, without a doubt, Duranton & Overman's K_d function, but many others have been tried, as reported in table 1 below:

Table 1 - *Choice of the appropriate function to describe a point pattern structure.*

Dimensions	Density functions	Cumulative functions
Topographic homogeneous	g (Ripley, 1976)	K (Ripley, 1976) K_{mm} (Penttinen et al., 1992)
Topographic inhomogeneous	g_{inhom} (Baddeley et al., 2000)	K_{inhom} (Baddeley et al., 2000) D (Diggle and Chetwynd, 1991)
Absolute	K_d (Duranton and Overman, 2005) K_{emp}	Cumulative of K_d (Behrens & Bougna, 2015) Cumulative of K_{emp}
Relative	m (Lang et al., 2020)	M (Marcon and Puech, 2010)

Source: Marcon & Puech (2017)

Let us provide a short description of the measures highlighted above.

- The *g* function is a topographic homogenous process developed by Ripley (1976, 1977) and defined by Marcon & Puech (2010, p. 752) <<*as the ratio of the probabilities of finding two points at a distance r from each other to the product of the probabilities of finding each of them*>>, with g(r) = 1 when points are independent from each other, and higher values when point pairs at distance r occur with higher frequency than under the null hypothesis of independence.
  g(r) is estimated by

(2) $$\hat{g}(r) = \frac{1}{2\pi r \widehat{\lambda^2}} \sum_i \sum_{j \neq i} k\left(\left\|x_i - x_j\right\|, r\right) c(i,j)$$

  where λ denotes the stationarity of the point process (i.e.: intensity is the same throughout the space), $c(i,j)$ is an edge-effect correction that depends on points i and j and $k\left(\left\|x_i - x_j\right\|, r\right)$ is a kernel estimator.

- The *K* function is the sum of *g* on a range of distances from 0 to *r*, and is thus defined as

(3) $$K(r) = \int_{p=0}^{r} g(\rho) 2\pi\rho d\rho$$

- If the point process is a homogeneous Poisson process, the pattern is dubbed *complete spatial randomness* (CSR), meaning that all the points have the same probability of being located anywhere in the space and that density is constant everywhere: in such case, the K function reaches its benchmark: $K(r) = \pi r^2$, whereas more points are found within a radius of r from each point when $K(r) > \pi r^2$ (concentration) and the inverse when $K(r) < \pi r^2$

(dispersion). The main drawbacks limiting the usefulness of the K function in the field of spatial economics are the implication of constant density as a benchmark (that is, the space under analysis cannot have obstacles that do not allow the presence of a specific point, independently from the economic relevance, such as physical barriers or legal constraints) and the impossibility of assigning different weights to the points (and thus plants cannot be distinguished on the basis of employees or revenue).

- The *Kmm* function (Penttinen, Stoyan & Henttonen, 1992) overcomes the second limitation of the K function, by introducing quantitative marks *w(xi)* and *w(xj)* to points i and j, in order to weight them. Its estimator is:

(4) $$K_{mn}(r) = \frac{1}{A\lambda^2\overline{w^2}}\sum_i\sum_{j\neq 1}\mathbf{1}\left(\widehat{\cap x_i} - x_j \cap \leq r\right)w(x_i)w(x_j)c(i,j)$$

$\overline{w^2}$ is the average squared point weight and is equal to $\frac{\sum_i\sum_{j\neq i}w(x_i)w(x_j)}{n(n-1)}$, whereas $c(i,j)$ is an edge-effect correction that depends on points i and j. A weighted equivalent of g was introduced by Stoyan & Ohser (1985) as well, but to the best of our knowledge it has never been used in empirical applications.

- The *D* function differs from the ones described so far since it allows to deal with non-stationary point patterns in an inhomogeneous space, and consists of <<*the difference between two K functions: that of the points of interest, called cases, and that of other points, called controls: D = Kc – K0*>> (Marcon & Puech, 2017, p. 12). The D function has three limitations:
  - Values are not comparable on the same plot of the D function, since the expected number of points is greater at large distances than it is at smaller ones;
  - Over the same distances, values of two D plots are not comparable when controls are different;
  - Points cannot be weighted.

- The *ginhom* and the *Kinhom* functions are topographic inhomogeneous measures of distance. Kinhom counts the average number of neighbors on disks centered on the reference points, but calculate the average differently from K. The average value of the indicator function is weighted by the reciprocal of the intensity of the point process around each point. Kinhom and ginhom are estimated as follows:

(5) $$\widehat{K}_{inhom}(r) = \frac{1}{A}\sum_i\sum_{j\neq i}\frac{\mathbf{1}(\|x_i - x_j\| \leq r)\, c(i,j)}{\hat{\lambda}(x_i)\hat{\lambda}(x_j)}$$

(6) $$\hat{g}_{inhom}(r) = \frac{1}{2\pi r}\sum_i\sum_{j\neq i}\frac{k(\|x_i - x_j\|, r)\, c(i,j)}{\hat{\lambda}(x_i)\hat{\lambda}(x_j)}$$

where $\lambda(x_i)$ and $\lambda(x_j)$ denote the local density of points around x_i and x_j, $c(i,j)$ is an edge-effect correction that depends on points *i* and *j,* and $k\left(\|x_i - x_j\|, r\right)$ is a kernel estimator. As Marcon and Puech (2017, p. 60) acknowledged, *Kinhom <<has been little used in economics […] because it requires the intensity of the point process to be estimated by kernel methods. If the kernel's bandwidth is very small, intensity is highly variable and independence is found, while a wide kernel results in more stationarity and dependence. In other words, the results are highly dependent on the arbitrary choice of the estimation kernel bandwidth [and thus] may be arbitrary>>.*

- The *Kd* function is the probability density function that a point's neighbor is found at a given

distance. Point pairs at each distance are counted and the average is normalized so that its sum is 1. Values of Kd are compared to the confidence interval of the null hypothesis that points are randomly placed. Kemp is a variant that allows to weigh points. Cumulative versions of both Kd and Kemp have been introduced by Behrens & Bougna (2015), providing the proportion of pairs located within a given distance r apart and not *at* a given distance r.

- The *M* function is a cumulative function that provides the relative frequency of neighbors of a given type (such as firms belonging to the same industry as opposed to the entire population of firms) within a certain distance, compared to the same frequency in the whole space. It is estimated by:

(7) $$\widehat{M}(r) = \sum_i \frac{\sum_{j \neq i} \mathbf{1}\left(\left\|x_i - x_j^c\right\| \leq r\right) w\left(x_j^c\right)}{\sum_{j \neq i} \mathbf{1}\left(\left\|x_i - x_j\right\| \leq r\right) w\left(x_j\right)} \Big/ \sum_i \frac{W_c - w(x_i)}{W - w(x_i)}$$

where x_j^c are neighbors of the chosen type, x_j are neighbors of any type, *r* is the selected distance, w is the weight of choice, W_c is the total weight of the first type of points, and W is the total weight of all points.

- Finally, the *m* function is a modified density version of the M function, with the local ratio defined at distance *r* rather than within distance r. Its estimator is:

(8) $$\widehat{m}(r) = \sum_i \frac{\sum_{j \neq i} k\left(\left\|x_i - x_j^c\right\|, r\right) w\left(x_j^c\right)}{\sum_{j \neq i} k\left(\left\|x_i - x_j\right\|, r\right) w\left(x_j\right)} \Big/ \sum_i \frac{W_c - w(x_i)}{W - w(x_i)}$$

The relationship between m and M is different from the relationship between g and K: the latter two are topographic functions and the cumulative function is the integral of the density function over r, whereas m and M, being relative functions, are not derived from a measure of space.

The measures described above and their constant development during the last two decades show that there is a growing interest in measuring spatial phenomena as accurately as possible overcoming the issues arising from dealing with data aggregation on the basis of predefined geographical zones. Particularly, Marcon & Puech's M and Lang, Marcon & Puech's m represent two measures that allow to study spatial phenomena respectively with a cumulative and with a density approach, while respecting all the criteria identified by Duranton & Overman (2005) for evaluating a distance measure.

2.2.3 Empirical background

A set of recent evidence for a small group of European, Asian and American countries confirms the widespread prediction that industrial activity exhibits specific location patterns. These findings suggest, therefore, that a high level of concentration in manufacturing can be observed in different countries of the world. As shown by a multitude of theoretical models developed by economists as diverse as A.C. Pigou and Paul Krugman, agglomeration originates from *Marshallian externalities* depending on three forces: *knowledge spill-overs*, *labor market pooling*, and *cost reductions* due to input sharing.

Theoretical literature has been accompanied by a sizeable amount of empirical studies aiming to measure agglomeration as accurately as possible. These studies have relied on different *generations* (Nakajima, Saito & Uesugi, 2012) of indices before arriving to the current wave of distance-based methods.

The first generation corresponds to dated indices such as Gini, Isard, Herfindahl, and Theil. In the study of Italy, three different first-generation measures were used by Pagnini (2003) in order to measure agglomeration in manufacturing in 1996. His results show <<*that for an overwhelmingly majority of sectors centripetal forces prevail over centrifugal ones*>> and that <<*agglomeration is fostered by both the human capital intensity of a sector and its propensity to innovate*>>, whereas <<*transportation costs per chilometer and the usage of land as production factor act as forces of dispersion*>>, enabling the author to <<*conclude that industries where information spillovers are more relevant tend to be more agglomerated than the others*>>.

Other studies of concentration in Italy by means of first-generation indices were performed by Lafourcade & Mion (2007) and by De Dominicis, Arbia & De Groot (2013), both providing a particular focus on the relationship between size and spatial agglomeration patterns.

The second generation started out when Ellison & Glaeser (1997) introduced the so-called *dartboard approach*, comparing the degree of spatial concentration of employment in a given sector with the degree of concentration that would result if every plant in that sector were redistributed randomly across actually existing locations, that is, like darts thrown at the map.

Ellison & Glaeser's index (henceforth, the *EG index*) would be used by Rosenthal & Strange (2001) to measure the level of spatial concentration among manufacturing industries at a 4-digit level and for different geographic scales (zip code, county, and state) for the fourth quarter of 2000. Their aim was to explain differences in the spatial concentration of industries, by matching the latter with data on industry characteristics. To purse their aim, they regressed the EG index against those industry characteristics they had identified as proxies for the three causes of localization, controlling for product shipping costs and natural advantage.

The EG index was also used by Kolko (2010), but his focus was also on Services, and not limited to Manufacturing. He relied on a far deeper level of industrial detail, getting down to 6-digit industries. Studying US firms in 2004, he found that service industries, although more urbanized, are less agglomerated than manufacturing, because transport costs represent an incentive to locate near their customers and also because they are far less reliant on natural resources.

More recently, the necessity to deal with the Modifiable Areal Unit Problem allowed the development of a new assumption, that is continuous space, leading to the birth of a third generation of indices, starting out with Duranton & Overman's K_d. A practical problem with this last generation is the high volume of information that needs to be dealt with, posing difficulties both in collecting and managing data.

This third generation is the one we are dealing with in this paper and, as such, we deem necessary to provide a short review of how they have been used for empirical applications, dividing the latter between those that relied on the most ubiquitous measure - Duranton & Overman's K_d - and the very few that attempted to work with the most recent and promising tools offered by distance-based methods' literature - Marcon & Puech's *M* and Lang, Marcon & Puech's *m*. Despite the disadvantages incurred by the former group, many of these studies are surely interesting, because they measure agglomeration on territories as large as entire countries or at least national sub-entities, such as regions or states.

Table 2 offers a summary of the studies shortly reviewed below, showing the most salient features characterizing each. Particularly, as concerns the study of determinants behind agglomeration, we underline whether positive, negative or not significant correlation was reported. We also underline whether characteristics such as workforce features, ownership type or co-agglomeration were taken into consideration.

Table 2 – *Most relevant empirical applications of distance-based methods*

	Duranton & Overman (2005)	Nakajima, Saito & Uesugi (2012)	Barlet, Briant & Crusson (2013)	Koh & Riedel (2014)	Behrens & Bougna (2015)	Brakman, Garretsen & Zhao (2017)	Aleksandrova, Behrens & Kuznetsova (2019)	Almeida, Neto & Rocha (2020)	Cainelli, Ganau and Jiang (2020)	Lajimi, Le Gallo & Bennamou (2020)
Country	UK	Japan	France	Germany	Canada	China	Russia	Brazil	Italy	Tunisia
Year	1996	2006	2005	1999	2001-2009	2002-2008	2014	2006-2015	2007–2012	2017
Census data	yes	no	yes	no	no	yes	no	yes	no	yes
Industrial detail	3 & 4 digit	2 & 4 digit	4 digit	4 digit	4 & 6 digit	4 digit	3 digit	3 & 4 digit	2 digit	1 digit
Unit of analysis	plants	firms	plants	plants	plants	firms	plants	firms	firms (excluding multi-plant)	firms
Unit weight	no	no	yes	no	yes	no	no	yes	no	yes
Primary sector	no	no	no	no	no	no	no	no	no	no
Services sector	no	yes	yes	yes	no	no	no	no	no	no
Time					negative	positive		negative	-	
Firm/plant size (competition)	not significant	not significant	positive		not significant	negative				
Entry			negative			positive				
Exit			positive							
Age					not significant					
Technological level								positive		
Labor pooling								positive		
Transport costs							negative	negative		
Natural advantages								not significant		
Exports					positive					positive
Worforce features				yes				yes		
Geographical considerations							east/west			
Ownership type						yes				yes
Inputs / intermediate							own industry input	positive		
Co-agglomeration							yes			

Source: Compiled by the authors

K studies

Duranton & Overman (2005) pioneered the application of distance-based measures for the study of agglomeration across industries in a developed country by using microdata. They investigated location patterns in the manufacturing sector in the UK relying on their newly developed K_d index. They found that 52% of industries exhibited localization at a 5% confidence level, with 24% of them showing dispersion at the same confidence level, corresponding to a non-random distribution across space. This first contribution, which is both methodological and empirical, has been followed by many other studies which rely on this index to assess agglomeration levels across industries and, most importantly, their determinants along the line of Rosenthal and Strange (2001).

Nakajima, Saito and Uesugi (2012) focused on Japan and found that about half of the 561 four-digit manufacturing industries they studied can be classified as localized, in contrast with a lower figure of only about 35% for service industries. Moreover, they did not find specific patterns for entrant or exiting firms, separated from general patterns: thus, they concluded, <<*industries are becoming neither more concentrated nor more dispersed and the location patterns are stable over time*>> (Nakajima, Saito & Uesugi, 2012, p. 18).

Barlet, Briant & Crusson (2012) studied the location patterns of business-oriented service and manufacturing industries in France relying on an improved version of the K_d index, which takes into account the number of plants in each industry. They showed that concentration is more present among service industries (61%) than manufacturing industries (42%), especially at short distance. They also provided evidence that, as regards service industries, the largest plants are mostly localized at shorter distances. Finally, they showed that, between 1996 and 2005, incoming plants reduced localization whereas exiting plants reinforced it.

Researching Germany, Koh & Riedel (2014) assessed the agglomeration patterns of four-digit industries in Germany using the K_d index. They found that 71% of manufacturing industries are localized while this ratio shoots up to 97% for the service industries. They also provided some

suggestive evidence about the potential agglomeration forces at work, by regressing the localization index with respect to a number of industry characteristics, such as its maturity and its average workforce qualification.

In line with the results above, Behrens & Bougna (2015, p. 48) found that <<*depending on industry definitions and years, 40% to 60% of manufacturing industries are clustered*>>. They also showed that localization in Canada has generally decreased and that the locational trends of small plants, young plants, and exporters do not differ significantly with respect to large, old and non-exporting plants.

Cainelli, Ganau & Jiang (2020) demonstrated that different statistical techniques produce quite different pictures. In particular, they found that most Italian manufacturing industries experienced spatial dispersion processes during the period of the Great Recession. Finally, their results indicate that space–time dispersion processes occurred within small spatial distances and a short time horizon, although space–time interactions do not seem statistically significant.

As regards developing countries, the available evidence is scarcer, although some interesting contributions have recently appeared.

Brakman, Garretsen & Zhao (2017) examined the location of manufacturing in China and found that around 80% of industries at 4-digit in China are significantly localized. Moreover, they found that localization increased rapidly in the period between 2002 and 2008, especially as a consequence of new entrants. Unsurprisingly, they also found that ownership differentiates localization patterns: private and foreign forms are, as a matter of fact, more localized than state-owned firms.

Aleksandrova, Behrens & Kuznetsova (2020) analyzed the agglomeration and co-agglomeration patterns of manufacturing industries in Russia and found that 80% of 3-digit industries are both agglomerated and co-agglomerated. Moreover, results indicate that industry pairs with stronger buyer–supplier links tend to co-agglomerate more than other industries. Finally, they found that, as expected, industries with higher transport costs are more dispersed, while industry pairs with higher transport costs are less co-agglomerated.

Other two recent studies devoted to developing countries are Almeida, Neto & Rocha (2020) for Brasil and Lajimi, Le Gallo & Bennamou (2020) for Tunisia.

Almeida, Neto & Rocha (2020) found that almost 90% of Brazilian manufacturing at 3-digit have statistically significant localization for 2006 and 2015. They also showed that the technological intensity influences localization patterns: high-tech industries locate at short distances in the large urban areas while low-tech industries are located at great distances. Moreover, they found evidence for the presence of Marshallian agglomeration forces, transport cost and market structure.

In their study on Tunisia based on the K_d index applied to a sample of firms in the manufacturing industry, Laajimi, Le Gallo & Bennamou (2020) found that results are compatible with previous studies, with a higher concentration of high tech with respect to low tech industries. They also found interesting results by differentiating firms with respect to their propensity to export and to their ownership structure.

M studies

Whereas applications of Duranton & Overman's K_d have been plenty, we have been unable to find a tentative measurement of agglomeration on a national scale through our measure of choice, that is Marcon & Puech's M.

In order to find some empirical applications of *M*, one could turn to Jensen & Michel (2011) who used it to infer the spatial pattern of stores in Lyon (France), although this could be taken more like a mathematical exercise rather than an economic study[45]. Marcon & Puech (2015) themselves later developed such an application when "releasing" their newest measure, the lower-case *m*, in order to show how this could provide a different type of information in respect to Duranton & Overman's *Kd*[46], when describing the distribution of pharmacies in Lyon weighed against the distribution of non-food retail stores.

Two empirical applications of M were developed by Coll-Martìnez, Moreno-Monroy & Arauzo-Carod (2019) and Méndez-Ortega & Arauzo-Carod (2019) who, respectively, computed both *m* and *M* for creative industries and for software-developing industries in Barcelona metropolitan area, underlining how such measures provide the great advantage of being *relative* and not *absolute* (such as Duranton & Overman's Kd), thus comparable between industries and years.

[45] Points (firms) were not even weighted by the number of employees working in them.
[46] It must be remembered that they both are *density measures*, not *cumulative measures* such as *M*.

2.3 Data and methods

Despite the difficulties highlighted above, the accuracy provided by Marcon & Puech's M and the possibility to pioneer such a measure on a national scale led us to it as the index of choice for studying agglomeration in Italy. The exceptional detail provided by ISTAT's ASIA datasets in describing not only every firm, but every single plant in the country, convinced us that we could obtain precise enough results, even when accounting for the slight approximation we were forced to accept concerning the geographical location of each establishment. Finally, our intent was to understand not only the geographical distribution of economic activities: we also aimed to infer their patterns of change during the Great Recession caused by the financial crisis that struck the whole world after the bursting of the U.S. housing bubble and the bankruptcy of Lehman Brothers in September 2008. Therefore, we measured agglomeration for two different years[47]: the initial year is 2007, a year that ISTAT described as <<*exceptional as concerns firms' birth rate*>>[48], showing a dynamicity that would not only be lost the following year, but probably unrecovered not even a decade later. As concerns the choice of 2012 as the closing year for our analysis, this would be the first year since the beginning of the Great Recession that showed an increase both in the number of firms and in the number of employees, although this would have later revealed itself as more of a rebound rather than a real recovery, since both firms and employees would then decrease every following year until 2016[49].

In this section, we describe the datasets and the measure we relied on, we show our methodology and we also provide a short snapshot of the Italian economic environment in the two years we studied.

2.3.1 ASIA

ASIA (Archivio statistico delle imprese attive[50]) is a register established in 1996 in accordance with the provisions of European Council Regulation No. 2816/93 on Community coordination in drawing up business registers for statistical purposes, later replaced by Regulation (EC) No. 177/2008, and according to an harmonized methodology adopted by Eurostat.

Since 1996, ASIA covers every enterprise[51] currently active in Italy and contributing to gross domestic product, in the fields of manufacturing, trade and services, providing name, address, field of activity, number of employees, legal form, turnover class, and dates of creation and cessation.

Economic activities not included in ASIA are: agriculture, forestry and fishing; public administration and defense; compulsory social security; activities of membership organizations; activities of

[47] The same years have also been chosen by Cainelli, Ganau & Jiang (2020), who acknowledged that 2007 <<*is generally regarded as a pre-crisis year*>> and that 2012 <<*corresponds to the first year the Italian economy entered a second wave of downturn after the recovery peak reached in 2011*>>.

[48] https://www.istat.it/it/files//2011/02/testointegrale20091006.pdf.

[49] https://www.istat.it/it/files/2018/12/C14.pdf.

[50] Italian for "Statistical register of active enterprises".

[51] Defined by ISTAT's quality report (https://www.istat.it/it/archivio/216767), in accordance with European Council Regulation No. 696/93, as <<*the smallest combination of legal units that is an organizational unit producing goods or services, which benefits from a certain degree of autonomy in decision-making, especially for the allocation of its current resources. An enterprise carries out one or more activities at one or more locations. An enterprise may be a sole legal unit*>>.

households as employers; undifferentiated goods- and services-producing activities of households for own use; activities of extraterritorial organizations and bodies; units classified as public institutions and private non-profit institutions.

ASIA is updated every year through a process[52] that integrates several administrative and statistical sources[53], guaranteeing a proper statistical representation of active enterprises and of their identification, demographic and economic information. The register has a central role within economic statistics, and it is used for national accounting estimates.

Since 2004, ISTAT also provides another dataset, called Registro statistico delle Unità Locali (ASIA – UL), whose scope is roughly the same as the original register's and which has been built-up through a specific survey: Indagine sulle Unità Locali delle Grandi Imprese (IULGI). This survey has allowed to locate and define the main variables of each local unit[54].

[52] ISTAT's quality report defines it as consisting in:

- Data acquisition;
- Analysis of the appropriateness of the sources;
- Transformation of data to standardize definitions;
- Transformation of data to standardize classifications;
- Record linkage;
- Audit and integration of unusual and/or missing data;
- Standardization, geocodification, de-duplication and validation of address data;
- Evaluation of consistency with previous data from the same elaboration.

[53] Agenzia delle Entrate; INAIL (Istituto Nazionale per l'Assicurazione contro gli Infortuni sul Lavoro); CCIAA (Camere di Commercio, Industria, Agricoltura e Artigianato); Banca d'Italia, INPS (Istituto Nazionale della Previdenza Sociale); Seat – pagine gialle Spa; ISVAP (Istituto per la Vigilanza sulle Assicurazioni Private e di Interesse Collettivo).

[54] Defined by ISTAT's quality report (http://siqual.istat.it/SIQual/visualizza.do?id=8889016), in accordance with European Council Regulation No. 696/93, as <<*an enterprise or part thereof (e.g. a workshop, factory, warehouse, office, mine or depot) situated in a geographically identified place. At or from this place economic activity is carried out for which – save for certain exceptions – one or more persons work (even if only part-time) for one and the same enterprise*>>.

2.3.2 A snapshot of the Italian production system

Italy covers a total area of 302.073 km²[55] with a population amounting to 58.223.744 as of January 1st, 2007 and to 59.394.207 as of January 1st, 2012. Demographically, strong patterns of concentration are evident, with a great share of municipalities (67,9%, covering 72,5% of the entire country's surface) shown by ISTAT as featuring a low rate of urbanization and, indeed, representing only 24.3% of the country's population. On the other hand, municipalities featuring a high rate of urbanization are only 3,3% and only cover 4,8% of the total surface (the latter figure is actually strongly inflated by Rome, by far the largest municipality in the country), but a third of the country's population lives there.[56]

In 2007, in Italy there were 4.480.473 firms with 17.586.031 employees, with an increase of 70.465 firms and 469.281 employees compared to the previous year. Five years later, firms would be 4.442.452 with 16.722.210 employees, featuring an increase of 16.502 firms and 298.124 employees on the previous year, after three straight years of decreasing figures.

Tables 3 and 4 below show the number of firms, plants and employees operating in each group of industries[57].

Table 3 – *Descriptive statistics by industry (1-digit level), 2007*

Code	Industry description	Firms	Plants	Employees	Mean firm size	Mean plant size
A	AGRICULTURE, FORESTRY AND FISHING	286	289	811	2,83	2,81
B	MINING AND QUARRYING	2.996	4.282	36.213	12,09	8,46
C	MANUFACTURING	481.297	532.661	4.451.187	9,25	8,36
D	ELECTRICITY, GAS, STEAM AND AIR CONDITIONING SUPPLY	2.157	4.877	84.173	39,02	17,26
E	WATER SUPPLY; SEWERAGE, WASTE MANAGEMENT AND REMEDIATION ACTIVITIES	7.916	11.921	164.334	20,76	13,79
F	CONSTRUCTION	639.795	674.441	1.985.235	3,10	2,94
G	WHOLESALE AND RETAIL TRADE; REPAIR OF MOTOR VEHICLES AND MOTORCYCLES	1.258.321	1.345.158	3.525.265	2,80	2,62
H	TRANSPORTATION AND STORAGE	143.290	172.092	1.123.884	7,84	6,53
I	ACCOMODATION AND FOOD SERVICE ACTIVITIES	287.429	311.848	1.191.255	4,14	3,82
J	INFORMATION AND COMMUNICATION	103.586	112.578	553.514	5,34	4,92
K	FINANCIAL AND INSURANCE ACTIVITIES	72.716	111.874	586.967	8,07	5,25
L	REAL ESTATE ACTIVITIES	197.059	199.944	308.494	1,57	1,54
M	PROFESSIONAL, SCIENTIFIC AND TECHNICAL ACTIVITIES	692.941	702.743	1.198.277	1,73	1,71
N	ADMINISTRATIVE AND SUPPORT SERVICE ACTIVITIES	156.282	173.617	1.085.699	6,95	6,25
P	EDUCATION	24.130	25.769	78.714	3,26	3,05
Q	HUMAN HEALTH AND SOCIAL WORK ACTIVITIES	226.322	235.733	644.156	2,85	2,73
R	ARTS, ENTERTAINMENT AND RECREATION	61.977	64.999	164.757	2,66	2,53
S	OTHER SERVICE ACTIVITIES	195.598	199.779	403.927	2,07	2,02

Source: Compiled by the authors

[55] Istat, Movimento e calcolo della popolazione residente annuale; Variazioni territoriali, denominazione dei comuni, calcolo delle superfici comunali

[56] Istat, Movimento e calcolo della popolazione residente annuale; Variazioni territoriali, denominazione dei comuni, calcolo delle superfici comunali; Eurostat

[57] Note that agricultural plants were censed in the ASIA dataset only under certain very strict conditions, and were assigned to a different register since 2011. More information at https://agriregionieuropa.univpm.it/it/content/article/31/36/il-settore-agricolo-nel-business-register.

Table 4 – *Descriptive statistic by industry (1-digit level), 2012*

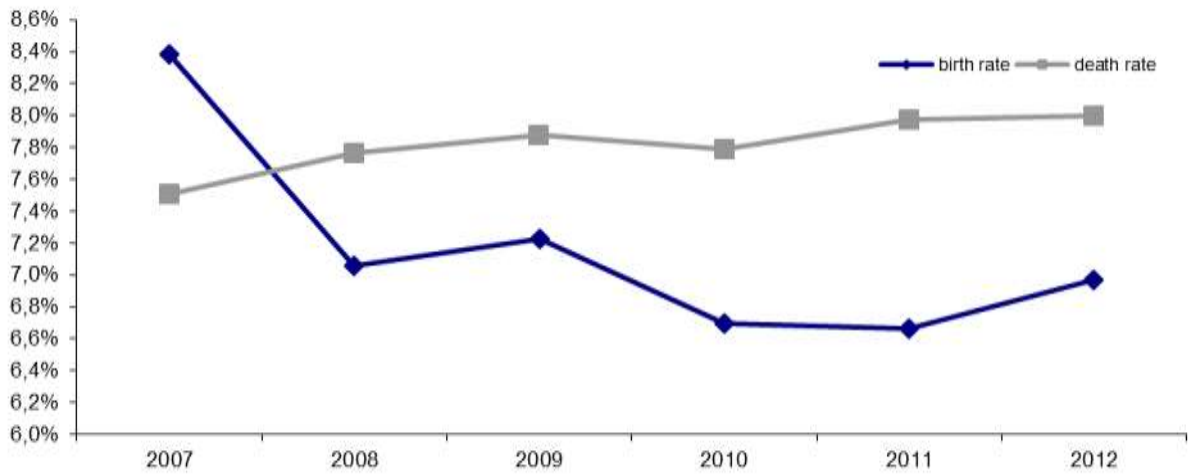
Code	Industry description	Firms	Plants	Employees	Mean firm size	Mean plant size
A	AGRICULTURE, FORESTRY AND FISHING	-	-	-		
B	MINING AND QUARRYING	2.478	3.254	27.984		
C	MANUFACTURING	424.622	465.536	3.839.673	9,04	8,25
D	ELECTRICITY, GAS, STEAM AND AIR CONDITIONING SUPPLY	9.029	12.007	87.915	9,74	7,32
E	WATER SUPPLY; SEWERAGE, WASTE MANAGEMENT AND REMEDIATION ACTIVITIES	9.053	13.370	182.310	20,14	13,64
F	CONSTRUCTION	581.735	594.819	1.549.374	2,66	2,60
G	WHOLESALE AND RETAIL TRADE; REPAIR OF MOTOR VEHICLES AND MOTORCYCLES	1.187.751	1.284.317	3.446.705	2,90	2,68
H	TRANSPORTATION AND STORAGE	133.481	162.271	1.078.439	8,08	6,65
I	ACCOMODATION AND FOOD SERVICE ACTIVITIES	318.133	343.506	1.323.843	4,16	3,85
J	INFORMATION AND COMMUNICATION	98.963	108.500	542.511	5,48	5,00
K	FINANCIAL AND INSURANCE ACTIVITIES	92.474	130.027	589.682	6,38	4,54
L	REAL ESTATE ACTIVITIES	236.873	239.415	289.175	1,22	1,21
M	PROFESSIONAL, SCIENTIFIC AND TECHNICAL ACTIVITIES	716.007	726.753	1.193.627	1,67	1,64
N	ADMINISTRATIVE AND SUPPORT SERVICE ACTIVITIES	146.727	163.477	1.114.627	7,60	6,82
P	EDUCATION	27.302	29.700	90.519	3,32	3,05
Q	HUMAN HEALTH AND SOCIAL WORK ACTIVITIES	261.634	271.722	755.538	2,89	2,78
R	ARTS, ENTERTAINMENT AND RECREATION	64.137	68.560	173.595	2,71	2,53
S	OTHER SERVICE ACTIVITIES	205.292	209.648	449.108	2,19	2,14

Source: Compiled by the authors

A large majority of Italian plants verge on the small side, with a percentage hovering around 95% for both 2007 and 2012, whereas only slight over 3000 in the entire country have more than 250 employees, and only about 0,6% featuring more than 50 employees.

Firms' birth rate was 8,4% with 338.439 new firms in 2007, decreasing to 7% and 275.427 new firms in 2012, whereas death rate was initially lower at 7,5% (303.001 firms shutting down in 2007) but surpassed birth rate during the Crisis and resulted in 8,0% (316.282 firms ceasing activity) in 2012. Thus, the balance went from +0,9% in 2007 to a negative -1,0% in 2012, after being constantly negative for five years in a row.

Figure 1 – *Birth and death rate of Italian firms*



Source: Compiled by the authors

Table 5 shows that services were less impacted than other activities, with just two marginally negative years at the apex of the crisis in 2010 and 2011, whereas manufacturing and trade started out with an already negative balance in 2007; construction was the best performing macro-sector

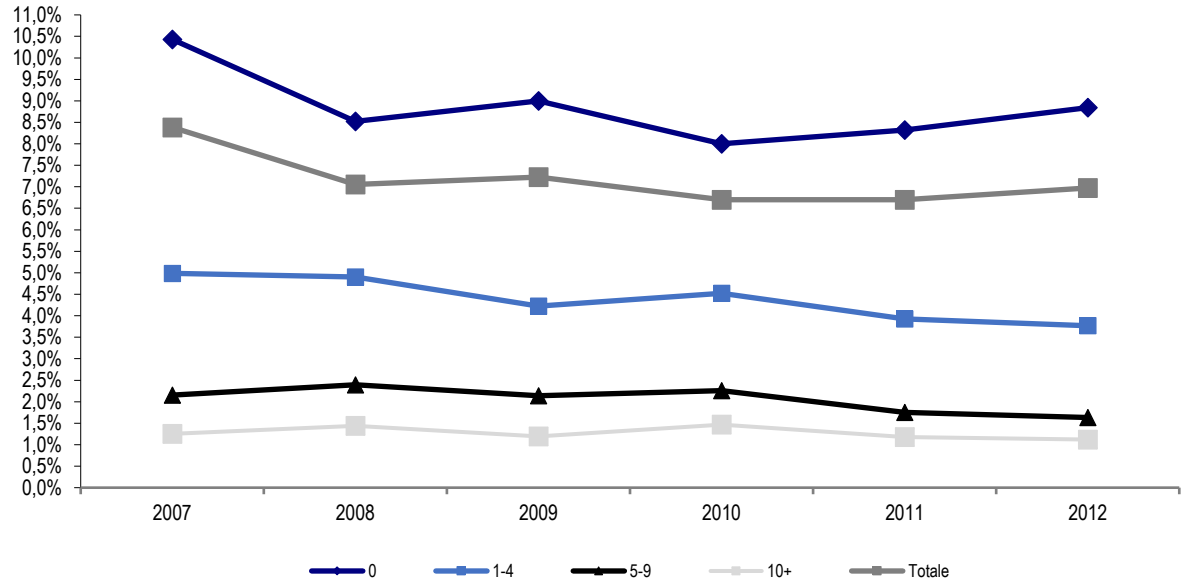
before the recession hit, showing a positive 2,8% balance, but was the most severely hit by the Crisis and in 2012 it still featured a negative balance of -3,0%.

Table 5 – *Birth and death rate by sector – Years 2007-2012*

Year	Birth rate	New firms	Death rate	Ceased firms	Turnover rate
Manufacturing					
2007	5,4	26.666	6,1	30.242	-0,7
2008	5,2	25.056	6,5	31.400	-1,3
2009	4,5	20.808	6,7	30.935	-2,2
2010	4,9	21.907	6,1	27.957	-1,2
2011	4,9	22.041	6,4	28.761	-1,5
2012	5,0	22.120	6,6	29.370	-1,6
Construction					
2007	11,3	72.077	8,5	54.072	2,8
2008	8,7	55.911	9,4	60.279	-0,7
2009	10,0	63.475	11,1	70.224	-1,1
2010	8,1	50.255	9,8	59.916	-1,7
2011	7,1	42.539	10,7	64.502	-3,7
2012	7,5	43.500	10,5	61.014	-3,0
Trade					
2007	6,8	85.325	8,0	101.224	-1,3
2008	6,0	73.650	7,8	96.922	-1,8
2009	5,7	68.982	7,7	93.084	-2,0
2010	6,2	74.542	7,8	94.477	-1,6
2011	6,3	75.211	8,0	96.238	-1,8
2012	6,5	76.949	7,9	93.737	-1,4
Service					
2007	9,4	154.371	7,1	117.463	2,2
2008	7,8	131.524	7,5	126.389	0,3
2009	8,0	135.569	7,1	120.637	0,9
2010	6,9	118.356	7,5	127.985	-0,6
2011	7,2	124.880	7,4	127.194	-0,2
2012	7,6	132.858	7,6	132.161	0,0
Total					
2007	8,4	338.439	7,5	303.001	0,9
2008	7,1	286.141	7,8	314.990	-0,7
2009	7,2	288.834	7,9	314.880	-0,7
2010	6,7	265.060	7,8	310.335	-1,1
2011	6,7	264.671	8,0	316.695	-1,3
2012	7,0	275.427	8,0	316.282	-1,0

Figure 2 shows that the 2012 increase in the firms' birth rate was driven exclusively by firms with no employees (unsurprisingly, since they constituted 85,6% of all new firms), whereas every other size class showed negative rates, in line with the previous year after a marginal rebound in 2010 (that, interestingly, had been somehow anticipated by a similar increase in 2009 for the zero employee class).

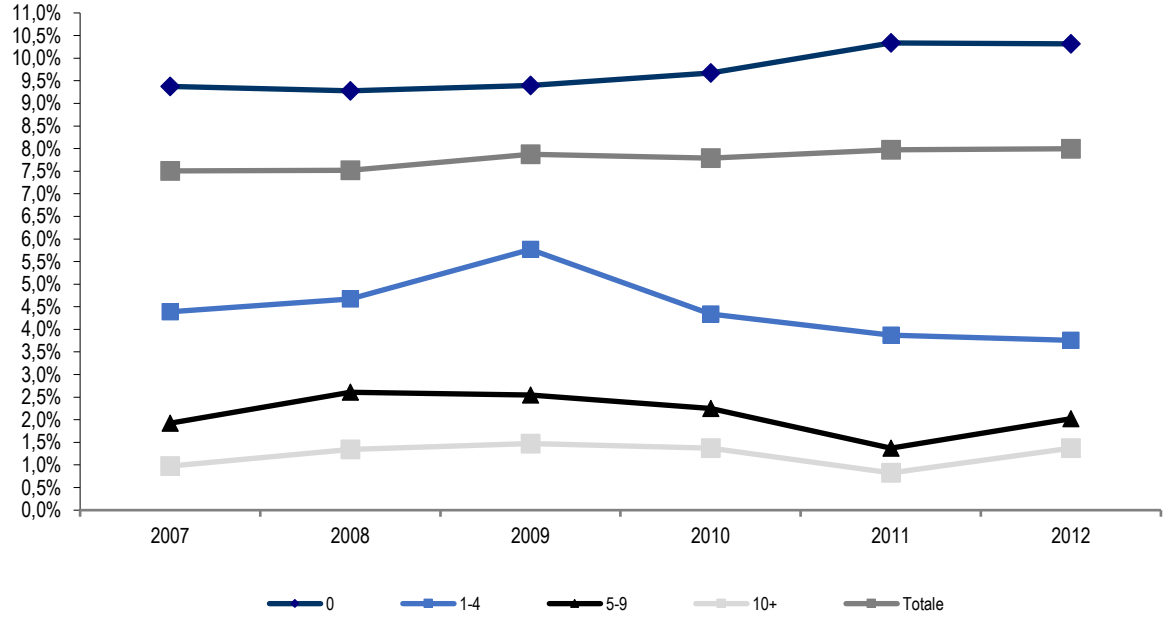
Figure 2 – *Birth rate of Italian firms by number of employees*



Source: Compiled by the authors

Patterns for death rate are shown below in figure 3 and seem to be fairly constant for smaller firms (and, consequently, for firms in general), and increasing for larger firms.

Figure 3 – *Death rate of Italian firms by number of employees*



Source: Compiled by the authors

Finally, table 6 shows that survival rates sharply decreased between 2007 and 2012. Less concerned by such a decrease were Manufacturing and, especially, Trade, whereas Services and Construction were hit more severely.

Table 6 – *Survival rates of firms up to five-year-old in 2007 and 2012, by sector*

Sector	Firm age	2007	2012
Manufacturing	5 years	55,9	51,2
	4 years	61,9	57,6
	3 years	68,4	66,8
	2 years	78,0	77,3
	1year	88,8	86,9
Construction	5 years	52,9	44,8
	4 years	58,0	46,5
	3 years	63,9	54,3
	2 years	73,6	64,9
	1year	85,6	79,0
Trade	5 years	49,7	46,5
	4 years	55,4	54,1
	3 years	62,5	60,2
	2 years	72,3	70,9
	1year	84,7	81,1
Services	5 years	54,6	50,4
	4 years	60,3	55,6
	3 years	66,1	62,5
	2 years	75,9	70,3
	1year	87,5	80,8
Total	5 years	53,0	48,3
	4 years	58,6	53,6
	3 years	64,9	60,5
	2 years	74,7	70,0
	1year	86,4	81,1

Source: Compiled by the authors

2.3.3 M index and methodology

Marcon & Puech (2010) noted how the largest number of properties identified by Duranton and Overman (2005) to define a sound distance measure, were thus far respected by their own measure, that is the *K-density* function (denoted K_d). However, since K_d is a density measure, they believed there was still the need for a cumulative function, that would be useless in order to evaluate geographic concentration. The authors showed how the two types of functions are not substitutes, but indeed complement each other, and, consequently, they built a new function named M[58], for the measurement of intra- and inter-industry geographic concentration.

(9)
$$\widehat{M}(r) = \sum_i \frac{\sum_{j \neq i} \mathbf{1}\left(\left\|x_i - x_j^c\right\| \leq r\right) w\left(x_j^c\right)}{\sum_{j \neq i} \mathbf{1}\left(\left\|x_i - x_j\right\| \leq r\right) w\left(x_j\right)} \Big/ \sum_i \frac{W_c - w(x_i)}{W - w(x_i)}$$

In a map, two types of points – which, in our case, represent plants - are identified:

a) reference points (in our case, plants belonging to a specific industry);
b) target neighbor points (in our case, plants belonging to the same industry as the reference point).

The average number of target neighbors is compared to a benchmark in order to verify whether they are more or less frequent than they would be if plants were distributed randomly. In order to control for the local density of points, target neighbor points (in our case, the number of plants, belonging to the same industry, located within the selected distance r from the reference point) are normalized by the number of all the neighbors located within the same radius. The average of the resulting ratio for each reference point will then be weighted against the same ratio for the entire area – in our case, the whole country: if the former is higher than the latter – that is, M is greater than 1 - then the industry is somehow concentrated with points showing some degree of mutual attraction that would not be spotted if they were randomly distributed and independent from each other. On the other hand, if the latter ratio is higher than the former, it means that points tend to repel each other, therefore the industry is more dispersed than a random distribution. M also allows to weigh points, for example by – as is our case – employees working at the plant.

One major difficulty was posed by the huge number of interactions required in order to account for every couple of plant in the country located at less than the largest distance range we selected for our analysis. We overcame such an issue by approximating the plants' locations to the centroids of the municipalities where they are located, reducing the number of total spatial interactions to slightly less than 2.500.000 – still a huge figure, but manageable. A similar expedient was found by Brakman, Garretsen & Zhao (2017) when studying spatial concentration of Chinese manufacturing firms: their limit was not computational, but concerned the actual location of the firms, since information was provided only at county level. They offered an interesting justification to such an approximation, by comparing the mean value of intra-county distances (19 kilometers) to the median value of all pair-wise distances between manufacturing firms in China (around 900 kilometers). At first sight, such an approximation might seem counterintuitive when one is handling complex distance-based methods in order to pursue accuracy, but, as well expressed by Marcon & Puech (2017, p. 30) themselves, <<*cumulative functions are insensitive to errors at smaller scales*

[58] Marcon & Puech (2010, pp. 747-748) <<*called it the M function because it is an extension of the existing cumulative distance-based methods, namely Ripley's K function (1976, 1977) and Besag's L function (1977)*>>.

than the distance they consider: if the uncertainty is a few hectometers, the number of neighbors up to a few kilometers is known with no error except for the more distant ones, which are a small proportion>>. Our expedient shall not be perceived as a simple aggregation of data, since each plant is considered separately from the others. Instead, what we are doing is approximating the geographical position of the plant by no more than a few kilometers: only 67 municipalities, out of over 9000, cover more than 250 km², and the median surface is just slightly over 20 km²; moreover, it is also easy to presume that most plants actually gravitate closer to the municipality centroid than a random distribution would predict, further reducing the magnitude of our approximation. Therefore, it is irrelevant that our methodology allows to simplify computations by numerically aggregating employees after their location has been registered, since this would occur even with the most pristine and punctual usage of distance methods: in the real world, employees are not piled up one above the other in the exact geo-localized position of the plant, but they move in space and are also separated from each other by at least a few meters, and – more often than not – much more than that, with many plants covering an ample surface (think of airports, harbors, large warehouses). Since nobody would require distance measures to take into account this physiological separation between people in the same working area or even the *exact* position of each one of them in each moment, the real question should be whether the magnitude of our approximation is too large and whether it makes the implementation of distance measures useless compared to more conventional methods relying on aggregation. Such a question is clearly legitimate and will surely find a proper answer in a future study, where we aim to compare results obtained through our methodology with non-approximated computations for a localized and well circumscribed area such as Sardinia.

ISTAT provides origin-destination matrices with distances between Italian municipalities, both in meters of road travel and in minutes of time travel. As described in the related methodological note[59], values were computed through GIS tools and TomTom MultiNet 2013 road network, relying on municipalities' centroids (identified as the census section that includes the municipal house) as they were in 2013. Travel times and roads are computed in ideal conditions, not accounting for traffic but only for average travel speed in each road tract[60]. Since ISTAT provides distance matrices for each region separately (linking each of the region's municipality to every other Italian municipality) in order not to have a single large file, we had to join them together, excluding couples whose distance was far beyond our ranges of interest (the maximum one being 30 minutes). Moreover, some municipalities were not connected by road, therefore we had to compute their distances and attach them. This has proved a relatively easy job, since all of them were minor islands[61] consisting of one or just a few municipalities (all of which would be further away from any other outside municipality than what our maximum range of 30 minutes would require), except for the exclave of Campione d'Italia, which has a distance from a few municipalities just under 30 minutes, but the need to cross foreign territory and border checks could easily justify our choice not to include it within such a range. This same reasoning was followed for the only municipality entirely

[59] https://www.istat.it/it/files//2015/04/Nota_Tecnica_MatriciDistanza.pdf

[60] Between 15 and 50 km/h for urban roads, roundabouts and interchanges; between 60 and 80 km/h for non urban roads ("*strade statali*", "*strade provinciali*" and "*strade comunali*"); between 85 and 95 km/h for high-speed non urban roads ("*superstrade*"); between 100 and 120 km/h for highways ("*autostrade*").

[61] Ten island municipalities belonging to Tuscany; two island municipalities belonging to Lazio; nine island municipalities belonging to Campania; one island municipality belonging to Puglia; four island municipalities belonging to Sicily.

located in a lake island, that is Monte Isola, which is surrounded by Lago di Garda and whose population relies on public sea transport to reach any other municipality.

ISTAT constructed the distance matrix with 2013 data, so it needed amending in order to account for municipalities that no longer existed by that date, but that were represented in the ASIA datasets of 2007 and 2012[62]. Particularly, the newly formed municipalities of Gravedona e Uniti (013249), Comano Terme (022228) and Ledro (022229) back in 2007 were still constituted by the following - later extinct – municipalities, that thus needed to be created anew for the 2007 distance matrix, in order to account for plants located in such municipalities in the 2007 ASIA dataset[63]:

Table 7 - *Newly-formed municipalities and their constituent entities in 2007.*

Gravedona e Uniti (013249)	**Comano Terme (022228)**	**Ledro (022229)**
Consiglio di Rumo (013076)	Bleggio Inferiore (022016)	Bezzecca (022014)
Germasino (013108)	Lomaso (022107)	Concei (022065)
Gravedona (013112)		Molina di Ledro (022119)
		Pieve di Ledro (022141)
		Tiarno di Sopra (022197)
		Tiarno di Sotto (022198)

Source: Compiled by the authors

Another 112 municipalities had been assigned to another – sometimes newly-formed – province between 2007 and 2012, thus their code had been changed, and needed to be modified when adapting the 2013 distance matrix for 2007 computations.

Although we decided to do as little editing as possible on ASIA datasets, the 2012 dataset needed some amendment as well: specifically, 19 of the 130 plants related to a firm whose tax code (Partita IVA) is listed as 08590821008 had ostensibly erroneous data which we were unable to explain and correct, so we just decided to drop them.

The ASIA dataset for each year was then crossed with the ISTAT distance matrix for the same year through SQL queries that create new columns, showing for each plant *i*:

- the number of employees *w* working in plants of the same industry (x_j^c) within the borders of the municipality it belongs to and in municipalities whose centroid is located within the selected distance range *r*;

[62] On the other hand and in order to simplify procedures and avoid unnecessary modification of the datasets – as well as an unbalanced preference for precision that would have been accorded to just a few cases - we decided to ignore that some plants could have been better localized by assigning them to their newly formed municipality censed in 2013 but not yet existent in 2007 and/or 2012. As a further justification for our choice, it is to be highlighted that what matters in our study is to be as close as possible to exact location, and it is likely that at least some of these plants could still be closer to the centroid of the original municipality rather than to the centroid of their current one.

[63] Since only 11 municipalities were concerned, we did not bother to compute distances ourselves (which would have been a huge job and likely to result in almost unavoidable mistakes) and we just approximated their location to those of the current municipalities that have absorbed them meanwhile.

- the number of employees *w* working in plants of every industry (x_j) within the borders of the municipality it belongs to and in municipalities whose centroid is located within the selected distance range *r*.

We then proceeded to compute the total number of employees working in each industry (W_c) and the total number of employees working in every industry (*W*).

These numbers allowed us to compute the M for each industry at the selected distance range, through the following formula:

(10) $$\widehat{M}(r) = \sum_i \frac{\sum_{j \neq i} \mathbf{1}\left(\left\|x_i - x_j^c\right\| \leq r\right) w\left(x_j^c\right)}{\sum_{j \neq i} \mathbf{1}\left(\left\|x_i - x_j\right\| \leq r\right) w\left(x_j\right)} \Big/ \sum_i \frac{W_c - w(x_i)}{W - w(x_i)}$$

The process is repeated for each distance (5, 10, 15, 20 and 30 minutes) and for both years (2007 and 2012).

2.4 Baseline results

M results for the five computed distance ranges are summarized in tables 8 and 9.

Table 8 – *Descriptive statistics for M results (2007)*

Distance Range	Obs	Mean	Std. Dev.	Min	Max
M (5 minutes)	250	1,98	21,05	0	18732,45
M (10 minutes)	250	1,77	5,92	0	5147,11
M (15 minutes)	250	1,57	2,38	0	1175,11
M (20 minutes)	250	1,45	1,96	0	1043,71
M (30 minutes)	250	1,32	1,30	0	834,61

Source: Compiled by the authors

Table 9 – *Descriptive statistics for M results (2012)*

Distance Range	Obs	Mean	Std. Dev.	Min	Max
M (5 minutes)	245	1,90	3,84	0	195,57
M (10 minutes)	245	1,72	3,14	0	108,5
M (15 minutes)	245	1,53	2,35	0	106,54
M (20 minutes)	245	1,43	1,86	0	96,87
M (30 minutes)	245	1,29	1,13	0	45,4

Source: Compiled by the authors

For every distance, there is at least an industry whose agglomeration is equal to zero, that is, none of its plants lies within the selected distance from another plant belonging to the same industry.

Whereas the weighted mean is quite consistent either between different ranges in the same year and between 2007 and 2012, maximum values show extremely different results: however this is due to the presence in 2007 of a handful of extremely small industries, featuring less than 10 plants, which skewed the statistics with extreme values. These industries all belong to the primary sector, which however has specific criteria[64] that exclude the largest proportion of activities involved in such area of production. Since 2011, ISTAT has excluded from the ASIA register all these activities, focusing on manufacturing, construction, utilities and services, and therefore such outliers do not exist in the 2012 dataset.

Another interesting feature is the higher ratio between agglomeration at the shortest distance range (5 minutes) and agglomeration at the longest distance range (30 minutes): in fact, this ratio is on average significantly higher for Manufacturing industries than for Service industries, either when industries are weighted by employees (2,21 to 1,20 in 2007, and 2,23 to 1,19 in 2012) and when they are weighted by the number of plants (2,05 to 1,17 in 2007, and 2,08 to 1,16 in 2012). This observation sharply contrast with Barlet, Briant & Crusson (2013, p. 339), who report that most service industries showing non-random distribution *<<are localized at very short distances (less than 4 km)>>*, attributing this to *<<the fact that they are mainly located in the heart of a few big cities and strongly benefit from highly localized technological spillovers>>*.

As a first step, we checked whether results were consistent for the different distance ranges we had selected for the analysis. As clearly apparent in tables 10 and 11, M is quite consistent for every distance range and even more so in 2012, when correlation is almost always really close to 1.

[64] A comprehensive explanation can be found at https://agriregionieuropa.univpm.it/it/content/article/31/36/il-settore-agricolo-nel-business-register.

Table 10 – *Correlation of M at different distances in 2007.*

	M (5 minutes)	M (10 minutes)	M (15 minutes)	M (20 minutes)	M (30 minutes)
M (5 minutes)	1,00				
M (10 minutes)	0,55	1,00			
M (15 minutes)	0,74	0,61	1,00		
M (20 minutes)	0,66	0,50	0,99	1,00	
M (30 minutes)	0,65	0,51	0,97	0,98	1,00

Source: compiled by the authors

Table 11 – *Correlation of M at different distances in 2012.*

	M (5 minutes)	M (10 minutes)	M (15 minutes)	M (20 minutes)	M (30 minutes)
M (5 minutes)	1,00				
M (10 minutes)	0,96	1,00			
M (15 minutes)	0,90	0,97	1,00		
M (20 minutes)	0,86	0,94	0,99	1,00	
M (30 minutes)	0,82	0,92	0,95	0,96	1,00

Source: compiled by the authors

Since industries in our analysis are deeply different from one another in terms of size[65], we also checked whether consistency held when accounting for such differences, weighting industries by the number of their employees. Indeed, Tables 12 and 13 below show that correlation is still high when industries are weighted.

Table 12 – *Correlation of M at different distances in 2007, weighted by industry employees.*

	M (5 minutes)	M (10 minutes)	M (15 minutes)	M (20 minutes)	M (30 minutes)
M (5 minutes)	1				
M (10 minutes)	0,82	1			
M (15 minutes)	0,83	0,84	1		
M (20 minutes)	0,83	0,82	0,99	1	
M (30 minutes)	0,86	0,83	0,98	0,99	1

Source: compiled by the authors

Table 13 – *Correlation of M at different distances in 2012, weighted by industry employees.*

	M (5 minutes)	M (10 minutes)	M (15 minutes)	M (20 minutes)	M (30 minutes)
M (5 minutes)	1				
M (10 minutes)	0,98	1			
M (15 minutes)	0,94	0,97	1		
M (20 minutes)	0,91	0,96	0,99	1	
M (30 minutes)	0,82	0,89	0,90	0,91	1

Source: compiled by the authors

Finally, Table 14 below shows that changes in M between 2007 and 2012 (expressed in terms of the percentage change over 2007 results) are very stable as well.

Table 14 – *Correlation of % changes in M between 2007 and 2012 at different distances in 2007.*

	M (5 minutes)	M (10 minutes)	M (15 minutes)	M (20 minutes)	M (30 minutes)
M (5 minutes)	1,00				
M (10 minutes)	0,91	1,00			
M (15 minutes)	0,87	0,94	1,00		
M (20 minutes)	0,84	0,91	0,97	1,00	
M (30 minutes)	0,80	0,88	0,91	0,93	1,00

Source: compiled by the authors

[65] As a general reference, the largest industry in terms of employees in 2007 (Construction of Buildings) featured well over 700.000 employees, whereas several industries only had a handful.

As apparent in tables 15 and 16, among the most agglomerated industries there are a handful made up by very few industries involved in mining and quarrying: for the 15, 20 and 30 minute distance ranges, the most agglomerated industry is "*Mining of Hard Coal* (051)", entirely made up by only two plants, both located in Gonnesa (Sardinia). At shorter distances, it still gets the second spot behind two similarly small industries: "*Mining of non-ferrous metal ores* (072)" (almost entirely located in Olmedo and Furtei, again in Sardinia) for the 10 minute range, and "*Manufacture of military fighting vehicles* (304)" (located in Lombardore, Piemonte).

However, it is evident that such small numbers make volatility between years high and it is hard to infer any significant pattern. Indeed, if extremely small industries are left aside and we focus on those with at least 50 plants[66], some patterns do emerge.

Natural features are, as clearly expected, a strong component behind agglomeration, with inland water transport activities solidly among the three most agglomerated industries for each distance range[67]. As seen for smaller industries, extraction of physical resources plays a major role in agglomeration, with *Logging* (022) being among the five most agglomerated industries at 5, 10 and 15 minutes and among the ten most agglomerated at 20 minutes, and *Mining and quarrying N.E.C.* (089) close to the top especially as regards shorter ranges. We shall not be surprised by the strong agglomeration patterns spotted in these industries, well described by conspicuous literature[68].

A bit down in the ranking but in still in the higher positions, other industries relying on less specific, but still necessary – or, at least, clearly advantageous - geographic features, are those related to sea activities, such as *Processing and preserving of fish, crustaceans and molluscs* (102), *Sea and coastal water transport* (501) and *Building of ships and boats* (301), or to particular types of tourism such as *Camping grounds, recreational vehicle parks and trailer parks* (553) and *Other short term accommodation activities* (552). Whereas industries described in the paragraph above show especially high agglomeration particularly at shorter ranges, this second type features comparatively higher results for larger distances since the natural advantage is necessary but it is more widespread rather than specific to a single area. It is also interesting to note that Koh and Riedel (2014, p. 831) underlined how *Processing and preserving of fish, crustaceans and molluscs* (102) and *Building of ships and boats* (301) <<*were found to be among the most dispersed in the UK, but list among the twenty most localized industries in Germany, which may (partly) reflect geographic differences between the two countries*>>, with our results for Italy showing a similar pattern as Germany.

Generally, the presence of transport activities - *Passenger air transport* (511) is also among the most agglomerated industries - was also observed by Barlet, Briant & Crusson (2013, p. 343), who argue that <<*transport activities which rely on large infrastructures as ports and airports*>> show

[66] Almeida, Neto & Rocha (2020) chose to lower the threshold to only 10 plants, whereas Behrens & Bougna (2015) restricted their analysis to industries with at least 25 firms when checking for robustness.

[67] Unsurprisingly, Venezia is responsible for over half of the national employment in "*Inland passenger water transport* (503)" and for almost three quarters in "*Inland freight water transport* (504)", with comparatively minor contributions from surrounding centers (such as Chioggia and Cavallino-Treporti) and from municipalities adjacent to large lakes (such as Garda, Maggiore and Como lakes).

[68] Guillain & Le Gallo (2010) found out that even in such an urbanized setting as Paris metropolitan area, the most agglomerated industries are those related to 1. *Coking, petroleum refining, nuclear industry*; 2. *Extraction*.

<<*location patterns*>> compatible with <<*natural advantage (access to the sea) or indivisible facility sharing*>>.

Some of the other industries showing the highest degree of agglomeration pertain to areas where public investment is, or was, consistent because of a high level of public concern, such as *Manufacture of weapons and ammunition* (254)[69].

Especially for larger distance ranges, traditional manufacturing activities pertaining to well-known industrial districts[70] play a significant role: *Manufacture of footwear* (152)[71] - which is an industry widely known for its significant geographic concentration, as acknowledged in a comprehensive study by Sorenson & Audia (2000), but also in an early anticipation by Hoover (1937) - *Manufacture of clay building materials* (233)[72], *Spinning, weaving and finishing of textiles* (131)[73], *Manufacture of jewellery, bijouterie and related articles* (321)[74], *Manufacture of musical instruments* (322)[75] and *Tanning and dressing of leather; manufacture of luggage; handbags; saddlery and harness; dressing and dyeing of fur* (151)[76], all come among the top 12 most agglomerated industries for every distance range.

These results seem in line with those obtained by other authors through different measures, such as Pagnini (2003) who investigated Italian industries in 1996, and identified <<*traditional activities characterized by weak economies of scale*>> such as *Manufacture of clay building materials* (233), *Spinning, weaving and finishing of textiles* (131), *Manufacture of jewellery, bijouterie and related articles* (321) and *Tanning and dressing of leather; manufacture of luggage; handbags; saddlery and harness; dressing and dyeing of fur* (151) among the most agglomerated industries. Textile and clothing industries, in particular, have been reported as among the most agglomerated almost unanimously and ubiquitously by authors such as Duranton & Overman (2005) for the UK and Barlet, Briant & Crusson (2013) for France. Koh & Riedel (2014, p. 831), after acknowledging the same phenomenon for Germany, where <<*among the twenty most localized industries, three belong to textiles and nine industries are related to metal products*>> argued that <<*as many of these agglomeration patterns evolved with the Industrial Revolution in the nineteenth century, the analysis provides strong evidence for the persistence of agglomeration patterns*>>.

Another set of activities identified by Pagnini (2003) as agglomerated is constituted by some industries that, on the other hand, either feature strong economies of scale – such as *Manufacture of motor vehicles* (291) – or can be defined as technologically advanced - as is the case with *Manufacture of pharmaceuticals* (211) and *Manufacture of air and spacecraft and related*

[69] A third of its employees revolve around Brescia, whereas another third is equally split between La Spezia and Rome.
[70] Goodman, Bamford & Saynor (1989), Becattini (1990) and Becattini, Bellandi and De Propris (2014) among many others.
[71] With around a third of its almost 100.000 employees concentrated in the southern portion of Marche.
[72] Over 60% of the industry's employees are located between Bologna and Reggio Emilia, with the town of Sassuolo (Modena) accounting for 27% of world exports of ceramic tiles (Menghinello, 2002).
[73] With around 40% of the industry's employees working between Biella and Borgosesia in Piemonte, and almost another 20% located around Prato, which Menghinello (2002) estimates to hold 4% of the textile world market.
[74] With three main centers around Arezzo in Tuscany (accounting for 3,5% of world jewellery sales, according to Menghinello, 2002), Valenza in Piemonte, and Vicenza in Veneto, which sum up to over half of the total national employment.
[75] 40% of total employment concentrated in the southern half of the Marche region
[76] With a third of the total workforce settled in the Tuscanian Arno valley between Firenze and Pisa, and another fifth around Vicenza, in Veneto.

machinery (303): although these do not emerge among the *most* agglomerated industries in our study, they still show high values.

Table 15 - *20 most agglomerated industries in 2007.*

Industry code	Industry description	Employees	Plants	M (5 minutes)	M (10 minutes)	M (15 minutes)	M (20 minutes)	M (30 minutes)
51	MINING OF HARD COAL	521	2	16952,27	2826,35	1175,11	1043,71	834,61
304	MANUFACTURE OF MILITARY FIGHTING VEHICLES	87	4	18732,45	589,3	231,04	103,81	18,35
72	MINING OF NON-FERROUS METAL ORES	75,84	4	5147,11	5147,11	222,58	45,29	35,84
61	EXTRACTION OF CRUDE PETROLEUM	228	7	504,11	504,11	504,11	488,63	236,55
91	SUPPORT ACTIVITIES FOR PETROLEUM AND NATURAL GAS EXTRACTION	1.036,66	38	267,51	264,71	110,78	92,08	58,57
254	MANUFACTURE OF WEAPONS AND AMMUNITION	7.547,86	267	205,43	109,98	82,75	54,95	24,39
504	INLAND FREIGHT WATER TRANSPORT	603,34	162	90,94	90,78	91,23	66,98	30,48
503	INLAND PASSENGER WATER TRANSPORT	2.608,01	622	64,59	61,84	59,02	46,77	20,29
191	MANUFACTURE OF COKE OVEN PRODUCTS	184,59	9	78,69	42,12	25,68	20,61	13,25
22	LOGGING	153,07	100	58,21	45,78	34,65	13,06	3,72
322	MANUFACTURE OF MUSICAL INSTRUMENTS	2.353,94	688	47,58	28,32	23,55	19,46	8,68
233	MANUFACTURE OF CLAY BUILDING MATERIALS	40.436,12	1299	37,21	30,05	27,12	19,29	12,96
131	SPINNING, WEAVING AND FINISHING OF TEXTILES	33.588,59	3135	35,71	31,88	23,44	20,34	12,81
152	MANUFACTURE OF FOOTWEAR	95.076,97	11202	33,66	28,13	23,25	20,31	16,7
321	MANUFACTURE OF JEWELLERY, BIJOUTERIE AND RELATED ARTICLES	41.204,11	10447	36,31	33,9	16,7	16,33	11,1
89	MINING AND QUARRYING N.E.C.	3.248,64	461	47,45	33,15	16,02	6,4	5,03
234	MANUFACTURE OF OTHER PORCELAIN AND CERAMIC PRODUCTS	18.823,56	3627	34,34	24,19	12,21	9,52	4,92
151	TANNING AND DRESSING OF LEATHER; MANUFACTURE OF LUGGAGE; HANDBAGS; SADDLERY AND HARNESS; DRESSING AND DYEING OF FUR	60.711,90	8793	28,28	20,57	15,45	10,74	6,85
102	PROCESSING AND PRESERVING OF FISH, CRUSTACEANS AND MOLLUSCS	6.521,59	536	24,06	18,59	15,12	11,11	7,18
511	PASSENGER AIR TRANSPORT	22.301,52	545	19,68	17,49	16,57	15,86	2,61

Source: Compiled by the authors

Table 16 – *20 most agglomerated industries in 2012.*

Industry code	Industry description	Employees	Plants	M (5 minutes)	M (10 minutes)	M (15 minutes)	M (20 minutes)	M (30 minutes)
254	MANUFACTURE OF WEAPONS AND AMMUNITION	6.490,58	275	195,57	108,5	76,61	50,2	17,58
61	EXTRACTION OF CRUDE PETROLEUM	331,47	13	99,78	99,78	99,78	96,87	45,4
504	INLAND FREIGHT WATER TRANSPORT	627,77	118	105,88	105,85	106,54	77,75	35,76
503	INLAND PASSENGER WATER TRANSPORT	1.837,58	884	101,89	97,75	96,02	72,17	30,09
91	SUPPORT ACTIVITIES FOR PETROLEUM AND NATURAL GAS EXTRACTION	1.715,54	63	87,52	83,1	46,04	38,19	28,14
131	SPINNING, WEAVING AND FINISHING OF TEXTILES	20.517,02	2.061	42,34	37,21	25,88	22,53	14,18
511	PASSENGER AIR TRANSPORT	23.853,23	429	37,65	33,17	32,04	30,92	3,66
233	MANUFACTURE OF CLAY BUILDING MATERIALS	29.786,78	989	40,75	31,86	29,72	20,15	13,62
322	MANUFACTURE OF MUSICAL INSTRUMENTS	2.171,98	681	48,91	28,63	24,29	20,38	8,7
152	MANUFACTURE OF FOOTWEAR	80.786,56	9.420	35,77	29,95	24,7	21,29	17,41
89	MINING AND QUARRYING N.E.C.	2.877,20	402	52,73	42,25	15,69	6,08	4,4
321	MANUFACTURE OF JEWELLERY, BIJOUTERIE AND RELATED ARTICLES	31.059,54	8.785	38,92	36,46	16,81	16,17	11,09
234	MANUFACTURE OF OTHER PORCELAIN AND CERAMIC PRODUCTS	13.339,28	2.643	38,87	27,94	14,15	10,3	5,03
62	EXTRACTION OF NATURAL GAS	7.906,62	64	42,94	23,67	5,89	5,01	3,99
151	TANNING AND DRESSING OF LEATHER; MANUFACTURE OF LUGGAGE; HANDBAGS; SADDLERY AND HARNESS; DRESSING AND DYEING OF FUR	56.746,64	7.820	27,31	20,14	15,18	10,92	7,3
102	PROCESSING AND PRESERVING OF FISH, CRUSTACEANS AND MOLLUSCS	5.346,38	472	22,47	16,95	15,28	10,23	6,72
206	MANUFACTURE OF MAN-MADE FIBRES	2.978,57	54	16,82	21,44	13,85	11,85	4
553	CAMPING GROUNDS, RECREATIONAL VEHICLE PARKS AND TRAILER PARKS	8.488,23	1.892	18,6	15,7	12,63	8,16	5,33
132	WEAVING OF TEXTILES	32.153,14	2.349	19,18	15,85	11,22	8,31	5,04
171	MANUFACTURE OF PULP, PAPER AND PAPERBOARD	12.357,93	313	21,09	19,28	7,88	6,25	3,97

Source: Compiled by the authors

Dispersed industries are unsurprising as well and are mostly pertaining to the service sector and to activities typically distributed all around the country and featuring a local reach, either because of non-increasing returns to scale (Krugman, 1991) or because of a public interest in serving the largest possible share of the population. Prominent examples of the former are activities related to

professional consultancy[77], construction and house repair[78] and personal finance[79], whereas the latter is represented by industries related to education[80], healthcare[81] and postal activities (531).

When focusing strictly on manufacturing, the most dispersed industries for every distance range are, unsurprisingly, those related to some types of food processing[82], *Manufacture of structural metal products* (251) and *Manufacture of products of wood, cork, straw and plaiting materials* (162). For longer distance ranges, *Manufacture of paints, varnishes and similar coatings, printing ink and mastics* (203), *Manufacture of basic iron and steel* (241), *Manufacture of other non-metallic mineral products n.e.c.* (239), *Manufacture of plastic products* (222) and *Manufacture of other fabricated metal products n.e.c.* (259) are the most dispersed industries. As per Cainelli, Ganau & Jiang (2020, p. 423), *Manufacture of tobacco products* (120) is one of a few industries with a <<*very little number of firms operating in it*>> with a <<*peculiar spatial distribution*>>[83].

Table 17 – *20 most dispersed industries in 2007.*

Industry code	Industry description	Employees	Plants	M (5 minutes)	M (10 minutes)	M (15 minutes)	M (20 minutes)	M (30 minutes)
12	GROWING OF PERENNIAL CROPS	5	4	0	0	0	0	0
14	ANIMAL PRODUCTION	54,34	15	0	0	0	0,05	0,86
774	LEASING OF INTELLECTUAL PROPERTY AND SIMILAR PRODUCTS, EXCEPT COPYRIGHTED WORKS	95,2	22	0,71	0,7	0,51	0,4	0,49
120	MANUFACTURE OF TOBACCO PRODUCTS	1.394,02	10	0,74	0,74	0,74	0,71	0,61
31	FISHING	309,46	19	0	0	0	0	4,3
531	POSTAL ACTIVITIES	154.135,00	12315	0,68	0,95	1,05	1,07	1,08
641	MONETARY INTERMEDIATION	358.988,03	33390	1	1	0,99	0,99	1,01
960	OTHER PERSONAL SERVICE ACTIVITIES	348.944,94	169009	1,08	1,06	1,04	1,03	1,02
432	ELECTRICAL, PLUMBING AND OTHER CONSTRUCTION INSTALLATION ACTIVITIES	506.546,22	160326	1,13	1,08	1,05	1,03	1,01
662	ACTIVITIES AUXILIARY TO INSURANCE AND PENSION FUNDING	102.281,83	41285	1,18	1,09	1,04	1,02	1,03
952	REPAIR OF PERSONAL AND HOUSEHOLD GOODS	37.893,09	23801	1,13	1,1	1,08	1,06	1,04
711	ARCHITECTURAL AND ENGINEERING ACTIVITIES AND RELATED TECHNICAL CONSULTANCY	287.692,22	217633	1,14	1,1	1,08	1,06	1,05
631	DATA PROCESSING, HOSTING AND RELATED ACTIVITIES; WEB PORTALS	135.775,00	37722	1,16	1,11	1,07	1,06	1,06
749	OTHER PROFESSIONAL, SCIENTIFIC AND TECHNICAL ACTIVITIES N.E.C.	112.307,14	70962	1,15	1,12	1,09	1,07	1,06
467	OTHER SPECIALIZED WHOLESALE	226.222,89	47382	1,16	1,12	1,09	1,08	1,06
476	RETAIL SALE OF CULTURAL AND RECREATION GOODS IN SPECIALIZED STORES	105.282,85	52496	1,15	1,13	1,1	1,09	1,07
812	CLEANING ACTIVITIES	411.465,13	34283	1,12	1,11	1,12	1,1	1,09
562	EVENT CATERING AND OTHER FOOD SERVICE ACTIVITIES	114.392,05	9164	1,1	1,08	1,13	1,11	1,12
692	ACCOUNTING, BOOKKEEPING AND AUDITING ACTIVITIES; TAX CONSULTANCY	243.521,77	121291	1,23	1,16	1,08	1,05	1,04
742	PHOTOGRAPHIC ACTIVITIES	23.369,06	15268	1,13	1,14	1,11	1,09	1,09

Source: Compiled by the authors

[77] *Accounting, bookkeeping and auditing activities; tax consultancy* (692); *Architectural and engineering activities and related technical consultancy* (711); *Other professional, scientific and technical activities n.e.c.* (749).

[78] *Electrical, plumbing and other construction installation activities* (432), *Repair of personal and household goods* (952), *Building completion and finishing* (433).

[79] *Monetary intermediation* (641), *Activities auxiliary to insurance and pension funding* (662*), Activities auxiliary to financial service activities, except insurance and pension funding* (661).

[80] *Higher education* (854), *Other education* (855).

[81] *Medical and dental practice activities* (862).

[82] *Manufacture of bakery products* (107) and *Manufacture of other food products* (108).

[83] They also underline that <<*according to the 2011 Industry and Services Census (Istat), there were only eight active local units operating in Italy, of which one in the Northern part of the country (Piedmont), six in the Central part of the country (two in Tuscany, one in Umbria, one in the Marches, two in Latium), and one in the Southern part of the country (Campania)*>>.

***Table 18** – 20 most dispersed industries in 2012.*

Industry code	Industry description	Employees	Plants	M (5 minutes)	M (10 minutes)	M (15 minutes)	M (20 minutes)	M (30 minutes)
72	MINING OF NON-FERROUS METAL ORES	46,15	7	0	0	0	0	0
99	SUPPORT ACTIVITIES FOR OTHER MINING AND QUARRYING	73,49	10	0	0	0	0	0
191	MANUFACTURE OF COKE OVEN PRODUCTS	272,18	5	0	0	0	0	0
304	MANUFACTURE OF MILITARY FIGHTING VEHICLES	79,6	2	0	0	0	0	0
120	MANUFACTURE OF TOBACCO PRODUCTS	531,12	8	0,1	0,1	0,1	0,1	0,09
268	MANUFACTURE OF MAGNETIC AND OPTICAL MEDIA	73,87	25	0	0,4	1,06	0,55	0,6
531	POSTAL ACTIVITIES	146.032,78	12.393	0,67	0,92	1,03	1,07	1,07
641	MONETARY INTERMEDIATION	346.024,78	31.865	0,95	0,97	0,97	0,98	1
960	OTHER PERSONAL SERVICE ACTIVITIES	402.387,38	182.821	1,07	1,05	1,04	1,03	1,02
662	ACTIVITIES AUXILIARY TO INSURANCE AND PENSION FUNDING	117.140,18	56.447	1,12	1,07	1,03	1,02	1,03
432	ELECTRICAL, PLUMBING AND OTHER CONSTRUCTION INSTALLATION ACTIVITIES	484.826,78	157.771	1,13	1,08	1,05	1,03	1,01
711	ARCHITECTURAL AND ENGINEERING ACTIVITIES AND RELATED TECHNICAL CONSULTANCY	267.715,75	205.279	1,11	1,08	1,06	1,04	1,03
562	EVENT CATERING AND OTHER FOOD SERVICE ACTIVITIES	118.285,52	11.753	1,05	1,07	1,07	1,07	1,08
749	OTHER PROFESSIONAL, SCIENTIFIC AND TECHNICAL ACTIVITIES N.E.C.	114.698,01	81.170	1,13	1,1	1,07	1,06	1,05
631	DATA PROCESSING, HOSTING AND RELATED ACTIVITIES; WEB PORTALS	115.814,23	33.770	1,15	1,1	1,06	1,05	1,05
476	RETAIL SALE OF CULTURAL AND RECREATION GOODS IN SPECIALIZED STORES	103.644,92	50.948	1,12	1,1	1,08	1,07	1,06
712	TECHNICAL TESTING AND ANALYSIS	33.231,33	9.847	1,11	1,1	1,08	1,07	1,07
742	PHOTOGRAPHIC ACTIVITIES	19.397,32	13.820	1,11	1,12	1,09	1,08	1,07
479	RETAIL TRADE NOT IN STORES, STALLS OR MARKETS	39.217,78	15.006	1,15	1,12	1,08	1,08	1,06
692	ACCOUNTING, BOOKKEEPING AND AUDITING ACTIVITIES; TAX CONSULTANCY	259.365,91	129.711	1,22	1,14	1,07	1,04	1,03

Source: Compiled by the authors

2.4.1 Dynamics of spatial concentration

When analyzing the same timeframe, Cainelli, Ganau & Jiang (2020, p. 443) found out that <<*Italian manufacturing sectors experienced a process of space-time dispersion during the period of the Great Recession, although with slightly different intensity and patterns*>>[84]. Indeed, descriptive statistics provided in tables 3 and 4 in the previous section show a slight decrease in the weighted mean of agglomeration results for every distance range. However, a deeper look at changes between 2007 and 2012 results, provided in table 19 below, shows that the decrease in absolute terms does not have a counterpart when referring to percentage changes.

***Table 19** – Descriptive statistics for percentage changes in M between 2007 and 2012*

Distance Range	Obs	Mean	Std. Dev.	Min	Max
M (5 minutes)	243	0,20	9,72	-100	508,49
M (10 minutes)	243	0,18	9,02	-100	582,74
M (15 minutes)	243	0,02	7,99	-100	256,97
M (20 minutes)	243	-0,06	7,02	-100	300,49
M (30 minutes)	243	-0,19	6,16	-100	342,41

Source: Compiled by the authors

In 2012, the patterns of the most agglomerated industries do not seem to have changed much, with the same reasons outlined above for 2007 that seem to be still valid five years - and a severe economic crisis - later. Nevertheless, and even leaving aside the smallest industries, M values seem to be generally lower than they were five years earlier: this seems somehow reminiscent of Behrens & Bougna's (2015, p. 48) finding that <<*localization is decreasing, i.e., manufacturing industries become less geographically concentrated in Canada*>>, whereas it contrasts with findings by Brakman, Garretsen & Zhao (2017) who report increased agglomeration in China between 2002 and 2008.

[84] This difference in intensity and patterns is reminiscent of De Dominicis, Arbia & De Groot (2013, p. 5), who observed that <<*whereas manufacturing has been spreading out, service activities have become increasingly clustered*>>.

Aside from the afore-mentioned activities, whose distribution strongly depends on natural availability of resources above any other factor, another finding from Behrens & Bougna (2015, p. 48) seems to be valid for Italy as they found it true for Canada between 2001 and 2009: whereas activities seem to be generally more dispersed than a few years before, <<*some of the most strongly localized industries are becoming even more localized*>>. Indeed, activities related to industrial districts have not lost ground as concerns agglomeration, with the names on top still the same as in 2007 and many of the most agglomerated manufacturing industries have become even more in 2012: that is the case, for example, of *Manufacture of clay building materials* (233), *Spinning, weaving and finishing of textiles* (131), *Manufacture of footwear* (152) and *Manufacture of jewellery, bijouterie and related articles* (321).

A strong agglomeration pattern for every distance range has regarded industries as diverse as *Transport via pipeline* (495)[85], *Construction of roads and railways* (421), *Renting and leasing of personal and household goods* (772) and *Waste treatment and disposal* (382). As concerns manufacturing, the industries that have seen the most agglomeration during those five years were *Manufacture of batteries and accumulators* (272) and *Manufacture of motor vehicles* (291), notwithstanding the different changes intervened in their economic structure: the former has seen constant employment but a very large decrease in the number of plants, whereas the latter has seen a modest decrease in employment but a larger increase in the number of plants. These results are quite consistent with Almeida, Neto & Rocha (2020, p. 9), who report that <<*except in technology intensive sectors*>>, agglomeration <<*shows a decreasing trend*>> and that <<*manufacturing employment has tended to deconcentrate in the last decades […] simultaneously with an increase in the number of manufacturing sectors with statistically significant localization patterns*>>.

Table 20 – *20 industries with the largest % increase in agglomeration between 2007 and 2012.*

Industry code	Industry description	Employees	Plants	M (5 minutes)	M (10 minutes)	M (15 minutes)	M (20 minutes)	M (30 minutes)
62	EXTRACTION OF NATURAL GAS	**-15,94**	**-32,63**	364,72	436,73	256,97	229,61	241,03
783	OTHER HUMAN RESOURCES PROVISION	**1.824,94**	**18,75**	133,97	135,25	232,43	300,49	342,41
774	LEASING OF INTELLECTUAL PROPERTY AND SIMILAR PRODUCTS, EXCEPT COPYRIGHTED WORKS	**1.406,44**	**1.063,64**	81,69	174,29	227,45	272,50	244,90
512	FREIGHT AIR TRANSPORT	**94,23**	**48,00**	-43,13	582,74	198,03	160,00	87,77
492	FREIGHT RAIL TRANSPORT	**12,79**	**141,67**	378,93	279,63	170,48	151,09	-20,18
772	RENTING AND LEASING OF PERSONAL AND HOUSEHOLD GOODS	**-32,31**	**-33,46**	192,26	173,65	163,38	146,72	126,77
272	MANUFACTURE OF BATTERIES AND ACCUMULATORS	**-0,27**	**-34,13**	73,45	158,43	195,29	114,77	155,77
613	SATELLITE TELECOMMUNICATIONS ACTIVITIES	**-8,35**	**170,00**	508,49	56,76	-2,04	-26,18	73,93
291	MANUFACTURE OF MOTOR VEHICLES	**-3,16**	**20,26**	89,73	104,10	82,24	89,54	52,48
511	PASSENGER AIR TRANSPORT	**6,96**	**-21,28**	91,31	89,65	93,36	94,96	40,23
495	TRANSPORT VIA PIPELINE	**-18,19**	**7,35**	58,18	128,07	143,24	46,73	27,83
802	SECURITY SYSTEMS SERVICE ACTIVITIES	**860,32**	**1.345,45**	86,94	55,91	54,49	87,29	117,65
652	REINSURANCE	**-39,23**	**50,00**	75,93	75,69	80,67	82,37	84,29
559	OTHER ACCOMODATION	**-33,16**	**13,49**	182,96	110,03	14,71	30,80	-11,84
503	INLAND PASSENGER WATER TRANSPORT	**-29,54**	**42,12**	57,75	58,07	62,69	54,31	48,30
267	MANUFACTURE OF OPTICAL INSTRUMENTS AND PHOTOGRAPHIC EQUIPMENT	**-2,34**	**-4,88**	43,27	65,22	53,21	42,69	56,94
202	MANUFACTURE OF PESTICIDES AND OTHER AGROCHEMICAL PRODUCTS	**-19,00**	**-26,26**	101,70	53,01	59,45	36,99	6,67
235	MANUFACTURE OF CEMENT, LIME AND PLASTER	**-18,84**	**-16,59**	75,64	35,68	21,39	28,62	14,36
211	MANUFACTURE OF PHARMACEUTICALS	**0,89**	**-22,66**	121,94	25,66	17,27	6,69	-0,42
854	HIGHER EDUCATION	**250,02**	**594,12**	33,12	21,92	17,27	31,40	38,30

Source: Compiled by the authors

[85] Strangely enough, since the industry has lost a sizeable portion of its 2007 employees but such a shrinking has not been paralleled by a decreased in the number of plants, which have actually increased.

As for agglomeration, dispersion patterns have not changed much either, with activities related to personal finance and postal services still among the least geographically concentrated, as well as those related to professional consultancy. The most dispersed industries related to manufacturing are the same as those in 2007, as well. Among the many industries that have significantly dispersed between 2007 and 2012, the most noteworthy (also because of its size) is *Manufacture of medical and dental instruments and supplies* (325), which has undergone a decrease in the total workforce and a comparable increase in the number of plants.

Table 21 – *20 industries with the largest % decrease in agglomeration between 2007 and 2012*

Industry code	Industry description	Employees	Plants	M (5 minutes)	M (10 minutes)	M (15 minutes)	M (20 minutes)	M (30 minutes)
72	MINING OF NON-FERROUS METAL ORES	**-39,15**	**75,00**	-100,00	-100,00	-100,00	-100,00	-100,00
191	MANUFACTURE OF COKE OVEN PRODUCTS	**47,45**	**-44,44**	-100,00	-100,00	-100,00	-100,00	-100,00
304	MANUFACTURE OF MILITARY FIGHTING VEHICLES	**-8,51**	**-50,00**	-100,00	-100,00	-100,00	-100,00	-100,00
120	MANUFACTURE OF TOBACCO PRODUCTS	**-61,90**	**-20,00**	-86,49	-86,49	-86,49	-85,92	-85,25
268	MANUFACTURE OF MAGNETIC AND OPTICAL MEDIA	**-85,90**	**-52,83**	-100,00	-87,73	-73,16	-79,78	-64,29
61	EXTRACTION OF CRUDE PETROLEUM	**45,38**	**85,71**	-80,21	-80,21	-80,21	-80,18	-80,81
872	RESIDENTIAL CARE ACTIVITIES FOR MENTAL RETARDATION, MENTAL HEALTH AND SUBSTANCE ABUSE	**397,15**	**362,43**	-68,13	-76,57	-67,79	-61,79	-51,26
91	SUPPORT ACTIVITIES FOR PETROLEUM AND NATURAL GAS EXTRACTION	**65,49**	**65,79**	-67,28	-68,61	-58,44	-58,53	-51,95
390	REMEDIATION ACTIVITIES AND OTHER WASTE MANAGEMENT SERVICES	**91,16**	**96,55**	-52,48	-40,11	-40,91	-42,34	-40,54
856	EDUCATIONAL SUPPORT ACTIVITIES	**218,97**	**757,81**	-65,04	-53,71	-21,16	1,50	-41,18
811	COMBINED FACILITIES SUPPORT ACTIVITIES	**141,56**	**398,08**	-4,66	-36,44	-40,71	-40,95	-33,51
325	MANUFACTURE OF MEDICAL AND DENTAL INSTRUMENTS AND SUPPLIES	**-6,81**	**11,55**	-31,31	-32,67	-31,50	-29,88	-27,35
642	ACTIVITIES OF HOLDING COMPANIES	**-65,20**	**811,38**	-35,71	-39,26	-25,46	-25,26	-22,89
323	MANUFACTURE OF SPORTS GOODS	**-8,37**	**-4,70**	-34,61	-34,23	-25,14	-16,71	-10,11
643	TRUSTS, FUNDS AND SIMILAR FINANCIAL ENTITIES	**-95,87**	**-68,75**	37,14	-51,52	-37,89	-28,51	-37,08
799	OTHER RESERVATION SERVICE AND RELATED ACTIVITIES	**44,49**	**70,33**	-49,80	-49,90	-50,83	16,76	18,42
552	OTHER SHORT TERM ACCOMODATION ACTIVITIES	**19,60**	**37,41**	-20,41	-18,65	-19,14	-21,37	-23,78
773	RENTING AND LEASING OF OTHER MACHINERY, EQUIPMENT AND TANGIBLE GOODS	**12,97**	**1,50**	-18,03	-19,77	-20,11	-20,00	-20,24
932	OTHER AMUSEMENT AND RECREATION ACTIVITIES	**-2,77**	**6,95**	-21,56	-21,17	-19,37	-16,19	-15,64
232	MANUFACTURE OF REFRACTORY PRODUCTS	**-8,90**	**-1,20**	-16,42	-16,23	-26,16	-15,82	-14,42

Source: Compiled by the authors

2.4.2 Industry size

Agglomeration results do not seem to be correlated with industry size when measured in terms of employees nor in terms of the number of plants:

Table 22 - *Correlation between agglomeration and two measures of industry size in 2007, by distance range.*

Distance range (2007)	# of employees	# of plants
5 minutes	0,0045	0,0023
10 minutes	0,0047	0,0024
15 minutes	0,0072	0,0040
20 minutes	0,0056	0,0031
30 minutes	0,0041	0,0022

Source: Compiled by the authors

Table 23 - *Correlation between agglomeration and two measures of industry size in 2012, by distance range.*

Distance range (2012)	# of employees	# of plants
5 minutes	0,0301	0,0212
10 minutes	0,0298	0,0208
15 minutes	0,0226	0,0159
20 minutes	0,0210	0,0149
30 minutes	0,0239	0,0181

Source: Compiled by the authors

Weighting each industry by the number of its employees does not change much either, with correlation still close to zero:

Table 24 - *Weighted correlation between agglomeration and two measures of industry size in 2007, by distance range.*

Distance range (2007)	# of employees	# of plants
5 minutes	0,0005	0,0004
10 minutes	0,0045	0,0037
15 minutes	0,1430	0,1240
20 minutes	0,0119	0,0104
30 minutes	0,0085	0,0075

Source: Compiled by the authors

Table 25 - *Weighted correlation between agglomeration and two measures of industry size in 2007, by distance range.*

Distance range (2012)	# of employees	# of plants
5 minutes	0,0595	0,0464
10 minutes	0,0652	0,0518
15 minutes	0,0613	0,0502
20 minutes	0,0610	0,0505
30 minutes	0,0641	0,0550

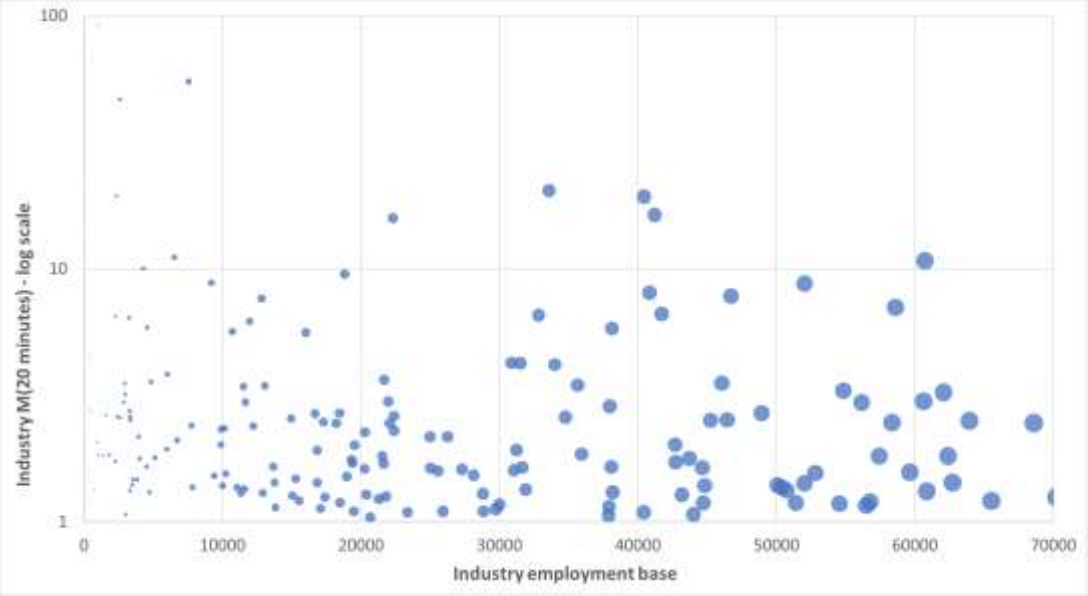
Source: Compiled by the authors

The underlying figure provides a visual overview of the (almost non-existent) correlation between agglomeration and number of employees: in this case, we provide results for the 20-minute distance range in 2007 as an example which is quite representative for both years and for every other distance range. In order to provide more immediateness, we have focused on the most relevant part of the plot, leaving out industries with more than 70.000 employees, since only a handful of them report an agglomeration index higher than 2[86]. M results over 100 are not shown either, leaving out only two marginal industries[87].

[86] For the highest selected distance range (30 minutes), only industries 551, 310, 293, 281 and 152 have an M higher than 2, whereas for shorter distance ranges there are only 13 industries above that threshold. Among them all, only *Manufacture of footwear (152)* could be considered very agglomerated at every distance range, whereas *Manufacture of general-purpose machinery (281)* show M results ranging from 9,67 to 3,98*, Hotels (551)* show M results ranging from 6,8 to 3,41, *Manufacture of furniture (310)* show results ranging from 6,61 to 2,17, and *Manufacture of parts and accessories for motor vehicles (293)* show results ranging from 4,08 to 2,46. Every other industry with more than 70.000 employees shows a limited degree of agglomeration at every distance. In this intermediate distance range (20 minutes), in addition to those with an M higher than 2 for every range, only *Manufacture of wearing apparel, except fur apparel (141)* is excluded.

[87] *Mining of hard coal (051)* and *Extraction of crude petroleum (061)*, summing up to only 9 plants and well under 1000 employees in total.

Figure 4 – *Focused outlook of correlation of industry size in terms of employees and agglomeration at 5 minute distance, weighed by industry size in terms of employees, in 2007.*



Source: Compiled by the authors

Even when isolating single areas of activity (e.g.: primary sector, manufacturing, services, etc.), there seems to be close to no correlation between different proxies for size and agglomeration, not even when assigning comparatively more weight to larger industries. The same holds true when trying to spot correlation between agglomeration and measures of size in industries with similar size.

2.4.3 Agglomeration change and industry size change

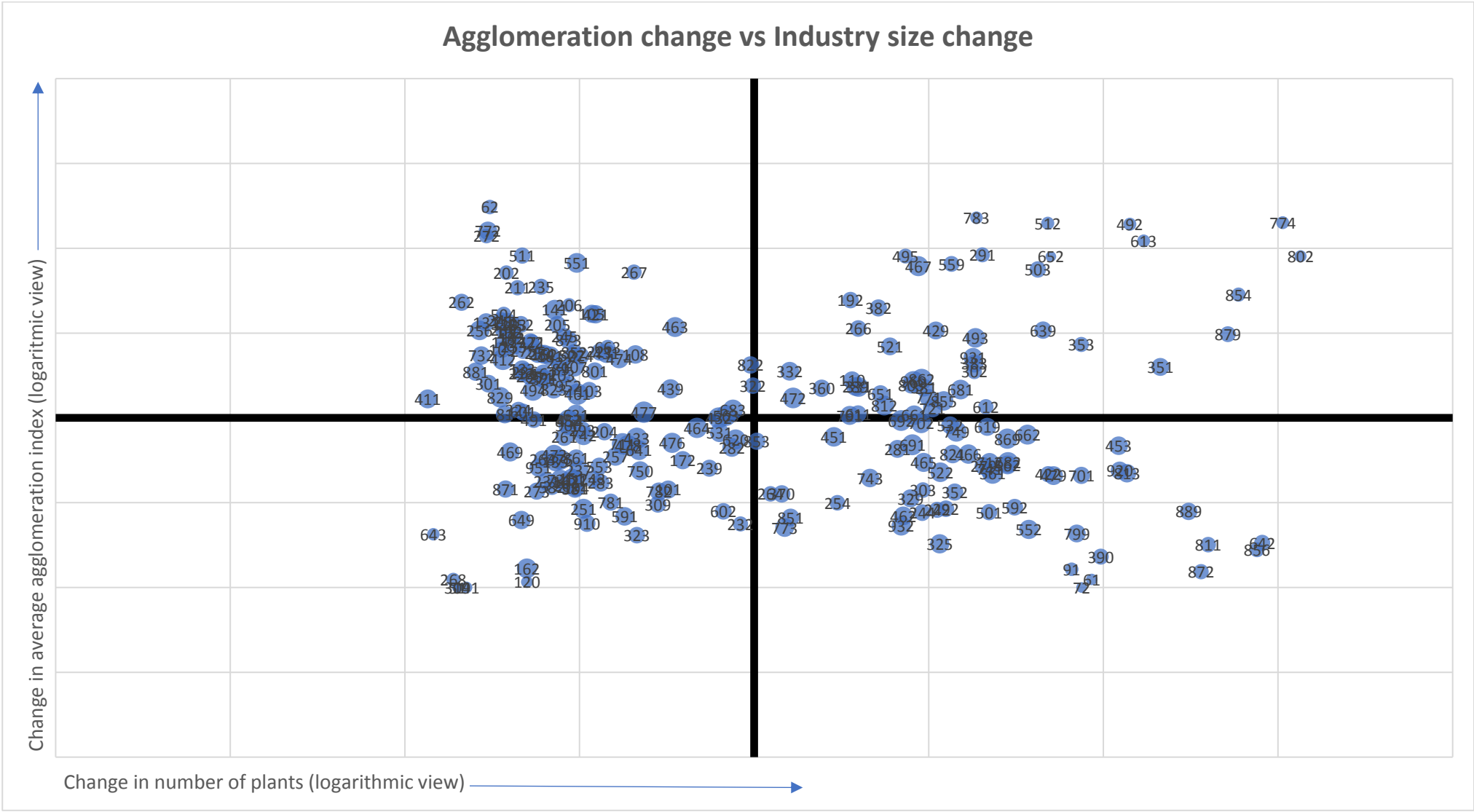
Finally, we decided to explore whether dynamics of industry growth were somehow related to dynamics of agglomeration. The following graph shows that all quadrants are decently represented, without any apparent predomination.

We then selected a representative service industry and a representative manufacturing industry for each quadrant, portraying its density[88] within each municipality in order to show the territorial change occurred for industries undergoing different dynamics. Using density instead of the raw number of plants within a municipality prevents the over-representation of really large municipalities.

It is immediately evident, for instance, how industry 131 (Spinning, weaving and finishing of textiles), which has seen a decrease in size and an increase in agglomeration between 2007 and 2012, shows reduced density overall but only outside existing agglomeration where density was higher in 2007. Industry 772 (Renting and leasing of personal and household goods) shows the same phenomenon, offering perhaps an even stronger visual impact.

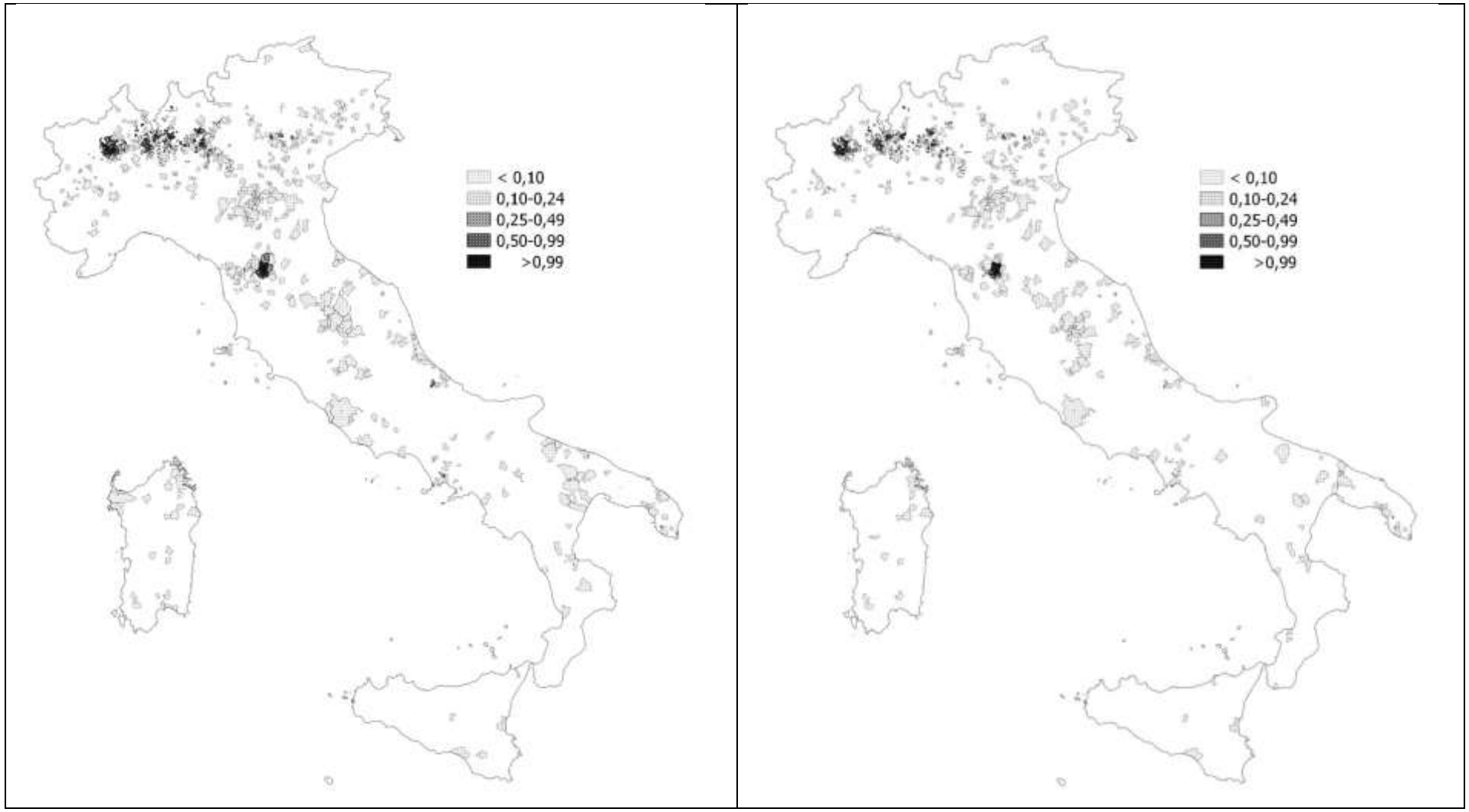
[88] Number of plants in the industry in the municipality / Municipality's area in square kilometers.

Figure 5 – *Agglomeration change vs Industry size change in terms of plants, 2007-2012 (logarithmic scales)*



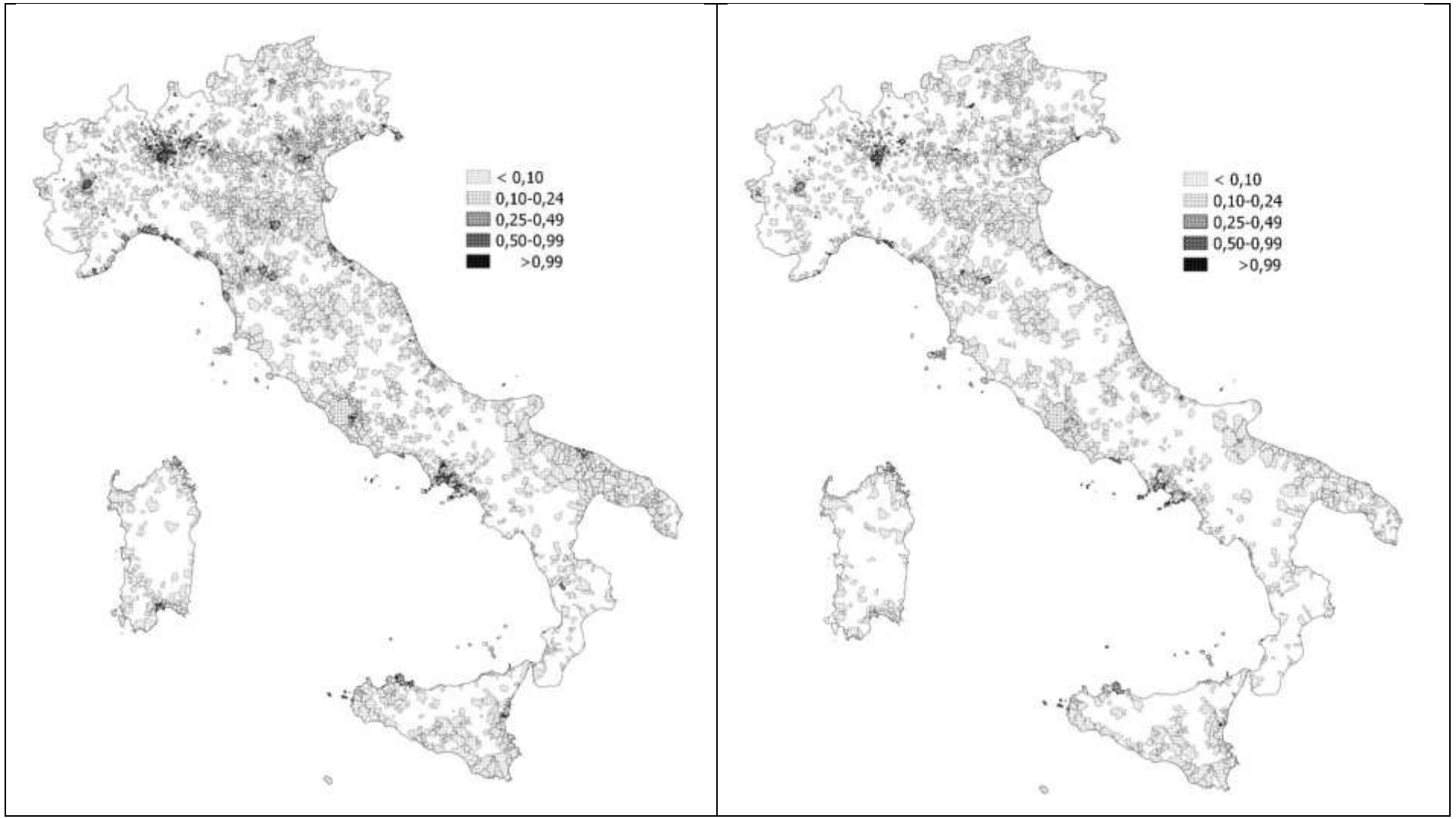
Source: Compiled by the authors

Figure 6 *– Decreasing size and growing agglomeration in Manufacturing (131 – Spinning, weaving and finishing of textiles)*



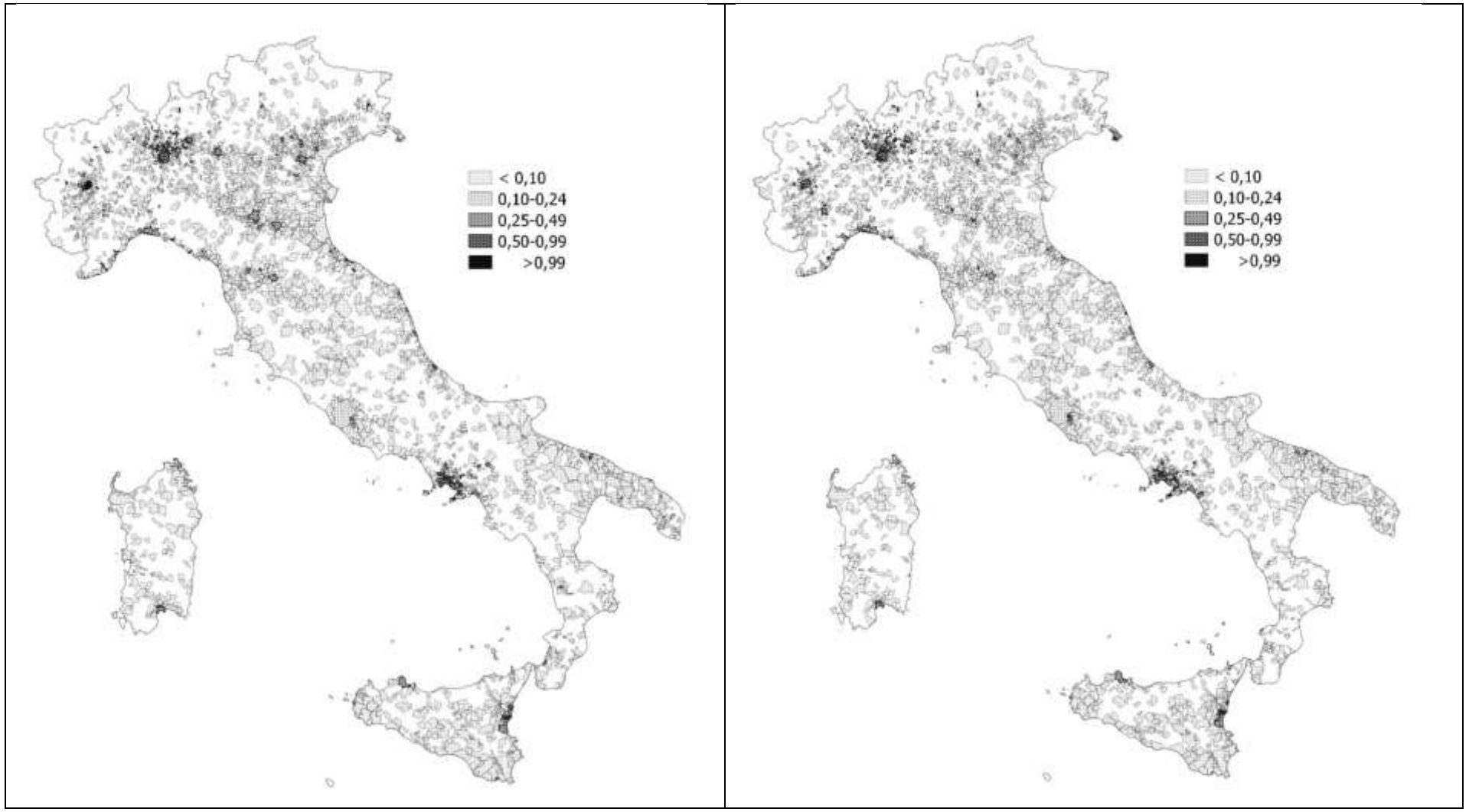
Source: Compiled by the authors

Figure 7 *– Decreasing size and growing agglomeration in Services (772 – Renting and leasing of personal and household goods)*



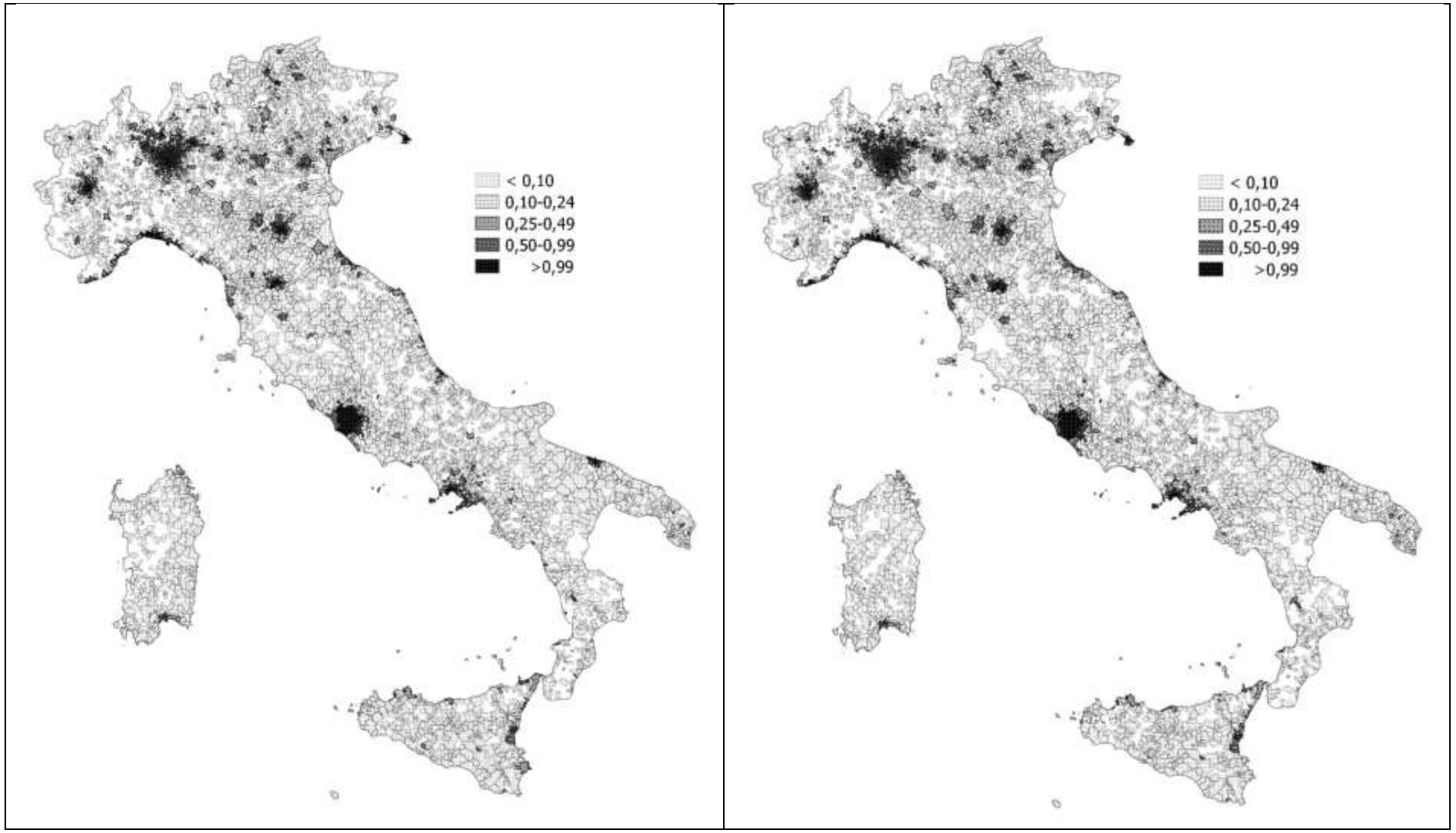
Source: Compiled by the authors

Figure 8 *– Increasing size and growing agglomeration in Manufacturing (108 – Manufacture of other food products)*



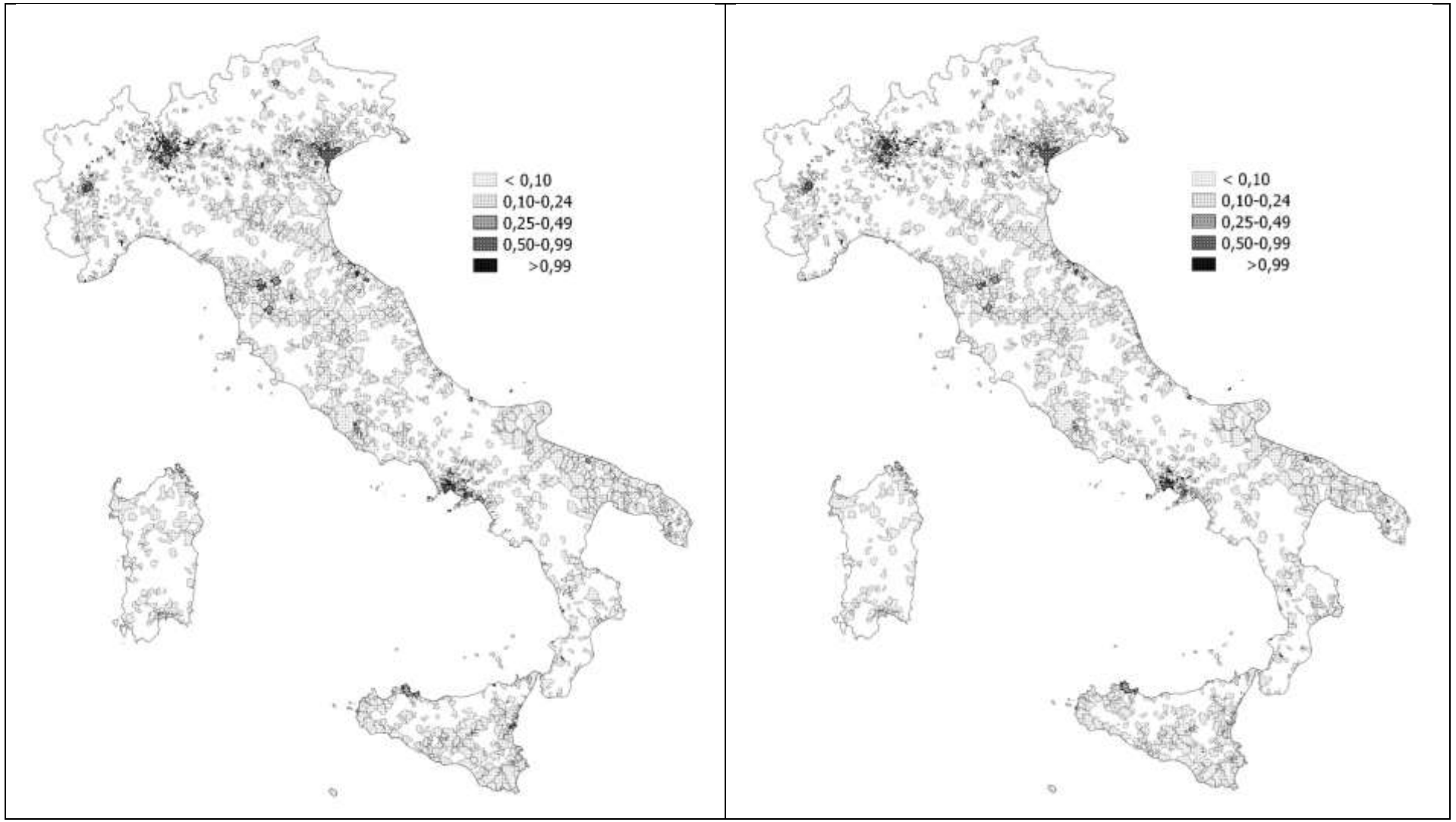
Source: Compiled by the authors

Figure 9 *– Increasing size and growing agglomeration in Services (493 – Other passenger land transport)*



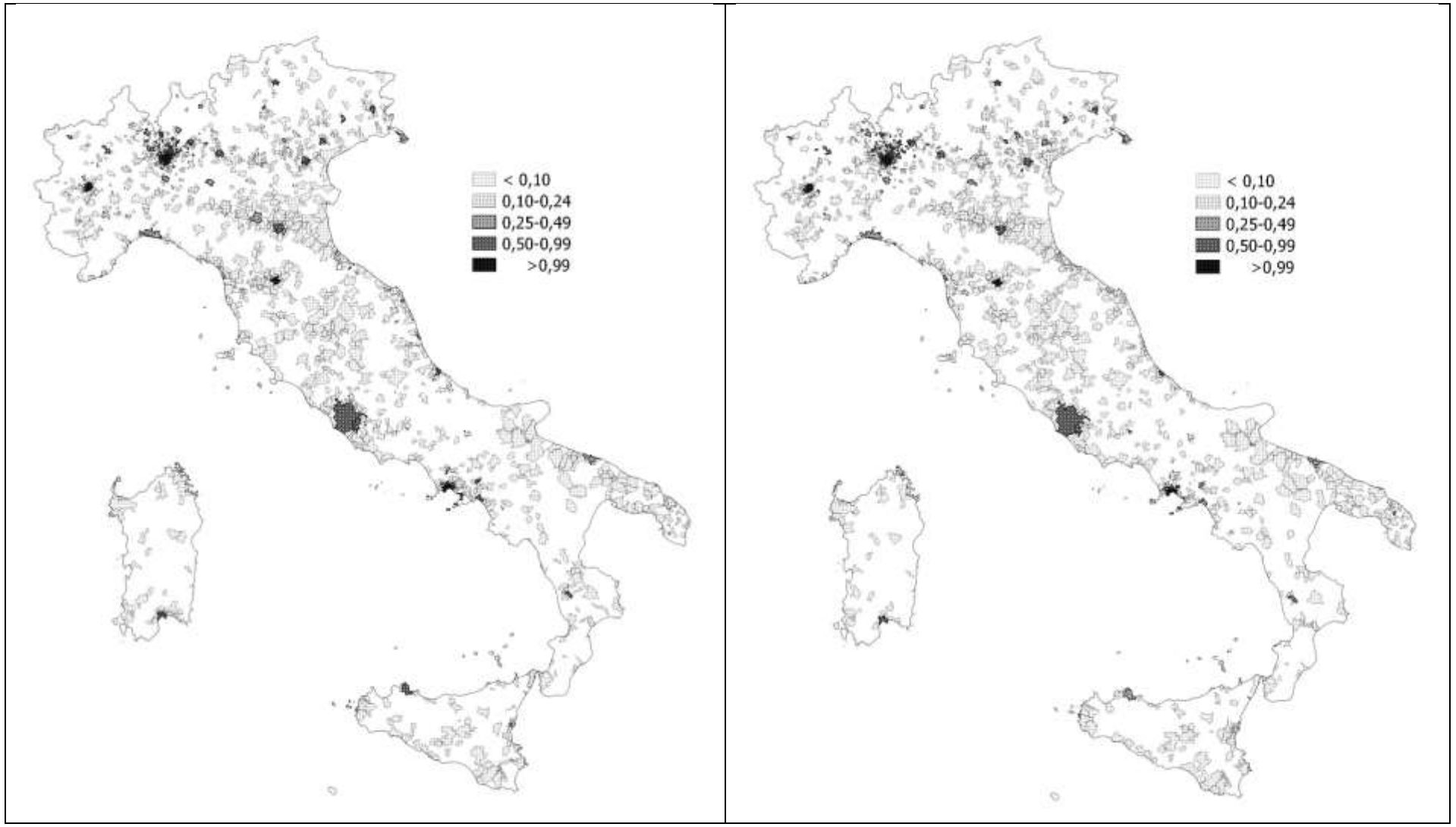
Source: Compiled by the authors

Figure 10 *– Decreasing size and decreasing agglomeration in Manufacturing (231 – Manufacture of glass and glass products)*



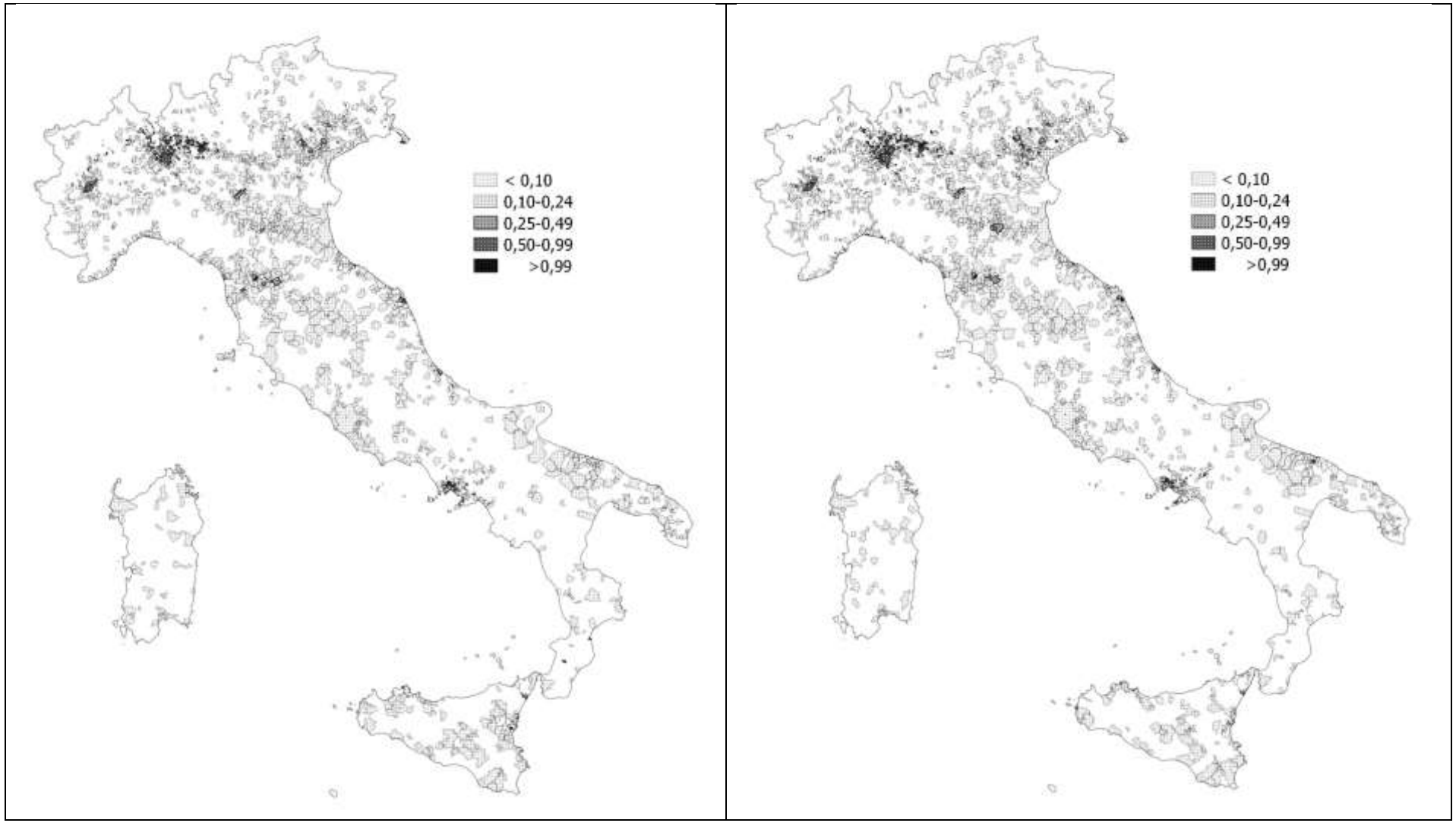
Source: Compiled by the authors

Figure 11 *– Decreasing size and decreasing agglomeration in Services (581 – Publishing of books, periodicals and other publishing activities)*



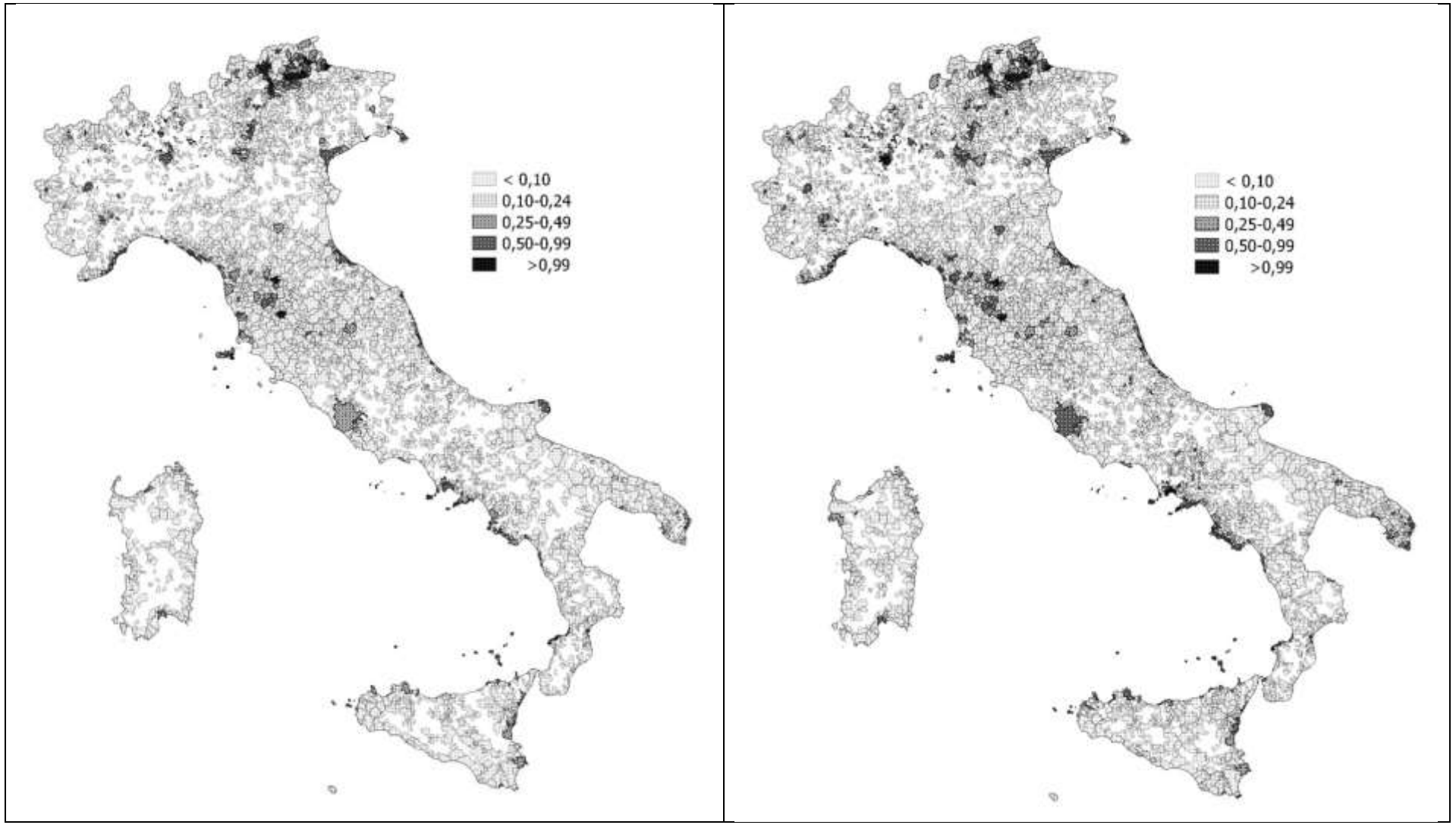
Source: Compiled by the authors

Figure 12 *– Increasing size and decreasing agglomeration in Manufacturing (329 – Other manufacturing n.e.c.)*



Source: Compiled by the authors

Figure 13 *– Increasing size and decreasing agglomeration in Services (552 – Other short term accommodation activities)*



Source: Compiled by the authors

2.5 Determinants of agglomeration: an exploratory analysis

In this section, we aim to explore possible determinants behind the agglomeration rates we have found for 2007 and 2012. Specifically, we selected some proxies identified in previous literature and we correlate them with our agglomeration results: mean plant size, industry entry and exit rates, mean firm age, and technological level or knowledge intensity for, respectively, manufacturing and service industries. This allows us to draw comparisons and to explore similarities and differences with findings from other authors.

Finally, we also explore the correlation between said determinants and agglomeration within industries featuring similar levels of technological level or knowledge intensity, in order to verify whether there might be opposite-sign patterns offsetting each other between profoundly different industries.

2.5.1 Economies of scale and competition

In order to understand the impact of economies of scale and competition on agglomeration, several authors used different measures of plant size as a proxy and investigated its correlation with spatial distribution patterns: among them, Kim (1995) and Holmes & Stevens (2002), who both reported a positive correlation between plant size and concentration in U.S. manufacturing industries. However, Lafourcade & Mion (2007, p. 47) highlight that although they found <<*strong evidence of a significant positive relationship between plant size and concentration*>> when investigating Italian manufacturing plants, it is small plants that show the higher degree of agglomeration.

Cainelli, Iacobucci & Morganti (2006) also investigated the relationship between spatial distribution and firms' size, concluding that agglomeration has a positive influence on the size of firms belonging to industrial districts, where groups tend to be more common, more concentrated and less diversified than in non-district areas.

In our case, exploring the relationship between plant size in general and agglomeration would require a huge amount of new computations, so we had to settle with comparing an industry's mean plant size with its level of agglomeration.

When comparing mean plant size with agglomeration results by industry, a seemingly promising positive correlation in 2007 disappears in 2012. Interestingly though, weighting industry by the number of plants (in order to account for the huge differences separating smaller and larger industries) produces more consistent and similar results between the two years.

In their study of Japanese firms, Nakajima, Saito & Uesugi (2012) show that large plants in service industries tend to be more localized and to have a larger impact, although this is not true for manufacturing. Indeed, when studying Chinese manufacturing firms, Brakman, Garretsen & Zhao (2017, p. 5199) reported that <<*large firms are relatively less important for localization than smaller firms. Most location dynamics take place among smaller firms*>>.

In our case, the positive correlation we found for economic activities in general seems to depend mostly on services, although figures are too small to be considered significant. These results are somehow reminiscent of Barlet, Briant & Crusson (2013, p. 346-347), who found that <<*the largest plants in service industries display uneven patterns of location*>>. They advance two possible explanations: <<*that sorting/selection of the most productive plants is stronger in service than in manufacturing industries*>> and <<*that, from a dynamic point of view, service plants can grow faster and larger because they enjoy stronger localization economies*>>.

Table 26 – *Correlation between agglomeration and mean plant size*

	unweighted		weighted	
	2007	2012	2007	2012
M (5 minutes)	0,30	0,04	0,05	0,17
M (10 minutes)	0,22	0,04	0,1	0,16
M (15 minutes)	0,40	0,04	0,19	0,16
M (20 minutes)	0,41	0,05	0,18	0,16
M (30 minutes)	0,43	0,08	0,17	0,16

Source: Compiled by the authors

Table 27 – *Correlation between agglomeration and mean plant size by sector*

	manufacturing		services	
	2007	2012	2007	2012
M (5 minutes)	-0,01	-0,02	0,03	0,04
M (10 minutes)	-0,01	-0,01	0,03	0,04
M (15 minutes)	-0,01	0,00	0,01	0,04
M (20 minutes)	-0,01	0,02	0,02	0,06
M (30 minutes)	-0,01	0,02	0,03	0,11

Source: Compiled by the authors

2.5.2 Entry rate

The entry rate – measured as the ratio between the *number of firms belonging to industry x with initial date of activity within the last three years before year y*, and *the number of firms belonging to industry x* – shows negative correlation with agglomeration results, albeit with generally low figures that are somehow higher for 2007 and, especially, for manufacturing

Similarly, Barlet, Briant & Crusson (2013, p. 339), exploring the service industry in France between 1996 and 2005, argue that <<*new plants tend to disperse service industries by locating outside existing clusters*>>. On the other hand, our results contrast with Brakman, Garretsen & Zhao (2017, p. 5199) who found that <<*new firms […] are more localized than incumbents*>>, but this might be related to China's peculiar situation, especially when accounting for reforms that took place just before the period analyzed by the authors.

Table 28 – *Correlation between agglomeration and entry rate*

	unweighted		weighted	
	2007	2012	2007	2012
M (5 minutes)	-0,14	-0,03	-0,03	-0,04
M (10 minutes)	-0,04	-0,03	-0,06	-0,05
M (15 minutes)	-0,17	-0,03	-0,11	-0,03
M (20 minutes)	-0,17	-0,03	-0,10	0,03
M (30 minutes)	-0,14	-0,04	-0,09	-0,03

Source: Compiled by the authors

Table 29 – *Correlation between agglomeration and entry rate by sector*

	manufacturing		services	
	2007	2012	2007	2012
M (5 minutes)	-0,21	-0,05	-0,13	-0,15
M (10 minutes)	-0,23	-0,07	-0,12	-0,14
M (15 minutes)	-0,24	-0,07	-0,12	-0,13
M (20 minutes)	-0,23	-0,08	-0,13	0,12
M (30 minutes)	-0,15	-0,10	-0,14	-0,10

Source: Compiled by the authors

2.5.3 Exit rate

The exit rate – measured as the ratio between the *number of firms belonging to industry x with final date of activity in the year y*, and the *number of firms belonging to industry x* – shows generally negative correlation with agglomeration results, but figures are even closer to zero than they are for the entry rate, and also more volatile. In this respect, they contrast with Barlet, Briant & Crusson (2013, p. 339), who found that exiting plants tend to increase <<*the localization patterns of most service industries*>>, but they are highly reminiscent of Cainelli, Giannini & Iacobucci (2019, p. 961), who demonstrated how <<*firms located in local clusters or those belonging to a business group had higher rates of survival during the Great Recession*>>.

Table 30 *– Correlation between agglomeration and exit rate*

	unweighted		weighted	
	2007	2012	2007	2012
M (5 minutes)	-0,12	-0,03	-0,02	-0,03
M (10 minutes)	-0,12	-0,03	-0,04	-0,04
M (15 minutes)	-0,13	-0,03	-0,06	-0,03
M (20 minutes)	-0,11	-0,03	-0,06	0,03
M (30 minutes)	-0,10	-0,04	-0,05	-0,03

Source: Compiled by the authors

Table 31 *– Correlation between agglomeration and exit rate by sector*

	manufacturing		services	
	2007	2012	2007	2012
M (5 minutes)	-0,11	-0,05	-0,25	-0,03
M (10 minutes)	-0,05	-0,07	-0,21	-0,03
M (15 minutes)	-0,01	-0,07	-0,20	-0,02
M (20 minutes)	0,07	-0,08	-0,20	-0,02
M (30 minutes)	0,28	-0,10	-0,22	-0,01

Source: Compiled by the authors

2.5.4 Age

Weighted firm age – *the average age of firms in industry x, weighted by the number of employees working in each firm* – shows somehow positive correlation with agglomeration results. This is consistent with Barlet, Briant & Crusson's (2013) considerations about the entry rate, as we have reported a few paragraphs above.

Table 32 *– Correlation between agglomeration and age*

	unweighted		weighted	
	2007	2012	2007	2012
M (5 minutes)	-0,02	0,12	0,03	0,16
M (10 minutes)	-0,03	0,10	0,10	0,15
M (15 minutes)	0,05	0,05	0,18	0,14
M (20 minutes)	0,06	0,03	0,17	0,14
M (30 minutes)	0,08	0,05	0,16	0,14

Source: Compiled by the authors

Table 33 *– Correlation between agglomeration and age by sector*

	manufacturing		services	
	2007	2012	2007	2012
M (5 minutes)	-0,24	0,02	0,11	0,03
M (10 minutes)	-0,24	0,02	0,12	0,05
M (15 minutes)	-0,22	0,03	0,11	0,04
M (20 minutes)	-0,21	0,02	0,12	0,04
M (30 minutes)	-0,13	0,01	0,10	0,04

Source: Compiled by the authors

2.5.5 Technological level and knowledge intensity

Finally, we turned to some intrinsic characteristic of industries, namely the level of technology in manufacturing industries and the knowledge intensity of service industries, in order to understand their influence on agglomeration.

As a proxy for technology and knowledge intensity, we used Eurostat's aggregations defining the following four technological levels for manufacturing industries[89]:

- high-technology;
- medium high-technology;
- medium low-technology;
- low-technology;

and the following two knowledge intensity[90] levels for services:

- knowledge-intensive;
- less knowledge-intensive.

In order to have a quantitative measure to compute correlations, we simply assigned a numerical value to each category, from a minimum of 1 for "*low-technology*" to a maximum of 4 for "*high-technology*" and just the two extreme values for, respectively, "*less knowledge-intensive*" and "*knowledge-intensive*".

As regards manufacturing, our results contrast with Pagnini (2003), who found that agglomeration in Italy is not limited to traditional industries, but is also featured by high-tech industries. Indeed, more in line with previous research concerning the U.K. and U.S., we find a negative correlation between agglomeration and technological level in manufacturing industries, when we weight these by their number of plants, as shown in table 34.

Table 34 – *Correlation between agglomeration and technological level in manufacturing industries*

	unweighted		weighted	
	2007	2012	2007	2012
M (5 minutes)	0,06	-0,06	-0,02	-0,15
M (10 minutes)	0,04	-0,10	-0,17	-0,18
M (15 minutes)	0,02	-0,10	-0,18	-0,18
M (20 minutes)	-0,02	-0,13	-0,19	-0,19
M (30 minutes)	-0,13	-0,19	-0,19	-0,20

Source: Compiled by the authors

Table 35 – *Correlation between agglomeration and knowledge intensity in service industries*

	unweighted		weighted	
	2007	2012	2007	2012
M (5 minutes)	0,16	0,14	-0,01	-0,01
M (10 minutes)	0,15	0,15	-0,01	0,00
M (15 minutes)	0,14	0,14	-0,01	-0,01
M (20 minutes)	0,14	0,15	-0,01	-0,01
M (30 minutes)	0,14	0,15	-0,02	-0,03

Source: Compiled by the authors

[89] Eurostat defines the technological intensity of a sector according to the ratio R&D expenditure/value added (https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:High-tech).

[90] Eurostat classifies an activity <<*as knowledge intensive if employed tertiary educated persons (according to ISCED 97 levels 5+6, according to ISCED 2011 levels 5 to 8) represent more than 33% of the total employment in that activity. The definition is built based on the average number of employed persons aged 15-64 at aggregated EU-27 level according to NACE at 2-digit, using EU Labour Force Survey data*>> (https://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Knowledge_Intensive_Activity_(KIA)).

Again, as can be seen when looking at the 54 High and Medium High-technology industries in tables 36 and 37, although some correlations seem to emerge for entry and exit rate and for average firm age in 2007, they disappear five years later, raising doubt about their actual significance.

Table 36 – *M correlations (2007). Only 54 High and Medium High-Technology industries*

	size	entry 3 yrs	exit 1 yr	age weighted imprese
M (5 minutes)	-0,03	-0,39	-0,25	-0,31
M (10 minutes)	-0,03	-0,41	-0,22	-0,30
M (15 minutes)	-0,02	-0,42	-0,20	-0,28
M (20 minutes)	-0,01	-0,41	-0,17	-0,25
M (30 minutes)	0,03	-0,32	-0,03	-0,12

Source: Compiled by the authors

Table 37 – *M correlations (2012). Only 54 High and Medium High-Technology industries*

	size	entry 3 yrs	exit 1 yr	age weighted imprese
M (5 minutes)	-0,01	-0,06	-0,05	0,00
M (10 minutes)	0,02	-0,07	-0,07	0,00
M (15 minutes)	0,03	-0,07	-0,07	0,01
M (20 minutes)	0,07	-0,08	-0,08	0,01
M (30 minutes)	0,13	-0,13	-0,13	0,00

Source: Compiled by the authors

The same happens when shifting the attention towards the 41 Low and Medium Low-Technology industries, as apparent in tables 38 and 39. In this case, the exit rate shows a high level of positive correlation for every distance range in 2007, but then turns to really low and negative values five years later.

Table 38 – *M correlations (2007). Only 41 Low and Medium Low-Technology industries*

	size	entry 3 yrs	exit 1 yr	age weighted imprese
M (5 minutes)	-0,04	-0,07	0,63	-0,23
M (10 minutes)	-0,05	-0,11	0,51	-0,15
M (15 minutes)	-0,08	-0,11	0,48	-0,11
M (20 minutes)	-0,09	-0,09	0,46	-0,11
M (30 minutes)	-0,09	-0,08	0,47	-0,12

Source: Compiled by the authors

Table 39 – *M correlations (2012). Only 41 Low and Medium Low-Technology industries*

	size	entry 3 yrs	exit 1 yr	age weighted imprese
M (5 minutes)	-0,13	-0,07	-0,07	0,09
M (10 minutes)	-0,11	-0,11	-0,10	0,09
M (15 minutes)	-0,15	-0,10	-0,10	0,11
M (20 minutes)	-0,16	-0,10	-0,09	0,10
M (30 minutes)	-0,17	-0,09	-0,09	0,09

Source: Compiled by the authors

Shifting our attention to services, the exit rate correlation with agglomeration again seems interesting in 2007 for both the 69 Knowledge Intensive industries and the 56 Less Knowledge Intensive industries, but then disappears for both in 2012. However, both levels seem to hint at some correlation between the entry rate and agglomeration in both years.

Table 40 – *M correlations (2007). Only 69 Knowledge Intensive industries*

	size	entry 3 yrs	exit 1 yr	age weighted imprese
M (5 minutes)	0,00	-0,17	-0,27	0,14
M (10 minutes)	-0,01	-0,16	-0,24	0,14
M (15 minutes)	-0,02	-0,16	-0,23	0,14
M (20 minutes)	-0,02	-0,17	-0,23	0,15
M (30 minutes)	-0,02	-0,17	-0,24	0,12

Source: Compiled by the authors

Table 41 – *M correlations (2012). Only 69 Knowledge Intensive industries*

	size	entry 3 yrs	exit 1 yr	age weighted imprese
M (5 minutes)	0,02	-0,17	-0,05	0,06
M (10 minutes)	0,02	-0,16	-0,04	0,07
M (15 minutes)	0,02	-0,16	-0,03	0,06
M (20 minutes)	0,04	-0,15	-0,03	0,05
M (30 minutes)	0,09	-0,13	-0,02	0,06

Source: Compiled by the authors

Table 42 – *M correlations (2007). Only 56 Less Knowledge Intensive industries*

	size	entry 3 yrs	exit 1 yr	age weighted imprese
M (5 minutes)	0,04	-0,21	-0,24	0,01
M (10 minutes)	0,00	-0,22	-0,20	0,04
M (15 minutes)	0,00	-0,21	-0,16	0,05
M (20 minutes)	0,01	-0,24	-0,18	0,05
M (30 minutes)	0,18	-0,24	-0,25	-0,01

Source: Compiled by the authors

Table 43 – *M correlations (2012). Only 56 Less Knowledge Intensive industries*

	size	entry 3 yrs	exit 1 yr	age weighted imprese
M (5 minutes)	0,14	-0,27	0,00	-0,10
M (10 minutes)	0,10	-0,25	-0,01	-0,05
M (15 minutes)	0,05	-0,19	-0,14	0,01
M (20 minutes)	0,04	-0,18	-0,16	0,00
M (30 minutes)	0,08	-0,12	-0,15	-0,01

Source: Compiled by the authors

2.6 Conclusion

We have used comprehensive data provided by ISTAT – the Italian institute of statistics - in order to measure agglomeration for Italian industries before and after the Great Recession, in a way that is, as far as we know, unprecedented for Italy. Indeed, we believe that this might be the first time that an entire country's economy has been mapped with such an advanced distance-measure as Marcon & Puech's M. Even when accounting for the slight approximation that we were forced to accept in order to deal with the huge amount of data, we believe our contribution is certainly relevant as concerns both the methodological approach and the accuracy of our results.

Indeed, our methodology suggests an innovative way to apply such an accurate measure outside the limited scope of city neighborhoods and extends its availability to the study of larger geographic regions and even entire countries. This is of utmost importance because it offers an alternative to accepting the distortions caused by the Modifiable Areal Unit Problem or, alternatively, by the absence of a benchmark when relying on other distance-based methods. With micro-geographic data becoming increasingly available, it would be a shame not to explore ways to implement them when researching economics. Certainly, it would also be interesting to compare results obtained with our proposed methodology with those obtained with an exact geo-localization of plants without any sort of approximation: this would confirm the accuracy and the applicability of our methodology when dealing with larger regions.

Still, our results seem plausible and in line with our expectations and with other researchers' findings, both in Italy and abroad. In particular, they reinforce Marcon & Puech's (2017, p. 30) position that <<*cumulative functions are insensitive to errors at smaller scales than the distance they consider: if the uncertainty is a few hectometers, the number of neighbors up to a few kilometers is known with no error except for the more distant ones, which are a small proportion*>>. Indeed, when scrolling our ranking of the most agglomerated industries, it is easy to spot those factors that literature traditionally identifies as fundamental in generating agglomeration; and, on the other side of the spectrum, those industries that came out as the most disperse are certainly in line with literature predictions.

Such results are surely interesting in and by themselves, but their relevance grows when they present the opportunity to compare a large advanced country's position before and after a dramatic event such as the Great Recession. These results might suggest further study and interpretation as concerns how agglomerations behave and react to a crisis.

We also took the opportunity to experiment with some preliminary analysis in this direction, by exploring some possible factors behind agglomeration and its change during those years. We tried to spot correlations between industry agglomeration, and changes thereof, with indicators of industry size, age, and entry and exit rates, as well as with technological and knowledge intensity. Moreover, we also controlled for size, macro-sector of activity, technological level and knowledge intensity. Our results, albeit somehow uncertain in some cases, have mostly been in accordance with both theoretical literature and with empirical studies performed in other countries and with other measures. Specifically, we believe that some of the most at large considerations of previous literature were confirmed, with agglomeration somehow slightly decreasing (Behrens & Bougna,

2015; Almeida, Neto and Rocha, 2020) during the Great Recession, but the most agglomerated industries – especially manufacturing ones – maintaining a high degree of agglomeration, and sometimes even increasing it (Behrens & Bougna, 2015). When digging deeper in order to explore possible determinants, our research was clearly limited by the necessity to use industry-wide proxies rather than plant-specific ones: as an example, exploring the relation between agglomeration and the actual size of plants would have required to compute the index again for each size threshold, so we had to settle for a correlation with the industry's mean plant size. Despite such a constraint, we were able to spot some promising correlations: the technological level seems to be negatively correlated – although only slightly – with agglomeration in manufacturing industries, in line with previous results from research in the U.K. and in the U.S., and the entry rate also seems negatively correlated with agglomeration for Services – and even more so when treating knowledge intensive industries separately from less knowledge intensive industries. However – and unfortunately – we believe that what has emerged from this last step was not robust enough to produce a significant model, so we decided to limit the results of our study to correlations. This could however represent an initial step for future and deeper studies in such direction. Indeed, there are many accessory ideas that have emerged and that we aim to explore in the future, building up from the results of this study.

We recognize that the lack of a significance test of results for each industry is a clear limit when trying to distinguish which industries might reveal a relation between their agglomeration index and other measures, such as size, age and entry/exit rates. However, such a test would require an immense amount of new computations, since we would need to simulate a high number of redistributions of plants along their actual locations. In the exploration of possible determinants behind agglomeration, we somehow took into account the lower significance of results for smaller industries (a lower number of plants corresponds to a higher probability that results were obtained by chance) by weighting each industry by the number of plants that it consists of. This provides a minimum degree of reliability and allows not to give the same importance to results that are much more likely than others not to be a consequence of chance alone. However, the possibility to discern which industries have actually reliable agglomeration results, would make the exploration of determinants much easier, allowing us to possibly find out patterns that, so far, we have not been able to clearly identify.

Chapter 3
The geography of location patterns in Italy through the Great Recession

3.1 Introduction

The previous chapter allowed us to assess the reliability of Marcon & Puech's M for measuring agglomeration without the need to settle on pre-defined borders. Despite the - apparently - conflictual need to approximate plants' exact position to the centroid of the community where they are located, our results seem reliable and in line with both previous literature and our own expectation. Italy, however, is a largely asymmetric country in terms of economic development. Indeed, the Northern part, revolving around Italy's largest urban agglomeration - Milan, and the so-called <<*magic circle*>> (Dunford, 2006) surrounding the city and covering the entire Po Valley - is undoubtedly the country's economic powerhouse. The presence of a primate city is clearly not an exception: Paris and London are far more economically dominant in their respective countries than Milan is in Italy. What is peculiar, though, is that with the only possible exception being the capital Rome, the economic gradient in Italy is far more apparent than in other countries: Paris economically dominates France, but other strong regions are spread all over the country (e.g.: the Rhone-Alpes-Provence corridor that runs from Lyon to Marseille and the Cote d'Azur; Bordeaux and its surroundings; Bretagne), whereas regions outside the scope of the capital but around it are relatively less productive. The same is true in the United Kingdom, where Scotland is richer than any area outside London and the South-eastern part of the country. Such a patchwork is non-existent in Italy, where, almost unequivocally, every region is richer than its southern neighbors, determining a divide that, with the possible and partial exclusion of the period 1950-1970, has remained unchanged since the early 1890s (Di Caro, 2015). Specifically, the Great Recession saw a contraction of the South's gross domestic product twice as large as that observed in the Center-North (Di Caro, 2018).

Although the North's economic influence at this point in time has somehow attracted bordering areas[91] that have been absorbed in its value chains, shifting the economic divide to a more southern position, it is however indisputable that, until recently, the northern section of the Apennines has played a significant role in forming and maintaining such a divide. The consequence is that the portion of Italy north of this divide features an economy that is substantially different from - and far more integrated in European value chains than - the rest of the country. Therefore, we would not be surprised to discover that the North-South divide between continental and peninsular Italy and the sea that separates the major islands of Sicily and Sardinia from the mainland, produce agglomeration patterns that are industrially, geographically and temporally different between each macro-region. Indeed, and in the context of the Great Recession, Di Caro (2015, p. 273) noted that <<*the spatial unevenness of economic downturns has been evident and clearly observable within nations over the centuries […]. While some places show a strong attitude toward shock-absorption, re-orientation of activities and ability to recover, others are less responsive to slumps and deeply affected*>>; more specifically, as highlighted by Lagravinese (2015, p. 332), <<*The economic crises that have occurred in Italy in the last 40 years have had different effects on the Italian regions*>>.

Such considerations led us to inquire more about localized patterns that might hide behind national results, in order to explore where the drivers of agglomeration and dispersion are located for each

[91] Namely, Northern Tuscany, Siena, and northern Marche.

industry and, possibly, also what the determinants are. The second question, indeed, was left somehow unanswered by the national study, since agglomeration determinants seemed loosely correlated with results, leaving us without any significant story to tell about what drives agglomeration and what was behind its change (or lack thereof) during the years of the Great Recession, between 2007 and 2012. It is therefore interesting to explore the hypothesis that such determinants are somehow blurred and offset by different agglomeration or demographic patterns taking place in each region.

In this chapter - after testifying the lack of a relevant literature concerned with measuring agglomeration regionally through distance-based methods, and with drawing comparisons between different areas and between each one of them and the entire country – we briefly describe the macro-regions we have identified and the methodology used to compute M for these areas. We then provide baseline results for each macro-region and we analyze the dynamics they have been characterized by during the Great Recession, focusing on similarities and differences between them and between each one and Italy as a whole. Finally, we try to assess whether those determinants that have provided inconclusive results nationally can be better correlated with single areas of the country, in order to check whether each region's path might have offset the others, somehow obscuring underlying patterns. Indeed, as highlighted by Iammarino (2005, p. 497), <<*the literature on geographical systems of innovation has traditionally shown a "national-bias" that has strongly affected the identification of actors, relationships and attributes operating at the sub-national scale*>>. Our paper aims to contribute at filling such a gap, and to help understanding agglomeration phenomena on a more localized level. Exploring such phenomena would definitely be useful to improve our understanding of agglomeration dynamics in general, and of the Italian economy specifically, especially during a period of great economic change such as the Great Recession.

3.2 Empirical background and methodology

We have been unable to find relevant literature where distance measures are used to measure spatial concentration in two or more sub-entities, such as regions or provinces, in order to assess similarities and differences between each other and in respect to the entire country. Indeed, some studies have focused on single regions, but the reason was not simply a willingness to perform this kind of analysis, as much as the need to deal with smaller datasets and less computations than studying the country as a whole would have required.

Some of these studies are mostly intended as demonstrative applications of distance measures, such as Lang, Marcon & Puech (2020), who analyse the distribution of pharmacies - compared to all non-food stores - in the city of Lyon (France), in order to provide a <<*concrete example*>> of their new distance measure, m, and to evaluate similarities and differences with results obtained with Duranton & Overman's K_d function. Jensen & Michel (2011) had in effect performed a similar study a few years earlier.

Some studies have focused on single cities rather than entire regions or other areas consisting of more than one single urban location. This is the case of Ó hUallacháin & Leslie (2007, p. 1584), who used distance-based method to <<*estimate the relationship between establishment size and distance from the centre*>>, or Moreno-Monroy & Garcìa-Cruz (2016), who used M to assess the degree of spatial agglomeration and co-agglomeration of formal versus informal manufacturing activity within Cali metropolitan area in Colombia. In Italy, Arbia, Espa, Giuliani & Mazzitelli (2010) investigated the long-run localization of ICT (Information and Communication Technology) firms around Rome between 1920 and 2005.

On the other hand, Laajimi, Le Gallo & Benammou (2020) examined the location patterns of manufacturing industries in the Tunisian Sahel, relying on detailed micro-geographic data and Duranton and Overman's K_d function. However, their scope is limited to 1-digit industry, they do not have data regarding Services, their unit of analysis is firms instead of single plants, and they do not provide a temporal or spatial comparison or a study of possible determinants. Nguyen & Diez (2017) use distance measures to analyse the locational pattern of multi-national enterprises and their spatial impact in Vietnam's Red River Delta region and Southeast. Despite its focus being limited to only multi-national enterprises, this study is possibly the most relevant for our review, since it aims to compare the rate of agglomeration in two different areas of the same country and – just as in Italy's case – one (the Southeast, revolving around the national economic powerhouse Ho Chi Minh) has a more business-friendly environment than the other (the Northern Red River Delta, revolving around Vietnam's capital Hanoi). Finally, Arbia, Espa, Giuliani & Dickson (2014) use the space-time inhomogeneous K-function to detect the spatio-temporal clustering of firm entries and firm exits in the pharmaceutical and medical device manufacturing industry between 2004 and 2009 in Veneto, Italy.

Two empirical applications of M in single regions were developed by Coll-Martìnez, Moreno-Monroy & Arauzo-Carod (2019) and Méndez-Ortega & Arauzo-Carod (2019) who, respectively, computed both *m* and *M* for creative industries and for software-developing industries in Barcelona metropolitan area[92], underlining how such measures provide the great advantage of being *relative*

[92] In a later study, Méndez-Ortega & Arauzo-Carod (2020) also compared the distribution of software and video game activities in Barcelona with that in Lyon and Hamburg.

and not *absolute* (such as Duranton & Overman's Kd), thus comparable between industries and years. However – and despite the choice of what we believe are the most relevant distance measures – their studies are much restricted in terms of time, space and industry, and are not intended as a cross-regional analysis or as a study to assess possible determinants behind agglomeration or its change during a specific time period.

3.2.1 Italian macro-regions

Italy covers a total area of 302.073 km²[93] with a population amounting to 58.223.744 as of January 1st, 2007 and to 59.394.207 as of January 1st, 2012. Demographically, strong patterns of concentration are evident, with a great share of municipalities (67,9%, covering 72,5% of the entire country's surface) shown by ISTAT as featuring a low rate of urbanization and, indeed, representing only 24.3% of the country's population. On the other hand, municipalities featuring a high rate of urbanization are only 3,3% and only cover 4,8% of the total surface (the latter figure is actually strongly inflated by Rome, by far the largest municipality in the country), but a third of the country's population lives there.[94]

In 2007, in Italy there were 4.480.473 firms with 17.586.031 employees, with an increase of 70.465 firms and 469.281 employees compared to the previous year. Five years later, firms would be 4.442.452 with 16.722.210 employees, featuring an increase of 16.502 firms and 298.124 employees on the previous year, after three straight years of decreasing figures.

We decided to focus on four – geographically homogenous – macro-regions:

- The North consists in the European NUTS-1 regions North West and North East, and includes the demographically dense Po Valley, the surrounding mountain sides separating it from the peninsular part of Italy and from the rest of Europe, and the Liguria region revolving around Genoa and its port. It is arguably the economic core of the country, and - despite covering less than 40% of the national surface - it amounts for over 45% of the population, and over 55% of both national GDP and employment.
- The Center-South is the peninsular part of Italy south of the Apennine Chain and consists of the two European NUTS-1 regions Centre and South. Its fragmented geography is probably the main factor behind its economic dis-homogeneity compared to the North, with remote Calabria being the least productive region in the entire country, and Tuscany being on par with some Northern regions.
- Sicily is one of the two components of the European NUTS-1 region Islands, coinciding with the NUTS-2 region by the same name and consisting in the largest island in the country and in the entire Mediterranean Basin, plus some adjacent minor islands. Despite having over 8% of the national population, its GDP corresponds to just 5%, making Sicily the poorest Italian region behind only Calabria.
- Sardinia is the other component of the European NUTS-1 region Islands, and the second largest island in the country. Despite having a similar surface, Sardinia is far less populated than Sicily, and its population is less than 3% of Italy.

Tables 3 and 4 below show the number of firms, plants and employees operating in each group of industries defined at the one-digit level in 2007 and 2012.

[93] Istat, Movimento e calcolo della popolazione residente annuale; Variazioni territoriali, denominazione dei comuni, calcolo delle superfici comunali.

[94] Istat, Movimento e calcolo della popolazione residente annuale; Variazioni territoriali, denominazione dei comuni, calcolo delle superfici comunali; Eurostat.

Table 44 – *Descriptive statistics by industry (one-digit) for Italian macro-regions, 2007*

		NORTH					CENTER-SOUTH				
Code	**Industry description**	**Firms**	**Plants**	**Employees**	**Mean firm size**	**Mean plant size**	**Firms**	**Plants**	**Employees**	**Mean firm size**	**Mean plant size**
A	AGRICULTURE, FORESTRY AND FISHING	141	144	521	3,70	3,62	120	120	253	2,11	2,11
B	MINING AND QUARRYING	1.263	1.857	16.826	13,32	9,06	1.227	1.742	14.794	12,06	8,49
C	MANUFACTURING	261.555	292.843	2.916.318	11,15	9,96	184.440	201.995	1.362.507	7,39	6,75
D	ELECTRICITY, GAS, STEAM AND AIR CONDITIONING SUPPLY	1.320	2.648	42.044	31,85	15,88	728	1.821	33.957	46,64	18,65
E	WATER SUPPLY; SEWERAGE, WASTE MANAGEMENT AND REMEDIATION ACTIVITIES	3.517	5.297	68.971	19,61	13,02	3.421	5.191	74.656	21,82	14,38
F	CONSTRUCTION	355.432	369.305	1.028.855	2,89	2,79	235.960	251.983	779.595	3,30	3,09
G	WHOLESALE AND RETAIL TRADE; REPAIR OF MOTOR VEHICLES AND MOTORCYCLES	551.990	601.730	1.827.511	3,31	3,04	568.762	599.735	1.381.862	2,43	2,30
H	TRANSPORTATION AND STORAGE	78.681	94.288	597.965	7,60	6,34	52.948	63.809	441.696	8,34	6,92
I	ACCOMODATION AND FOOD SERVICE ACTIVITIES	144.383	158.370	643.749	4,46	4,06	117.413	125.995	453.109	3,86	3,60
J	INFORMATION AND COMMUNICATION	57.697	62.868	301.504	5,23	4,80	39.390	42.704	224.028	5,69	5,25
K	FINANCIAL AND INSURANCE ACTIVITIES	38.395	60.911	349.698	9,11	5,74	29.036	42.686	201.910	6,95	4,73
L	REAL ESTATE ACTIVITIES	133.618	135.553	210.442	1,57	1,55	57.697	58.641	88.948	1,54	1,52
M	PROFESSIONAL, SCIENTIFIC AND TECHNICAL ACTIVITIES	346.856	353.057	666.745	1,92	1,89	288.594	291.603	448.358	1,55	1,54
N	ADMINISTRATIVE AND SUPPORT SERVICE ACTIVITIES	83.105	93.020	603.904	7,27	6,49	61.558	67.741	413.429	6,72	6,10
P	EDUCATION	12.328	13.113	35.311	2,86	2,69	9.750	10.411	34.489	3,54	3,31
Q	HUMAN HEALTH AND SOCIAL WORK ACTIVITIES	110.705	115.678	327.509	2,96	2,83	94.039	97.197	249.090	2,65	2,56
R	ARTS, ENTERTAINMENT AND RECREATION	29.497	31.090	86.038	2,92	2,77	28.103	29.287	66.691	2,37	2,28
S	OTHER SERVICE ACTIVITIES	98.090	100.604	213.938	2,18	2,13	80.867	82.326	159.154	1,97	1,93

		SICILY					SARDINIA				
Code	**Industry description**	**Firms**	**Plants**	**Employees**	**Mean firm size**	**Mean plant size**	**Firms**	**Plants**	**Employees**	**Mean firm size**	**Mean plant size**
A	AGRICULTURE, FORESTRY AND FISHING	19	19	29	1,50	1,50	6	6	8	1,33	1,33
B	MINING AND QUARRYING	290	386	2.106	7,26	5,46	212	297	2.488	11,73	8,38
C	MANUFACTURING	25.141	26.987	120.954	4,81	4,48	9.707	10.835	51.397	5,29	4,74
D	ELECTRICITY, GAS, STEAM AND AIR CONDITIONING SUPPLY	81	292	5.502	67,93	18,84	26	116	2.670	102,71	23,02
E	WATER SUPPLY; SEWERAGE, WASTE MANAGEMENT AND REMEDIATION ACTIVITIES	694	996	14.741	21,24	14,80	280	437	5.966	21,31	13,65
F	CONSTRUCTION	31.928	35.431	118.351	3,71	3,34	16.364	17.722	58.434	3,57	3,30
G	WHOLESALE AND RETAIL TRADE; REPAIR OF MOTOR VEHICLES AND MOTORCYCLES	102.442	106.912	227.466	2,22	2,13	33.799	36.779	88.423	2,62	2,40
H	TRANSPORTATION AND STORAGE	7.830	9.341	58.569	7,48	6,27	3.746	4.654	25.655	6,85	5,51
I	ACCOMODATION AND FOOD SERVICE ACTIVITIES	16.823	17.758	59.533	3,54	3,35	8.808	9.725	34.865	3,96	3,59
J	INFORMATION AND COMMUNICATION	4.294	4.615	18.829	4,39	4,08	2.159	2.391	9.152	4,24	3,83
K	FINANCIAL AND INSURANCE ACTIVITIES	4.115	6.236	25.539	6,21	4,10	1.157	2.041	9.821	8,49	4,81
L	REAL ESTATE ACTIVITIES	3.618	3.678	5.834	1,61	1,59	2.008	2.072	3.271	1,63	1,58
M	PROFESSIONAL, SCIENTIFIC AND TECHNICAL ACTIVITIES	40.982	41.328	58.837	1,44	1,42	16.362	16.755	24.337	1,49	1,45
N	ADMINISTRATIVE AND SUPPORT SERVICE ACTIVITIES	7.692	8.489	44.609	5,80	5,25	3.808	4.367	23.757	6,24	5,44
P	EDUCATION	1.507	1.674	7.349	4,88	4,39	535	571	1.565	2,93	2,74
Q	HUMAN HEALTH AND SOCIAL WORK ACTIVITIES	15.728	16.631	50.798	3,23	3,05	5.824	6.227	16.759	2,88	2,69
R	ARTS, ENTERTAINMENT AND RECREATION	3.039	3.182	8.038	2,65	2,53	1.313	1.440	3.990	3,04	2,77
S	OTHER SERVICE ACTIVITIES	12.102	12.213	21.635	1,79	1,77	4.531	4.636	9.199	2,03	1,98

Source: Compiled by the authors

Table 45 – *Descriptive statistics by industry (one-digit) for Italian macro-regions, 2012*

		NORTH					CENTER-SOUTH				
Code	**Industry description**	**Firms**	**Plants**	**Employees**	**Mean firm size**	**Mean plant size**	**Firms**	**Plants**	**Employees**	**Mean firm size**	**Mean plant size**
A	AGRICULTURE, FORESTRY AND FISHING	-	-	-			-	-	-		
B	MINING AND QUARRYING	987	1.360	12.846	13,02	9,45	1.048	1.339	11.024	10,52	8,23
C	MANUFACTURING	230.318	256.142	2.531.332	10,99	9,88	163.400	176.398	1.158.696	7,09	6,57
D	ELECTRICITY, GAS, STEAM AND AIR CONDITIONING SUPPLY	5.247	6.711	47.196	8,99	7,03	3.230	4.423	33.480	10,37	7,57
E	WATER SUPPLY; SEWERAGE, WASTE MANAGEMENT AND REMEDIATION ACTIVITIES	3.970	5.829	75.382	18,99	12,93	3.938	5.824	82.327	20,91	14,14
F	CONSTRUCTION	314.381	321.163	829.800	2,64	2,58	221.052	226.008	591.905	2,68	2,62
G	WHOLESALE AND RETAIL TRADE; REPAIR OF MOTOR VEHICLES AND MOTORCYCLES	522.448	575.315	1.777.998	3,40	3,09	537.797	573.252	1.358.817	2,53	2,37
H	TRANSPORTATION AND STORAGE	70.796	86.438	569.789	8,05	6,59	51.729	62.680	429.506	8,30	6,85
I	ACCOMODATION AND FOOD SERVICE ACTIVITIES	154.742	169.159	702.989	4,54	4,16	133.424	142.730	514.184	3,85	3,60
J	INFORMATION AND COMMUNICATION	55.114	60.502	302.493	5,49	5,00	37.713	41.295	212.813	5,64	5,15
K	FINANCIAL AND INSURANCE ACTIVITIES	47.989	69.435	352.800	7,35	5,08	37.287	50.618	202.528	5,43	4,00
L	REAL ESTATE ACTIVITIES	155.358	156.994	192.254	1,24	1,22	73.766	74.530	87.144	1,18	1,17
M	PROFESSIONAL, SCIENTIFIC AND TECHNICAL ACTIVITIES	361.461	367.847	666.450	1,84	1,81	297.919	301.483	448.127	1,50	1,49
N	ADMINISTRATIVE AND SUPPORT SERVICE ACTIVITIES	76.118	85.735	615.505	8,09	7,18	59.287	65.072	426.865	7,20	6,56
P	EDUCATION	14.179	15.467	43.940	3,10	2,84	10.776	11.652	37.209	3,45	3,19
Q	HUMAN HEALTH AND SOCIAL WORK ACTIVITIES	128.528	133.914	391.368	3,05	2,92	107.862	111.371	287.888	2,67	2,58
R	ARTS, ENTERTAINMENT AND RECREATION	30.980	33.259	84.752	2,74	2,55	28.614	30.401	72.091	2,52	2,37
S	OTHER SERVICE ACTIVITIES	103.939	106.317	235.986	2,27	2,22	84.623	86.371	179.699	2,12	2,08

		SICILY					SARDINIA				
Code	**Industry description**	**Firms**	**Plants**	**Employees**	**Mean firm size**	**Mean plant size**	**Firms**	**Plants**	**Employees**	**Mean firm size**	**Mean plant size**
A	AGRICULTURE, FORESTRY AND FISHING	-	-	-			-	-	-		
B	MINING AND QUARRYING	291	357	1.823	6,27	5,11	152	194	1.704	11,21	8,78
C	MANUFACTURING	22.662	24.038	100.685	4,44	4,19	8.242	8.953	40.298	4,89	4,50
D	ELECTRICITY, GAS, STEAM AND AIR CONDITIONING SUPPLY	454	675	4.707	10,37	6,97	98	198	2.532	25,83	12,79
E	WATER SUPPLY; SEWERAGE, WASTE MANAGEMENT AND REMEDIATION ACTIVITIES	857	1.186	17.399	20,30	14,67	288	531	7.202	25,01	13,56
F	CONSTRUCTION	31.224	32.066	86.656	2,78	2,70	15.078	15.582	41.012	2,72	2,63
G	WHOLESALE AND RETAIL TRADE; REPAIR OF MOTOR VEHICLES AND MOTORCYCLES	95.849	101.314	226.725	2,37	2,24	31.657	34.436	83.165	2,63	2,42
H	TRANSPORTATION AND STORAGE	7.568	8.960	55.940	7,39	6,24	3.388	4.193	23.205	6,85	5,53
I	ACCOMODATION AND FOOD SERVICE ACTIVITIES	19.800	20.684	68.912	3,48	3,33	10.167	10.933	37.758	3,71	3,45
J	INFORMATION AND COMMUNICATION	4.172	4.522	17.968	4,31	3,97	1.964	2.181	9.237	4,70	4,24
K	FINANCIAL AND INSURANCE ACTIVITIES	5.541	7.516	25.121	4,53	3,34	1.657	2.458	9.233	5,57	3,76
L	REAL ESTATE ACTIVITIES	4.938	5.027	6.105	1,24	1,21	2.811	2.864	3.672	1,31	1,28
M	PROFESSIONAL, SCIENTIFIC AND TECHNICAL ACTIVITIES	40.560	41.093	56.851	1,40	1,38	16.067	16.330	22.199	1,38	1,36
N	ADMINISTRATIVE AND SUPPORT SERVICE ACTIVITIES	7.692	8.561	48.898	6,36	5,71	3.630	4.109	23.359	6,44	5,68
P	EDUCATION	1.778	1.946	7.484	4,21	3,85	569	635	1.886	3,32	2,97
Q	HUMAN HEALTH AND SOCIAL WORK ACTIVITIES	18.749	19.599	55.312	2,95	2,82	6.495	6.838	20.970	3,23	3,07
R	ARTS, ENTERTAINMENT AND RECREATION	3.236	3.474	9.454	2,92	2,72	1.307	1.420	3.669	2,81	2,58
S	OTHER SERVICE ACTIVITIES	12.058	12.195	23.750	1,97	1,95	4.672	4.765	9.673	2,07	2,03

Source: Compiled by the author

3.2.2 M index and methodology

Our methodology strictly follows the one described in the previous chapter for the national computations. The same datasets – already amended and verified for the previous study – were integrated with a new column with the corresponding macro-region (*NORTH*, *CENTERSOUTH*, *SICILY*, *SARDINIA*).

Then, for each macro-region, the relevant part of the dataset for each year was crossed with the ISTAT distance matrix for the same year through SQL queries that create new columns, showing for each plant *i*:

- the number of employees *w* working in plants of the same industry (x_j^c) within the borders of the municipality it belongs to and in municipalities whose centroid is located within the selected distance range *r*;

- the number of employees *w* working in plants of every industry (x_j) within the borders of the municipality it belongs to and in municipalities whose centroid is located within the selected distance range *r*.

For each macro-region, we then proceeded to compute the total number of employees working in each industry (W_c) and the total number of employees working in every industry (*W*), treating the area as an island (or as the entire country was treated in the national computation).

These numbers allowed us to compute the M for each industry at the selected distance range (5, 10, 15, 20 and 30 minutes) for each macro-region and for both years (2007 and 2012), through the following formula:

$$\widehat{M}(r) = \sum_i \frac{\sum_{j \neq i} \mathbf{1}\left(\left\|x_i - x_j^c\right\| \leq r\right) w\left(x_j^c\right)}{\sum_{j \neq i} \mathbf{1}\left(\|x_i - x_j\| \leq r\right) w\left(x_j\right)} \Big/ \sum_i \frac{W_c - w(x_i)}{W - w(x_i)} \quad (11)$$

Results were then analyzed, mostly through weighted correlation, assigning to each industry a weight that is proportional to the number of plants it consists of: this allows us to compare industries of various sizes, ranging from a handful up to tens of thousands.

In order to avoid comparisons that might have often revealed meaningless, we have also decided to treat Manufacturing and Services separately when it seemed reasonable to do so.

3.3 Baseline results

Results highlight the expected similarities and differences between Italian macro-regions, but have also revealed some unexpected patterns. The high correlation between the entire country and, respectively, its Northern and Central-Southern macro-regions does not come as a surprise, at least because of their weight in the Italian economy as a whole; for the same fact, and – possibly even more important – their insularity, we were not surprised by Sicily and, especially, Sardinia's low correlations with Italy. On the other hand, we did not expect to see mainland Italy's high correlations with the entire country decreasing between 2007 and 2012, and especially so as concerns Northern Italy. Indeed, the North loses so much for the 30-minute distance range, that it becomes just slightly more correlated with the entire country than Sicily is.

Some patterns between different macro-regions seem to emerge also, although their study is beyond the scope of this dissertation. It is however interesting to highlight at least the most apparent:

- The North and the Center-South show a strongly decreasing correlation for longer distances.
- Meanwhile, the Center-South is becoming more and more correlated with Sicily and Sardinia for every distance range.
- Sicily and Sardinia's correlation is strongly increasing at shorter distances.

Table 46 – *Correlation between M results for each macro-region in 2007 and 2012*

2007					
M (5 minutes)	**Italy**	**North**	**Center-South**	**Sicily**	**Sardinia**
Italy	1,00	0,91	0,86	0,28	0,17
North	0,91	1,00	0,67	0,24	0,13
Center-South	0,86	0,67	1,00	0,23	0,22
Sicily	0,28	0,24	0,23	1,00	0,08
Sardinia	0,17	0,13	0,22	0,08	1,00
M (10 minutes)	**Italy**	**North**	**Center-South**	**Sicily**	**Sardinia**
Italy	1,00	0,89	0,84	0,35	0,16
North	0,89	1,00	0,63	0,25	0,12
Center-South	0,84	0,63	1,00	0,36	0,21
Sicily	0,35	0,25	0,36	1,00	0,10
Sardinia	0,16	0,12	0,21	0,10	1,00
M (15 minutes)	**Italy**	**North**	**Center-South**	**Sicily**	**Sardinia**
Italy	1,00	0,89	0,85	0,39	0,18
North	0,89	1,00	0,72	0,39	0,21
Center-South	0,85	0,72	1,00	0,34	0,24
Sicily	0,39	0,39	0,34	1,00	0,15
Sardinia	0,18	0,21	0,24	0,15	1,00
M (20 minutes)	**Italy**	**North**	**Center-South**	**Sicily**	**Sardinia**
Italy	1,00	0,86	0,86	0,37	0,16
North	0,86	1,00	0,70	0,39	0,19
Center-South	0,86	0,70	1,00	0,31	0,25
Sicily	0,37	0,39	0,31	1,00	0,16
Sardinia	0,16	0,19	0,25	0,16	1,00
M (30 minutes)	**Italy**	**North**	**Center-South**	**Sicily**	**Sardinia**
Italy	1,00	0,77	0,89	0,36	0,12
North	0,77	1,00	0,65	0,45	0,18
Center-South	0,89	0,65	1,00	0,34	0,22
Sicily	0,36	0,45	0,34	1,00	0,18
Sardinia	0,12	0,18	0,22	0,18	1,00

2012					
M (5 minutes)	**Italy**	**North**	**Center-South**	**Sicily**	**Sardinia**
Italy	1,00	0,85	0,83	0,34	0,15
North	0,85	1,00	0,66	0,28	0,15
Center-South	0,83	0,66	1,00	0,37	0,22
Sicily	0,34	0,28	0,37	1,00	0,23
Sardinia	0,15	0,15	0,22	0,23	1,00
M (10 minutes)	**Italy**	**North**	**Center-South**	**Sicily**	**Sardinia**
Italy	1,00	0,81	0,79	0,36	0,17
North	0,81	1,00	0,60	0,27	0,17
Center-South	0,79	0,60	1,00	0,42	0,28
Sicily	0,36	0,27	0,42	1,00	0,25
Sardinia	0,17	0,17	0,28	0,25	1,00
M (15 minutes)	**Italy**	**North**	**Center-South**	**Sicily**	**Sardinia**
Italy	1,00	0,73	0,76	0,34	0,19
North	0,73	1,00	0,63	0,35	0,23
Center-South	0,76	0,63	1,00	0,38	0,32
Sicily	0,34	0,35	0,38	1,00	0,15
Sardinia	0,19	0,23	0,32	0,15	1,00
M (20 minutes)	**Italy**	**North**	**Center-South**	**Sicily**	**Sardinia**
Italy	1,00	0,66	0,79	0,39	0,17
North	0,66	1,00	0,58	0,39	0,22
Center-South	0,79	0,58	1,00	0,44	0,31
Sicily	0,39	0,39	0,44	1,00	0,15
Sardinia	0,17	0,22	0,31	0,15	1,00
M (30 minutes)	**Italy**	**North**	**Center-South**	**Sicily**	**Sardinia**
Italy	1,00	0,46	0,87	0,38	0,15
North	0,46	1,00	0,43	0,39	0,18
Center-South	0,87	0,43	1,00	0,38	0,28
Sicily	0,38	0,39	0,38	1,00	0,17
Sardinia	0,15	0,18	0,28	0,17	1,00

Source: Compiled by the authors

3.3.1 Northern Italy

M results for the five computed distance ranges are summarized – with means and standard deviations weighted by the number of plants in each industry - in the tables below, in addition with (unweighted) descriptive statistics about employees and plants.

Table 47 – *Descriptive statistics for M results - North (2007)*

	Obs	Mean	Std. Dev.	Min	Max
M (5 minutes)	246	1,97	18,16	0	16062,40
M (10 minutes)	246	1,74	3,56	0	505,31
M (15 minutes)	246	1,50	2,11	0	198,11
M (20 minutes)	246	1,38	1,65	0	89,01
M (30 minutes)	246	1,24	0,96	0	26,77
Employees	246	40397,75	58937,58	12,09	338141,8
Plants	246	10131,16	22164,71	2	158680

Source: Compiled by the authors

Table 48 – *Descriptive statistics for M results - North (2012)*

	Obs	Mean	Std. Dev.	Min	Max
M (5 minutes)	242	2,32	4,79	0	204,22
M (10 minutes)	242	2,12	4,06	0	147,61
M (15 minutes)	242	1,90	2,80	0	82,91
M (20 minutes)	242	1,79	2,40	0	82,55
M (30 minutes)	242	1,65	1,92	0	82,37
Employees	242	38978,27	56272,65	1,08	311285,5
Plants	242	10130,52	21743,60	2	146048

Source: Compiled by the authors

For every distance, there is at least an industry whose agglomeration is equal to zero - that is, none of its plants lies within the selected distance from another plant belonging to the same industry: specifically, *Manufacture of tobacco products (120)* shows zero agglomeration for every distance (every plant is at least 30 minutes apart from every other plant), *whereas Animal production (14)* and *Fishing (31)* show zero agglomeration for every distance below 20 minutes included.

Whereas the weighted mean is quite consistent either between different ranges in the same year and between 2007 and 2012, maximum values show extremely different results. However, this is entirely dependent on a really small industry – *Manufacturing of military fighting vehicles (304)* – whose 86 employees are all spread between just three plants, all located in the small municipality of Lombardore (Piemonte). Indeed, apart from this case, the most agglomerated industry for every distance is *Manufacture of weapons and ammunition (254)* - which surpasses even the aforementioned small industry when 30 minutes are selected as the range of choice – providing maximum results which are very similar to 2012, and even lower for the larger distance ranges.

Generally, agglomeration seems to follow similar patterns as it does nationally. Among the four - very small - industries that top the country-wide ranking of agglomeration in 2007, only the aforementioned "*Manufacturing of military fighting vehicles (304)*" is represented in the Northern part of the country.

Table 49 - *20 most agglomerated industries in Northern Italy in 2007.*

Industry code	Industry description	Employe	Plants	M (5 minutes)	M (10 minutes)	M (15 minutes)	M (20 minutes)	M (30 minutes)	National ran
304	MANUFACTURE OF MILITARY FIGHTING VEHICLES	86	3	16062,4	505,31	198,11	89,01	15,73	2
254	MANUFACTURE OF WEAPONS AND AMMUNITION	4766,63	219	222,97	118,83	88,98	59,17	26,77	6
89	MINING AND QUARRYING N.E.C.	1194,72	160	139,32	112,07	38,14	9,99	7,16	16
504	INLAND FREIGHT WATER TRANSPORT	551,39	153	59,53	59,42	59,71	43,83	19,94	7
91	SUPPORT ACTIVITIES FOR PETROLEUM AND NATURAL GAS EXTRACTION	302,27	16	56,58	56,59	55,91	52,63	20,4	5
22	LOGGING	87,91	64	88,56	67,94	51,67	19,08	4,88	10
191	MANUFACTURE OF COKE OVEN PRODUCTS	180,75	5	90,82	48,62	29,63	23,79	15,29	9
321	MANUFACTURE OF JEWELLERY, BIJOUTERIE AND RELATED ARTICLES	22365,24	4928	59,03	55,56	18,59	18,25	9,77	15
503	INLAND PASSENGER WATER TRANSPORT	2446,44	600	40,32	38,45	36,67	29,16	12,66	8
233	MANUFACTURE OF CLAY BUILDING MATERIALS	32156,15	762	41,76	33,96	31,09	22,53	15,19	12
131	SPINNING, WEAVING AND FINISHING OF TEXTILES	23028,32	1398	23,87	20,24	20,1	19,24	14,59	13
151	TANNING AND DRESSING OF LEATHER; MANUFACTURE OF LUGGAGE; HANDBAGS; SADDLERY AND HARNESS; DRESSING AND DYEING OF FUR	24678,34	2796	30,52	22,24	18,66	14,21	7,27	18
552	OTHER SHORT TERM ACCOMODATION ACTIVITIES	16861,56	7651	21,2	18,47	16,33	14,45	10,55	27
553	CAMPING GROUNDS, RECREATIONAL VEHICLE PARKS AND TRAILER PARKS	4489,17	940	24,2	19,51	16,55	9,07	4,92	21
152	MANUFACTURE OF FOOTWEAR	29912,01	2969	28,75	20,27	10,94	6,46	3,46	14
322	MANUFACTURE OF MUSICAL INSTRUMENTS	989,3	403	21,9	17,65	14,77	11,45	4,03	11
104	MANUFACTURE OF VEGETABLE AND ANIMAL OILS AND FATS	3024,39	237	21,84	20,71	12,85	7,26	4,46	34
102	PROCESSING AND PRESERVING OF FISH, CRUSTACEANS AND MOLLUSCS	2031,74	130	19,08	13,8	12,92	10,96	8,23	19
81	QUARRYING OF STONE, SAND AND CLAY	9897,77	1640	24,83	18,37	7,38	3,61	2,28	33
502	INLAND WATER TRANSPORT	4342,47	110	12,09	11,98	11,67	11,14	9,06	38

Source: Compiled by the authors

Table 50 – *20 most agglomerated industries in Northern Italy in 2012.*

Industry code	Industry description	Employe	Plants	M (5 minutes)	M (10 minutes)	M (15 minutes)	M (20 minutes)	M (30 minutes)	National rank
254	MANUFACTURE OF WEAPONS AND AMMUNITION	4289,1	222	204,22	112,74	79,11	51,62	18,47	1
264	MANUFACTURE OF CONSUMER ELECTRONICS	1578,2	154	83,25	83,7	82,91	82,55	82,37	60
89	MINING AND QUARRYING N.E.C.	1084,57	147	175,8	147,61	45,81	11,21	8,36	11
322	MANUFACTURE OF MUSICAL INSTRUMENTS	974,12	415	67,37	63,64	61,7	58,68	51,07	9
504	INLAND FREIGHT WATER TRANSPORT	602,15	115	63,91	63,89	64,3	46,93	21,58	3
503	INLAND PASSENGER WATER TRANSPORT	1786,38	864	60,44	57,99	56,96	42,81	17,85	4
235	MANUFACTURE OF CEMENT, LIME AND PLASTER	4417,93	120	44,81	41,09	41,13	40,23	39,2	49
856	EDUCATIONAL SUPPORT ACTIVITIES	1600,2	649	38,24	38,52	38,46	38,34	38,31	157
321	MANUFACTURE OF JEWELLERY, BIJOUTERIE AND RELATED ARTICLES	16761,51	4169	64,55	61	18,96	18,35	9,96	12
233	MANUFACTURE OF CLAY BUILDING MATERIALS	24434,5	560	45,84	36,61	34,82	24,32	16,71	8
104	MANUFACTURE OF VEGETABLE AND ANIMAL OILS AND FATS	2710,54	232	45,58	40,6	26,48	22	19,53	34
582	SOFTWARE PUBLISHING	1118,66	340	27,65	27,75	27,59	27,48	27,58	170
642	ACTIVITIES OF HOLDING COMPANIES	1657,51	2772	25,63	25,49	25,47	25,32	25,18	147
131	SPINNING, WEAVING AND FINISHING OF TEXTILES	14085,46	933	30,53	25,87	24,51	23,16	17,33	6
62	EXTRACTION OF NATURAL GAS	5331,78	28	67,29	30,75	5,39	4,74	3,96	14
102	PROCESSING AND PRESERVING OF FISH, CRUSTACEANS AND MOLLUSCS	1897,8	102	31,34	24,7	21,43	16,7	12,82	16
910	LIBRARIES, ARCHIVES, MUSEUMS AND OTHER CULTURAL ACTIVITIES	3064,27	493	21,73	21,66	21,22	21,02	20,82	101
553	CAMPING GROUNDS, RECREATIONAL VEHICLE PARKS AND TRAILER PARKS	4383,09	896	29,85	25,41	22,79	13,96	9,75	18
151	TANNING AND DRESSING OF LEATHER; MANUFACTURE OF LUGGAGE; HANDBAGS; SADDLERY AND HARNESS; DRESSING AND DYEING OF FUR	21379,67	2327	32,58	23,88	19,99	15,3	8,48	15
109	MANUFACTURE OF PREPARED ANIMAL FEEDS	5003,93	393	21,56	18,98	18,44	17,86	17,24	56

Source: Compiled by the authors

Indeed, natural features are a strong component even when isolating this part of the country, with *Logging (022)* and several other activities related to resource extraction ranked among the most agglomerated industries, especially for shorter distance ranges[95]. As observed on a national scale, this is unsurprising notwithstanding the area's high urban density, as Guillain & Le Gallo (2010) demonstrated that, even in Paris metropolitan area, these activities are among the most agglomerated.

Similarly, transport activities - often relying on natural features, especially in the case of water transport, and <<*large infrastructures*>>, thus showing <<*location patterns*>> compatible with <<*natural advantage (access to the sea) or indivisible facility sharing*>> (Barlet, Briant & Crusson, 2013, p. 343) - maintain the same high level of agglomeration that was observed on a national scale, with *Inland freight water transport (504)*, *Inland passenger water transport (503*), *Sea and coastal water transport (501)* being consistently among the most agglomerated industries[96]. A notable

[95] We are unable to say for sure as concerns 2012, since they stopped being mapped after 2007.

[96] The only exception – as in the case of national results – being the latter, but only for the 5-minute range.

difference with national results concerns air transport, which seems far less agglomerated, to the point that, for a 30-minute distance range*, Freight air transport (512)* appears more dispersed than it would be in a random distribution.

Other activities that somehow rely on the proximity to specific sites, though arguably more widespread than previous natural features, such as *Hotels (551)*[97], *Camping grounds, recreational vehicle parks and trailer parks (553)*, and *Other short term accommodation activities (552)* seem in line with national results, albeit slightly more agglomerated.

Koh & Riedel (2014, p. 831) underlined how *Processing and preserving of fish, crustaceans and molluscs* (102) and *Building of ships and boats* (301) <<*were found to be among the most dispersed in the UK, but list among the twenty most localized industries in Germany, which may (partly) reflect geographic differences between the two countries*>>, with Northern Italy showing a pattern similar to Germany's, just as Italy as a whole does.

As concerns manufacturing, the only significant difference appears to be *Manufacturing of domestic appliances (275),* which seems far less agglomerated in the Northern part of the country than it is nationally. Indeed, traditional activities – especially those related to textiles, leather, footwear, jewelry, and musical instruments - seem to be the most agglomerated, not unlike what is seen on a national scale, and in line with results obtained by other authors through different measures, such as Pagnini (2003) who investigated Italian industries in 1996, and identified traditional activities characterized by weak economies of scale - such as *Manufacture of clay building materials* (233), *Spinning, weaving and finishing of textiles* (131), *Manufacture of jewellery, bijouterie and related articles* (321) and *Tanning and dressing of leather; manufacture of luggage; handbags; saddlery and harness; dressing and dyeing of fur* (151) - among the most agglomerated industries. In particular, textile and clothing industries have been reported as among the most agglomerated almost unanimously and ubiquitously by authors such as Duranton & Overman (2005) for the UK and Barlet, Briant & Crusson (2013) for France. Koh & Riedel (2014, 831), after acknowledging the same phenomenon for Germany, where <<*among the twenty most localized industries, three belong to textiles*>> argued that <<*as many of these agglomeration patterns evolved with the Industrial Revolution in the nineteenth century, the analysis provides strong evidence for the persistence of agglomeration patterns*>>. In summary, two different – but not mutually exclusive - phenomena might play a significant role here: the lack of internal scale economies, typically identified as the key reason behind the success of industrial districts – and path dependency, with the historical persistence of industries established in the past decades and even centuries.

As in the national analysis and unlike Pagnini (2003), we did not find especially high values for industries such as *Manufacture of motor vehicles* (291), *Manufacture of pharmaceuticals* (211) and *Manufacture of air and spacecraft and related machinery* (303).

[97] In terms of ranking, *Hotels (551)* lose some ground to other activities in 2012, but still show quite high values, very much similar to 2007 for every distance range.

Table 51 – *20 most dispersed industries in Northern Italy in 2007.*

Industry code	Industry description	Employe	Plants	M (5 minutes)	M (10 minutes)	M (15 minutes)	M (20 minutes)	M (30 minutes)	National ran
120	MANUFACTURE OF TOBACCO PRODUCTS	226,53	2	0	0	0	0	0	247
774	LEASING OF INTELLECTUAL PROPERTY AND SIMILAR PRODUCTS, EXCEPT COPYRIGHTED WORKS	65,7	16	0,75	0,75	0,53	0,4	0,37	248
531	POSTAL ACTIVITIES	69020,69	6101	0,71	0,98	1,04	1,05	1,05	245
474	RETAIL SALE OF INFORMATION AND COMMUNICATIONS EQUIPMENT IN SPECIALIZED STORES	17783,97	4751	0,99	0,96	1	1,01	1,03	214
641	MONETARY INTERMEDIATION	212035,3	19134	1,01	1,01	0,99	0,99	1,01	244
960	OTHER PERSONAL SERVICE ACTIVITIES	184411,8	84764	1,07	1,04	1,02	1,02	1,01	243
711	ARCHITECTURAL AND ENGINEERING ACTIVITIES AND RELATED TECHNICAL CONSULTANCY	149760,5	106603	1,1	1,06	1,04	1,03	1,03	239
452	MAINTENANCE AND REPAIR OF MOTOR VEHICLES	117026,2	39471	1,11	1,08	1,06	1,04	1,02	221
432	ELECTRICAL, PLUMBING AND OTHER CONSTRUCTION INSTALLATION ACTIVITIES	280157,8	89920	1,16	1,08	1,05	1,02	1	242
471	RETAIL SALE IN NON-SPECIALIZED STORES	260025,5	30774	1,05	1,08	1,08	1,07	1,05	225
461	WHOLESALE ON A FEE OR CONTRACT BASIS	163992,1	130193	1,14	1,08	1,06	1,05	1,05	223
952	REPAIR OF PERSONAL AND HOUSEHOLD GOODS	20451,68	12532	1,13	1,09	1,07	1,05	1,04	240
467	OTHER SPECIALIZED WHOLESALE	142597,9	26446	1,13	1,09	1,07	1,06	1,05	236
749	OTHER PROFESSIONAL, SCIENTIFIC AND TECHNICAL ACTIVITIES N.E.C.	69946,41	43078	1,14	1,1	1,07	1,05	1,05	237
475	RETAIL SALE OF OTHER HOUSEHOLD EQUIPMENT IN SPECIALIZED STORES	107230,5	36602	1,14	1,1	1,07	1,06	1,04	185
862	MEDICAL AND DENTAL PRACTICE ACTIVITIES	117259,2	76443	1,16	1,12	1,07	1,05	1,04	228
662	ACTIVITIES AUXILIARY TO INSURANCE AND PENSION FUNDING	57830,6	21413	1,23	1,1	1,04	1,03	1,04	241
454	SALE, MAINTENANCE AND REPAIR OF MOTORCYCLES AND RELATED PARTS AND ACCESSORIES	9784,22	3574	1,13	1,11	1,09	1,07	1,08	227
742	PHOTOGRAPHIC ACTIVITIES	12197,61	7289	1,15	1,15	1,08	1,06	1,05	232
473	RETAIL SALE OF AUTOMOTIVE FUEL IN SPECIALIZED STORES	28878,32	11134	1,1	1,11	1,11	1,1	1,07	198

Source: Compiled by the authors

Table 52 – *20 most dispersed industries in Northern Italy in 2012.*

Industry code	Industry description	Employe	Plants	M (5 minutes)	M (10 minutes)	M (15 minutes)	M (20 minutes)	M (30 minutes)	National rank
643	TRUSTS, FUNDS AND SIMILAR FINANCIAL ENTITIES	11,77	2	0	0	0	0	0	76
72	MINING OF NON-FERROUS METAL ORES	1,08	2	0	0	0	0	0	242
99	SUPPORT ACTIVITIES FOR OTHER MINING AND QUARRYING	21,9	4	0	0	0	0	0	243
191	MANUFACTURE OF COKE OVEN PRODUCTS	262,54	3	0	0	0	0	0	244
268	MANUFACTURE OF MAGNETIC AND OPTICAL MEDIA	50,84	13	0	0,6	1,59	0,82	0,9	240
641	MONETARY INTERMEDIATION	207955,6	18325	1,06	1,07	1,07	1,08	1,11	238
960	OTHER PERSONAL SERVICE ACTIVITIES	210359,7	92314	1,16	1,14	1,12	1,11	1,11	237
432	ELECTRICAL, PLUMBING AND OTHER CONSTRUCTION INSTALLATION ACTIVITIES	271205,8	86526	1,23	1,17	1,13	1,11	1,09	235
782	TEMPORARY EMPLOYMENT AGENCY ACTIVITIES	137155,3	2955	1,22	1,12	1,1	1,13	1,17	199
471	RETAIL SALE IN NON-SPECIALIZED STORES	256729,8	27384	1,13	1,16	1,17	1,16	1,15	214
711	ARCHITECTURAL AND ENGINEERING ACTIVITIES AND RELATED TECHNICAL CONSULTANCY	142172	103459	1,2	1,16	1,15	1,13	1,13	234
477	RETAIL SALE OF OTHER GOODS IN SPECIALIZED STORES	280325	104395	1,25	1,18	1,14	1,13	1,12	207
812	CLEANING ACTIVITIES	221735,5	19374	1,18	1,18	1,21	1,19	1,18	226
862	MEDICAL AND DENTAL PRACTICE ACTIVITIES	129985,9	82780	1,28	1,24	1,19	1,17	1,16	220
692	ACCOUNTING, BOOKKEEPING AND AUDITING ACTIVITIES; TAX CONSULTANCY	144535,2	61509	1,39	1,27	1,16	1,12	1,11	225
861	HOSPITAL ACTIVITIES	42037,4	584	1,57	1,24	1,16	1,08	1,05	149
360	WATER COLLECTION, TREATMENT AND SUPPLY	11360,26	699	1,47	1,16	1,13	1,13	1,24	167
467	OTHER SPECIALIZED WHOLESALE	138187,7	27706	1,28	1,24	1,21	1,21	1,2	224
563	BEVERAGE SERVING ACTIVITIES	179341,9	64056	1,3	1,27	1,23	1,2	1,17	208
682	RENTING AND OPERATING OF SELF-OWNED OR LEASED REAL ESTATE	124162,5	105989	1,3	1,27	1,24	1,23	1,22	190

Source: Compiled by the authors

Some industries appear more dispersed in the Northern part of the country than they do nationally: apart from the already cited case of *Freight air transport (512)*, also *Construction of utility projects (422)* and *Manufacture of railway locomotives and rolling stocks* show such a pattern, despite not having a significantly different proportion of workers and plants located there compared to general economic activity.

On the other hand, *Pre-primary education (851)*, *Primary education (852)* and *Libraries, archives, museums and other cultural activities (910)* seem far more dispersed than they are nationally in 2007, but this might be due to a far lower proportion of such activities compared to general

economic activities, with between 20 and 40% of plants and employees being located in the North - compared to about 60% of economic activities overall – and possibly following more of a urban pattern than an economic one. However, it is remarkable that *Pre-primary education (851)* and, especially, *Libraries, archives, museums and other cultural activities (910)* significantly increased their agglomeration results in 2012 without a corresponding change on the national scale: indeed, *Primary education (852)*, the industry whose pattern most differ from the national, was the only one that went quite unchanged during that time period.

As concerns manufacturing activities, the most remarkable differences are represented by industries as diverse as *Manufacture of corrugated paper and paperboard and of containers (172)*, *Manufacture of refined petro0leum products (192)*, and *Manufacture of electronic components and boards (261),* all of which show quite increased dispersion in the North compared to the rest of the country.

3.3.2 Central-Southern Italy

M results for the five computed distance ranges are summarized – with means and standard deviations weighted by the number of plants in each industry - in the tables below, in addition with descriptive statistics about employees and plants.

Table 53 – *Descriptive statistics for M results – Center-South (2007)*

	Obs	Mean	Std. Dev.	Min	Max
M (5 minutes)	245	1,83	3,20	0	311,39
M (10 minutes)	245	1,68	2,69	0	307,98
M (15 minutes)	245	1,50	1,85	0	120,68
M (20 minutes)	245	1,41	1,53	0	98,74
M (30 minutes)	245	1,29	1,08	0	66,14
Employees	245	26238,30	44058,12	1,84	313858,8
Plants	245	8061,16	18351,40	2	128272

Source: Compiled by the authors

Table 54 – *Descriptive statistics for M results – Center-South (2012)*

	Obs	Mean	Std. Dev.	Min	Max
M (5 minutes)	242	1,78	2,98	0	94,05
M (10 minutes)	242	1,63	2,45	0	88,96
M (15 minutes)	242	1,47	1,74	0	45,87
M (20 minutes)	242	1,38	1,46	0	39,41
M (30 minutes)	242	1,27	1,02	0	29,53
Employees	242	25348,20	41560,69	7,18	262983,9
Plants	242	8121,67	18019,12	2	121551

Source: Compiled by the authors

Apart from industries that are either absent from Central-Southern Italy and those that have less than two plants - thus making it impossible to identify any degree of agglomeration – there are a handful of industries with zero agglomeration in either year:

- For 2007, these industries are *Growing of perennial crops (012)*, *Fishing (031)*, *Manufacture of coke oven products (191)*, *Security systems service activities (802)* and – except for larger distance ranges of 20 and 30 minutes – *Animal production (014)*;
- For 2012, they *are Mining of non-ferrous metal ores (072)*, *Support activities for other mining and quarrying (099)*, *Manufacture of magnetic and optical media (268)*, and *Inland freight water transport (504)*, for every distance range.

It is not a surprise that all these industries have less than 10 plants and 50 employees each.

Whereas the weighted mean is very consistent either between different ranges in the same year and between 2007 and 2012, maximum values show results that are quite diverse – albeit not as much as for Northern Italy – but it is due exclusively to an industry with less than 20 plants and far less than 1000 employees: *Support activities for petroleum and natural gas extraction (099)*.

Generally, agglomeration patterns do not differ excessively from national ones, although there are some differences. Indeed, as apparent in the two tables below, the four industries that are most agglomerated at the national level in 2007 do not appear in the Center-South rankings, since only one worker was employed in Manufacture of military fighting vehicles (304) - which is almost entirely concentrated in one small municipality in the North – and none in the other three industries. In 2012 as well, the four most agglomerated industries nationally – although present in the Center-South – are not that much agglomerated and are further down in the ranking.

Table 55 - *20 most agglomerated industries in Central-Southern Italy in 2007.*

Industry code	Industry description	Employe	Plants	M (5 minutes)	M (10 minutes)	M (15 minutes)	M (20 minutes)	M (30 minutes	National ran
91	SUPPORT ACTIVITIES FOR PETROLEUM AND NATURAL GAS EXTRACTION	677,16	18	311,39	307,98	120,68	98,74	66,14	5
322	MANUFACTURE OF MUSICAL INSTRUMENTS	1.324,89	257	66,29	36,8	30,72	25,98	12,25	11
131	SPINNING, WEAVING AND FINISHING OF TEXTILES	10.332,13	1.707	49,73	45,65	27,43	21,69	11,05	13
275	MANUFACTURE OF DOMESTIC APPLIANCES	15.562,18	212	31,92	29,71	30,67	29,58	22,6	26
171	MANUFACTURE OF PULP, PAPER AND PAPERBOARD	5.427,16	172	41,38	41,12	16,14	10,9	6,08	23
132	WEAVING OF TEXTILES	9.341,71	1.500	32,94	30,77	20,89	14,99	8,17	24
511	PASSENGER AIR TRANSPORT	12.055,85	221	24,9	24,84	24,78	24,73	3,22	20
234	MANUFACTURE OF OTHER PORCELAIN AND CERAMIC PRODUCTS	9.876,24	1.906	36,45	25,21	11,3	8,9	4,4	17
872	RESIDENTIAL CARE ACTIVITIES FOR MENTAL RETARDATION, MENTAL HEALTH AND SUBSTANCE ABUSE	928,87	72	25,41	30,7	15,35	9,85	4,4	25
152	MANUFACTURE OF FOOTWEAR	64.700,64	8.132	21,77	18,6	16,01	14,33	11,99	14
321	MANUFACTURE OF JEWELLERY, BIJOUTERIE AND RELATED ARTICLES	17.750,61	4.919	17,18	15,67	14,78	14,01	11,85	15
133	FINISHING OF TEXTILES	11.318,51	1.145	18,15	17,06	13,2	8,98	5,31	36
264	MANUFACTURE OF CONSUMER ELECTRONICS	1.129,67	82	40,99	10,12	4,33	3,57	2,97	45
206	MANUFACTURE OF MAN-MADE FIBRES	816,47	11	27,85	10,64	7,51	6,5	4,31	22
151	TANNING AND DRESSING OF LEATHER; MANUFACTURE OF LUGGAGE; HANDBAGS; SADDLERY AND HARNESS; DRESSING AND DYEING OF FUR	35.786,72	5.886	19,73	14,35	10,37	6,94	4,81	18
553	CAMPING GROUNDS, RECREATIONAL VEHICLE PARKS AND TRAILER PARKS	3.755,99	917	14,15	12,64	9,76	8,23	6,16	21
202	MANUFACTURE OF PESTICIDES AND OTHER AGROCHEMICAL PRODUCTS	268,9	15	19,23	19,23	4,56	2,54	2,22	75
501	SEA AND COASTAL WATER TRANSPORT	5.932,45	219	11,11	10,4	8,87	8,02	7,94	29
309	MANUFACTURE OF TRANSPORT EQUIPMENT N.E.C.	7.176,86	180	13,19	11,87	9,22	7,37	4,3	52
301	BUILDING OF SHIPS AND BOATS	12.213,30	1.311	12,78	11,43	7,92	7,49	5,64	32

Source: Compiled by the authors

Table 56 – *20 most agglomerated industries in Central-Southern Italy in 2012.*

Industry code	Industry description	Employe	Plants	M (5 minutes)	M (10 minutes)	M (15 minutes)	M (20 minutes)	M (30 minutes)	National rank
91	SUPPORT ACTIVITIES FOR PETROLEUM AND NATURAL GAS EXTRACTION	1.179,34	32	94,05	88,96	45,87	37,2	29,53	5
322	MANUFACTURE OF MUSICAL INSTRUMENTS	1.169,70	247	74,02	39,1	32,49	27,77	12,57	9
131	SPINNING, WEAVING AND FINISHING OF TEXTILES	6.354,44	1.111	56,84	51,21	28,11	22,4	11,33	6
275	MANUFACTURE OF DOMESTIC APPLIANCES	10.225,04	167	36,4	35,5	35,66	32,67	24,68	23
511	PASSENGER AIR TRANSPORT	14.930,08	188	39,63	39,5	39,41	39,41	4,06	7
171	MANUFACTURE OF PULP, PAPER AND PAPERBOARD	3.897,49	145	44,5	43,41	16,03	11,76	6,9	20
132	WEAVING OF TEXTILES	6.535,57	1.088	34,9	31,94	20,94	14,88	8,09	19
234	MANUFACTURE OF OTHER PORCELAIN AND CERAMIC PRODUCTS	7.114,81	1.392	40,67	29,26	13,46	9,71	4,49	13
152	MANUFACTURE OF FOOTWEAR	53.918,55	6.872	23,62	20,14	17,25	15,25	12,71	10
272	MANUFACTURE OF BATTERIES AND ACCUMULATORS	736,08	27	25,28	23,44	12,65	10,72	7,25	29
321	MANUFACTURE OF JEWELLERY, BIJOUTERIE AND RELATED ARTICLES	13.515,42	4.136	17,48	15,97	14,99	14,34	12,07	12
253	MANUFACTURE OF STEAM GENERATORS, EXCEPT CENTRAL HEATING HOT WATER BOILERS	418,27	25	25,95	25,95	8,35	5,38	2,38	63
133	FINISHING OF TEXTILES	8.298,06	953	18,42	16,93	13,06	8,59	5,2	28
62	EXTRACTION OF NATURAL GAS	2.505,32	30	21,3	19,91	7,83	6,46	4,9	14
202	MANUFACTURE OF PESTICIDES AND OTHER AGROCHEMICAL PRODUCTS	130	9	22,57	22,57	7,17	3,16	2,78	45
291	MANUFACTURE OF MOTOR VEHICLES	24.963,01	49	15,8	13,81	10,21	10,91	6,04	38
501	SEA AND COASTAL WATER TRANSPORT	4.699,88	285	12,23	11,85	10,26	9,55	10,32	30
613	SATELLITE TELECOMMUNICATIONS ACTIVITIES	209,24	22	32,54	7,06	4,75	2,52	7,29	40
233	MANUFACTURE OF CLAY BUILDING MATERIALS	4.317,11	307	21,91	13,82	10,78	4,33	2,75	8
151	TANNING AND DRESSING OF LEATHER; MANUFACTURE OF LUGGAGE; HANDBAGS; SADDLE	35.227,33	5.422	17,99	13,35	9,78	6,95	5,01	15

Source: Compiled by the authors

Natural features seem somehow less present in the highest ranks of agglomeration compared to the national results and to the North: indeed, the only industries involved with the extraction of natural resources that are among the 20 most agglomerated are *Support activities for petroleum and natural gas extraction (091)* and *Extraction of natural gas (062)*. However, these industries are usually very small in terms of the number of plants and employees, thus it is difficult to extract significant implications from these raw observations.

Indeed, larger industries revolving around transport activities, which still rely quite heavily on natural features - especially in the case of water transport - and <<*large infrastructures*>>, thus showing <<*location patterns*>> compatible with <<*natural advantage (access to the sea) or*

indivisible facility sharing>>[98] - maintain the same high level of agglomeration that was observed on a national scale and in the Northern part of the country. Particularly, *Inland passenger water transport (503*) ranks even higher than it does in the entire country – especially for shorter distance ranges, probably as an effect of a lower density of airports compared to other areas. The exception though is represented by industries involved in inland water transport (namely, *Inland freight water transport (504)* and *Inland passenger water transport (503)*), clearly as a consequence of the industry being almost non-existent in this part of the country, where most rivers and lakes are not large enough to be sailed.

Other activities that somehow rely on the proximity to specific sites - though arguably more widespread than previous natural features - such as *Hotels (551)*, *Camping grounds, recreational vehicle parks and trailer parks (553)*, and *Other short term accommodation activities (552)* are still quite agglomerated, albeit somehow less so than nationally and, especially, than they are in the North.

Koh & Riedel (2014, p. 831) underlined how *Processing and preserving of fish, crustaceans and molluscs* (102) and *Building of ships and boats* (301) <<*were found to be among the most dispersed in the UK, but list among the twenty most localized industries in Germany, which may (partly) reflect geographic differences between the two countries*>>, with Central-Southern Italy showing a pattern similar to Germany's, just as entire Italy does.

As concerns manufacturing, patterns do not seem to differ much from the national analysis: indeed, traditional activities – especially those related to musical instruments, textiles, footwear, jewelry, and leather - seem to be just as (and sometimes even more) agglomerated than they are nationally, in line with results obtained by other authors through different measures, such as Pagnini (2003) who investigated Italian industries in 1996, and identified traditional activities characterized by weak economies of scale - such as *Manufacture of clay building materials* (233), *Spinning, weaving and finishing of textiles* (131), *Manufacture of jewellery, bijouterie and related articles* (321) and *Tanning and dressing of leather; manufacture of luggage; handbags; saddlery and harness; dressing and dyeing of fur* (151) - among the most agglomerated industries. Textile and clothing industries, in particular, have been reported as among the most agglomerated almost unanimously and ubiquitously by authors such as Duranton & Overman (2005) for the UK and Barlet, Briant & Crusson (2013) for France. Koh & Riedel (2014, p. 831), after acknowledging the same phenomenon for Germany, where <<*among the twenty most localized industries, three belong to textiles*>> argued that <<*as many of these agglomeration patterns evolved with the Industrial Revolution in the nineteenth century, the analysis provides strong evidence for the persistence of agglomeration patterns*>>.

As in the national analysis and unlike Pagnini (2003), we did not find especially high values for industries such as *Manufacture of motor vehicles* (291), *Manufacture of pharmaceuticals* (211) and *Manufacture of air and spacecraft and related machinery* (303).

[98] Barlet, Briant & Crusson (2013).

Table 57 – *20 most dispersed industries in Central-Southern Italy in 2007.*

Industry code	Industry description	Employe	Plants	M (5 minutes)	M (10 minutes)	M (15 minutes)	M (20 minutes)	M (30 minutes	National ran
12	GROWING OF PERENNIAL CROPS	3	3	0	0	0	0	0	250
31	FISHING	37,79	10	0	0	0	0	0	246
191	MANUFACTURE OF COKE OVEN PRODUCTS	1,84	2	0	0	0	0	0	9
802	SECURITY SYSTEMS SERVICE ACTIVITIES	41,88	4	0	0	0	0	0	146
14	ANIMAL PRODUCTION	41,25	9	0	0	0	0,04	0,06	249
774	LEASING OF INTELLECTUAL PROPERTY AND SIMILAR PRODUCTS, EXCEPT COPYRIGHTED WORKS	29,5	6	0,24	0,24	0,24	0,24	0,2	248
492	FREIGHT RAIL TRANSPORT	119,2	6	0,4	0,4	0,4	0,38	0,33	94
120	MANUFACTURE OF TOBACCO PRODUCTS	1.167,49	8	0,41	0,41	0,41	0,4	0,34	247
783	OTHER HUMAN RESOURCES PROVISION	19,28	4	0,61	0,61	0,61	0,6	0,51	96
62	EXTRACTION OF NATURAL GAS	3.902,03	48	0,72	0,83	0,91	0,8	0,9	66
241	MANUFACTURE OF BASIC IRON AND STEEL	20.721,15	261	1,04	0,92	0,9	0,76	0,66	143
353	STEAM AND AIR CONDITIONING SUPPLY	1.022,78	24	0,84	0,83	0,91	0,88	0,83	92
854	HIGHER EDUCATION	198,35	32	0,42	0,94	1,07	1,13	0,99	184
531	POSTAL ACTIVITIES	69.742,84	5.026	0,64	0,9	1,01	1,04	1,03	245
495	TRANSPORT VIA PIPELINE	729,99	50	1,12	0,64	1,27	0,99	0,95	85
641	MONETARY INTERMEDIATION	124.270,95	11.670	1	1	0,99	0,99	1,01	244
360	WATER COLLECTION, TREATMENT AND SUPPLY	13.084,63	716	1,05	1	0,99	1	1,07	176
960	OTHER PERSONAL SERVICE ACTIVITIES	138.409,75	70.204	1,07	1,06	1,04	1,03	1,02	243
662	ACTIVITIES AUXILIARY TO INSURANCE AND PENSION FUNDING	37.201,08	16.608	1,12	1,08	1,04	1,01	1,02	241
432	ELECTRICAL, PLUMBING AND OTHER CONSTRUCTION INSTALLATION ACTIVITIES	190.624,53	59.206	1,12	1,08	1,05	1,04	1,02	242

Source: Compiled by the authors

Table 58 – *20 most dispersed industries in Central-Southern Italy in 2012.*

Industry code	Industry description	Employees	Plants	M (5 minutes	M (10 minute	M (15 minute	M (20 minute	M (30 minute	National rank
504	INLAND FREIGHT WATER TRANSPORT	22,62	2	0	0	0	0	0	3
99	SUPPORT ACTIVITIES FOR OTHER MINING AND QUARRYING	19	2	0	0	0	0	0	243
268	MANUFACTURE OF MAGNETIC AND OPTICAL MEDIA	17,29	8	0	0	0	0	0	240
72	MINING OF NON-FERROUS METAL ORES	10,11	2	0	0	0	0	0	242
120	MANUFACTURE OF TOBACCO PRODUCTS	472,48	7	0,05	0,05	0,05	0,05	0,04	241
241	MANUFACTURE OF BASIC IRON AND STEEL	17.931,68	177	0,99	0,84	0,77	0,55	0,78	110
531	POSTAL ACTIVITIES	67.794,31	5.111	0,63	0,87	0,99	1,02	1,03	239
641	MONETARY INTERMEDIATION	118.543,17	11.257	0,97	0,98	0,99	0,99	1,01	238
360	WATER COLLECTION, TREATMENT AND SUPPLY	12.963,20	712	1,04	1,03	0,94	0,93	1,02	167
662	ACTIVITIES AUXILIARY TO INSURANCE AND PENSION FUNDING	43.201,75	22.981	1,09	1,06	1,02	1,01	1,01	236
960	OTHER PERSONAL SERVICE ACTIVITIES	162.185,43	75.798	1,07	1,05	1,04	1,03	1,02	237
476	RETAIL SALE OF CULTURAL AND RECREATION GOODS IN SPECIALIZED STORES	41.111,44	22.155	1,07	1,07	1,05	1,04	1,04	230
381	WASTE COLLECTION	44.058,30	1.726	1,01	1,06	1,08	1,08	1,08	184
692	ACCOUNTING, BOOKKEEPING AND AUDITING ACTIVITIES; TAX CONSULTANCY	96.782,99	56.671	1,13	1,1	1,05	1,03	1,02	225
631	DATA PROCESSING, HOSTING AND RELATED ACTIVITIES; WEB PORTALS	40.514,07	12.998	1,11	1,08	1,05	1,04	1,05	231
951	REPAIR OF COMPUTERS AND COMMUNICATION EQUIPMENT	5.241,20	2.372	1,07	1,09	1,07	1,05	1,06	223
711	ARCHITECTURAL AND ENGINEERING ACTIVITIES AND RELATED TECHNICAL CONSULTANCY	105.110,32	84.185	1,12	1,09	1,06	1,05	1,03	234
465	WHOLESALE OF MACHINERY, EQUIPMENT AND SUPPLIES	16.658,37	5.463	1,12	1,09	1,07	1,04	1,03	205
432	ELECTRICAL, PLUMBING AND OTHER CONSTRUCTION INSTALLATION ACTIVITIES	179.473,37	59.812	1,13	1,09	1,06	1,05	1,03	235
862	MEDICAL AND DENTAL PRACTICE ACTIVITIES	110.973,40	73.938	1,11	1,09	1,07	1,05	1,04	220

Source: Compiled by the authors

Dispersion as well seems to be in line with the rest of the country: except for the already mentioned *Inland freight water transport (504)* and some other small industries with less than 50 plants, among larger industries only *Manufacture of basic iron and steel (241)* seems highly dispersed, whereas it is quite agglomerated nationally.

As concerns manufacturing activities, the most remarkable difference is represented by *Manufacture of general-purpose machinery (281)*, which shows much more dispersion in the Center-South compared to the rest of the country in both 2007 and 2012.

3.3.3 Sicily

M results for the five computed distance ranges are summarized – with means and standard deviations weighted by the number of plants in each industry - in the tables below, in addition with descriptive statistics about employees and plants.

Table 59 – *Descriptive statistics for M results - Sicily (2007)*

	Obs	Mean	Std. Dev.	Min	Max
M (5 minutes)	232	1,38	1,49	0	304,52
M (10 minutes)	232	1,30	0,95	0	27,64
M (15 minutes)	232	1,23	0,68	0	24,33
M (20 minutes)	232	1,17	0,50	0	23,58
M (30 minutes)	232	1,11	0,29	0	11,42
Employees	232	3658,15	7036,62	1,95	59667,44
Plants	232	1276,56	3006,72	2	22153

Source: Compiled by the authors

Table 60 – *Descriptive statistics for M results - Sicily (2012)*

	Obs	Mean	Std. Dev.	Min	Max
M (5 minutes)	231	1,38	1,33	0	54,59
M (10 minutes)	231	1,30	1,04	0	40,00
M (15 minutes)	231	1,24	0,77	0	40,00
M (20 minutes)	231	1,17	0,58	0	38,83
M (30 minutes)	231	1,11	0,33	0	18,07
Employees	231	3522,79	6466,66	2	45990,63
Plants	231	1269,31	2892,27	2	21148,00

Source: Compiled by the authors

Several industries, operating in different fields of activity, show zero agglomeration for every distance range, but all of them consist of not more than 5 plants each. However, is interesting to note that some of them are quite large industries nationally and, indeed, much more agglomerated: it is the case, for instance, of *Spinning, weaving and finishing of textiles (131)*.

Mean values, when each industry is weighted by its number of plants, are remarkably similar between 2007 and 2012, not only for agglomeration results, but also for the number of employees and plants.

The low correlation to national results reveals itself when focusing on single industries. Indeed, whereas many of them follow the typical and expected pattern that was observed nationally and in other macro-regions of Italy, some of them like *Manufacture of games and toys (324)* or *Higher education (854)* seem far more agglomerated than they are country-wide.

Table 61 - *20 most agglomerated industries in Sicily in 2007.*

Industry code	Industry description	Employees	Plants	M (5 minutes)	M (10 minutes)	M (15 minutes)	M (20 minutes)	M (30 minutes)	National ran
22	LOGGING	2	2	304,52	6,12	6,04	5,29	4,61	10
309	MANUFACTURE OF TRANSPORT EQUIPMENT N.E.C.	104,33	13	78,07	17,88	8,94	1,9	1,98	52
61	EXTRACTION OF CRUDE PETROLEUM	228	7	24,33	24,33	24,33	23,58	11,42	4
232	MANUFACTURE OF REFRACTORY PRODUCTS	52,33	5	53,05	26,62	7,41	6,04	3,46	40
324	MANUFACTURE OF GAMES AND TOYS	98,03	20	27,94	27,64	10,52	7,89	2,23	103
234	MANUFACTURE OF OTHER PORCELAIN AND CERAMIC PRODUCTS	1278,18	507	18,51	17,44	12,42	9,79	5,05	17
302	MANUFACTURE OF RAILWAY LOCOMOTIVES AND ROLLING STOCKS	466,75	7	12,73	23,52	15,12	4,32	3,94	58
221	MANUFACTURE OF RUBBER PRODUCTS	178,18	32	18,7	18,91	7,37	6,01	2,09	41
102	PROCESSING AND PRESERVING OF FISH, CRUSTACEANS AND MOLLUSCS	1313,95	133	12,93	11,5	9,4	6,15	3,88	19
233	MANUFACTURE OF CLAY BUILDING MATERIALS	990,83	117	15,8	10,32	6,11	3,65	1,63	12
264	MANUFACTURE OF CONSUMER ELECTRONICS	24,75	8	4,93	3,88	14,79	8,32	4,86	45
16	SUPPORT ACTIVITIES TO AGRICULTURE AND POST-HARVEST CROP ACTIVITIES	19,5	14	9,51	9,51	8	4,96	2,94	50
101	PROCESSING AND PRESERVING OF MEAT	782,41	133	17,66	5,45	3,83	3,35	2,48	31
323	MANUFACTURE OF SPORTS GOODS	47,58	20	11,49	11,62	4,34	3,36	1,08	42
272	MANUFACTURE OF BATTERIES AND ACCUMULATORS	17,42	7	6,56	6,56	6,56	7,9	2,85	72
275	MANUFACTURE OF DOMESTIC APPLIANCES	18,83	2	6,27	6,14	5,91	5,17	4,61	26
293	MANUFACTURE OF PARTS AND ACCESSORIES FOR MOTOR VEHICLES	585,8	42	8,49	6,93	5,29	3,39	1,2	78
81	QUARRYING OF STONE, SAND AND CLAY	1267,8	294	9,92	5,56	5,26	2,13	1,97	33
854	HIGHER EDUCATION	20,33	7	11,56	7,09	2,63	1,17	0,47	184
553	CAMPING GROUNDS, RECREATIONAL VEHICLE PARKS AND TRAILER PARKS	283,29	91	5,93	4,96	4,77	3,54	2,42	21

Source: Compiled by the authors

Table 62 – *20 most agglomerated industries in Sicily in 2012.*

Industry code	Industry description	Employees	Plants	M (5 minutes	M (10 minute	M (15 minute	M (20 minute	M (30 minute	National ra
91	SUPPORT ACTIVITIES FOR PETROLEUM AND NATURAL GAS EXTRACTION	94,78	5	40	40	40	38,83	18,07	5
234	MANUFACTURE OF OTHER PORCELAIN AND CERAMIC PRODUCTS	699,03	375	24,38	23,74	16,56	12,6	6,06	13
309	MANUFACTURE OF TRANSPORT EQUIPMENT N.E.C.	113,95	18	54,59	15,05	6,14	1,24	1,31	64
255	FORGING, PRESSING, STAMPING AND ROLL-FORMING OF METAL; POWDER METALLURGY	51	15	30,02	21,2	7,18	3,87	2,16	59
302	MANUFACTURE OF RAILWAY LOCOMOTIVES AND ROLLING STOCKS	404,79	10	25,64	17,22	13,78	3,53	3,09	61
62	EXTRACTION OF NATURAL GAS	63,31	5	0	0	1,27	1,23	0,82	14
283	MANUFACTURE OF AGRICULTURAL AND FORESTRY MACHINERY	194,42	52	21,69	8,67	8,76	6,24	3,4	53
233	MANUFACTURE OF CLAY BUILDING MATERIALS	633,71	99	18,82	12,58	5,94	3,46	1,79	8
211	MANUFACTURE OF PHARMACEUTICALS	58,22	2	10,12	10,12	7,58	5,55	4,67	58
772	RENTING AND LEASING OF PERSONAL AND HOUSEHOLD GOODS	386,1	296	7,62	7,57	7,6	7,57	6,52	68
267	MANUFACTURE OF OPTICAL INSTRUMENTS AND PHOTOGRAPHIC EQUIPMENT	5,3	3	0	0	19,87	12,41	4,35	41
102	PROCESSING AND PRESERVING OF FISH, CRUSTACEANS AND MOLLUSCS	1.151,77	117	10,88	9,65	8,3	4,78	2,97	16
101	PROCESSING AND PRESERVING OF MEAT	704,31	115	20,02	5,3	3,11	3,1	2,15	32
109	MANUFACTURE OF PREPARED ANIMAL FEEDS	391,57	63	6,76	6,13	5,79	4,89	4,55	56
81	QUARRYING OF STONE, SAND AND CLAY	1.032,37	276	11,65	5,97	5,75	2,1	1,96	31
265	MANUFACTURE OF MEASURING, TESTING, NAVIGATING AND CONTROL EQUIPMENT; WATCHES AND CLOCKS	7,5	6	6,58	6,58	4,93	3,61	4,68	114
274	MANUFACTURE OF ELECTRIC LIGHTING EQUIPMENT	80,27	35	10,03	6,59	3,97	2,12	1,19	70
221	MANUFACTURE OF RUBBER PRODUCTS	127,86	31	6,66	6,78	3,99	3,45	1,09	39
264	MANUFACTURE OF CONSUMER ELECTRONICS	37,5	13	8,04	6,39	2,45	2,89	1,79	60
390	REMEDIATION ACTIVITIES AND OTHER WASTE MANAGEMENT SERVICES	290,07	49	4,46	5,05	4,04	3,52	2,4	127

Source: Compiled by the authors

Activities related to resource extraction, such as *Logging (022)*, Extraction of crude petroleum (061), Quarrying of stone, sand and clay (081), Support activities for petroleum and natural gas extraction (091) and Extraction of natural gas (062) are among the most agglomerated, as we have observed on the national ground and as widely described by literature for every type of territory: indeed, Guillain & Le Gallo (2010) demonstrated that, even in an urbanized setting as Paris metropolitan area, these activities are among the most agglomerated.

Among the most agglomerated industries, there is a strong presence of other activities that still revolve around the presence of natural resources, as is the case for those related to food processing, that were found by Koh & Riedel (2014, p. 831) <<*to be among the most dispersed in the UK, but list among the twenty most localized industries in Germany, which may (partly) reflect geographic differences between the two countries*>>.

Interestingly though, transport activities do not appear among the most agglomerated industries in Sicily, as could have been expected not only from results obtained nationally and in other macro-regions, but also by relying on literature. Indeed, quite surprisingly, they appear at the bottom of the ranking, among the least agglomerated industries[99].

Other activities that somehow rely on the proximity to specific sites, though arguably more widespread than previous natural features, such as *Hotels (551)*, *Camping grounds, recreational vehicle parks and trailer parks (553)*, and *Other short term accommodation activities (552)* do not seem to be as agglomerated as expected and as found out to be nationally and in other macro-regions.

As in the national analysis and unlike Pagnini (2003), we did not find especially high values for industries such as *Manufacture of motor vehicles* (291), *Manufacture of pharmaceuticals* (211) and *Manufacture of air and spacecraft and related machinery* (303).

[99] This might however be a consequence of these industries consisting in far less plants in Sicily than they do nationally, thereby providing less significance.

Table 63 – *20 most dispersed industries in Sicily in 2007.*

Industry code	Industry description	Employees	Plants	M (5 minutes)	M (10 minutes)	M (15 minutes)	M (20 minutes)	M (30 minutes)	National ran
91	SUPPORT ACTIVITIES FOR PETROLEUM AND NATURAL GAS EXTRACTION	57,23	4	0	0	0	0	0	5
131	SPINNING, WEAVING AND FINISHING OF TEXTILES	8,41	5	0	0	0	0	0	13
268	MANUFACTURE OF MAGNETIC AND OPTICAL MEDIA	2	2	0	0	0	0	0	64
503	INLAND PASSENGER WATER TRANSPORT	7,34	3	0	0	0	0	0	8
504	INLAND FREIGHT WATER TRANSPORT	12,73	2	0	0	0	0	0	7
613	SATELLITE TELECOMMUNICATIONS ACTIVITIES	3,38	2	0	0	0	0	0	100
663	FUND MANAGEMENT ACTIVITIES	1,95	2	0	0	0	0	0	35
856	EDUCATIONAL SUPPORT ACTIVITIES	2,58	3	0	0	0	0	0	99
202	MANUFACTURE OF PESTICIDES AND OTHER AGROCHEMICAL PRODUCTS	50,08	6	0	0	0,17	0,15	0,12	75
353	STEAM AND AIR CONDITIONING SUPPLY	104,06	4	0	0,3	0,28	0,22	0,16	92
872	RESIDENTIAL CARE ACTIVITIES FOR MENTAL RETARDATION, MENTAL HEALTH AND SUBSTANCE ABUSE	123,83	10	0	0	0,19	0,53	0,4	25
284	MANUFACTURE OF METAL-FORMING MACHINERY AND MACHINE TOOLS	74,33	15	0	0,26	0,4	0,54	1,07	84
133	FINISHING OF TEXTILES	10,59	6	0	0	0	0	2,32	36
592	SOUND RECORDING AND MUSIC PUBLISHING ACTIVITIES	53,42	18	0,31	0,31	0,61	0,47	0,81	119
495	TRANSPORT VIA PIPELINE	149,93	10	0,35	0,51	0,71	0,6	0,42	85
253	MANUFACTURE OF STEAM GENERATORS, EXCEPT CENTRAL HEATING HOT WATER BOILERS	76,95	7	0,73	0,66	0,56	0,51	0,31	69
267	MANUFACTURE OF OPTICAL INSTRUMENTS AND PHOTOGRAPHIC EQUIPMENT	4,59	3	0	0	0	0	3,35	62
281	MANUFACTURE OF GENERAL-PURPOSE MACHINERY	248,89	46	0,72	0,84	0,82	0,83	0,83	37
244	MANUFACTURE OF BASIC PRECIOUS AND OTHER NON-FERROUS METALS; REPROCESSING OF NUCLEA	459,92	32	0,73	0,7	0,74	0,94	1,12	60
531	POSTAL ACTIVITIES	11314,05	763	0,61	0,81	0,93	0,97	1,01	245

Source: Compiled by the authors

Table 64 – *20 most dispersed industries in Sicily in 2012.*

Industry code	Industry description	Employees	Plants	M (5 minutes	M (10 minute	M (15 minute	M (20 minute	M (30 minute	National ra
99	SUPPORT ACTIVITIES FOR OTHER MINING AND QUARRYING	19,64	3	0	0	0	0	0	243
202	MANUFACTURE OF PESTICIDES AND OTHER AGROCHEMICAL PRODUCTS	48,1	5	0	0	0	0	0	45
232	MANUFACTURE OF REFRACTORY PRODUCTS	4,14	3	0	0	0	0	0	55
253	MANUFACTURE OF STEAM GENERATORS, EXCEPT CENTRAL HEATING HOT WATER BOILERS	12,11	3	0	0	0	0	0	63
268	MANUFACTURE OF MAGNETIC AND OPTICAL MEDIA	2	2	0	0	0	0	0	240
303	MANUFACTURE OF AIR AND SPACECRAFT AND RELATED MACHINERY	113,51	3	0	0	0	0	0	52
503	INLAND PASSENGER WATER TRANSPORT	4,9	2	0	0	0	0	0	4
613	SATELLITE TELECOMMUNICATIONS ACTIVITIES	9	3	0	0	0	0	0	40
774	LEASING OF INTELLECTUAL PROPERTY AND SIMILAR PRODUCTS, EXCEPT COPYRIGHTED WORKS	2	3	0	0	0	0	0	142
133	FINISHING OF TEXTILES	27,59	6	0	0	0	0	0,65	28
582	SOFTWARE PUBLISHING	108,38	6	0	0	0	0	0,92	170
353	STEAM AND AIR CONDITIONING SUPPLY	141,26	6	0	0	0,28	0,36	0,33	85
291	MANUFACTURE OF MOTOR VEHICLES	1.294,50	6	0	0	0,18	0,06	1,17	38
244	MANUFACTURE OF BASIC PRECIOUS AND OTHER NON-FERROUS METALS; REPROCESSING OF NUCLEAR FUELS	373,35	47	0,51	0,52	0,76	0,72	0,79	72
281	MANUFACTURE OF GENERAL-PURPOSE MACHINERY	158,41	42	0,57	0,67	0,48	1,04	0,79	37
324	MANUFACTURE OF GAMES AND TOYS	69,07	22	0,07	0,28	1,08	1,08	1,08	88
323	MANUFACTURE OF SPORTS GOODS	24,18	12	2,79	0,43	0,15	0,28	0,35	62
235	MANUFACTURE OF CEMENT, LIME AND PLASTER	666,01	44	0,3	0,45	1,13	1,1	1,08	49
531	POSTAL ACTIVITIES	10.418,52	770	0,62	0,81	0,92	0,98	1,01	239
559	OTHER ACCOMODATION	105,96	33	1,03	0,88	0,9	0,9	0,78	48

Source: Compiled by the authors

3.3.4 Sardinia

M results for the five computed distance ranges are summarized – with means and standard deviations weighted by the number of plants in each industry - in the tables below, in addition with descriptive statistics about employees and plants.

Table 65 – *Descriptive statistics for M results - Sardinia (2007)*

	Obs	Mean	Std. Dev.	Min	Max
M (5 minutes)	224	1,44	2,60	0	358,34
M (10 minutes)	224	1,35	1,78	0	263,24
M (15 minutes)	224	1,26	0,84	0	119,76
M (20 minutes)	224	1,20	0,66	0	101,39
M (30 minutes)	224	1,14	0,39	0	28,77
Employees	224	1659,21	3286,44	2,00	30526,34
Plants	224	540,46	1245,69	2,00	8745,00

Source: Compiled by the authors

Table 66 – *Descriptive statistics for M results - Sardinia (2012)*

	Obs	Mean	Std. Dev.	Min	Max
M (5 minutes)	219	1,43	2,31	0	201,05
M (10 minutes)	219	1,34	1,31	0	80,69
M (15 minutes)	219	1,26	0,74	0	42,3
M (20 minutes)	219	1,19	0,58	0	39,49
M (30 minutes)	219	1,14	0,41	0	29,16
Employees	219	1552,30	2816,06	1,20	16941,03
Plants	219	532,47	1177,86	2,00	7336,00

Source: Compiled by the authors

Several industries, operating in different fields of activity, show zero agglomeration for every distance range, but all of them consist of less than 5 plants each.

Mean values, when each industry is weighted by its number of plants, are remarkably similar between 2007 and 2012

The low correlation to national results highlighted in table 46 finds an easy explanation when we look at single industries: indeed, the most agglomerated industries in Sardinia are almost unequivocally different than those in Italy as a whole, especially when the smallest and least significant ones are left out. Indeed, many manufacturing activities are among the most agglomerated industries in Sardinia, whereas they appear in the middle ranks nationally. On the other hand, those manufacturing activities that are among the most agglomerated industries in Italy – such as Manufacture of musical instruments (322), Manufacture of clay building materials (233), Manufacture of footwear (152) and Manufacture of jewellery, bijouterie and related articles (321) – are not agglomerated at all in Sardinia.

Industries related to resource extraction are, unsurprisingly, among the most agglomerated, with those revolving around mining strictly near the top of the ranking. *Logging (022)* and *Extraction of natural gas (062)* curiously appear among the least agglomerated, but the reason is clearly their almost non-existence in Sardinia, with only two plants each. On the other hand, transport and accommodation activities are – just like in the case of Sicily – far less agglomerated in Sardinia than they are nationally and in the peninsular part of the country.

Table 67 - *20 most agglomerated industries in Sardinia in 2007.*

Industry code	Industry description	Employe	Plants	M (5 minutes)	M (10 minutes)	M (15 minutes)	M (20 minutes)	M (30 minutes)	National ran
206	MANUFACTURE OF MAN-MADE FIBRES	154	2	263,24	263,24	119,76	101,39	16,54	22
51	MINING OF HARD COAL	521	2	358,34	59,74	24,84	22,06	17,64	1
72	MINING OF NON-FERROUS METAL ORES	74,84	3	165,37	165,37	7,15	1,46	1,15	3
284	MANUFACTURE OF METAL-FORMING MACHINERY AND MACHINE TOOLS	68,25	9	108,83	42,56	40,61	36,94	28,77	84
242	MANUFACTURE OF TUBES, PIPES AND HOLLOW PROFILES AND OF TUBE OR PIPE FITTINGS OF CAST-IR	80,08	3	68,21	52,01	52,01	34,19	24,75	61
257	MANUFACTURE OF CUTLERY, HAND TOOLS AND GENERAL HARDWARE	58,58	38	50,48	48,47	9,93	7,92	5,4	59
856	EDUCATIONAL SUPPORT ACTIVITIES	3,92	4	21,15	21,15	21,15	8,57	0,6	99
143	MANUFACTURE OF KNITTED AND CROCHETED APPAREL	303,38	17	41,53	10,78	8,23	5,85	3,4	30
244	MANUFACTURE OF BASIC PRECIOUS AND OTHER NON-FERROUS METALS; REPROCESSING OF NUCLEA	1794,96	21	19,78	19,77	15,39	4,55	6,61	60
235	MANUFACTURE OF CEMENT, LIME AND PLASTER	296,64	10	47,24	12,11	3,65	1,75	0,78	67
309	MANUFACTURE OF TRANSPORT EQUIPMENT N.E.C.	7,75	4	15,43	12,85	10,49	10,49	4,27	52
232	MANUFACTURE OF REFRACTORY PRODUCTS	214,53	7	28,15	14,74	6,55	1,75	1,97	40
283	MANUFACTURE OF AGRICULTURAL AND FORESTRY MACHINERY	106,13	21	17,81	14,09	3,03	1,95	1,47	49
553	CAMPING GROUNDS, RECREATIONAL VEHICLE PARKS AND TRAILER PARKS	676,97	102	11,94	8,33	6,44	5,84	3,62	21
89	MINING AND QUARRYING N.E.C.	370,5	42	17,24	6,11	7,69	2,41	2,19	16
273	MANUFACTURE OF WIRING AND WIRING DEVICES	19,58	3	23,33	7,03	3,11	0,79	0,7	70
501	SEA AND COASTAL WATER TRANSPORT	516,28	100	7,54	7,93	6,41	4,28	4,04	29
131	SPINNING, WEAVING AND FINISHING OF TEXTILES	219,73	25	10,02	7,39	4,09	5,83	2,32	13
212	MANUFACTURE OF MEDICINAL CHEMICAL AND BOTANICAL PRODUCTS	53,02	16	11	4,24	4,48	4,12	2,89	79
275	MANUFACTURE OF DOMESTIC APPLIANCES	9,02	3	14,13	7,42	3,3	0,88	0,69	26

Source: Compiled by the authors

Table 68 – *20 most agglomerated industries in Sardinia in 2012.*

Industry code	Industry description	Employees	Plants	M (5 minutes)	M (10 minutes)	M (15 minutes)	M (20 minutes)	M (30 minutes)	National rank
252	MANUFACTURE OF TANKS, RESERVOIRS AND CONTAINERS OF METAL	29,21	6	201,05	35,16	35,16	30,5	27,76	69
582	SOFTWARE PUBLISHING	3	3	116,96	58,77	29,31	26,28	16,06	170
283	MANUFACTURE OF AGRICULTURAL AND FORESTRY MACHINERY	32,91	11	116,83	80,69	8,09	4,91	3,37	53
284	MANUFACTURE OF METAL-FORMING MACHINERY AND MACHINE TOOLS	12,05	4	52,66	43,55	42,3	39,49	29,16	77
242	MANUFACTURE OF TUBES, PIPES AND HOLLOW PROFILES AND OF TUBE OR PIPE FITTINGS OF CAST-IRON	75,1	4	53,51	41,68	41,68	27,67	19,48	74
133	FINISHING OF TEXTILES	10,4	10	26,13	26,13	29	23,27	8,4	28
235	MANUFACTURE OF CEMENT, LIME AND PLASTER	222,23	10	78,74	18,99	4,78	2,57	0,63	49
257	MANUFACTURE OF CUTLERY, HAND TOOLS AND GENERAL HARDWARE	53,55	34	36,22	35,13	5,64	4,35	3,31	65
143	MANUFACTURE OF KNITTED AND CROCHETED APPAREL	185,44	13	6,51	22,98	20,05	12,12	7,27	24
132	WEAVING OF TEXTILES	248,12	30	18,12	17,63	9,03	6,6	3,89	19
232	MANUFACTURE OF REFRACTORY PRODUCTS	203,76	5	25,6	12,24	5,65	1,67	1,31	55
241	MANUFACTURE OF BASIC IRON AND STEEL	14,76	5	12,36	9,64	9,64	6,4	4,51	110
192	MANUFACTURE OF REFINED PETROLEUM PRODUCTS	1.448,77	31	13,86	9,42	9,3	5,93	1,05	66
244	MANUFACTURE OF BASIC PRECIOUS AND OTHER NON-FERROUS METALS; REPROCESSING OF NUCLEAR FUELS	1.403,26	24	11,42	11,41	8,45	2,3	4,71	72
131	SPINNING, WEAVING AND FINISHING OF TEXTILES	73,4	12	15,05	7,14	1,67	8,2	2,62	6
271	MANUFACTURE OF ELECTRIC MOTORS, GENERATORS, TRANSFORMERS AND ELECTRICITY DISTRIBUTION AND CONTROL APPARATUS	49,8	14	7,31	7,3	6,62	6,2	4,86	98
151	TANNING AND DRESSING OF LEATHER; MANUFACTURE OF LUGGAGE; HANDBAGS; SADDLERY AND HARNESS; DRESSING AND DYEING OF FUR	37,46	27	9,03	7,41	6,19	3,96	2,91	15
501	SEA AND COASTAL WATER TRANSPORT	593,84	114	7,17	7,55	5,67	3,72	3,62	30
553	CAMPING GROUNDS, RECREATIONAL VEHICLE PARKS AND TRAILER PARKS	502,42	85	7,98	5,97	4,36	4,12	2,68	18
109	MANUFACTURE OF PREPARED ANIMAL FEEDS	143,8	23	7,06	7,05	2,93	3,72	2,87	56

Source: Compiled by the authors

Table 69 – *20 most dispersed industries in Sardinia in 2007.*

Industry code	Industry description	Employe	Plants	M (5 minutes)	M (10 minutes)	M (15 minutes)	M (20 minutes)	M (30 minutes)	National ran
16	SUPPORT ACTIVITIES TO AGRICULTURE AND POST-HARVEST CROP ACTIVITIES	6	4	0	0	0	0	0	50
22	LOGGING	2	2	0	0	0	0	0	10
202	MANUFACTURE OF PESTICIDES AND OTHER AGROCHEMICAL PRODUCTS	17,42	2	0	0	0	0	0	75
245	CASTING OF IRON AND STEEL	15,67	3	0	0	0	0	0	55
255	FORGING, PRESSING, STAMPING AND ROLL-FORMING OF METAL; POWDER METALLURGY	61,49	5	0	0	0	0	0	68
267	MANUFACTURE OF OPTICAL INSTRUMENTS AND PHOTOGRAPHIC EQUIPMENT	2,64	2	0	0	0	0	0	62
268	MANUFACTURE OF MAGNETIC AND OPTICAL MEDIA	2	2	0	0	0	0	0	64
302	MANUFACTURE OF RAILWAY LOCOMOTIVES AND ROLLING STOCKS	324,42	3	0	0	0	0	0	58
353	STEAM AND AIR CONDITIONING SUPPLY	60,04	3	0	0	0	0	0	92
872	RESIDENTIAL CARE ACTIVITIES FOR MENTAL RETARDATION, MENTAL HEALTH AND SUBSTANCE ABUSE	2,08	2	0	0	0	0	0	25
266	MANUFACTURE OF IRRADIATION, ELECTROMEDICAL AND ELECTROTHERAPEUTIC EQUIPMENT	148,5	8	0,05	0,04	0,03	0,03	0,09	54
133	FINISHING OF TEXTILES	3,92	4	0,81	0,7	0,56	0,46	0,41	36
265	MANUFACTURE OF MEASURING, TESTING, NAVIGATING AND CONTROL EQUIPMENT; WATCHES AND CLOCKS	12,93	6	1,66	0,87	0,39	0,1	0,08	128
62	EXTRACTION OF NATURAL GAS	41,88	2	0	0	0	0	3,27	66
241	MANUFACTURE OF BASIC IRON AND STEEL	12,33	4	0	1,11	0,9	0,8	0,73	143
263	MANUFACTURE OF COMMUNICATION EQUIPMENT	128,65	17	0,39	0,48	1,01	0,96	0,99	127
279	MANUFACTURE OF OTHER ELECTRICAL EQUIPMENT	201,74	19	1,52	0,41	0,33	0,29	1,42	136
152	MANUFACTURE OF FOOTWEAR	72,23	20	0,76	0,68	0,89	0,81	0,84	14
292	MANUFACTURE OF BODIES (COACHWORK) FOR MOTOR VEHICLES; MANUFACTURE OF TRAILERS AND SEMI-TRAILERS	39,89	9	0	1,23	1,14	0,83	0,99	77
322	MANUFACTURE OF MUSICAL INSTRUMENTS	5,83	6	1,06	0,99	0,88	0,72	0,6	11

Source: Compiled by the authors

Table 70 – *20 most dispersed industries in Sardinia in 2012.*

Industry code	Industry description	Employees	Plants	M (5 minutes)	M (10 minutes)	M (15 minutes)	M (20 minutes)	M (30 minutes)	National rank
72	MINING OF NON-FERROUS METAL ORES	34,96	3	0	0	0	0	0	242
265	MANUFACTURE OF MEASURING, TESTING, NAVIGATING AND CONTROL EQUIPMENT; WATCHES AND CLOCKS	7	3	0	0	0	0	0	114
293	MANUFACTURE OF PARTS AND ACCESSORIES FOR MOTOR VEHICLES	6,25	2	0	0	0	0	0	75
212	MANUFACTURE OF MEDICINAL CHEMICAL AND BOTANICAL PRODUCTS	2	3	0	0	0	0	0	73
802	SECURITY SYSTEMS SERVICE ACTIVITIES	11,3	2	0	0	0	0	0	87
291	MANUFACTURE OF MOTOR VEHICLES	1,2	2	0	0	0	0	0	38
353	STEAM AND AIR CONDITIONING SUPPLY	133,04	3	0	0	0	0	0	85
202	MANUFACTURE OF PESTICIDES AND OTHER AGROCHEMICAL PRODUCTS	12,58	2	0	0	0	0	0	45
268	MANUFACTURE OF MAGNETIC AND OPTICAL MEDIA	3,74	2	0	0	0	0	0	240
503	INLAND PASSENGER WATER TRANSPORT	12,44	2	0	0	0	0	0	4
559	OTHER ACCOMODATION	27,73	15	0,09	0,08	0,07	0,23	0,35	48
142	MANUFACTURE OF ARTICLES OF FUR	6,48	3	0	0	0	0	1,13	43
266	MANUFACTURE OF IRRADIATION, ELECTROMEDICAL AND ELECTROTHERAPEUTIC EQUIPMENT	188,95	9	0,3	0,3	0,21	0,18	0,18	50
309	MANUFACTURE OF TRANSPORT EQUIPMENT N.E.C.	24,54	6	0	0,11	0,67	0,4	0,36	64
279	MANUFACTURE OF OTHER ELECTRICAL EQUIPMENT	100,38	18	0,31	0,31	0,39	0,4	1,21	131
261	MANUFACTURE OF ELECTRONIC COMPONENTS AND BOARDS	10,25	4	0	0	0	1,46	1,3	92
203	MANUFACTURE OF PAINTS, VARNISHES AND SIMILAR COATINGS, PRINTING INK AND MASTICS	105,45	23	0,16	0,36	0,66	0,73	0,85	113
255	FORGING, PRESSING, STAMPING AND ROLL-FORMING OF METAL; POWDER METALLURGY	39,28	3	0	0	0	1,57	1,39	59
491	PASSENGER RAIL TRANSPORT, INTERURBAN	495,16	11	0,88	0,78	0,64	0,52	0,46	152
856	EDUCATIONAL SUPPORT ACTIVITIES	30,84	24	0,55	0,7	0,84	0,56	0,9	157

Source: Compiled by the authors

3.4 Regional dynamics of spatial concentration

Agglomeration patterns in single macro-regions seem quite different from national ones. Indeed - whereas percentage changes in agglomeration[100] between 2007 and 2012 in Italy as a whole hovered around zero – only Sicily and Sardinia have seen marginal changes during the same temporal frame, with the Center-South and, especially, the North showing strong patterns of agglomeration.

This is even more contrasting with our initial observation of raw absolute figures (which instead showed a slight – but general tendency towards dispersion) in accordance with Cainelli, Ganau & Jiang (2020, p. 443), who found that <<*Italian manufacturing sectors experienced a process of space-time dispersion during the period of the Great Recession, although with slightly different intensity and patterns*>>.

Table 71 *– Descriptive statistics for percentage changes in Northern Italy's M between 2007 and 2012*

	Obs	Mean	Std. Dev.	Min	Max
M (5 minutes)	234	25,70	69,94	-100,00	2703,03
M (10 minutes)	234	28,05	78,16	-80,00	3208,30
M (15 minutes)	234	30,08	86,32	-67,22	4218,23
M (20 minutes)	234	31,64	90,93	-67,55	4111,73
M (30 minutes)	234	33,73	99,68	-66,57	4773,96

Source: Compiled by the authors

Table 72 *– Descriptive statistics for percentage changes in Central-Southern Italy's M between 2007 and 2012*

	Obs	Mean	Std. Dev.	Min	Max
M (5 minutes)	227	13,66	118,42	-100	2858,33
M (10 minutes)	227	8,76	99,07	-100	2298,80
M (15 minutes)	227	5,14	43,37	-100	760,44
M (20 minutes)	227	5,92	41,45	-100	707,50
M (30 minutes)	227	4,74	31,08	-100	559,09

Source: Compiled by the authors

Table 73 *– Descriptive statistics for percentage changes in Sicily's M between 2007 and 2012*

	Obs	Mean	Std. Dev.	Min	Max
M (5 minutes)	196	1,51	22,63	-100	1496,81
M (10 minutes)	196	1,24	20,96	-100	1447,45
M (15 minutes)	196	1,04	13,85	-100	469,84
M (20 minutes)	196	0,63	12,39	-100	261,70
M (30 minutes)	196	0,34	9,98	-67,59	211,96

Source: Compiled by the authors

Table 74 *– Descriptive statistics for percentage changes in M in Sardinia between 2007 and 2012*

	Obs	Mean	Std. Dev.	Min	Max
M (5 minutes)	174	2,75	32,82	-100	555,98
M (10 minutes)	174	1,62	29,38	-100	472,68
M (15 minutes)	174	0,66	21,52	-100	202,01
M (20 minutes)	174	0,67	17,98	-100	151,79
M (30 minutes)	174	0,44	14,80	-100	129,25

Source: Compiled by the authors

Such an increase was clearly driven by widespread agglomerating trends in Manufacturing industries in every macro-region, even those – Sicily and Sardinia – where the overall increase was marginal. This observation strongly contrasts with findings by Behrens & Bougna (2015, p. 48) that <<*manufacturing industries become less geographically concentrated in Canada*>>, and more consistent with Brakman, Garretsen & Zhao (2017) who instead report increased agglomeration in China between 2002 and 2008.

[100] With each industry weighted by the number of its plants.

Table 75 *– Descriptive statistics for percentage changes in Manufacturing industries in Northern Italy's M between 2007 and 2012*

	Obs	Mean	Std. Dev.	Min	Max
M (5 minutes)	92	29,37	73,10	-100	2703,03
M (10 minutes)	92	33,84	86,43	-80,00	3208,30
M (15 minutes)	92	37,82	108,70	-66,17	4218,23
M (20 minutes)	92	41,91	111,24	-67,33	4111,73
M (30 minutes)	92	50,59	141,25	-55,88	4773,96

Source: Compiled by the authors

Table 76 *- Descriptive statistics for percentage changes in Manufacturing industries in Central-Southern Italy's M between 2007 and 2012*

	Obs	Mean	Std. Dev.	Min	Max
M (5 minutes)	90	12,33	55,26	-100	567,02
M (10 minutes)	90	7,05	61,51	-100	959,18
M (15 minutes)	90	7,34	42,12	-100	565,79
M (20 minutes)	90	8,24	41,75	-100	605,26
M (30 minutes)	90	7,11	35,54	-100	559,09

Source: Compiled by the authors

Table 77 *– Descriptive statistics for percentage changes in Manufacturing industries in Sicily's M between 2007 and 2012*

	Obs	Mean	Std. Dev.	Min	Max
M (5 minutes)	70	11,79	60,17	-99,75	1496,81
M (10 minutes)	70	10,46	55,25	-98,99	1447,45
M (15 minutes)	70	6,18	25,59	-96,54	469,84
M (20 minutes)	70	4,02	16,76	-91,67	219,83
M (30 minutes)	70	2,30	11,95	-67,59	134,78

Source: Compiled by the authors

Table 78 *– Descriptive statistics for percentage changes in Manufacturing industries in Sardinia's M between 2007 and 2012*

	Obs	Mean	Std. Dev.	Min	Max
M (5 minutes)	56	7,47	60,27	-100	555,98
M (10 minutes)	56	8,56	53,24	-100	472,68
M (15 minutes)	56	2,31	34,00	-100	202,01
M (20 minutes)	56	3,33	24,81	-100	151,79
M (30 minutes)	56	3,22	17,56	-100	129,25

Source: Compiled by the authors

Results are somehow more mixed when shifting the focus on Service industries: whereas the trend towards agglomeration is still present and similarly intensive in the North and in the Center-South, it disappears in Sicily and Sardinia, where services are rather dispersing – albeit only slightly so.

Table 79 *– Descriptive statistics for percentage changes in Service industries in Northern Italy's M between 2007 and 2012*

	Obs	Mean	Std. Dev.	Min	Max
M (5 minutes)	120	23,69	57,48	-43,45	1317,95
M (10 minutes)	120	25,48	62,51	-51,79	1645,28
M (15 minutes)	120	27,20	68,02	-42,80	1934,92
M (20 minutes)	120	28,42	74,04	-41,00	2804,55
M (30 minutes)	120	29,52	78,85	-37,48	2124,19

Source: Compiled by the authors

Table 80 *– Descriptive statistics for percentage changes in Service industries in Central-Southern Italy's M between 2007 and 2012*

	Obs	Mean	Std. Dev.	Min	Max
M (5 minutes)	115	11,06	61,05	-74,85	564,85
M (10 minutes)	115	7,31	45,74	-76,91	430,37
M (15 minutes)	115	2,78	23,26	-66,06	177,78
M (20 minutes)	115	2,68	20,28	-58,27	157,76
M (30 minutes)	115	3,17	13,55	-51,14	133,63

Source: Compiled by the authors

Table 81 *– Descriptive statistics for percentage changes in Service industries in Sicily's M between 2007 and 2012*

	Obs	Mean	Std. Dev.	Min	Max
M (5 minutes)	107	-0,51	14,06	-100	301,01
M (10 minutes)	107	-0,49	13,25	-100	270,97
M (15 minutes)	107	-0,10	12,11	-100	243,89
M (20 minutes)	107	-0,27	11,86	-100	261,70
M (30 minutes)	107	-0,13	10,07	-49,68	211,96

Source: Compiled by the authors

Table 82 *– Descriptive statistics for percentage changes in Service industries in Sardinia's M between 2007 and 2012*

	Obs	Mean	Std. Dev.	Min	Max
M (5 minutes)	100	0,48	18,53	-88,61	99,19
M (10 minutes)	100	-1,37	15,86	-89,74	100,81
M (15 minutes)	100	-0,82	15,48	-96,05	93,75
M (20 minutes)	100	-0,89	14,66	-85,06	87,39
M (30 minutes)	100	-0,81	13,32	-83,01	82,20

Source: Compiled by the authors

Looking at the change in single industries, it seems like Northern Italy has undergone different paths than the country as a whole. Indeed, whereas the change in the number of employees and plants in each industry shows a remarkably strong correlation between the two areas[101], correlation between M change in the North and M change country-wide amounts to slightly less than 0,2 when industries are weighted. On the other hand, agglomeration change in the Central-Southern part of Italy seems to be decently correlated with agglomeration change in the entire country. Indeed, not only the change in the number of employees and plants shows the same remarkably strong correlation with national figures that was found in the North - around 0,9 when industries are weighted by their number of employees – but also correlation between M change in Central-Southern Italy and M change in the entire country hovers around 0,7-0,8. Sicily shows similarly high correlation as regards the change in employees and plants, but correlation between M change in single industries with national figures oscillates between 0,45 and 0,75 when industries are weighted by the number of plants they consist of. Finally, Sardinia still shows the same high correlation with national results for employees and plants, and a correlation between 0,3 and 0,5 for M change in single industries.

Observing the single industries that showed most agglomeration confirms what emerged from correlations described above: change in agglomeration in Northern Italy followed different paths than the rest of the country, with some of the industries that dispersed the most nationally ranking as the most agglomerating in this part of Italy. Here are some interesting cases:

- *Manufacture of consumer electronics (264)* suffered a huge downsizing in terms of employees (plants remained stable), but it was almost entirely concentrated in the North of the country, thus having an immense impact on agglomeration, whereas the rest of the country saw a dispersing trend.
- *Educational support activities (856)* underwent an opposite trend, but with similar effects on agglomeration, which largely increased: in this case, the industry was almost entirely concentrated in the North in 2007, and – although the size increase was remarkable in this macro-region as well – it comparatively increased more in other parts of the country. However, the growth was very different and, whereas it produced agglomeration in the North, the effect for Italy was generally a dispersing one.
- Another interesting case yet is represented by *Sewerage (370)* and *Veterinary activities (750)*. Both industries remained pretty stable both in the North and in the entire country, in terms of both employees and plants: however, Northern Italy saw a spike in agglomeration, whereas activities nationally showed a relevant pattern of dispersion.

[101] Both figures are well over 0,9 both with a simple correlation and with a weighted one, where every industry is weighted by the number of plants it consists of.

Table 83 – *20 industries with the largest % increase in agglomeration in Northern Italy between 2007 and 2012.*

Industry code	Industry description	Employees	Plants	M (5 minutes)	M (10 minutes)	M (15 minutes)	M (20 minutes)	M (30 minutes)	National rank
264	MANUFACTURE OF CONSUMER ELECTRONICS	-27,16	-0,65	2703,03	3208,30	4218,23	4111,73	4773,96	203
582	SOFTWARE PUBLISHING	-50,65	-1,16	1317,95	1645,28	1691,56	1808,33	2124,19	194
856	EDUCATIONAL SUPPORT ACTIVITIES	133,12	827,14	686,83	941,08	1934,92	2804,55	1580,26	230
910	LIBRARIES, ARCHIVES, MUSEUMS AND OTHER CULTURAL ACTIVITIES	29,33	-7,16	1156,07	1245,34	1448,91	1810,91	1921,36	220
235	MANUFACTURE OF CEMENT, LIME AND PLASTER	-20,30	-20,53	1127,67	1004,57	1102,63	1441,38	2140,00	14
642	ACTIVITIES OF HOLDING COMPANIES	-56,96	849,32	815,36	847,58	1148,53	1322,47	1601,35	227
601	RADIO BROADCASTING	-23,38	-21,25	575,61	845,64	1048,73	1223,53	1435,34	102
411	PROJECT MANAGEMENT ACTIVITIES RELATED TO CONSTRUCTION	-81,28	-76,21	747,30	841,67	891,94	909,92	941,03	128
592	SOUND RECORDING AND MUSIC PUBLISHING ACTIVITIES	-5,13	33,20	593,19	650,93	766,85	813,14	913,46	209
639	OTHER INFORMATION SERVICE ACTIVITIES	75,33	45,13	572,85	634,06	638,97	637,04	678,74	34
722	RESEARCH AND EXPERIMENTAL DEVELOPMENT ON SOCIAL SCIENCES AND HUMANITIES	0,56	-19,07	512,57	545,81	649,67	692,91	760,16	45
772	RENTING AND LEASING OF PERSONAL AND HOUSEHOLD GOODS	-34,99	-34,79	574,83	573,97	569,93	550,35	588,80	5
262	MANUFACTURE OF COMPUTERS AND PERIPHERAL EQUIPMENT	-38,06	-48,95	338,75	516,60	501,57	538,89	790,00	18
803	INVESTIGATION ACTIVITIES	27,65	1,42	438,19	456,30	468,46	512,50	531,90	86
370	SEWERAGE	-4,72	1,05	397,89	473,55	489,66	503,54	519,09	204
322	MANUFACTURE OF MUSICAL INSTRUMENTS	-1,53	2,98	207,63	260,57	317,74	412,49	1167,25	87
750	VETERINARY ACTIVITIES	7,59	3,37	421,31	454,39	466,67	470,91	483,18	180
109	MANUFACTURE OF PREPARED ANIMAL FEEDS	-40,33	-26,54	309,89	338,34	361,00	463,41	646,32	52
192	MANUFACTURE OF REFINED PETROLEUM PRODUCTS	0,68	0,43	161,89	252,59	434,03	420,98	455,73	17
422	CONSTRUCTION OF UTILITY PROJECTS	33,92	132,89	102,72	343,70	423,66	412,09	419,75	184

Source: Compiled by the authors

Whereas dispersion patterns do not seem to differ as much as agglomerating trends do, there are still some remarkable cases to highlight, even when leaving aside smaller industries such as *Security systems service activities (802)* and *Reinsurance (652)*. An interesting example is constituted by *Manufacture of steam generators, except central heating hot water boilers (253)*, whose decrease in employees and plants, percentagewise, was similar in Italy and in its northern macro-region. However, the industry shrinkage between 2007 and 2012 produced different geographic patterns: nationally, the industry was among those that saw the most agglomeration during that timeframe, whereas in the North it was in the top 10 of the most dispersing industries.

Table 84 – *20 industries with the largest % decrease in agglomeration in Northern Italy between 2007 and 2012*

Industry code	Industry description	Employees	Plants	M (5 minutes)	M (10 minutes)	M (15 minutes)	M (20 minutes)	M (30 minutes)	National rank
268	MANUFACTURE OF MAGNETIC AND OPTICAL MEDIA	-82,29	-51,85	-100,00	-80,00	-66,17	-67,33	-55,88	234
91	SUPPORT ACTIVITIES FOR PETROLEUM AND NATURAL GAS EXTRACTION	46,04	62,50	-70,40	-70,40	-67,22	-67,55	-66,57	232
501	SEA AND COASTAL WATER TRANSPORT	86,61	14,77	-32,80	-51,79	-40,91	-41,00	-37,48	214
325	MANUFACTURE OF MEDICAL AND DENTAL INSTRUMENTS AND SUPPLIES	-9,77	3,76	-25,34	-26,82	-25,31	-22,87	-19,22	228
253	MANUFACTURE OF STEAM GENERATORS, EXCEPT CENTRAL HEATING HOT WATER BOILERS	-21,00	-22,30	-28,89	-26,88	-25,40	-8,94	-14,07	29
232	MANUFACTURE OF REFRACTORY PRODUCTS	-4,69	0,88	-9,61	-6,09	-27,76	-21,05	-15,74	221
360	WATER COLLECTION, TREATMENT AND SUPPLY	-3,04	-8,63	-21,39	-18,31	-16,91	-14,39	-7,46	92
552	OTHER SHORT TERM ACCOMODATION ACTIVITIES	16,41	19,21	-15,14	-12,40	-11,88	-15,16	-14,79	224
254	MANUFACTURE OF WEAPONS AND AMMUNITION	-10,02	1,37	-8,41	-5,12	-11,09	-12,76	-31,00	207
182	REPRODUCTION OF RECORDED MEDIA	-7,74	-22,64	-18,30	-10,53	-12,50	-15,05	-7,65	43
324	MANUFACTURE OF GAMES AND TOYS	-23,78	-21,99	-8,33	-15,98	-12,43	-9,29	-8,13	101
932	OTHER AMUSEMENT AND RECREATION ACTIVITIES	-7,59	5,38	-14,41	-13,99	-12,11	-3,14	0,36	222
502	INLAND WATER TRANSPORT	-16,26	-6,36	-8,60	-6,93	-6,43	-7,45	-13,80	60
353	STEAM AND AIR CONDITIONING SUPPLY	66,10	74,80	-19,61	-15,14	-21,12	10,86	16,25	48
861	HOSPITAL ACTIVITIES	17,12	-7,15	-15,14	-8,15	0,00	-2,70	-2,78	165
889	OTHER SOCIAL WORK ACTIVITIES WITHOUT ACCOMODATION	297,90	301,83	-4,58	-8,44	-2,88	-0,74	-1,50	213
602	TELEVISION PROGRAMMING AND BROADCASTING ACTIVITIES	23,05	1,53	4,07	1,04	-8,10	-7,28	-6,92	212
263	MANUFACTURE OF COMMUNICATION EQUIPMENT	-17,35	-17,54	-13,00	6,92	4,64	-6,41	-5,71	166
612	WIRELESS TELECOMMUNICATIONS ACTIVITIES	6,31	24,71	-4,30	-6,60	-8,61	-0,73	11,80	130
782	TEMPORARY EMPLOYMENT AGENCY ACTIVITIES	-22,08	2,07	-15,86	-5,08	2,80	5,61	7,34	201

Source: Compiled by the authors

Even when focusing on single industries, Central-Southern Italy seems to differ from the North and to be somehow more in line with national results. Leaving aside really small industries, the only notable exception among those that have showed the highest increase in agglomeration in Central-Southern Italy, but not nationally, is *Educational support activities (856).* This industry shows a different pattern locally than it did nationally, just like we observed in the North, where the industry was almost entirely concentrated as of 2007, before undergoing significant growth both there and, even more so, in the rest of the country. Such a tremendous growth produced contemporarily significant agglomeration in the North and in the Center-South of Italy, but even stronger dispersion elsewhere.

Table 85 – *20 industries with the largest % increase in agglomeration in Central-Southern Italy between 2007 and 2012*

Industry code	Industry description	Employees	Plants	M (5 minutes)	M (10 minutes)	M (15 minutes)	M (20 minutes)	M (30 minutes)	National rank
62	EXTRACTION OF NATURAL GAS	-35,79	-37,50	2858,33	2298,80	760,44	707,50	444,44	1
272	MANUFACTURE OF BATTERIES AND ACCUMULATORS	16,63	-40,00	567,02	552,92	565,79	605,26	559,09	3
253	MANUFACTURE OF STEAM GENERATORS, EXCEPT CENTRAL HEATING HOT WATER BOILERS	-49,81	-24,24	555,30	959,18	297,62	292,70	183,33	22
291	MANUFACTURE OF MOTOR VEHICLES	-2,72	25,64	505,36	429,12	343,91	368,24	205,05	4
559	OTHER ACCOMODATION	-36,66	19,35	564,85	430,37	177,78	151,79	87,50	7
772	RENTING AND LEASING OF PERSONAL AND HOUSEHOLD GOODS	-28,45	-33,52	211,56	176,98	173,23	157,76	133,63	2
245	CASTING OF IRON AND STEEL	-16,84	-12,21	66,31	81,71	47,83	46,94	30,29	33
854	HIGHER EDUCATION	245,43	606,25	192,86	29,79	18,69	12,39	19,19	11
856	EDUCATIONAL SUPPORT ACTIVITIES	923,72	584,31	136,30	78,52	67,74	11,18	-28,10	223
511	PASSENGER AIR TRANSPORT	23,84	-14,93	59,16	59,02	59,04	59,36	26,09	5
495	TRANSPORT VIA PIPELINE	-20,99	-8,00	-9,82	84,38	73,23	67,68	41,05	6
324	MANUFACTURE OF GAMES AND TOYS	-26,13	-24,87	152,66	15,48	9,90	39,30	21,25	94
161	SAWMILLING AND PLANING OF WOOD	-13,05	-22,47	64,51	50,41	44,29	40,66	18,00	72
274	MANUFACTURE OF ELECTRIC LIGHTING EQUIPMENT	-16,85	-19,37	49,78	71,92	41,70	28,21	16,28	55
353	STEAM AND AIR CONDITIONING SUPPLY	13,93	87,50	30,95	75,90	28,57	38,64	21,69	41
235	MANUFACTURE OF CEMENT, LIME AND PLASTER	-15,76	-14,98	71,03	44,14	33,07	32,12	13,04	9
254	MANUFACTURE OF WEAPONS AND AMMUNITION	-21,59	10,64	33,19	26,62	25,51	48,75	39,33	200
221	MANUFACTURE OF RUBBER PRODUCTS	-14,91	1,69	3,42	11,58	48,41	54,30	55,45	47
182	REPRODUCTION OF RECORDED MEDIA	-9,80	-28,49	74,53	26,47	26,96	6,87	22,56	36
233	MANUFACTURE OF CLAY BUILDING MATERIALS	-37,36	-23,63	56,17	28,32	32,60	16,71	15,55	43

Source: Compiled by the authors

In the lowest ranks, among industries that have shown the strongest dispersing trends in Central Southern Italy, the only ones that have gone on an opposite direction in respect to national trends, are actually pretty small industries. The only relevant difference in respect to the entire country is represented by *Manufacture of optical instruments and photographic equipment (267)*, an industry that has undergone significant agglomeration nationally during the same time frame.

Table 86 – *20 industries with the largest % decrease in agglomeration in Central-Southern Italy between 2007 and 2012*

Industry code	Industry description	Employees	Plants	M (5 minutes)	M (10 minutes)	M (15 minutes)	M (20 minutes)	M (30 minutes)	National rank
268	MANUFACTURE OF MAGNETIC AND OPTICAL MEDIA	-92,57	-63,64	-100,00	-100,00	-100,00	-100,00	-100,00	227
872	RESIDENTIAL CARE ACTIVITIES FOR MENTAL RETARDATION, MENTAL HEALTH AND SUBSTANCE ABUSE	307,67	297,22	-74,85	-76,91	-66,06	-58,27	-51,14	226
91	SUPPORT ACTIVITIES FOR PETROLEUM AND NATURAL GAS EXTRACTION	74,16	77,78	-69,80	-71,12	-61,99	-62,33	-55,35	225
267	MANUFACTURE OF OPTICAL INSTRUMENTS AND PHOTOGRAPHIC EQUIPMENT	-16,00	6,90	-62,72	-71,34	-62,07	-39,57	7,48	8
390	REMEDIATION ACTIVITIES AND OTHER WASTE MANAGEMENT SERVICES	89,37	70,47	-56,42	-40,23	-34,35	-37,99	-29,71	224
201	MANUFACTURE OF BASIC CHEMICALS, FERTILIZERS AND NITROGEN COMPOUNDS, PLASTICS AND SYNTHETIC RUBBER IN PRIMARY FORMS	-17,61	-16,09	-50,59	-51,99	-28,05	-18,56	-16,34	186
292	MANUFACTURE OF BODIES (COACHWORK) FOR MOTOR VEHICLES; MANUFACTURE OF TRAILERS AND SEMI-TRAILERS	-30,19	8,83	-33,06	-37,64	-22,09	-32,20	-37,21	203
642	ACTIVITIES OF HOLDING COMPANIES	-80,83	798,06	-21,52	-28,05	-29,36	-31,63	-37,62	220
243	CASTING OF SEMI-FINISHED STEEL PRODUCTS	-1,71	-6,71	-21,39	-36,70	-33,09	-11,28	-8,19	181
773	RENTING AND LEASING OF OTHER MACHINERY, EQUIPMENT AND TANGIBLE GOODS	9,88	2,69	-19,77	-19,88	-19,88	-20,00	-19,75	216
663	FUND MANAGEMENT ACTIVITIES	-25,10	13,33	-17,58	-18,22	-18,62	-19,54	-19,85	44
370	SEWERAGE	0,95	2,86	-21,48	-18,34	-23,89	-13,82	-15,60	197
273	MANUFACTURE OF WIRING AND WIRING DEVICES	-17,43	-28,06	-1,19	-18,43	-19,24	-24,51	-27,73	193
592	SOUND RECORDING AND MUSIC PUBLISHING ACTIVITIES	2,58	31,34	-19,49	-19,91	-18,52	-16,34	-12,71	202
552	OTHER SHORT TERM ACCOMODATION ACTIVITIES	26,96	53,96	-16,79	-16,07	-16,15	-15,70	-17,20	217
329	OTHER MANUFACTURING N.E.C.	7,31	4,57	-26,02	-20,18	-17,89	-8,54	-8,84	198
649	OTHER FINANCIAL SERVICE ACTIVITIES, EXCEPT INSURANCE AND PENSION FUNDING ACTIVITIES	9,36	-7,47	-14,29	-15,15	-15,71	-17,68	-16,67	212
851	PRE-PRIMARY EDUCATION	7,47	-1,83	-13,17	-18,44	-14,81	-14,50	-16,84	211
261	MANUFACTURE OF ELECTRONIC COMPONENTS AND BOARDS	-15,37	-10,71	-16,42	-13,33	-14,10	-16,35	-16,42	142
813	LANDSCAPE CARE AND MAINTENANCE SERVICE ACTIVITIES	239,81	159,32	-15,89	-16,67	-14,86	-9,80	-11,03	175

Source: Compiled by the authors

As per the correlation observed above, Sicily is somehow in the middle between Northern Italy and the Center-South, as regards similarity in agglomeration change to the entire country. Most industries that most agglomerated between 2007 and 2012 have followed the same trend nationally, but some of them are actually among those that have dispersed the most when considering the country as a whole. Among them, we could find both shrinking industries – *Sound recording and music publishing activities (592)* – and growing industries – *Activities of employment placement agencies (781)*.

Table 87 – *20 industries with the largest % increase in agglomeration in Sicily between 2007 and 2012*

Industry code	Industry description	Employees	Plants	M (5 minutes)	M (10 minutes)	M (15 minutes)	M (20 minutes)	M (30 minutes)	National rank
255	FORGING, PRESSING, STAMPING AND ROLL-FORMING OF METAL; POWDER METALLURGY	-20,47	-31,82	1496,81	1447,45	469,84	219,83	134,78	11
143	MANUFACTURE OF KNITTED AND CROCHETED APPAREL	-9,15	0,00	719,44	789,86	100,86	-63,32	-63,14	24
772	RENTING AND LEASING OF PERSONAL AND HOUSEHOLD GOODS	-33,55	-31,00	247,95	248,85	243,89	244,09	211,96	1
205	MANUFACTURE OF OTHER CHEMICAL PRODUCTS N.E.C.	-79,19	-22,39	440,24	232,28	238,04	151,88	103,31	14
592	SOUND RECORDING AND MUSIC PUBLISHING ACTIVITIES	-58,87	-33,33	270,97	270,97	193,44	261,70	29,63	179
781	ACTIVITES OF EMPLOYMENT PLACEMENT AGENCIES	206,70	43,75	301,01	241,74	183,93	168,54	124,74	178
212	MANUFACTURE OF MEDICINAL CHEMICAL AND BOTANICAL PRODUCTS	296,46	-28,57	491,57	188,29	97,44	55,07	65,77	54
283	MANUFACTURE OF AGRICULTURAL AND FORESTRY MACHINERY	-29,20	-5,45	148,17	186,14	219,71	136,36	86,81	166
263	MANUFACTURE OF COMMUNICATION EQUIPMENT	-9,95	3,13	227,12	475,56	63,64	-1,63	-1,56	140
879	OTHER RESIDENTIAL CARE ACTIVITIES	1814,99	840,00	297,06	117,60	84,16	106,90	61,70	22
182	REPRODUCTION OF RECORDED MEDIA	-41,01	-15,79	343,10	126,92	94,32	-0,89	8,82	26
411	PROJECT MANAGEMENT ACTIVITIES RELATED TO CONSTRUCTION	-58,11	-45,33	12,77	119,79	150,00	152,83	117,78	103
382	WASTE TREATMENT AND DISPOSAL	71,41	-1,85	28,57	97,69	70,90	142,31	62,24	7
161	SAWMILLING AND PLANING OF WOOD	-36,38	-37,41	134,48	110,42	49,60	28,46	6,60	55
257	MANUFACTURE OF CUTLERY, HAND TOOLS AND GENERAL HARDWARE	-8,44	0,00	-2,29	186,88	93,27	67,06	-16,67	138
241	MANUFACTURE OF BASIC IRON AND STEEL	-16,66	-40,43	-9,59	37,33	174,53	72,66	12,41	10
852	PRIMARY EDUCATION	-14,48	5,56	42,65	160,68	56,83	-13,93	7,09	95
732	MARKET RESEARCH AND PUBLIC OPINION POLLING	18,25	-34,46	90,83	83,93	20,91	11,93	0,00	39
501	SEA AND COASTAL WATER TRANSPORT	-2,68	27,69	36,13	33,96	28,20	50,00	47,37	183
771	RENTING AND LEASING OF MOTOR VEHICLES	-3,13	8,76	63,13	58,12	39,77	11,59	12,74	102

Source: Compiled by the authors

On the other hand, among those industries that have dispersed the most in Sicily, there are many that were actually among the most agglomerating nationally during the same time period: namely,

Passenger air transport (511), *Other accommodation (559)* and *Manufacture of cement, lime and plaster (235)* were all among the five most agglomerating industries nation-wide.

Table 88 – *20 industries with the largest % decrease in agglomeration in Sicily between 2007 and 2012*

Industry code	Industry description	Employees	Plants	M (5 minutes)	M (10 minutes)	M (15 minutes)	M (20 minutes)	M (30 minutes)	National rank
323	MANUFACTURE OF SPORTS GOODS	-49,18	-40,00	-75,72	-96,30	-96,54	-91,67	-67,59	194
324	MANUFACTURE OF GAMES AND TOYS	-29,54	10,00	-99,75	-98,99	-89,73	-86,31	-51,57	76
582	SOFTWARE PUBLISHING	-35,02	-79,31	-100,00	-100,00	-100,00	-100,00	-23,97	168
559	OTHER ACCOMODATION	-44,61	-35,29	-71,93	-78,33	-74,43	-52,38	-49,68	3
221	MANUFACTURE OF RUBBER PRODUCTS	-28,24	-3,13	-64,39	-64,15	-45,86	-42,60	-47,85	33
301	BUILDING OF SHIPS AND BOATS	-34,45	-34,75	-50,41	-53,04	-43,45	-45,34	-27,83	60
722	RESEARCH AND EXPERIMENTAL DEVELOPMENT ON SOCIAL SCIENCES AND HUMANITIES	-69,56	-3,39	-67,10	-48,57	-51,23	-30,06	-8,06	28
773	RENTING AND LEASING OF OTHER MACHINERY, EQUIPMENT AND TANGIBLE GOODS	24,24	-2,08	-29,68	-34,41	-34,27	-35,21	-35,21	191
293	MANUFACTURE OF PARTS AND ACCESSORIES FOR MOTOR VEHICLES	-30,83	-23,81	-41,46	-48,34	-49,91	-51,33	42,50	83
813	LANDSCAPE CARE AND MAINTENANCE SERVICE ACTIVITIES	269,34	169,54	-31,84	-46,48	-29,90	-15,83	-16,30	156
782	TEMPORARY EMPLOYMENT AGENCY ACTIVITIES	-41,04	8,16	-27,59	-25,43	-21,88	-31,33	-31,17	174
89	MINING AND QUARRYING N.E.C.	-23,67	-21,05	-20,71	-8,21	-39,88	-32,40	-26,74	49
239	MANUFACTURE OF OTHER NON-METALLIC MINERAL PRODUCTS N.E.C.	9,16	0,00	-38,64	-7,56	-30,89	-36,67	-13,39	151
235	MANUFACTURE OF CEMENT, LIME AND PLASTER	-24,68	-15,38	-41,18	-26,23	-50,87	-4,35	0,93	4
553	CAMPING GROUNDS, RECREATIONAL VEHICLE PARKS AND TRAILER PARKS	-21,70	-5,49	-38,11	-21,17	-15,72	-25,14	-20,25	149
511	PASSENGER AIR TRANSPORT	27,00	-53,85	-30,27	-27,11	-26,67	-15,60	-15,51	2
360	WATER COLLECTION, TREATMENT AND SUPPLY	24,98	13,01	-23,29	-30,82	-17,65	-20,16	-15,04	67
244	MANUFACTURE OF BASIC PRECIOUS AND OTHER NON-FERROUS METALS; REPROCESSING OF NUCLEAR FUELS	-18,82	46,88	-30,14	-25,71	2,70	-23,40	-29,46	184
601	RADIO BROADCASTING	-35,50	-16,24	-38,07	-36,31	-24,03	-2,75	2,88	77
102	PROCESSING AND PRESERVING OF FISH, CRUSTACEANS AND MOLLUSCS	-12,34	-12,03	-15,85	-16,09	-11,70	-22,28	-23,45	165

Source: Compiled by the authors

Sardinia, in a similar way to Sicily, seems to have followed agglomerating trends quite reminiscent of national ones, although some differences are remarkable: chiefly, the most agglomerating industry in Sardinia – *Manufacture of agricultural and forestry machinery (283)* – is among the most dispersing nationally, and the same is true not only for other similarly shrinking industries – such as *Construction of utility projects (422)* and *Processing and preserving of meat (101)* – but also for strongly growing ones, as is the case of *Landscape care and maintenance service activities (142).*

Table 89 – *20 industries with the largest % increase in agglomeration in Sardinia between 2007 and 2012*

Industry code	Industry description	Employees	Plants	M (5 minutes)	M (10 minutes)	M (15 minutes)	M (20 minutes)	M (30 minutes)	National rank
283	MANUFACTURE OF AGRICULTURAL AND FORESTRY MACHINERY	-68,99	-47,62	555,98	472,68	167,00	151,79	129,25	151
132	WEAVING OF TEXTILES	-67,55	-18,92	159,23	213,70	202,01	67,09	23,10	16
192	MANUFACTURE OF REFINED PETROLEUM PRODUCTS	2,58	14,81	111,93	123,22	115,78	111,79	34,62	3
772	RENTING AND LEASING OF PERSONAL AND HOUSEHOLD GOODS	-27,60	-17,17	99,19	100,81	93,75	87,39	82,20	1
256	TREATMENT AND COATING OF METALS; MACHINING	-40,19	-49,21	168,28	173,10	85,99	15,50	6,67	14
151	TANNING AND DRESSING OF LEATHER; MANUFACTURE OF LUGGAGE; HANDBAGS; SADDLERY AND HARNESS; DRESSING AND DYEING OF FUR	-56,28	-40,00	92,95	84,33	89,88	78,38	61,67	76
152	MANUFACTURE OF FOOTWEAR	-21,63	15,00	130,26	157,35	94,38	-14,81	39,29	29
143	MANUFACTURE OF KNITTED AND CROCHETED APPAREL	-38,88	-23,53	-84,32	113,17	143,62	107,18	113,82	19
324	MANUFACTURE OF GAMES AND TOYS	-75,47	-43,75	489,47	-44,78	-9,70	-35,27	-29,38	66
274	MANUFACTURE OF ELECTRIC LIGHTING EQUIPMENT	-8,68	-26,32	100,88	42,64	126,02	58,62	24,19	32
109	MANUFACTURE OF PREPARED ANIMAL FEEDS	-48,13	-34,29	52,81	171,15	22,08	52,46	26,43	25
803	INVESTIGATION ACTIVITIES	140,78	65,00	40,20	50,58	45,57	44,52	66,95	52
429	CONSTRUCTION OF OTHER CIVIL ENGINGEERING PROJECTS	2,11	-3,55	68,38	81,08	49,55	31,13	15,38	15
422	CONSTRUCTION OF UTILITY PROJECTS	-37,92	-57,89	62,14	109,40	39,85	32,80	-5,47	144
262	MANUFACTURE OF COMPUTERS AND PERIPHERAL EQUIPMENT	-61,62	-52,83	38,17	59,62	50,00	35,66	34,65	4
813	LANDSCAPE CARE AND MAINTENANCE SERVICE ACTIVITIES	170,29	222,73	47,48	40,91	30,43	40,57	33,98	142
351	ELECTRIC POWER GENERATION, TRANSMISSION AND DISTRIBUTION	-6,54	88,54	54,74	47,06	49,32	27,06	3,92	40
101	PROCESSING AND PRESERVING OF MEAT	-17,83	-4,35	33,60	52,08	20,63	38,89	28,13	156
108	MANUFACTURE OF OTHER FOOD PRODUCTS	-14,04	-19,39	36,12	49,82	28,11	33,50	21,92	30
233	MANUFACTURE OF CLAY BUILDING MATERIALS	1,04	27,78	146,67	45,41	-19,14	-8,87	2,46	24

Source: Compiled by the authors

Among the most dispersing industries in Sardinia, on the other hand, many are actually agglomerating nationally: the most striking example is *Other accommodation (559),* which comes

second both as for the most dispersing in Sardinia and for the most agglomerating in the entire country.

Table 90 – *20 industries with the largest % decrease in agglomeration in Sardinia between 2007 and 2012*

Industry code	Industry description	Employees	Plants	M (5 minutes)	M (10 minutes)	M (15 minutes)	M (20 minutes)	M (30 minutes)	National rank
212	MANUFACTURE OF MEDICINAL CHEMICAL AND BOTANICAL PRODUCTS	-96,23	-81,25	-100,00	-100,00	-100,00	-100,00	-100,00	46
559	OTHER ACCOMODATION	-73,05	-34,78	-88,61	-89,74	-96,05	-85,06	-83,01	2
871	RESIDENTIAL NURSING CARE FACILITIES	-2,32	-51,47	-63,03	-60,38	-77,01	-61,88	-62,50	155
89	MINING AND QUARRYING N.E.C.	-12,18	-14,29	-66,94	-30,28	-60,73	-29,46	-51,60	41
491	PASSENGER RAIL TRANSPORT, INTERURBAN	-75,33	-87,50	57,14	-50,00	-71,56	-78,69	-74,73	99
244	MANUFACTURE OF BASIC PRECIOUS AND OTHER NON-FERROUS METALS; REPROCESSING OF NUCLEAR FUELS	-21,82	14,29	-42,26	-42,29	-45,09	-49,45	-28,74	164
139	MANUFACTURE OF OTHER TEXTILES	-27,39	-28,08	-50,41	-53,63	-49,29	-37,44	-7,09	129
203	MANUFACTURE OF PAINTS, VARNISHES AND SIMILAR COATINGS, PRINTING INK AND MASTICS	-35,07	-34,29	-81,40	-52,00	-28,26	-20,65	-12,37	48
411	PROJECT MANAGEMENT ACTIVITIES RELATED TO CONSTRUCTION	-91,47	-65,66	-17,33	-25,00	-39,74	-55,56	-50,22	91
161	SAWMILLING AND PLANING OF WOOD	-50,52	-46,30	-49,06	-50,00	-37,38	-25,00	-21,62	47
257	MANUFACTURE OF CUTLERY, HAND TOOLS AND GENERAL HARDWARE	-8,59	-10,53	-28,25	-27,52	-43,20	-45,08	-38,70	124
532	COURIER ACTIVITIES	49,36	51,43	-33,93	-39,78	-37,65	-37,65	-30,34	104
553	CAMPING GROUNDS, RECREATIONAL VEHICLE PARKS AND TRAILER PARKS	-25,78	-16,67	-33,17	-28,33	-32,30	-29,45	-25,97	135
106	MANUFACTURE OF GRAIN MILL PRODUCTS, STARCHES AND STARCH PRODUCTS	-15,69	-38,78	-52,25	-29,65	-13,24	-34,34	-13,98	17
822	ACTIVITIES OF CALL CENTERS	6,57	-9,73	-43,05	-30,26	-21,86	-18,55	-22,91	38
799	OTHER RESERVATION SERVICE AND RELATED ACTIVITIES	21,53	33,67	-10,03	-38,18	-27,99	-32,91	-16,77	173
172	MANUFACTURE OF CORRUGATED PAPER AND PAPERBOARD AND OF CONTAINERS OF PAPER AND PAPERBOARD	-14,27	-18,18	-17,11	-13,91	-31,65	-30,08	-32,46	128
332	INSTALLATION OF INDUSTRIAL MACHINERY AND EQUIPMENT	-3,02	4,67	-26,05	-34,88	-20,83	-27,34	-12,93	43
81	QUARRYING OF STONE, SAND AND CLAY	-39,78	-38,46	-35,30	-33,14	-16,03	-22,80	-3,70	96
243	CASTING OF SEMI-FINISHED STEEL PRODUCTS	-57,23	-42,86	0,58	-12,69	-33,09	-41,53	-22,63	147

Source: Compiled by the authors

3.5 Determinants of agglomeration: an exploratory analysis

In this section, we reproduce the exploration of possible determinants behind the agglomeration rates we have carried out in the previous chapter, only on a macro-regional basis. The proxies are the same that we had already identified for the previous analysis: mean plant size, industry entry and exit rates, mean firm age, and technological level or knowledge intensity for, respectively, manufacturing and service industries. This allows us to draw comparisons and to explore similarities and differences with findings from other authors.

Finally, we also explore the correlation between said determinants and agglomeration within industries featuring similar levels of technological level or knowledge intensity, in order to verify whether there might be opposite-sign patterns offsetting each other between profoundly different industries.

3.5.1 Economies of scale and competition

In order to understand the impact of economies of scale and competition on agglomeration, several authors have used different measures of plant size as a proxy and have investigated its correlation with spatial distribution patterns: among them, Kim (1995) and Holmes and Stevens (2002), who both reported a positive correlation between plant size and concentration in U.S. manufacturing industries. However, Lafourcade & Mion (2007, p. 47) highlight that although they found <<*strong evidence of a significant positive relationship between plant size and concentration*>> when investigating Italian manufacturing plants, it is small plants that show the higher degree of agglomeration.

In their study of Japanese firms, Nakajima, Saito & Uesugi (2012) show that large plants in service industries tend to be more localized and to have a larger impact, although this is not true for manufacturing. Indeed, when studying Chinese manufacturing firms, Brakman, Garretsen & Zhao (2017, p. 199) reported that <<*large firms are relatively less important for localization than smaller firms. Most location dynamics take place among smaller firms*>>.

In our case, differentiating plants by their size within and throughout industries, would have required an immense amount of computations and time. Thus, our best alternative has been to check whether an industry's mean plant size[102] was in any way correlated with that industry's agglomeration index.

Results are mixed and inconclusive: with the possible exception of Northern Italy, agglomeration in Manufacturing industries seems totally uncorrelated with mean plant size in 2007, with a slight hint of positive correlation (stronger in Sardinia than in other macro-regions) appearing in 2012

[102] The number of employees divided by the number of plants within the same industry.

In Services, Northern Italy's slight positive correlation in 2007 decreases until almost disappearing in 2012; on the other hand, the other macro-regions feature a slight negative correlation in 2007 that reinforces and becomes positive in 2012.

Table 91 – *Weighted correlation between agglomeration and mean plant size by sector in Northern Italy*

	manufacturing		services	
	2007	2012	2007	2012
M (5 minutes)	0,0139	0,0448	0,067	0,0305
M (10 minutes)	0,0233	0,0298	0,0616	0,0236
M (15 minutes)	0,0985	0,1033	0,0579	0,0205
M (20 minutes)	0,0881	0,0905	0,0574	0,018
M (30 minutes)	0,1165	0,0926	0,0648	0,0143

Source: Compiled by the authors

Table 92 *- Weighted correlation between agglomeration and mean plant size by sector in Central-Southern Italy*

	manufacturing		services	
	2007	2012	2007	2012
M (5 minutes)	-0,01	0,07	-0,09	0,21
M (10 minutes)	0,00	0,08	-0,08	0,23
M (15 minutes)	0,01	0,09	-0,08	0,25
M (20 minutes)	0,01	0,09	-0,08	0,26
M (30 minutes)	0,02	0,08	-0,10	0,14

Source: Compiled by the authors

Table 93 – *Weighted correlation between agglomeration and mean plant size by sector in Sicily*

	manufacturing		services	
	2007	2012	2007	2012
M (5 minutes)	-0,01	0,05	-0,10	0,17
M (10 minutes)	0,00	0,04	-0,10	0,17
M (15 minutes)	0,01	0,04	-0,09	0,16
M (20 minutes)	0,01	0,05	-0,09	0,14
M (30 minutes)	0,02	0,10	-0,12	0,11

Source: Compiled by the authors

Table 94 *– Weighted correlation between agglomeration and mean plant size by sector in Sardinia*

	manufacturing		services	
	2007	2012	2007	2012
M (5 minutes)	0,02	0,16	-0,01	0,07
M (10 minutes)	0,02	0,19	-0,02	0,06
M (15 minutes)	0,03	0,31	-0,02	0,10
M (20 minutes)	0,02	0,12	-0,02	0,12
M (30 minutes)	0,02	0,08	-0,02	0,13

Source: Compiled by the authors

3.5.2 Entry rate

Barlet, Briant & Crusson (2013, p. 339), exploring the service industry in France between 1996 and 2005, argue that <<*new plants tend to disperse service industries by locating outside existing clusters*>>. On the other hand, Brakman, Garretsen & Zhao (2017, p. 199) found that <<*new firms […] are more localized than incumbents*>>, but this might be related to China's peculiar situation, especially when accounting for reforms that took place just before the years analyzed by the authors and for the larger number of entrants compared to western economies.

In our case, the national analysis produced results that are quite reminiscent of Barlet, Briant & Crussons (2013)'s, with generally negative correlation for both manufacturing and services.

On the other hand, results at the macro-regional level more inconsistent, with different signs and magnitudes, sometimes disappearing between different years: Central-Southern Italy and Sicily, for example, show a decent negative correlation between entry rate and agglomeration in Services in 2007, but it suddenly and totally disappears in 2012, beside not having any counterpart in Northern Italy and Sardinia, where it already hovers around zero in 2007. Manufacturing, as well, shows quite inconsistent correlation – albeit generally negative – with Sicily being the only one featuring somehow interesting figures, but only in 2012.

Table 95 – *Weighted correlation between agglomeration and entry rate by sector in Northern Italy*

	manufacturing		services	
	2007	2012	2007	2012
M (5 minutes)	-0,03	-0,07	-0,06	0,01
M (10 minutes)	-0,11	-0,06	-0,06	0,02
M (15 minutes)	-0,15	-0,05	-0,05	0,03
M (20 minutes)	-0,14	-0,04	-0,06	0,04
M (30 minutes)	-0,15	-0,04	-0,05	0,06

Source: Compiled by the authors

Table 96 – *Weighted correlation between agglomeration and entry rate by sector in Central-Southern Italy*

	manufacturing		services	
	2007	2012	2007	2012
M (5 minutes)	-0,04	0,06	-0,38	-0,01
M (10 minutes)	-0,03	0,06	-0,36	-0,01
M (15 minutes)	0,01	0,07	-0,35	-0,01
M (20 minutes)	0,05	0,05	-0,33	0,00
M (30 minutes)	0,08	0,07	-0,34	0,02

Source: *Compiled by the authors*

Table 97 – *Weighted correlation between agglomeration and entry rate by sector in Sicily*

	manufacturing		services	
	2007	2012	2007	2012
M (5 minutes)	-0,05	-0,24	-0,27	0,05
M (10 minutes)	-0,09	-0,25	-0,25	0,03
M (15 minutes)	-0,07	-0,26	-0,26	0,02
M (20 minutes)	-0,05	-0,22	-0,26	0,02
M (30 minutes)	-0,09	-0,26	-0,24	0,02

Source: Compiled by the authors

Table 98 – *Weighted correlation between agglomeration and entry rate by sector in Sardinia*

	manufacturing		services	
	2007	2012	2007	2012
M (5 minutes)	-0,04	-0,06	0,00	0,00
M (10 minutes)	0,01	-0,06	-0,02	-0,03
M (15 minutes)	-0,07	-0,04	0,00	-0,02
M (20 minutes)	-0,06	-0,09	-0,06	-0,01
M (30 minutes)	-0,07	-0,11	-0,02	-0,02

Source: Compiled by the authors

3.5.3 Exit rate

Barlet, Briant & Crusson (2013, p. 339) also find that exiting plants tend to increase <<*the localization patterns of most service industries*>>. In our case though, the exit rate shows generally negative correlation with agglomeration results, but figures are even closer to zero and somehow more volatile than for the entry rate. These results are more consistent, but not dissimilar to our findings for the entire country.

National results were generally slightly negative, but macro-regions show different trends. Whereas Manufacturing in 2007 showed a slight negative correlation between agglomeration and exit rate, such a correlation took different paths in 2012: it mostly disappeared in Northern Italy, it reduced in Sardinia, it grew in Sicily, and it became positive in Central-Southern Italy.

Services, as well – despite showing negative correlation everywhere in both years – show different trends.

Table 99 – *Weighted correlation between agglomeration and exit rate by sector in Northern Italy*

	manufacturing		services	
	2007	2012	2007	2012
M (5 minutes)	-0,02	0,05	-0,05	-0,03
M (10 minutes)	-0,10	0,06	-0,05	-0,02
M (15 minutes)	-0,12	0,02	-0,05	-0,01
M (20 minutes)	-0,11	0,02	-0,05	0,01
M (30 minutes)	-0,11	-0,02	-0,05	0,03

Source: Compiled by the authors

Table 100 – *Weighted correlation between agglomeration and exit rate by sector in Central-Southern Italy*

	manufacturing		services	
	2007	2012	2007	2012
M (5 minutes)	-0,06	0,14	-0,23	-0,12
M (10 minutes)	-0,08	0,16	-0,20	-0,11
M (15 minutes)	-0,02	0,17	-0,22	-0,09
M (20 minutes)	-0,01	0,14	-0,22	-0,08
M (30 minutes)	0,02	0,15	-0,18	-0,11

Source: Compiled by the authors

Table 101 – *Weighted correlation between agglomeration and exit rate by sector in Sicily*

	manufacturing		services	
	2007	2012	2007	2012
M (5 minutes)	-0,10	-0,24	-0,11	-0,16
M (10 minutes)	-0,10	-0,17	-0,12	-0,15
M (15 minutes)	-0,12	-0,18	-0,12	-0,11
M (20 minutes)	-0,10	-0,19	-0,11	-0,08
M (30 minutes)	-0,07	-0,24	-0,09	-0,08

Source: Compiled by the authors

Table 102 – *Weighted correlation between agglomeration and exit rate by sector in Sardinia*

	manufacturing		services	
	2007	2012	2007	2012
M (5 minutes)	-0,15	-0,15	-0,10	-0,17
M (10 minutes)	-0,14	-0,12	-0,13	-0,21
M (15 minutes)	-0,14	-0,07	-0,13	-0,23
M (20 minutes)	-0,11	-0,06	-0,15	-0,21
M (30 minutes)	-0,10	-0,04	-0,12	-0,22

Source: Compiled by the authors

3.5.4 Age

Weighted firm age – *the average age of firms in industry x, weighted by the number of employees working in each firm* – shows somehow positive correlation with agglomeration results. This is consistent with Barlet, Briant & Crusson's (2013) considerations about entry rate, as we have reported a few paragraphs above.

Differently from other determinants, age seems more consistently correlated with agglomeration when analyzing single macro-regions rather than the country as a whole: whereas in the latter, results were mixed and quite inconclusive, macro-regions all feature a slightly positive correlation in Manufacturing for both years. Services also feature a slightly positive correlation in Northern and Central-Southern Italy, whereas Sicily shows negative correlation and Sardinia shows no correlation at all.

Table 103 – *Weighted correlation between agglomeration and age by sector in Northern Italy*

	manufacturing		services	
	2007	2012	2007	2012
M (5 minutes)	0,01	0,12	0,09	0,03
M (10 minutes)	0,08	0,11	0,09	0,03
M (15 minutes)	0,17	0,18	0,09	0,03
M (20 minutes)	0,16	0,17	0,09	0,02
M (30 minutes)	0,19	0,17	0,09	0,02

Source: Compiled by the authors

Table 104 – *Weighted correlation between agglomeration and age by sector in Central-Southern Italy*

	manufacturing		services	
	2007	2012	2007	2012
M (5 minutes)	0,16	0,15	0,17	0,03
M (10 minutes)	0,25	0,14	0,17	0,04
M (15 minutes)	0,23	0,11	0,20	0,04
M (20 minutes)	0,21	0,11	0,22	0,05
M (30 minutes)	0,23	0,07	0,09	0,06

Source: Compiled by the authors

Table 105 – *Weighted correlation between agglomeration and age by sector in Sicily*

	manufacturing		services	
	2007	2012	2007	2012
M (5 minutes)	0,06	0,12	-0,09	-0,08
M (10 minutes)	0,14	0,10	-0,09	-0,06
M (15 minutes)	0,09	0,12	-0,09	-0,05
M (20 minutes)	0,08	0,11	-0,08	-0,05
M (30 minutes)	0,09	0,18	-0,10	-0,07

Source: Compiled by the authors

Table 106 – *Weighted correlation between agglomeration and age by sector in Sardinia*

	manufacturing		services	
	2007	2012	2007	2012
M (5 minutes)	0,06	0,05	-0,03	-0,01
M (10 minutes)	0,02	0,06	-0,01	0,00
M (15 minutes)	0,12	0,09	0,02	-0,01
M (20 minutes)	0,08	0,08	0,08	-0,01
M (30 minutes)	0,08	0,09	0,03	-0,02

Source: Compiled by the authors

3.5.5 Technological level and knowledge intensity

Finally, we turned to some intrinsic characteristics of industries - namely the level of technology in manufacturing industries and the knowledge intensity of service industries - in order to understand their influence on agglomeration.

As a proxy for technology and knowledge intensity, we used Eurostat's aggregations defining four technological levels for manufacturing industries[103] (high-technology; medium high-technology; medium low-technology; low-technology) and two knowledge intensity[104] levels for services (knowledge-intensive; less knowledge-intensive).

In order to have a quantitative measure to compute correlations, we simply assigned a numerical value to each category, from a minimum of 1 for "*low-technology*" to a maximum of 4 for "*high-technology*" and just the two extreme values for, respectively, "*less knowledge-intensive*" and "*knowledge-intensive*".

[103] Eurostat (https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:High-tech) defines the technological intensity of a sector according to the ratio R&D expenditure/value added.

[104] Eurostat (https://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Knowledge_Intensive_Activity_(KIA)) classifies an activity <<*as knowledge intensive if employed tertiary educated persons (according to ISCED 97 levels 5+6, according to ISCED 2011 levels 5 to 8) represent more than 33% of the total employment in that activity. The definition is built based on the average number of employed persons aged 15-64 at aggregated EU-27 level according to NACE at 2-digit, using EU Labour Force Survey data*>>.

Concerning manufacturing, our findings are generally in line with both previous research concerning the U.K. and U.S. and with our results for the entire country, with a negative correlation between agglomeration and technological level; however, Sicily shows an unexplainable change between 2007 and 2012, where correlation becomes positive, whereas Sardinia reveals a slight trend in the opposite direction. Results for services are similar to the national analysis as well, with far less consistency in the correlation between agglomeration and knowledge intensity.

Table 107 – *Weighted correlation between agglomeration and technological level for manufacturing industries/knowledge intensity for service industries in Northern Italy*

	manufacturing		services	
	2007	2012	2007	2012
M (5 minutes)	-0,03	-0,13	-0,02	0,04
M (10 minutes)	-0,17	-0,14	-0,02	0,05
M (15 minutes)	-0,16	-0,10	-0,03	0,05
M (20 minutes)	-0,18	-0,11	-0,03	0,05
M (30 minutes)	-0,17	-0,06	-0,04	0,07

Source: Compiled by the authors

Table 108 – *Weighted correlation between agglomeration and technological level for manufacturing industries/knowledge intensity for service industries in Central-Southern Italy*

	manufacturing		services	
	2007	2012	2007	2012
M (5 minutes)	-0,31	-0,14	-0,15	-0,06
M (10 minutes)	-0,30	-0,17	-0,12	-0,05
M (15 minutes)	-0,22	-0,20	-0,11	-0,04
M (20 minutes)	-0,20	-0,19	-0,08	-0,03
M (30 minutes)	-0,13	-0,21	-0,21	-0,05

Source: Compiled by the authors

Table 109 – *Weighted correlation between agglomeration and technological level for manufacturing industries/knowledge intensity for service industries in Sicily*

	manufacturing		services	
	2007	2012	2007	2012
M (5 minutes)	-0,31	0,26	-0,17	-0,15
M (10 minutes)	-0,30	0,26	-0,14	-0,13
M (15 minutes)	-0,22	0,27	-0,13	-0,15
M (20 minutes)	-0,20	0,24	-0,10	-0,14
M (30 minutes)	-0,13	0,27	-0,24	-0,11

Source: Compiled by the authors

Table 110 – *Weighted correlation between agglomeration and technological level for manufacturing industries/knowledge intensity for service industries in Sardinia*

	manufacturing		services	
	2007	2012	2007	2012
M (5 minutes)	0,07	0,05	-0,10	0,00
M (10 minutes)	0,07	0,04	-0,11	0,01
M (15 minutes)	0,04	-0,07	-0,15	-0,05
M (20 minutes)	0,02	-0,14	-0,20	-0,04
M (30 minutes)	0,03	-0,10	-0,20	-0,04

Source: Compiled by the authors

The negative correlation between entry/exit rates and agglomeration that was observed on a national level seems to be far less consistent when macro-regions are analyzed separately: indeed, only Sicily features a constant negative correlation for both determinants in both years, but only the correlation between entry rate and agglomeration seems significant. Sardinia, instead, shows some negative correlation in both years only for exit rate.

On the other hand, the small and not-so-small negative correlations of, respectively, size and age turn positive when limiting the analysis to Northern Italy and, even more so, Sardinia, as had happened between 2007 and 2012 for the country as a whole. Central-Southern Italy, though, shows very different correlations, with size apparently uncorrelated to agglomeration in 2007 and just slightly correlated in 2012, but age looking quite correlated for both years, differently from Northern Italy and somehow reminiscently of the national results for 2007: however, country-wide correlations between age and agglomeration disappeared in 2012, whereas they even grow in Central-Southern Italy.

Table 111 – *M correlations (2007). Only High and Medium High-Technology industries in Northern Italy*

	size	entry	exit	age
M (5 minutes)	0,01	-0,03	-0,01	0,00
M (10 minutes)	0,09	-0,13	-0,07	0,13
M (15 minutes)	0,13	-0,11	-0,06	0,16
M (20 minutes)	0,15	-0,10	-0,06	0,16
M (30 minutes)	0,20	-0,10	-0,06	0,16

Source: Compiled by the authors

Table 112 – *M correlations (2012). Only High and Medium High-Technology industries in Northern Italy*

	size	entry	exit	age
M (5 minutes)	0,06	-0,10	0,17	0,12
M (10 minutes)	0,08	-0,07	0,17	0,14
M (15 minutes)	0,11	-0,02	0,15	0,16
M (20 minutes)	0,11	0,01	0,15	0,17
M (30 minutes)	0,10	0,06	0,14	0,16

Source: Compiled by the authors

Table 113 – *M correlations (2007). Only High and Medium High-Technology industries in Central-Southern Italy*

	size	entry	exit	age
M (5 minutes)	-0,01	-0,08	-0,09	0,30
M (10 minutes)	0,00	-0,05	-0,04	0,34
M (15 minutes)	0,00	0,02	-0,01	0,36
M (20 minutes)	0,01	0,08	-0,01	0,34
M (30 minutes)	0,00	0,09	0,01	0,32

Source: Compiled by the authors

Table 114 – *M correlations (2012). Only High and Medium High-Technology industries in Central-Southern Italy*

	size	entry	exit	age
M (5 minutes)	0,04	0,01	0,12	0,29
M (10 minutes)	0,08	0,03	0,10	0,32
M (15 minutes)	0,16	0,02	0,02	0,43
M (20 minutes)	0,20	0,02	-0,01	0,42
M (30 minutes)	0,19	0,04	-0,07	0,41

Source: Compiled by the authors

Table 115 – *M correlations (2007). Only High and Medium High-Technology industries in Sicily*

	size	entry	exit	age
M (5 minutes)	-0,01	-0,16	-0,07	0,09
M (10 minutes)	0,00	-0,18	-0,04	0,15
M (15 minutes)	0,00	-0,15	-0,04	0,12
M (20 minutes)	0,01	-0,13	-0,01	0,10
M (30 minutes)	0,00	-0,14	0,01	0,10

Source: Compiled by the authors

Table 116 – *M correlations (2012). Only High and Medium High-Technology industries in Sicily*

	size	entry	exit	age
M (5 minutes)	-0,08	-0,35	-0,10	-0,19
M (10 minutes)	-0,08	-0,31	-0,05	-0,21
M (15 minutes)	-0,09	-0,30	-0,03	-0,25
M (20 minutes)	-0,07	-0,22	-0,01	-0,24
M (30 minutes)	-0,02	-0,25	-0,01	-0,25

Source: Compiled by the authors

Table 117 – *M correlations (2007). Only High and Medium High-Technology industries in Sardinia*

	size	entry	exit	age
M (5 minutes)	0,25	0,01	-0,20	0,10
M (10 minutes)	0,26	0,06	-0,17	0,00
M (15 minutes)	0,38	-0,04	-0,14	0,09
M (20 minutes)	0,20	-0,03	-0,11	0,08
M (30 minutes)	0,19	-0,03	-0,11	0,06

Source: Compiled by the authors

Table 118 – *M correlations (2012). Only High and Medium High-Technology industries in Sardinia*

	size	entry	exit	age
M (5 minutes)	0,14	-0,01	-0,17	0,16
M (10 minutes)	0,12	-0,01	-0,17	0,03
M (15 minutes)	0,32	0,10	-0,12	0,02
M (20 minutes)	0,05	0,02	-0,09	0,07
M (30 minutes)	0,14	0,05	-0,06	0,42

Source: Compiled by the authors

When shifting the focus on Low and Medium Low-Technology industries, size seems to correlate well with agglomeration in 2012 (and especially so in Central-Southern Italy and Sicily), whereas five years earlier such a correlation was present only in the North. Interestingly, national results showed negative correlation in both years. Entry rate seems far more mixed, with Northern Italy and Sardinia showing negative correlation with agglomeration (as the entire country does), whereas positive correlation is featured in the Center-South, and an interesting positive correlation in 2007 turning negative in 2012 in Sicily. Exit rate shows interesting correlation with agglomeration only in Sicily,

where a negative correlation appears in both 2007 and 2012. Finally, age seems generally correlated positively with agglomeration.

Table 119 – *M correlations (2007). Only Low and Medium Low-Technology industries in Northern Italy*

	size	entry	exit	age
M (5 minutes)	0,12	-0,14	-0,13	0,11
M (10 minutes)	0,08	-0,12	-0,11	0,09
M (15 minutes)	0,26	-0,20	-0,16	0,22
M (20 minutes)	0,22	-0,18	-0,14	0,20
M (30 minutes)	0,25	-0,20	-0,13	0,25

Source: Compiled by the authors

Table 120 – *M correlations (2012). Only Low and Medium Low-Technology industries in Northern Italy*

	size	entry	exit	age
M (5 minutes)	0,12	-0,08	0,01	0,15
M (10 minutes)	0,09	-0,08	0,01	0,13
M (15 minutes)	0,23	-0,07	-0,02	0,22
M (20 minutes)	0,19	-0,08	-0,03	0,20
M (30 minutes)	0,17	-0,09	-0,07	0,20

Source: Compiled by the authors

Table 121 – *M correlations (2007). Only Low and Medium Low-Technology industries in Central-Southern Italy*

	size	entry	exit	age
M (5 minutes)	-0,07	0,20	-0,03	0,00
M (10 minutes)	-0,05	0,16	-0,14	0,14
M (15 minutes)	-0,03	0,14	-0,02	0,02
M (20 minutes)	-0,02	0,15	0,00	-0,04
M (30 minutes)	0,01	0,14	0,04	-0,04

Source: Compiled by the authors

Table 122 – *M correlations (2012) Only Low and Medium Low-Technology industries in Central-Southern Italy*

	size	entry	exit	age
M (5 minutes)	0,36	0,11	0,15	0,14
M (10 minutes)	0,36	0,10	0,16	0,14
M (15 minutes)	0,34	0,13	0,17	0,11
M (20 minutes)	0,31	0,09	0,13	0,12
M (30 minutes)	0,29	0,11	0,14	0,08

Source: Compiled by the authors

Table 123 – *M correlations (2007). Only Low and Medium Low-Technology industries in Sicily*

	size	entry	exit	age
M (5 minutes)	-0,07	0,31	-0,32	-0,07
M (10 minutes)	-0,05	0,17	-0,35	0,06
M (15 minutes)	-0,03	0,29	-0,37	-0,01
M (20 minutes)	-0,02	0,33	-0,37	-0,04
M (30 minutes)	0,01	0,29	-0,38	0,00

Source: Compiled by the authors

Table 124 – *M correlations (2012). Only Low and Medium Low-Technology industries in Sicily*

	size	entry	exit	age
M (5 minutes)	0,21	-0,13	-0,33	0,40
M (10 minutes)	0,23	-0,25	-0,27	0,50
M (15 minutes)	0,24	-0,28	-0,31	0,55
M (20 minutes)	0,33	-0,31	-0,42	0,61
M (30 minutes)	0,28	-0,34	-0,45	0,62

Source: Compiled by the authors

Table 125 – *M correlations (2007). Only Low and Medium Low-Technology industries in Sardinia*

	size	entry	exit	age
M (5 minutes)	0,01	-0,19	-0,13	0,07
M (10 minutes)	0,01	-0,20	-0,25	0,18
M (15 minutes)	0,02	-0,21	-0,27	0,35
M (20 minutes)	0,02	-0,23	-0,25	0,22
M (30 minutes)	0,03	-0,23	-0,17	0,24

Source: Compiled by the authors

Table 126 – *M correlations (2012). Only Low and Medium Low-Technology industries in Sardinia*

	size	entry	exit	age
M (5 minutes)	0,14	-0,11	-0,10	0,01
M (10 minutes)	0,30	-0,16	0,00	0,13
M (15 minutes)	0,31	-0,16	-0,02	0,12
M (20 minutes)	0,21	-0,19	-0,05	0,08
M (30 minutes)	0,02	-0,27	-0,02	0,11

Source: Compiled by the authors

Knowledge Intensive service industries do not show constant and reliable patterns as well: interesting correlations between agglomeration and, respectively, entry rate and size in 2007 and 2012 are not seen elsewhere and, possibly more important, in the other year, when they not only decreased to almost zero, but even changed sign in both cases. Only age seems to have similar numbers in different regions (North and Center-South, but not Sicily) and in both years, but they are

mostly close to zero and reminiscent of national results only for 2012: in 2007, Italy showed quite a strong negative correlation, indeed.

Table 127 – *M correlations (2007). Only Knowledge Intensive industries in Northern Italy*

	size	entry	exit	age
M (5 minutes)	0,08	0,02	-0,04	0,08
M (10 minutes)	0,06	0,03	-0,04	0,08
M (15 minutes)	0,05	0,03	-0,04	0,07
M (20 minutes)	0,05	0,04	-0,04	0,07
M (30 minutes)	0,07	0,09	-0,04	0,05

Source: Compiled by the authors

Table 128 – *M correlations (2012). Only Knowledge Intensive industries in Northern Italy*

	size	entry	exit	age
M (5 minutes)	0,03	0,09	0,05	0,04
M (10 minutes)	0,02	0,09	0,06	0,04
M (15 minutes)	0,02	0,10	0,06	0,04
M (20 minutes)	0,01	0,11	0,08	0,04
M (30 minutes)	0,01	0,13	0,11	0,05

Source: Compiled by the authors

Table 129 – *M correlations (2007). Only Knowledge Intensive industries in Central-Southern Italy*

	size	entry	exit	age
M (5 minutes)	-0,04	-0,26	-0,15	0,18
M (10 minutes)	-0,03	-0,25	-0,13	0,17
M (15 minutes)	-0,03	-0,25	-0,16	0,21
M (20 minutes)	-0,03	-0,24	-0,17	0,22
M (30 minutes)	-0,05	-0,17	-0,06	0,09

Source: Compiled by the authors

Table 130 – *M correlations (2012). Only Knowledge Intensive industries in Central-Southern Italy*

	size	entry	exit	age
M (5 minutes)	0,36	0,09	0,03	0,01
M (10 minutes)	0,37	0,09	0,04	0,01
M (15 minutes)	0,36	0,09	0,06	0,01
M (20 minutes)	0,36	0,09	0,06	0,01
M (30 minutes)	0,23	0,24	0,17	0,00

Source: Compiled by the authors

Table 131 – *M correlations (2007). Only Knowledge Intensive industries in Sicily*

	size	entry	exit	age
M (5 minutes)	-0,04	-0,19	-0,08	-0,09
M (10 minutes)	-0,04	-0,17	-0,10	-0,09
M (15 minutes)	-0,04	-0,20	-0,12	-0,08
M (20 minutes)	-0,04	-0,21	-0,11	-0,08
M (30 minutes)	-0,06	-0,14	-0,11	-0,12

Source: Compiled by the authors

Table 132 – *M correlations (2012). Only Knowledge Intensive industries in Sicily*

	size	entry	exit	age
M (5 minutes)	0,38	0,17	-0,09	-0,14
M (10 minutes)	0,40	0,16	-0,11	-0,13
M (15 minutes)	0,43	0,21	-0,09	-0,13
M (20 minutes)	0,37	0,21	-0,06	-0,13
M (30 minutes)	0,37	0,21	-0,05	-0,12

Source: Compiled by the authors

Table 133 – *M correlations (2007). Only Knowledge Intensive industries in Sardinia*

	size	entry	exit	age
M (5 minutes)	0,00	0,16	0,02	-0,01
M (10 minutes)	0,00	0,10	-0,02	0,03
M (15 minutes)	0,00	0,13	-0,01	0,02
M (20 minutes)	-0,01	0,14	0,02	0,07
M (30 minutes)	-0,01	0,11	0,05	0,09

Source: Compiled by the authors

Table 134 – *M correlations (2012). Only Knowledge Intensive industries in Sardinia*

	size	entry	exit	age
M (5 minutes)	0,05	0,05	-0,08	-0,02
M (10 minutes)	0,04	0,02	-0,12	0,00
M (15 minutes)	0,05	0,03	-0,14	-0,02
M (20 minutes)	0,07	0,08	-0,11	-0,04
M (30 minutes)	0,07	0,09	-0,11	-0,05

Source: Compiled by the authors

Less Knowledge Intensive services show more consistency, at least in terms of correlation sign: entry and exit rate correlate negatively with agglomeration in both years and in both macro-regions, just as they do in the entire country; age, as well, shows a constantly positive correlation, albeit slight and inconsistent with national findings. Size, on the other hand, does not seem to offer much meaning in terms of correlation with agglomeration. An interesting note are the high and similar

correlation results for all determinants in the Center-South and Sicily in 2007: we are unable to explain both their presence and their sudden disappearance in 2012, with the only exception of exit rate, which only decreases to a certain extent, without disappearing or changing sign.

Table 135 – *M correlations (2007). Only Less Knowledge Intensive industries in Northern Italy*

	size	entry	exit	age
M (5 minutes)	0,07	-0,11	-0,07	0,09
M (10 minutes)	0,07	-0,10	-0,07	0,09
M (15 minutes)	0,08	-0,10	-0,07	0,09
M (20 minutes)	0,07	-0,11	-0,07	0,09
M (30 minutes)	0,08	-0,11	-0,06	0,09

Source: Compiled by the authors

Table 136 – *M correlations (2012). Only Less Knowledge Intensive industries in Northern Italy*

	size	entry	exit	age
M (5 minutes)	0,06	-0,08	-0,11	0,04
M (10 minutes)	0,06	-0,08	-0,11	0,04
M (15 minutes)	0,05	-0,08	-0,10	0,04
M (20 minutes)	0,05	-0,07	-0,10	0,03
M (30 minutes)	0,04	-0,07	-0,09	0,03

Source: Compiled by the authors

Table 137 – *M correlations (2007). Only Less Knowledge Intensive industries in Central-Southern Italy*

	size	entry	exit	age
M (5 minutes)	-0,23	-0,62	-0,48	0,50
M (10 minutes)	-0,23	-0,62	-0,48	0,50
M (15 minutes)	-0,23	-0,61	-0,48	0,50
M (20 minutes)	-0,24	-0,61	-0,48	0,50
M (30 minutes)	-0,24	-0,59	-0,47	0,48

Source: Compiled by the authors

Table 138 – *M correlations (2012). Only Less Knowledge Intensive industries in Central-Southern Italy*

	size	entry	exit	age
M (5 minutes)	0,03	-0,12	-0,27	0,03
M (10 minutes)	0,04	-0,13	-0,27	0,05
M (15 minutes)	0,06	-0,14	-0,29	0,07
M (20 minutes)	0,06	-0,15	-0,29	0,09
M (30 minutes)	0,05	-0,16	-0,30	0,10

Source: Compiled by the authors

Table 139 – *M correlations (2007). Only Less Knowledge Intensive industries in Sicily*

	size	entry	exit	age
M (5 minutes)	-0,25	-0,50	-0,34	0,57
M (10 minutes)	-0,26	-0,50	-0,34	0,57
M (15 minutes)	-0,26	-0,49	-0,33	0,55
M (20 minutes)	-0,27	-0,48	-0,33	0,55
M (30 minutes)	-0,27	-0,46	-0,31	0,54

Source: *Compiled by the authors*

Table 140 – *M correlations (2012). Only Less Knowledge Intensive industries in Sicily*

	size	entry	exit	age
M (5 minutes)	0,10	-0,04	-0,30	-0,04
M (10 minutes)	0,11	-0,06	-0,27	-0,02
M (15 minutes)	0,13	-0,07	-0,23	-0,01
M (20 minutes)	0,12	-0,07	-0,19	-0,03
M (30 minutes)	0,08	-0,05	-0,17	-0,08

Source: *Compiled by the authors*

Table 141 – *M correlations (2007). Only Less Knowledge Intensive industries in Sardinia*

	size	entry	exit	age
M (5 minutes)	-0,02	-0,09	-0,19	-0,08
M (10 minutes)	-0,02	-0,09	-0,23	-0,07
M (15 minutes)	-0,03	-0,05	-0,20	-0,04
M (20 minutes)	-0,03	-0,09	-0,20	0,01
M (30 minutes)	-0,03	-0,01	-0,16	-0,06

Source: *Compiled by the authors*

Table 142 - *M correlations (2012). Only Less Knowledge Intensive industries in Sardinia*

	size	entry	exit	age
M (5 minutes)	0,13	-0,10	-0,36	0,00
M (10 minutes)	0,12	-0,09	-0,33	0,00
M (15 minutes)	0,19	-0,07	-0,33	0,00
M (20 minutes)	0,22	-0,09	-0,32	0,00
M (30 minutes)	0,25	-0,10	-0,33	0,00

Source: *Compiled by the authors*

3.6 Conclusion

In this chapter we have applied the methodology we had previously used to measure agglomeration nationally, but this time the aim was to explore macro-regional patterns instead. Such an analysis had two main objectives: measuring agglomeration in itself allowed us to draw comparisons and to verify the peculiarities of each macro-region both statically and dynamically. The second goal was to verify whether the proxies that we had already used in the national study in order to discover possible determinants behind agglomeration and behind its change during the years of the Great Recession, showed some correlation when the scope is restricted to single – and maybe more economically uniform – macro-regions. Indeed, this would confirm this hypothesis that some patterns might actually exist but that opposite movements and signs in different areas are hiding them.

To pursue our goal, we have identified four geographically homogenous macro-regions: the North, revolving around the Po Valley and the surrounding mountains; the Center-South, corresponding to the peninsular part of the country; and the two major islands of Sicily and Sardinia.

Following the same methodology of our previous study and approximating plants' position to the centroid of the municipality where they are located – as to reconcile the two different needs of overcoming predefined zoning and the consequent Modifiable Areal Unit Problem, and avoiding an incommensurable amount of computations that would have otherwise made the measurement impossible - we have used Marcon & Puech's M to assess agglomeration for each industry within each macro-region, treating them as islands bordering no other place on the outside.

Our first goal was clearly reached, with interesting results that have allowed us to draw a more complete picture of the geographic distribution of economic activities in Italy and their change between 2007 and 2012.

Results seem in line with expectations and with relevant literature, giving us confidence that the methodology is sound and somehow confirming also national results provided in the previous chapter. Indeed, activities relying on any type of geographic advantage – from those related to resource extraction to those involved in air and sea transport, but also those that rely on local peculiarities such as tourism-related industries – show a high degree of agglomeration everywhere, just as highlighted by literature and as found in the national study, with only scattered industries distancing themselves from the general trend.

Many common patterns were observed, but also some interesting peculiarities have emerged. Unsurprisingly, Northern Italy's significant share of the economy means that the area's agglomeration patterns are strongly correlated with national results – albeit significantly less so after the Great Recession - and even a focus on specific areas of activities has revealed mostly similarities. Central-Southern Italy, as well, has proved a much stronger correlation with national patterns than we would have thought and – quite surprisingly, after observing the decrease in its Northern neighbors - the correlation was still high five years later. Sicily and, especially, Sardinia, on the other hand, show a far weaker correlation with national results, with a slight increase for Sicily in 2012 and further plummeting for Sardinia, that ends up with a literally non-existing correlation.

Such a low correlation is apparent when looking at single areas of activity in the two major islands: indeed, transport activities and accommodation industries seem far more widespread than it would have been expected, and than they are nationally and in other parts of the country.

The second step consisted in the connection of those agglomeration indices to possible determinants of agglomeration - namely size, entry and exit rate, age, and technological level. Unfortunately, although some interesting observations are certainly to be noted, most results are still inconclusive, and it is quite difficult to extract a general model. Indeed, most proxies did not show consistent correlation, with figures that were either low or inconsistent between years or distance ranges, even when treating Manufacturing and Service separately.

Indeed, whereas firms' entry and exit rate provided a generally negative correlation with agglomeration in a specific industry for both Manufacturing and Services, the figures hovered between -0,2 and 0, and when higher values appeared, their validity is arguable since – as is the case of entry rate in Services in the Center-South and Sicily – they would suddenly and unexplainably regress back to around zero five years later. Firm age is perhaps the most reliable determinant, with a – albeit slight – almost constant positive correlation with agglomeration results, at least in Manufacturing activities; the mainland also features a positive correlation in Services, whereas both major islands show either negative or no correlation at all. The technological level of Manufacturing activities, as well, seems correlated – negatively – with agglomeration in mainland Italy, whereas results in the islands and for Services are too mixed and inconsistent to draw any conclusion whatsoever.

Such inconsistency has led us to try to differentiate industries further, by technological level for Manufacturing and by Knowledge intensity for Services. However, although some macro-regions have showed interesting results, the samples are probably too small and do not offer enough consistency between each other to draw any significant conclusion: as an example, exit rate in Low and Medium Low-Technology industries in Sicily shows an interesting negative correlation with agglomeration rates (hovering between -0,3 and -0,5) in Sicily in both 2007 and 2012, but the same figure is extremely variable between other macro-regions, ranging from -0,2/-0,3 for 2007 in Sardinia to +0,1/+0,2 for 2012 in Central-Southern Italy.

All in all and despite the impossibility to build a model out of the analysis of determinants, we believe that these results themselves - and the opportunity they provide to draw a detailed picture of Italian macro-regions in terms of the propensity of industries to agglomerate and the impact the Great Recession has had on these patterns, as well to infer similarities and peculiarities around the country – are relevant and constitute a starting point for further studies. The most interesting "*next step*" would include testing the significance of agglomeration results: such a process would be quite heavy in terms of computational intensity, but would reveal which industries have robust enough data that might be used to "clean the fog" when studying possible determinants behind agglomeration, and hopefully lead to the discovery of meaningful correlations and to the development of a reliable model.

Conclusion and ideas for future research

This explorative dissertation has multiple goals and we believe the results have been more than satisfactory. The availability of a huge amount of detailed information provided by ISTAT's ASIA dataset led us to wonder whether we could use it to compute an accurate measure of agglomeration. After reviewing both the theoretical literature pertaining to the geographic distribution of economic activities, and the empirical literature on spatial measures, we chose to rely on one of the most innovative – and least used – measures: Marcon & Puech's *M*.

M belongs to the group of so-called distance-based methods, an innovative set of measures that aims to circumvent the Modifiable Areal Unit Problem, which has always represented a significant bias when measuring spatial phenomena relying on pre-defined geographical aggregates. The major difficulty accompanying such a measure, however, is the huge computational intensity required, since each plant must be related individually with each other plant within the radius of choice, leading to an immense number of computations, especially when the goal is to map an entire country. Indeed, to the best of our knowledge, nobody had ever tried to accomplish such a task before. In order to circumvent such an issue, we had to rely on a necessary compromise, consisting in the approximation of each plant's geographical location to the centroid of the municipality that it belongs to. This allowed us to reduce the computational intensity to a manageable level, with "only" about 10.000 locations to inter-relate, instead of the original number, amounting to almost 5 million; moreover, it provided us with the opportunity of using an already established authoritative source for distances, since ISTAT also develops matrices showing distances between each and every Italian municipality. We believe that what was lost with such an approximation was actually not too relevant, compared to the opportunity of exploring agglomerations with much more detail and much less geographical bias than conventional measures.

Our first – much practical - goal was to exploit the huge potential of the ASIA dataset in order to measure agglomeration for the about 250 industries that constitute the Italian economy. Such a measurement is useful to understand which industries tend to agglomerate the most and which ones, on the other hand, follow a more dispersed pattern, and whether the patterns are in line with those outlined by other authors in other countries and periods. Our goal was undoubtedly satisfied and produced results that seem much reliable, not only because they are generally consistent with literature and reminiscent of similar studies for other countries or employing more conventional types of measures, but also because they do not change in an unexpected and unjustifiable manner between 2007 and 2012. We believe that our results are much useful, not only because they contribute to build a more accurate view of the Italian economy, but also because they do so by employing an innovative measure, limiting the MAUP bias that plague more conventional ones.

Indeed, the second goal of our study was to understand whether an approximation of the exact location of plants could still produce viable results while allowing to exploit the huge potential of distance-based measures, which are usually not easily implemented for large areas - let alone entire countries - and for multiple years. The consistency of our results between different years - and, even more so, with previous literature and expectations – leads us to believe that such a goal was satisfied, and that the approximation of plants' locations to the centroid of the municipality where

they are located, could be a viable solution to decrease the huge computational intensity required by large-scale studies of this kind.

The possibilities offered by the computation of a reliable agglomeration index led us to question whether the Great Recession had a significant impact on agglomeration (and vice-versa), significantly changing the geographical shape of the Italian economy. Similarly, we were interested in investigating possible determinants behind agglomeration, both statically and dynamically. We believe that some of the most at large considerations of previous literature were confirmed, with agglomeration somehow slightly decreasing (Behrens & Bougna, 2015; Almeida, Neto & Rocha, 2020), but with the most agglomerated industries – especially manufacturing ones – maintaining a high degree of agglomeration, and sometimes even increasing it (Behrens & Bougna, 2015). When digging deeper in order to explore possible determinants, our research was clearly limited by the necessity to use industry-wide proxies rather than plant-specific ones: as an example, exploring the relation between agglomeration and the actual size of plants would have required to compute the index again for each size threshold, so we had to settle for a correlation with the industry's mean plant size. Despite such a constraint, we were able to spot some promising correlations: the technological level seems to be negatively correlated – although only slightly – with agglomeration in manufacturing industries, in line with previous results from research in the U.K. and in the U.S., and the entry rate also seems negatively correlated with agglomeration for Services – and even more so when treating knowledge intensive industries separately from less knowledge intensive industries.

Moreover, and in consideration of Italy's well known geographic and economic asymmetry, we also wondered whether different patterns in different areas of the country were conflicting with each other, masking actual connections behind determinants. This led us to divide the country into four homogeneous areas: Northern Italy, Peninsular Italy (the Center and the South), and the two major islands of Sardinia and Sicily. Such a process allowed us to identify quite different patterns in each area and provided us with a better understanding of those features that seem to affect the entire country and those that are present only in certain places. Indeed, whereas we clearly expected to find that Northern Italy – but also Central-Southern Italy, albeit slightly less so – showed much correlation between its spatial distribution of economic activities and the entire country's, it came out as a surprise that such a correlation in Sardinia is virtually non-existent, and agglomeration and dispersion follow autonomous patterns. The study of macro-regional dynamics also showed that, whereas agglomeration in the North has increased by double-digit percentages, the increase in the rest of the country was mostly marginal, and especially so in the islands – and this holds for both Manufacturing and Services. Moreover, the study of determinants behind agglomeration shows more consistency between years and within areas of activity, when macro-regions are treated separately.

Notwithstanding the really useful insight provided by the study and by the exploration of possible determinants, we believe that relations between agglomeration and our proxies were not robust enough to produce a significant model, so we decided to limit the results of our study to correlations. This could however represent an initial step for future and deeper studies in such direction. Indeed, there are many accessory paths that have emerged and that we aim to explore in the future, building up from the results of this dissertation.

First, we would be interested in estimating the significance of the M results we have obtained: this would require an immense amount of new computations, since we would need to simulate a high number of redistributions of plants along their actual locations. In the exploration of possible determinants behind agglomeration, we somehow took into account the lower significance of results for smaller industries (a lower number of plants corresponds to a higher chance that results were obtained by chance) by weighting each industry by the number of plants that it consists of. This provides a minimum degree of reliability and allows not to give the same importance to results that are much more likely than others not to be a consequence of chance alone.

Another interesting way to test the robustness of our results could consist in repeating the computations of M for a smaller area (Sardinia could be the most obvious solution, being an island and having a decent representation of industries in every area, without having too high a number of plants, which would require an immense amount of computations), using this time the exact location of plants without any sort of approximation. Such a test would reveal whether our approximation of the location of plants to the centroid of the municipality where they are located, constitutes a satisfactory trade-off between feasibility and reliability of results – just as we hope and believe.

Finally, the possibility to discern which industries' agglomeration rates are actually significant would make the exploration of determinants much easier, allowing us to possibly find out patterns that, so far, we have not yet been able to identify.

All in all, we believe that this dissertation represents an interesting contribution to understand and identify agglomeration - both in general and in the specific case of Italy - which is of the utmost importance to gain useful insight on a country's economic structure.

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Appendix

Figures

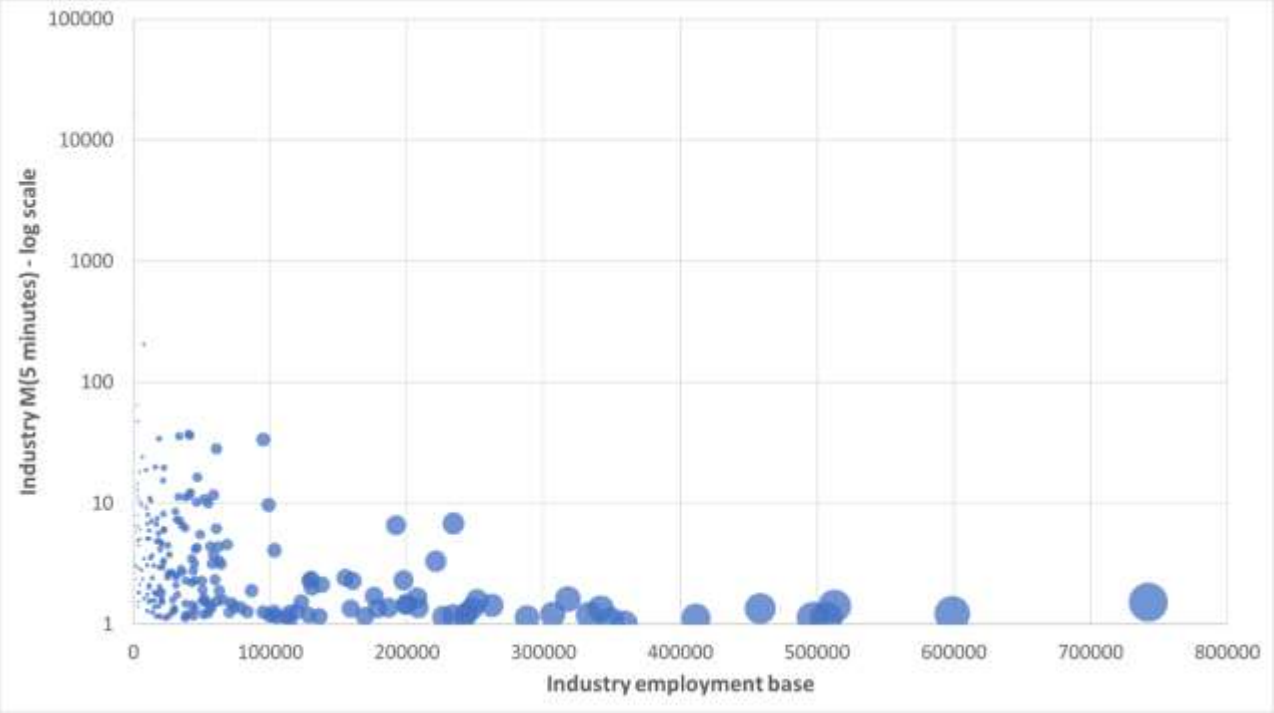

Figure 14 – *Correlation of industry size in terms of employees and agglomeration at 5 minute distance, weighed by industry size in terms of employees, in 2007.* ***Source:*** *Compiled by the authors*

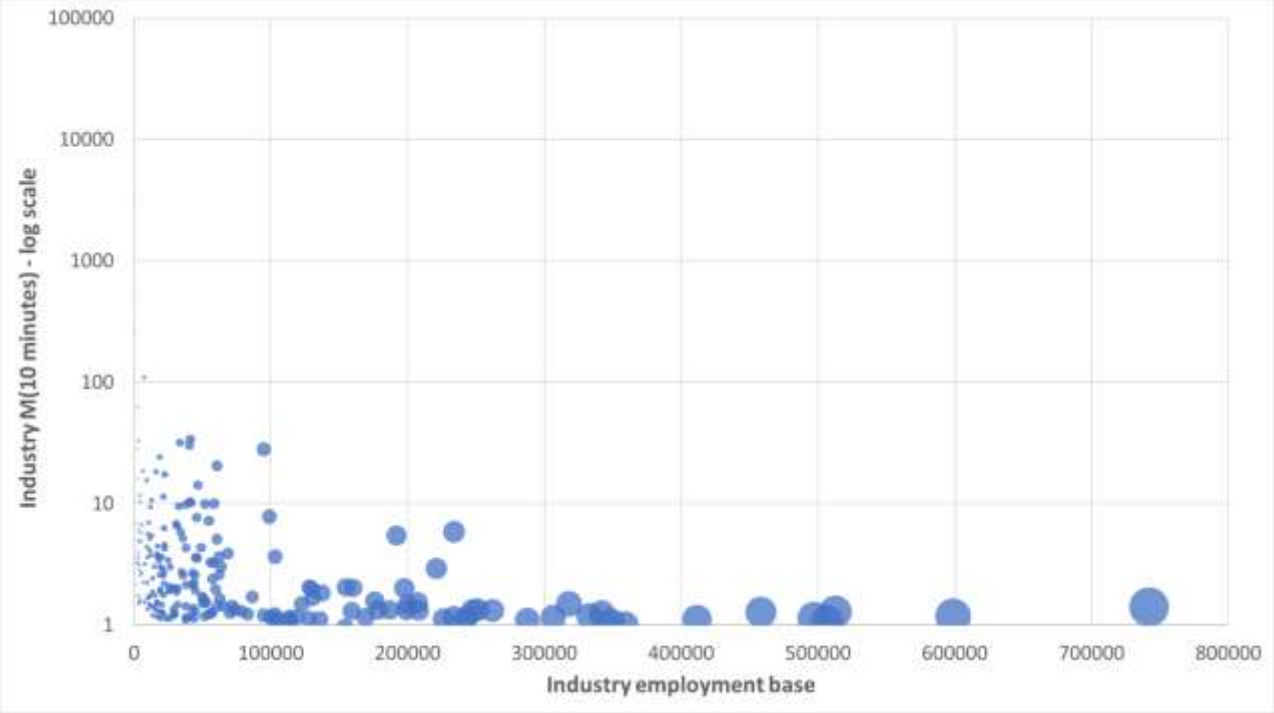

Figure 15 – *Correlation of industry size in terms of employees and agglomeration at 10 minute distance, weighed by industry size in terms of employees, in 2007.* ***Source:*** *Compiled by the authors*

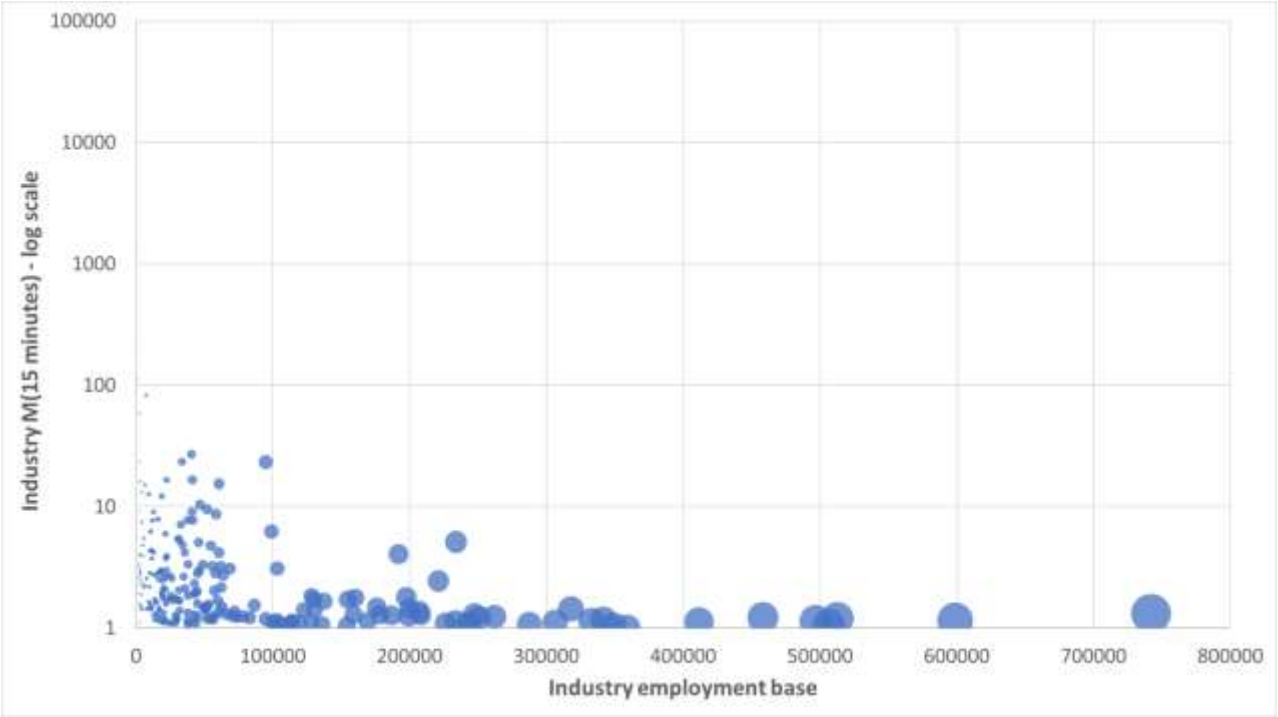

Figure 16 – *Correlation of industry size in terms of employees and agglomeration at 15 minute distance, weighed by industry size in terms of employees, in 2007.* ***Source:*** *Compiled by the authors*

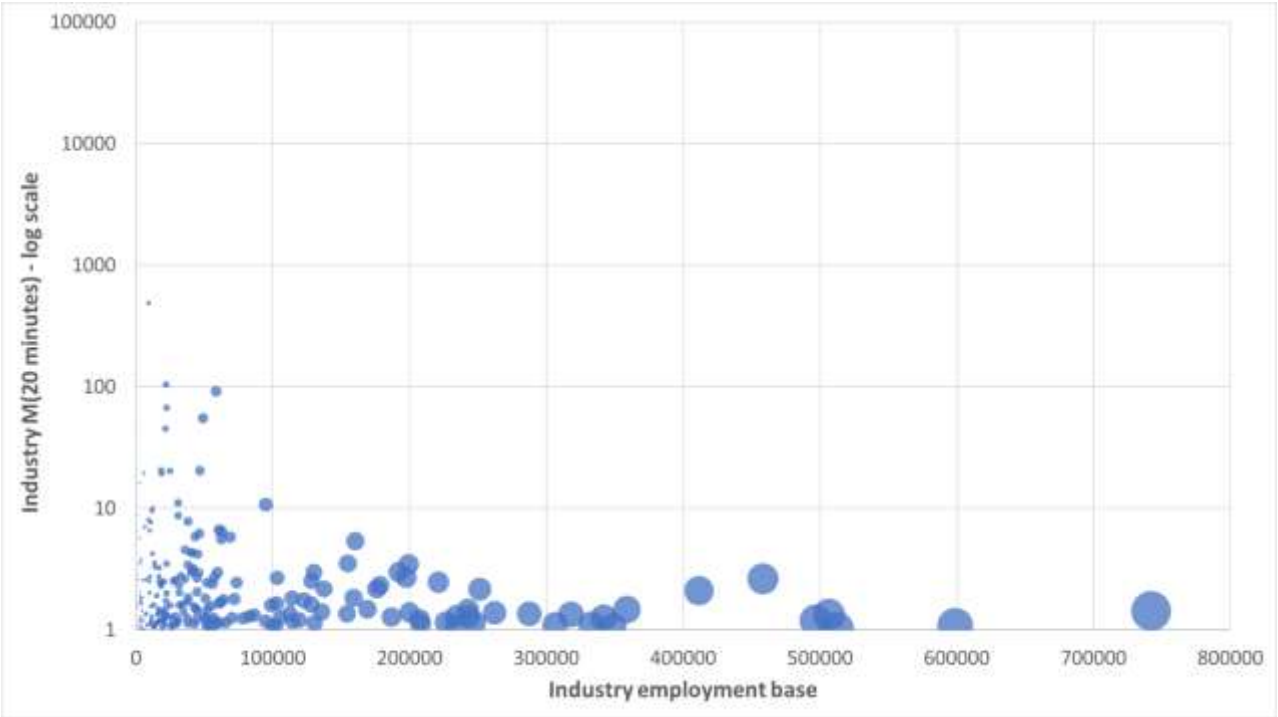

Figure 17 – *Correlation of industry size in terms of employees and agglomeration at 20 minute distance, weighed by industry size in terms of employees, in 2007.* ***Source:*** *Compiled by the authors*

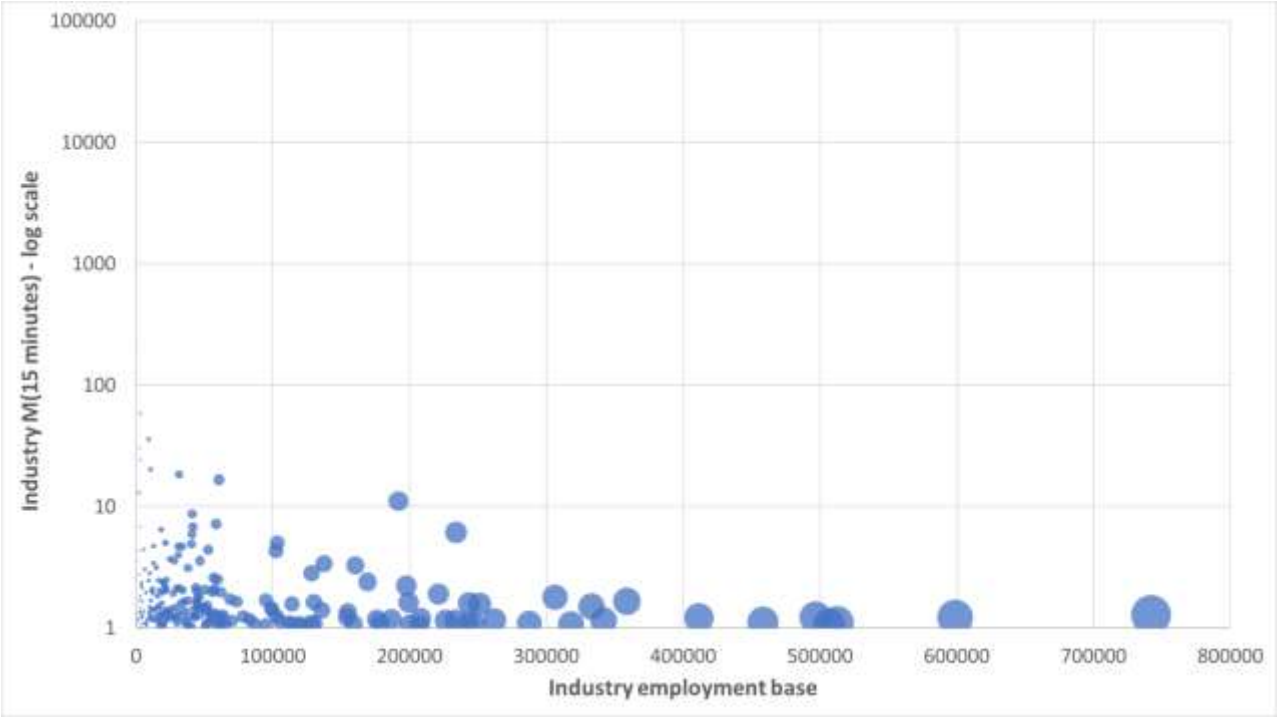

Figure 18 – *Correlation of industry size in terms of employees and agglomeration at 30 minute distance, weighed by industry size in terms of employees, in 2007.* ***Source:*** *Compiled by the authors*

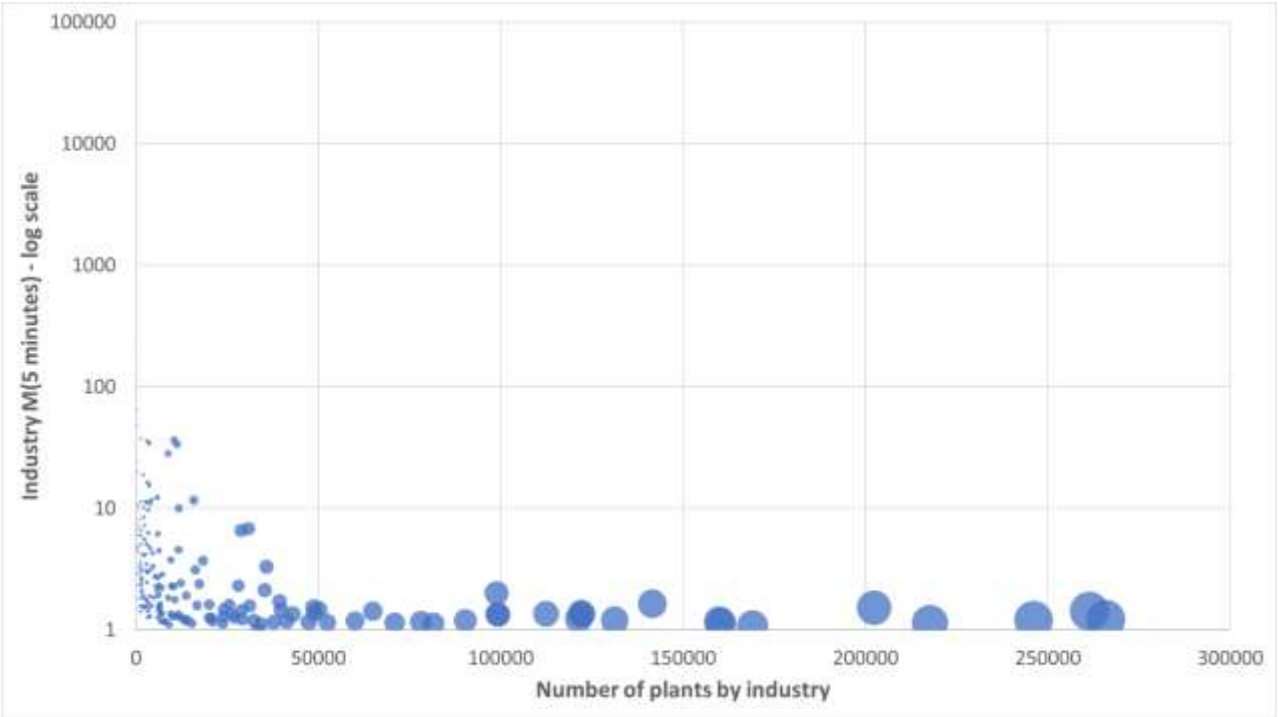

Figure 19 – *Correlation of industry size in terms of number of plants and agglomeration at 5 minute distance, weighed by industry size in terms of number of plants, in 2007.* ***Source:*** *Compiled by the authors*

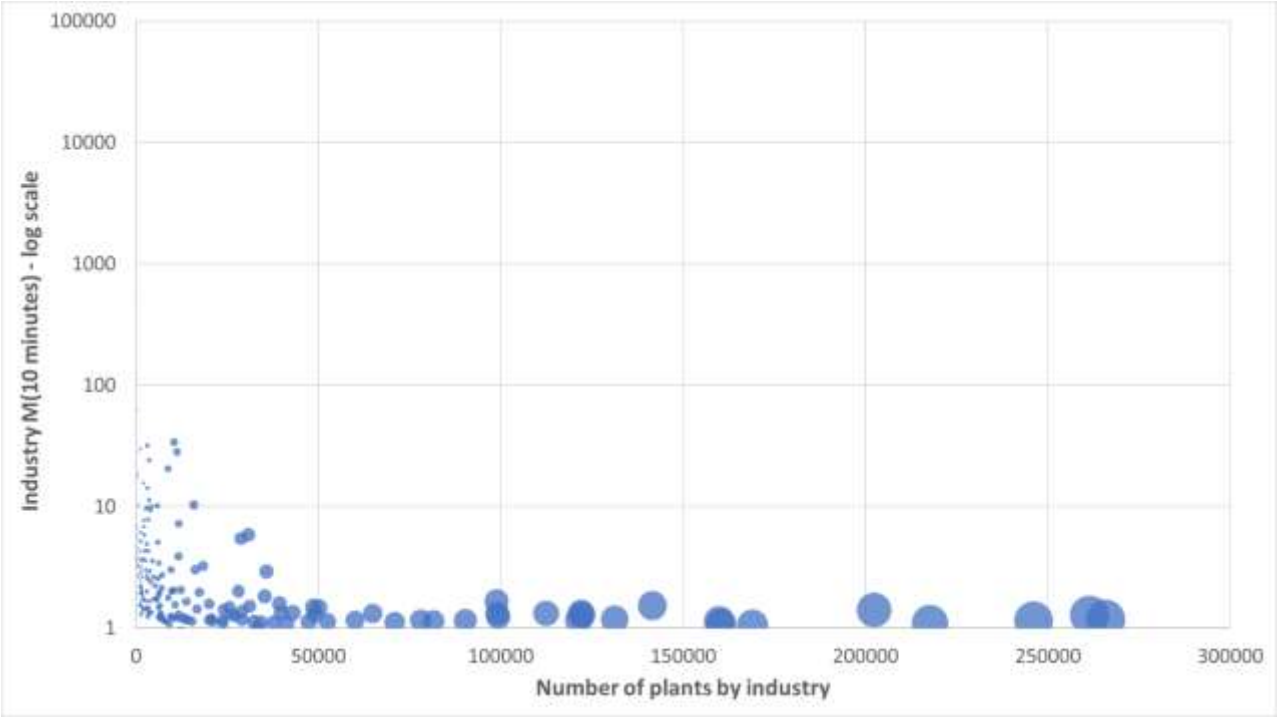

Figure 20 – *Correlation of industry size in terms of number of plants and agglomeration at 10 minute distance, weighed by industry size in terms of number of plants, in 2007.* ***Source:*** *Compiled by the authors*

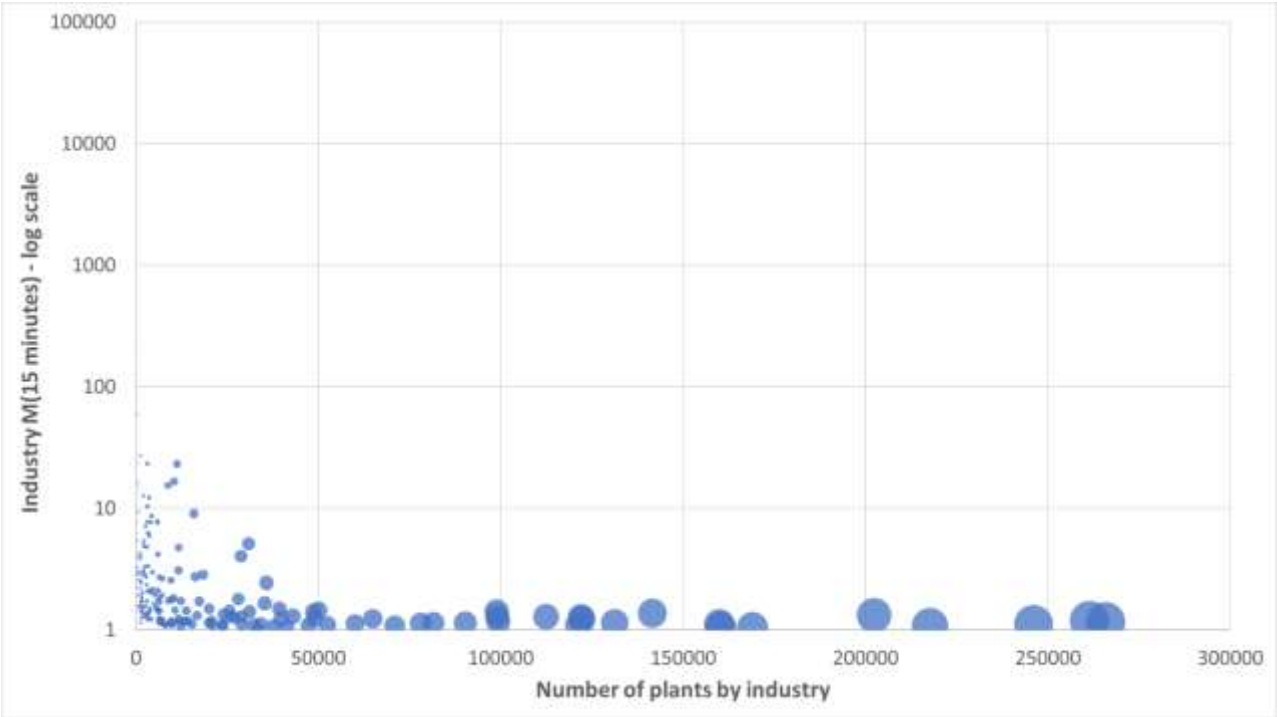

Figure 21 – *Correlation of industry size in terms of number of plants and agglomeration at 15 minute distance, weighed by industry size in terms of number of plants, in 2007.* ***Source:*** *Compiled by the authors*

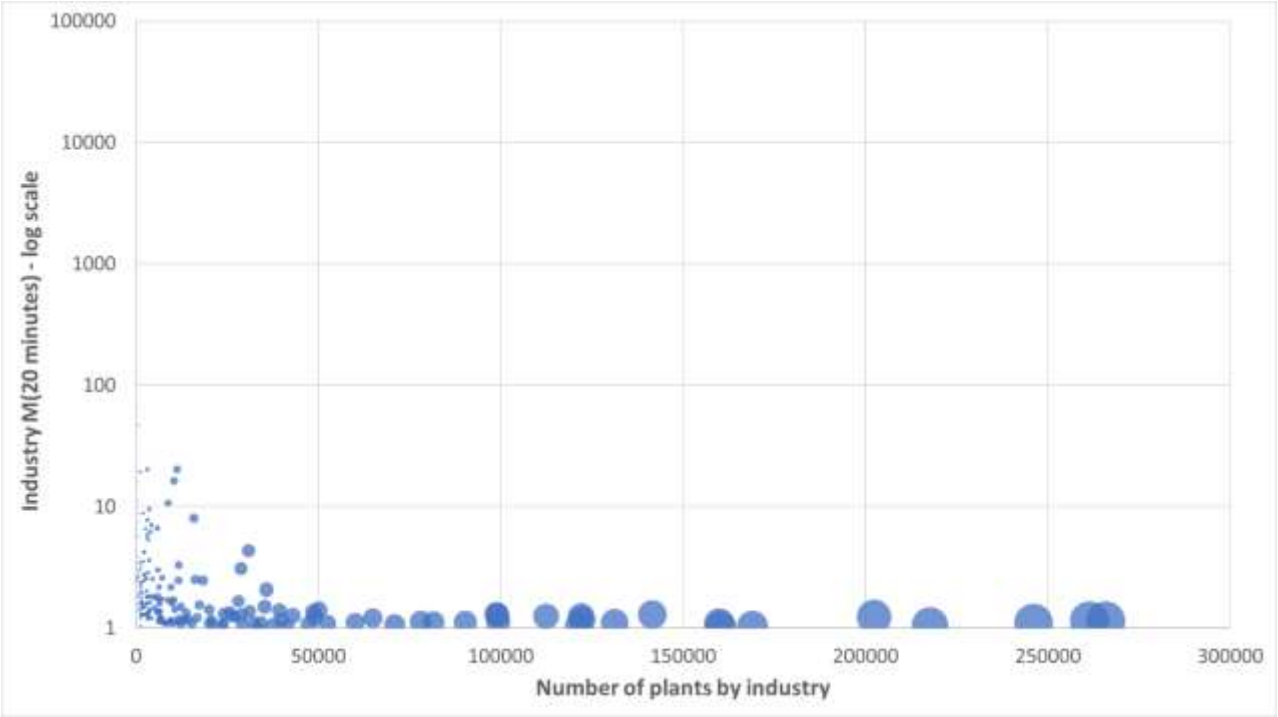

Figure 22 – *Correlation of industry size in terms of number of plants and agglomeration at 20 minute distance, weighed by industry size in terms of number of plants, in 2007.* ***Source:*** *Compiled by the authors*

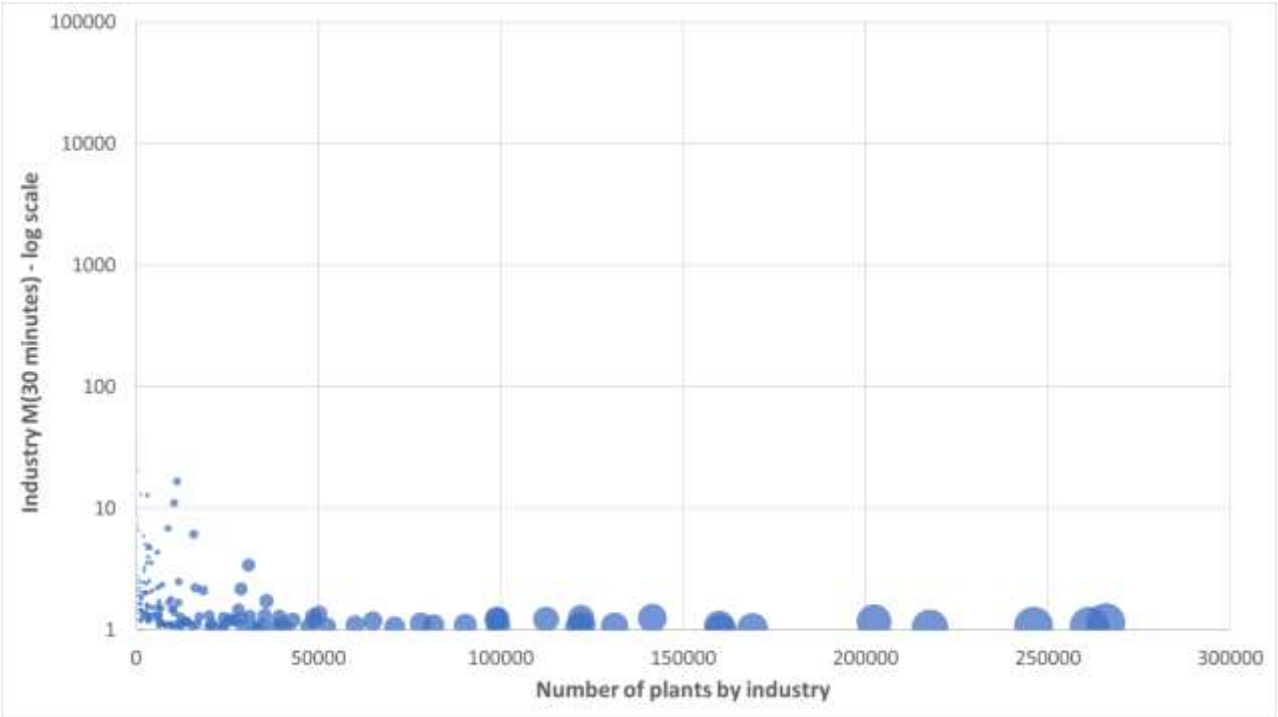

Figure 23 – *Correlation of industry size in terms of number of plants and agglomeration at 30 minute distance, weighed by industry size in terms of number of plants, in 2007.* ***Source:*** *Compiled by the authors*

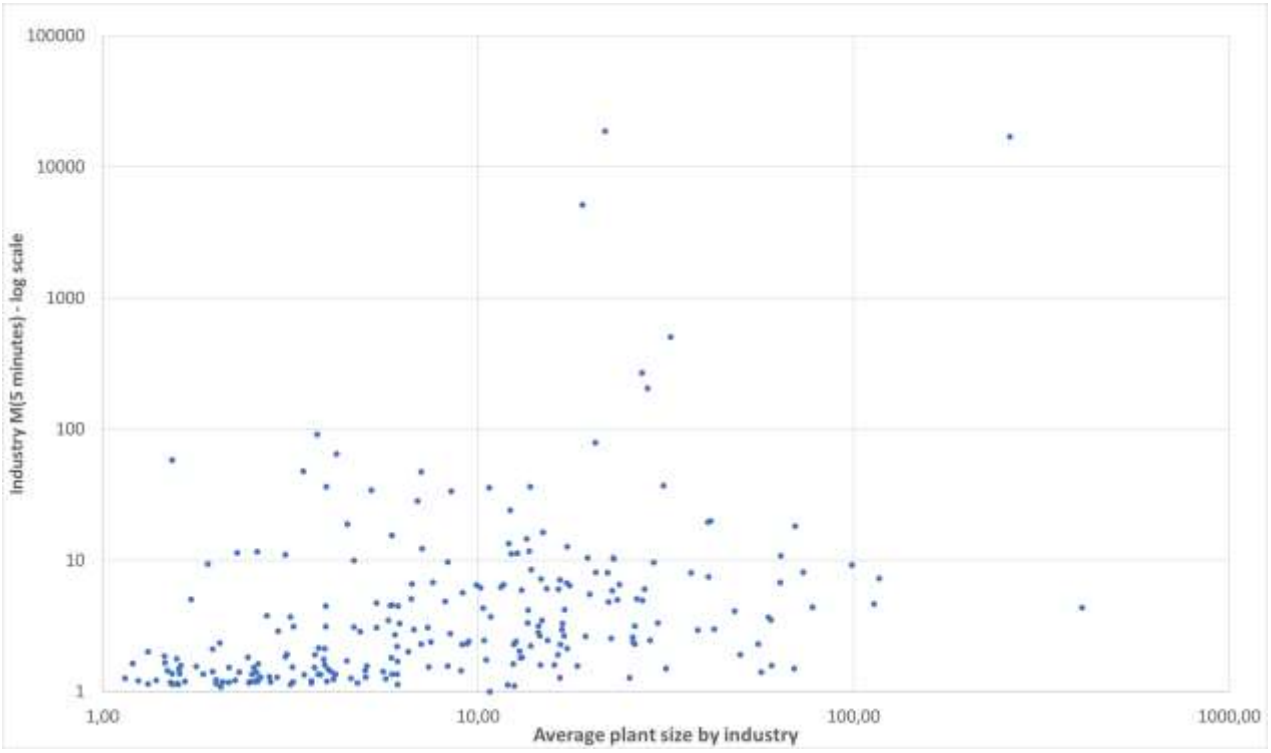

Figure 24 – *Correlation of average plant size by industry and agglomeration at 5 minute distance, in 2007.* ***Source:*** *Compiled by the authors*

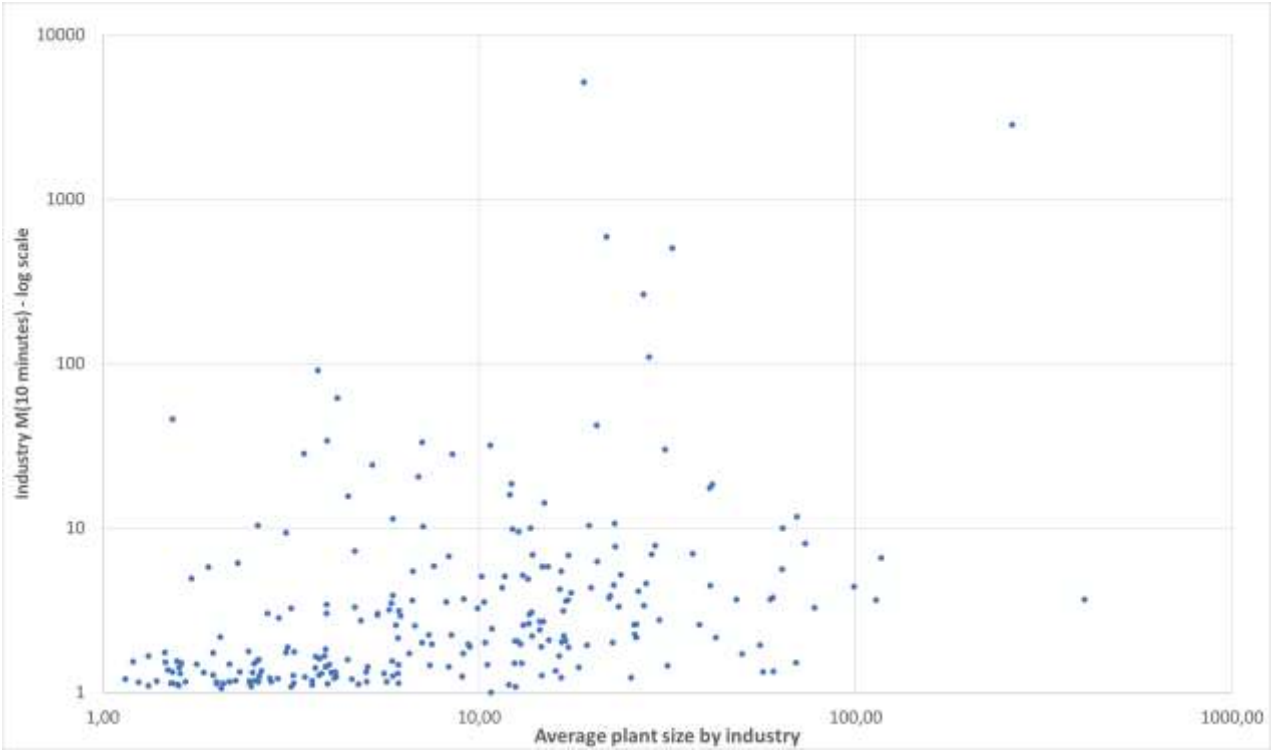

Figure 25 – *Correlation of average plant size by industry and agglomeration at 10 minute distance, in 2007.* ***Source:*** *Compiled by the authors*

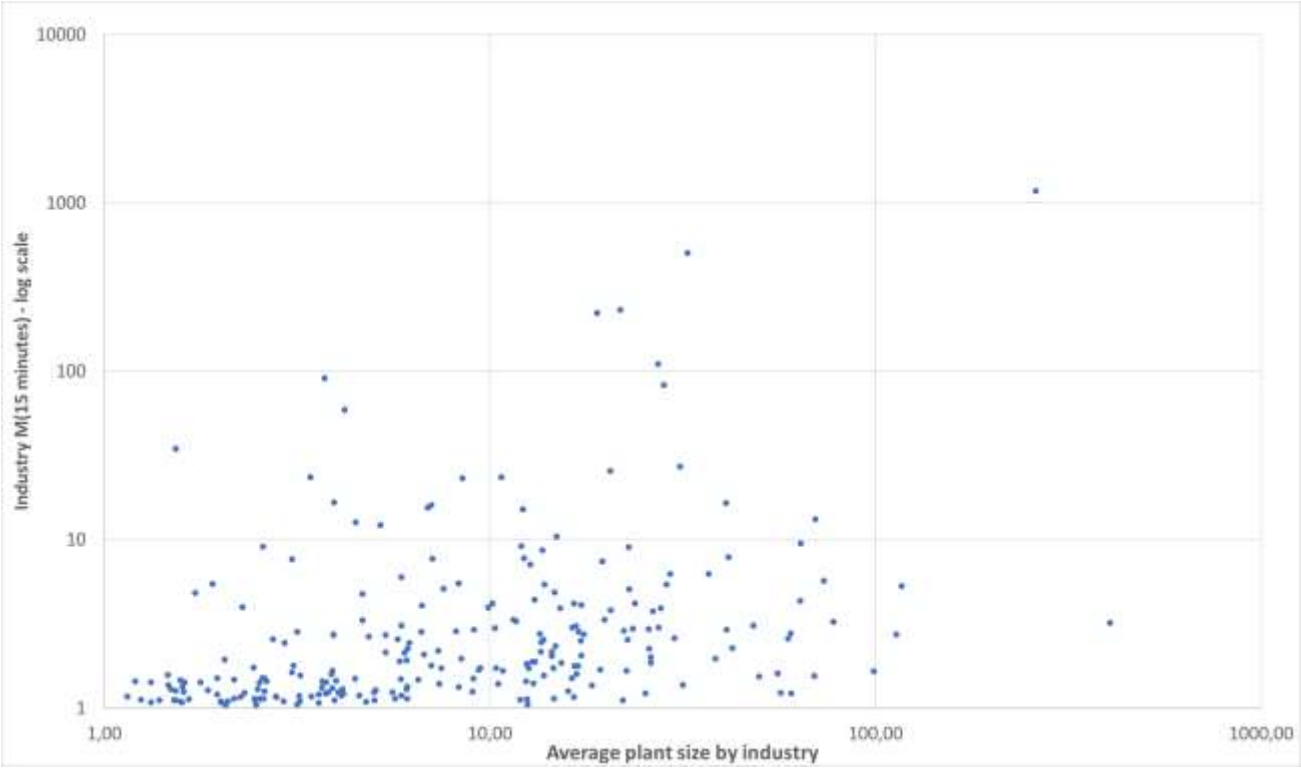

Figure 26 – Correlation of average plant size by industry and agglomeration at 15 minute distance, in 2007. ***Source:*** *Compiled by the authors*

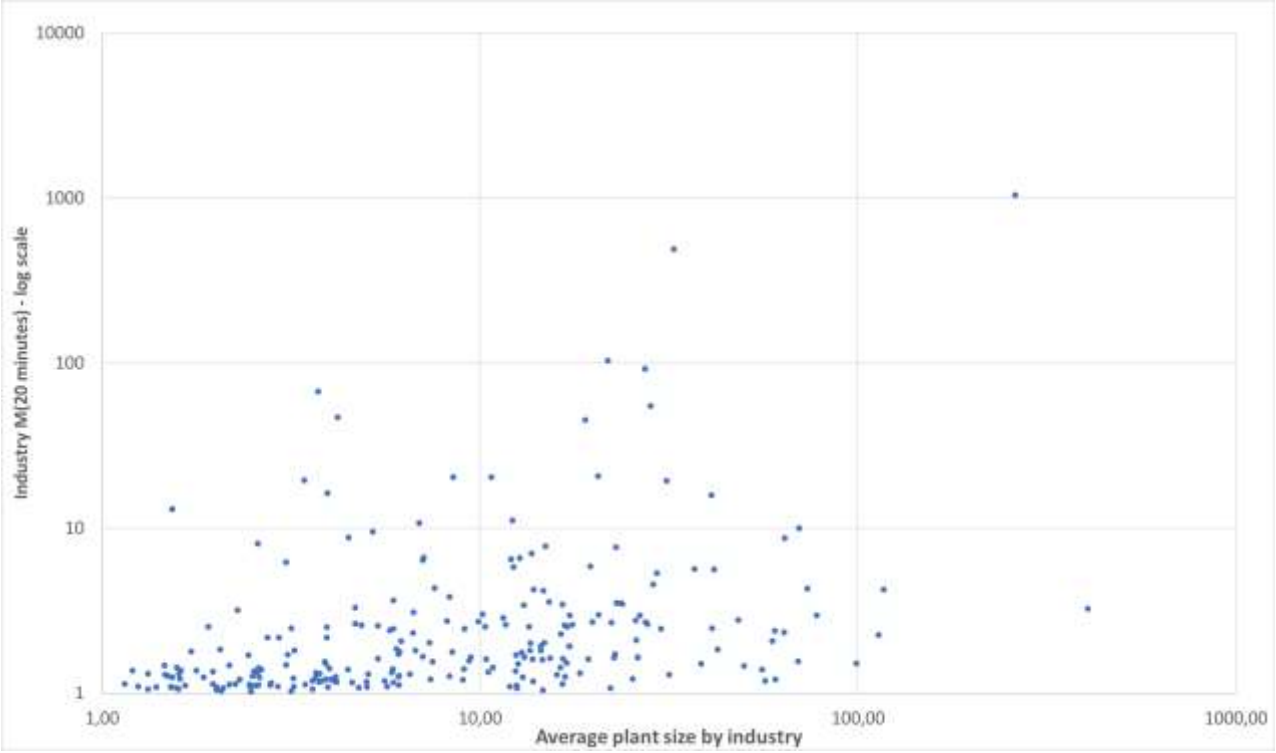

Figure 27 – *Correlation of average plant size by industry and agglomeration at 20 minute distance, in 2007.* ***Source:*** *Compiled by the authors*

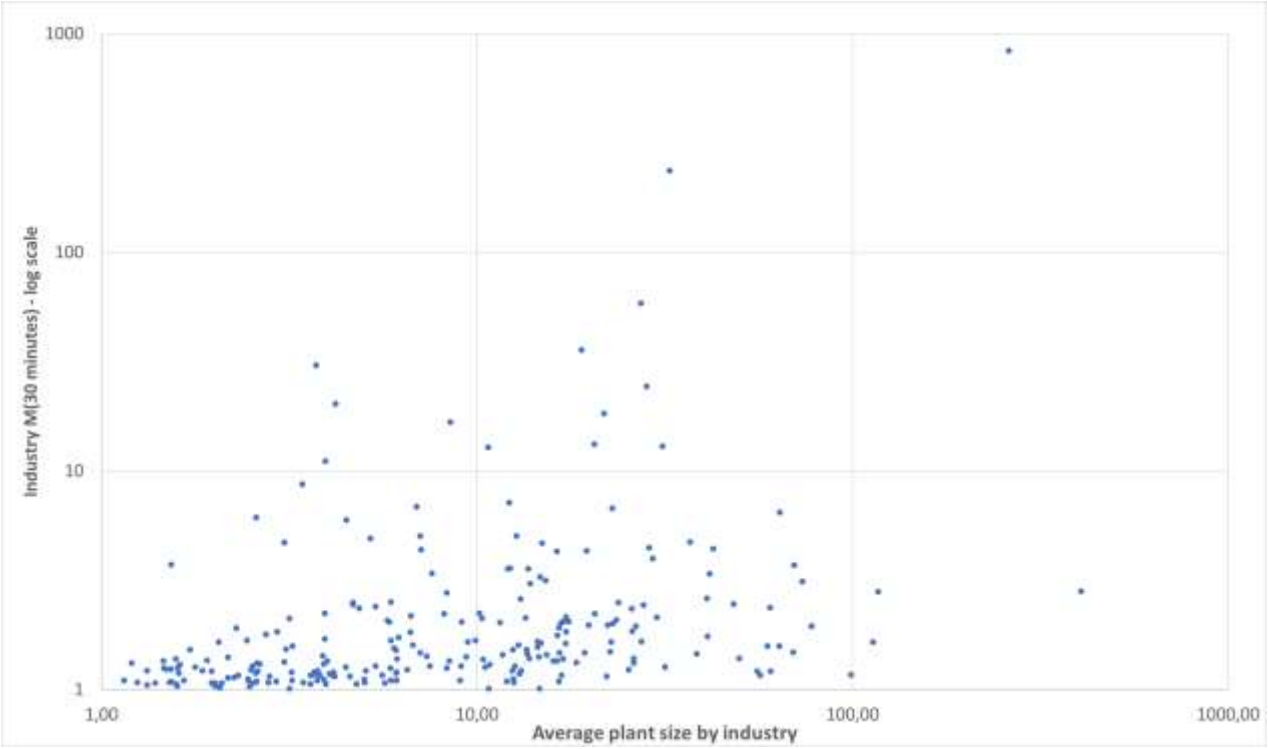

Figure 28 – *Correlation of average plant size by industry and agglomeration at 30 minute distance, in 2007.* ***Source:*** *Compiled by the authors*

Tables

Table 143 - *Agglomeration results by industry and distance range. Italy, 2007.* ***Source:*** *Compiled by the authors*

Code	Industry description	Employees	Plants	M (5 minutes)	M (10 minutes)	M (15 minutes)	M (20 minutes)	M (30 minutes)
12	GROWING OF PERENNIAL CROPS	5	4	0	0	0	0	0
13	PLANT PROPAGATION	2,75	1	-	-	-	-	-
14	ANIMAL PRODUCTION	54,34	15	0	0	0	0,05	0,86
16	SUPPORT ACTIVITIES TO AGRICULTURE AND POST-HARVEST CROP ACTIVITIES	286,11	150	9,34	5,79	5,47	2,52	1,36
22	LOGGING	153,07	100	58,21	45,78	34,65	13,06	3,72
31	FISHING	309,46	19	0	0	0	0	4,3
51	MINING OF HARD COAL	521	2	16952,27	2826,35	1175,11	1043,71	834,61
61	EXTRACTION OF CRUDE PETROLEUM	228	7	504,11	504,11	504,11	488,63	236,55
62	EXTRACTION OF NATURAL GAS	9.405,99	95	9,24	4,41	1,65	1,52	1,17
71	MINING OF IRON ORES	15	1	-	-	-	-	-
72	MINING OF NON-FERROUS METAL ORES	75,84	4	5147,11	5147,11	222,58	45,29	35,84
81	QUARRYING OF STONE, SAND AND CLAY	21.682,17	3674	15,49	11,4	5,97	3,64	2,51
89	MINING AND QUARRYING N.E.C.	3.248,64	461	47,45	33,15	16,02	6,4	5,03
91	SUPPORT ACTIVITIES FOR PETROLEUM AND NATURAL GAS EXTRACTION	1.036,66	38	267,51	264,71	110,78	92,08	58,57
99	SUPPORT ACTIVITIES FOR OTHER MINING AND QUARRYING	-	-	-	-	-	-	-
101	PROCESSING AND PRESERVING OF MEAT	58.590,43	4283	11,71	10	8,64	7,03	3,57
102	PROCESSING AND PRESERVING OF FISH, CRUSTACEANS AND MOLLUSCS	6.521,59	536	24,06	18,59	15,12	11,11	7,18
103	PROCESSING AND PRESERVING OF FRUIT AND VEGETABLES	30.867,85	2226	8,49	6,88	5,42	4,25	3,05
104	MANUFACTURE OF VEGETABLE AND ANIMAL OILS AND FATS	11.962,60	3907	11,04	9,37	7,67	6,2	4,7
105	MANUFACTURE OF DAIRY PRODUCTS	46.437,55	4499	4,31	3,55	2,98	2,53	2,11
106	MANUFACTURE OF GRAIN MILL PRODUCTS, STARCHES AND STARCH PRODUCTS	9.901,19	1489	5,09	3,62	2,83	2,32	1,83
107	MANUFACTURE OF BAKERY PRODUCTS	178.338,05	43013	1,35	1,33	1,29	1,26	1,2
108	MANUFACTURE OF OTHER FOOD PRODUCTS	56.767,55	6307	1,45	1,25	1,25	1,2	1,1
109	MANUFACTURE OF PREPARED ANIMAL FEEDS	11.505,40	882	5,93	5,14	4,39	3,42	2,59
110	MANUFACURE OF BEVERAGES	37.976,73	3300	6,25	4,32	3,35	2,86	2,03
120	MANUFACTURE OF TOBACCO PRODUCTS	1.394,02	10	0,74	0,74	0,74	0,71	0,61
131	SPINNING, WEAVING AND FINISHING OF TEXTILES	33.588,59	3135	35,71	31,88	23,44	20,34	12,81
132	WEAVING OF TEXTILES	46.720,51	3137	16,34	14,18	10,39	7,79	4,68
133	FINISHING OF TEXTILES	38.121,01	3113	11,23	9,85	7,76	5,81	3,58
139	MANUFACTURE OF OTHER TEXTILES	68.579,81	11652	4,56	3,89	3,09	2,46	1,68
141	MANUFACTURE OF WEARING APPAREL, EXCEPT FUR APPAREL	221.060,67	35791	3,31	2,92	2,44	2,07	1,73
142	MANUFACTURE OF ARTICLES OF FUR	2.965,92	1300	11,43	6,11	3,98	3,19	1,91
143	MANUFACTURE OF KNITTED AND CROCHETED APPAREL	41.698,62	5878	12,24	10,17	7,72	6,64	4,37
151	TANNING AND DRESSING OF LEATHER; MANUFACTURE OF LUGGAGE; HANDBAGS;	60.711,90	8793	28,28	20,57	15,45	10,74	6,85

	SADDLERY AND HARNESS; DRESSING AND DYEING OF FUR							
152	MANUFACTURE OF FOOTWEAR	95.076,97	11202	33,66	28,13	23,25	20,31	16,7
161	SAWMILLING AND PLANING OF WOOD	24.978,12	6361	4,48	3,43	2,72	2,17	1,7
162	MANUFACTURE OF PRODUCTS OF WOOD, CORK, STRAW AND PLAITING MATERIALS	137.597,66	35244	2,13	1,83	1,66	1,5	1,31
171	MANUFACTURE OF PULP, PAPER AND PAPERBOARD	16.029,68	385	19,95	18,46	7,88	5,6	3,39
172	MANUFACTURE OF CORRUGATED PAPER AND PAPERBOARD AND OF CONTAINERS OF PAPER AND PAPERBOARD	62.387,66	4601	3,34	2,61	2,16	1,82	1,52
181	PRINTING AND SERVICE ACTIVITIES RELATED TO PRINTING	114.102,96	20073	1,25	1,16	1,14	1,1	1,07
182	REPRODUCTION OF RECORDED MEDIA	1.378,70	427	3,13	1,76	1,56	1,82	1,58
191	MANUFACTURE OF COKE OVEN PRODUCTS	184,59	9	78,69	42,12	25,68	20,61	13,25
192	MANUFACTURE OF REFINED PETROLEUM PRODUCTS	18.456,65	674	4,96	3,38	3	2,69	1,66
201	MANUFACTURE OF BASIC CHEMICALS, FERTILIZERS AND NITROGEN COMPOUNDS, PLASTICS AND SYNTHETIC RUBBER IN PRIMARY FORMS	44.647,73	1711	3,16	2,6	2,01	1,64	1,32
202	MANUFACTURE OF PESTICIDES AND OTHER AGROCHEMICAL PRODUCTS	2.254,87	99	5,89	4,49	2,54	1,73	1,65
203	MANUFACTURE OF PAINTS, VARNISHES AND SIMILAR COATINGS, PRINTING INK AND MASTICS	21.823,22	1300	3,3	2,2	1,59	1,26	1,16
204	MANUFACTURE OF SOAP AND DETERGENTS, CLEANING AND POLISHING PREPARATIONS, PERFUMES AND TOILET PREPARATIONS	25.574,88	1750	2,65	1,9	1,72	1,59	1,41
205	MANUFACTURE OF OTHER CHEMICAL PRODUCTS N.E.C.	25.024,60	1634	2,45	2,08	1,86	1,63	1,44
206	MANUFACTURE OF MAN-MADE FIBRES	4.265,84	61	18,18	11,73	13,2	10,02	3,7
211	MANUFACTURE OF PHARMACEUTICALS	12.225,37	203	3,51	3,78	2,78	2,39	2,37
212	MANUFACTURE OF MEDICINAL CHEMICAL AND BOTANICAL PRODUCTS	56.156,68	723	4,4	3,28	3,24	2,96	1,95
221	MANUFACTURE OF RUBBER PRODUCTS	46.067,48	2004	10,21	7,72	5,07	3,53	2
222	MANUFACTURE OF PLASTICS PRODUCTS	154.941,30	12299	2,42	2,05	1,72	1,5	1,28
231	MANUFACTURE OF GLASS AND GLASS PRODUCTS	43.716,76	5191	2,76	2,23	1,96	1,78	1,35
232	MANUFACTURE OF REFRACTORY PRODUCTS	2.879,96	167	12,73	6,84	4,09	2,97	2,15
233	MANUFACTURE OF CLAY BUILDING MATERIALS	40.436,12	1299	37,21	30,05	27,12	19,29	12,96
234	MANUFACTURE OF OTHER PORCELAIN AND CERAMIC PRODUCTS	18.823,56	3627	34,34	24,19	12,21	9,52	4,92
235	MANUFACTURE OF CEMENT, LIME AND PLASTER	11.641,30	440	5,09	4,12	3,74	2,97	1,95
236	MANUFACTURE OF ARTICLES OF CONCRETE, CEMENT AND PLASTER	59.647,65	6372	2,33	1,97	1,69	1,57	1,41
237	CUTTING, SHAPING AND FINISHING OF STONE	54.824,37	11720	9,98	7,22	4,76	3,3	2,5
239	MANUFACTURE OF OTHER NON-METALLIC MINERAL PRODUCTS N.E.C.	13.759,60	1274	3,7	2,43	1,66	1,43	1,3
241	MANUFACTURE OF BASIC IRON AND STEEL	44.826,63	804	2,3	1,93	1,6	1,39	1,21
242	MANUFACTURE OF TUBES, PIPES AND HOLLOW PROFILES AND OF TUBE OR PIPE FITTINGS OF CAST-IRON	17.303,81	421	7,49	4,45	2,92	2,48	1,75
243	CASTING OF SEMI-FINISHED STEEL PRODUCTS	19.547,14	1437	4,18	2,99	2,45	2,01	1,46
244	MANUFACTURE OF BASIC PRECIOUS AND OTHER NON-FERROUS METALS; REPROCESSING OF NUCLEAR FUELS	22.381,94	807	6,02	4,58	3,93	2,62	2,43
245	CASTING OF IRON AND STEEL	35.652,19	1500	6,57	5,2	4,18	3,47	2,5

251	MANUFACTURE OF STRUCTURAL METAL PRODUCTS	199.173,42	39796	1,45	1,33	1,24	1,17	1,11
252	MANUFACTURE OF TANKS, RESERVOIRS AND CONTAINERS OF METAL	16.840,24	978	6,71	3,64	2,51	1,92	1,62
253	MANUFACTURE OF STEAM GENERATORS, EXCEPT CENTRAL HEATING HOT WATER BOILERS	3.313,77	189	6,42	4,03	2,73	2,6	2,05
254	MANUFACTURE OF WEAPONS AND AMMUNITION	7.547,86	267	205,43	109,98	82,75	54,95	24,39
255	FORGING, PRESSING, STAMPING AND ROLL-FORMING OF METAL; POWDER METALLURGY	48.935,75	2466	5,53	4,34	3,34	2,69	1,97
256	TREATMENT AND COATING OF METALS; MACHINING	197.510,42	28029	2,31	2,01	1,79	1,66	1,47
257	MANUFACTURE OF CUTLERY, HAND TOOLS AND GENERAL HARDWARE	60.630,60	5974	6,17	5,08	4,17	3	2,23
259	MANUFACTURE OF OTHER FABRICATED METAL PRODUCTS N.E.C.	130.008,99	17389	2,38	1,97	1,72	1,55	1,28
261	MANUFACTURE OF ELECTRONIC COMPONENTS AND BOARDS	42.678,79	2888	3,48	2,7	2,34	2,02	1,63
262	MANUFACTURE OF COMPUTERS AND PERIPHERAL EQUIPMENT	9.911,32	1349	3,06	2,24	2,19	2,02	1,42
263	MANUFACTURE OF COMMUNICATION EQUIPMENT	31.648,24	1400	2,55	2	1,67	1,64	1,49
264	MANUFACTURE OF CONSUMER ELECTRONICS	3.344,03	248	14,57	4,9	2,75	2,52	2,13
265	MANUFACTURE OF MEASURING, TESTING, NAVIGATING AND CONTROL EQUIPMENT; WATCHES AND CLOCKS	27.301,79	1411	2,64	1,94	1,69	1,61	1,47
266	MANUFACTURE OF IRRADIATION, ELECTROMEDICAL AND ELECTROTHERAPEUTIC EQUIPMENT	13.049,84	789	7,08	5,46	4,18	3,45	1,92
267	MANUFACTURE OF OPTICAL INSTRUMENTS AND PHOTOGRAPHIC EQUIPMENT	2.398,11	205	6,54	5,06	3,27	2,6	1,44
268	MANUFACTURE OF MAGNETIC AND OPTICAL MEDIA	523,75	53	6,51	3,26	3,95	2,72	1,68
271	MANUFACTURE OF ELECTRIC MOTORS, GENERATORS, TRANSFORMERS AND ELECTRICITY DISTRIBUTION AND CONTROL APPARATUS	57.439,66	3971	3,15	2,4	2,03	1,82	1,56
272	MANUFACTURE OF BATTERIES AND ACCUMULATORS	2.961,84	126	5,01	3,32	2,97	3,52	2,08
273	MANUFACTURE OF WIRING AND WIRING DEVICES	22.387,85	1370	6,05	4,25	3,01	2,29	1,77
274	MANUFACTURE OF ELECTRIC LIGHTING EQUIPMENT	18.218,93	2005	5,65	3,7	2,92	2,45	2,04
275	MANUFACTURE OF DOMESTIC APPLIANCES	52.036,05	813	10,81	9,97	9,48	8,74	6,48
279	MANUFACTURE OF OTHER ELECTRICAL EQUIPMENT	31.048,78	2993	2,46	2	1,72	1,6	1,37
281	MANUFACTURE OF GENERAL-PURPOSE MACHINERY	99.000,39	3372	9,67	7,81	6,25	5,35	3,98
282	MANUFACTURE OF OTHER GENERAL-PURPOSE MACHINERY	160.408,25	9689	2,29	2,02	1,77	1,62	1,47
283	MANUFACTURE OF AGRICULTURAL AND FORESTRY MACHINERY	33.996,51	2313	7,21	5,84	4,85	4,18	3,27
284	MANUFACTURE OF METAL-FORMING MACHINERY AND MACHINE TOOLS	45.239,57	2663	4,21	3,59	2,84	2,52	2,05
289	MANUFACTURE OF OTHER SPECIAL-PURPOSE MACHINERY	128.494,04	10324	2,29	2,05	1,83	1,7	1,52
291	MANUFACTURE OF MOTOR VEHICLES	62.078,08	153	4,38	3,66	3,21	3,25	2,82
292	MANUFACTURE OF BODIES (COACHWORK) FOR MOTOR VEHICLES; MANUFACTURE OF TRAILERS AND SEMI-TRAILERS	16.685,63	750	4,81	3,85	2,87	2,68	1,97
293	MANUFACTURE OF PARTS AND ACCESSORIES FOR MOTOR VEHICLES	103.133,67	2143	4,08	3,67	3,09	2,77	2,46
301	BUILDING OF SHIPS AND BOATS	32.827,42	2581	11,31	9,52	7,12	6,56	5,03
302	MANUFACTURE OF RAILWAY LOCOMOTIVES AND ROLLING STOCKS	10.147,69	159	6,81	5,63	4,32	2,34	1,58

303	MANUFACTURE OF AIR AND SPACECRAFT AND RELATED MACHINERY	31.511,70	270	7,29	6,58	5,31	4,24	2,8
304	MANUFACTURE OF MILITARY FIGHTING VEHICLES	87	4	18732,45	589,3	231,04	103,81	18,35
309	MANUFACTURE OF TRANSPORT EQUIPMENT N.E.C.	21.970,94	1068	8,13	6,27	3,8	2,99	2,22
310	MANUFACTURE OF FURNITURE	191.982,91	28839	6,61	5,47	4,05	3,09	2,17
321	MANUFACTURE OF JEWELLERY, BIJOUTERIE AND RELATED ARTICLES	41.204,11	10447	36,31	33,9	16,7	16,33	11,1
322	MANUFACTURE OF MUSICAL INSTRUMENTS	2.353,94	688	47,58	28,32	23,55	19,46	8,68
323	MANUFACTURE OF SPORTS GOODS	6.006,06	724	9,68	6,72	5,49	3,83	2,77
324	MANUFACTURE OF GAMES AND TOYS	4.020,93	657	4,48	3,13	2,26	1,78	1,38
325	MANUFACTURE OF MEDICAL AND DENTAL INSTRUMENTS AND SUPPLIES	63.924,26	16260	3,13	3,03	2,73	2,51	2,23
329	OTHER MANUFACTURING N.E.C.	20.265,27	3782	4,74	2,95	2,14	1,62	1,28
331	REPAIR OF FABRICATED METAL PRODUCTS, MACHINERY AND EQUIPMENT	128.128,62	32421	1,19	1,13	1,11	1,09	1,06
332	INSTALLATION OF INDUSTRIAL MACHINERY AND EQUIPMENT	56.483,72	9575	1,36	1,26	1,19	1,16	1,1
351	ELECTRIC POWER GENERATION, TRANSMISSION AND DISTRIBUTION	60.868,92	3311	1,56	1,42	1,36	1,32	1,33
352	MANUFACTURE OF GAS; DISTRIBUTION OF GASEOUS FUELS THROUGH MAINS	20.663,21	1408	1,59	1,27	1,14	1,04	1,01
353	STEAM AND AIR CONDITIONING SUPPLY	2.641,03	158	2,96	3,13	3,07	2,58	2,01
360	WATER COLLECTION, TREATMENT AND SUPPLY	28.814,19	1807	1,59	1,35	1,26	1,29	1,35
370	SEWERAGE	11.340,09	1738	2,01	1,72	1,47	1,3	1,23
381	WASTE COLLECTION	83.076,43	3285	1,27	1,23	1,22	1,22	1,23
382	WASTE TREATMENT AND DISPOSAL	17.404,11	1341	1,8	1,51	1,4	1,25	1,18
383	MATERIALS RECOVERY	20.381,58	3344	1,69	1,47	1,34	1,28	1,2
390	REMEDIATION ACTIVITIES AND OTHER WASTE MANAGEMENT SERVICES	3.317,36	406	4,84	3,54	2,86	2,74	2,22
411	PROJECT MANAGEMENT ACTIVITIES RELATED TO CONSTRUCTION	16.840,43	10703	1,77	1,55	1,46	1,43	1,38
412	CONSTRUCTION OF BUILDINGS	742.194,38	202297	1,52	1,41	1,32	1,24	1,17
421	CONSTRUCTION OF ROADS AND RAILWAYS	50.065,88	5528	2,28	1,72	1,49	1,4	1,28
422	CONSTRUCTION OF UTILITY PROJECTS	18.976,96	493	2,95	2,58	1,97	1,51	1,46
429	CONSTRUCTION OF OTHER CIVIL ENGINGEERING PROJECTS	21.536,30	3190	2,97	2,54	2,08	1,82	1,6
431	DEMOLITION AND SITE PREPARATION	50.735,29	13775	1,91	1,65	1,44	1,33	1,2
432	ELECTRICAL, PLUMBING AND OTHER CONSTRUCTION INSTALLATION ACTIVITIES	506.546,22	160326	1,13	1,08	1,05	1,03	1,01
433	BUILDING COMPLETION AND FINISHING	512.811,69	261363	1,42	1,28	1,2	1,14	1,07
439	OTHER SPECIALIZED CONSTRUCTION ACTIVITIES	65.527,99	16766	1,59	1,43	1,31	1,21	1,11
451	SALE OF MOTOR VEHICLES	119.349,28	23767	1,28	1,16	1,11	1,09	1,08
452	MAINTENANCE AND REPAIR OF MOTOR VEHICLES	233.894,94	90246	1,19	1,16	1,14	1,12	1,09
453	SALE OF MOTOR VEHICLE PARTS AND ACCESSORIES	30.002,78	7197	1,35	1,25	1,21	1,17	1,15
454	SALE, MAINTENANCE AND REPAIR OF MOTORCYCLES AND RELATED PARTS AND ACCESSORIES	19.484,22	7921	1,16	1,14	1,11	1,1	1,1
461	WHOLESALE ON A FEE OR CONTRACT BASIS	306.511,22	246059	1,21	1,15	1,12	1,1	1,08
462	WHOLESALE OF AGRICULTURAL RAW MATERIALS AND LIVE ANIMALS	26.252,48	9577	3,78	3,03	2,57	2,17	1,79

463	WHOLESALE OF FOOD, BEVERAGES AND TOBACCO	175.961,16	39386	1,71	1,58	1,49	1,39	1,27
464	WHOLESALE OF HOUSEHOLD GOODS	262.248,75	64907	1,43	1,32	1,24	1,21	1,18
465	WHOLESALE OF MACHINERY, EQUIPMENT AND SUPPLIES	54.560,92	13231	1,24	1,22	1,19	1,18	1,16
466	WHOLESALE OF OTHER MACHINERY AND EQUIPMENT	94.856,31	20699	1,26	1,2	1,19	1,16	1,15
467	OTHER SPECIALIZED WHOLESALE	226.222,89	47382	1,16	1,12	1,09	1,08	1,06
469	NON-SPECIALIZED WHOLESALE TRADE	51.406,62	14304	1,21	1,18	1,2	1,19	1,16
471	RETAIL SALE IN NON-SPECIALIZED STORES	496.960,91	81565	1,13	1,14	1,14	1,12	1,1
472	RETAIL SALE OF FOOD, BEVERAGES AND TOBACCO IN SPECIALIZED STORES	208.288,69	112391	1,36	1,32	1,28	1,25	1,22
473	RETAIL SALE OF AUTOMOTIVE FUEL IN SPECIALIZED STORES	70.222,84	26928	1,26	1,26	1,26	1,25	1,21
474	RETAIL SALE OF INFORMATION AND COMMUNICATIONS EQUIPMENT IN SPECIALIZED STORES	37.923,74	13544	1,18	1,16	1,16	1,15	1,15
475	RETAIL SALE OF OTHER HOUSEHOLD EQUIPMENT IN SPECIALIZED STORES	247.524,98	98986	1,35	1,32	1,29	1,27	1,23
476	RETAIL SALE OF CULTURAL AND RECREATION GOODS IN SPECIALIZED STORES	105.282,85	52496	1,15	1,13	1,1	1,09	1,07
477	RETAIL SALE OF OTHER GOODS IN SPECIALIZED STORES	598.930,00	265820	1,22	1,18	1,16	1,14	1,14
478	RETAIL SALE VIA STALLS AND MARKETS	130.529,21	98866	2,01	1,67	1,42	1,31	1,22
479	RETAIL TRADE NOT IN STORES, STALLS OR MARKETS	28.850,67	9886	1,28	1,21	1,1	1,1	1,09
491	PASSENGER RAIL TRANSPORT, INTERURBAN	52.827,71	761	1,5	1,52	1,55	1,56	1,48
492	FREIGHT RAIL TRANSPORT	1.020,61	24	2,99	2,16	2,27	1,84	4,41
493	OTHER PASSENGER LAND TRANSPORT	159.007,52	26115	1,35	1,3	1,29	1,26	1,19
494	FREIGHT TRANSPORT BY ROAD	341.843,56	99350	1,34	1,24	1,17	1,13	1,08
495	TRANSPORT VIA PIPELINE	3.011,22	136	8,01	3,74	1,11	1,07	1,15
501	SEA AND COASTAL WATER TRANSPORT	12.837,14	560	10,44	10,69	9,06	7,63	6,76
502	INLAND WATER TRANSPORT	10.718,39	290	8,04	6,97	6,24	5,65	4,73
503	INLAND PASSENGER WATER TRANSPORT	2.608,01	622	64,59	61,84	59,02	46,77	20,29
504	INLAND FREIGHT WATER TRANSPORT	603,34	162	90,94	90,78	91,23	66,98	30,48
511	PASSENGER AIR TRANSPORT	22.301,52	545	19,68	17,49	16,57	15,86	2,61
512	FREIGHT AIR TRANSPORT	343,68	25	36,45	3,07	2,54	1,6	1,39
521	WAREHOUSING AND STORAGE	31.898,27	3038	1,75	1,47	1,39	1,34	1,27
522	SUPPORT ACTIVITIES FOR TRANSPORTATION	317.824,47	25598	1,62	1,5	1,44	1,36	1,22
531	POSTAL ACTIVITIES	154.135,00	12315	0,68	0,95	1,05	1,07	1,08
532	COURIER ACTIVITIES	12.903,72	2551	1,56	1,43	1,28	1,3	1,22
551	HOTELS	233.991,97	30876	6,8	5,88	5,13	4,33	3,41
552	OTHER SHORT TERM ACCOMODATION ACTIVITIES	40.834,78	15845	11,66	10,35	9,09	8,05	6,14
553	CAMPING GROUNDS, RECREATIONAL VEHICLE PARKS AND TRAILER PARKS	9.205,42	2050	18,84	15,6	12,67	8,8	5,95
559	OTHER ACCOMODATION	1.593,44	341	3,11	3,29	3,33	2,63	2,45
561	RESTAURANTS AND MOBILE FOOD SERVICE ACTIVITIES	458.246,97	122294	1,35	1,28	1,22	1,17	1,1
562	EVENT CATERING AND OTHER FOOD SERVICE ACTIVITIES	114.392,05	9164	1,1	1,08	1,13	1,11	1,12
563	BEVERAGE SERVING ACTIVITIES	332.990,03	131278	1,2	1,18	1,14	1,11	1,07

581	PUBLISHING OF BOOKS, PERIODICALS AND OTHER PUBLISHING ACTIVITIES	42.732,43	7032	2,21	2,14	1,92	1,72	1,51
582	SOFTWARE PUBLISHING	3.475,97	591	1,81	1,55	1,48	1,4	1,25
591	MOTION PICTURE, VIDEO AND TELEVISION PROGRAMME ACTIVITIES	34.777,62	7160	2,86	2,74	2,65	2,59	2,35
592	SOUND RECORDING AND MUSIC PUBLISHING ACTIVITIES	1.820,82	889	2,34	2,17	1,94	1,84	1,65
601	RADIO BROADCASTING	4.719,77	1254	2,14	1,61	1,42	1,31	1,22
602	TELEVISION PROGRAMMING AND BROADCASTING ACTIVITIES	22.083,32	733	3,34	2,76	2,6	2,45	2,14
611	WIRED TELECOMMUNICATIONS ACTIVITIES	73.552,23	1296	1,4	1,33	1,23	1,19	1,16
612	WIRELESS TELECOMMUNICATIONS ACTIVITIES	20.289,84	179	4,64	3,64	2,74	2,26	1,65
613	SATELLITE TELECOMMUNICATIONS ACTIVITIES	515,34	20	2,59	2,59	2,94	2,75	2,34
619	OTHER TELECOMMUNICATIONS ACTIVITIES	10.013,04	3793	1,29	1,35	1,44	1,39	1,31
620	COMPUTER PROGRAMMING, CONSULTANCY AND RELATED ACTIVITIES	199.932,66	50145	1,47	1,47	1,45	1,41	1,35
631	DATA PROCESSING, HOSTING AND RELATED ACTIVITIES; WEB PORTALS	135.775,00	37722	1,16	1,11	1,07	1,06	1,06
639	OTHER INFORMATION SERVICE ACTIVITIES	3.825,36	1764	1,53	1,48	1,47	1,47	1,4
641	MONETARY INTERMEDIATION	358.988,03	33390	1	1	0,99	0,99	1,01
642	ACTIVITIES OF HOLDING COMPANIES	5.984,44	413	2,8	2,7	2,16	1,94	1,66
643	TRUSTS, FUNDS AND SIMILAR FINANCIAL ENTITIES	458,62	16	2,45	6,93	5,41	4,56	4,45
649	OTHER FINANCIAL SERVICE ACTIVITIES, EXCEPT INSURANCE AND PENSION FUNDING ACTIVITIES	35.923,21	5977	2,71	2,56	2,12	1,85	1,55
651	INSURANCE	38.077,59	1456	2,3	2,15	1,85	1,65	1,39
652	REINSURANCE	294	4	8,1	8,02	5,69	4,31	3,12
661	ACTIVITIES AUXILIARY TO FINANCIAL SERVICE ACTIVITIES, EXCEPT INSURANCE AND PENSION FUNDING	40.420,11	29101	1,22	1,17	1,11	1,09	1,07
662	ACTIVITIES AUXILIARY TO INSURANCE AND PENSION FUNDING	102.281,83	41285	1,18	1,09	1,04	1,02	1,03
663	FUND MANAGEMENT ACTIVITIES	4.539,29	232	10,44	10,37	7,46	5,85	4,32
681	BUYING AND SELLING OF SELF-OWNED REAL ESTATE	43.166,69	28977	1,45	1,37	1,29	1,28	1,24
682	RENTING AND OPERATING OF SELF-OWNED OR LEASED REAL ESTATE	186.805,34	122049	1,37	1,33	1,27	1,25	1,24
683	REAL ESTATE ACTIVITIES ON A FEE OR CONTRACT BASIS	78.522,25	48918	1,37	1,3	1,25	1,22	1,19
691	LEGAL ACTIVITIES	207.447,81	141573	1,65	1,53	1,37	1,29	1,25
692	ACCOUNTING, BOOKKEEPING AND AUDITING ACTIVITIES; TAX CONSULTANCY	243.521,77	121291	1,23	1,16	1,08	1,05	1,04
701	ACTIVITIES OF HEAD OFFICE	19.317,20	1497	2,04	1,96	1,88	1,76	1,6
702	MANAGEMENT CONSULTANCY ACTIVITIES	122.640,64	48589	1,52	1,49	1,41	1,36	1,28
711	ARCHITECTURAL AND ENGINEERING ACTIVITIES AND RELATED TECHNICAL CONSULTANCY	287.692,22	217633	1,14	1,1	1,08	1,06	1,05
712	TECHNICAL TESTING AND ANALYSIS	25.918,19	8053	1,18	1,14	1,1	1,1	1,1
721	RESEARCH AND EXPERIMENTAL DEVELOPMENT ON NATURAL SCIENCES AND ENGINEERING	21.305,56	6648	1,54	1,27	1,18	1,23	1,2
722	RESEARCH AND EXPERIMENTAL DEVELOPMENT ON SOCIAL SCIENCES AND HUMANITIES	3.507,22	2398	1,86	1,75	1,57	1,47	1,35
731	ADVERTISING	52.017,79	20020	1,62	1,58	1,5	1,42	1,32
732	MARKET RESEARCH AND PUBLIC OPINION POLLING	19.402,98	6268	1,93	1,88	1,79	1,71	1,53
741	SPECIALIZED DESIGN ACTIVITIES	38.171,67	23954	1,48	1,42	1,34	1,31	1,26

742	PHOTOGRAPHIC ACTIVITIES	23.369,06	15268	1,13	1,14	1,11	1,09	1,09
743	TRANSLATION AND INTERPRETATION ACTIVITIES	7.831,07	6517	1,63	1,54	1,44	1,37	1,32
749	OTHER PROFESSIONAL, SCIENTIFIC AND TECHNICAL ACTIVITIES N.E.C.	112.307,14	70962	1,15	1,12	1,09	1,07	1,06
750	VETERINARY ACTIVITIES	13.827,15	12072	1,26	1,2	1,17	1,14	1,1
771	RENTING AND LEASING OF MOTOR VEHICLES	10.234,02	2639	1,76	1,66	1,58	1,55	1,43
772	RENTING AND LEASING OF PERSONAL AND HOUSEHOLD GOODS	11.057,78	6222	1,55	1,48	1,42	1,37	1,27
773	RENTING AND LEASING OF OTHER MACHINERY, EQUIPMENT AND TANGIBLE GOODS	21.646,68	8890	1,83	1,77	1,74	1,7	1,68
774	LEASING OF INTELLECTUAL PROPERTY AND SIMILAR PRODUCTS, EXCEPT COPYRIGHTED WORKS	95,2	22	0,71	0,7	0,51	0,4	0,49
781	ACTIVITES OF EMPLOYMENT PLACEMENT AGENCIES	3.940,53	1343	2,89	2,84	2,43	2,17	1,84
782	TEMPORARY EMPLOYMENT AGENCY ACTIVITIES	251.424,98	4157	1,58	1,34	1,22	1,21	1,21
783	OTHER HUMAN RESOURCES PROVISION	949	16	3,68	3,66	2,59	2,06	1,58
791	TRAVEL AGENCY AND TOUR OPERATOR ACTIVITIES	44.720,89	11744	1,34	1,3	1,24	1,19	1,16
799	OTHER RESERVATION SERVICE AND RELATED ACTIVITIES	5.139,09	2990	5,06	4,93	4,82	1,79	1,52
801	PRIVATE SECURITY ACTIVITIES	71.921,63	2276	1,5	1,45	1,37	1,29	1,27
802	SECURITY SYSTEMS SERVICE ACTIVITIES	151,75	11	2,22	2,2	1,56	1,18	0,85
803	INVESTIGATION ACTIVITIES	3.337,37	1297	1,4	1,56	1,51	1,33	1,19
811	COMBINED FACILITIES SUPPORT ACTIVITIES	6.726,05	260	2,36	2,25	2,26	2,1	1,85
812	CLEANING ACTIVITIES	411.465,13	34283	1,12	1,11	1,12	1,1	1,09
813	LANDSCAPE CARE AND MAINTENANCE SERVICE ACTIVITIES	11.568,08	5895	2,1	1,74	1,51	1,35	1,21
821	OFFICE ADMINISTRATIVE AND SUPPORT ACTIVITIES	15.529,25	6714	1,4	1,33	1,23	1,21	1,16
822	ACTIVITIES OF CALL CENTERS	31.244,34	1812	2,12	1,88	2,05	1,92	1,84
823	ORGANIZATION OF CONVENTIONS AND TRADE SHOWS	15.290,53	4991	1,84	1,75	1,63	1,48	1,34
829	BUSINESS SUPPORT SERVICE ACTIVITIES N.E.C.	169.256,92	78055	1,17	1,16	1,14	1,13	1,13
851	PRE-PRIMARY EDUCATION	14.955,28	2784	3,06	3,03	2,72	2,56	2,4
852	PRIMARY EDUCATION	4.830,00	317	6,11	5,81	3,93	3,57	3,15
853	SECONDARY EDUCATION	13.670,88	1449	2,41	1,89	1,73	1,65	1,65
854	HIGHER EDUCATION	501,97	68	1,54	1,46	1,39	1,21	0,94
855	OTHER EDUCATION	44.008,72	21023	1,18	1,14	1,1	1,07	1,07
856	EDUCATIONAL SUPPORT ACTIVITIES	747,18	128	4,52	3,5	1,89	1,33	2,04
861	HOSPITAL ACTIVITIES	86.487,74	1731	1,9	1,71	1,54	1,46	1,39
862	MEDICAL AND DENTAL PRACTICE ACTIVITIES	242.639,64	159869	1,17	1,14	1,11	1,09	1,08
869	OTHER HUMAN HEALTH ACTIVITIES	99.478,65	60050	1,19	1,16	1,13	1,11	1,1
871	RESIDENTIAL NURSING CARE FACILITIES	28.137,20	1663	2,67	2,06	1,78	1,53	1,38
872	RESIDENTIAL CARE ACTIVITIES FOR MENTAL RETARDATION, MENTAL HEALTH AND SUBSTANCE ABUSE	2.279,79	189	13,43	15,92	9,19	6,49	3,57
873	RESIDENTIAL CARE ACTIVITIES FOR THE ELDERLY AND DISABLED	62.718,65	3841	1,9	1,66	1,5	1,43	1,35
879	OTHER RESIDENTIAL CARE ACTIVITIES	4.513,37	345	1,83	2,57	1,88	1,65	1,22

881	SOCIAL WORK ACTIVITIES WITHOUT ACCOMODATION FOR THE ELDERLY AND DISABLED	102.860,86	6234	1,27	1,23	1,16	1,14	1,09
889	OTHER SOCIAL WORK ACTIVITIES WITHOUT ACCOMODATION	15.039,80	1811	1,57	1,43	1,33	1,27	1,25
900	CREATIVE, ARTS AND ENTERTAINMENT ACTIVITIES	50.404,49	31207	1,58	1,51	1,42	1,37	1,3
910	LIBRARIES, ARCHIVES, MUSEUMS AND OTHER CULTURAL ACTIVITIES	7.766,76	1345	3,49	3,18	2,56	2,4	2,07
920	GAMBLING AND BETTING ACTIVITIES	18.497,20	3307	1,42	1,3	1,24	1,19	1,16
931	SPORTS ACTIVITIES	29.737,53	10697	1,3	1,22	1,17	1,12	1,08
932	OTHER AMUSEMENT AND RECREATION ACTIVITIES	58.350,99	18443	3,71	3,26	2,84	2,47	2,11
951	REPAIR OF COMPUTERS AND COMMUNICATION EQUIPMENT	17.088,85	6969	1,17	1,17	1,14	1,13	1,12
952	REPAIR OF PERSONAL AND HOUSEHOLD GOODS	37.893,09	23801	1,13	1,1	1,08	1,06	1,04
960	OTHER PERSONAL SERVICE ACTIVITIES	348.944,94	169009	1,08	1,06	1,04	1,03	1,02
	TOTAL	**17.586.862,15**	**4.884.605**					

Table 144 - *Agglomeration results by industry and distance range. Italy, 2012.* ***Source:*** *Compiled by the authors*

Code	Industry description	Employees	Plants	M (5 minutes)	M (10 minutes)	M (15 minutes)	M (20 minutes)	M (30 minutes)
12	GROWING OF PERENNIAL CROPS	-	-	-	-	-	-	-
13	PLANT PROPAGATION	-	-	-	-	-	-	-
14	ANIMAL PRODUCTION	-	-	-	-	-	-	-
16	SUPPORT ACTIVITIES TO AGRICULTURE AND POST-HARVEST CROP ACTIVITIES	-	-	-	-	-	-	-
22	LOGGING	-	-	-	-	-	-	-
31	FISHING	-	-	-	-	-	-	-
51	MINING OF HARD COAL	442,34	1	-	-	-	-	-
61	EXTRACTION OF CRUDE PETROLEUM	331,47	13	99,78	99,78	99,78	96,87	45,4
62	EXTRACTION OF NATURAL GAS	7.906,62	64	42,94	23,67	5,89	5,01	3,99
71	MINING OF IRON ORES	-	-	-	-	-	-	-
72	MINING OF NON-FERROUS METAL ORES	46,15	7	0	0	0	0	0
81	QUARRYING OF STONE, SAND AND CLAY	14.004,57	2.690	15,56	10,24	6,01	3,63	2,63
89	MINING AND QUARRYING N.E.C.	2.877,20	402	52,73	42,25	15,69	6,08	4,4
91	SUPPORT ACTIVITIES FOR PETROLEUM AND NATURAL GAS EXTRACTION	1.715,54	63	87,52	83,1	46,04	38,19	28,14
99	SUPPORT ACTIVITIES FOR OTHER MINING AND QUARRYING	73,49	10	0	0	0	0	0
101	PROCESSING AND PRESERVING OF MEAT	57.096,10	4.150	10,67	9,25	7,97	6,66	3,37
102	PROCESSING AND PRESERVING OF FISH, CRUSTACEANS AND MOLLUSCS	5.346,38	472	22,47	16,95	15,28	10,23	6,72
103	PROCESSING AND PRESERVING OF FRUIT AND VEGETABLES	28.041,97	2.030	8,45	6,83	5,34	4,29	3,03
104	MANUFACTURE OF VEGETABLE AND ANIMAL OILS AND FATS	10.779,71	3.498	10,7	9,06	7,03	5,58	4,31
105	MANUFACTURE OF DAIRY PRODUCTS	42.555,81	4.116	4,51	3,63	3,02	2,47	1,98
106	MANUFACTURE OF GRAIN MILL PRODUCTS, STARCHES AND STARCH PRODUCTS	8.490,36	1.110	6,07	4,26	2,89	2,5	1,9
107	MANUFACTURE OF BAKERY PRODUCTS	170.892,91	38.396	1,41	1,39	1,34	1,31	1,24
108	MANUFACTURE OF OTHER FOOD PRODUCTS	59.205,81	6.005	1,51	1,35	1,32	1,29	1,13
109	MANUFACTURE OF PREPARED ANIMAL FEEDS	7.146,22	637	7,31	5,18	4,14	3,53	2,86
110	MANUFACURE OF BEVERAGES	35.461,89	3.420	6,27	4,7	3,49	2,89	2,02
120	MANUFACTURE OF TOBACCO PRODUCTS	531,12	8	0,1	0,1	0,1	0,1	0,09
131	SPINNING, WEAVING AND FINISHING OF TEXTILES	20.517,02	2.061	42,34	37,21	25,88	22,53	14,18
132	WEAVING OF TEXTILES	32.153,14	2.349	19,18	15,85	11,22	8,31	5,04
133	FINISHING OF TEXTILES	26.925,24	2.450	12,13	10,5	8,14	5,86	3,52
139	MANUFACTURE OF OTHER TEXTILES	55.212,51	10.051	4,48	3,74	2,96	2,37	1,63
141	MANUFACTURE OF WEARING APPAREL, EXCEPT FUR APPAREL	178.783,97	30.828	4,12	3,67	2,93	2,35	1,91
142	MANUFACTURE OF ARTICLES OF FUR	2.177,82	950	10,66	6,47	4,48	3,71	2,12
143	MANUFACTURE OF KNITTED AND CROCHETED APPAREL	31.149,17	4.441	13,88	11,35	8,47	7	4,55
151	TANNING AND DRESSING OF LEATHER; MANUFACTURE OF LUGGAGE; HANDBAGS; SADDLERY AND HARNESS; DRESSING AND DYEING OF FUR	56.746,64	7.820	27,31	20,14	15,18	10,92	7,3
152	MANUFACTURE OF FOOTWEAR	80.786,56	9.420	35,77	29,95	24,7	21,29	17,41

161	SAWMILLING AND PLANING OF WOOD	20.115,12	5.338	4,82	3,47	2,83	2,29	1,67
162	MANUFACTURE OF PRODUCTS OF WOOD, CORK, STRAW AND PLAITING MATERIALS	108.522,11	28.188	2,14	1,82	1,65	1,5	1,32
171	MANUFACTURE OF PULP, PAPER AND PAPERBOARD	12.357,93	313	21,09	19,28	7,88	6,25	3,97
172	MANUFACTURE OF CORRUGATED PAPER AND PAPERBOARD AND OF CONTAINERS OF PAPER AND PAPERBOARD	60.858,51	4.483	3,2	2,52	2,11	1,75	1,49
181	PRINTING AND SERVICE ACTIVITIES RELATED TO PRINTING	89.638,29	17.117	1,25	1,16	1,14	1,1	1,06
182	REPRODUCTION OF RECORDED MEDIA	1.240,57	322	4,15	1,87	1,63	1,73	1,66
191	MANUFACTURE OF COKE OVEN PRODUCTS	272,18	5	0	0	0	0	0
192	MANUFACTURE OF REFINED PETROLEUM PRODUCTS	18.674,88	698	6,3	4,42	3,92	3,31	1,84
201	MANUFACTURE OF BASIC CHEMICALS, FERTILIZERS AND NITROGEN COMPOUNDS, PLASTICS AND SYNTHETIC RUBBER IN PRIMARY FORMS	37.785,81	1.508	2,92	2,22	1,87	1,6	1,32
202	MANUFACTURE OF PESTICIDES AND OTHER AGROCHEMICAL PRODUCTS	1.826,40	73	11,88	6,87	4,05	2,37	1,76
203	MANUFACTURE OF PAINTS, VARNISHES AND SIMILAR COATINGS, PRINTING INK AND MASTICS	20.112,26	1.136	3,26	2,31	1,69	1,28	1,21
204	MANUFACTURE OF SOAP AND DETERGENTS, CLEANING AND POLISHING PREPARATIONS, PERFUMES AND TOILET PREPARATIONS	24.360,20	1.624	2,51	1,95	1,7	1,58	1,37
205	MANUFACTURE OF OTHER CHEMICAL PRODUCTS N.E.C.	22.198,99	1.415	3,05	2,26	2,05	1,8	1,57
206	MANUFACTURE OF MAN-MADE FIBRES	2.978,57	54	16,82	21,44	13,85	11,85	4
211	MANUFACTURE OF PHARMACEUTICALS	12.334,40	157	7,79	4,75	3,26	2,55	2,36
212	MANUFACTURE OF MEDICINAL CHEMICAL AND BOTANICAL PRODUCTS	48.740,61	568	4,76	3,75	3,1	2,84	2
221	MANUFACTURE OF RUBBER PRODUCTS	39.582,43	1.851	10,34	7,57	5,55	3,87	2,23
222	MANUFACTURE OF PLASTICS PRODUCTS	140.930,88	10.699	2,58	2,14	1,78	1,57	1,32
231	MANUFACTURE OF GLASS AND GLASS PRODUCTS	37.839,29	4.392	2,62	2,08	1,84	1,68	1,29
232	MANUFACTURE OF REFRACTORY PRODUCTS	2.623,77	165	10,64	5,73	3,02	2,5	1,84
233	MANUFACTURE OF CLAY BUILDING MATERIALS	29.786,78	989	40,75	31,86	29,72	20,15	13,62
234	MANUFACTURE OF OTHER PORCELAIN AND CERAMIC PRODUCTS	13.339,28	2.643	38,87	27,94	14,15	10,3	5,03
235	MANUFACTURE OF CEMENT, LIME AND PLASTER	9.448,54	367	8,94	5,59	4,54	3,82	2,23
236	MANUFACTURE OF ARTICLES OF CONCRETE, CEMENT AND PLASTER	41.902,25	5.061	2,45	2,06	1,73	1,62	1,44
237	CUTTING, SHAPING AND FINISHING OF STONE	44.469,75	10.537	9,8	7,16	4,5	3,1	2,34
239	MANUFACTURE OF OTHER NON-METALLIC MINERAL PRODUCTS N.E.C.	11.970,08	1.251	3,29	2,41	1,67	1,41	1,21
241	MANUFACTURE OF BASIC IRON AND STEEL	40.889,78	577	3,14	2,3	1,7	1,36	1,34
242	MANUFACTURE OF TUBES, PIPES AND HOLLOW PROFILES AND OF TUBE OR PIPE FITTINGS OF CAST-IRON	16.016,32	468	6	3,8	2,68	2,26	1,59
243	CASTING OF SEMI-FINISHED STEEL PRODUCTS	18.428,80	1.316	3,78	2,69	2,31	1,99	1,46
244	MANUFACTURE OF BASIC PRECIOUS AND OTHER NON-FERROUS METALS; REPROCESSING OF NUCLEAR FUELS	18.832,71	881	5,66	3,68	3,2	2,33	2,18
245	CASTING OF IRON AND STEEL	29.774,46	1.317	6,93	5,64	4,64	3,89	2,71
251	MANUFACTURE OF STRUCTURAL METAL PRODUCTS	175.260,27	36.021	1,47	1,34	1,23	1,17	1,1
252	MANUFACTURE OF TANKS, RESERVOIRS AND CONTAINERS OF METAL	13.341,44	766	7,35	4,16	2,99	2,18	1,73

253	MANUFACTURE OF STEAM GENERATORS, EXCEPT CENTRAL HEATING HOT WATER BOILERS	2.330,59	144	6,96	5,24	2,81	3,01	2,17
254	MANUFACTURE OF WEAPONS AND AMMUNITION	6.490,58	275	195,57	108,5	76,61	50,2	17,58
255	FORGING, PRESSING, STAMPING AND ROLL-FORMING OF METAL; POWDER METALLURGY	40.020,81	1.824	6,64	5,13	3,89	3,04	1,98
256	TREATMENT AND COATING OF METALS; MACHINING	132.579,06	17.557	2,66	2,28	1,97	1,81	1,56
257	MANUFACTURE OF CUTLERY, HAND TOOLS AND GENERAL HARDWARE	53.045,42	5.602	5,96	4,84	4,02	2,95	2,21
259	MANUFACTURE OF OTHER FABRICATED METAL PRODUCTS N.E.C.	111.664,33	14.374	2,58	2,1	1,83	1,63	1,31
261	MANUFACTURE OF ELECTRONIC COMPONENTS AND BOARDS	38.874,72	2.535	3,41	2,71	2,34	1,97	1,56
262	MANUFACTURE OF COMPUTERS AND PERIPHERAL EQUIPMENT	6.102,25	710	3,38	3,24	2,62	2,34	1,77
263	MANUFACTURE OF COMMUNICATION EQUIPMENT	25.898,83	1.172	2,09	1,91	1,78	1,64	1,5
264	MANUFACTURE OF CONSUMER ELECTRONICS	2.348,65	246	8,36	4,56	2,98	2,46	2,22
265	MANUFACTURE OF MEASURING, TESTING, NAVIGATING AND CONTROL EQUIPMENT; WATCHES AND CLOCKS	19.768,97	1.137	3,01	1,9	1,74	1,61	1,48
266	MANUFACTURE OF IRRADIATION, ELECTROMEDICAL AND ELECTROTHERAPEUTIC EQUIPMENT	12.186,09	787	7,7	6,23	5,05	3,84	1,95
267	MANUFACTURE OF OPTICAL INSTRUMENTS AND PHOTOGRAPHIC EQUIPMENT	2.341,97	195	9,37	8,36	5,01	3,71	2,26
268	MANUFACTURE OF MAGNETIC AND OPTICAL MEDIA	73,87	25	0	0,4	1,06	0,55	0,6
271	MANUFACTURE OF ELECTRIC MOTORS, GENERATORS, TRANSFORMERS AND ELECTRICITY DISTRIBUTION AND CONTROL APPARATUS	49.062,78	3.308	3,29	2,48	2,03	1,88	1,62
272	MANUFACTURE OF BATTERIES AND ACCUMULATORS	2.953,80	83	8,69	8,58	8,77	7,56	5,32
273	MANUFACTURE OF WIRING AND WIRING DEVICES	19.715,86	1.129	5,38	3,51	2,88	2,23	1,75
274	MANUFACTURE OF ELECTRIC LIGHTING EQUIPMENT	17.049,24	1.807	6,11	4,11	3,07	2,5	2,05
275	MANUFACTURE OF DOMESTIC APPLIANCES	37.294,54	642	11	11,16	10,23	9,19	6,76
279	MANUFACTURE OF OTHER ELECTRICAL EQUIPMENT	35.253,02	3.609	2,42	1,84	1,63	1,53	1,38
281	MANUFACTURE OF GENERAL-PURPOSE MACHINERY	99.376,91	3.595	9,66	7,71	5,99	5,16	3,88
282	MANUFACTURE OF OTHER GENERAL-PURPOSE MACHINERY	157.805,25	9.559	2,31	2,05	1,78	1,62	1,46
283	MANUFACTURE OF AGRICULTURAL AND FORESTRY MACHINERY	30.914,01	2.138	7,21	5,47	4,51	3,85	3,01
284	MANUFACTURE OF METAL-FORMING MACHINERY AND MACHINE TOOLS	36.894,59	2.225	4,37	3,78	3,09	2,66	2,15
289	MANUFACTURE OF OTHER SPECIAL-PURPOSE MACHINERY	127.601,23	10.717	2,36	2,11	1,88	1,74	1,53
291	MANUFACTURE OF MOTOR VEHICLES	60.116,54	184	8,31	7,47	5,85	6,16	4,3
292	MANUFACTURE OF BODIES (COACHWORK) FOR MOTOR VEHICLES; MANUFACTURE OF TRAILERS AND SEMI-TRAILERS	11.952,45	844	4,26	3,33	2,71	2,3	1,69
293	MANUFACTURE OF PARTS AND ACCESSORIES FOR MOTOR VEHICLES	90.165,53	1.936	4,03	3,64	3,18	2,8	2,5
301	BUILDING OF SHIPS AND BOATS	24.155,09	1.723	11,13	9,48	7,68	6,81	5,18
302	MANUFACTURE OF RAILWAY LOCOMOTIVES AND ROLLING STOCKS	10.787,49	188	6,73	5,11	4,19	2,68	1,84
303	MANUFACTURE OF AIR AND SPACECRAFT AND RELATED MACHINERY	35.065,07	295	7,11	6,11	4,55	3,84	2,74
304	MANUFACTURE OF MILITARY FIGHTING VEHICLES	79,6	2	0	0	0	0	0

309	MANUFACTURE OF TRANSPORT EQUIPMENT N.E.C.	18.525,46	1.071	6,43	5,11	3,56	2,92	2,13
310	MANUFACTURE OF FURNITURE	147.551,56	21.065	7,78	6,3	4,54	3,42	2,35
321	MANUFACTURE OF JEWELLERY, BIJOUTERIE AND RELATED ARTICLES	31.059,54	8.785	38,92	36,46	16,81	16,17	11,09
322	MANUFACTURE OF MUSICAL INSTRUMENTS	2.171,98	681	48,91	28,63	24,29	20,38	8,7
323	MANUFACTURE OF SPORTS GOODS	5.503,40	690	6,33	4,42	4,11	3,19	2,49
324	MANUFACTURE OF GAMES AND TOYS	2.997,21	510	5,9	2,62	2,03	1,81	1,37
325	MANUFACTURE OF MEDICAL AND DENTAL INSTRUMENTS AND SUPPLIES	59.571,75	18.138	2,15	2,04	1,87	1,76	1,62
329	OTHER MANUFACTURING N.E.C.	20.309,82	4.079	4,02	2,66	1,92	1,51	1,25
331	REPAIR OF FABRICATED METAL PRODUCTS, MACHINERY AND EQUIPMENT	114.964,05	33.705	1,22	1,17	1,13	1,11	1,08
332	INSTALLATION OF INDUSTRIAL MACHINERY AND EQUIPMENT	51.932,80	9.728	1,43	1,32	1,23	1,18	1,13
351	ELECTRIC POWER GENERATION, TRANSMISSION AND DISTRIBUTION	61.567,05	10.324	1,75	1,51	1,42	1,33	1,28
352	MANUFACTURE OF GAS; DISTRIBUTION OF GASEOUS FUELS THROUGH MAINS	22.492,67	1.407	1,43	1,11	1,06	0,99	0,98
353	STEAM AND AIR CONDITIONING SUPPLY	3.854,86	276	2,73	3,08	2,77	3,25	2,61
360	WATER COLLECTION, TREATMENT AND SUPPLY	29.150,72	1.851	1,49	1,34	1,3	1,35	1,49
370	SEWERAGE	11.012,09	1.763	1,79	1,58	1,3	1,25	1,17
381	WASTE COLLECTION	91.124,23	3.593	1,29	1,27	1,25	1,25	1,25
382	WASTE TREATMENT AND DISPOSAL	17.993,77	1.410	2,34	1,84	1,65	1,53	1,26
383	MATERIALS RECOVERY	26.687,47	3.955	1,81	1,55	1,39	1,33	1,22
390	REMEDIATION ACTIVITIES AND OTHER WASTE MANAGEMENT SERVICES	6.341,52	798	2,3	2,12	1,69	1,58	1,32
411	PROJECT MANAGEMENT ACTIVITIES RELATED TO CONSTRUCTION	3.982,97	2.782	1,8	1,74	1,41	1,33	1,29
412	CONSTRUCTION OF BUILDINGS	424.855,22	146.755	1,65	1,5	1,38	1,28	1,19
421	CONSTRUCTION OF ROADS AND RAILWAYS	49.019,67	5.081	2,91	2,19	1,75	1,53	1,3
422	CONSTRUCTION OF UTILITY PROJECTS	19.663,07	731	2,39	2,33	1,97	1,76	1,3
429	CONSTRUCTION OF OTHER CIVIL ENGINGEERING PROJECTS	23.260,81	3.540	3,54	2,82	2,34	1,95	1,66
431	DEMOLITION AND SITE PREPARATION	41.549,25	12.809	1,97	1,77	1,57	1,41	1,24
432	ELECTRICAL, PLUMBING AND OTHER CONSTRUCTION INSTALLATION ACTIVITIES	484.826,78	157.771	1,13	1,08	1,05	1,03	1,01
433	BUILDING COMPLETION AND FINISHING	441.820,50	249.089	1,44	1,3	1,21	1,14	1,06
439	OTHER SPECIALIZED CONSTRUCTION ACTIVITIES	60.395,57	16.261	1,64	1,46	1,34	1,23	1,13
451	SALE OF MOTOR VEHICLES	103.285,12	24.447	1,23	1,14	1,1	1,08	1,07
452	MAINTENANCE AND REPAIR OF MOTOR VEHICLES	211.324,69	79.839	1,18	1,15	1,12	1,11	1,08
453	SALE OF MOTOR VEHICLE PARTS AND ACCESSORIES	55.473,12	15.994	1,26	1,21	1,19	1,17	1,16
454	SALE, MAINTENANCE AND REPAIR OF MOTORCYCLES AND RELATED PARTS AND ACCESSORIES	16.412,89	7.027	1,16	1,13	1,1	1,08	1,08
461	WHOLESALE ON A FEE OR CONTRACT BASIS	268.189,84	220.798	1,2	1,15	1,11	1,09	1,08
462	WHOLESALE OF AGRICULTURAL RAW MATERIALS AND LIVE ANIMALS	28.631,53	10.261	3,21	2,61	2,2	1,86	1,54
463	WHOLESALE OF FOOD, BEVERAGES AND TOBACCO	184.878,63	38.269	1,95	1,78	1,69	1,53	1,38
464	WHOLESALE OF HOUSEHOLD GOODS	253.812,17	63.527	1,45	1,33	1,25	1,21	1,19
465	WHOLESALE OF MACHINERY, EQUIPMENT AND SUPPLIES	54.462,38	14.468	1,22	1,17	1,15	1,13	1,12

466	WHOLESALE OF OTHER MACHINERY AND EQUIPMENT	101.729,86	24.190	1,22	1,17	1,15	1,13	1,13
467	OTHER SPECIALIZED WHOLESALE	223.647,30	51.512	1,17	1,12	1,09	1,08	1,05
469	NON-SPECIALIZED WHOLESALE TRADE	43.129,94	10.731	1,17	1,16	1,18	1,15	1,13
471	RETAIL SALE IN NON-SPECIALIZED STORES	494.041,50	72.828	1,12	1,14	1,14	1,13	1,11
472	RETAIL SALE OF FOOD, BEVERAGES AND TOBACCO IN SPECIALIZED STORES	222.452,58	114.269	1,38	1,34	1,3	1,28	1,24
473	RETAIL SALE OF AUTOMOTIVE FUEL IN SPECIALIZED STORES	62.200,10	23.161	1,22	1,22	1,23	1,21	1,19
474	RETAIL SALE OF INFORMATION AND COMMUNICATIONS EQUIPMENT IN SPECIALIZED STORES	29.766,33	12.741	1,29	1,23	1,2	1,19	1,18
475	RETAIL SALE OF OTHER HOUSEHOLD EQUIPMENT IN SPECIALIZED STORES	217.791,13	86.219	1,31	1,28	1,25	1,23	1,19
476	RETAIL SALE OF CULTURAL AND RECREATION GOODS IN SPECIALIZED STORES	103.644,92	50.948	1,12	1,1	1,08	1,07	1,06
477	RETAIL SALE OF OTHER GOODS IN SPECIALIZED STORES	605.400,19	254.430	1,21	1,17	1,15	1,13	1,13
478	RETAIL SALE VIA STALLS AND MARKETS	127.212,01	93.652	1,93	1,61	1,4	1,3	1,21
479	RETAIL TRADE NOT IN STORES, STALLS OR MARKETS	39.217,78	15.006	1,15	1,12	1,08	1,08	1,06
491	PASSENGER RAIL TRANSPORT, INTERURBAN	39.330,72	622	1,85	1,6	1,4	1,32	1,35
492	FREIGHT RAIL TRANSPORT	1.151,17	58	14,32	8,2	6,14	4,62	3,52
493	OTHER PASSENGER LAND TRANSPORT	167.634,39	30.947	1,45	1,42	1,41	1,38	1,29
494	FREIGHT TRANSPORT BY ROAD	310.356,13	81.007	1,39	1,27	1,2	1,14	1,09
495	TRANSPORT VIA PIPELINE	2.463,61	146	12,67	8,53	2,7	1,57	1,47
501	SEA AND COASTAL WATER TRANSPORT	15.550,29	684	8,95	8,84	7,59	6,55	6,58
502	INLAND WATER TRANSPORT	10.868,93	258	9,45	8,2	6,4	5,58	4,3
503	INLAND PASSENGER WATER TRANSPORT	1.837,58	884	101,89	97,75	96,02	72,17	30,09
504	INLAND FREIGHT WATER TRANSPORT	627,77	118	105,88	105,85	106,54	77,75	35,76
511	PASSENGER AIR TRANSPORT	23.853,23	429	37,65	33,17	32,04	30,92	3,66
512	FREIGHT AIR TRANSPORT	667,53	37	20,73	20,96	7,57	4,16	2,61
521	WAREHOUSING AND STORAGE	24.916,72	3.220	2,06	1,68	1,44	1,34	1,26
522	SUPPORT ACTIVITIES FOR TRANSPORTATION	318.937,56	28.579	1,54	1,42	1,36	1,3	1,2
531	POSTAL ACTIVITIES	146.032,78	12.393	0,67	0,92	1,03	1,07	1,07
532	COURIER ACTIVITIES	14.210,44	2.889	1,44	1,36	1,3	1,3	1,28
551	HOTELS	205.606,20	27.674	6,81	5,89	5,14	4,33	3,39
552	OTHER SHORT TERM ACCOMODATION ACTIVITIES	48.836,91	21.773	9,28	8,42	7,35	6,33	4,68
553	CAMPING GROUNDS, RECREATIONAL VEHICLE PARKS AND TRAILER PARKS	8.488,23	1.892	18,6	15,7	12,63	8,16	5,33
559	OTHER ACCOMODATION	1.065,02	387	8,8	6,91	3,82	3,44	2,16
561	RESTAURANTS AND MOBILE FOOD SERVICE ACTIVITIES	593.431,13	150.650	1,28	1,21	1,16	1,12	1,07
562	EVENT CATERING AND OTHER FOOD SERVICE ACTIVITIES	118.285,52	11.753	1,05	1,07	1,07	1,07	1,08
563	BEVERAGE SERVING ACTIVITIES	348.130,72	129.377	1,21	1,19	1,15	1,12	1,09
581	PUBLISHING OF BOOKS, PERIODICALS AND OTHER PUBLISHING ACTIVITIES	35.747,99	6.286	2,02	1,93	1,81	1,63	1,44
582	SOFTWARE PUBLISHING	1.912,41	506	1,45	1,49	1,37	1,27	1,35
591	MOTION PICTURE, VIDEO AND TELEVISION PROGRAMME ACTIVITIES	25.533,70	6.765	2,39	2,34	2,29	2,22	2,03

592	SOUND RECORDING AND MUSIC PUBLISHING ACTIVITIES	1.739,42	1.165	1,99	1,81	1,71	1,71	1,55
601	RADIO BROADCASTING	3.685,96	990	2,35	1,58	1,39	1,31	1,22
602	TELEVISION PROGRAMMING AND BROADCASTING ACTIVITIES	25.197,27	722	3,15	2,45	2,21	2,06	1,81
611	WIRED TELECOMMUNICATIONS ACTIVITIES	57.927,30	1.347	1,37	1,31	1,23	1,18	1,16
612	WIRELESS TELECOMMUNICATIONS ACTIVITIES	21.944,32	217	4,6	3,59	2,64	2,2	1,73
613	SATELLITE TELECOMMUNICATIONS ACTIVITIES	472,31	54	15,76	4,06	2,88	2,03	4,07
619	OTHER TELECOMMUNICATIONS ACTIVITIES	13.890,41	4.613	1,43	1,4	1,36	1,33	1,3
620	COMPUTER PROGRAMMING, CONSULTANCY AND RELATED ACTIVITIES	231.837,95	49.505	1,44	1,43	1,42	1,39	1,34
631	DATA PROCESSING, HOSTING AND RELATED ACTIVITIES; WEB PORTALS	115.814,23	33.770	1,15	1,1	1,06	1,05	1,05
639	OTHER INFORMATION SERVICE ACTIVITIES	6.807,43	2.560	1,71	1,7	1,66	1,59	1,49
641	MONETARY INTERMEDIATION	346.024,78	31.865	0,95	0,97	0,97	0,98	1
642	ACTIVITIES OF HOLDING COMPANIES	2.082,76	3.764	1,8	1,64	1,61	1,45	1,28
643	TRUSTS, FUNDS AND SIMILAR FINANCIAL ENTITIES	18,95	5	3,36	3,36	3,36	3,26	2,8
649	OTHER FINANCIAL SERVICE ACTIVITIES, EXCEPT INSURANCE AND PENSION FUNDING ACTIVITIES	34.964,16	4.691	2,17	2,06	1,8	1,58	1,38
651	INSURANCE	43.927,46	1.533	2,36	2,18	1,88	1,68	1,42
652	REINSURANCE	178,66	6	14,25	14,09	10,28	7,86	5,75
661	ACTIVITIES AUXILIARY TO FINANCIAL SERVICE ACTIVITIES, EXCEPT INSURANCE AND PENSION FUNDING	41.579,52	31.500	1,23	1,18	1,12	1,1	1,09
662	ACTIVITIES AUXILIARY TO INSURANCE AND PENSION FUNDING	117.140,18	56.447	1,12	1,07	1,03	1,02	1,03
663	FUND MANAGEMENT ACTIVITIES	3.765,64	216	11	10,92	8,01	6,32	4,65
681	BUYING AND SELLING OF SELF-OWNED REAL ESTATE	33.316,71	33.384	1,45	1,41	1,34	1,3	1,27
682	RENTING AND OPERATING OF SELF-OWNED OR LEASED REAL ESTATE	181.012,72	156.743	1,3	1,27	1,24	1,22	1,21
683	REAL ESTATE ACTIVITIES ON A FEE OR CONTRACT BASIS	74.845,81	49.288	1,36	1,29	1,25	1,21	1,17
691	LEGAL ACTIVITIES	221.797,58	152.980	1,61	1,49	1,34	1,27	1,23
692	ACCOUNTING, BOOKKEEPING AND AUDITING ACTIVITIES; TAX CONSULTANCY	259.365,91	129.711	1,22	1,14	1,07	1,04	1,03
701	ACTIVITIES OF HEAD OFFICE	25.972,41	2.617	1,93	1,89	1,78	1,68	1,52
702	MANAGEMENT CONSULTANCY ACTIVITIES	104.626,45	52.984	1,53	1,5	1,42	1,37	1,3
711	ARCHITECTURAL AND ENGINEERING ACTIVITIES AND RELATED TECHNICAL CONSULTANCY	267.715,75	205.279	1,11	1,08	1,06	1,04	1,03
712	TECHNICAL TESTING AND ANALYSIS	33.231,33	9.847	1,11	1,1	1,08	1,07	1,07
721	RESEARCH AND EXPERIMENTAL DEVELOPMENT ON NATURAL SCIENCES AND ENGINEERING	20.161,85	7.345	1,68	1,31	1,21	1,2	1,13
722	RESEARCH AND EXPERIMENTAL DEVELOPMENT ON SOCIAL SCIENCES AND HUMANITIES	3.065,11	1.940	1,99	1,88	1,69	1,6	1,46
731	ADVERTISING	44.892,74	17.439	1,52	1,48	1,42	1,35	1,27
732	MARKET RESEARCH AND PUBLIC OPINION POLLING	9.686,08	3.979	2,07	2,03	1,86	1,78	1,59
741	SPECIALIZED DESIGN ACTIVITIES	46.724,97	29.296	1,39	1,34	1,29	1,27	1,24
742	PHOTOGRAPHIC ACTIVITIES	19.397,32	13.820	1,11	1,12	1,09	1,08	1,07
743	TRANSLATION AND INTERPRETATION ACTIVITIES	8.421,12	6.817	1,53	1,44	1,36	1,31	1,28
749	OTHER PROFESSIONAL, SCIENTIFIC AND TECHNICAL ACTIVITIES N.E.C.	114.698,01	81.170	1,13	1,1	1,07	1,06	1,05
750	VETERINARY ACTIVITIES	13.870,12	11.529	1,18	1,15	1,12	1,1	1,07

771	RENTING AND LEASING OF MOTOR VEHICLES	10.152,77	2.902	1,84	1,7	1,55	1,47	1,39
772	RENTING AND LEASING OF PERSONAL AND HOUSEHOLD GOODS	7.484,96	4.140	4,53	4,05	3,74	3,38	2,88
773	RENTING AND LEASING OF OTHER MACHINERY, EQUIPMENT AND TANGIBLE GOODS	24.454,56	9.023	1,5	1,42	1,39	1,36	1,34
774	LEASING OF INTELLECTUAL PROPERTY AND SIMILAR PRODUCTS, EXCEPT COPYRIGHTED WORKS	1.434,13	256	1,29	1,92	1,67	1,49	1,69
781	ACTIVITES OF EMPLOYMENT PLACEMENT AGENCIES	4.326,42	1.254	2,59	2,53	2,18	1,94	1,71
782	TEMPORARY EMPLOYMENT AGENCY ACTIVITIES	191.419,52	4.011	1,29	1,19	1,16	1,18	1,21
783	OTHER HUMAN RESOURCES PROVISION	18.267,68	19	8,61	8,61	8,61	8,25	6,99
791	TRAVEL AGENCY AND TOUR OPERATOR ACTIVITIES	39.376,17	12.158	1,32	1,28	1,23	1,18	1,16
799	OTHER RESERVATION SERVICE AND RELATED ACTIVITIES	7.425,63	5.093	2,54	2,47	2,37	2,09	1,8
801	PRIVATE SECURITY ACTIVITIES	66.668,16	2.090	1,64	1,47	1,37	1,32	1,33
802	SECURITY SYSTEMS SERVICE ACTIVITIES	1.457,29	159	4,15	3,43	2,41	2,21	1,85
803	INVESTIGATION ACTIVITIES	4.467,58	1.400	1,79	1,59	1,3	1,27	1,2
811	COMBINED FACILITIES SUPPORT ACTIVITIES	16.247,14	1.295	2,25	1,43	1,34	1,24	1,23
812	CLEANING ACTIVITIES	427.604,25	36.188	1,1	1,1	1,11	1,1	1,09
813	LANDSCAPE CARE AND MAINTENANCE SERVICE ACTIVITIES	36.724,96	13.937	1,97	1,62	1,45	1,31	1,18
821	OFFICE ADMINISTRATIVE AND SUPPORT ACTIVITIES	18.296,44	7.634	1,36	1,29	1,21	1,16	1,14
822	ACTIVITIES OF CALL CENTERS	51.757,74	1.793	2,03	2,07	2,1	2,06	1,94
823	ORGANIZATION OF CONVENTIONS AND TRADE SHOWS	11.497,30	4.290	1,75	1,66	1,64	1,53	1,39
829	BUSINESS SUPPORT SERVICE ACTIVITIES N.E.C.	175.564,67	55.835	1,18	1,18	1,16	1,16	1,15
851	PRE-PRIMARY EDUCATION	16.460,77	2.829	2,62	2,52	2,36	2,19	2,02
852	PRIMARY EDUCATION	4.740,52	283	6,4	5,93	3,73	3,49	3,14
853	SECONDARY EDUCATION	13.832,09	1.435	2,36	1,83	1,71	1,62	1,63
854	HIGHER EDUCATION	1.756,98	472	2,05	1,78	1,63	1,59	1,3
855	OTHER EDUCATION	51.345,50	23.583	1,22	1,16	1,11	1,09	1,07
856	EDUCATIONAL SUPPORT ACTIVITIES	2.383,27	1.098	1,58	1,62	1,49	1,35	1,2
861	HOSPITAL ACTIVITIES	89.954,65	1.550	1,82	1,69	1,48	1,42	1,35
862	MEDICAL AND DENTAL PRACTICE ACTIVITIES	268.574,81	174.423	1,16	1,14	1,1	1,09	1,08
869	OTHER HUMAN HEALTH ACTIVITIES	124.873,48	76.961	1,17	1,14	1,11	1,09	1,08
871	RESIDENTIAL NURSING CARE FACILITIES	25.953,05	1.222	2,08	1,79	1,69	1,54	1,45
872	RESIDENTIAL CARE ACTIVITIES FOR MENTAL RETARDATION, MENTAL HEALTH AND SUBSTANCE ABUSE	11.333,93	874	4,28	3,73	2,96	2,48	1,74
873	RESIDENTIAL CARE ACTIVITIES FOR THE ELDERLY AND DISABLED	64.827,91	3.397	2,22	1,82	1,62	1,5	1,38
879	OTHER RESIDENTIAL CARE ACTIVITIES	25.963,49	2.125	2,41	2,27	1,85	1,74	1,52
881	SOCIAL WORK ACTIVITIES WITHOUT ACCOMODATION FOR THE ELDERLY AND DISABLED	83.076,19	3.789	1,33	1,31	1,19	1,13	1,14
889	OTHER SOCIAL WORK ACTIVITIES WITHOUT ACCOMODATION	60.980,84	7.381	1,27	1,23	1,17	1,16	1,13
900	CREATIVE, ARTS AND ENTERTAINMENT ACTIVITIES	39.154,30	27.588	1,54	1,49	1,41	1,36	1,29
910	LIBRARIES, ARCHIVES, MUSEUMS AND OTHER CULTURAL ACTIVITIES	9.706,02	1.223	2,51	2,41	2,17	2,08	1,93

920	GAMBLING AND BETTING ACTIVITIES	30.773,84	7.404	1,34	1,3	1,24	1,22	1,21
931	SPORTS ACTIVITIES	33.595,48	12.614	1,39	1,3	1,23	1,18	1,1
932	OTHER AMUSEMENT AND RECREATION ACTIVITIES	56.736,32	19.725	2,91	2,57	2,29	2,07	1,78
951	REPAIR OF COMPUTERS AND COMMUNICATION EQUIPMENT	14.289,67	5.776	1,18	1,1	1,08	1,07	1,08
952	REPAIR OF PERSONAL AND HOUSEHOLD GOODS	32.431,07	21.051	1,18	1,13	1,1	1,08	1,05
960	OTHER PERSONAL SERVICE ACTIVITIES	402.387,38	182.821	1,07	1,05	1,04	1,03	1,02
	TOTAL	**16.721.746,59**	**4.826.867**					

Table 145 - *Agglomeration results by industry and distance range. Northern Italy, 2007.* ***Source:*** *Compiled by the authors*

Industry code	Industry description	Employees	Plants	M (5 minutes)	M (10 minutes)	M (15 minutes)	M (20 minutes)	M (30 minutes)
012	GROWING OF PERENNIAL CROPS	-	-	-	-	-	-	-
013	PLANT PROPAGATION	-	-	-	-	-	-	-
014	ANIMAL PRODUCTION	12,09	5	0,00	0,00	0,00	0,00	6,97
016	SUPPORT ACTIVITIES TO AGRICULTURE AND POST-HARVEST CROP ACTIVITIES	153,33	67	8,62	3,71	3,48	2,86	1,57
022	LOGGING	87,91	64	88,56	67,94	51,67	19,08	4,88
031	FISHING	267,67	8	0,00	0,00	0,00	0,00	7,23
051	MINING OF HARD COAL	-	-	-	-	-	-	-
061	EXTRACTION OF CRUDE PETROLEUM	-	-	-	-	-	-	-
062	EXTRACTION OF NATURAL GAS	5430,17	40	20,83	9,30	2,67	2,51	1,52
071	MINING OF IRON ORES	-	-	-	-	-	-	-
072	MINING OF NON-FERROUS METAL ORES	1	1	-	-	-	-	-
081	QUARRYING OF STONE, SAND AND CLAY	9897,77	1640	24,83	18,37	7,38	3,61	2,28
089	MINING AND QUARRYING N.E.C.	1194,72	160	139,32	112,07	38,14	9,99	7,16
091	SUPPORT ACTIVITIES FOR PETROLEUM AND NATURAL GAS EXTRACTION	302,27	16	56,58	56,59	55,91	52,63	20,40
099	SUPPORT ACTIVITIES FOR OTHER MINING AND QUARRYING	-	-	-	-	-	-	-
101	PROCESSING AND PRESERVING OF MEAT	42898,6	2703	12,90	11,28	9,87	8,01	3,88
102	PROCESSING AND PRESERVING OF FISH, CRUSTACEANS AND MOLLUSCS	2031,74	130	19,08	13,80	12,92	10,96	8,23
103	PROCESSING AND PRESERVING OF FRUIT AND VEGETABLES	14313,07	592	4,74	3,72	2,97	2,45	1,95
104	MANUFACTURE OF VEGETABLE AND ANIMAL OILS AND FATS	3024,39	237	21,84	20,71	12,85	7,26	4,46
105	MANUFACTURE OF DAIRY PRODUCTS	26024,75	1827	3,86	3,14	2,76	2,51	2,26
106	MANUFACTURE OF GRAIN MILL PRODUCTS, STARCHES AND STARCH PRODUCTS	6179,23	673	7,15	4,58	3,49	2,80	2,04
107	MANUFACTURE OF BAKERY PRODUCTS	88944,98	17643	1,20	1,20	1,16	1,14	1,12
108	MANUFACTURE OF OTHER FOOD PRODUCTS	36699,44	3184	1,45	1,26	1,29	1,27	1,11
109	MANUFACTURE OF PREPARED ANIMAL FEEDS	8386,15	535	5,26	4,33	4,00	3,17	2,31
110	MANUFACURE OF BEVERAGES	23164,25	1467	8,93	5,50	4,02	3,36	2,34
120	MANUFACTURE OF TOBACCO PRODUCTS	226,53	2	0,00	0,00	0,00	0,00	0,00
131	SPINNING, WEAVING AND FINISHING OF TEXTILES	23028,32	1398	23,87	20,24	20,10	19,24	14,59
132	WEAVING OF TEXTILES	36584,04	1585	10,95	8,69	7,00	5,48	3,62
133	FINISHING OF TEXTILES	26777,24	1957	7,42	6,08	4,89	4,01	2,57
139	MANUFACTURE OF OTHER TEXTILES	44316,97	6132	4,19	3,38	2,66	2,14	1,37
141	MANUFACTURE OF WEARING APPAREL, EXCEPT FUR APPAREL	119387	17064	2,52	2,22	1,95	1,82	1,51
142	MANUFACTURE OF ARTICLES OF FUR	2003,43	832	13,91	7,00	4,31	3,41	1,85
143	MANUFACTURE OF KNITTED AND CROCHETED APPAREL	29058,41	3615	12,61	10,74	8,19	7,05	4,46
151	TANNING AND DRESSING OF LEATHER; MANUFACTURE OF LUGGAGE; HANDBAGS; SADDLERY AND HARNESS; DRESSING AND DYEING OF FUR	24678,34	2796	30,52	22,24	18,66	14,21	7,27
152	MANUFACTURE OF FOOTWEAR	29912,01	2969	28,75	20,27	10,94	6,46	3,46

161	SAWMILLING AND PLANING OF WOOD	16030,11	3297	5,72	4,23	3,25	2,50	1,90
162	MANUFACTURE OF PRODUCTS OF WOOD, CORK, STRAW AND PLAITING MATERIALS	82058,89	17489	2,32	1,95	1,73	1,53	1,29
171	MANUFACTURE OF PULP, PAPER AND PAPERBOARD	10349,77	193	5,01	2,61	2,13	1,91	1,48
172	MANUFACTURE OF CORRUGATED PAPER AND PAPERBOARD AND OF CONTAINERS OF PAPER AND PAPERBOARD	37912,19	2574	2,20	1,62	1,40	1,25	1,13
181	PRINTING AND SERVICE ACTIVITIES RELATED TO PRINTING	75000,82	10800	1,26	1,15	1,13	1,10	1,09
182	REPRODUCTION OF RECORDED MEDIA	654,32	212	3,06	2,28	2,08	2,06	1,83
191	MANUFACTURE OF COKE OVEN PRODUCTS	180,75	5	90,82	48,62	29,63	23,79	15,29
192	MANUFACTURE OF REFINED PETROLEUM PRODUCTS	6796,5	233	3,49	2,32	1,44	1,43	1,31
201	MANUFACTURE OF BASIC CHEMICALS, FERTILIZERS AND NITROGEN COMPOUNDS, PLASTICS AND SYNTHETIC RUBBER IN PRIMARY FORMS	31262,71	1059	2,23	1,75	1,59	1,40	1,18
202	MANUFACTURE OF PESTICIDES AND OTHER AGROCHEMICAL PRODUCTS	1918,47	76	4,34	3,12	2,02	1,39	1,36
203	MANUFACTURE OF PAINTS, VARNISHES AND SIMILAR COATINGS, PRINTING INK AND MASTICS	17057,41	788	3,25	2,15	1,53	1,17	1,12
204	MANUFACTURE OF SOAP AND DETERGENTS, CLEANING AND POLISHING PREPARATIONS, PERFUMES AND TOILET PREPARATIONS	19301,65	1136	2,63	1,84	1,62	1,49	1,32
205	MANUFACTURE OF OTHER CHEMICAL PRODUCTS N.E.C.	19027,86	1020	2,32	1,89	1,79	1,54	1,36
206	MANUFACTURE OF MAN-MADE FIBRES	3276,62	47	7,92	3,17	8,77	6,32	2,73
211	MANUFACTURE OF PHARMACEUTICALS	9662,93	155	3,12	3,38	2,47	1,99	1,99
212	MANUFACTURE OF MEDICINAL CHEMICAL AND BOTANICAL PRODUCTS	28876,25	377	4,60	2,44	2,15	2,21	1,98
221	MANUFACTURE OF RUBBER PRODUCTS	34348,04	1359	10,15	7,66	5,09	3,44	1,79
222	MANUFACTURE OF PLASTICS PRODUCTS	113207,9	8286	2,14	1,82	1,52	1,33	1,13
231	MANUFACTURE OF GLASS AND GLASS PRODUCTS	25945,06	2490	2,96	2,31	2,10	1,98	1,46
232	MANUFACTURE OF REFRACTORY PRODUCTS	2094,36	114	8,95	4,76	3,35	2,85	1,97
233	MANUFACTURE OF CLAY BUILDING MATERIALS	32156,15	762	41,76	33,96	31,09	22,53	15,19
234	MANUFACTURE OF OTHER PORCELAIN AND CERAMIC PRODUCTS	7442,91	1078	15,32	8,29	5,81	4,11	2,81
235	MANUFACTURE OF CEMENT, LIME AND PLASTER	5543,11	151	3,65	3,72	3,42	2,61	1,75
236	MANUFACTURE OF ARTICLES OF CONCRETE, CEMENT AND PLASTER	29586,29	2593	2,47	1,81	1,53	1,39	1,21
237	CUTTING, SHAPING AND FINISHING OF STONE	25520,72	4731	16,00	11,98	6,26	4,00	2,51
239	MANUFACTURE OF OTHER NON-METALLIC MINERAL PRODUCTS N.E.C.	9127,31	700	3,51	2,04	1,62	1,34	1,16
241	MANUFACTURE OF BASIC IRON AND STEEL	23565,98	492	3,28	2,70	2,13	1,87	1,63
242	MANUFACTURE OF TUBES, PIPES AND HOLLOW PROFILES AND OF TUBE OR PIPE FITTINGS OF CAST-IRON	15619,15	314	6,10	3,61	2,30	1,95	1,37
243	CASTING OF SEMI-FINISHED STEEL PRODUCTS	14879,55	882	3,68	2,67	2,32	1,95	1,35
244	MANUFACTURE OF BASIC PRECIOUS AND OTHER NON-FERROUS METALS; REPROCESSING OF NUCLEAR FUELS	13443,96	392	5,69	3,32	2,79	2,38	2,00
245	CASTING OF IRON AND STEEL	31086,29	1212	5,05	4,02	3,23	2,67	1,93
251	MANUFACTURE OF STRUCTURAL METAL PRODUCTS	110213,8	18558	1,49	1,31	1,20	1,13	1,05

252	MANUFACTURE OF TANKS, RESERVOIRS AND CONTAINERS OF METAL	11951,95	654	5,03	2,95	2,22	1,64	1,39
253	MANUFACTURE OF STEAM GENERATORS, EXCEPT CENTRAL HEATING HOT WATER BOILERS	2402,41	148	5,92	3,72	2,48	2,46	1,99
254	MANUFACTURE OF WEAPONS AND AMMUNITION	4766,63	219	222,97	118,83	88,98	59,17	26,77
255	FORGING, PRESSING, STAMPING AND ROLL-FORMING OF METAL; POWDER METALLURGY	41681,14	1970	4,26	3,31	2,52	2,06	1,51
256	TREATMENT AND COATING OF METALS; MACHINING	151761,6	22069	1,92	1,67	1,48	1,38	1,22
257	MANUFACTURE OF CUTLERY, HAND TOOLS AND GENERAL HARDWARE	52050,04	4877	4,73	3,89	3,20	2,27	1,68
259	MANUFACTURE OF OTHER FABRICATED METAL PRODUCTS N.E.C.	95318,42	10707	2,41	1,97	1,70	1,52	1,25
261	MANUFACTURE OF ELECTRONIC COMPONENTS AND BOARDS	26437,96	2189	2,60	1,99	1,83	1,63	1,37
262	MANUFACTURE OF COMPUTERS AND PERIPHERAL EQUIPMENT	7139,52	713	3,69	2,59	2,54	2,34	1,60
263	MANUFACTURE OF COMMUNICATION EQUIPMENT	18991,69	878	2,23	1,59	1,51	1,56	1,40
264	MANUFACTURE OF CONSUMER ELECTRONICS	2166,62	155	2,97	2,53	1,92	1,96	1,69
265	MANUFACTURE OF MEASURING, TESTING, NAVIGATING AND CONTROL EQUIPMENT; WATCHES AND CLOCKS	20322,68	1098	2,27	1,62	1,40	1,34	1,23
266	MANUFACTURE OF IRRADIATION, ELECTROMEDICAL AND ELECTROTHERAPEUTIC EQUIPMENT	9713,92	485	7,93	6,14	4,54	3,73	1,93
267	MANUFACTURE OF OPTICAL INSTRUMENTS AND PHOTOGRAPHIC EQUIPMENT	1763,65	142	5,73	4,58	2,99	2,38	1,27
268	MANUFACTURE OF MAGNETIC AND OPTICAL MEDIA	287	27	2,80	3,00	4,70	2,51	2,04
271	MANUFACTURE OF ELECTRIC MOTORS, GENERATORS, TRANSFORMERS AND ELECTRICITY DISTRIBUTION AND CONTROL APPARATUS	45936,44	3080	2,42	1,81	1,56	1,43	1,24
272	MANUFACTURE OF BATTERIES AND ACCUMULATORS	2313,3	74	5,19	3,13	3,13	3,90	2,28
273	MANUFACTURE OF WIRING AND WIRING DEVICES	16912,09	1008	4,41	3,02	2,15	1,69	1,31
274	MANUFACTURE OF ELECTRIC LIGHTING EQUIPMENT	13609,6	1321	5,41	3,50	2,78	2,27	1,85
275	MANUFACTURE OF DOMESTIC APPLIANCES	36446,02	596	4,43	4,02	3,26	2,73	1,89
279	MANUFACTURE OF OTHER ELECTRICAL EQUIPMENT	22565,5	2157	1,87	1,58	1,40	1,33	1,17
281	MANUFACTURE OF GENERAL-PURPOSE MACHINERY	85458,28	2904	7,30	5,90	4,70	4,02	2,98
282	MANUFACTURE OF OTHER GENERAL-PURPOSE MACHINERY	137537	7598	1,80	1,59	1,38	1,26	1,15
283	MANUFACTURE OF AGRICULTURAL AND FORESTRY MACHINERY	27314,02	1709	5,76	4,70	3,87	3,34	2,65
284	MANUFACTURE OF METAL-FORMING MACHINERY AND MACHINE TOOLS	38396,89	2228	2,78	2,39	1,85	1,61	1,30
289	MANUFACTURE OF OTHER SPECIAL-PURPOSE MACHINERY	107496,2	8264	1,77	1,58	1,41	1,32	1,18
291	MANUFACTURE OF MOTOR VEHICLES	34814,96	105	5,28	4,22	3,74	3,81	3,32
292	MANUFACTURE OF BODIES (COACHWORK) FOR MOTOR VEHICLES; MANUFACTURE OF TRAILERS AND SEMI-TRAILERS	10665,66	429	4,15	2,95	2,09	1,90	1,61
293	MANUFACTURE OF PARTS AND ACCESSORIES FOR MOTOR VEHICLES	72052,58	1587	3,37	3,10	2,59	2,30	2,10
301	BUILDING OF SHIPS AND BOATS	17493,78	956	10,53	8,64	7,13	6,29	5,04
302	MANUFACTURE OF RAILWAY LOCOMOTIVES AND ROLLING STOCKS	4562,85	69	7,30	2,51	1,90	1,43	0,97
303	MANUFACTURE OF AIR AND SPACECRAFT AND RELATED MACHINERY	16096,81	123	3,28	3,96	3,49	3,04	2,12

304	MANUFACTURE OF MILITARY FIGHTING VEHICLES	86	3	16062,40	505,31	198,11	89,01	15,73
309	MANUFACTURE OF TRANSPORT EQUIPMENT N.E.C.	14682	871	6,29	4,64	2,50	1,96	1,63
310	MANUFACTURE OF FURNITURE	122686,9	17406	7,31	5,78	4,30	3,17	2,06
321	MANUFACTURE OF JEWELLERY, BIJOUTERIE AND RELATED ARTICLES	22365,24	4928	59,03	55,56	18,59	18,25	9,77
322	MANUFACTURE OF MUSICAL INSTRUMENTS	989,3	403	21,90	17,65	14,77	11,45	4,03
323	MANUFACTURE OF SPORTS GOODS	5143,81	527	7,63	5,33	4,74	3,29	2,39
324	MANUFACTURE OF GAMES AND TOYS	2410,5	432	3,84	2,19	1,69	1,40	1,23
325	MANUFACTURE OF MEDICAL AND DENTAL INSTRUMENTS AND SUPPLIES	48072,74	9407	3,71	3,58	3,20	2,93	2,55
329	OTHER MANUFACTURING N.E.C.	14706,96	2242	3,69	2,85	2,20	1,66	1,22
331	REPAIR OF FABRICATED METAL PRODUCTS, MACHINERY AND EQUIPMENT	71284,8	19063	1,19	1,12	1,09	1,08	1,05
332	INSTALLATION OF INDUSTRIAL MACHINERY AND EQUIPMENT	36675,98	6106	1,29	1,18	1,13	1,10	1,05
351	ELECTRIC POWER GENERATION, TRANSMISSION AND DISTRIBUTION	28382,68	1737	1,98	1,74	1,63	1,59	1,53
352	MANUFACTURE OF GAS; DISTRIBUTION OF GASEOUS FUELS THROUGH MAINS	12207,21	784	1,71	1,30	1,20	1,09	1,03
353	STEAM AND AIR CONDITIONING SUPPLY	1454,15	127	3,62	3,83	3,74	3,13	2,40
360	WATER COLLECTION, TREATMENT AND SUPPLY	11716,96	765	1,87	1,42	1,36	1,32	1,34
370	SEWERAGE	6379,8	856	1,42	1,21	1,16	1,13	1,10
381	WASTE COLLECTION	30473,39	1357	1,31	1,21	1,12	1,13	1,12
382	WASTE TREATMENT AND DISPOSAL	9584,53	592	1,75	1,26	1,07	1,06	1,02
383	MATERIALS RECOVERY	9214,17	1564	1,76	1,46	1,30	1,23	1,13
390	REMEDIATION ACTIVITIES AND OTHER WASTE MANAGEMENT SERVICES	1602,19	163	4,49	3,36	2,72	2,39	1,79
411	PROJECT MANAGEMENT ACTIVITIES RELATED TO CONSTRUCTION	12390,59	8313	1,48	1,32	1,24	1,21	1,17
412	CONSTRUCTION OF BUILDINGS	338141,8	92086	1,36	1,25	1,17	1,12	1,05
421	CONSTRUCTION OF ROADS AND RAILWAYS	25926,64	2308	1,79	1,49	1,39	1,31	1,19
422	CONSTRUCTION OF UTILITY PROJECTS	7473,87	149	2,57	1,19	0,93	0,91	0,81
429	CONSTRUCTION OF OTHER CIVIL ENGINGEERING PROJECTS	9380,99	1086	3,60	2,52	2,12	1,73	1,47
431	DEMOLITION AND SITE PREPARATION	28578,15	6546	1,97	1,58	1,39	1,29	1,17
432	ELECTRICAL, PLUMBING AND OTHER CONSTRUCTION INSTALLATION ACTIVITIES	280157,8	89920	1,16	1,08	1,05	1,02	1,00
433	BUILDING COMPLETION AND FINISHING	287280	158680	1,39	1,23	1,15	1,10	1,04
439	OTHER SPECIALIZED CONSTRUCTION ACTIVITIES	39524,93	10217	1,68	1,48	1,35	1,23	1,12
451	SALE OF MOTOR VEHICLES	63545,43	10824	1,27	1,14	1,10	1,07	1,07
452	MAINTENANCE AND REPAIR OF MOTOR VEHICLES	117026,2	39471	1,11	1,08	1,06	1,04	1,02
453	SALE OF MOTOR VEHICLE PARTS AND ACCESSORIES	17882,23	3251	1,33	1,23	1,19	1,15	1,15
454	SALE, MAINTENANCE AND REPAIR OF MOTORCYCLES AND RELATED PARTS AND ACCESSORIES	9784,22	3574	1,13	1,11	1,09	1,07	1,08
461	WHOLESALE ON A FEE OR CONTRACT BASIS	163992,1	130193	1,14	1,08	1,06	1,05	1,05
462	WHOLESALE OF AGRICULTURAL RAW MATERIALS AND LIVE ANIMALS	14629,73	4672	3,74	2,98	2,67	2,32	1,94
463	WHOLESALE OF FOOD, BEVERAGES AND TOBACCO	89327,69	15688	1,52	1,36	1,32	1,24	1,16
464	WHOLESALE OF HOUSEHOLD GOODS	156033,6	32672	1,33	1,27	1,22	1,19	1,17
465	WHOLESALE OF MACHINERY, EQUIPMENT AND SUPPLIES	35621,25	7205	1,30	1,28	1,26	1,24	1,23

466	WHOLESALE OF OTHER MACHINERY AND EQUIPMENT	67720,07	12890	1,22	1,17	1,15	1,13	1,13
467	OTHER SPECIALIZED WHOLESALE	142597,9	26446	1,13	1,09	1,07	1,06	1,05
469	NON-SPECIALIZED WHOLESALE TRADE	33280,95	8485	1,20	1,19	1,21	1,20	1,17
471	RETAIL SALE IN NON-SPECIALIZED STORES	260025,5	30774	1,05	1,08	1,08	1,07	1,05
472	RETAIL SALE OF FOOD, BEVERAGES AND TOBACCO IN SPECIALIZED STORES	93331,52	43696	1,21	1,17	1,14	1,12	1,10
473	RETAIL SALE OF AUTOMOTIVE FUEL IN SPECIALIZED STORES	28878,32	11134	1,10	1,11	1,11	1,10	1,07
474	RETAIL SALE OF INFORMATION AND COMMUNICATIONS EQUIPMENT IN SPECIALIZED STORES	17783,97	4751	0,99	0,96	1,00	1,01	1,03
475	RETAIL SALE OF OTHER HOUSEHOLD EQUIPMENT IN SPECIALIZED STORES	107230,5	36602	1,14	1,10	1,07	1,06	1,04
476	RETAIL SALE OF CULTURAL AND RECREATION GOODS IN SPECIALIZED STORES	53670,85	24192	1,17	1,13	1,10	1,08	1,06
477	RETAIL SALE OF OTHER GOODS IN SPECIALIZED STORES	274051,1	107871	1,18	1,12	1,09	1,07	1,06
478	RETAIL SALE VIA STALLS AND MARKETS	64108,18	42282	1,74	1,40	1,25	1,19	1,13
479	RETAIL TRADE NOT IN STORES, STALLS OR MARKETS	16989,6	5057	1,23	1,16	1,13	1,11	1,08
491	PASSENGER RAIL TRANSPORT, INTERURBAN	23931,32	335	1,89	1,49	1,40	1,42	1,51
492	FREIGHT RAIL TRANSPORT	901,41	18	2,56	1,85	1,94	1,57	3,80
493	OTHER PASSENGER LAND TRANSPORT	71434,8	14520	1,48	1,41	1,39	1,37	1,27
494	FREIGHT TRANSPORT BY ROAD	188439,6	55464	1,27	1,19	1,12	1,08	1,05
495	TRANSPORT VIA PIPELINE	2131,3	76	11,08	5,10	1,09	1,13	1,29
501	SEA AND COASTAL WATER TRANSPORT	4524,06	176	7,56	10,04	7,92	7,22	6,03
502	INLAND WATER TRANSPORT	4342,47	110	12,09	11,98	11,67	11,14	9,06
503	INLAND PASSENGER WATER TRANSPORT	2446,44	600	40,32	38,45	36,67	29,16	12,66
504	INLAND FREIGHT WATER TRANSPORT	551,39	153	59,53	59,42	59,71	43,83	19,94
511	PASSENGER AIR TRANSPORT	8500,55	291	12,68	6,85	4,57	2,78	1,67
512	FREIGHT AIR TRANSPORT	256,01	19	36,52	2,76	2,17	1,24	0,92
521	WAREHOUSING AND STORAGE	21756,45	1869	1,73	1,41	1,33	1,27	1,25
522	SUPPORT ACTIVITIES FOR TRANSPORTATION	192934	13287	1,66	1,51	1,43	1,34	1,26
531	POSTAL ACTIVITIES	69020,69	6101	0,71	0,98	1,04	1,05	1,05
532	COURIER ACTIVITIES	6794,11	1269	1,63	1,46	1,30	1,37	1,29
551	HOTELS	129273,8	18129	8,79	7,56	6,65	5,53	4,33
552	OTHER SHORT TERM ACCOMODATION ACTIVITIES	16861,56	7651	21,20	18,47	16,33	14,45	10,55
553	CAMPING GROUNDS, RECREATIONAL VEHICLE PARKS AND TRAILER PARKS	4489,17	940	24,20	19,51	16,55	9,07	4,92
559	OTHER ACCOMODATION	542,64	112	2,13	2,70	2,89	2,67	2,46
561	RESTAURANTS AND MOBILE FOOD SERVICE ACTIVITIES	241771,8	58749		1,32	1,25	1,18	1,10
562	EVENT CATERING AND OTHER FOOD SERVICE ACTIVITIES	72699,25	5201	1,07	1,05	1,14	1,12	1,13
563	BEVERAGE SERVING ACTIVITIES	178110,4	67588	1,21	1,18	1,14	1,11	1,07
581	PUBLISHING OF BOOKS, PERIODICALS AND OTHER PUBLISHING ACTIVITIES	28097,9	3793	2,48	2,39	2,07	1,79	1,51
582	SOFTWARE PUBLISHING	2267,01	344	1,95	1,59	1,54	1,44	1,24
591	MOTION PICTURE, VIDEO AND TELEVISION PROGRAMME ACTIVITIES	12158,79	3139	2,26	1,86	1,57	1,48	1,34
592	SOUND RECORDING AND MUSIC PUBLISHING ACTIVITIES	1222,59	509	2,35	2,14	1,84	1,75	1,56

601	RADIO BROADCASTING	2069,93	480	2,87	1,95	1,58	1,36	1,16
602	TELEVISION PROGRAMMING AND BROADCASTING ACTIVITIES	8761,82	262	5,16	2,88	2,47	2,06	1,59
611	WIRED TELECOMMUNICATIONS ACTIVITIES	30942,9	580	1,48	1,43	1,26	1,21	1,16
612	WIRELESS TELECOMMUNICATIONS ACTIVITIES	9813,1	85	6,51	5,00	3,60	2,73	1,61
613	SATELLITE TELECOMMUNICATIONS ACTIVITIES	152,25	8	0,38	0,38	2,29	1,72	1,35
619	OTHER TELECOMMUNICATIONS ACTIVITIES	5946,44	1987	1,25	1,36	1,55	1,43	1,32
620	COMPUTER PROGRAMMING, CONSULTANCY AND RELATED ACTIVITIES	117249,2	30714	1,39	1,39	1,36	1,32	1,26
631	DATA PROCESSING, HOSTING AND RELATED ACTIVITIES; WEB PORTALS	81114,55	20136	1,19	1,12	1,08	1,07	1,07
639	OTHER INFORMATION SERVICE ACTIVITIES	1707,33	831	1,51	1,38	1,36	1,35	1,27
641	MONETARY INTERMEDIATION	212035,3	19134	1,01	1,01	0,99	0,99	1,01
642	ACTIVITIES OF HOLDING COMPANIES	3851,32	292	2,80	2,69	2,04	1,78	1,48
643	TRUSTS, FUNDS AND SIMILAR FINANCIAL ENTITIES	289,35	13	2,25	7,27	5,56	4,63	4,61
649	OTHER FINANCIAL SERVICE ACTIVITIES, EXCEPT INSURANCE AND PENSION FUNDING ACTIVITIES	23037,69	3806	2,91	2,72	2,15	1,82	1,48
651	INSURANCE	27480,23	807	2,65	2,48	2,09	1,83	1,50
652	REINSURANCE	155	3	13,02	12,90	9,15	6,93	5,01
661	ACTIVITIES AUXILIARY TO FINANCIAL SERVICE ACTIVITIES, EXCEPT INSURANCE AND PENSION FUNDING	20971,44	15243	1,22	1,14	1,08	1,06	1,06
662	ACTIVITIES AUXILIARY TO INSURANCE AND PENSION FUNDING	57830,6	21413	1,23	1,10	1,04	1,03	1,04
663	FUND MANAGEMENT ACTIVITIES	4046,82	200	7,55	7,49	5,35	4,17	3,07
681	BUYING AND SELLING OF SELF-OWNED REAL ESTATE	30556,65	20719	1,30	1,22	1,14	1,13	1,11
682	RENTING AND OPERATING OF SELF-OWNED OR LEASED REAL ESTATE	132285,9	86025	1,20	1,15	1,09	1,08	1,07
683	REAL ESTATE ACTIVITIES ON A FEE OR CONTRACT BASIS	47599,46	28809	1,35	1,28	1,22	1,18	1,16
691	LEGAL ACTIVITIES	90322,65	54467	1,84	1,62	1,33	1,20	1,14
692	ACCOUNTING, BOOKKEEPING AND AUDITING ACTIVITIES; TAX CONSULTANCY	134762,7	57767	1,34	1,21	1,10	1,05	1,04
701	ACTIVITIES OF HEAD OFFICE	14434,61	1074	1,76	1,68	1,60	1,50	1,36
702	MANAGEMENT CONSULTANCY ACTIVITIES	77454,56	30056	1,58	1,55	1,44	1,37	1,28
711	ARCHITECTURAL AND ENGINEERING ACTIVITIES AND RELATED TECHNICAL CONSULTANCY	149760,5	106603	1,10	1,06	1,04	1,03	1,03
712	TECHNICAL TESTING AND ANALYSIS	16010,49	4371	1,18	1,13	1,11	1,11	1,11
721	RESEARCH AND EXPERIMENTAL DEVELOPMENT ON NATURAL SCIENCES AND ENGINEERING	11244,28	3116	2,06	1,44	1,27	1,33	1,24
722	RESEARCH AND EXPERIMENTAL DEVELOPMENT ON SOCIAL SCIENCES AND HUMANITIES	1909,5	1332	1,91	1,79	1,51	1,41	1,28
731	ADVERTISING	35000,41	12095	1,72	1,67	1,57	1,47	1,35
732	MARKET RESEARCH AND PUBLIC OPINION POLLING	13728,46	4260	1,89	1,84	1,74	1,65	1,46
741	SPECIALIZED DESIGN ACTIVITIES	27064,45	16539	1,31	1,26	1,17	1,15	1,11
742	PHOTOGRAPHIC ACTIVITIES	12197,61	7289	1,15	1,15	1,08	1,06	1,05
743	TRANSLATION AND INTERPRETATION ACTIVITIES	5280,52	4365	1,42	1,34	1,24	1,18	1,16
749	OTHER PROFESSIONAL, SCIENTIFIC AND TECHNICAL ACTIVITIES N.E.C.	69946,41	43078	1,14	1,10	1,07	1,05	1,05
750	VETERINARY ACTIVITIES	7628,26	6645	1,22	1,14	1,11	1,10	1,07

771	RENTING AND LEASING OF MOTOR VEHICLES	3860,59	1157	1,59	1,34	1,27	1,18	1,15
772	RENTING AND LEASING OF PERSONAL AND HOUSEHOLD GOODS	6115,78	3107	1,51	1,46	1,43	1,41	1,25
773	RENTING AND LEASING OF OTHER MACHINERY, EQUIPMENT AND TANGIBLE GOODS	10377,5	3808	1,27	1,19	1,15	1,11	1,09
774	LEASING OF INTELLECTUAL PROPERTY AND SIMILAR PRODUCTS, EXCEPT COPYRIGHTED WORKS	65,7	16	0,75	0,75	0,53	0,40	0,37
781	ACTIVITES OF EMPLOYMENT PLACEMENT AGENCIES	2635,49	986	2,91	2,85	2,37	2,06	1,72
782	TEMPORARY EMPLOYMENT AGENCY ACTIVITIES	176031,7	2895	1,45	1,18	1,07	1,07	1,09
783	OTHER HUMAN RESOURCES PROVISION	929,72	12	2,89	2,88	2,03	1,62	1,24
791	TRAVEL AGENCY AND TOUR OPERATOR ACTIVITIES	23839,68	5629	1,30	1,25	1,16	1,11	1,10
799	OTHER RESERVATION SERVICE AND RELATED ACTIVITIES	2442,2	1325	10,08	9,73	9,72	2,00	1,56
801	PRIVATE SECURITY ACTIVITIES	31161,79	893	1,61	1,49	1,34	1,24	1,18
802	SECURITY SYSTEMS SERVICE ACTIVITIES	100,05	6	3,80	3,77	2,67	2,02	1,46
803	INVESTIGATION ACTIVITIES	1733,06	706	1,44	1,35	1,30	1,20	1,16
811	COMBINED FACILITIES SUPPORT ACTIVITIES	2238,69	113	3,00	2,77	2,61	2,13	1,67
812	CLEANING ACTIVITIES	208690,8	18011	1,12	1,12	1,14	1,10	1,09
813	LANDSCAPE CARE AND MAINTENANCE SERVICE ACTIVITIES	7232,8	3938	1,99	1,57	1,37	1,24	1,09
821	OFFICE ADMINISTRATIVE AND SUPPORT ACTIVITIES	8924,89	3571	1,44	1,33	1,20	1,19	1,16
822	ACTIVITIES OF CALL CENTERS	11185,08	767	2,05	1,87	1,75	1,54	1,37
823	ORGANIZATION OF CONVENTIONS AND TRADE SHOWS	8943,35	2769	1,92	1,83	1,69	1,51	1,36
829	BUSINESS SUPPORT SERVICE ACTIVITIES N.E.C.	97395,06	43311	1,16	1,14	1,12	1,11	1,11
851	PRE-PRIMARY EDUCATION	3801,11	654	1,50	1,41	1,21	1,19	1,20
852	PRIMARY EDUCATION	2060,26	117	1,60	1,59	1,41	1,28	1,20
853	SECONDARY EDUCATION	4931,9	624	2,69	1,54	1,29	1,10	1,09
854	HIGHER EDUCATION	282,29	28	1,16	1,13	1,65	1,38	1,03
855	OTHER EDUCATION	23548,56	11620	1,22	1,17	1,11	1,08	1,07
856	EDUCATIONAL SUPPORT ACTIVITIES	686,43	70	4,86	3,70	1,89	1,32	2,28
861	HOSPITAL ACTIVITIES	35892,21	629	1,85	1,35	1,16	1,11	1,08
862	MEDICAL AND DENTAL PRACTICE ACTIVITIES	117259,2	76443	1,16	1,12	1,07	1,05	1,04
869	OTHER HUMAN HEALTH ACTIVITIES	43647,11	31614	1,20	1,14	1,10	1,07	1,06
871	RESIDENTIAL NURSING CARE FACILITIES	17194,9	741	2,65	1,97	1,73	1,50	1,35
872	RESIDENTIAL CARE ACTIVITIES FOR MENTAL RETARDATION, MENTAL HEALTH AND SUBSTANCE ABUSE	1225,01	105	5,19	5,70	5,11	4,33	3,22
873	RESIDENTIAL CARE ACTIVITIES FOR THE ELDERLY AND DISABLED	39042,58	1833	1,61	1,48	1,33	1,31	1,23
879	OTHER RESIDENTIAL CARE ACTIVITIES	3146,17	163	2,01	3,43	2,27	2,20	1,48
881	SOCIAL WORK ACTIVITIES WITHOUT ACCOMODATION FOR THE ELDERLY AND DISABLED	60783,6	3165	1,21	1,16	1,12	1,10	1,05
889	OTHER SOCIAL WORK ACTIVITIES WITHOUT ACCOMODATION	9318,28	985	1,53	1,54	1,39	1,35	1,33
900	CREATIVE, ARTS AND ENTERTAINMENT ACTIVITIES	27970,27	15555	1,43	1,31	1,19	1,13	1,09
910	LIBRARIES, ARCHIVES, MUSEUMS AND OTHER CULTURAL ACTIVITIES	2369,37	531	1,73	1,61	1,37	1,10	1,03

920	GAMBLING AND BETTING ACTIVITIES	8829,84	1363	1,37	1,27	1,07	1,00	1,03
931	SPORTS ACTIVITIES	17472,93	5873	1,40	1,31	1,24	1,17	1,11
932	OTHER AMUSEMENT AND RECREATION ACTIVITIES	29395,45	7768	4,79	4,29	3,80	3,18	2,81
951	REPAIR OF COMPUTERS AND COMMUNICATION EQUIPMENT	9075	3308	1,15	1,14	1,12	1,13	1,12
952	REPAIR OF PERSONAL AND HOUSEHOLD GOODS	20451,68	12532	1,13	1,09	1,07	1,05	1,04
960	OTHER PERSONAL SERVICE ACTIVITIES	184411,8	84764	1,07	1,04	1,02	1,02	1,01
	TOTAL	**9.937.326,93**	**2.492.232**					

Table 146 - *Agglomeration results by industry and distance range. Northern Italy, 2012.* ***Source:*** *Compiled by the authors*

Industry code	Industry description	Employees	Plants	M (5 minutes)	M (10 minutes)	M (15 minutes)	M (20 minutes)	M (30 minutes)
012	GROWING OF PERENNIAL CROPS	-	-	-	-	-	-	-
013	PLANT PROPAGATION	-	-	-	-	-	-	-
014	ANIMAL PRODUCTION	-	-	-	-	-	-	-
016	SUPPORT ACTIVITIES TO AGRICULTURE AND POST-HARVEST CROP ACTIVITIES	-	-	-	-	-	-	-
022	LOGGING	-	-	-	-	-	-	-
031	FISHING	-	-	-	-	-	-	-
051	MINING OF HARD COAL	-	-	-	-	-	-	-
061	EXTRACTION OF CRUDE PETROLEUM	-	-	-	-	-	-	-
062	EXTRACTION OF NATURAL GAS	5331,78	28	67,29	30,75	5,39	4,74	3,96
071	MINING OF IRON ORES	-	-	-	-	-	-	-
072	MINING OF NON-FERROUS METAL ORES	1,08	2	0,00	0,00	0,00	0,00	0,00
081	QUARRYING OF STONE, SAND AND CLAY	5965,55	1153	26,04	17,64	9,50	6,74	5,38
089	MINING AND QUARRYING N.E.C.	1084,57	147	175,80	147,61	45,81	11,21	8,36
091	SUPPORT ACTIVITIES FOR PETROLEUM AND NATURAL GAS EXTRACTION	441,42	26	16,75	16,75	18,33	17,08	6,82
099	SUPPORT ACTIVITIES FOR OTHER MINING AND QUARRYING	21,9	4	0,00	0,00	0,00	0,00	0,00
101	PROCESSING AND PRESERVING OF MEAT	41919,24	2605	12,63	11,20	9,83	8,32	4,39
102	PROCESSING AND PRESERVING OF FISH, CRUSTACEANS AND MOLLUSCS	1897,8	102	31,34	24,70	21,43	16,70	12,82
103	PROCESSING AND PRESERVING OF FRUIT AND VEGETABLES	12136,91	569	7,73	6,34	5,52	4,93	4,56
104	MANUFACTURE OF VEGETABLE AND ANIMAL OILS AND FATS	2710,54	232	45,58	40,60	26,48	22,00	19,53
105	MANUFACTURE OF DAIRY PRODUCTS	23436,55	1650	6,99	6,17	5,83	5,53	5,28
106	MANUFACTURE OF GRAIN MILL PRODUCTS, STARCHES AND STARCH PRODUCTS	5366,51	506	11,70	8,77	6,94	6,43	5,59
107	MANUFACTURE OF BAKERY PRODUCTS	81994,56	14884	1,56	1,56	1,53	1,51	1,48
108	MANUFACTURE OF OTHER FOOD PRODUCTS	38429,58	2969	2,35	2,23	2,19	2,19	2,00
109	MANUFACTURE OF PREPARED ANIMAL FEEDS	5003,93	393	21,56	18,98	18,44	17,86	17,24
110	MANUFACURE OF BEVERAGES	22435,71	1536	9,14	6,42	4,75	4,01	2,96
120	MANUFACTURE OF TOBACCO PRODUCTS	58,64	1	-	-	-	-	-
131	SPINNING, WEAVING AND FINISHING OF TEXTILES	14085,46	933	30,53	25,87	24,51	23,16	17,33
132	WEAVING OF TEXTILES	25346,3	1221	13,96	10,41	8,00	6,15	4,07
133	FINISHING OF TEXTILES	18589,19	1481	8,96	7,42	5,94	4,83	3,18
139	MANUFACTURE OF OTHER TEXTILES	35929,65	5451	4,41	3,45	2,78	2,29	1,59
141	MANUFACTURE OF WEARING APPAREL, EXCEPT FUR APPAREL	93867,15	14402	2,99	2,67	2,34	2,25	1,90
142	MANUFACTURE OF ARTICLES OF FUR	1503,1	642	11,72	7,00	4,66	3,79	1,97
143	MANUFACTURE OF KNITTED AND CROCHETED APPAREL	21492,85	2662	16,37	13,64	10,62	8,93	5,93

151	TANNING AND DRESSING OF LEATHER; MANUFACTURE OF LUGGAGE; HANDBAGS; SADDLERY AND HARNESS; DRESSING AND DYEING OF FUR	21379,67	2327	32,58	23,88	19,99	15,30	8,48
152	MANUFACTURE OF FOOTWEAR	26561,92	2468	29,03	21,18	11,95	6,99	3,70
161	SAWMILLING AND PLANING OF WOOD	12680,38	3045	9,04	7,55	6,93	6,35	5,83
162	MANUFACTURE OF PRODUCTS OF WOOD, CORK, STRAW AND PLAITING MATERIALS	67622,91	14333	2,90	2,50	2,30	2,14	1,94
171	MANUFACTURE OF PULP, PAPER AND PAPERBOARD	8303,4	152	5,64	3,27	2,52	2,66	2,09
172	MANUFACTURE OF CORRUGATED PAPER AND PAPERBOARD AND OF CONTAINERS OF PAPER AND PAPERBOARD	36352,67	2496	2,89	2,34	2,12	1,98	1,86
181	PRINTING AND SERVICE ACTIVITIES RELATED TO PRINTING	58628,06	9082	1,43	1,32	1,29	1,26	1,25
182	REPRODUCTION OF RECORDED MEDIA	603,67	164	2,50	2,04	1,82	1,75	1,69
191	MANUFACTURE OF COKE OVEN PRODUCTS	262,54	3,00	0,00	0,00	0,00	0,00	0,00
192	MANUFACTURE OF REFINED PETROLEUM PRODUCTS	6843,03	234	9,14	8,18	7,69	7,45	7,28
201	MANUFACTURE OF BASIC CHEMICALS, FERTILIZERS AND NITROGEN COMPOUNDS, PLASTICS AND SYNTHETIC RUBBER IN PRIMARY FORMS	27643,88	969	4,06	3,32	3,04	2,87	2,65
202	MANUFACTURE OF PESTICIDES AND OTHER AGROCHEMICAL PRODUCTS	1635,72	57	9,26	5,19	3,16	1,87	1,39
203	MANUFACTURE OF PAINTS, VARNISHES AND SIMILAR COATINGS, PRINTING INK AND MASTICS	15993,39	706	3,05	2,26	1,62	1,19	1,15
204	MANUFACTURE OF SOAP AND DETERGENTS, CLEANING AND POLISHING PREPARATIONS, PERFUMES AND TOILET PREPARATIONS	18532,24	1030	6,41	5,86	5,64	5,52	5,33
205	MANUFACTURE OF OTHER CHEMICAL PRODUCTS N.E.C.	17887,07	912	4,36	3,75	3,65	3,41	3,23
206	MANUFACTURE OF MAN-MADE FIBRES	2390,52	41	15,61	19,90	12,84	10,99	3,68
211	MANUFACTURE OF PHARMACEUTICALS	10192,57	120	6,75	4,10	2,75	2,04	1,93
212	MANUFACTURE OF MEDICINAL CHEMICAL AND BOTANICAL PRODUCTS	23587,61	308	4,96	2,82	2,23	2,23	1,95
221	MANUFACTURE OF RUBBER PRODUCTS	29564,66	1193	11,18	8,21	6,09	4,21	2,36
222	MANUFACTURE OF PLASTICS PRODUCTS	105471,8	7318	2,44	2,08	1,77	1,58	1,37
231	MANUFACTURE OF GLASS AND GLASS PRODUCTS	22540,94	2158	3,44	2,71	2,46	2,29	1,81
232	MANUFACTURE OF REFRACTORY PRODUCTS	1996,23	115	8,09	4,47	2,42	2,25	1,66
233	MANUFACTURE OF CLAY BUILDING MATERIALS	24434,5	560	45,84	36,61	34,82	24,32	16,71
234	MANUFACTURE OF OTHER PORCELAIN AND CERAMIC PRODUCTS	5398,06	788	18,58	8,80	6,02	4,30	3,01
235	MANUFACTURE OF CEMENT, LIME AND PLASTER	4417,93	120	44,81	41,09	41,13	40,23	39,20
236	MANUFACTURE OF ARTICLES OF CONCRETE, CEMENT AND PLASTER	21577,16	2162	3,78	2,91	2,65	2,48	2,30
237	CUTTING, SHAPING AND FINISHING OF STONE	21590,59	4362	15,89	12,01	6,10	3,98	2,61
239	MANUFACTURE OF OTHER NON-METALLIC MINERAL PRODUCTS N.E.C.	8425,91	722	6,43	5,53	4,81	4,52	4,36
241	MANUFACTURE OF BASIC IRON AND STEEL	22504,02	367	4,43	3,18	2,22	1,82	1,67
242	MANUFACTURE OF TUBES, PIPES AND HOLLOW PROFILES AND OF TUBE OR PIPE FITTINGS OF CAST-IRON	14382,91	335	7,03	5,15	4,21	3,86	3,29
243	CASTING OF SEMI-FINISHED STEEL PRODUCTS	14116,55	816	4,26	3,42	3,13	2,79	2,20

244	MANUFACTURE OF BASIC PRECIOUS AND OTHER NON-FERROUS METALS; REPROCESSING OF NUCLEAR FUELS	11394,94	434	8,26	5,06	4,70	4,29	3,88
245	CASTING OF IRON AND STEEL	25992,01	1064	5,88	4,93	4,23	3,64	2,76
251	MANUFACTURE OF STRUCTURAL METAL PRODUCTS	100314,6	16948	1,85	1,66	1,54	1,47	1,39
252	MANUFACTURE OF TANKS, RESERVOIRS AND CONTAINERS OF METAL	9675,62	530	6,52	3,77	2,72	1,90	1,45
253	MANUFACTURE OF STEAM GENERATORS, EXCEPT CENTRAL HEATING HOT WATER BOILERS	1897,82	115	4,21	2,72	1,85	2,24	1,71
254	MANUFACTURE OF WEAPONS AND AMMUNITION	4289,1	222	204,22	112,74	79,11	51,62	18,47
255	FORGING, PRESSING, STAMPING AND ROLL-FORMING OF METAL; POWDER METALLURGY	34139,01	1488	5,20	4,06	3,09	2,49	1,70
256	TREATMENT AND COATING OF METALS; MACHINING	104903,7	14202	2,69	2,39	2,15	2,03	1,83
257	MANUFACTURE OF CUTLERY, HAND TOOLS AND GENERAL HARDWARE	44813,44	4491	5,31	4,42	3,80	2,93	2,34
259	MANUFACTURE OF OTHER FABRICATED METAL PRODUCTS N.E.C.	82933	8976	3,26	2,76	2,48	2,29	1,96
261	MANUFACTURE OF ELECTRONIC COMPONENTS AND BOARDS	24550,37	1894	3,99	3,36	3,18	2,91	2,58
262	MANUFACTURE OF COMPUTERS AND PERIPHERAL EQUIPMENT	4422,21	364	16,19	15,97	15,28	14,95	14,24
263	MANUFACTURE OF COMMUNICATION EQUIPMENT	15696,35	724	1,94	1,70	1,58	1,46	1,32
264	MANUFACTURE OF CONSUMER ELECTRONICS	1578,2	154	83,25	83,70	82,91	82,55	82,37
265	MANUFACTURE OF MEASURING, TESTING, NAVIGATING AND CONTROL EQUIPMENT; WATCHES AND CLOCKS	13125,16	906	2,85	1,71	1,52	1,39	1,28
266	MANUFACTURE OF IRRADIATION, ELECTROMEDICAL AND ELECTROTHERAPEUTIC EQUIPMENT	9020,59	512	10,39	8,94	7,45	6,14	4,04
267	MANUFACTURE OF OPTICAL INSTRUMENTS AND PHOTOGRAPHIC EQUIPMENT	1804,91	128	9,83	8,97	5,31	3,81	2,17
268	MANUFACTURE OF MAGNETIC AND OPTICAL MEDIA	50,84	13	0,00	0,60	1,59	0,82	0,90
271	MANUFACTURE OF ELECTRIC MOTORS, GENERATORS, TRANSFORMERS AND ELECTRICITY DISTRIBUTION AND CONTROL APPARATUS	38023,77	2562	3,21	2,63	2,31	2,18	1,98
272	MANUFACTURE OF BATTERIES AND ACCUMULATORS	2217,72	56	3,70	4,01	6,78	5,88	4,20
273	MANUFACTURE OF WIRING AND WIRING DEVICES	15232,78	868	5,25	3,97	3,61	3,19	2,78
274	MANUFACTURE OF ELECTRIC LIGHTING EQUIPMENT	13279,83	1271	7,43	5,61	4,88	4,37	3,98
275	MANUFACTURE OF DOMESTIC APPLIANCES	27053,32	471	8,85	9,21	8,18	7,74	6,84
279	MANUFACTURE OF OTHER ELECTRICAL EQUIPMENT	26884,97	2620	4,17	3,79	3,67	3,57	3,45
281	MANUFACTURE OF GENERAL-PURPOSE MACHINERY	86758,39	3125	8,07	6,63	5,35	4,74	3,79
282	MANUFACTURE OF OTHER GENERAL-PURPOSE MACHINERY	132689,8	7461	2,23	2,03	1,81	1,68	1,56
283	MANUFACTURE OF AGRICULTURAL AND FORESTRY MACHINERY	25701,99	1597	9,33	7,93	7,22	6,69	6,09
284	MANUFACTURE OF METAL-FORMING MACHINERY AND MACHINE TOOLS	31864,17	1891	3,98	3,61	3,13	2,82	2,52
289	MANUFACTURE OF OTHER SPECIAL-PURPOSE MACHINERY	108283,4	8587	2,07	1,88	1,72	1,62	1,46
291	MANUFACTURE OF MOTOR VEHICLES	33857,83	127	5,26	4,89	4,09	4,23	3,62
292	MANUFACTURE OF BODIES (COACHWORK) FOR MOTOR VEHICLES; MANUFACTURE OF TRAILERS AND SEMI-TRAILERS	7682,46	489	4,40	3,28	2,39	2,07	1,68

293	MANUFACTURE OF PARTS AND ACCESSORIES FOR MOTOR VEHICLES	64137,4	1460	4,28	3,98	3,57	3,24	3,00
301	BUILDING OF SHIPS AND BOATS	14079,78	666	10,78	9,47	8,14	7,19	5,59
302	MANUFACTURE OF RAILWAY LOCOMOTIVES AND ROLLING STOCKS	4908,65	78	3,68	2,06	1,81	2,27	1,40
303	MANUFACTURE OF AIR AND SPACECRAFT AND RELATED MACHINERY	17718,73	149	5,35	4,69	3,21	2,95	2,25
304	MANUFACTURE OF MILITARY FIGHTING VEHICLES	79,44	1	-	-	-	-	-
309	MANUFACTURE OF TRANSPORT EQUIPMENT N.E.C.	12175,86	859	8,53	7,13	5,84	5,45	5,25
310	MANUFACTURE OF FURNITURE	98248,01	13423	8,11	6,39	4,77	3,52	2,32
321	MANUFACTURE OF JEWELLERY, BIJOUTERIE AND RELATED ARTICLES	16761,51	4169	64,55	61,00	18,96	18,35	9,96
322	MANUFACTURE OF MUSICAL INSTRUMENTS	974,12	415	67,37	63,64	61,70	58,68	51,07
323	MANUFACTURE OF SPORTS GOODS	4706,85	497	9,82	7,99	7,41	6,93	6,35
324	MANUFACTURE OF GAMES AND TOYS	1837,32	337	3,52	1,84	1,48	1,27	1,13
325	MANUFACTURE OF MEDICAL AND DENTAL INSTRUMENTS AND SUPPLIES	43374,93	9761	2,77	2,62	2,39	2,26	2,06
329	OTHER MANUFACTURING N.E.C.	14493,24	2484	4,62	3,87	3,22	2,79	2,51
331	REPAIR OF FABRICATED METAL PRODUCTS, MACHINERY AND EQUIPMENT	63730,19	19575	1,67	1,60	1,55	1,54	1,50
332	INSTALLATION OF INDUSTRIAL MACHINERY AND EQUIPMENT	34247,56	6276	1,86	1,75	1,69	1,64	1,61
351	ELECTRIC POWER GENERATION, TRANSMISSION AND DISTRIBUTION	29765,56	5702	2,71	2,33	2,22	2,11	2,03
352	MANUFACTURE OF GAS; DISTRIBUTION OF GASEOUS FUELS THROUGH MAINS	15015,24	787	2,30	1,94	1,91	1,84	1,84
353	STEAM AND AIR CONDITIONING SUPPLY	2415,32	222	2,91	3,25	2,95	3,47	2,79
360	WATER COLLECTION, TREATMENT AND SUPPLY	11360,26	699	1,47	1,16	1,13	1,13	1,24
370	SEWERAGE	6078,65	865	7,07	6,94	6,84	6,82	6,81
381	WASTE COLLECTION	33550,44	1367	1,61	1,55	1,48	1,50	1,50
382	WASTE TREATMENT AND DISPOSAL	9195,49	702	2,49	1,46	1,25	1,17	1,13
383	MATERIALS RECOVERY	12145,86	1807	2,51	2,28	2,13	2,07	1,99
390	REMEDIATION ACTIVITIES AND OTHER WASTE MANAGEMENT SERVICES	3051,44	389	10,86	10,39	9,93	9,91	9,70
411	PROJECT MANAGEMENT ACTIVITIES RELATED TO CONSTRUCTION	2319,23	1978	12,54	12,43	12,30	12,22	12,18
412	CONSTRUCTION OF BUILDINGS	205666,6	66892	1,62	1,46	1,36	1,30	1,21
421	CONSTRUCTION OF ROADS AND RAILWAYS	25814,71	2276	4,09	3,42	3,22	2,99	2,80
422	CONSTRUCTION OF UTILITY PROJECTS	10008,68	347	5,21	5,28	4,87	4,66	4,21
429	CONSTRUCTION OF OTHER CIVIL ENGINGEERING PROJECTS	9843,42	1159	6,34	5,54	5,24	5,10	4,75
431	DEMOLITION AND SITE PREPARATION	23361,56	5882	4,03	3,73	3,58	3,41	3,26
432	ELECTRICAL, PLUMBING AND OTHER CONSTRUCTION INSTALLATION ACTIVITIES	271205,8	86526	1,23	1,17	1,13	1,11	1,09
433	BUILDING COMPLETION AND FINISHING	243445,4	146048	1,54	1,37	1,29	1,23	1,17
439	OTHER SPECIALIZED CONSTRUCTION ACTIVITIES	38134,63	10055	2,39	2,17	2,04	1,95	1,84
451	SALE OF MOTOR VEHICLES	56443,88	11622	1,48	1,38	1,35	1,33	1,32
452	MAINTENANCE AND REPAIR OF MOTOR VEHICLES	107196,1	35573	1,37	1,33	1,31	1,29	1,27
453	SALE OF MOTOR VEHICLE PARTS AND ACCESSORIES	29193,53	6635	2,28	2,22	2,20	2,18	2,19
454	SALE, MAINTENANCE AND REPAIR OF MOTORCYCLES AND RELATED PARTS AND ACCESSORIES	8905,63	3397	3,69	3,64	3,63	3,62	3,61
461	WHOLESALE ON A FEE OR CONTRACT BASIS	143386,6	116505	1,32	1,26	1,24	1,23	1,22

462	WHOLESALE OF AGRICULTURAL RAW MATERIALS AND LIVE ANIMALS	15703,8	4771	5,72	5,20	4,89	4,61	4,31
463	WHOLESALE OF FOOD, BEVERAGES AND TOBACCO	85248,1	14970	1,84	1,71	1,66	1,59	1,51
464	WHOLESALE OF HOUSEHOLD GOODS	149204,9	31308	1,40	1,34	1,30	1,28	1,26
465	WHOLESALE OF MACHINERY, EQUIPMENT AND SUPPLIES	35183,99	7943	1,59	1,55	1,51	1,50	1,49
466	WHOLESALE OF OTHER MACHINERY AND EQUIPMENT	72546,45	14749	1,42	1,39	1,37	1,35	1,35
467	OTHER SPECIALIZED WHOLESALE	138187,7	27706	1,28	1,24	1,21	1,21	1,20
469	NON-SPECIALIZED WHOLESALE TRADE	28245,52	6294	2,15	2,16	2,19	2,17	2,15
471	RETAIL SALE IN NON-SPECIALIZED STORES	256729,8	27384	1,13	1,16	1,17	1,16	1,15
472	RETAIL SALE OF FOOD, BEVERAGES AND TOBACCO IN SPECIALIZED STORES	94285,43	43486	1,42	1,38	1,35	1,33	1,30
473	RETAIL SALE OF AUTOMOTIVE FUEL IN SPECIALIZED STORES	25900,28	9704	2,37	2,38	2,37	2,37	2,35
474	RETAIL SALE OF INFORMATION AND COMMUNICATIONS EQUIPMENT IN SPECIALIZED STORES	13124,63	4627	2,30	2,19	2,14	2,13	2,13
475	RETAIL SALE OF OTHER HOUSEHOLD EQUIPMENT IN SPECIALIZED STORES	98779,82	33071	1,41	1,36	1,34	1,33	1,31
476	RETAIL SALE OF CULTURAL AND RECREATION GOODS IN SPECIALIZED STORES	53575,5	23611	1,49	1,46	1,43	1,42	1,41
477	RETAIL SALE OF OTHER GOODS IN SPECIALIZED STORES	280325	104395	1,25	1,18	1,14	1,13	1,12
478	RETAIL SALE VIA STALLS AND MARKETS	62695,05	39850	2,01	1,70	1,57	1,51	1,45
479	RETAIL TRADE NOT IN STORES, STALLS OR MARKETS	23136,05	7714	2,33	2,29	2,27	2,28	2,26
491	PASSENGER RAIL TRANSPORT, INTERURBAN	18554,46	299	2,29	1,87	1,61	1,53	1,60
492	FREIGHT RAIL TRANSPORT	1011,38	44	12,19	6,97	5,23	3,88	2,87
493	OTHER PASSENGER LAND TRANSPORT	76477,37	16605	1,70	1,65	1,66	1,63	1,52
494	FREIGHT TRANSPORT BY ROAD	168459,9	44153	1,54	1,45	1,38	1,33	1,30
495	TRANSPORT VIA PIPELINE	1743,09	87	16,70	11,22	2,91	1,52	1,54
501	SEA AND COASTAL WATER TRANSPORT	8442,13	202	5,08	4,84	4,68	4,26	3,77
502	INLAND WATER TRANSPORT	3636,58	103	11,05	11,15	10,92	10,31	7,81
503	INLAND PASSENGER WATER TRANSPORT	1786,38	864	60,44	57,99	56,96	42,81	17,85
504	INLAND FREIGHT WATER TRANSPORT	602,15	115	63,91	63,89	64,30	46,93	21,58
511	PASSENGER AIR TRANSPORT	7394,63	222	27,43	12,30	8,70	4,79	2,08
512	FREIGHT AIR TRANSPORT	438,31	24	24,21	25,51	8,18	4,19	2,66
521	WAREHOUSING AND STORAGE	16092,31	1874	3,58	3,31	3,09	2,99	2,93
522	SUPPORT ACTIVITIES FOR TRANSPORTATION	194026,8	14608	1,72	1,55	1,47	1,40	1,33
531	POSTAL ACTIVITIES	64027,83	6076	1,20	1,46	1,53	1,55	1,56
532	COURIER ACTIVITIES	7095,43	1162	4,01	3,87	3,68	3,71	3,66
551	HOTELS	114529,5	15952	8,96	7,70	6,75	5,61	4,39
552	OTHER SHORT TERM ACCOMODATION ACTIVITIES	19628,34	9121	17,99	16,18	14,39	12,26	8,99
553	CAMPING GROUNDS, RECREATIONAL VEHICLE PARKS AND TRAILER PARKS	4383,09	896	29,85	25,41	22,79	13,96	9,75
559	OTHER ACCOMODATION	452,12	154	3,37	3,33	3,17	2,89	2,17
561	RESTAURANTS AND MOBILE FOOD SERVICE ACTIVITIES	311285,5	72001	1,39	1,31	1,26	1,21	1,14
562	EVENT CATERING AND OTHER FOOD SERVICE ACTIVITIES	73369,04	6979	1,53	1,56	1,57	1,57	1,58
563	BEVERAGE SERVING ACTIVITIES	179341,9	64056	1,30	1,27	1,23	1,20	1,17

581	PUBLISHING OF BOOKS, PERIODICALS AND OTHER PUBLISHING ACTIVITIES	23683,27	3396	2,45	2,34	2,20	1,96	1,74
582	SOFTWARE PUBLISHING	1118,66	340	27,65	27,75	27,59	27,48	27,58
591	MOTION PICTURE, VIDEO AND TELEVISION PROGRAMME ACTIVITIES	9841,3	3061	2,14	1,98	1,88	1,78	1,66
592	SOUND RECORDING AND MUSIC PUBLISHING ACTIVITIES	1159,86	678	16,29	16,07	15,95	15,98	15,81
601	RADIO BROADCASTING	1585,92	378	19,39	18,44	18,15	18,00	17,81
602	TELEVISION PROGRAMMING AND BROADCASTING ACTIVITIES	10781,03	266	5,37	2,91	2,27	1,91	1,48
611	WIRED TELECOMMUNICATIONS ACTIVITIES	24263,46	630	1,54	1,45	1,25	1,19	1,14
612	WIRELESS TELECOMMUNICATIONS ACTIVITIES	10432,08	106	6,23	4,67	3,29	2,71	1,80
613	SATELLITE TELECOMMUNICATIONS ACTIVITIES	254,07	29	1,60	1,59	1,36	1,70	1,40
619	OTHER TELECOMMUNICATIONS ACTIVITIES	5973,4	2108	2,98	2,94	2,99	2,90	2,81
620	COMPUTER PROGRAMMING, CONSULTANCY AND RELATED ACTIVITIES	142389,5	30415	1,44	1,44	1,42	1,39	1,35
631	DATA PROCESSING, HOSTING AND RELATED ACTIVITIES; WEB PORTALS	68016,71	17889	1,37	1,30	1,26	1,25	1,26
639	OTHER INFORMATION SERVICE ACTIVITIES	2993,4	1206	10,16	10,13	10,05	9,95	9,89
641	MONETARY INTERMEDIATION	207955,6	18325	1,06	1,07	1,07	1,08	1,11
642	ACTIVITIES OF HOLDING COMPANIES	1657,51	2772	25,63	25,49	25,47	25,32	25,18
643	TRUSTS, FUNDS AND SIMILAR FINANCIAL ENTITIES	11,77	2	0,00	0,00	0,00	0,00	0,00
649	OTHER FINANCIAL SERVICE ACTIVITIES, EXCEPT INSURANCE AND PENSION FUNDING ACTIVITIES	20454,7	2619	2,83	2,68	2,26	1,96	1,71
651	INSURANCE	32379,81	850	2,75	2,53	2,16	1,90	1,58
652	REINSURANCE	148,45	5	12,09	11,95	8,73	6,67	4,88
661	ACTIVITIES AUXILIARY TO FINANCIAL SERVICE ACTIVITIES, EXCEPT INSURANCE AND PENSION FUNDING	21552,19	15945	1,95	1,88	1,82	1,79	1,79
662	ACTIVITIES AUXILIARY TO INSURANCE AND PENSION FUNDING	65245,78	28736	1,44	1,35	1,31	1,30	1,31
663	FUND MANAGEMENT ACTIVITIES	3394,25	181	8,08	8,01	5,85	4,59	3,37
681	BUYING AND SELLING OF SELF-OWNED REAL ESTATE	22634,03	22720	1,88	1,84	1,77	1,73	1,71
682	RENTING AND OPERATING OF SELF-OWNED OR LEASED REAL ESTATE	124162,5	105989	1,30	1,27	1,24	1,23	1,22
683	REAL ESTATE ACTIVITIES ON A FEE OR CONTRACT BASIS	45457,22	28285	1,67	1,59	1,54	1,50	1,47
691	LEGAL ACTIVITIES	96355,53	59136	1,83	1,62	1,36	1,24	1,18
692	ACCOUNTING, BOOKKEEPING AND AUDITING ACTIVITIES; TAX CONSULTANCY	144535,2	61509	1,39	1,27	1,16	1,12	1,11
701	ACTIVITIES OF HEAD OFFICE	18308,13	1837	2,89	2,86	2,74	2,64	2,49
702	MANAGEMENT CONSULTANCY ACTIVITIES	65819,07	32957	1,80	1,76	1,65	1,59	1,51
711	ARCHITECTURAL AND ENGINEERING ACTIVITIES AND RELATED TECHNICAL CONSULTANCY	142172	103459	1,20	1,16	1,15	1,13	1,13
712	TECHNICAL TESTING AND ANALYSIS	20645,95	5293	3,04	3,02	3,00	3,00	3,00
721	RESEARCH AND EXPERIMENTAL DEVELOPMENT ON NATURAL SCIENCES AND ENGINEERING	12247,07	3517	3,16	2,49	2,37	2,43	2,34
722	RESEARCH AND EXPERIMENTAL DEVELOPMENT ON SOCIAL SCIENCES AND HUMANITIES	1920,22	1078	11,70	11,56	11,32	11,18	11,01
731	ADVERTISING	30198,39	10101	2,11	2,06	1,99	1,91	1,80
732	MARKET RESEARCH AND PUBLIC OPINION POLLING	7370,85	2747	2,91	2,88	2,73	2,65	2,46

741	SPECIALIZED DESIGN ACTIVITIES	33552,26	20121	1,82	1,78	1,73	1,71	1,70
742	PHOTOGRAPHIC ACTIVITIES	10200,79	6841	2,09	2,09	2,03	2,01	1,99
743	TRANSLATION AND INTERPRETATION ACTIVITIES	5592,95	4486	4,82	4,72	4,64	4,60	4,57
749	OTHER PROFESSIONAL, SCIENTIFIC AND TECHNICAL ACTIVITIES N.E.C.	69323,91	47896	1,46	1,43	1,40	1,39	1,39
750	VETERINARY ACTIVITIES	8207,22	6869	6,36	6,32	6,29	6,28	6,24
771	RENTING AND LEASING OF MOTOR VEHICLES	3941,45	1265	3,67	3,43	3,32	3,28	3,29
772	RENTING AND LEASING OF PERSONAL AND HOUSEHOLD GOODS	3975,83	2026	10,19	9,84	9,58	9,17	8,61
773	RENTING AND LEASING OF OTHER MACHINERY, EQUIPMENT AND TANGIBLE GOODS	11992,87	3922	3,48	3,40	3,36	3,35	3,33
774	LEASING OF INTELLECTUAL PROPERTY AND SIMILAR PRODUCTS, EXCEPT COPYRIGHTED WORKS	578,57	177	2,24	2,16	1,81	1,56	1,38
781	ACTIVITES OF EMPLOYMENT PLACEMENT AGENCIES	2811,87	903	6,61	6,56	6,14	5,86	5,62
782	TEMPORARY EMPLOYMENT AGENCY ACTIVITIES	137155,3	2955	1,22	1,12	1,10	1,13	1,17
783	OTHER HUMAN RESOURCES PROVISION	18134,99	8	12,54	12,54	12,54	12,01	10,16
791	TRAVEL AGENCY AND TOUR OPERATOR ACTIVITIES	20814	5593	1,60	1,55	1,48	1,43	1,43
799	OTHER RESERVATION SERVICE AND RELATED ACTIVITIES	3183,18	1959	5,70	5,60	5,56	5,11	4,71
801	PRIVATE SECURITY ACTIVITIES	25283,63	766	2,38	1,92	1,83	1,73	1,65
802	SECURITY SYSTEMS SERVICE ACTIVITIES	441,27	74	4,44	2,74	1,70	1,94	1,47
803	INVESTIGATION ACTIVITIES	2212,22	716	7,75	7,51	7,39	7,35	7,33
811	COMBINED FACILITIES SUPPORT ACTIVITIES	9166,91	626	4,68	3,04	2,87	2,70	2,73
812	CLEANING ACTIVITIES	221735,5	19374	1,18	1,18	1,21	1,19	1,18
813	LANDSCAPE CARE AND MAINTENANCE SERVICE ACTIVITIES	22220,33	8763	3,45	3,04	2,87	2,74	2,60
821	OFFICE ADMINISTRATIVE AND SUPPORT ACTIVITIES	9837,72	4083	3,10	3,01	2,91	2,85	2,84
822	ACTIVITIES OF CALL CENTERS	14749,3	555	3,47	3,23	3,17	2,91	2,68
823	ORGANIZATION OF CONVENTIONS AND TRADE SHOWS	7058,88	2344	3,07	2,97	2,97	2,84	2,69
829	BUSINESS SUPPORT SERVICE ACTIVITIES N.E.C.	100211,2	29626	1,34	1,35	1,32	1,32	1,31
851	PRE-PRIMARY EDUCATION	4595,52	719	4,29	4,36	4,31	4,22	4,11
852	PRIMARY EDUCATION	2249,89	90	1,69	1,88	1,35	1,38	1,17
853	SECONDARY EDUCATION	5114,16	659	5,09	4,37	4,16	4,05	4,05
854	HIGHER EDUCATION	919,62	206	3,32	2,44	2,05	1,90	1,44
855	OTHER EDUCATION	29460,89	13144	1,69	1,63	1,56	1,52	1,49
856	EDUCATIONAL SUPPORT ACTIVITIES	1600,2	649	38,24	38,52	38,46	38,34	38,31
861	HOSPITAL ACTIVITIES	42037,4	584	1,57	1,24	1,16	1,08	1,05
862	MEDICAL AND DENTAL PRACTICE ACTIVITIES	129985,9	82780	1,28	1,24	1,19	1,17	1,16
869	OTHER HUMAN HEALTH ACTIVITIES	56693,81	41370	1,42	1,37	1,33	1,30	1,29
871	RESIDENTIAL NURSING CARE FACILITIES	18257,05	602	4,11	3,69	3,61	3,45	3,35
872	RESIDENTIAL CARE ACTIVITIES FOR MENTAL RETARDATION, MENTAL HEALTH AND SUBSTANCE ABUSE	6259,85	480	12,58	11,46	11,47	11,28	11,10
873	RESIDENTIAL CARE ACTIVITIES FOR THE ELDERLY AND DISABLED	42583,86	1581	3,63	3,40	3,15	3,06	2,98
879	OTHER RESIDENTIAL CARE ACTIVITIES	11731,92	788	5,17	4,87	4,68	4,66	4,49

881	SOCIAL WORK ACTIVITIES WITHOUT ACCOMODATION FOR THE ELDERLY AND DISABLED	46740,88	1771	1,55	1,58	1,45	1,43	1,43
889	OTHER SOCIAL WORK ACTIVITIES WITHOUT ACCOMODATION	37077,21	3958	1,46	1,41	1,35	1,34	1,31
900	CREATIVE, ARTS AND ENTERTAINMENT ACTIVITIES	21337,16	14361	2,01	1,95	1,84	1,78	1,74
910	LIBRARIES, ARCHIVES, MUSEUMS AND OTHER CULTURAL ACTIVITIES	3064,27	493	21,73	21,66	21,22	21,02	20,82
920	GAMBLING AND BETTING ACTIVITIES	13445,94	3121	3,52	3,43	3,33	3,29	3,28
931	SPORTS ACTIVITIES	19738,9	7098	2,02	1,92	1,83	1,76	1,65
932	OTHER AMUSEMENT AND RECREATION ACTIVITIES	27165,57	8186	4,10	3,69	3,34	3,08	2,82
951	REPAIR OF COMPUTERS AND COMMUNICATION EQUIPMENT	7856,74	2788	3,00	2,84	2,82	2,82	2,85
952	REPAIR OF PERSONAL AND HOUSEHOLD GOODS	17769,28	11215	2,49	2,42	2,38	2,36	2,33
960	OTHER PERSONAL SERVICE ACTIVITIES	210359,7	92314	1,16	1,14	1,12	1,11	1,11
	TOTAL	**9.432.879,41**	**2.451.587**					

Table 147 - *Agglomeration results by industry and distance range. Peninsular Italy, 2007.* ***Source:*** *Compiled by the authors*

Industry code	Industry description	Employees	Plants	M (5 minutes)	M (10 minutes)	M (15 minutes)	M (20 minutes)	M (30 minutes)
012	GROWING OF PERENNIAL CROPS	3,00	3	0,00	0,00	0,00	0,00	0,00
013	PLANT PROPAGATION	2,75	1	-	-	-	-	-
014	ANIMAL PRODUCTION	41,25	9	0,00	0,00	0,00	0,04	0,06
016	SUPPORT ACTIVITIES TO AGRICULTURE AND POST-HARVEST CROP ACTIVITIES	107,28	65	10,32	6,94	6,86	1,60	0,77
022	LOGGING	61,16	32	0,29	5,33	3,55	1,75	1,35
031	FISHING	37,79	10	0,00	0,00	0,00	0,00	0,00
051	MINING OF HARD COAL	-	-	-	-	-	-	-
061	EXTRACTION OF CRUDE PETROLEUM	-	-	-	-	-	-	-
062	EXTRACTION OF NATURAL GAS	3.902,03	48	0,72	0,83	0,91	0,80	0,90
071	MINING OF IRON ORES	-	-	-	-	-	-	-
072	MINING OF NON-FERROUS METAL ORES	-	-	-	-	-	-	-
081	QUARRYING OF STONE, SAND AND CLAY	9.052,03	1.493	9,45	6,69	4,62	3,62	2,49
089	MINING AND QUARRYING N.E.C.	1.162,40	183	15,86	8,97	4,83	3,25	2,57
091	SUPPORT ACTIVITIES FOR PETROLEUM AND NATURAL GAS EXTRACTION	677,16	18	311,39	307,98	120,68	98,74	66,14
099	SUPPORT ACTIVITIES FOR OTHER MINING AND QUARRYING	-	-	-	-	-	-	-
101	PROCESSING AND PRESERVING OF MEAT	14.199,50	1.355	4,61	3,38	2,47	2,05	1,78
102	PROCESSING AND PRESERVING OF FISH, CRUSTACEANS AND MOLLUSCS	2.843,78	241	15,00	8,84	6,64	5,97	3,70
103	PROCESSING AND PRESERVING OF FRUIT AND VEGETABLES	14.602,30	1.291	9,43	7,64	6,04	4,65	3,24
104	MANUFACTURE OF VEGETABLE AND ANIMAL OILS AND FATS	7.599,30	3.049	6,89	5,78	4,72	3,91	2,96
105	MANUFACTURE OF DAIRY PRODUCTS	16.954,12	2.243	4,80	3,91	3,05	2,56	2,02
106	MANUFACTURE OF GRAIN MILL PRODUCTS, STARCHES AND STARCH PRODUCTS	2.830,64	592	3,35	2,66	2,11	1,99	1,69
107	MANUFACTURE OF BAKERY PRODUCTS	69.314,54	18.576	1,28	1,27	1,22	1,19	1,13
108	MANUFACTURE OF OTHER FOOD PRODUCTS	16.593,15	2.325	1,35	1,21	1,20	1,12	1,09
109	MANUFACTURE OF PREPARED ANIMAL FEEDS	2.331,03	231	8,16	8,59	5,61	3,79	2,69
110	MANUFACURE OF BEVERAGES	11.786,85	1.387	3,65	3,20	2,52	2,11	1,51
120	MANUFACTURE OF TOBACCO PRODUCTS	1.167,49	8	0,41	0,41	0,41	0,40	0,34
131	SPINNING, WEAVING AND FINISHING OF TEXTILES	10.332,13	1.707	49,73	45,65	27,43	21,69	11,05
132	WEAVING OF TEXTILES	9.341,71	1.500	32,94	30,77	20,89	14,99	8,17
133	FINISHING OF TEXTILES	11.318,51	1.145	18,15	17,06	13,20	8,98	5,31
139	MANUFACTURE OF OTHER TEXTILES	23.071,49	4.960	5,15	4,70	3,80	2,98	2,17
141	MANUFACTURE OF WEARING APPAREL, EXCEPT FUR APPAREL	97.965,36	17.805	3,54	3,12	2,53	2,04	1,70

142	MANUFACTURE OF ARTICLES OF FUR	894,33	427	2,87	2,74	2,45	2,11	1,77
143	MANUFACTURE OF KNITTED AND CROCHETED APPAREL	12.279,24	2.225	8,64	6,59	4,91	4,29	3,44
151	TANNING AND DRESSING OF LEATHER; MANUFACTURE OF LUGGAGE; HANDBAGS; SADDLERY AND HARNESS; DRESSING AND DYEING OF FUR	35.786,72	5.886	19,73	14,35	10,37	6,94	4,81
152	MANUFACTURE OF FOOTWEAR	64.700,64	8.132	21,77	18,60	16,01	14,33	11,99
161	SAWMILLING AND PLANING OF WOOD	7.695,55	2.608	2,93	2,44	2,10	1,82	1,50
162	MANUFACTURE OF PRODUCTS OF WOOD, CORK, STRAW AND PLAITING MATERIALS	45.003,25	13.984	1,71	1,52	1,39	1,29	1,18
171	MANUFACTURE OF PULP, PAPER AND PAPERBOARD	5.427,16	172	41,38	41,12	16,14	10,90	6,08
172	MANUFACTURE OF CORRUGATED PAPER AND PAPERBOARD AND OF CONTAINERS OF PAPER AND PAPERBOARD	23.190,76	1.825	4,88	3,98	3,19	2,59	2,08
181	PRINTING AND SERVICE ACTIVITIES RELATED TO PRINTING	34.593,20	7.730	1,30	1,22	1,20	1,13	1,06
182	REPRODUCTION OF RECORDED MEDIA	667,55	186	3,18	1,36	1,15	1,60	1,33
191	MANUFACTURE OF COKE OVEN PRODUCTS	1,84	2	0,00	0,00	0,00	0,00	0,00
192	MANUFACTURE OF REFINED PETROLEUM PRODUCTS	5.933,56	350	3,96	2,15	2,13	1,61	1,25
201	MANUFACTURE OF BASIC CHEMICALS, FERTILIZERS AND NITROGEN COMPOUNDS, PLASTICS AND SYNTHETIC RUBBER IN PRIMARY FORMS	8.794,82	522	5,08	4,52	2,21	1,94	1,53
202	MANUFACTURE OF PESTICIDES AND OTHER AGROCHEMICAL PRODUCTS	268,90	15	19,23	19,23	4,56	2,54	2,22
203	MANUFACTURE OF PAINTS, VARNISHES AND SIMILAR COATINGS, PRINTING INK AND MASTICS	4.201,74	422	3,21	2,14	1,64	1,46	1,13
204	MANUFACTURE OF SOAP AND DETERGENTS, CLEANING AND POLISHING PREPARATIONS, PERFUMES AND TOILET PREPARATIONS	5.828,32	540	1,83	1,47	1,52	1,42	1,28
205	MANUFACTURE OF OTHER CHEMICAL PRODUCTS N.E.C.	4.460,90	528	2,86	2,62	1,93	1,64	1,35
206	MANUFACTURE OF MAN-MADE FIBRES	816,47	11	27,85	10,64	7,51	6,50	4,31
211	MANUFACTURE OF PHARMACEUTICALS	2.545,15	44	1,50	1,50	1,25	2,25	2,09
212	MANUFACTURE OF MEDICINAL CHEMICAL AND BOTANICAL PRODUCTS	26.919,76	295	4,13	3,96	4,13	3,57	1,89
221	MANUFACTURE OF RUBBER PRODUCTS	11.314,35	593	5,56	4,23	2,52	2,21	2,02
222	MANUFACTURE OF PLASTICS PRODUCTS	37.447,13	3.481	2,70	2,25	1,90	1,68	1,48
231	MANUFACTURE OF GLASS AND GLASS PRODUCTS	16.180,50	2.131	2,89	2,41	2,02	1,73	1,36
232	MANUFACTURE OF REFRACTORY PRODUCTS	518,74	41	6,89	4,63	2,36	1,80	1,53
233	MANUFACTURE OF CLAY BUILDING MATERIALS	6.891,81	402	14,03	10,77	8,13	3,71	2,38
234	MANUFACTURE OF OTHER PORCELAIN AND CERAMIC PRODUCTS	9.876,24	1.906	36,45	25,21	11,30	8,90	4,40
235	MANUFACTURE OF CEMENT, LIME AND PLASTER	4.917,35	227	4,66	4,44	3,78	3,30	2,07
236	MANUFACTURE OF ARTICLES OF CONCRETE, CEMENT AND PLASTER	23.525,85	2.761	2,16	2,03	1,74	1,63	1,44
237	CUTTING, SHAPING AND FINISHING OF STONE	22.394,10	5.226	6,79	4,64	3,64	3,11	2,62
239	MANUFACTURE OF OTHER NON-METALLIC MINERAL PRODUCTS N.E.C.	4.013,03	465	4,67	3,70	2,01	1,78	1,65

241	MANUFACTURE OF BASIC IRON AND STEEL	20.721,15	261	1,04	0,92	0,90	0,76	0,66
242	MANUFACTURE OF TUBES, PIPES AND HOLLOW PROFILES AND OF TUBE OR PIPE FITTINGS OF CAST-IRON	1.543,76	91	2,93	1,87	1,52	1,66	1,42
243	CASTING OF SEMI-FINISHED STEEL PRODUCTS	3.868,13	432	6,03	4,06	2,75	1,95	1,71
244	MANUFACTURE OF BASIC PRECIOUS AND OTHER NON-FERROUS METALS; REPROCESSING OF NUCLEAR FUELS	6.683,10	362	3,33	2,72	2,81	2,59	2,08
245	CASTING OF IRON AND STEEL	4.468,06	262	4,66	3,28	2,53	2,45	1,75
251	MANUFACTURE OF STRUCTURAL METAL PRODUCTS	73.476,74	17.099	1,44	1,37	1,27	1,22	1,16
252	MANUFACTURE OF TANKS, RESERVOIRS AND CONTAINERS OF METAL	4.137,18	259	13,16	5,71	2,88	2,37	2,05
253	MANUFACTURE OF STEAM GENERATORS, EXCEPT CENTRAL HEATING HOT WATER BOILERS	833,41	33	3,96	2,45	2,10	1,37	0,84
254	MANUFACTURE OF WEAPONS AND AMMUNITION	2.726,81	47	7,02	6,65	5,92	4,39	2,39
255	FORGING, PRESSING, STAMPING AND ROLL-FORMING OF METAL; POWDER METALLURGY	7.128,99	469	5,35	4,66	3,99	2,86	2,02
256	TREATMENT AND COATING OF METALS; MACHINING	40.017,98	5.258	2,21	1,88	1,66	1,50	1,35
257	MANUFACTURE OF CUTLERY, HAND TOOLS AND GENERAL HARDWARE	8.387,12	1.021	4,50	3,73	3,06	2,85	2,45
259	MANUFACTURE OF OTHER FABRICATED METAL PRODUCTS N.E.C.	31.161,23	5.654	1,98	1,72	1,56	1,44	1,22
261	MANUFACTURE OF ELECTRONIC COMPONENTS AND BOARDS	11.605,86	672	7,37	5,85	4,61	3,67	2,68
262	MANUFACTURE OF COMPUTERS AND PERIPHERAL EQUIPMENT	2.446,95	477	2,04	1,79	1,73	1,55	1,14
263	MANUFACTURE OF COMMUNICATION EQUIPMENT	12.012,74	473	3,01	2,67	1,88	1,70	1,57
264	MANUFACTURE OF CONSUMER ELECTRONICS	1.129,67	82	40,99	10,12	4,33	3,57	2,97
265	MANUFACTURE OF MEASURING, TESTING, NAVIGATING AND CONTROL EQUIPMENT; WATCHES AND CLOCKS	6.792,63	293	2,22	1,86	1,76	1,65	1,44
266	MANUFACTURE OF IRRADIATION, ELECTROMEDICAL AND ELECTROTHERAPEUTIC EQUIPMENT	3.084,46	267	3,01	2,24	2,16	1,81	1,59
267	MANUFACTURE OF OPTICAL INSTRUMENTS AND PHOTOGRAPHIC EQUIPMENT	627,23	58	6,92	4,71	2,90	2,30	1,47
268	MANUFACTURE OF MAGNETIC AND OPTICAL MEDIA	232,75	22	10,49	3,68	3,42	2,98	1,38
271	MANUFACTURE OF ELECTRIC MOTORS, GENERATORS, TRANSFORMERS AND ELECTRICITY DISTRIBUTION AND CONTROL APPARATUS	10.997,70	825	4,46	3,76	2,97	2,35	1,87
272	MANUFACTURE OF BATTERIES AND ACCUMULATORS	631,12	45	3,79	3,59	1,90	1,52	1,10
273	MANUFACTURE OF WIRING AND WIRING DEVICES	5.191,18	335	10,95	8,14	5,82	4,08	3,39
274	MANUFACTURE OF ELECTRIC LIGHTING EQUIPMENT	4.406,32	604	4,56	3,17	2,47	2,34	2,15
275	MANUFACTURE OF DOMESTIC APPLIANCES	15.562,18	212	31,92	29,71	30,67	29,58	22,60
279	MANUFACTURE OF OTHER ELECTRICAL EQUIPMENT	7.980,95	760	4,03	2,97	2,32	2,04	1,73
281	MANUFACTURE OF GENERAL-PURPOSE MACHINERY	13.028,96	401	1,63	1,32	1,58	1,44	1,32
282	MANUFACTURE OF OTHER GENERAL-PURPOSE MACHINERY	20.226,02	1.832	2,04	1,80	1,67	1,56	1,34
283	MANUFACTURE OF AGRICULTURAL AND FORESTRY MACHINERY	6.301,74	528	9,53	7,60	6,41	5,35	3,80

284	MANUFACTURE OF METAL-FORMING MACHINERY AND MACHINE TOOLS	6.700,10	411	11,07	9,49	8,27	7,92	6,80
289	MANUFACTURE OF OTHER SPECIAL-PURPOSE MACHINERY	19.927,41	1.898	2,48	2,16	1,93	1,80	1,55
291	MANUFACTURE OF MOTOR VEHICLES	25.661,30	39	2,61	2,61	2,30	2,33	1,98
292	MANUFACTURE OF BODIES (COACHWORK) FOR MOTOR VEHICLES; MANUFACTURE OF TRAILERS AND SEMI-TRAILERS	5.638,41	283	6,05	5,50	4,30	4,10	2,58
293	MANUFACTURE OF PARTS AND ACCESSORIES FOR MOTOR VEHICLES	30.463,63	507	5,12	4,30	3,68	3,45	2,83
301	BUILDING OF SHIPS AND BOATS	12.213,30	1.311	12,78	11,43	7,92	7,49	5,64
302	MANUFACTURE OF RAILWAY LOCOMOTIVES AND ROLLING STOCKS	4.793,67	80	5,96	6,07	4,83	2,63	1,72
303	MANUFACTURE OF AIR AND SPACECRAFT AND RELATED MACHINERY	15.404,89	145	8,30	6,95	5,48	4,25	2,73
304	MANUFACTURE OF MILITARY FIGHTING VEHICLES	1,00	1					
309	MANUFACTURE OF TRANSPORT EQUIPMENT N.E.C.	7.176,86	180	13,19	11,87	9,22	7,37	4,30
310	MANUFACTURE OF FURNITURE	65.482,47	10.158	4,88	4,59	3,40	2,83	2,41
321	MANUFACTURE OF JEWELLERY, BIJOUTERIE AND RELATED ARTICLES	17.750,61	4.919	17,18	15,67	14,78	14,01	11,85
322	MANUFACTURE OF MUSICAL INSTRUMENTS	1.324,89	257	66,29	36,80	30,72	25,98	12,25
323	MANUFACTURE OF SPORTS GOODS	791,84	164	14,85	9,72	2,96	2,26	1,45
324	MANUFACTURE OF GAMES AND TOYS	1.458,84	189	4,88	4,07	3,13	2,29	1,60
325	MANUFACTURE OF MEDICAL AND DENTAL INSTRUMENTS AND SUPPLIES	13.498,41	5.857	1,13	1,12	1,11	1,06	1,10
329	OTHER MANUFACTURING N.E.C.	4.980,34	1.313	8,11	3,42	2,18	1,64	1,47
331	REPAIR OF FABRICATED METAL PRODUCTS, MACHINERY AND EQUIPMENT	46.026,58	10.749	1,20	1,16	1,13	1,10	1,08
332	INSTALLATION OF INDUSTRIAL MACHINERY AND EQUIPMENT	16.459,58	2.848	1,38	1,30	1,17	1,13	1,08
351	ELECTRIC POWER GENERATION, TRANSMISSION AND DISTRIBUTION	25.590,30	1.278	1,27	1,20	1,20	1,15	1,16
352	MANUFACTURE OF GAS; DISTRIBUTION OF GASEOUS FUELS THROUGH MAINS	7.343,54	519	1,49	1,27	1,04	0,93	0,96
353	STEAM AND AIR CONDITIONING SUPPLY	1.022,78	24	0,84	0,83	0,91	0,88	0,83
360	WATER COLLECTION, TREATMENT AND SUPPLY	13.084,63	716	1,05	1,00	0,99	1,00	1,07
370	SEWERAGE	4.261,46	735	2,70	2,29	1,80	1,52	1,41
381	WASTE COLLECTION	40.518,17	1.509	1,07	1,06	1,07	1,07	1,10
382	WASTE TREATMENT AND DISPOSAL	6.305,84	583	1,78	1,65	1,50	1,34	1,23
383	MATERIALS RECOVERY	9.144,55	1.455	1,53	1,37	1,25	1,22	1,15
390	REMEDIATION ACTIVITIES AND OTHER WASTE MANAGEMENT SERVICES	1.340,93	193	4,91	3,53	2,62	2,29	1,75
411	PROJECT MANAGEMENT ACTIVITIES RELATED TO CONSTRUCTION	3.996,05	2.216	1,89	1,54	1,46	1,40	1,35
412	CONSTRUCTION OF BUILDINGS	313.858,80	85.218	1,50	1,40	1,30	1,21	1,13
421	CONSTRUCTION OF ROADS AND RAILWAYS	19.166,31	2.443	2,25	1,64	1,39	1,32	1,19
422	CONSTRUCTION OF UTILITY PROJECTS	8.836,88	258	2,82	2,81	1,89	1,18	1,20
429	CONSTRUCTION OF OTHER CIVIL ENGINGEERING PROJECTS	9.375,57	1.552	2,47	2,22	1,73	1,43	1,28
431	DEMOLITION AND SITE PREPARATION	17.687,35	5.504	1,86	1,71	1,48	1,35	1,21

432	ELECTRICAL, PLUMBING AND OTHER CONSTRUCTION INSTALLATION ACTIVITIES	190.624,53	59.206	1,12	1,08	1,05	1,04	1,02
433	BUILDING COMPLETION AND FINISHING	194.415,65	90.266	1,47	1,37	1,27	1,20	1,11
439	OTHER SPECIALIZED CONSTRUCTION ACTIVITIES	21.633,90	5.320	1,41	1,31	1,22	1,13	1,06
451	SALE OF MOTOR VEHICLES	46.060,44	10.667	1,27	1,15	1,10	1,07	1,06
452	MAINTENANCE AND REPAIR OF MOTOR VEHICLES	94.372,75	39.709	1,16	1,13	1,11	1,10	1,06
453	SALE OF MOTOR VEHICLE PARTS AND ACCESSORIES	9.851,55	3.087	1,44	1,32	1,26	1,23	1,18
454	SALE, MAINTENANCE AND REPAIR OF MOTORCYCLES AND RELATED PARTS AND ACCESSORIES	7.794,67	3.441	1,10	1,08	1,06	1,05	1,05
461	WHOLESALE ON A FEE OR CONTRACT BASIS	118.011,42	96.171	1,22	1,19	1,14	1,12	1,09
462	WHOLESALE OF AGRICULTURAL RAW MATERIALS AND LIVE ANIMALS	9.929,05	4.164	3,93	3,16	2,49	2,03	1,66
463	WHOLESALE OF FOOD, BEVERAGES AND TOBACCO	68.446,40	18.276	1,67	1,58	1,45	1,38	1,26
464	WHOLESALE OF HOUSEHOLD GOODS	92.049,02	27.551	1,57	1,40	1,28	1,24	1,22
465	WHOLESALE OF MACHINERY, EQUIPMENT AND SUPPLIES	16.262,32	4.969	1,16	1,13	1,11	1,09	1,06
466	WHOLESALE OF OTHER MACHINERY AND EQUIPMENT	23.140,72	6.506	1,19	1,13	1,12	1,09	1,07
467	OTHER SPECIALIZED WHOLESALE	70.646,17	17.450	1,23	1,18	1,15	1,13	1,09
469	NON-SPECIALIZED WHOLESALE TRADE	15.311,12	4.869	1,16	1,14	1,14	1,11	1,10
471	RETAIL SALE IN NON-SPECIALIZED STORES	188.891,00	40.465	1,13	1,13	1,11	1,10	1,07
472	RETAIL SALE OF FOOD, BEVERAGES AND TOBACCO IN SPECIALIZED STORES	91.762,41	54.474	1,29	1,25	1,21	1,18	1,14
473	RETAIL SALE OF AUTOMOTIVE FUEL IN SPECIALIZED STORES	32.937,20	12.467	1,18	1,18	1,17	1,15	1,12
474	RETAIL SALE OF INFORMATION AND COMMUNICATIONS EQUIPMENT IN SPECIALIZED STORES	16.829,23	7.194	1,12	1,10	1,09	1,08	1,07
475	RETAIL SALE OF OTHER HOUSEHOLD EQUIPMENT IN SPECIALIZED STORES	110.141,84	48.400	1,24	1,21	1,18	1,16	1,12
476	RETAIL SALE OF CULTURAL AND RECREATION GOODS IN SPECIALIZED STORES	42.142,79	22.762	1,09	1,08	1,06	1,05	1,04
477	RETAIL SALE OF OTHER GOODS IN SPECIALIZED STORES	263.576,90	128.272	1,13	1,11	1,08	1,07	1,07
478	RETAIL SALE VIA STALLS AND MARKETS	53.688,73	44.882	2,05	1,69	1,40	1,28	1,18
479	RETAIL TRADE NOT IN STORES, STALLS OR MARKETS	10.016,35	3.959	1,23	1,15	1,07	1,09	1,10
491	PASSENGER RAIL TRANSPORT, INTERURBAN	24.397,39	289	1,38	1,30	1,13	1,05	1,05
492	FREIGHT RAIL TRANSPORT	119,20	6	0,40	0,40	0,40	0,38	0,33
493	OTHER PASSENGER LAND TRANSPORT	74.030,93	9.657	1,29	1,25	1,24	1,22	1,17
494	FREIGHT TRANSPORT BY ROAD	129.389,69	35.889	1,44	1,30	1,24	1,18	1,11
495	TRANSPORT VIA PIPELINE	729,99	50	1,12	0,64	1,27	0,99	0,95
501	SEA AND COASTAL WATER TRANSPORT	5.932,45	219	11,11	10,40	8,87	8,02	7,94
502	INLAND WATER TRANSPORT	3.822,91	131	7,26	4,96	3,57	3,39	2,88
503	INLAND PASSENGER WATER TRANSPORT	129,82	12	8,14	5,65	3,93	3,38	2,14
504	INLAND FREIGHT WATER TRANSPORT	39,22	7	7,99	7,99	7,68	7,22	5,81

511	PASSENGER AIR TRANSPORT	12.055,85	221	24,90	24,84	24,78	24,73	3,22
512	FREIGHT AIR TRANSPORT	87,67	6	2,36	2,36	2,79	2,67	3,43
521	WAREHOUSING AND STORAGE	8.858,10	973	1,63	1,55	1,50	1,48	1,25
522	SUPPORT ACTIVITIES FOR TRANSPORTATION	107.127,29	10.311	1,66	1,57	1,52	1,45	1,21
531	POSTAL ACTIVITIES	69.742,84	5.026	0,64	0,90	1,01	1,04	1,03
532	COURIER ACTIVITIES	5.232,51	1.012	1,47	1,35	1,22	1,21	1,14
551	HOTELS	84.856,75	10.741	4,24	3,70	3,07	2,70	2,19
552	OTHER SHORT TERM ACCOMODATION ACTIVITIES	18.744,07	6.876	6,67	6,10	5,14	4,46	3,43
553	CAMPING GROUNDS, RECREATIONAL VEHICLE PARKS AND TRAILER PARKS	3.755,99	917	14,15	12,64	9,76	8,23	6,16
559	OTHER ACCOMODATION	756,62	155	2,02	1,91	1,71	1,68	1,28
561	RESTAURANTS AND MOBILE FOOD SERVICE ACTIVITIES	181.180,85	52.313	1,28	1,22	1,16	1,12	1,07
562	EVENT CATERING AND OTHER FOOD SERVICE ACTIVITIES	37.386,19	3.383	1,16	1,12	1,10	1,09	1,09
563	BEVERAGE SERVING ACTIVITIES	126.428,39	51.610	1,16	1,14	1,11	1,08	1,05
581	PUBLISHING OF BOOKS, PERIODICALS AND OTHER PUBLISHING ACTIVITIES	12.825,68	2.803	1,80	1,76	1,73	1,65	1,55
582	SOFTWARE PUBLISHING	1.023,13	211	1,58	1,48	1,35	1,25	1,25
591	MOTION PICTURE, VIDEO AND TELEVISION PROGRAMME ACTIVITIES	21.342,61	3.544	2,65	2,64	2,64	2,59	2,34
592	SOUND RECORDING AND MUSIC PUBLISHING ACTIVITIES	528,40	351	2,36	2,26	2,16	2,02	1,81
601	RADIO BROADCASTING	2.155,72	607	1,59	1,22	1,15	1,14	1,10
602	TELEVISION PROGRAMMING AND BROADCASTING ACTIVITIES	12.550,52	390	2,40	2,39	2,32	2,27	2,03
611	WIRED TELECOMMUNICATIONS ACTIVITIES	36.357,27	593	1,25	1,19	1,14	1,08	1,08
612	WIRELESS TELECOMMUNICATIONS ACTIVITIES	9.056,77	75	3,38	2,63	2,02	1,82	1,53
613	SATELLITE TELECOMMUNICATIONS ACTIVITIES	359,71	10	2,78	2,78	2,77	2,68	2,30
619	OTHER TELECOMMUNICATIONS ACTIVITIES	3.342,86	1.586	1,41	1,41	1,36	1,35	1,31
620	COMPUTER PROGRAMMING, CONSULTANCY AND RELATED ACTIVITIES	76.742,02	17.301	1,56	1,55	1,54	1,51	1,46
631	DATA PROCESSING, HOSTING AND RELATED ACTIVITIES; WEB PORTALS	45.815,14	14.447	1,11	1,09	1,06	1,05	1,05
639	OTHER INFORMATION SERVICE ACTIVITIES	1.928,38	786	1,43	1,45	1,47	1,47	1,41
641	MONETARY INTERMEDIATION	124.270,95	11.670	1,00	1,00	0,99	0,99	1,01
642	ACTIVITIES OF HOLDING COMPANIES	1.923,79	103	2,23	2,21	2,18	2,15	2,02
643	TRUSTS, FUNDS AND SIMILAR FINANCIAL ENTITIES	169,27	3	3,25	3,25	3,25	3,16	2,72
649	OTHER FINANCIAL SERVICE ACTIVITIES, EXCEPT INSURANCE AND PENSION FUNDING ACTIVITIES	11.429,12	1.873	2,03	1,98	1,91	1,81	1,62
651	INSURANCE	9.741,49	523	1,49	1,40	1,35	1,27	1,14
652	REINSURANCE	139,00	1					
661	ACTIVITIES AUXILIARY TO FINANCIAL SERVICE ACTIVITIES, EXCEPT INSURANCE AND PENSION FUNDING	16.544,73	11.875	1,19	1,16	1,11	1,08	1,07

662	ACTIVITIES AUXILIARY TO INSURANCE AND PENSION FUNDING	37.201,08	16.608	1,12	1,08	1,04	1,01	1,02
663	FUND MANAGEMENT ACTIVITIES	490,52	30	4,95	4,94	4,94	4,81	4,13
681	BUYING AND SELLING OF SELF-OWNED REAL ESTATE	11.568,49	7.643	1,40	1,38	1,32	1,30	1,25
682	RENTING AND OPERATING OF SELF-OWNED OR LEASED REAL ESTATE	50.450,28	33.564	1,50	1,49	1,44	1,42	1,38
683	REAL ESTATE ACTIVITIES ON A FEE OR CONTRACT BASIS	26.929,07	17.434	1,36	1,33	1,28	1,26	1,21
691	LEGAL ACTIVITIES	98.818,56	73.151	1,38	1,31	1,22	1,17	1,15
692	ACCOUNTING, BOOKKEEPING AND AUDITING ACTIVITIES; TAX CONSULTANCY	91.830,89	52.782	1,13	1,10	1,05	1,04	1,02
701	ACTIVITIES OF HEAD OFFICE	4.724,77	391	2,10	2,09	2,04	1,95	1,76
702	MANAGEMENT CONSULTANCY ACTIVITIES	39.427,83	16.183	1,30	1,31	1,28	1,26	1,23
711	ARCHITECTURAL AND ENGINEERING ACTIVITIES AND RELATED TECHNICAL CONSULTANCY	113.283,58	90.524	1,15	1,12	1,09	1,07	1,05
712	TECHNICAL TESTING AND ANALYSIS	7.872,54	3.031	1,16	1,15	1,08	1,08	1,08
721	RESEARCH AND EXPERIMENTAL DEVELOPMENT ON NATURAL SCIENCES AND ENGINEERING	8.780,06	2.872	1,13	1,11	1,08	1,12	1,14
722	RESEARCH AND EXPERIMENTAL DEVELOPMENT ON SOCIAL SCIENCES AND HUMANITIES	1.335,23	971	1,71	1,68	1,59	1,53	1,47
731	ADVERTISING	14.862,33	6.898	1,29	1,25	1,22	1,20	1,16
732	MARKET RESEARCH AND PUBLIC OPINION POLLING	4.913,73	1.756	1,48	1,43	1,40	1,38	1,30
741	SPECIALIZED DESIGN ACTIVITIES	10.102,68	6.785	1,63	1,56	1,51	1,48	1,40
742	PHOTOGRAPHIC ACTIVITIES	8.859,96	6.350	1,10	1,12	1,10	1,09	1,08
743	TRANSLATION AND INTERPRETATION ACTIVITIES	2.389,75	2.022	1,84	1,77	1,70	1,61	1,51
749	OTHER PROFESSIONAL, SCIENTIFIC AND TECHNICAL ACTIVITIES N.E.C.	36.152,41	23.548	1,13	1,12	1,10	1,08	1,06
750	VETERINARY ACTIVITIES	5.003,97	4.339	1,31	1,26	1,23	1,18	1,12
771	RENTING AND LEASING OF MOTOR VEHICLES	5.368,89	1.126	1,48	1,45	1,41	1,41	1,23
772	RENTING AND LEASING OF PERSONAL AND HOUSEHOLD GOODS	4.013,08	2.488	1,47	1,39	1,27	1,16	1,13
773	RENTING AND LEASING OF OTHER MACHINERY, EQUIPMENT AND TANGIBLE GOODS	8.999,64	3.897	1,72	1,66	1,61	1,60	1,57
774	LEASING OF INTELLECTUAL PROPERTY AND SIMILAR PRODUCTS, EXCEPT COPYRIGHTED WORKS	29,50	6	0,24	0,24	0,24	0,24	0,20
781	ACTIVITES OF EMPLOYMENT PLACEMENT AGENCIES	1.258,71	333	1,65	1,69	1,71	1,73	1,59
782	TEMPORARY EMPLOYMENT AGENCY ACTIVITIES	69.938,29	1.148	1,51	1,46	1,35	1,29	1,23
783	OTHER HUMAN RESOURCES PROVISION	19,28	4	0,61	0,61	0,61	0,60	0,51
791	TRAVEL AGENCY AND TOUR OPERATOR ACTIVITIES	17.114,21	4.930	1,40	1,34	1,33	1,28	1,23
799	OTHER RESERVATION SERVICE AND RELATED ACTIVITIES	2.197,58	1.370	1,89	1,79	1,69	1,52	1,42
801	PRIVATE SECURITY ACTIVITIES	33.390,45	1.130	1,30	1,28	1,24	1,17	1,17
802	SECURITY SYSTEMS SERVICE ACTIVITIES	41,88	4	0,00	0,00	0,00	0,00	0,00
803	INVESTIGATION ACTIVITIES	1.457,52	511	1,32	1,77	1,71	1,45	1,20

811	COMBINED FACILITIES SUPPORT ACTIVITIES	3.881,55	132	1,85	1,79	1,89	1,87	1,70
812	CLEANING ACTIVITIES	173.705,60	13.214	1,11	1,09	1,10	1,10	1,09
813	LANDSCAPE CARE AND MAINTENANCE SERVICE ACTIVITIES	3.597,25	1.674	2,14	1,98	1,75	1,53	1,45
821	OFFICE ADMINISTRATIVE AND SUPPORT ACTIVITIES	5.655,24	2.621	1,36	1,33	1,29	1,23	1,17
822	ACTIVITIES OF CALL CENTERS	13.934,14	832	1,60	1,53	1,54	1,52	1,44
823	ORGANIZATION OF CONVENTIONS AND TRADE SHOWS	5.557,78	1.913	1,69	1,63	1,54	1,44	1,31
829	BUSINESS SUPPORT SERVICE ACTIVITIES N.E.C.	63.268,76	30.408	1,18	1,18	1,17	1,16	1,15
851	PRE-PRIMARY EDUCATION	8.647,07	1.638	2,43	2,44	2,16	2,00	1,90
852	PRIMARY EDUCATION	2.389,16	179	7,14	6,92	4,50	4,10	3,57
853	SECONDARY EDUCATION	5.884,55	604	2,03	1,66	1,56	1,47	1,50
854	HIGHER EDUCATION	198,35	32	0,42	0,94	1,07	1,13	0,99
855	OTHER EDUCATION	17.316,05	7.907	1,16	1,12	1,09	1,07	1,06
856	EDUCATIONAL SUPPORT ACTIVITIES	54,25	51	1,35	1,35	1,24	1,61	1,53
861	HOSPITAL ACTIVITIES	42.792,70	892	1,65	1,56	1,47	1,38	1,30
862	MEDICAL AND DENTAL PRACTICE ACTIVITIES	100.409,36	67.405	1,11	1,10	1,07	1,06	1,05
869	OTHER HUMAN HEALTH ACTIVITIES	41.932,68	23.984	1,17	1,14	1,12	1,11	1,09
871	RESIDENTIAL NURSING CARE FACILITIES	8.373,19	621	2,43	2,20	1,89	1,69	1,48
872	RESIDENTIAL CARE ACTIVITIES FOR MENTAL RETARDATION, MENTAL HEALTH AND SUBSTANCE ABUSE	928,87	72	25,41	30,70	15,35	9,85	4,40
873	RESIDENTIAL CARE ACTIVITIES FOR THE ELDERLY AND DISABLED	16.345,97	1.320	2,40	1,79	1,48	1,31	1,22
879	OTHER RESIDENTIAL CARE ACTIVITIES	1.026,63	129	1,80	1,40	1,55	1,14	1,13
881	SOCIAL WORK ACTIVITIES WITHOUT ACCOMODATION FOR THE ELDERLY AND DISABLED	32.496,93	2.153	1,34	1,25	1,10	1,08	1,02
889	OTHER SOCIAL WORK ACTIVITIES WITHOUT ACCOMODATION	4.783,26	621	1,27	1,16	1,15	1,06	1,03
900	CREATIVE, ARTS AND ENTERTAINMENT ACTIVITIES	19.937,08	14.028	1,72	1,69	1,64	1,59	1,49
910	LIBRARIES, ARCHIVES, MUSEUMS AND OTHER CULTURAL ACTIVITIES	3.421,46	582	2,25	1,97	1,31	1,27	1,16
920	GAMBLING AND BETTING ACTIVITIES	8.004,85	1.623	1,35	1,22	1,22	1,18	1,13
931	SPORTS ACTIVITIES	10.305,17	4.060	1,20	1,12	1,09	1,05	1,04
932	OTHER AMUSEMENT AND RECREATION ACTIVITIES	25.022,47	8.994	3,11	2,68	2,29	2,09	1,75
951	REPAIR OF COMPUTERS AND COMMUNICATION EQUIPMENT	6.404,27	2.845	1,12	1,11	1,08	1,07	1,06
952	REPAIR OF PERSONAL AND HOUSEHOLD GOODS	14.340,44	9.277	1,12	1,10	1,07	1,06	1,04
960	OTHER PERSONAL SERVICE ACTIVITIES	138.409,75	70.204	1,07	1,06	1,04	1,03	1,02
	TOTAL	**6.428.272,92**	**1.974.867**					

Table 148 - *Agglomeration results by industry and distance range. Peninsular Italy, 2012.* ***Source:*** *Compiled by the authors*

Industry code	Industry description	Employees	Plants	M (5 minutes)	M (10 minutes)	M (15 minutes)	M (20 minutes)	M (30 minutes)
012	GROWING OF PERENNIAL CROPS	-	-					
013	PLANT PROPAGATION	-	-					
014	ANIMAL PRODUCTION	-	-					
016	SUPPORT ACTIVITIES TO AGRICULTURE AND POST-HARVEST CROP ACTIVITIES	-	-					
022	LOGGING	-	-					
031	FISHING	-	-					
051	MINING OF HARD COAL	-	-					
061	EXTRACTION OF CRUDE PETROLEUM	115,77	5	2,91	2,91	2,91	2,83	2,43
062	EXTRACTION OF NATURAL GAS	2.505,32	30	21,30	19,91	7,83	6,46	4,90
071	MINING OF IRON ORES	-	-					
072	MINING OF NON-FERROUS METAL ORES	10,11	2	0,00	0,00	0,00	0,00	0,00
081	QUARRYING OF STONE, SAND AND CLAY	6.124,71	1.109	11,60	8,09	5,38	3,98	2,66
089	MINING AND QUARRYING N.E.C.	1.069,57	159	15,39	7,94	5,57	4,12	2,77
091	SUPPORT ACTIVITIES FOR PETROLEUM AND NATURAL GAS EXTRACTION	1.179,34	32	94,05	88,96	45,87	37,20	29,53
099	SUPPORT ACTIVITIES FOR OTHER MINING AND QUARRYING	19,00	2					
101	PROCESSING AND PRESERVING OF MEAT	13.889,22	1.342	3,61	2,97	2,40	2,03	1,76
102	PROCESSING AND PRESERVING OF FISH, CRUSTACEANS AND MOLLUSCS	1.962,03	215	13,62	6,40	6,90	5,64	3,40
103	PROCESSING AND PRESERVING OF FRUIT AND VEGETABLES	14.077,84	1.149	8,96	7,34	5,73	4,60	3,12
104	MANUFACTURE OF VEGETABLE AND ANIMAL OILS AND FATS	6.997,85	2.676	6,36	5,37	4,26	3,53	2,73
105	MANUFACTURE OF DAIRY PRODUCTS	16.072,81	2.047	5,09	4,14	3,29	2,64	2,00
106	MANUFACTURE OF GRAIN MILL PRODUCTS, STARCHES AND STARCH PRODUCTS	2.403,52	437	4,63	3,49	2,25	2,01	1,67
107	MANUFACTURE OF BAKERY PRODUCTS	68.268,31	17.010	1,33	1,31	1,25	1,22	1,14
108	MANUFACTURE OF OTHER FOOD PRODUCTS	17.474,37	2.319	1,39	1,22	1,27	1,23	1,13
109	MANUFACTURE OF PREPARED ANIMAL FEEDS	1.606,92	158	8,16	7,90	4,70	4,17	3,23
110	MANUFACURE OF BEVERAGES	9.948,94	1.433	4,29	3,81	2,74	2,21	1,57
120	MANUFACTURE OF TOBACCO PRODUCTS	472,48	7	0,05	0,05	0,05	0,05	0,04
131	SPINNING, WEAVING AND FINISHING OF TEXTILES	6.354,44	1.111	56,84	51,21	28,11	22,40	11,33
132	WEAVING OF TEXTILES	6.535,57	1.088	34,90	31,94	20,94	14,88	8,09
133	FINISHING OF TEXTILES	8.298,06	953	18,42	16,93	13,06	8,59	5,20
139	MANUFACTURE OF OTHER TEXTILES	18.410,08	4.166	5,01	4,65	3,71	2,96	2,14
141	MANUFACTURE OF WEARING APPAREL, EXCEPT FUR APPAREL	82.104,48	15.719	4,56	4,08	3,15	2,32	1,88

142	MANUFACTURE OF ARTICLES OF FUR	636,34	280	4,01	2,83	2,59	2,39	2,03
143	MANUFACTURE OF KNITTED AND CROCHETED APPAREL	9.418,56	1.745	8,73	7,07	5,05	4,34	3,63
151	TANNING AND DRESSING OF LEATHER; MANUFACTURE OF LUGGAGE; HANDBAGS; SADDLERY AND HARNESS; DRESSING AND DYEING OF FUR	35.227,33	5.422	17,99	13,35	9,78	6,95	5,01
152	MANUFACTURE OF FOOTWEAR	53.918,55	6.872	23,62	20,14	17,25	15,25	12,71
161	SAWMILLING AND PLANING OF WOOD	6.691,45	2.022	4,82	3,67	3,03	2,56	1,77
162	MANUFACTURE OF PRODUCTS OF WOOD, CORK, STRAW AND PLAITING MATERIALS	33.556,10	11.019	1,74	1,56	1,41	1,30	1,18
171	MANUFACTURE OF PULP, PAPER AND PAPERBOARD	3.897,49	145	44,50	43,41	16,03	11,76	6,90
172	MANUFACTURE OF CORRUGATED PAPER AND PAPERBOARD AND OF CONTAINERS OF PAPER AND PAPERBOARD	23.357,76	1.765	4,61	3,78	3,08	2,44	1,98
181	PRINTING AND SERVICE ACTIVITIES RELATED TO PRINTING	27.312,89	6.706	1,30	1,24	1,23	1,14	1,05
182	REPRODUCTION OF RECORDED MEDIA	602,15	133	5,55	1,72	1,46	1,71	1,63
191	MANUFACTURE OF COKE OVEN PRODUCTS	8,64	1					
192	MANUFACTURE OF REFINED PETROLEUM PRODUCTS	6.278,10	354	3,51	1,96	1,65	1,38	1,12
201	MANUFACTURE OF BASIC CHEMICALS, FERTILIZERS AND NITROGEN COMPOUNDS, PLASTICS AND SYNTHETIC RUBBER IN PRIMARY FORMS	7.246,16	438	2,51	2,17	1,59	1,58	1,28
202	MANUFACTURE OF PESTICIDES AND OTHER AGROCHEMICAL PRODUCTS	130,00	9	22,57	22,57	7,17	3,16	2,78
203	MANUFACTURE OF PAINTS, VARNISHES AND SIMILAR COATINGS, PRINTING INK AND MASTICS	3.644,54	366	3,50	1,86	1,57	1,37	1,14
204	MANUFACTURE OF SOAP AND DETERGENTS, CLEANING AND POLISHING PREPARATIONS, PERFUMES AND TOILET PREPARATIONS	5.445,42	515	2,29	1,87	1,62	1,54	1,31
205	MANUFACTURE OF OTHER CHEMICAL PRODUCTS N.E.C.	3.922,76	434	4,19	2,68	2,05	1,84	1,49
206	MANUFACTURE OF MAN-MADE FIBRES	588,05	13	1,35	1,67	1,22	0,99	0,60
211	MANUFACTURE OF PHARMACEUTICALS	2.083,61	35	1,75	1,16	1,58	2,47	1,92
212	MANUFACTURE OF MEDICINAL CHEMICAL AND BOTANICAL PRODUCTS	23.931,30	232	4,34	4,39	3,73	3,25	1,95
221	MANUFACTURE OF RUBBER PRODUCTS	9.627,34	603	5,75	4,72	3,74	3,41	3,14
222	MANUFACTURE OF PLASTICS PRODUCTS	32.146,35	2.975	3,07	2,47	2,07	1,84	1,60
231	MANUFACTURE OF GLASS AND GLASS PRODUCTS	13.950,67	1.757	2,39	2,04	1,74	1,57	1,23
232	MANUFACTURE OF REFRACTORY PRODUCTS	419,64	42	6,23	3,69	2,33	2,52	1,78
233	MANUFACTURE OF CLAY BUILDING MATERIALS	4.317,11	307	21,91	13,82	10,78	4,33	2,75
234	MANUFACTURE OF OTHER PORCELAIN AND CERAMIC PRODUCTS	7.114,81	1.392	40,67	29,26	13,46	9,71	4,49
235	MANUFACTURE OF CEMENT, LIME AND PLASTER	4.142,37	193	7,97	6,40	5,03	4,36	2,34
236	MANUFACTURE OF ARTICLES OF CONCRETE, CEMENT AND PLASTER	16.219,29	2.141	2,34	2,28	1,83	1,77	1,53
237	CUTTING, SHAPING AND FINISHING OF STONE	17.872,25	4.661	6,35	4,44	3,43	2,96	2,52
239	MANUFACTURE OF OTHER NON-METALLIC MINERAL PRODUCTS N.E.C.	3.079,27	426	3,79	2,88	1,98	1,83	1,36

241	MANUFACTURE OF BASIC IRON AND STEEL	17.931,68	177	0,99	0,84	0,77	0,55	0,78
242	MANUFACTURE OF TUBES, PIPES AND HOLLOW PROFILES AND OF TUBE OR PIPE FITTINGS OF CAST-IRON	1.496,96	108	2,60	2,38	1,49	1,55	1,26
243	CASTING OF SEMI-FINISHED STEEL PRODUCTS	3.802,11	403	4,74	2,57	1,84	1,73	1,57
244	MANUFACTURE OF BASIC PRECIOUS AND OTHER NON-FERROUS METALS; REPROCESSING OF NUCLEAR FUELS	5.661,16	376	3,79	2,99	2,87	2,51	2,12
245	CASTING OF IRON AND STEEL	3.715,78	230	7,75	5,96	3,74	3,60	2,28
251	MANUFACTURE OF STRUCTURAL METAL PRODUCTS	62.185,59	15.300	1,47	1,39	1,29	1,23	1,17
252	MANUFACTURE OF TANKS, RESERVOIRS AND CONTAINERS OF METAL	3.153,74	195	8,12	4,14	2,75	2,45	2,04
253	MANUFACTURE OF STEAM GENERATORS, EXCEPT CENTRAL HEATING HOT WATER BOILERS	418,27	25	25,95	25,95	8,35	5,38	2,38
254	MANUFACTURE OF WEAPONS AND AMMUNITION	2.138,18	52	9,35	8,42	7,43	6,53	3,33
255	FORGING, PRESSING, STAMPING AND ROLL-FORMING OF METAL; POWDER METALLURGY	5.791,52	318	6,75	5,28	4,65	2,80	1,64
256	TREATMENT AND COATING OF METALS; MACHINING	24.839,72	3.039	2,80	2,30	2,01	1,78	1,47
257	MANUFACTURE OF CUTLERY, HAND TOOLS AND GENERAL HARDWARE	8.054,95	1.039	4,76	4,07	3,22	3,00	2,56
259	MANUFACTURE OF OTHER FABRICATED METAL PRODUCTS N.E.C.	26.472,84	4.547	2,29	1,91	1,71	1,57	1,31
261	MANUFACTURE OF ELECTRONIC COMPONENTS AND BOARDS	9.821,62	600	6,16	5,07	3,96	3,07	2,24
262	MANUFACTURE OF COMPUTERS AND PERIPHERAL EQUIPMENT	1.527,16	258	2,54	2,59	1,98	1,77	1,45
263	MANUFACTURE OF COMMUNICATION EQUIPMENT	9.677,51	405	2,24	2,17	2,04	1,90	1,74
264	MANUFACTURE OF CONSUMER ELECTRONICS	732,95	79	23,53	8,40	4,99	4,04	3,68
265	MANUFACTURE OF MEASURING, TESTING, NAVIGATING AND CONTROL EQUIPMENT; WATCHES AND CLOCKS	6.629,31	222	1,87	1,68	1,73	1,69	1,55
266	MANUFACTURE OF IRRADIATION, ELECTROMEDICAL AND ELECTROTHERAPEUTIC EQUIPMENT	2.895,62	244	3,41	2,24	2,69	2,17	1,68
267	MANUFACTURE OF OPTICAL INSTRUMENTS AND PHOTOGRAPHIC EQUIPMENT	526,90	62	2,58	1,35	1,10	1,39	1,58
268	MANUFACTURE OF MAGNETIC AND OPTICAL MEDIA	17,29	8	0,00	0,00	0,00	0,00	0,00
271	MANUFACTURE OF ELECTRIC MOTORS, GENERATORS, TRANSFORMERS AND ELECTRICITY DISTRIBUTION AND CONTROL APPARATUS	10.309,59	673	5,19	3,52	2,67	2,49	2,13
272	MANUFACTURE OF BATTERIES AND ACCUMULATORS	736,08	27	25,28	23,44	12,65	10,72	7,25
273	MANUFACTURE OF WIRING AND WIRING DEVICES	4.286,45	241	10,82	6,64	4,70	3,08	2,45
274	MANUFACTURE OF ELECTRIC LIGHTING EQUIPMENT	3.663,90	487	6,83	5,45	3,50	3,00	2,50
275	MANUFACTURE OF DOMESTIC APPLIANCES	10.225,04	167	36,40	35,50	35,66	32,67	24,68
279	MANUFACTURE OF OTHER ELECTRICAL EQUIPMENT	8.004,83	896	3,90	2,54	1,99	2,03	1,75
281	MANUFACTURE OF GENERAL-PURPOSE MACHINERY	12.189,49	407	1,61	1,60	1,64	1,49	1,29
282	MANUFACTURE OF OTHER GENERAL-PURPOSE MACHINERY	22.825,50	1.859	1,96	1,62	1,47	1,41	1,31
283	MANUFACTURE OF AGRICULTURAL AND FORESTRY MACHINERY	4.984,69	478	9,74	8,38	6,69	6,05	4,11

284	MANUFACTURE OF METAL-FORMING MACHINERY AND MACHINE TOOLS	4.905,75	315	13,26	11,39	10,06	9,80	8,24
289	MANUFACTURE OF OTHER SPECIAL-PURPOSE MACHINERY	18.599,01	1.989	2,88	2,60	2,17	1,95	1,59
291	MANUFACTURE OF MOTOR VEHICLES	24.963,01	49	15,80	13,81	10,21	10,91	6,04
292	MANUFACTURE OF BODIES (COACHWORK) FOR MOTOR VEHICLES; MANUFACTURE OF TRAILERS AND SEMI-TRAILERS	3.936,43	308	4,05	3,43	3,35	2,78	1,62
293	MANUFACTURE OF PARTS AND ACCESSORIES FOR MOTOR VEHICLES	25.616,70	442	4,75	4,17	3,79	3,41	2,97
301	BUILDING OF SHIPS AND BOATS	8.079,07	845	14,23	12,30	9,22	8,01	5,84
302	MANUFACTURE OF RAILWAY LOCOMOTIVES AND ROLLING STOCKS	5.182,14	99	6,50	5,40	4,40	2,60	1,81
303	MANUFACTURE OF AIR AND SPACECRAFT AND RELATED MACHINERY	17.232,83	143	7,17	6,10	4,73	3,84	2,63
304	MANUFACTURE OF MILITARY FIGHTING VEHICLES	0,16	1					
309	MANUFACTURE OF TRANSPORT EQUIPMENT N.E.C.	6.211,11	188	11,58	12,06	10,00	8,32	4,46
310	MANUFACTURE OF FURNITURE	47.376,84	6.955	6,13	5,53	3,76	3,12	2,59
321	MANUFACTURE OF JEWELLERY, BIJOUTERIE AND RELATED ARTICLES	13.515,42	4.136	17,48	15,97	14,99	14,34	12,07
322	MANUFACTURE OF MUSICAL INSTRUMENTS	1.169,70	247	74,02	39,10	32,49	27,77	12,57
323	MANUFACTURE OF SPORTS GOODS	763,37	175	1,90	2,84	6,23	2,08	1,39
324	MANUFACTURE OF GAMES AND TOYS	1.077,68	142	12,33	4,70	3,44	3,19	1,94
325	MANUFACTURE OF MEDICAL AND DENTAL INSTRUMENTS AND SUPPLIES	13.615,24	7.050	1,19	1,19	1,14	1,10	1,07
329	OTHER MANUFACTURING N.E.C.	5.344,25	1.373	6,00	2,73	1,79	1,50	1,34
331	REPAIR OF FABRICATED METAL PRODUCTS, MACHINERY AND EQUIPMENT	40.237,21	11.333	1,22	1,20	1,16	1,13	1,09
332	INSTALLATION OF INDUSTRIAL MACHINERY AND EQUIPMENT	14.490,10	2.853	1,68	1,53	1,32	1,23	1,17
351	ELECTRIC POWER GENERATION, TRANSMISSION AND DISTRIBUTION	25.808,35	3.844	1,39	1,28	1,21	1,14	1,12
352	MANUFACTURE OF GAS; DISTRIBUTION OF GASEOUS FUELS THROUGH MAINS	6.506,66	534	1,44	1,18	1,09	0,99	0,97
353	STEAM AND AIR CONDITIONING SUPPLY	1.165,24	45	1,10	1,46	1,17	1,22	1,01
360	WATER COLLECTION, TREATMENT AND SUPPLY	12.963,20	712	1,04	1,03	0,94	0,93	1,02
370	SEWERAGE	4.301,76	756	2,12	1,87	1,37	1,31	1,19
381	WASTE COLLECTION	44.058,30	1.726	1,01	1,06	1,08	1,08	1,08
382	WASTE TREATMENT AND DISPOSAL	6.219,15	540	1,94	1,65	1,54	1,29	1,15
383	MATERIALS RECOVERY	12.245,29	1.761	1,87	1,56	1,39	1,36	1,23
390	REMEDIATION ACTIVITIES AND OTHER WASTE MANAGEMENT SERVICES	2.539,26	329	2,14	2,11	1,72	1,42	1,23
411	PROJECT MANAGEMENT ACTIVITIES RELATED TO CONSTRUCTION	1.579,36	729	2,49	2,51	1,69	1,59	1,60
412	CONSTRUCTION OF BUILDINGS	171.435,56	61.470	1,67	1,53	1,40	1,28	1,17
421	CONSTRUCTION OF ROADS AND RAILWAYS	18.902,46	2.241	3,13	2,43	1,80	1,59	1,32
422	CONSTRUCTION OF UTILITY PROJECTS	7.906,24	317	2,44	2,21	1,92	1,74	1,27
429	CONSTRUCTION OF OTHER CIVIL ENGINGEERING PROJECTS	10.978,16	1.850	3,01	2,39	1,93	1,54	1,35
431	DEMOLITION AND SITE PREPARATION	14.721,12	5.319	1,98	1,87	1,61	1,46	1,27

432	ELECTRICAL, PLUMBING AND OTHER CONSTRUCTION INSTALLATION ACTIVITIES	179.473,37	59.812	1,13	1,09	1,06	1,05	1,03
433	BUILDING COMPLETION AND FINISHING	168.546,35	89.158	1,49	1,38	1,27	1,20	1,10
439	OTHER SPECIALIZED CONSTRUCTION ACTIVITIES	18.362,62	5.112	1,50	1,36	1,26	1,13	1,07
451	SALE OF MOTOR VEHICLES	39.019,78	10.684	1,23	1,14	1,10	1,07	1,06
452	MAINTENANCE AND REPAIR OF MOTOR VEHICLES	84.502,08	34.796	1,16	1,12	1,10	1,09	1,06
453	SALE OF MOTOR VEHICLE PARTS AND ACCESSORIES	20.984,37	7.240	1,27	1,22	1,20	1,19	1,16
454	SALE, MAINTENANCE AND REPAIR OF MOTORCYCLES AND RELATED PARTS AND ACCESSORIES	6.114,37	2.920	1,16	1,12	1,08	1,06	1,07
461	WHOLESALE ON A FEE OR CONTRACT BASIS	103.530,33	86.638	1,22	1,18	1,13	1,11	1,09
462	WHOLESALE OF AGRICULTURAL RAW MATERIALS AND LIVE ANIMALS	10.926,52	4.634	3,59	2,83	2,30	1,88	1,54
463	WHOLESALE OF FOOD, BEVERAGES AND TOBACCO	76.625,10	18.161	1,89	1,72	1,61	1,46	1,33
464	WHOLESALE OF HOUSEHOLD GOODS	92.226,27	27.737	1,64	1,45	1,30	1,25	1,24
465	WHOLESALE OF MACHINERY, EQUIPMENT AND SUPPLIES	16.658,37	5.463	1,12	1,09	1,07	1,04	1,03
466	WHOLESALE OF OTHER MACHINERY AND EQUIPMENT	24.870,73	7.853	1,19	1,10	1,09	1,07	1,05
467	OTHER SPECIALIZED WHOLESALE	71.016,94	19.496	1,24	1,19	1,16	1,13	1,09
469	NON-SPECIALIZED WHOLESALE TRADE	12.668,31	3.708	1,17	1,13	1,13	1,11	1,09
471	RETAIL SALE IN NON-SPECIALIZED STORES	190.510,38	36.428	1,12	1,13	1,12	1,11	1,08
472	RETAIL SALE OF FOOD, BEVERAGES AND TOBACCO IN SPECIALIZED STORES	102.887,60	56.437	1,28	1,25	1,21	1,18	1,14
473	RETAIL SALE OF AUTOMOTIVE FUEL IN SPECIALIZED STORES	29.180,97	10.799	1,15	1,15	1,15	1,14	1,11
474	RETAIL SALE OF INFORMATION AND COMMUNICATIONS EQUIPMENT IN SPECIALIZED STORES	13.536,29	6.586	1,16	1,13	1,11	1,10	1,09
475	RETAIL SALE OF OTHER HOUSEHOLD EQUIPMENT IN SPECIALIZED STORES	93.949,53	41.565	1,23	1,20	1,17	1,15	1,11
476	RETAIL SALE OF CULTURAL AND RECREATION GOODS IN SPECIALIZED STORES	41.111,44	22.155	1,07	1,07	1,05	1,04	1,04
477	RETAIL SALE OF OTHER GOODS IN SPECIALIZED STORES	262.983,90	121.551	1,13	1,10	1,08	1,07	1,07
478	RETAIL SALE VIA STALLS AND MARKETS	51.956,40	42.375	2,00	1,66	1,40	1,29	1,19
479	RETAIL TRADE NOT IN STORES, STALLS OR MARKETS	13.557,07	6.026	1,16	1,13	1,08	1,08	1,07
491	PASSENGER RAIL TRANSPORT, INTERURBAN	18.609,12	278	1,52	1,37	1,21	1,14	1,14
492	FREIGHT RAIL TRANSPORT	139,79	14	1,06	0,75	0,43	1,13	2,24
493	OTHER PASSENGER LAND TRANSPORT	77.968,37	12.373	1,48	1,45	1,43	1,39	1,31
494	FREIGHT TRANSPORT BY ROAD	119.168,34	30.186	1,52	1,36	1,28	1,20	1,12
495	TRANSPORT VIA PIPELINE	576,77	46	1,01	1,18	2,20	1,66	1,34
501	SEA AND COASTAL WATER TRANSPORT	4.699,88	285	12,23	11,85	10,26	9,55	10,32
502	INLAND WATER TRANSPORT	4.741,69	123	9,49	7,22	4,14	3,75	2,97
503	INLAND PASSENGER WATER TRANSPORT	33,86	16	7,52	5,18	3,58	2,95	2,26
504	INLAND FREIGHT WATER TRANSPORT	22,62	2	0,00	0,00	0,00	0,00	0,00

511	PASSENGER AIR TRANSPORT	14.930,08	188	39,63	39,50	39,41	39,41	4,06
512	FREIGHT AIR TRANSPORT	209,67	12	12,02	9,46	6,08	4,13	2,54
521	WAREHOUSING AND STORAGE	7.616,14	1.121	2,32	1,68	1,40	1,30	1,18
522	SUPPORT ACTIVITIES FOR TRANSPORTATION	107.063,74	11.631	1,48	1,41	1,38	1,33	1,19
531	POSTAL ACTIVITIES	67.794,31	5.111	0,63	0,87	0,99	1,02	1,03
532	COURIER ACTIVITIES	5.931,33	1.294	1,30	1,22	1,23	1,23	1,21
551	HOTELS	74.007,91	9.787	4,04	3,53	2,98	2,67	2,18
552	OTHER SHORT TERM ACCOMODATION ACTIVITIES	23.797,71	10.586	5,55	5,12	4,31	3,76	2,84
553	CAMPING GROUNDS, RECREATIONAL VEHICLE PARKS AND TRAILER PARKS	3.380,90	825	14,01	12,53	8,91	7,69	6,05
559	OTHER ACCOMODATION	479,21	185	13,43	10,13	4,75	4,23	2,40
561	RESTAURANTS AND MOBILE FOOD SERVICE ACTIVITIES	234.724,27	64.336	1,21	1,16	1,11	1,08	1,05
562	EVENT CATERING AND OTHER FOOD SERVICE ACTIVITIES	39.707,19	4.172	1,09	1,10	1,07	1,07	1,10
563	BEVERAGE SERVING ACTIVITIES	138.086,57	52.839	1,18	1,16	1,13	1,10	1,07
581	PUBLISHING OF BOOKS, PERIODICALS AND OTHER PUBLISHING ACTIVITIES	10.507,36	2.515	1,74	1,68	1,61	1,53	1,41
582	SOFTWARE PUBLISHING	682,37	157	1,69	1,68	1,64	1,60	1,61
591	MOTION PICTURE, VIDEO AND TELEVISION PROGRAMME ACTIVITIES	14.570,28	3.302	2,40	2,40	2,38	2,33	2,12
592	SOUND RECORDING AND MUSIC PUBLISHING ACTIVITIES	542,05	461	1,90	1,81	1,76	1,69	1,58
601	RADIO BROADCASTING	1.755,81	475	2,16	1,39	1,24	1,18	1,13
602	TELEVISION PROGRAMMING AND BROADCASTING ACTIVITIES	13.524,81	366	2,13	2,11	2,02	1,96	1,78
611	WIRED TELECOMMUNICATIONS ACTIVITIES	28.478,64	605	1,19	1,14	1,13	1,09	1,09
612	WIRELESS TELECOMMUNICATIONS ACTIVITIES	9.117,81	88	2,97	2,53	1,91	1,64	1,50
613	SATELLITE TELECOMMUNICATIONS ACTIVITIES	209,24	22	32,54	7,06	4,75	2,52	7,29
619	OTHER TELECOMMUNICATIONS ACTIVITIES	6.773,94	2.053	1,39	1,36	1,27	1,24	1,27
620	COMPUTER PROGRAMMING, CONSULTANCY AND RELATED ACTIVITIES	82.725,24	17.099	1,52	1,50	1,50	1,47	1,43
631	DATA PROCESSING, HOSTING AND RELATED ACTIVITIES; WEB PORTALS	40.514,07	12.998	1,11	1,08	1,05	1,04	1,05
639	OTHER INFORMATION SERVICE ACTIVITIES	3.411,19	1.154	1,72	1,73	1,72	1,70	1,59
641	MONETARY INTERMEDIATION	118.543,17	11.257	0,97	0,98	0,99	0,99	1,01
642	ACTIVITIES OF HOLDING COMPANIES	368,83	925	1,75	1,59	1,54	1,47	1,26
643	TRUSTS, FUNDS AND SIMILAR FINANCIAL ENTITIES	7,18	3	6,51	6,51	6,51	6,31	5,41
649	OTHER FINANCIAL SERVICE ACTIVITIES, EXCEPT INSURANCE AND PENSION FUNDING ACTIVITIES	12.499,32	1.733	1,74	1,68	1,61	1,49	1,35
651	INSURANCE	10.535,15	554	1,36	1,29	1,21	1,14	1,05
652	REINSURANCE	30,21	1					
661	ACTIVITIES AUXILIARY TO FINANCIAL SERVICE ACTIVITIES, EXCEPT INSURANCE AND PENSION FUNDING	16.975,01	13.130	1,21	1,17	1,12	1,09	1,08

662	ACTIVITIES AUXILIARY TO INSURANCE AND PENSION FUNDING	43.201,75	22.981	1,09	1,06	1,02	1,01	1,01
663	FUND MANAGEMENT ACTIVITIES	367,39	34	4,08	4,04	4,02	3,87	3,31
681	BUYING AND SELLING OF SELF-OWNED REAL ESTATE	9.769,38	9.846	1,43	1,39	1,34	1,26	1,25
682	RENTING AND OPERATING OF SELF-OWNED OR LEASED REAL ESTATE	51.967,75	46.640	1,46	1,45	1,42	1,39	1,36
683	REAL ESTATE ACTIVITIES ON A FEE OR CONTRACT BASIS	25.407,21	18.044	1,33	1,29	1,25	1,22	1,18
691	LEGAL ACTIVITIES	105.331,24	78.612	1,36	1,28	1,20	1,16	1,13
692	ACCOUNTING, BOOKKEEPING AND AUDITING ACTIVITIES; TAX CONSULTANCY	96.782,99	56.671	1,13	1,10	1,05	1,03	1,02
701	ACTIVITIES OF HEAD OFFICE	7.445,57	717	2,09	2,05	2,03	1,96	1,81
702	MANAGEMENT CONSULTANCY ACTIVITIES	34.746,48	17.615	1,35	1,34	1,32	1,31	1,27
711	ARCHITECTURAL AND ENGINEERING ACTIVITIES AND RELATED TECHNICAL CONSULTANCY	105.110,32	84.185	1,12	1,09	1,06	1,05	1,03
712	TECHNICAL TESTING AND ANALYSIS	10.065,39	3.734	1,16	1,13	1,10	1,09	1,07
721	RESEARCH AND EXPERIMENTAL DEVELOPMENT ON NATURAL SCIENCES AND ENGINEERING	7.096,48	3.185	1,41	1,37	1,29	1,2	1,16
722	RESEARCH AND EXPERIMENTAL DEVELOPMENT ON SOCIAL SCIENCES AND HUMANITIES	1.019,40	771	1,86	1,80	1,71	1,69	1,63
731	ADVERTISING	13.002,16	6.347	1,25	1,21	1,18	1,15	1,13
732	MARKET RESEARCH AND PUBLIC OPINION POLLING	1.904,35	1.096	1,47	1,41	1,36	1,31	1,27
741	SPECIALIZED DESIGN ACTIVITIES	12.101,27	8.410	1,50	1,43	1,39	1,37	1,30
742	PHOTOGRAPHIC ACTIVITIES	7.411,81	5.630	1,08	1,09	1,09	1,07	1,07
743	TRANSLATION AND INTERPRETATION ACTIVITIES	2.632,26	2.139	1,60	1,56	1,48	1,44	1,39
749	OTHER PROFESSIONAL, SCIENTIFIC AND TECHNICAL ACTIVITIES N.E.C.	38.731,40	28.487	1,13	1,12	1,09	1,07	1,06
750	VETERINARY ACTIVITIES	4.745,95	3.884	1,20	1,18	1,17	1,14	1,11
771	RENTING AND LEASING OF MOTOR VEHICLES	5.238,74	1.269	1,37	1,35	1,30	1,29	1,21
772	RENTING AND LEASING OF PERSONAL AND HOUSEHOLD GOODS	2.871,17	1.654	4,58	3,85	3,47	2,99	2,64
773	RENTING AND LEASING OF OTHER MACHINERY, EQUIPMENT AND TANGIBLE GOODS	9.888,57	4.002	1,38	1,33	1,29	1,28	1,26
774	LEASING OF INTELLECTUAL PROPERTY AND SIMILAR PRODUCTS, EXCEPT COPYRIGHTED WORKS	853,56	76	0,40	1,79	1,63	1,5	2,11
781	ACTIVITES OF EMPLOYMENT PLACEMENT AGENCIES	1.409,98	322	1,61	1,56	1,58	1,54	1,44
782	TEMPORARY EMPLOYMENT AGENCY ACTIVITIES	49.954,73	952	1,35	1,29	1,22	1,16	1,14
783	OTHER HUMAN RESOURCES PROVISION	132,69	11	2,80	2,80	2,80	2,71	3,13
791	TRAVEL AGENCY AND TOUR OPERATOR ACTIVITIES	15.578,19	5.331	1,38	1,34	1,30	1,24	1,20
799	OTHER RESERVATION SERVICE AND RELATED ACTIVITIES	3.588,14	2.636	2,27	2,23	2,11	1,94	1,73
801	PRIVATE SECURITY ACTIVITIES	34.085,80	1.080	1,30	1,25	1,17	1,14	1,19
802	SECURITY SYSTEMS SERVICE ACTIVITIES	979,76	74	3,55	3,19	2,31	1,98	1,71
803	INVESTIGATION ACTIVITIES	2.035,72	586	1,87	1,70	1,26	1,25	1,15

811	COMBINED FACILITIES SUPPORT ACTIVITIES	6.164,31	551	1,75	1,69	1,69	1,61	1,58
812	CLEANING ACTIVITIES	176.433,50	13.772	1,09	1,07	1,09	1,07	1,07
813	LANDSCAPE CARE AND MAINTENANCE SERVICE ACTIVITIES	12.223,64	4.341	1,80	1,65	1,49	1,38	1,29
821	OFFICE ADMINISTRATIVE AND SUPPORT ACTIVITIES	7.268,57	2.992	1,32	1,27	1,23	1,19	1,16
822	ACTIVITIES OF CALL CENTERS	27.730,56	964	1,49	1,68	1,54	1,54	1,45
823	ORGANIZATION OF CONVENTIONS AND TRADE SHOWS	3.923,31	1.700	1,68	1,61	1,55	1,49	1,36
829	BUSINESS SUPPORT SERVICE ACTIVITIES N.E.C.	66.504,10	22.759	1,18	1,18	1,17	1,16	1,16
851	PRE-PRIMARY EDUCATION	9.292,90	1.608	2,11	1,99	1,84	1,71	1,58
852	PRIMARY EDUCATION	2.138,16	169	7,61	7,01	4,31	4,11	3,67
853	SECONDARY EDUCATION	6.473,95	593	2,06	1,69	1,73	1,57	1,62
854	HIGHER EDUCATION	685,16	226	1,23	1,22	1,27	1,27	1,18
855	OTHER EDUCATION	18.063,31	8.707	1,14	1,10	1,07	1,05	1,04
856	EDUCATIONAL SUPPORT ACTIVITIES	555,37	349	3,19	2,41	2,08	1,79	1,10
861	HOSPITAL ACTIVITIES	40.552,80	794	1,70	1,70	1,48	1,44	1,37
862	MEDICAL AND DENTAL PRACTICE ACTIVITIES	110.973,40	73.938	1,11	1,09	1,07	1,05	1,04
869	OTHER HUMAN HEALTH ACTIVITIES	52.930,69	29.738	1,15	1,12	1,10	1,09	1,08
871	RESIDENTIAL NURSING CARE FACILITIES	5.890,19	424	1,74	1,87	1,94	1,7	1,61
872	RESIDENTIAL CARE ACTIVITIES FOR MENTAL RETARDATION, MENTAL HEALTH AND SUBSTANCE ABUSE	3.786,68	286	6,39	7,09	5,21	4,11	2,15
873	RESIDENTIAL CARE ACTIVITIES FOR THE ELDERLY AND DISABLED	16.313,97	1.140	3,06	2,12	1,84	1,64	1,39
879	OTHER RESIDENTIAL CARE ACTIVITIES	10.379,43	925	1,82	1,67	1,49	1,31	1,20
881	SOCIAL WORK ACTIVITIES WITHOUT ACCOMODATION FOR THE ELDERLY AND DISABLED	27.939,75	1.422	1,32	1,20	1,09	1,04	1,06
889	OTHER SOCIAL WORK ACTIVITIES WITHOUT ACCOMODATION	19.121,05	2.704	1,16	1,14	1,08	1,06	1,04
900	CREATIVE, ARTS AND ENTERTAINMENT ACTIVITIES	15.860,64	11.992	1,68	1,64	1,59	1,55	1,45
910	LIBRARIES, ARCHIVES, MUSEUMS AND OTHER CULTURAL ACTIVITIES	4.265,66	519	1,82	1,80	1,56	1,38	1,27
920	GAMBLING AND BETTING ACTIVITIES	14.798,04	3.567	1,15	1,15	1,11	1,1	1,09
931	SPORTS ACTIVITIES	11.716,38	4.659	1,20	1,14	1,11	1,08	1,05
932	OTHER AMUSEMENT AND RECREATION ACTIVITIES	25.450,00	9.664	2,63	2,31	2,06	1,89	1,62
951	REPAIR OF COMPUTERS AND COMMUNICATION EQUIPMENT	5.241,20	2.372	1,07	1,09	1,07	1,05	1,06
952	REPAIR OF PERSONAL AND HOUSEHOLD GOODS	12.272,83	8.201	1,15	1,12	1,09	1,07	1,05
960	OTHER PERSONAL SERVICE ACTIVITIES	162.185,43	75.798	1,07	1,05	1,04	1,03	1,02
	TOTAL	**6.134.302,42**	**1.965.447**					

Table 149 - *Agglomeration results by industry and distance range. Sicily, 2007.* ***Source:*** *Compiled by the authors*

Industry code	Industry description	Employees	Plants	M (5 minutes)	M (10 minutes)	M (15 minutes)	M (20 minutes)	M (30 minutes)
012	GROWING OF PERENNIAL CROPS	2,00	1	-	-	-	-	-
013	PLANT PROPAGATION	-	-	-	-	-	-	-
014	ANIMAL PRODUCTION	1,00	1	-	-	-	-	-
016	SUPPORT ACTIVITIES TO AGRICULTURE AND POST-HARVEST CROP ACTIVITIES	19,50	14	9,51	9,51	8,00	4,96	2,94
022	LOGGING	2,00	2	304,52	6,12	6,04	5,29	4,61
031	FISHING	4,00	1	-	-	-	-	-
051	MINING OF HARD COAL	-	-	-	-	-	-	-
061	EXTRACTION OF CRUDE PETROLEUM	228,00	7	24,33	24,33	24,33	23,58	11,42
062	EXTRACTION OF NATURAL GAS	31,91	5	0,00	0,00	0,00	3,57	2,02
071	MINING OF IRON ORES	-	-	-	-	-	-	-
072	MINING OF NON-FERROUS METAL ORES	-	-	-	-	-	-	-
081	QUARRYING OF STONE, SAND AND CLAY	1267,8	294	9,92	5,56	5,26	2,13	1,97
089	MINING AND QUARRYING N.E.C.	521,02	76	3,09	2,80	3,46	3,21	2,58
091	SUPPORT ACTIVITIES FOR PETROLEUM AND NATURAL GAS EXTRACTION	57,23	4	0,00	0,00	0,00	0,00	0,00
099	SUPPORT ACTIVITIES FOR OTHER MINING AND QUARRYING	-	-	-	-	-	-	-
101	PROCESSING AND PRESERVING OF MEAT	782,41	133	17,66	5,45	3,83	3,35	2,48
102	PROCESSING AND PRESERVING OF FISH, CRUSTACEANS AND MOLLUSCS	1313,95	133	12,93	11,50	9,40	6,15	3,88
103	PROCESSING AND PRESERVING OF FRUIT AND VEGETABLES	1378,9	283	1,91	1,79	1,48	1,31	1,18
104	MANUFACTURE OF VEGETABLE AND ANIMAL OILS AND FATS	1143,28	525	3,91	3,46	3,29	2,46	2,02
105	MANUFACTURE OF DAIRY PRODUCTS	1438,23	252	3,11	2,67	1,94	1,63	1,52
106	MANUFACTURE OF GRAIN MILL PRODUCTS, STARCHES AND STARCH PRODUCTS	691,64	175	2,52	2,86	2,57	1,89	1,54
107	MANUFACTURE OF BAKERY PRODUCTS	14057,76	5022	1,12	1,13	1,11	1,08	1,04
108	MANUFACTURE OF OTHER FOOD PRODUCTS	2828,42	602	1,23	1,26	1,19	1,10	1,10
109	MANUFACTURE OF PREPARED ANIMAL FEEDS	511,01	81	5,24	4,67	4,27	3,64	3,72
110	MANUFACURE OF BEVERAGES	2120,52	336	5,04	4,14	4,00	3,84	2,74
120	MANUFACTURE OF TOBACCO PRODUCTS	-	-	-	-	-	-	-
131	SPINNING, WEAVING AND FINISHING OF TEXTILES	8,41	5	0,00	0,00	0,00	0,00	0,00
132	WEAVING OF TEXTILES	30,17	15	0,45	3,02	1,17	0,99	1,47
133	FINISHING OF TEXTILES	10,59	6	0,00	0,00	0,00	0,00	2,32
139	MANUFACTURE OF OTHER TEXTILES	770,62	357	1,22	1,17	1,09	1,09	1,05
141	MANUFACTURE OF WEARING APPAREL, EXCEPT FUR APPAREL	3107,72	682	4,83	4,55	3,70	2,04	1,56
142	MANUFACTURE OF ARTICLES OF FUR	55,41	36	1,76	1,74	1,69	1,55	1,21

143	MANUFACTURE OF KNITTED AND CROCHETED APPAREL	57,59	21	0,72	0,69	1,16	6,08	3,12
151	TANNING AND DRESSING OF LEATHER; MANUFACTURE OF LUGGAGE; HANDBAGS; SADDLERY AND HARNESS; DRESSING AND DYEING OF FUR	161,16	66	1,03	1,03	1,11	1,24	1,10
152	MANUFACTURE OF FOOTWEAR	392,09	81	3,40	3,03	2,87	2,12	1,59
161	SAWMILLING AND PLANING OF WOOD	874,11	294	1,45	1,44	1,25	1,23	1,06
162	MANUFACTURE OF PRODUCTS OF WOOD, CORK, STRAW AND PLAITING MATERIALS	5560,56	2302	1,59	1,54	1,39	1,30	1,18
171	MANUFACTURE OF PULP, PAPER AND PAPERBOARD	105,42	10	1,04	0,33	0,20	3,20	1,48
172	MANUFACTURE OF CORRUGATED PAPER AND PAPERBOARD AND OF CONTAINERS OF PAPER AND PAPERBOARD	978,3	169	3,33	2,49	2,02	1,56	1,19
181	PRINTING AND SERVICE ACTIVITIES RELATED TO PRINTING	3409,68	1148	1,02	1,03	1,02	1,01	1,02
182	REPRODUCTION OF RECORDED MEDIA	43,5	19	0,58	0,78	0,88	1,12	1,36
191	MANUFACTURE OF COKE OVEN PRODUCTS	1	1	-	-	-	-	-
192	MANUFACTURE OF REFINED PETROLEUM PRODUCTS	4314,22	64	3,20	2,85	2,44	2,74	1,50
201	MANUFACTURE OF BASIC CHEMICALS, FERTILIZERS AND NITROGEN COMPOUNDS, PLASTICS AND SYNTHETIC RUBBER IN PRIMARY FORMS	2530,23	82	4,16	3,67	1,89	2,20	1,68
202	MANUFACTURE OF PESTICIDES AND OTHER AGROCHEMICAL PRODUCTS	50,08	6	0,00	0,00	0,17	0,15	0,12
203	MANUFACTURE OF PAINTS, VARNISHES AND SIMILAR COATINGS, PRINTING INK AND MASTICS	401,67	55	1,33	1,57	1,42	1,36	1,25
204	MANUFACTURE OF SOAP AND DETERGENTS, CLEANING AND POLISHING PREPARATIONS, PERFUMES AND TOILET PREPARATIONS	435,58	67	1,26	1,42	1,54	1,42	1,39
205	MANUFACTURE OF OTHER CHEMICAL PRODUCTS N.E.C.	1442,74	67	0,82	1,27	0,92	1,33	1,21
206	MANUFACTURE OF MAN-MADE FIBRES	18,75	1	-	-	-	-	-
211	MANUFACTURE OF PHARMACEUTICALS	17,29	4	2,90	2,90	2,22	1,64	2,97
212	MANUFACTURE OF MEDICINAL CHEMICAL AND BOTANICAL PRODUCTS	307,65	35	0,83	1,11	1,17	1,38	1,11
221	MANUFACTURE OF RUBBER PRODUCTS	178,18	32	18,70	18,91	7,37	6,01	2,09
222	MANUFACTURE OF PLASTICS PRODUCTS	3427,95	386	2,74	2,59	2,17	1,84	1,40
231	MANUFACTURE OF GLASS AND GLASS PRODUCTS	1190,23	437	1,19	1,12	1,12	1,10	1,01
232	MANUFACTURE OF REFRACTORY PRODUCTS	52,33	5	53,05	26,62	7,41	6,04	3,46
233	MANUFACTURE OF CLAY BUILDING MATERIALS	990,83	117	15,80	10,32	6,11	3,65	1,63
234	MANUFACTURE OF OTHER PORCELAIN AND CERAMIC PRODUCTS	1278,18	507	18,51	17,44	12,42	9,79	5,05
235	MANUFACTURE OF CEMENT, LIME AND PLASTER	884,2	52	0,51	0,61	2,30	1,15	1,07
236	MANUFACTURE OF ARTICLES OF CONCRETE, CEMENT AND PLASTER	4153,07	675	1,51	1,43	1,39	1,27	1,23
237	CUTTING, SHAPING AND FINISHING OF STONE	5000,21	1219	5,61	3,73	3,80	2,03	2,06
239	MANUFACTURE OF OTHER NON-METALLIC MINERAL PRODUCTS N.E.C.	363,71	80	1,32	1,19	1,23	1,20	1,27
241	MANUFACTURE OF BASIC IRON AND STEEL	527,17	47	0,73	0,75	1,06	1,39	1,37

242	MANUFACTURE OF TUBES, PIPES AND HOLLOW PROFILES AND OF TUBE OR PIPE FITTINGS OF CAST-IRON	60,82	13	1,90	1,90	3,42	4,55	3,08
243	CASTING OF SEMI-FINISHED STEEL PRODUCTS	635,66	88	3,44	2,75	1,83	1,64	1,27
244	MANUFACTURE OF BASIC PRECIOUS AND OTHER NON-FERROUS METALS; REPROCESSING OF NUCLEAR FUELS	459,92	32	0,73	0,70	0,74	0,94	1,12
245	CASTING OF IRON AND STEEL	82,17	23	1,65	1,63	1,52	1,25	1,54
251	MANUFACTURE OF STRUCTURAL METAL PRODUCTS	10631,24	2952	1,26	1,21	1,16	1,11	1,07
252	MANUFACTURE OF TANKS, RESERVOIRS AND CONTAINERS OF METAL	730,03	59	2,80	2,68	2,63	2,47	1,74
253	MANUFACTURE OF STEAM GENERATORS, EXCEPT CENTRAL HEATING HOT WATER BOILERS	76,95	7	0,73	0,66	0,56	0,51	0,31
254	MANUFACTURE OF WEAPONS AND AMMUNITION	-	-	-	-	-	-	-
255	FORGING, PRESSING, STAMPING AND ROLL-FORMING OF METAL; POWDER METALLURGY	64,13	22	1,88	1,37	1,26	1,21	0,92
256	TREATMENT AND COATING OF METALS; MACHINING	3794,47	513	3,22	3,13	2,92	2,94	2,11
257	MANUFACTURE OF CUTLERY, HAND TOOLS AND GENERAL HARDWARE	134,86	38	4,37	1,60	1,04	0,85	1,08
259	MANUFACTURE OF OTHER FABRICATED METAL PRODUCTS N.E.C.	2501,28	803	1,36	1,19	1,19	1,09	1,05
261	MANUFACTURE OF ELECTRONIC COMPONENTS AND BOARDS	4627,3	23	2,22	2,58	2,28	2,00	2,31
262	MANUFACTURE OF COMPUTERS AND PERIPHERAL EQUIPMENT	200,56	106	2,19	1,67	1,83	1,66	1,32
263	MANUFACTURE OF COMMUNICATION EQUIPMENT	515,16	32	0,59	0,45	0,99	1,23	1,28
264	MANUFACTURE OF CONSUMER ELECTRONICS	24,75	8	4,93	3,88	14,79	8,32	4,86
265	MANUFACTURE OF MEASURING, TESTING, NAVIGATING AND CONTROL EQUIPMENT; WATCHES AND CLOCKS	173,55	14	0,93	0,92	1,11	1,38	1,22
266	MANUFACTURE OF IRRADIATION, ELECTROMEDICAL AND ELECTROTHERAPEUTIC EQUIPMENT	102,96	29	1,72	1,74	1,61	1,30	1,18
267	MANUFACTURE OF OPTICAL INSTRUMENTS AND PHOTOGRAPHIC EQUIPMENT	4,59	3	0,00	0,00	0,00	0,00	3,35
268	MANUFACTURE OF MAGNETIC AND OPTICAL MEDIA	2	2	0,00	0,00	0,00	0,00	0,00
271	MANUFACTURE OF ELECTRIC MOTORS, GENERATORS, TRANSFORMERS AND ELECTRICITY DISTRIBUTION AND CONTROL APPARATUS	368,34	53	1,93	1,69	1,26	0,99	0,92
272	MANUFACTURE OF BATTERIES AND ACCUMULATORS	17,42	7	6,56	6,56	6,56	7,90	2,85
273	MANUFACTURE OF WIRING AND WIRING DEVICES	265	24	4,06	5,43	2,28	3,09	2,23
274	MANUFACTURE OF ELECTRIC LIGHTING EQUIPMENT	175,37	61	5,75	4,43	2,88	1,81	1,19
275	MANUFACTURE OF DOMESTIC APPLIANCES	18,83	2	6,27	6,14	5,91	5,17	4,61
279	MANUFACTURE OF OTHER ELECTRICAL EQUIPMENT	300,59	57	1,38	1,12	1,43	1,33	1,09
281	MANUFACTURE OF GENERAL-PURPOSE MACHINERY	248,89	46	0,72	0,84	0,82	0,83	0,83
282	MANUFACTURE OF OTHER GENERAL-PURPOSE MACHINERY	1852,94	191	2,05	2,09	1,99	2,16	1,60
283	MANUFACTURE OF AGRICULTURAL AND FORESTRY MACHINERY	274,62	55	8,74	3,03	2,74	2,64	1,82
284	MANUFACTURE OF METAL-FORMING MACHINERY AND MACHINE TOOLS	74,33	15	0,00	0,26	0,40	0,54	1,07

289	MANUFACTURE OF OTHER SPECIAL-PURPOSE MACHINERY	901,19	118	2,60	1,61	1,60	1,40	1,26
291	MANUFACTURE OF MOTOR VEHICLES	1600,48	8	2,38	2,35	0,59	0,21	0,76
292	MANUFACTURE OF BODIES (COACHWORK) FOR MOTOR VEHICLES; MANUFACTURE OF TRAILERS AND SEMI-TRAILERS	341,67	29	1,48	1,72	1,57	1,55	1,52
293	MANUFACTURE OF PARTS AND ACCESSORIES FOR MOTOR VEHICLES	585,8	42	8,49	6,93	5,29	3,39	1,20
301	BUILDING OF SHIPS AND BOATS	2832,96	236	6,09	3,45	2,90	2,47	2,12
302	MANUFACTURE OF RAILWAY LOCOMOTIVES AND ROLLING STOCKS	466,75	7	12,73	23,52	15,12	4,32	3,94
303	MANUFACTURE OF AIR AND SPACECRAFT AND RELATED MACHINERY	1	1	-	-	-	-	-
304	MANUFACTURE OF MILITARY FIGHTING VEHICLES	-	-	-	-	-	-	-
309	MANUFACTURE OF TRANSPORT EQUIPMENT N.E.C.	104,33	13	78,07	17,88	8,94	1,90	1,98
310	MANUFACTURE OF FURNITURE	3136,4	995	1,63	1,52	1,36	1,20	1,15
321	MANUFACTURE OF JEWELLERY, BIJOUTERIE AND RELATED ARTICLES	687,95	343	1,36	1,34	1,28	1,26	1,18
322	MANUFACTURE OF MUSICAL INSTRUMENTS	33,92	22	1,38	0,88	1,08	1,19	1,09
323	MANUFACTURE OF SPORTS GOODS	47,58	20	11,49	11,62	4,34	3,36	1,08
324	MANUFACTURE OF GAMES AND TOYS	98,03	20	27,94	27,64	10,52	7,89	2,23
325	MANUFACTURE OF MEDICAL AND DENTAL INSTRUMENTS AND SUPPLIES	1660,24	671	1,23	1,24	1,19	1,13	1,12
329	OTHER MANUFACTURING N.E.C.	464,89	178	1,51	1,86	1,63	1,26	1,25
331	REPAIR OF FABRICATED METAL PRODUCTS, MACHINERY AND EQUIPMENT	7420,64	1843	1,11	1,10	1,10	1,09	1,04
332	INSTALLATION OF INDUSTRIAL MACHINERY AND EQUIPMENT	2754,8	471	1,66	1,55	1,50	1,53	1,34
351	ELECTRIC POWER GENERATION, TRANSMISSION AND DISTRIBUTION	4402,41	200	0,99	0,99	0,93	0,90	1,03
352	MANUFACTURE OF GAS; DISTRIBUTION OF GASEOUS FUELS THROUGH MAINS	995,63	88	1,01	0,96	1,09	1,19	1,11
353	STEAM AND AIR CONDITIONING SUPPLY	104,06	4	0,00	0,30	0,28	0,22	0,16
360	WATER COLLECTION, TREATMENT AND SUPPLY	2305,69	269	1,46	1,46	1,19	1,29	1,33
370	SEWERAGE	436,83	88	1,42	1,29	1,39	1,35	1,17
381	WASTE COLLECTION	9157,65	286	0,96	0,96	0,99	0,99	0,93
382	WASTE TREATMENT AND DISPOSAL	1130,93	108	1,75	1,30	1,34	1,04	0,98
383	MATERIALS RECOVERY	1409,94	210	1,56	1,34	1,28	1,30	1,25
390	REMEDIATION ACTIVITIES AND OTHER WASTE MANAGEMENT SERVICES	299,68	35	4,45	3,35	2,40	3,33	2,38
411	PROJECT MANAGEMENT ACTIVITIES RELATED TO CONSTRUCTION	136,91	75	0,94	0,96	1,08	1,06	0,90
412	CONSTRUCTION OF BUILDINGS	59667,44	16248	1,27	1,22	1,17	1,10	1,06
421	CONSTRUCTION OF ROADS AND RAILWAYS	3564,18	605	2,91	1,94	1,56	1,40	1,38
422	CONSTRUCTION OF UTILITY PROJECTS	1703,69	29	1,46	1,28	1,52	1,78	1,31
429	CONSTRUCTION OF OTHER CIVIL ENGINGEERING PROJECTS	1828,23	383	2,20	2,24	1,91	1,97	1,68
431	DEMOLITION AND SITE PREPARATION	2554,1	1037	1,79	1,61	1,32	1,30	1,15
432	ELECTRICAL, PLUMBING AND OTHER CONSTRUCTION INSTALLATION ACTIVITIES	23963,07	7622	1,07	1,05	1,05	1,01	1,00

433	BUILDING COMPLETION AND FINISHING	21699,45	8542	1,36	1,29	1,22	1,16	1,08
439	OTHER SPECIALIZED CONSTRUCTION ACTIVITIES	3234,14	890	1,33	1,28	1,19	1,18	1,10
451	SALE OF MOTOR VEHICLES	7069,86	1809	1,07	1,05	1,03	1,02	1,04
452	MAINTENANCE AND REPAIR OF MOTOR VEHICLES	16044,99	8260	1,16	1,14	1,12	1,10	1,06
453	SALE OF MOTOR VEHICLE PARTS AND ACCESSORIES	1753,11	705	1,20	1,17	1,13	1,13	1,12
454	SALE, MAINTENANCE AND REPAIR OF MOTORCYCLES AND RELATED PARTS AND ACCESSORIES	1434,93	724	1,10	1,05	1,03	1,04	1,03
461	WHOLESALE ON A FEE OR CONTRACT BASIS	17928,53	14369	1,46	1,36	1,29	1,23	1,17
462	WHOLESALE OF AGRICULTURAL RAW MATERIALS AND LIVE ANIMALS	1169,71	575	2,86	2,56	2,46	2,12	1,60
463	WHOLESALE OF FOOD, BEVERAGES AND TOBACCO	13559,46	4154	1,68	1,55	1,50	1,31	1,12
464	WHOLESALE OF HOUSEHOLD GOODS	10944,95	3714	1,44	1,36	1,35	1,29	1,19
465	WHOLESALE OF MACHINERY, EQUIPMENT AND SUPPLIES	1985,49	791	1,15	1,13	1,09	1,09	1,06
466	WHOLESALE OF OTHER MACHINERY AND EQUIPMENT	2883,6	971	1,17	1,13	1,12	1,11	1,08
467	OTHER SPECIALIZED WHOLESALE	9334,99	2660	1,19	1,13	1,12	1,10	1,05
469	NON-SPECIALIZED WHOLESALE TRADE	2112,73	753	1,19	1,15	1,22	1,20	1,11
471	RETAIL SALE IN NON-SPECIALIZED STORES	31003,35	6848	1,05	1,04	1,04	1,03	1,01
472	RETAIL SALE OF FOOD, BEVERAGES AND TOBACCO IN SPECIALIZED STORES	16673,69	10294	1,13	1,11	1,08	1,06	1,02
473	RETAIL SALE OF AUTOMOTIVE FUEL IN SPECIALIZED STORES	6279,24	2517	1,09	1,08	1,10	1,08	1,05
474	RETAIL SALE OF INFORMATION AND COMMUNICATIONS EQUIPMENT IN SPECIALIZED STORES	2612,8	1310	1,07	1,06	1,06	1,05	1,03
475	RETAIL SALE OF OTHER HOUSEHOLD EQUIPMENT IN SPECIALIZED STORES	21606,94	10493	1,17	1,15	1,14	1,12	1,06
476	RETAIL SALE OF CULTURAL AND RECREATION GOODS IN SPECIALIZED STORES	6587,05	3962	1,04	1,03	1,04	1,03	1,01
477	RETAIL SALE OF OTHER GOODS IN SPECIALIZED STORES	45257,77	22153	1,06	1,04	1,03	1,03	1,01
478	RETAIL SALE VIA STALLS AND MARKETS	9829,02	9178	1,82	1,64	1,39	1,26	1,16
479	RETAIL TRADE NOT IN STORES, STALLS OR MARKETS	1394,19	672	2,10	2,00	1,16	1,13	1,10
491	PASSENGER RAIL TRANSPORT, INTERURBAN	2492	49	0,99	0,98	0,97	1,00	1,09
492	FREIGHT RAIL TRANSPORT	-	-	-	-	-	-	-
493	OTHER PASSENGER LAND TRANSPORT	9655,09	1266	0,99	1,01	0,93	0,90	0,90
494	FREIGHT TRANSPORT BY ROAD	16006,89	5355	1,34	1,27	1,18	1,13	1,08
495	TRANSPORT VIA PIPELINE	149,93	10	0,35	0,51	0,71	0,60	0,42
501	SEA AND COASTAL WATER TRANSPORT	1864,35	65	2,74	2,68	2,66	2,18	2,09
502	INLAND WATER TRANSPORT	2459,51	37	2,63	2,58	2,50	1,94	1,81
503	INLAND PASSENGER WATER TRANSPORT	7,34	3	0,00	0,00	0,00	0,00	0,00
504	INLAND FREIGHT WATER TRANSPORT	12,73	2	0,00	0,00	0,00	0,00	0,00
511	PASSENGER AIR TRANSPORT	561,62	26	6,41	4,98	3,60	2,18	1,87
512	FREIGHT AIR TRANSPORT	-	-	-	-	-	-	-

521	WAREHOUSING AND STORAGE	804,32	139	0,96	1,06	0,92	0,95	1,14
522	SUPPORT ACTIVITIES FOR TRANSPORTATION	12553,95	1426	1,29	1,29	1,24	1,16	1,14
531	POSTAL ACTIVITIES	11314,05	763	0,61	0,81	0,93	0,97	1,01
532	COURIER ACTIVITIES	686,97	200	1,48	1,40	1,25	1,17	1,05
551	HOTELS	11384,55	1171	4,09	3,81	3,33	2,85	1,97
552	OTHER SHORT TERM ACCOMODATION ACTIVITIES	3130,79	904	3,83	3,65	3,60	3,49	3,15
553	CAMPING GROUNDS, RECREATIONAL VEHICLE PARKS AND TRAILER PARKS	283,29	91	5,93	4,96	4,77	3,54	2,42
559	OTHER ACCOMODATION	191,29	51	3,67	4,06	3,52	1,89	1,55
561	RESTAURANTS AND MOBILE FOOD SERVICE ACTIVITIES	24019,09	7655	1,26	1,19	1,15	1,12	1,06
562	EVENT CATERING AND OTHER FOOD SERVICE ACTIVITIES	2611,59	340	0,98	0,98	1,03	0,99	1,04
563	BEVERAGE SERVING ACTIVITIES	17911,92	7546	1,18	1,16	1,14	1,10	1,06
581	PUBLISHING OF BOOKS, PERIODICALS AND OTHER PUBLISHING ACTIVITIES	1026,41	275	1,49	1,47	1,39	1,30	1,17
582	SOFTWARE PUBLISHING	166,8	29	0,85	1,09	1,28	1,44	1,21
591	MOTION PICTURE, VIDEO AND TELEVISION PROGRAMME ACTIVITIES	946,35	348	1,16	1,06	1,02	1,01	1,04
592	SOUND RECORDING AND MUSIC PUBLISHING ACTIVITIES	53,42	18	0,31	0,31	0,61	0,47	0,81
601	RADIO BROADCASTING	352,54	117	1,76	1,57	1,29	1,09	1,04
602	TELEVISION PROGRAMMING AND BROADCASTING ACTIVITIES	562,48	61	1,14	1,15	0,98	1,02	1,11
611	WIRED TELECOMMUNICATIONS ACTIVITIES	4435,56	65	1,33	1,30	1,16	1,10	1,01
612	WIRELESS TELECOMMUNICATIONS ACTIVITIES	839,66	12	3,05	2,99	2,78	2,37	2,10
613	SATELLITE TELECOMMUNICATIONS ACTIVITIES	3,38	2	0,00	0,00	0,00	0,00	0,00
619	OTHER TELECOMMUNICATIONS ACTIVITIES	563,02	175	0,91	0,99	1,09	1,32	1,36
620	COMPUTER PROGRAMMING, CONSULTANCY AND RELATED ACTIVITIES	3745,96	1436	1,31	1,28	1,25	1,19	1,13
631	DATA PROCESSING, HOSTING AND RELATED ACTIVITIES; WEB PORTALS	6000,22	1973	1,14	1,12	1,11	1,08	1,06
639	OTHER INFORMATION SERVICE ACTIVITIES	133,44	104	1,46	1,26	1,18	1,14	1,08
641	MONETARY INTERMEDIATION	16243,8	1843	0,91	0,94	0,96	0,97	0,98
642	ACTIVITIES OF HOLDING COMPANIES	81,4	11	1,55	1,52	1,46	1,28	1,19
643	TRUSTS, FUNDS AND SIMILAR FINANCIAL ENTITIES	-	-	-	-	-	-	-
649	OTHER FINANCIAL SERVICE ACTIVITIES, EXCEPT INSURANCE AND PENSION FUNDING ACTIVITIES	1055,9	222	1,92	1,87	1,64	1,48	1,27
651	INSURANCE	629,55	87	1,56	1,51	1,28	1,15	1,22
652	REINSURANCE	-	-	-	-	-	-	-
661	ACTIVITIES AUXILIARY TO FINANCIAL SERVICE ACTIVITIES, EXCEPT INSURANCE AND PENSION FUNDING	2128,87	1593	1,17	1,12	1,09	1,09	1,06
662	ACTIVITIES AUXILIARY TO INSURANCE AND PENSION FUNDING	5397,4	2478	1,08	1,06	1,02	1,02	1,02
663	FUND MANAGEMENT ACTIVITIES	1,95	2	0,00	0,00	0,00	0,00	0,00
681	BUYING AND SELLING OF SELF-OWNED REAL ESTATE	514,15	329	1,46	1,37	1,29	1,23	1,09

682	RENTING AND OPERATING OF SELF-OWNED OR LEASED REAL ESTATE	2687,61	1604	1,32	1,31	1,29	1,24	1,18
683	REAL ESTATE ACTIVITIES ON A FEE OR CONTRACT BASIS	2631,86	1745	1,24	1,22	1,22	1,19	1,13
691	LEGAL ACTIVITIES	14236,22	10952	1,25	1,22	1,13	1,08	1,06
692	ACCOUNTING, BOOKKEEPING AND AUDITING ACTIVITIES; TAX CONSULTANCY	12109,35	7925	1,08	1,06	1,03	1,02	1,01
701	ACTIVITIES OF HEAD OFFICE	120,72	19	1,35	1,33	1,50	1,30	1,07
702	MANAGEMENT CONSULTANCY ACTIVITIES	4082,13	1588	1,23	1,21	1,18	1,14	1,07
711	ARCHITECTURAL AND ENGINEERING ACTIVITIES AND RELATED TECHNICAL CONSULTANCY	16440,49	13906	1,07	1,05	1,04	1,03	1,02
712	TECHNICAL TESTING AND ANALYSIS	1591,8	485	1,15	1,11	1,07	1,10	1,12
721	RESEARCH AND EXPERIMENTAL DEVELOPMENT ON NATURAL SCIENCES AND ENGINEERING	953,89	432	0,79	1,01	1,03	1,19	1,07
722	RESEARCH AND EXPERIMENTAL DEVELOPMENT ON SOCIAL SCIENCES AND HUMANITIES	198,75	59	3,83	2,45	2,44	1,73	1,24
731	ADVERTISING	1648,05	747	1,21	1,22	1,23	1,22	1,17
732	MARKET RESEARCH AND PUBLIC OPINION POLLING	302,47	148	1,20	1,12	1,10	1,09	1,08
741	SPECIALIZED DESIGN ACTIVITIES	624,72	350	1,02	1,02	1,02	1,06	1,04
742	PHOTOGRAPHIC ACTIVITIES	1761,21	1259	0,95	0,97	0,99	1,00	1,00
743	TRANSLATION AND INTERPRETATION ACTIVITIES	107,33	87	1,95	1,83	1,23	1,07	0,98
749	OTHER PROFESSIONAL, SCIENTIFIC AND TECHNICAL ACTIVITIES N.E.C.	3933,12	2699	1,13	1,12	1,09	1,05	1,04
750	VETERINARY ACTIVITIES	727,01	672	1,27	1,22	1,14	1,13	1,08
771	RENTING AND LEASING OF MOTOR VEHICLES	660,53	217	1,98	1,91	1,71	1,64	1,57
772	RENTING AND LEASING OF PERSONAL AND HOUSEHOLD GOODS	581,03	429	2,19	2,17	2,21	2,20	2,09
773	RENTING AND LEASING OF OTHER MACHINERY, EQUIPMENT AND TANGIBLE GOODS	1467,33	771	2,83	2,79	2,86	2,84	2,84
774	LEASING OF INTELLECTUAL PROPERTY AND SIMILAR PRODUCTS, EXCEPT COPYRIGHTED WORKS	-	-	-	-	-	-	-
781	ACTIVITES OF EMPLOYMENT PLACEMENT AGENCIES	30,75	16	0,99	1,15	1,12	0,89	0,97
782	TEMPORARY EMPLOYMENT AGENCY ACTIVITIES	2815,52	49	1,74	1,73	1,60	1,66	1,54
783	OTHER HUMAN RESOURCES PROVISION	-	-	-	-	-	-	-
791	TRAVEL AGENCY AND TOUR OPERATOR ACTIVITIES	2682,23	918	1,12	1,12	1,09	1,08	1,06
799	OTHER RESERVATION SERVICE AND RELATED ACTIVITIES	310,31	197	1,53	1,41	1,32	1,22	1,15
801	PRIVATE SECURITY ACTIVITIES	4497,52	159	1,16	1,11	1,03	1,03	1,02
802	SECURITY SYSTEMS SERVICE ACTIVITIES	-	-	-	-	-	-	-
803	INVESTIGATION ACTIVITIES	111,33	60	1,44	1,43	1,35	1,33	1,15
811	COMBINED FACILITIES SUPPORT ACTIVITIES	595,42	12	1,57	1,56	1,24	0,94	0,96
812	CLEANING ACTIVITIES	19952,64	1988	1,11	1,11	1,10	1,09	1,07
813	LANDSCAPE CARE AND MAINTENANCE SERVICE ACTIVITIES	288,93	151	4,02	3,55	2,04	1,39	1,35

821	OFFICE ADMINISTRATIVE AND SUPPORT ACTIVITIES	611,55	342	1,30	1,27	1,19	1,15	1,09
822	ACTIVITIES OF CALL CENTERS	3898,71	100	1,52	1,49	1,46	1,42	1,40
823	ORGANIZATION OF CONVENTIONS AND TRADE SHOWS	518,93	214	1,79	1,48	1,42	1,32	1,22
829	BUSINESS SUPPORT SERVICE ACTIVITIES N.E.C.	5586,07	2866	1,05	1,04	1,03	1,04	1,02
851	PRE-PRIMARY EDUCATION	1986,53	399	1,41	1,33	1,29	1,26	1,12
852	PRIMARY EDUCATION	333,66	18	2,79	1,17	1,39	1,22	1,27
853	SECONDARY EDUCATION	2735,73	196	1,20	1,15	1,09	1,11	1,11
854	HIGHER EDUCATION	20,33	7	11,56	7,09	2,63	1,17	0,47
855	OTHER EDUCATION	2270,15	1051	0,98	0,98	0,98	0,99	1,02
856	EDUCATIONAL SUPPORT ACTIVITIES	2,58	3	0,00	0,00	0,00	0,00	0,00
861	HOSPITAL ACTIVITIES	6340,03	177	1,48	1,55	1,31	1,19	1,17
862	MEDICAL AND DENTAL PRACTICE ACTIVITIES	18538,14	11597	1,06	1,05	1,03	1,03	1,02
869	OTHER HUMAN HEALTH ACTIVITIES	11626,62	3415	1,04	1,03	1,02	1,02	1,03
871	RESIDENTIAL NURSING CARE FACILITIES	1843,84	233	1,42	1,27	1,13	1,17	1,17
872	RESIDENTIAL CARE ACTIVITIES FOR MENTAL RETARDATION, MENTAL HEALTH AND SUBSTANCE ABUSE	123,83	10	0,00	0,00	0,19	0,53	0,40
873	RESIDENTIAL CARE ACTIVITIES FOR THE ELDERLY AND DISABLED	5725,06	515	1,55	1,48	1,36	1,34	1,31
879	OTHER RESIDENTIAL CARE ACTIVITIES	134,6	35	0,68	1,25	1,01	0,87	0,94
881	SOCIAL WORK ACTIVITIES WITHOUT ACCOMODATION FOR THE ELDERLY AND DISABLED	5923,49	538	1,12	1,22	1,09	1,10	1,04
889	OTHER SOCIAL WORK ACTIVITIES WITHOUT ACCOMODATION	542,13	111	2,96	2,01	1,56	1,51	1,06
900	CREATIVE, ARTS AND ENTERTAINMENT ACTIVITIES	1658,91	1155	1,14	1,11	1,07	1,09	1,07
910	LIBRARIES, ARCHIVES, MUSEUMS AND OTHER CULTURAL ACTIVITIES	987,11	59	1,18	1,14	1,06	1,16	1,07
920	GAMBLING AND BETTING ACTIVITIES	1480,2	263	1,10	1,09	1,16	1,11	1,09
931	SPORTS ACTIVITIES	1390,87	507	1,03	1,03	1,02	1,01	0,99
932	OTHER AMUSEMENT AND RECREATION ACTIVITIES	2521,2	1198	1,35	1,26	1,19	1,12	1,04
951	REPAIR OF COMPUTERS AND COMMUNICATION EQUIPMENT	1050,47	537	1,17	1,16	1,13	1,10	1,07
952	REPAIR OF PERSONAL AND HOUSEHOLD GOODS	2273,34	1480	1,09	1,09	1,05	1,05	1,04
960	OTHER PERSONAL SERVICE ACTIVITIES	18311,09	10196	1,06	1,05	1,04	1,03	1,02
	TOTAL	**848.689,44**	**296.149**					

Table 150 - *Agglomeration results by industry and distance range. Sicily, 2012.* ***Source:*** *Compiled by the authors*

Industry code	Industry description	Employees	Plants	M (5 minutes)	M (10 minutes)	M (15 minutes)	M (20 minutes)	M (30 minutes)
012	GROWING OF PERENNIAL CROPS	-	-	-	-	-	-	-
013	PLANT PROPAGATION	-	-	-	-	-	-	-
014	ANIMAL PRODUCTION	-	-	-	-	-	-	-
016	SUPPORT ACTIVITIES TO AGRICULTURE AND POST-HARVEST CROP ACTIVITIES	-	-	-	-	-	-	-
022	LOGGING	-	-	-	-	-	-	-
031	FISHING	-	-	-	-	-	-	-
051	MINING OF HARD COAL	-	-	-	-	-	-	-
061	EXTRACTION OF CRUDE PETROLEUM	215,70	8	12,67	12,67	12,67	12,30	5,72
062	EXTRACTION OF NATURAL GAS	63,31	5	0,00	0,00	1,27	1,23	0,82
071	MINING OF IRON ORES	-	-	-	-	-	-	-
072	MINING OF NON-FERROUS METAL ORES	-	-	-	-	-	-	-
081	QUARRYING OF STONE, SAND AND CLAY	1.032,37	276	11,65	5,97	5,75	2,10	1,96
089	MINING AND QUARRYING N.E.C.	397,68	60	2,45	2,57	2,08	2,17	1,89
091	SUPPORT ACTIVITIES FOR PETROLEUM AND NATURAL GAS EXTRACTION	94,78	5	40,00	40,00	40,00	38,83	18,07
099	SUPPORT ACTIVITIES FOR OTHER MINING AND QUARRYING	19,64	3	0,00	0,00	0,00	0,00	0,00
101	PROCESSING AND PRESERVING OF MEAT	704,31	115	20,02	5,30	3,11	3,10	2,15
102	PROCESSING AND PRESERVING OF FISH, CRUSTACEANS AND MOLLUSCS	1.151,77	117	10,88	9,65	8,30	4,78	2,97
103	PROCESSING AND PRESERVING OF FRUIT AND VEGETABLES	1.664,78	281	2,77	2,43	2,01	1,62	1,41
104	MANUFACTURE OF VEGETABLE AND ANIMAL OILS AND FATS	879,05	494	4,67	4,10	3,77	2,35	1,93
105	MANUFACTURE OF DAIRY PRODUCTS	1.372,59	258	3,10	2,86	1,85	1,60	1,39
106	MANUFACTURE OF GRAIN MILL PRODUCTS, STARCHES AND STARCH PRODUCTS	551,97	137	2,77	2,95	2,63	2,25	1,77
107	MANUFACTURE OF BAKERY PRODUCTS	14.902,89	5011	1,11	1,11	1,10	1,07	1,03
108	MANUFACTURE OF OTHER FOOD PRODUCTS	2.746,09	559	1,54	1,52	1,34	1,18	1,14
109	MANUFACTURE OF PREPARED ANIMAL FEEDS	391,57	63	6,76	6,13	5,79	4,89	4,55
110	MANUFACURE OF BEVERAGES	2.072,15	340	3,99	3,74	3,68	3,24	2,25
120	MANUFACTURE OF TOBACCO PRODUCTS	-	-	-	-	-	-	-
131	SPINNING, WEAVING AND FINISHING OF TEXTILES	3,72	5	0,00	0,00	0,00	10,70	6,83
132	WEAVING OF TEXTILES	23,15	10	0,29	0,28	0,27	1,17	2,64
133	FINISHING OF TEXTILES	27,59	6	0,00	0,00	0,00	0,00	0,65
139	MANUFACTURE OF OTHER TEXTILES	567,30	288	1,13	1,10	1,10	1,15	1,04
141	MANUFACTURE OF WEARING APPAREL, EXCEPT FUR APPAREL	2.320,09	543	5,52	5,03	3,94	2,47	1,78
142	MANUFACTURE OF ARTICLES OF FUR	31,90	25	2,18	2,17	1,80	1,58	1,34
143	MANUFACTURE OF KNITTED AND CROCHETED APPAREL	52,32	21	5,90	6,14	2,33	2,23	1,15
151	TANNING AND DRESSING OF LEATHER; MANUFACTURE OF LUGGAGE; HANDBAGS;	102,18	44	1,36	1,34	1,32	1,30	1,23

	SADDLERY AND HARNESS; DRESSING AND DYEING OF FUR							
152	MANUFACTURE OF FOOTWEAR	249,48	57	4,67	3,51	3,49	2,59	1,82
161	SAWMILLING AND PLANING OF WOOD	556,10	184	3,40	3,03	1,87	1,58	1,13
162	MANUFACTURE OF PRODUCTS OF WOOD, CORK, STRAW AND PLAITING MATERIALS	3.911,39	1748	1,74	1,65	1,48	1,36	1,24
171	MANUFACTURE OF PULP, PAPER AND PAPERBOARD	53,80	9	1,40	3,04	1,51	0,65	0,87
172	MANUFACTURE OF CORRUGATED PAPER AND PAPERBOARD AND OF CONTAINERS OF PAPER AND PAPERBOARD	885,39	195	2,42	1,86	1,75	1,45	1,23
181	PRINTING AND SERVICE ACTIVITIES RELATED TO PRINTING	2.832,93	1004	1,06	1,08	1,04	1,04	1,02
182	REPRODUCTION OF RECORDED MEDIA	25,66	16	2,57	1,77	1,71	1,11	1,48
191	MANUFACTURE OF COKE OVEN PRODUCTS	-	-	-	-	-	-	-
192	MANUFACTURE OF REFINED PETROLEUM PRODUCTS	4.104,98	79	3,52	3,04	2,59	2,82	1,75
201	MANUFACTURE OF BASIC CHEMICALS, FERTILIZERS AND NITROGEN COMPOUNDS, PLASTICS AND SYNTHETIC RUBBER IN PRIMARY FORMS	1.607,25	67	3,29	3,39	2,38	2,92	2,30
202	MANUFACTURE OF PESTICIDES AND OTHER AGROCHEMICAL PRODUCTS	48,10	5	0,00	0,00	0,00	0,00	0,00
203	MANUFACTURE OF PAINTS, VARNISHES AND SIMILAR COATINGS, PRINTING INK AND MASTICS	368,88	41	1,30	1,13	1,37	1,18	1,24
204	MANUFACTURE OF SOAP AND DETERGENTS, CLEANING AND POLISHING PREPARATIONS, PERFUMES AND TOILET PREPARATIONS	334,72	66	2,68	2,01	1,12	1,04	1,17
205	MANUFACTURE OF OTHER CHEMICAL PRODUCTS N.E.C.	300,17	52	4,43	4,22	3,11	3,35	2,46
206	MANUFACTURE OF MAN-MADE FIBRES	-	-	-	-	-	-	-
211	MANUFACTURE OF PHARMACEUTICALS	58,22	2	10,12	10,12	7,58	5,55	4,67
212	MANUFACTURE OF MEDICINAL CHEMICAL AND BOTANICAL PRODUCTS	1.219,70	25	4,91	3,20	2,31	2,14	1,84
221	MANUFACTURE OF RUBBER PRODUCTS	127,86	31	6,66	6,78	3,99	3,45	1,09
222	MANUFACTURE OF PLASTICS PRODUCTS	2.723,44	291	3,09	2,83	2,27	1,94	1,50
231	MANUFACTURE OF GLASS AND GLASS PRODUCTS	1.047,19	377	1,23	1,17	1,17	1,15	1,02
232	MANUFACTURE OF REFRACTORY PRODUCTS	4,14	3	0,00	0,00	0,00	0,00	0,00
233	MANUFACTURE OF CLAY BUILDING MATERIALS	633,71	99	18,82	12,58	5,94	3,46	1,79
234	MANUFACTURE OF OTHER PORCELAIN AND CERAMIC PRODUCTS	699,03	375	24,38	23,74	16,56	12,60	6,06
235	MANUFACTURE OF CEMENT, LIME AND PLASTER	666,01	44	0,30	0,45	1,13	1,10	1,08
236	MANUFACTURE OF ARTICLES OF CONCRETE, CEMENT AND PLASTER	2.759,23	530	1,63	1,52	1,43	1,33	1,26
237	CUTTING, SHAPING AND FINISHING OF STONE	3.635,79	1061	6,18	3,99	4,06	2,04	2,04
239	MANUFACTURE OF OTHER NON-METALLIC MINERAL PRODUCTS N.E.C.	397,03	80	0,81	1,10	0,85	0,76	1,10
241	MANUFACTURE OF BASIC IRON AND STEEL	439,32	28	0,66	1,03	2,91	2,40	1,54
242	MANUFACTURE OF TUBES, PIPES AND HOLLOW PROFILES AND OF TUBE OR PIPE FITTINGS OF CAST-IRON	61,35	21	4,87	1,09	1,02	2,15	1,82
243	CASTING OF SEMI-FINISHED STEEL PRODUCTS	440,09	77	2,55	2,38	1,79	1,26	1,20
244	MANUFACTURE OF BASIC PRECIOUS AND OTHER NON-FERROUS METALS; REPROCESSING OF NUCLEAR FUELS	373,35	47	0,51	0,52	0,76	0,72	0,79

245	CASTING OF IRON AND STEEL	59,92	21	2,58	2,05	1,70	0,96	0,95
251	MANUFACTURE OF STRUCTURAL METAL PRODUCTS	8.443,68	2701	1,31	1,27	1,18	1,13	1,09
252	MANUFACTURE OF TANKS, RESERVOIRS AND CONTAINERS OF METAL	482,87	35	3,79	3,49	3,11	2,48	2,74
253	MANUFACTURE OF STEAM GENERATORS, EXCEPT CENTRAL HEATING HOT WATER BOILERS	12,11	3	0,00	0,00	0,00	0,00	0,00
254	MANUFACTURE OF WEAPONS AND AMMUNITION	-	-	-	-	-	-	-
255	FORGING, PRESSING, STAMPING AND ROLL-FORMING OF METAL; POWDER METALLURGY	51,00	15	30,02	21,20	7,18	3,87	2,16
256	TREATMENT AND COATING OF METALS; MACHINING	1.677,50	220	3,43	3,36	3,13	3,11	2,15
257	MANUFACTURE OF CUTLERY, HAND TOOLS AND GENERAL HARDWARE	123,48	38	4,27	4,59	2,01	1,42	0,90
259	MANUFACTURE OF OTHER FABRICATED METAL PRODUCTS N.E.C.	1.582,85	670	1,61	1,40	1,37	1,26	1,10
261	MANUFACTURE OF ELECTRONIC COMPONENTS AND BOARDS	4.492,48	37	3,41	3,64	2,56	2,33	2,51
262	MANUFACTURE OF COMPUTERS AND PERIPHERAL EQUIPMENT	105,18	63	2,32	2,36	2,12	1,69	1,28
263	MANUFACTURE OF COMMUNICATION EQUIPMENT	463,89	33	1,93	2,59	1,62	1,21	1,26
264	MANUFACTURE OF CONSUMER ELECTRONICS	37,50	13	8,04	6,39	2,45	2,89	1,79
265	MANUFACTURE OF MEASURING, TESTING, NAVIGATING AND CONTROL EQUIPMENT; WATCHES AND CLOCKS	7,50	6	6,58	6,58	4,93	3,61	4,68
266	MANUFACTURE OF IRRADIATION, ELECTROMEDICAL AND ELECTROTHERAPEUTIC EQUIPMENT	80,93	22	2,03	2,26	1,90	1,79	1,51
267	MANUFACTURE OF OPTICAL INSTRUMENTS AND PHOTOGRAPHIC EQUIPMENT	5,30	3	0,00	0,00	19,87	12,41	4,35
268	MANUFACTURE OF MAGNETIC AND OPTICAL MEDIA	2,00	2	0,00	0,00	0,00	0,00	0,00
271	MANUFACTURE OF ELECTRIC MOTORS, GENERATORS, TRANSFORMERS AND ELECTRICITY DISTRIBUTION AND CONTROL APPARATUS	679,62	59	1,42	1,32	1,28	1,34	1,22
272	MANUFACTURE OF BATTERIES AND ACCUMULATORS	-	-	-	-	-	-	-
273	MANUFACTURE OF WIRING AND WIRING DEVICES	156,67	15	4,46	6,29	2,07	2,79	1,99
274	MANUFACTURE OF ELECTRIC LIGHTING EQUIPMENT	80,27	35	10,03	6,59	3,97	2,12	1,19
275	MANUFACTURE OF DOMESTIC APPLIANCES	15,18	3	2,91	2,85	2,73	2,37	2,11
279	MANUFACTURE OF OTHER ELECTRICAL EQUIPMENT	262,84	75	2,08	1,94	1,57	1,32	1,11
281	MANUFACTURE OF GENERAL-PURPOSE MACHINERY	158,41	42	0,57	0,67	0,48	1,04	0,79
282	MANUFACTURE OF OTHER GENERAL-PURPOSE MACHINERY	1.971,39	188	2,85	2,53	2,34	2,32	1,61
283	MANUFACTURE OF AGRICULTURAL AND FORESTRY MACHINERY	194,42	52	21,69	8,67	8,76	6,24	3,40
284	MANUFACTURE OF METAL-FORMING MACHINERY AND MACHINE TOOLS	112,62	15	1,62	2,44	1,84	0,68	0,93
289	MANUFACTURE OF OTHER SPECIAL-PURPOSE MACHINERY	660,77	120	1,82	1,27	1,42	1,21	1,18
291	MANUFACTURE OF MOTOR VEHICLES	1.294,50	6	0,00	0,00	0,18	0,06	1,17
292	MANUFACTURE OF BODIES (COACHWORK) FOR MOTOR VEHICLES; MANUFACTURE OF TRAILERS AND SEMI-TRAILERS	292,77	39	1,37	1,81	1,32	1,26	1,50
293	MANUFACTURE OF PARTS AND ACCESSORIES FOR MOTOR VEHICLES	405,18	32	4,97	3,58	2,65	1,65	1,71
301	BUILDING OF SHIPS AND BOATS	1.856,97	154	3,02	1,62	1,64	1,35	1,53

302	MANUFACTURE OF RAILWAY LOCOMOTIVES AND ROLLING STOCKS	404,79	10	25,64	17,22	13,78	3,53	3,09
303	MANUFACTURE OF AIR AND SPACECRAFT AND RELATED MACHINERY	113,51	3	0,00	0,00	0,00	0,00	0,00
304	MANUFACTURE OF MILITARY FIGHTING VEHICLES	-	-	-	-	-	-	-
309	MANUFACTURE OF TRANSPORT EQUIPMENT N.E.C.	113,95	18	54,59	15,05	6,14	1,24	1,31
310	MANUFACTURE OF FURNITURE	1.610,93	553	2,15	1,93	1,60	1,35	1,28
321	MANUFACTURE OF JEWELLERY, BIJOUTERIE AND RELATED ARTICLES	500,53	288	1,32	1,33	1,16	1,12	1,04
322	MANUFACTURE OF MUSICAL INSTRUMENTS	24,16	16	1,05	1,05	1,37	0,94	1,01
323	MANUFACTURE OF SPORTS GOODS	24,18	12	2,79	0,43	0,15	0,28	0,35
324	MANUFACTURE OF GAMES AND TOYS	69,07	22	0,07	0,28	1,08	1,08	1,08
325	MANUFACTURE OF MEDICAL AND DENTAL INSTRUMENTS AND SUPPLIES	1.786,39	919	1,30	1,30	1,19	1,14	1,10
329	OTHER MANUFACTURING N.E.C.	359,35	163	2,38	2,56	1,92	1,48	1,08
331	REPAIR OF FABRICATED METAL PRODUCTS, MACHINERY AND EQUIPMENT	7.158,53	1944	1,11	1,11	1,13	1,14	1,08
332	INSTALLATION OF INDUSTRIAL MACHINERY AND EQUIPMENT	2.619,72	442	1,15	1,18	1,31	1,36	1,25
351	ELECTRIC POWER GENERATION, TRANSMISSION AND DISTRIBUTION	3.662,62	597	1,30	1,23	1,16	1,09	1,14
352	MANUFACTURE OF GAS; DISTRIBUTION OF GASEOUS FUELS THROUGH MAINS	902,69	72	1,03	0,86	0,86	0,91	0,86
353	STEAM AND AIR CONDITIONING SUPPLY	141,26	6	0,00	0,00	0,28	0,36	0,33
360	WATER COLLECTION, TREATMENT AND SUPPLY	2.881,67	304	1,12	1,01	0,98	1,03	1,13
370	SEWERAGE	460,24	104	2,26	1,80	1,69	1,64	1,31
381	WASTE COLLECTION	10.360,87	357	1,30	1,18	1,09	1,05	1,00
382	WASTE TREATMENT AND DISPOSAL	1.938,51	106	2,25	2,57	2,29	2,52	1,59
383	MATERIALS RECOVERY	1.467,23	266	1,36	1,24	1,18	1,09	1,05
390	REMEDIATION ACTIVITIES AND OTHER WASTE MANAGEMENT SERVICES	290,07	49	4,46	5,05	4,04	3,52	2,40
411	PROJECT MANAGEMENT ACTIVITIES RELATED TO CONSTRUCTION	57,35	41	1,06	2,11	2,70	2,68	1,96
412	CONSTRUCTION OF BUILDINGS	30.812,00	11735	1,39	1,31	1,23	1,15	1,08
421	CONSTRUCTION OF ROADS AND RAILWAYS	3.008,00	395	2,91	2,07	1,63	1,39	1,24
422	CONSTRUCTION OF UTILITY PROJECTS	1.150,60	43	1,76	1,89	1,67	1,26	0,90
429	CONSTRUCTION OF OTHER CIVIL ENGINGEERING PROJECTS	1.467,60	368	3,81	3,04	2,62	2,14	1,74
431	DEMOLITION AND SITE PREPARATION	2.174,36	1005	2,12	1,86	1,61	1,42	1,27
432	ELECTRICAL, PLUMBING AND OTHER CONSTRUCTION INSTALLATION ACTIVITIES	23.932,92	7905	1,04	1,02	1,03	1,02	1,01
433	BUILDING COMPLETION AND FINISHING	20.973,20	9772	1,44	1,35	1,26	1,19	1,10
439	OTHER SPECIALIZED CONSTRUCTION ACTIVITIES	3.080,11	802	1,31	1,31	1,26	1,24	1,10
451	SALE OF MOTOR VEHICLES	5.595,59	1663	1,08	1,06	1,04	1,01	1,03
452	MAINTENANCE AND REPAIR OF MOTOR VEHICLES	14.036,93	7020	1,17	1,14	1,12	1,10	1,06
453	SALE OF MOTOR VEHICLE PARTS AND ACCESSORIES	3.881,52	1619	1,10	1,09	1,09	1,09	1,06
454	SALE, MAINTENANCE AND REPAIR OF MOTORCYCLES AND RELATED PARTS AND ACCESSORIES	1.089,89	581	1,06	1,04	1,02	1,02	1,02
461	WHOLESALE ON A FEE OR CONTRACT BASIS	15.693,15	12905	1,43	1,33	1,26	1,19	1,14
462	WHOLESALE OF AGRICULTURAL RAW MATERIALS AND LIVE ANIMALS	1.341,44	629	2,32	2,13	1,97	1,75	1,42

463	WHOLESALE OF FOOD, BEVERAGES AND TOBACCO	18.392,46	3922	1,95	1,81	1,75	1,46	1,24
464	WHOLESALE OF HOUSEHOLD GOODS	9.578,30	3556	1,36	1,29	1,30	1,24	1,15
465	WHOLESALE OF MACHINERY, EQUIPMENT AND SUPPLIES	1.930,22	793	1,14	1,08	1,03	1,03	1,02
466	WHOLESALE OF OTHER MACHINERY AND EQUIPMENT	3.132,18	1191	1,14	1,09	1,07	1,07	1,05
467	OTHER SPECIALIZED WHOLESALE	10.490,73	3260	1,19	1,17	1,16	1,13	1,06
469	NON-SPECIALIZED WHOLESALE TRADE	1.630,10	574	1,24	1,24	1,25	1,26	1,16
471	RETAIL SALE IN NON-SPECIALIZED STORES	31.249,36	6139	1,02	1,02	1,05	1,04	1,01
472	RETAIL SALE OF FOOD, BEVERAGES AND TOBACCO IN SPECIALIZED STORES	18.466,04	10402	1,14	1,11	1,09	1,07	1,03
473	RETAIL SALE OF AUTOMOTIVE FUEL IN SPECIALIZED STORES	5.347,88	1974	1,03	1,03	1,06	1,04	1,02
474	RETAIL SALE OF INFORMATION AND COMMUNICATIONS EQUIPMENT IN SPECIALIZED STORES	2.352,21	1230	1,06	1,05	1,06	1,06	1,01
475	RETAIL SALE OF OTHER HOUSEHOLD EQUIPMENT IN SPECIALIZED STORES	18.409,36	8752	1,16	1,15	1,13	1,12	1,06
476	RETAIL SALE OF CULTURAL AND RECREATION GOODS IN SPECIALIZED STORES	6.141,50	3616	1,03	1,01	1,02	1,02	1,00
477	RETAIL SALE OF OTHER GOODS IN SPECIALIZED STORES	45.990,63	21148	1,06	1,04	1,04	1,03	1,02
478	RETAIL SALE VIA STALLS AND MARKETS	10.158,02	9407	1,56	1,39	1,23	1,16	1,09
479	RETAIL TRADE NOT IN STORES, STALLS OR MARKETS	1.817,34	933	1,33	1,32	1,09	1,08	1,08
491	PASSENGER RAIL TRANSPORT, INTERURBAN	1.671,98	34	1,17	1,16	1,08	1,03	1,07
492	FREIGHT RAIL TRANSPORT	-	-	-	-	-	-	-
493	OTHER PASSENGER LAND TRANSPORT	8.231,89	1242	1,09	1,10	1,02	0,99	0,96
494	FREIGHT TRANSPORT BY ROAD	16.109,84	4618	1,33	1,26	1,16	1,14	1,09
495	TRANSPORT VIA PIPELINE	143,75	13	2,75	1,07	1,34	1,13	0,78
501	SEA AND COASTAL WATER TRANSPORT	1.814,44	83	3,73	3,59	3,41	3,27	3,08
502	INLAND WATER TRANSPORT	2.410,14	25	3,64	3,60	3,52	2,39	1,79
503	INLAND PASSENGER WATER TRANSPORT	4,90	2	0,00	0,00	0,00	0,00	0,00
504	INLAND FREIGHT WATER TRANSPORT	3,00	1	-	-	-	-	-
511	PASSENGER AIR TRANSPORT	713,24	12	4,47	3,63	2,64	1,84	1,58
512	FREIGHT AIR TRANSPORT	19,55	1	-	-	-	-	-
521	WAREHOUSING AND STORAGE	826,60	161	1,63	1,42	1,06	0,99	1,03
522	SUPPORT ACTIVITIES FOR TRANSPORTATION	12.672,33	1671	1,36	1,34	1,25	1,18	1,13
531	POSTAL ACTIVITIES	10.418,52	770	0,62	0,81	0,92	0,98	1,01
532	COURIER ACTIVITIES	899,70	327	1,01	1,04	1,05	1,02	1,05
551	HOTELS	10.068,37	1191	4,07	3,87	3,51	3,03	2,06
552	OTHER SHORT TERM ACCOMODATION ACTIVITIES	3.700,83	1422	3,59	3,36	3,23	3,11	2,73
553	CAMPING GROUNDS, RECREATIONAL VEHICLE PARKS AND TRAILER PARKS	221,82	86	3,67	3,91	4,02	2,65	1,93
559	OTHER ACCOMODATION	105,96	33	1,03	0,88	0,90	0,90	0,78
561	RESTAURANTS AND MOBILE FOOD SERVICE ACTIVITIES	32.437,30	9745	1,20	1,15	1,12	1,09	1,04
562	EVENT CATERING AND OTHER FOOD SERVICE ACTIVITIES	2.972,33	352	0,99	0,92	1,01	0,97	1,04
563	BEVERAGE SERVING ACTIVITIES	19.405,65	7855	1,20	1,19	1,17	1,13	1,07

581	PUBLISHING OF BOOKS, PERIODICALS AND OTHER PUBLISHING ACTIVITIES	960,48	257	1,61	1,56	1,47	1,41	1,24
582	SOFTWARE PUBLISHING	108,38	6	0,00	0,00	0,00	0,00	0,92
591	MOTION PICTURE, VIDEO AND TELEVISION PROGRAMME ACTIVITIES	855,58	302	1,30	1,17	1,05	1,05	1,04
592	SOUND RECORDING AND MUSIC PUBLISHING ACTIVITIES	21,97	12	1,15	1,15	1,79	1,70	1,05
601	RADIO BROADCASTING	227,40	98	1,09	1,00	0,98	1,06	1,07
602	TELEVISION PROGRAMMING AND BROADCASTING ACTIVITIES	652,93	71	1,13	1,07	0,92	0,95	0,96
611	WIRED TELECOMMUNICATIONS ACTIVITIES	3.461,46	71	1,43	1,46	1,39	1,29	1,19
612	WIRELESS TELECOMMUNICATIONS ACTIVITIES	1.351,25	15	3,37	3,34	2,78	2,21	1,92
613	SATELLITE TELECOMMUNICATIONS ACTIVITIES	9,00	3	0,00	0,00	0,00	0,00	0,00
619	OTHER TELECOMMUNICATIONS ACTIVITIES	908,83	374	1,02	1,00	1,01	1,10	1,03
620	COMPUTER PROGRAMMING, CONSULTANCY AND RELATED ACTIVITIES	4.313,35	1372	1,26	1,24	1,24	1,19	1,16
631	DATA PROCESSING, HOSTING AND RELATED ACTIVITIES; WEB PORTALS	4.843,24	1802	1,17	1,13	1,10	1,08	1,05
639	OTHER INFORMATION SERVICE ACTIVITIES	253,97	139	1,71	1,73	1,58	1,25	1,23
641	MONETARY INTERMEDIATION	14.171,42	1650	0,88	0,91	0,95	0,97	0,99
642	ACTIVITIES OF HOLDING COMPANIES	53,86	47	1,29	1,29	0,91	1,33	1,06
643	TRUSTS, FUNDS AND SIMILAR FINANCIAL ENTITIES	-	-	-	-	-	-	-
649	OTHER FINANCIAL SERVICE ACTIVITIES, EXCEPT INSURANCE AND PENSION FUNDING ACTIVITIES	1.347,62	246	1,76	1,71	1,47	1,29	1,12
651	INSURANCE	724,49	85	1,55	1,53	1,28	1,13	1,14
652	REINSURANCE	-	-	-	-	-	-	-
661	ACTIVITIES AUXILIARY TO FINANCIAL SERVICE ACTIVITIES, EXCEPT INSURANCE AND PENSION FUNDING	2.394,04	1940	1,13	1,10	1,07	1,06	1,04
662	ACTIVITIES AUXILIARY TO INSURANCE AND PENSION FUNDING	6.425,55	3547	1,04	1,03	1,01	1,01	1,01
663	FUND MANAGEMENT ACTIVITIES	4,00	1	-	-	-	-	-
681	BUYING AND SELLING OF SELF-OWNED REAL ESTATE	525,71	498	1,28	1,23	1,15	1,10	1,02
682	RENTING AND OPERATING OF SELF-OWNED OR LEASED REAL ESTATE	2.963,05	2593	1,16	1,14	1,13	1,09	1,05
683	REAL ESTATE ACTIVITIES ON A FEE OR CONTRACT BASIS	2.615,93	1936	1,26	1,25	1,22	1,19	1,13
691	LEGAL ACTIVITIES	15.559,13	11868	1,25	1,23	1,14	1,09	1,06
692	ACCOUNTING, BOOKKEEPING AND AUDITING ACTIVITIES; TAX CONSULTANCY	12.995,05	8472	1,07	1,06	1,03	1,02	1,01
701	ACTIVITIES OF HEAD OFFICE	159,58	41	2,63	1,44	1,19	0,98	1,11
702	MANAGEMENT CONSULTANCY ACTIVITIES	3.120,79	1721	1,19	1,19	1,16	1,12	1,07
711	ARCHITECTURAL AND ENGINEERING ACTIVITIES AND RELATED TECHNICAL CONSULTANCY	13.566,92	11779	1,07	1,05	1,04	1,02	1,01
712	TECHNICAL TESTING AND ANALYSIS	2.011,55	645	0,97	0,98	1,01	1,03	1,04
721	RESEARCH AND EXPERIMENTAL DEVELOPMENT ON NATURAL SCIENCES AND ENGINEERING	588,22	469	1,21	1,19	1,14	1,13	1,09
722	RESEARCH AND EXPERIMENTAL DEVELOPMENT ON SOCIAL SCIENCES AND HUMANITIES	60,49	57	1,26	1,26	1,19	1,21	1,14
731	ADVERTISING	1.303,45	736	1,22	1,20	1,17	1,15	1,10
732	MARKET RESEARCH AND PUBLIC OPINION POLLING	357,68	97	2,29	2,06	1,33	1,22	1,08

741	SPECIALIZED DESIGN ACTIVITIES	702,89	463	1,15	1,11	1,15	1,07	1,05
742	PHOTOGRAPHIC ACTIVITIES	1.346,57	1032	0,97	0,99	1,01	1,00	1,00
743	TRANSLATION AND INTERPRETATION ACTIVITIES	119,99	121	1,59	1,43	1,30	1,21	1,03
749	OTHER PROFESSIONAL, SCIENTIFIC AND TECHNICAL ACTIVITIES N.E.C.	4.398,82	3102	1,09	1,08	1,05	1,05	1,05
750	VETERINARY ACTIVITIES	560,19	490	1,40	1,17	1,11	1,07	1,06
771	RENTING AND LEASING OF MOTOR VEHICLES	639,87	236	3,23	3,02	2,39	1,83	1,77
772	RENTING AND LEASING OF PERSONAL AND HOUSEHOLD GOODS	386,10	296	7,62	7,57	7,60	7,57	6,52
773	RENTING AND LEASING OF OTHER MACHINERY, EQUIPMENT AND TANGIBLE GOODS	1.822,94	755	1,99	1,83	1,88	1,84	1,84
774	LEASING OF INTELLECTUAL PROPERTY AND SIMILAR PRODUCTS, EXCEPT COPYRIGHTED WORKS	2,00	3	0,00	0,00	0,00	0,00	0,00
781	ACTIVITES OF EMPLOYMENT PLACEMENT AGENCIES	94,31	23	3,97	3,93	3,18	2,39	2,18
782	TEMPORARY EMPLOYMENT AGENCY ACTIVITIES	1.659,99	53	1,26	1,29	1,25	1,14	1,06
783	OTHER HUMAN RESOURCES PROVISION	-	-	-	-	-	-	-
791	TRAVEL AGENCY AND TOUR OPERATOR ACTIVITIES	2.142,53	929	1,06	1,08	1,08	1,05	1,03
799	OTHER RESERVATION SERVICE AND RELATED ACTIVITIES	424,61	367	1,68	1,60	1,51	1,43	1,25
801	PRIVATE SECURITY ACTIVITIES	4.409,84	154	1,20	1,03	0,94	0,98	0,98
802	SECURITY SYSTEMS SERVICE ACTIVITIES	24,96	9	0,63	0,63	0,71	1,90	1,03
803	INVESTIGATION ACTIVITIES	134,26	65	1,74	1,81	1,74	1,59	1,46
811	COMBINED FACILITIES SUPPORT ACTIVITIES	816,90	67	1,42	1,38	1,34	1,53	1,38
812	CLEANING ACTIVITIES	21.204,51	2057	1,13	1,14	1,15	1,15	1,14
813	LANDSCAPE CARE AND MAINTENANCE SERVICE ACTIVITIES	1.067,13	407	2,74	1,90	1,43	1,17	1,13
821	OFFICE ADMINISTRATIVE AND SUPPORT ACTIVITIES	794,15	358	1,32	1,31	1,22	1,18	1,11
822	ACTIVITIES OF CALL CENTERS	6.905,16	172	1,31	1,17	1,32	1,39	1,36
823	ORGANIZATION OF CONVENTIONS AND TRADE SHOWS	376,25	182	1,41	1,39	1,39	1,20	1,15
829	BUSINESS SUPPORT SERVICE ACTIVITIES N.E.C.	5.992,60	2428	1,02	1,03	1,03	1,02	1,02
851	PRE-PRIMARY EDUCATION	1.913,28	393	1,42	1,40	1,35	1,28	1,18
852	PRIMARY EDUCATION	285,36	19	3,98	3,05	2,18	1,05	1,36
853	SECONDARY EDUCATION	2.157,42	164	1,72	1,39	1,19	1,26	1,22
854	HIGHER EDUCATION	138,21	29	0,72	1,60	1,44	1,66	1,08
855	OTHER EDUCATION	2.792,55	1265	1,00	1,01	1,01	1,00	0,99
856	EDUCATIONAL SUPPORT ACTIVITIES	196,86	76	1,34	1,26	1,09	1,12	1,13
861	HOSPITAL ACTIVITIES	5.966,38	146	1,85	1,68	1,35	1,23	1,19
862	MEDICAL AND DENTAL PRACTICE ACTIVITIES	20.891,34	13101	1,06	1,05	1,03	1,03	1,02
869	OTHER HUMAN HEALTH ACTIVITIES	12.710,11	4506	1,06	1,04	1,02	1,02	1,03
871	RESIDENTIAL NURSING CARE FACILITIES	1.097,40	163	1,45	1,26	1,10	1,11	1,05
872	RESIDENTIAL CARE ACTIVITIES FOR MENTAL RETARDATION, MENTAL HEALTH AND SUBSTANCE ABUSE	868,50	85	5,35	4,03	2,75	2,50	2,06
873	RESIDENTIAL CARE ACTIVITIES FOR THE ELDERLY AND DISABLED	4.130,85	540	1,42	1,25	1,23	1,10	1,07
879	OTHER RESIDENTIAL CARE ACTIVITIES	2.577,58	329	2,70	2,72	1,86	1,80	1,52

881	SOCIAL WORK ACTIVITIES WITHOUT ACCOMODATION FOR THE ELDERLY AND DISABLED	4.870,71	375	1,14	1,33	1,19	1,03	1,04
889	OTHER SOCIAL WORK ACTIVITIES WITHOUT ACCOMODATION	2.199,38	354	1,55	1,58	1,41	1,34	1,27
900	CREATIVE, ARTS AND ENTERTAINMENT ACTIVITIES	1.418,45	836	1,15	1,17	1,10	1,13	1,09
910	LIBRARIES, ARCHIVES, MUSEUMS AND OTHER CULTURAL ACTIVITIES	1.477,53	65	1,18	1,35	1,26	1,18	1,13
920	GAMBLING AND BETTING ACTIVITIES	2.076,70	590	1,13	1,08	1,06	1,05	1,06
931	SPORTS ACTIVITIES	1.544,78	572	1,27	1,12	1,08	1,07	1,04
932	OTHER AMUSEMENT AND RECREATION ACTIVITIES	2.936,83	1411	1,28	1,18	1,12	1,07	1,03
951	REPAIR OF COMPUTERS AND COMMUNICATION EQUIPMENT	823,18	429	1,15	1,11	1,08	1,04	1,02
952	REPAIR OF PERSONAL AND HOUSEHOLD GOODS	1.759,48	1209	1,10	1,09	1,10	1,07	1,06
960	OTHER PERSONAL SERVICE ACTIVITIES	21.167,61	10557	1,04	1,04	1,03	1,02	1,02
	TOTAL	**813.789,84**	**293.213**					

Table 151 - *Agglomeration results by industry and distance range. Sardinia, 2007.* ***Source:*** *Compiled by the authors*

Industry code	Industry description	Employees	Plants	M (5 minutes)	M (10 minutes)	M (15 minutes)	M (20 minutes)	M (30 minutes)
012	GROWING OF PERENNIAL CROPS	-	-	-	-	-	-	-
013	PLANT PROPAGATION	-	-	-	-	-	-	-
014	ANIMAL PRODUCTION	-	-	-	-	-	-	-
016	SUPPORT ACTIVITIES TO AGRICULTURE AND POST-HARVEST CROP ACTIVITIES	6,00	4	0,00	0,00	0,00	0,00	0,00
022	LOGGING	2,00	2	0,00	0,00	0,00	0,00	0,00
031	FISHING	-	-	-	-	-	-	-
051	MINING OF HARD COAL	521,00	2	358,34	59,74	24,84	22,06	17,64
061	EXTRACTION OF CRUDE PETROLEUM	-	-	-	-	-	-	-
062	EXTRACTION OF NATURAL GAS	41,88	2	0,00	0,00	0,00	0,00	3,27
071	MINING OF IRON ORES	15,00	1	-	-	-	-	-
072	MINING OF NON-FERROUS METAL ORES	74,84	3	165,37	165,37	7,15	1,46	1,15
081	QUARRYING OF STONE, SAND AND CLAY	1.464,57	247	5,58	5,28	3,68	3,29	2,16
089	MINING AND QUARRYING N.E.C.	370,50	42	17,24	6,11	7,69	2,41	2,19
091	SUPPORT ACTIVITIES FOR PETROLEUM AND NATURAL GAS EXTRACTION	-	-	-	-	-	-	-
099	SUPPORT ACTIVITIES FOR OTHER MINING AND QUARRYING	-	-	-	-	-	-	-
101	PROCESSING AND PRESERVING OF MEAT	709,92	92	3,69	2,40	2,23	1,80	1,92
102	PROCESSING AND PRESERVING OF FISH, CRUSTACEANS AND MOLLUSCS	332,12	32	1,25	1,29	1,17	0,86	0,74
103	PROCESSING AND PRESERVING OF FRUIT AND VEGETABLES	573,58	60	6,95	5,33	2,86	2,80	2,31
104	MANUFACTURE OF VEGETABLE AND ANIMAL OILS AND FATS	195,63	96	4,12	3,26	2,83	2,20	1,83
105	MANUFACTURE OF DAIRY PRODUCTS	2020,45	177	3,23	3,00	3,47	2,36	1,81
106	MANUFACTURE OF GRAIN MILL PRODUCTS, STARCHES AND STARCH PRODUCTS	199,68	49	1,78	1,72	1,36	1,66	1,86
107	MANUFACTURE OF BAKERY PRODUCTS	6.020,76	1.772	1,63	1,58	1,48	1,40	1,29
108	MANUFACTURE OF OTHER FOOD PRODUCTS	646,54	196	5,15	2,77	2,17	2,06	1,46
109	MANUFACTURE OF PREPARED ANIMAL FEEDS	277,21	35	4,62	2,60	2,40	2,44	2,27
110	MANUFACURE OF BEVERAGES	905,11	110	1,88	1,58	1,45	1,14	1,04
120	MANUFACTURE OF TOBACCO PRODUCTS	-	-	-	-	-	-	-
131	SPINNING, WEAVING AND FINISHING OF TEXTILES	219,73	25	10,02	7,39	4,09	5,83	2,32
132	WEAVING OF TEXTILES	764,59	37	6,99	5,62	2,99	3,95	3,16
133	FINISHING OF TEXTILES	3,92	4	0,81	0,70	0,56	0,46	0,41
139	MANUFACTURE OF OTHER TEXTILES	420,73	203	3,65	3,58	2,80	2,03	1,41
141	MANUFACTURE OF WEARING APPAREL, EXCEPT FUR APPAREL	600,6	240	1,26	1,26	1,22	1,10	1,04
142	MANUFACTURE OF ARTICLES OF FUR	12,75	5	3,28	2,82	2,27	1,88	1,67
143	MANUFACTURE OF KNITTED AND CROCHETED APPAREL	303,38	17	41,53	10,78	8,23	5,85	3,40

151	TANNING AND DRESSING OF LEATHER; MANUFACTURE OF LUGGAGE; HANDBAGS; SADDLERY AND HARNESS; DRESSING AND DYEING OF FUR	85,68	45	4,68	4,02	3,26	2,22	1,80
152	MANUFACTURE OF FOOTWEAR	72,23	20	0,76	0,68	0,89	0,81	0,84
161	SAWMILLING AND PLANING OF WOOD	378,35	162	2,67	2,62	2,14	1,68	1,48
162	MANUFACTURE OF PRODUCTS OF WOOD, CORK, STRAW AND PLAITING MATERIALS	4974,95	1.469	3,03	2,62	2,56	2,42	2,11
171	MANUFACTURE OF PULP, PAPER AND PAPERBOARD	147,33	10	2,01	1,14	1,07	0,80	0,70
172	MANUFACTURE OF CORRUGATED PAPER AND PAPERBOARD AND OF CONTAINERS OF PAPER AND PAPERBOARD	306,41	33	3,04	2,66	2,37	1,33	1,14
181	PRINTING AND SERVICE ACTIVITIES RELATED TO PRINTING	1099,26	395	1,13	1,09	1,10	1,11	1,11
182	REPRODUCTION OF RECORDED MEDIA	13,33	10	0,67	1,40	1,30	1,81	1,71
191	MANUFACTURE OF COKE OVEN PRODUCTS	1	1	-	-	-	-	-
192	MANUFACTURE OF REFINED PETROLEUM PRODUCTS	1412,37	27	6,54	4,22	4,31	2,80	0,78
201	MANUFACTURE OF BASIC CHEMICALS, FERTILIZERS AND NITROGEN COMPOUNDS, PLASTICS AND SYNTHETIC RUBBER IN PRIMARY FORMS	2059,97	48	6,51	5,27	5,37	2,24	1,18
202	MANUFACTURE OF PESTICIDES AND OTHER AGROCHEMICAL PRODUCTS	17,42	2	0,00	0,00	0,00	0,00	0,00
203	MANUFACTURE OF PAINTS, VARNISHES AND SIMILAR COATINGS, PRINTING INK AND MASTICS	162,4	35	0,86	0,75	0,92	0,92	0,97
204	MANUFACTURE OF SOAP AND DETERGENTS, CLEANING AND POLISHING PREPARATIONS, PERFUMES AND TOILET PREPARATIONS	9,33	7	6,13	4,04	1,40	0,93	0,81
205	MANUFACTURE OF OTHER CHEMICAL PRODUCTS N.E.C.	93,1	19	8,77	5,31	1,26	0,92	0,62
206	MANUFACTURE OF MAN-MADE FIBRES	154	2	263,24	263,24	119,76	101,39	16,54
211	MANUFACTURE OF PHARMACEUTICALS	-	-	-	-	-	-	-
212	MANUFACTURE OF MEDICINAL CHEMICAL AND BOTANICAL PRODUCTS	53,02	16	11,00	4,24	4,48	4,12	2,89
221	MANUFACTURE OF RUBBER PRODUCTS	226,91	20	1,60	1,19	1,05	0,95	0,83
222	MANUFACTURE OF PLASTICS PRODUCTS	858,35	146	2,87	1,96	1,72	1,23	1,21
231	MANUFACTURE OF GLASS AND GLASS PRODUCTS	400,97	133	1,38	1,35	1,10	0,99	0,99
232	MANUFACTURE OF REFRACTORY PRODUCTS	214,53	7	28,15	14,74	6,55	1,75	1,97
233	MANUFACTURE OF CLAY BUILDING MATERIALS	397,33	18	2,10	2,07	3,24	1,24	1,22
234	MANUFACTURE OF OTHER PORCELAIN AND CERAMIC PRODUCTS	226,23	136	1,60	1,68	1,66	1,37	1,18
235	MANUFACTURE OF CEMENT, LIME AND PLASTER	296,64	10	47,24	12,11	3,65	1,75	0,78
236	MANUFACTURE OF ARTICLES OF CONCRETE, CEMENT AND PLASTER	2382,44	343	2,04	1,52	1,21	1,22	1,16
237	CUTTING, SHAPING AND FINISHING OF STONE	1909,34	544	2,23	2,07	1,86	1,73	1,61
239	MANUFACTURE OF OTHER NON-METALLIC MINERAL PRODUCTS N.E.C.	255,55	29	3,46	1,81	1,02	0,94	1,35
241	MANUFACTURE OF BASIC IRON AND STEEL	12,33	4	0,00	1,11	0,90	0,80	0,73
242	MANUFACTURE OF TUBES, PIPES AND HOLLOW PROFILES AND OF TUBE OR PIPE FITTINGS OF CAST-IRON	80,08	3	68,21	52,01	52,01	34,19	24,75

243	CASTING OF SEMI-FINISHED STEEL PRODUCTS	163,8	35	1,73	1,34	1,36	1,83	1,37
244	MANUFACTURE OF BASIC PRECIOUS AND OTHER NON-FERROUS METALS; REPROCESSING OF NUCLEAR FUELS	1794,96	21	19,78	19,77	15,39	4,55	6,61
245	CASTING OF IRON AND STEEL	15,67	3	0,00	0,00	0,00	0,00	0,00
251	MANUFACTURE OF STRUCTURAL METAL PRODUCTS	4851,63	1.187	1,24	1,21	1,16	1,13	1,13
252	MANUFACTURE OF TANKS, RESERVOIRS AND CONTAINERS OF METAL	21,08	6	7,06	7,06	3,19	1,31	1,13
253	MANUFACTURE OF STEAM GENERATORS, EXCEPT CENTRAL HEATING HOT WATER BOILERS	1	1	-	-	-	-	-
254	MANUFACTURE OF WEAPONS AND AMMUNITION	54,42	1	-	-	-	-	-
255	FORGING, PRESSING, STAMPING AND ROLL-FORMING OF METAL; POWDER METALLURGY	61,49	5	0,00	0,00	0,00	0,00	0,00
256	TREATMENT AND COATING OF METALS; MACHINING	1936,36	189	1,86	1,71	1,57	1,29	1,20
257	MANUFACTURE OF CUTLERY, HAND TOOLS AND GENERAL HARDWARE	58,58	38	50,48	48,47	9,93	7,92	5,40
259	MANUFACTURE OF OTHER FABRICATED METAL PRODUCTS N.E.C.	1028,06	225	1,56	1,30	1,31	1,06	0,98
261	MANUFACTURE OF ELECTRONIC COMPONENTS AND BOARDS	7,67	4	0,00	0,42	2,20	1,95	1,72
262	MANUFACTURE OF COMPUTERS AND PERIPHERAL EQUIPMENT	124,29	53	1,86	1,56	1,52	1,43	1,27
263	MANUFACTURE OF COMMUNICATION EQUIPMENT	128,65	17	0,39	0,48	1,01	0,96	0,99
264	MANUFACTURE OF CONSUMER ELECTRONICS	22,99	3	1,14	1,11	1,02	0,83	0,68
265	MANUFACTURE OF MEASURING, TESTING, NAVIGATING AND CONTROL EQUIPMENT; WATCHES AND CLOCKS	12,93	6	1,66	0,87	0,39	0,10	0,08
266	MANUFACTURE OF IRRADIATION, ELECTROMEDICAL AND ELECTROTHERAPEUTIC EQUIPMENT	148,5	8	0,05	0,04	0,03	0,03	0,09
267	MANUFACTURE OF OPTICAL INSTRUMENTS AND PHOTOGRAPHIC EQUIPMENT	2,64	2	0,00	0,00	0,00	0,00	0,00
268	MANUFACTURE OF MAGNETIC AND OPTICAL MEDIA	2	2	0,00	0,00	0,00	0,00	0,00
271	MANUFACTURE OF ELECTRIC MOTORS, GENERATORS, TRANSFORMERS AND ELECTRICITY DISTRIBUTION AND CONTROL APPARATUS	137,18	13	2,54	2,22	1,75	1,86	1,38
272	MANUFACTURE OF BATTERIES AND ACCUMULATORS	-	-	-	-	-	-	-
273	MANUFACTURE OF WIRING AND WIRING DEVICES	19,58	3	23,33	7,03	3,11	0,79	0,70
274	MANUFACTURE OF ELECTRIC LIGHTING EQUIPMENT	27,64	19	1,13	1,29	1,23	1,16	1,24
275	MANUFACTURE OF DOMESTIC APPLIANCES	9,02	3	14,13	7,42	3,30	0,88	0,69
279	MANUFACTURE OF OTHER ELECTRICAL EQUIPMENT	201,74	19	1,52	0,41	0,33	0,29	1,42
281	MANUFACTURE OF GENERAL-PURPOSE MACHINERY	264,26	21	1,35	1,39	1,29	1,17	1,24
282	MANUFACTURE OF OTHER GENERAL-PURPOSE MACHINERY	792,27	68	3,46	3,12	2,99	1,75	0,92
283	MANUFACTURE OF AGRICULTURAL AND FORESTRY MACHINERY	106,13	21	17,81	14,09	3,03	1,95	1,47
284	MANUFACTURE OF METAL-FORMING MACHINERY AND MACHINE TOOLS	68,25	9	108,83	42,56	40,61	36,94	28,77
289	MANUFACTURE OF OTHER SPECIAL-PURPOSE MACHINERY	169,26	44	1,89	1,39	1,37	0,95	1,06
291	MANUFACTURE OF MOTOR VEHICLES	1,34	1	-	-	-	-	-

292	MANUFACTURE OF BODIES (COACHWORK) FOR MOTOR VEHICLES; MANUFACTURE OF TRAILERS AND SEMI-TRAILERS	39,89	9	0,00	1,23	1,14	0,83	0,99
293	MANUFACTURE OF PARTS AND ACCESSORIES FOR MOTOR VEHICLES	31,66	7	0,00	0,00	6,51	4,11	1,68
301	BUILDING OF SHIPS AND BOATS	287,38	78	3,25	2,90	2,86	2,18	1,81
302	MANUFACTURE OF RAILWAY LOCOMOTIVES AND ROLLING STOCKS	324,42	3	0,00	0,00	0,00	0,00	0,00
303	MANUFACTURE OF AIR AND SPACECRAFT AND RELATED MACHINERY	9	1	-	-	-	-	-
304	MANUFACTURE OF MILITARY FIGHTING VEHICLES	-	-	-	-	-	-	-
309	MANUFACTURE OF TRANSPORT EQUIPMENT N.E.C.	7,75	4	15,43	12,85	10,49	10,49	4,27
310	MANUFACTURE OF FURNITURE	677,13	280	2,11	1,47	1,31	1,13	1,13
321	MANUFACTURE OF JEWELLERY, BIJOUTERIE AND RELATED ARTICLES	400,31	257	1,51	1,47	1,42	1,29	1,15
322	MANUFACTURE OF MUSICAL INSTRUMENTS	5,83	6	1,06	0,99	0,88	0,72	0,60
323	MANUFACTURE OF SPORTS GOODS	22,83	13	3,16	3,21	2,80	2,43	1,20
324	MANUFACTURE OF GAMES AND TOYS	53,56	16	0,38	2,68	2,68	2,58	1,94
325	MANUFACTURE OF MEDICAL AND DENTAL INSTRUMENTS AND SUPPLIES	692,87	325	1,21	1,21	1,13	1,08	1,07
329	OTHER MANUFACTURING N.E.C.	113,08	49	2,09	1,38	1,15	1,04	1,01
331	REPAIR OF FABRICATED METAL PRODUCTS, MACHINERY AND EQUIPMENT	3396,6	766	1,15	1,10	1,07	1,12	1,05
332	INSTALLATION OF INDUSTRIAL MACHINERY AND EQUIPMENT	593,36	150	1,19	1,29	1,20	1,28	1,16
351	ELECTRIC POWER GENERATION, TRANSMISSION AND DISTRIBUTION	2493,53	96	0,95	0,85	0,73	0,85	1,02
352	MANUFACTURE OF GAS; DISTRIBUTION OF GASEOUS FUELS THROUGH MAINS	116,83	17	1,02	0,90	0,87	1,11	1,13
353	STEAM AND AIR CONDITIONING SUPPLY	60,04	3	0,00	0,00	0,00	0,00	0,00
360	WATER COLLECTION, TREATMENT AND SUPPLY	1706,91	57	1,70	0,74	0,69	0,84	0,98
370	SEWERAGE	262	59	2,40	2,10	1,69	0,94	0,89
381	WASTE COLLECTION	2927,22	133	1,00	0,97	1,00	0,95	1,00
382	WASTE TREATMENT AND DISPOSAL	382,81	58	1,95	1,97	2,10	1,20	1,29
383	MATERIALS RECOVERY	612,92	115	1,45	1,53	1,53	1,07	1,06
390	REMEDIATION ACTIVITIES AND OTHER WASTE MANAGEMENT SERVICES	74,56	15	1,02	0,52	0,57	1,30	1,51
411	PROJECT MANAGEMENT ACTIVITIES RELATED TO CONSTRUCTION	316,88	99	1,50	1,52	1,51	2,25	2,25
412	CONSTRUCTION OF BUILDINGS	30526,34	8.745	1,34	1,27	1,20	1,13	1,07
421	CONSTRUCTION OF ROADS AND RAILWAYS	1408,75	172	2,06	2,04	1,60	1,49	1,22
422	CONSTRUCTION OF UTILITY PROJECTS	962,52	57	1,40	1,17	1,33	1,25	1,28
429	CONSTRUCTION OF OTHER CIVIL ENGINGEERING PROJECTS	951,51	169	1,17	1,11	1,11	1,06	1,04
431	DEMOLITION AND SITE PREPARATION	1915,69	688	1,43	1,38	1,30	1,18	1,11
432	ELECTRICAL, PLUMBING AND OTHER CONSTRUCTION INSTALLATION ACTIVITIES	11800,81	3.578	1,01	1,00	1,00	1,00	1,00
433	BUILDING COMPLETION AND FINISHING	9416,55	3.875	1,47	1,30	1,24	1,09	1,06
439	OTHER SPECIALIZED CONSTRUCTION ACTIVITIES	1135,02	339	1,54	1,40	1,21	1,13	1,07

451	SALE OF MOTOR VEHICLES	2673,55	467	1,29	1,24	1,20	1,14	1,07
452	MAINTENANCE AND REPAIR OF MOTOR VEHICLES	6450,95	2.806	1,10	1,09	1,07	1,04	1,05
453	SALE OF MOTOR VEHICLE PARTS AND ACCESSORIES	515,89	154	1,10	1,05	1,07	1,01	1,01
454	SALE, MAINTENANCE AND REPAIR OF MOTORCYCLES AND RELATED PARTS AND ACCESSORIES	470,4	182	1,23	1,23	1,06	1,07	1,04
461	WHOLESALE ON A FEE OR CONTRACT BASIS	6579,16	5.326	1,31	1,30	1,23	1,16	1,14
462	WHOLESALE OF AGRICULTURAL RAW MATERIALS AND LIVE ANIMALS	523,99	166	3,15	2,28	1,80	1,54	1,39
463	WHOLESALE OF FOOD, BEVERAGES AND TOBACCO	4627,6	1.268	1,30	1,23	1,17	1,05	1,07
464	WHOLESALE OF HOUSEHOLD GOODS	3221,15	970	1,41	1,35	1,38	1,31	1,23
465	WHOLESALE OF MACHINERY, EQUIPMENT AND SUPPLIES	691,86	266	1,32	1,33	1,24	1,18	1,11
466	WHOLESALE OF OTHER MACHINERY AND EQUIPMENT	1111,92	332	1,29	1,23	1,24	1,26	1,19
467	OTHER SPECIALIZED WHOLESALE	3643,79	826	1,17	1,13	1,12	1,09	1,05
469	NON-SPECIALIZED WHOLESALE TRADE	701,82	197	1,73	1,50	1,38	1,22	1,19
471	RETAIL SALE IN NON-SPECIALIZED STORES	17037,96	3.476	1,05	1,05	1,05	1,03	1,02
472	RETAIL SALE OF FOOD, BEVERAGES AND TOBACCO IN SPECIALIZED STORES	6521,06	3.927	1,18	1,16	1,12	1,07	1,05
473	RETAIL SALE OF AUTOMOTIVE FUEL IN SPECIALIZED STORES	2128,08	810	1,06	1,06	1,10	1,07	1,06
474	RETAIL SALE OF INFORMATION AND COMMUNICATIONS EQUIPMENT IN SPECIALIZED STORES	697,74	289	1,21	1,21	1,14	1,14	1,07
475	RETAIL SALE OF OTHER HOUSEHOLD EQUIPMENT IN SPECIALIZED STORES	8545,66	3.491	1,13	1,12	1,10	1,07	1,06
476	RETAIL SALE OF CULTURAL AND RECREATION GOODS IN SPECIALIZED STORES	2882,16	1.580	1,06	1,06	1,05	1,03	1,03
477	RETAIL SALE OF OTHER GOODS IN SPECIALIZED STORES	16044,25	7.524	1,05	1,04	1,02	1,01	1,00
478	RETAIL SALE VIA STALLS AND MARKETS	2903,28	2.524	2,05	1,77	1,45	1,33	1,14
479	RETAIL TRADE NOT IN STORES, STALLS OR MARKETS	450,53	198	1,15	1,25	1,13	1,10	1,10
491	PASSENGER RAIL TRANSPORT, INTERURBAN	2007	88	0,56	1,56	2,25	2,44	1,82
492	FREIGHT RAIL TRANSPORT	-	-	-	-	-	-	-
493	OTHER PASSENGER LAND TRANSPORT	3886,69	672	0,85	0,87	0,85	0,92	0,94
494	FREIGHT TRANSPORT BY ROAD	8007,4	2.642	1,34	1,26	1,19	1,11	1,09
495	TRANSPORT VIA PIPELINE	-	-	-	-	-	-	-
501	SEA AND COASTAL WATER TRANSPORT	516,28	100	7,54	7,93	6,41	4,28	4,04
502	INLAND WATER TRANSPORT	93,5	12	1,75	1,52	1,24	1,04	0,93
503	INLAND PASSENGER WATER TRANSPORT	24,41	7	1,05	0,90	0,73	0,60	1,28
504	INLAND FREIGHT WATER TRANSPORT	-	-	-	-	-	-	-
511	PASSENGER AIR TRANSPORT	1183,5	7	2,75	2,75	2,72	2,05	1,87
512	FREIGHT AIR TRANSPORT	-	-	-	-	-	-	-
521	WAREHOUSING AND STORAGE	479,4	57	3,10	1,71	1,17	0,95	1,07
522	SUPPORT ACTIVITIES FOR TRANSPORTATION	5209,27	574	1,22	1,10	1,13	1,06	1,07

531	POSTAL ACTIVITIES	4057,42	425	0,47	0,83	1,00	1,06	1,06
532	COURIER ACTIVITIES	190,13	70	1,68	1,81	1,70	1,62	1,45
551	HOTELS	8476,83	835	2,94	2,62	2,68	2,51	2,18
552	OTHER SHORT TERM ACCOMODATION ACTIVITIES	2098,36	414	3,02	2,80	2,76	2,84	2,64
553	CAMPING GROUNDS, RECREATIONAL VEHICLE PARKS AND TRAILER PARKS	676,97	102	11,94	8,33	6,44	5,84	3,62
559	OTHER ACCOMODATION	102,89	23	0,79	0,78	1,77	1,54	2,06
561	RESTAURANTS AND MOBILE FOOD SERVICE ACTIVITIES	11275,26	3.577	1,30	1,26	1,24	1,20	1,14
562	EVENT CATERING AND OTHER FOOD SERVICE ACTIVITIES	1695,02	240	1,02	1,13	1,15	1,11	1,01
563	BEVERAGE SERVING ACTIVITIES	10539,34	4.534	1,20	1,19	1,15	1,12	1,07
581	PUBLISHING OF BOOKS, PERIODICALS AND OTHER PUBLISHING ACTIVITIES	782,44	161	1,56	1,56	1,51	1,50	1,41
582	SOFTWARE PUBLISHING	19,03	7	0,97	2,02	2,46	2,03	1,80
591	MOTION PICTURE, VIDEO AND TELEVISION PROGRAMME ACTIVITIES	329,87	129	1,08	1,18	1,19	1,12	1,06
592	SOUND RECORDING AND MUSIC PUBLISHING ACTIVITIES	16,41	11	0,46	1,23	1,47	1,22	2,71
601	RADIO BROADCASTING	141,58	50	1,27	1,26	1,22	1,16	1,08
602	TELEVISION PROGRAMMING AND BROADCASTING ACTIVITIES	208,5	20	1,87	1,67	1,57	1,28	1,14
611	WIRED TELECOMMUNICATIONS ACTIVITIES	1816,5	58	0,99	0,85	0,75	0,87	0,84
612	WIRELESS TELECOMMUNICATIONS ACTIVITIES	580,31	7	2,91	3,85	3,12	2,68	2,42
613	SATELLITE TELECOMMUNICATIONS ACTIVITIES	-	-	-	-	-	-	-
619	OTHER TELECOMMUNICATIONS ACTIVITIES	160,72	45	0,82	0,89	1,33	1,39	1,20
620	COMPUTER PROGRAMMING, CONSULTANCY AND RELATED ACTIVITIES	2195,48	694	1,25	1,26	1,20	1,19	1,23
631	DATA PROCESSING, HOSTING AND RELATED ACTIVITIES; WEB PORTALS	2845,09	1.166	1,13	1,12	1,08	1,06	1,02
639	OTHER INFORMATION SERVICE ACTIVITIES	56,21	43	1,32	1,25	1,09	1,22	1,14
641	MONETARY INTERMEDIATION	6437,98	743	0,79	0,87	0,89	0,93	0,95
642	ACTIVITIES OF HOLDING COMPANIES	127,93	7	3,63	3,12	2,51	2,08	1,85
643	TRUSTS, FUNDS AND SIMILAR FINANCIAL ENTITIES	-	-	-	-	-	-	-
649	OTHER FINANCIAL SERVICE ACTIVITIES, EXCEPT INSURANCE AND PENSION FUNDING ACTIVITIES	400,5	76	2,22	2,04	1,73	1,56	1,35
651	INSURANCE	226,32	39	1,96	1,77	1,51	1,36	1,30
652	REINSURANCE	-	-	-	-	-	-	-
661	ACTIVITIES AUXILIARY TO FINANCIAL SERVICE ACTIVITIES, EXCEPT INSURANCE AND PENSION FUNDING	775,07	390	1,44	1,41	1,28	1,26	1,21
662	ACTIVITIES AUXILIARY TO INSURANCE AND PENSION FUNDING	1852,75	786	1,23	1,20	1,12	1,10	1,06
663	FUND MANAGEMENT ACTIVITIES	-	-	-	-	-	-	-
681	BUYING AND SELLING OF SELF-OWNED REAL ESTATE	527,4	286	2,11	1,79	1,81	1,79	1,64
682	RENTING AND OPERATING OF SELF-OWNED OR LEASED REAL ESTATE	1381,59	856	1,60	1,51	1,47	1,43	1,38
683	REAL ESTATE ACTIVITIES ON A FEE OR CONTRACT BASIS	1361,86	930	1,58	1,54	1,46	1,42	1,36

691	LEGAL ACTIVITIES	4070,39	3.003	1,86	1,72	1,49	1,35	1,23
692	ACCOUNTING, BOOKKEEPING AND AUDITING ACTIVITIES; TAX CONSULTANCY	4818,83	2.817	1,27	1,23	1,12	1,10	1,05
701	ACTIVITIES OF HEAD OFFICE	37,1	13	2,29	2,00	2,04	1,71	1,56
702	MANAGEMENT CONSULTANCY ACTIVITIES	1676,12	762	1,31	1,28	1,20	1,18	1,18
711	ARCHITECTURAL AND ENGINEERING ACTIVITIES AND RELATED TECHNICAL CONSULTANCY	8207,64	6.600	1,10	1,09	1,07	1,05	1,02
712	TECHNICAL TESTING AND ANALYSIS	443,36	166	1,42	1,34	1,29	1,25	1,12
721	RESEARCH AND EXPERIMENTAL DEVELOPMENT ON NATURAL SCIENCES AND ENGINEERING	327,33	228	1,80	1,49	1,40	1,23	1,28
722	RESEARCH AND EXPERIMENTAL DEVELOPMENT ON SOCIAL SCIENCES AND HUMANITIES	63,74	36	1,20	1,26	1,65	1,68	1,45
731	ADVERTISING	507	280	1,35	1,32	1,24	1,22	1,15
732	MARKET RESEARCH AND PUBLIC OPINION POLLING	458,32	104	1,77	1,67	1,44	1,58	1,51
741	SPECIALIZED DESIGN ACTIVITIES	379,82	280	1,06	1,14	1,06	1,05	1,06
742	PHOTOGRAPHIC ACTIVITIES	550,28	370	0,87	0,95	0,96	0,97	0,97
743	TRANSLATION AND INTERPRETATION ACTIVITIES	53,47	43	1,78	1,58	1,50	1,14	1,12
749	OTHER PROFESSIONAL, SCIENTIFIC AND TECHNICAL ACTIVITIES N.E.C.	2275,2	1.637	1,15	1,11	1,08	1,07	1,04
750	VETERINARY ACTIVITIES	467,91	416	1,09	1,18	1,16	1,17	1,12
771	RENTING AND LEASING OF MOTOR VEHICLES	344,01	139	2,09	2,01	1,89	1,96	1,89
772	RENTING AND LEASING OF PERSONAL AND HOUSEHOLD GOODS	347,89	198	1,24	1,24	1,28	1,19	1,18
773	RENTING AND LEASING OF OTHER MACHINERY, EQUIPMENT AND TANGIBLE GOODS	802,21	414	2,06	2,04	1,96	1,82	1,78
774	LEASING OF INTELLECTUAL PROPERTY AND SIMILAR PRODUCTS, EXCEPT COPYRIGHTED WORKS	-	-	-	-	-	-	-
781	ACTIVITES OF EMPLOYMENT PLACEMENT AGENCIES	15,58	8	3,54	3,85	3,11	2,61	2,34
782	TEMPORARY EMPLOYMENT AGENCY ACTIVITIES	2639,45	65	1,25	1,32	1,26	1,34	1,27
783	OTHER HUMAN RESOURCES PROVISION	-	-	-	-	-	-	-
791	TRAVEL AGENCY AND TOUR OPERATOR ACTIVITIES	1084,77	267	1,23	1,36	1,19	1,15	1,07
799	OTHER RESERVATION SERVICE AND RELATED ACTIVITIES	189	98	2,89	4,06	3,18	2,37	1,67
801	PRIVATE SECURITY ACTIVITIES	2871,87	94	1,24	1,24	1,18	1,16	1,11
802	SECURITY SYSTEMS SERVICE ACTIVITIES	9,82	1	-	-	-	-	-
803	INVESTIGATION ACTIVITIES	35,46	20	2,04	1,72	1,58	1,46	1,18
811	COMBINED FACILITIES SUPPORT ACTIVITIES	10,39	3	1,30	1,12	0,90	0,74	0,66
812	CLEANING ACTIVITIES	9116,06	1.070	1,02	1,03	1,00	1,03	1,03
813	LANDSCAPE CARE AND MAINTENANCE SERVICE ACTIVITIES	449,1	132	1,39	1,32	1,38	1,06	1,03
821	OFFICE ADMINISTRATIVE AND SUPPORT ACTIVITIES	337,57	180	1,41	1,35	1,17	1,22	1,19
822	ACTIVITIES OF CALL CENTERS	2226,41	113	2,23	1,52	2,47	2,21	2,27

823	ORGANIZATION OF CONVENTIONS AND TRADE SHOWS	270,47	95	2,37	2,09	1,96	1,55	1,37
829	BUSINESS SUPPORT SERVICE ACTIVITIES N.E.C.	3007,03	1.470	1,10	1,09	1,06	1,05	1,02
851	PRE-PRIMARY EDUCATION	520,57	93	1,51	1,46	1,43	1,30	1,15
852	PRIMARY EDUCATION	46,92	3	2,57	2,21	1,78	1,47	1,31
853	SECONDARY EDUCATION	118,7	25	1,98	1,46	1,15	0,74	0,77
854	HIGHER EDUCATION	1	1	-	-	-	-	-
855	OTHER EDUCATION	873,96	445	1,06	1,09	1,05	1,06	1,05
856	EDUCATIONAL SUPPORT ACTIVITIES	3,92	4	21,15	21,15	21,15	8,57	0,60
861	HOSPITAL ACTIVITIES	1462,8	33	2,10	1,27	1,00	1,31	1,28
862	MEDICAL AND DENTAL PRACTICE ACTIVITIES	6432,93	4.424	1,14	1,14	1,09	1,08	1,06
869	OTHER HUMAN HEALTH ACTIVITIES	2272,24	1.037	1,30	1,28	1,21	1,16	1,11
871	RESIDENTIAL NURSING CARE FACILITIES	725,27	68	7,79	4,19	3,35	1,60	1,36
872	RESIDENTIAL CARE ACTIVITIES FOR MENTAL RETARDATION, MENTAL HEALTH AND SUBSTANCE ABUSE	2,08	2	0,00	0,00	0,00	0,00	0,00
873	RESIDENTIAL CARE ACTIVITIES FOR THE ELDERLY AND DISABLED	1605,04	173	1,29	1,41	1,64	1,51	1,40
879	OTHER RESIDENTIAL CARE ACTIVITIES	205,97	18	1,93	1,98	1,60	0,93	0,63
881	SOCIAL WORK ACTIVITIES WITHOUT ACCOMODATION FOR THE ELDERLY AND DISABLED	3656,84	378	1,07	1,19	1,21	1,23	1,18
889	OTHER SOCIAL WORK ACTIVITIES WITHOUT ACCOMODATION	396,13	94	2,27	1,25	1,43	1,24	1,42
900	CREATIVE, ARTS AND ENTERTAINMENT ACTIVITIES	838,23	469	1,42	1,17	1,06	1,13	1,07
910	LIBRARIES, ARCHIVES, MUSEUMS AND OTHER CULTURAL ACTIVITIES	988,82	173	2,36	2,18	1,89	1,77	1,44
920	GAMBLING AND BETTING ACTIVITIES	182,31	58	1,39	1,11	1,01	1,01	0,98
931	SPORTS ACTIVITIES	568,56	257	1,19	1,10	1,00	1,00	0,97
932	OTHER AMUSEMENT AND RECREATION ACTIVITIES	1411,87	483	1,68	1,57	1,40	1,28	1,23
951	REPAIR OF COMPUTERS AND COMMUNICATION EQUIPMENT	559,11	279	1,27	1,30	1,27	1,19	1,11
952	REPAIR OF PERSONAL AND HOUSEHOLD GOODS	827,63	512	1,16	1,18	1,10	1,07	1,05
960	OTHER PERSONAL SERVICE ACTIVITIES	7812,31	3.845	1,03	1,01	1,02	1,03	1,00
	TOTAL	**371.227,11**	**121.063**					

Table 152 - *Agglomeration results by industry and distance range. Sardinia, 2012.* ***Source:*** *Compiled by the authors*

Industry code	Industry description	Employees	Plants	M (5 minutes)	M (10 minutes)	M (15 minutes)	M (20 minutes)	M (30 minutes)
012	GROWING OF PERENNIAL CROPS	-	-	-	-	-	-	-
013	PLANT PROPAGATION	-	-	-	-	-	-	-
014	ANIMAL PRODUCTION	-	-	-	-	-	-	-
016	SUPPORT ACTIVITIES TO AGRICULTURE AND POST-HARVEST CROP ACTIVITIES	-	-	-	-	-	-	-
022	LOGGING	-	-	-	-	-	-	-
031	FISHING	-	-	-	-	-	-	-
051	MINING OF HARD COAL	442,34	1	-	-	-	-	-
061	EXTRACTION OF CRUDE PETROLEUM	-	-	-	-	-	-	-
062	EXTRACTION OF NATURAL GAS	6,21	1	-	-	-	-	-
071	MINING OF IRON ORES	-	-	-	-	-	-	-
072	MINING OF NON-FERROUS METAL ORES	34,96	3	0,00	0,00	0,00	0,00	0,00
081	QUARRYING OF STONE, SAND AND CLAY	881,94	152	3,61	3,53	3,09	2,54	2,08
089	MINING AND QUARRYING N.E.C.	325,38	36	5,70	4,26	3,02	1,70	1,06
091	SUPPORT ACTIVITIES FOR PETROLEUM AND NATURAL GAS EXTRACTION	-	-	-	-	-	-	-
099	SUPPORT ACTIVITIES FOR OTHER MINING AND QUARRYING	12,95	1	-	-	-	-	-
101	PROCESSING AND PRESERVING OF MEAT	583,33	88	4,93	3,65	2,69	2,50	2,46
102	PROCESSING AND PRESERVING OF FISH, CRUSTACEANS AND MOLLUSCS	334,78	38	0,86	1,04	1,02	0,88	0,90
103	PROCESSING AND PRESERVING OF FRUIT AND VEGETABLES	162,44	31	3,93	2,74	3,12	3,54	2,19
104	MANUFACTURE OF VEGETABLE AND ANIMAL OILS AND FATS	192,27	96	4,34	3,58	2,32	2,02	1,54
105	MANUFACTURE OF DAIRY PRODUCTS	1.673,86	161	4,74	3,94	4,06	2,77	2,10
106	MANUFACTURE OF GRAIN MILL PRODUCTS, STARCHES AND STARCH PRODUCTS	168,36	30	0,85	1,21	1,18	1,09	1,60
107	MANUFACTURE OF BAKERY PRODUCTS	5.727,15	1491	1,69	1,69	1,58	1,49	1,31
108	MANUFACTURE OF OTHER FOOD PRODUCTS	555,77	158	7,01	4,15	2,78	2,75	1,78
109	MANUFACTURE OF PREPARED ANIMAL FEEDS	143,80	23	7,06	7,05	2,93	3,72	2,87
110	MANUFACURE OF BEVERAGES	1.005,09	111	1,51	1,53	1,25	1,17	0,97
120	MANUFACTURE OF TOBACCO PRODUCTS	-	-	-	-	-	-	-
131	SPINNING, WEAVING AND FINISHING OF TEXTILES	73,40	12	15,05	7,14	1,67	8,20	2,62
132	WEAVING OF TEXTILES	248,12	30	18,12	17,63	9,03	6,60	3,89
133	FINISHING OF TEXTILES	10,40	10	26,13	26,13	29,00	23,27	8,40
139	MANUFACTURE OF OTHER TEXTILES	305,48	146	1,81	1,66	1,42	1,27	1,31
141	MANUFACTURE OF WEARING APPAREL, EXCEPT FUR APPAREL	492,25	164	1,44	1,42	1,26	1,15	1,05
142	MANUFACTURE OF ARTICLES OF FUR	6,48	3	0,00	0,00	0,00	0,00	1,13
143	MANUFACTURE OF KNITTED AND CROCHETED APPAREL	185,44	13	6,51	22,98	20,05	12,12	7,27
151	TANNING AND DRESSING OF LEATHER; MANUFACTURE OF LUGGAGE; HANDBAGS;	37,46	27	9,03	7,41	6,19	3,96	2,91

	SADDLERY AND HARNESS; DRESSING AND DYEING OF FUR							
152	MANUFACTURE OF FOOTWEAR	56,61	23	1,75	1,75	1,73	0,69	1,17
161	SAWMILLING AND PLANING OF WOOD	187,19	87	1,36	1,31	1,34	1,26	1,16
162	MANUFACTURE OF PRODUCTS OF WOOD, CORK, STRAW AND PLAITING MATERIALS	3.431,71	1088	3,79	3,25	3,17	2,97	2,57
171	MANUFACTURE OF PULP, PAPER AND PAPERBOARD	103,24	7	3,04	1,48	1,13	0,65	0,55
172	MANUFACTURE OF CORRUGATED PAPER AND PAPERBOARD AND OF CONTAINERS OF PAPER AND PAPERBOARD	262,69	27	2,52	2,29	1,62	0,93	0,77
181	PRINTING AND SERVICE ACTIVITIES RELATED TO PRINTING	864,41	325	1,14	1,14	1,11	1,17	1,16
182	REPRODUCTION OF RECORDED MEDIA	9,09	9	1,21	1,17	1,07	1,95	1,68
191	MANUFACTURE OF COKE OVEN PRODUCTS	1,00	1	-	-	-	-	-
192	MANUFACTURE OF REFINED PETROLEUM PRODUCTS	1.448,77	31	13,86	9,42	9,30	5,93	1,05
201	MANUFACTURE OF BASIC CHEMICALS, FERTILIZERS AND NITROGEN COMPOUNDS, PLASTICS AND SYNTHETIC RUBBER IN PRIMARY FORMS	1.288,52	34	6,40	5,49	5,61	1,81	1,17
202	MANUFACTURE OF PESTICIDES AND OTHER AGROCHEMICAL PRODUCTS	12,58	2	0,00	0,00	0,00	0,00	0,00
203	MANUFACTURE OF PAINTS, VARNISHES AND SIMILAR COATINGS, PRINTING INK AND MASTICS	105,45	23	0,16	0,36	0,66	0,73	0,85
204	MANUFACTURE OF SOAP AND DETERGENTS, CLEANING AND POLISHING PREPARATIONS, PERFUMES AND TOILET PREPARATIONS	47,82	13	0,19	0,25	0,05	0,07	3,04
205	MANUFACTURE OF OTHER CHEMICAL PRODUCTS N.E.C.	88,99	17	10,41	5,71	1,22	0,85	0,90
206	MANUFACTURE OF MAN-MADE FIBRES	-	0	-	-	-	-	-
211	MANUFACTURE OF PHARMACEUTICALS	-	0	-	-	-	-	-
212	MANUFACTURE OF MEDICINAL CHEMICAL AND BOTANICAL PRODUCTS	2,00	3	0,00	0,00	0,00	0,00	0,00
221	MANUFACTURE OF RUBBER PRODUCTS	262,57	24	1,83	0,94	0,73	1,63	1,15
222	MANUFACTURE OF PLASTICS PRODUCTS	589,30	115	2,04	1,50	1,57	1,26	1,17
231	MANUFACTURE OF GLASS AND GLASS PRODUCTS	300,49	100	1,27	1,28	1,10	1,01	1,03
232	MANUFACTURE OF REFRACTORY PRODUCTS	203,76	5	25,60	12,24	5,65	1,67	1,31
233	MANUFACTURE OF CLAY BUILDING MATERIALS	401,46	23	5,18	3,01	2,62	1,13	1,25
234	MANUFACTURE OF OTHER PORCELAIN AND CERAMIC PRODUCTS	127,38	88	2,51	1,84	1,74	1,32	1,27
235	MANUFACTURE OF CEMENT, LIME AND PLASTER	222,23	10	78,74	18,99	4,78	2,57	0,63
236	MANUFACTURE OF ARTICLES OF CONCRETE, CEMENT AND PLASTER	1.346,57	228	1,47	1,41	1,14	1,18	1,15
237	CUTTING, SHAPING AND FINISHING OF STONE	1.371,12	453	1,92	1,94	1,77	1,59	1,58
239	MANUFACTURE OF OTHER NON-METALLIC MINERAL PRODUCTS N.E.C.	67,87	23	7,38	2,35	0,28	0,27	1,25
241	MANUFACTURE OF BASIC IRON AND STEEL	14,76	5	12,36	9,64	9,64	6,40	4,51
242	MANUFACTURE OF TUBES, PIPES AND HOLLOW PROFILES AND OF TUBE OR PIPE FITTINGS OF CAST-IRON	75,10	4	53,51	41,68	41,68	27,67	19,48
243	CASTING OF SEMI-FINISHED STEEL PRODUCTS	70,05	20	1,74	1,17	0,91	1,07	1,06
244	MANUFACTURE OF BASIC PRECIOUS AND OTHER NON-FERROUS METALS; REPROCESSING OF NUCLEAR FUELS	1.403,26	24	11,42	11,41	8,45	2,30	4,71

245	CASTING OF IRON AND STEEL	6,75	2	5,77	4,92	3,81	3,15	2,81
251	MANUFACTURE OF STRUCTURAL METAL PRODUCTS	4.316,41	1072	1,24	1,19	1,10	1,06	1,09
252	MANUFACTURE OF TANKS, RESERVOIRS AND CONTAINERS OF METAL	29,21	6	201,05	35,16	35,16	30,50	27,76
253	MANUFACTURE OF STEAM GENERATORS, EXCEPT CENTRAL HEATING HOT WATER BOILERS	2,39	1	-	-	-	-	-
254	MANUFACTURE OF WEAPONS AND AMMUNITION	63,30	1	-	-	-	-	-
255	FORGING, PRESSING, STAMPING AND ROLL-FORMING OF METAL; POWDER METALLURGY	39,28	3	0,00	0,00	0,00	1,57	1,39
256	TREATMENT AND COATING OF METALS; MACHINING	1.158,17	96	4,99	4,67	2,92	1,49	1,28
257	MANUFACTURE OF CUTLERY, HAND TOOLS AND GENERAL HARDWARE	53,55	34	36,22	35,13	5,64	4,35	3,31
259	MANUFACTURE OF OTHER FABRICATED METAL PRODUCTS N.E.C.	675,64	181	1,43	1,36	1,31	1,23	1,13
261	MANUFACTURE OF ELECTRONIC COMPONENTS AND BOARDS	10,25	4	0,00	0,00	0,00	1,46	1,30
262	MANUFACTURE OF COMPUTERS AND PERIPHERAL EQUIPMENT	47,70	25	2,57	2,49	2,28	1,94	1,71
263	MANUFACTURE OF COMMUNICATION EQUIPMENT	61,08	10	0,55	0,54	0,82	1,05	1,04
264	MANUFACTURE OF CONSUMER ELECTRONICS	-	0	-	-	-	-	-
265	MANUFACTURE OF MEASURING, TESTING, NAVIGATING AND CONTROL EQUIPMENT; WATCHES AND CLOCKS	7,00	3	0,00	0,00	0,00	0,00	0,00
266	MANUFACTURE OF IRRADIATION, ELECTROMEDICAL AND ELECTROTHERAPEUTIC EQUIPMENT	188,95	9	0,30	0,30	0,21	0,18	0,18
267	MANUFACTURE OF OPTICAL INSTRUMENTS AND PHOTOGRAPHIC EQUIPMENT	4,86	2	0,00	0,00	0,00	0,00	6,24
268	MANUFACTURE OF MAGNETIC AND OPTICAL MEDIA	3,74	2	0,00	0,00	0,00	0,00	0,00
271	MANUFACTURE OF ELECTRIC MOTORS, GENERATORS, TRANSFORMERS AND ELECTRICITY DISTRIBUTION AND CONTROL APPARATUS	49,80	14	7,31	7,30	6,62	6,20	4,86
272	MANUFACTURE OF BATTERIES AND ACCUMULATORS	-	0	-	-	-	-	-
273	MANUFACTURE OF WIRING AND WIRING DEVICES	39,96	5	1,15	1,11	1,02	0,83	0,67
274	MANUFACTURE OF ELECTRIC LIGHTING EQUIPMENT	25,24	14	2,27	1,84	2,78	1,84	1,54
275	MANUFACTURE OF DOMESTIC APPLIANCES	1,00	1	-	-	-	-	-
279	MANUFACTURE OF OTHER ELECTRICAL EQUIPMENT	100,38	18	0,31	0,31	0,39	0,40	1,21
281	MANUFACTURE OF GENERAL-PURPOSE MACHINERY	270,62	21	0,74	1,24	1,12	1,38	1,44
282	MANUFACTURE OF OTHER GENERAL-PURPOSE MACHINERY	318,56	51	2,71	1,67	1,79	1,64	1,15
283	MANUFACTURE OF AGRICULTURAL AND FORESTRY MACHINERY	32,91	11	116,83	80,69	8,09	4,91	3,37
284	MANUFACTURE OF METAL-FORMING MACHINERY AND MACHINE TOOLS	12,05	4	52,66	43,55	42,30	39,49	29,16
289	MANUFACTURE OF OTHER SPECIAL-PURPOSE MACHINERY	58,02	21	2,58	1,96	1,87	0,96	0,61
291	MANUFACTURE OF MOTOR VEHICLES	1,20	2	0,00	0,00	0,00	0,00	0,00
292	MANUFACTURE OF BODIES (COACHWORK) FOR MOTOR VEHICLES; MANUFACTURE OF TRAILERS AND SEMI-TRAILERS	40,79	8	2,29	1,73	1,19	0,90	0,75
293	MANUFACTURE OF PARTS AND ACCESSORIES FOR MOTOR VEHICLES	6,25	2	0,00	0,00	0,00	0,00	0,00
301	BUILDING OF SHIPS AND BOATS	139,27	58	3,80	3,86	3,50	3,14	2,35

302	MANUFACTURE OF RAILWAY LOCOMOTIVES AND ROLLING STOCKS	291,91	1	-	-	-	-	-
303	MANUFACTURE OF AIR AND SPACECRAFT AND RELATED MACHINERY	-	-	-	-	-	-	-
304	MANUFACTURE OF MILITARY FIGHTING VEHICLES	-	-	-	-	-	-	-
309	MANUFACTURE OF TRANSPORT EQUIPMENT N.E.C.	24,54	6	0,00	0,11	0,67	0,40	0,36
310	MANUFACTURE OF FURNITURE	315,78	134	1,83	1,22	1,19	1,15	1,21
321	MANUFACTURE OF JEWELLERY, BIJOUTERIE AND RELATED ARTICLES	282,08	192	1,67	1,61	1,38	1,40	1,12
322	MANUFACTURE OF MUSICAL INSTRUMENTS	4,00	3	1,44	1,23	0,95	0,79	0,70
323	MANUFACTURE OF SPORTS GOODS	9,00	6	2,37	2,19	2,46	2,35	2,08
324	MANUFACTURE OF GAMES AND TOYS	13,14	9	2,24	1,48	2,42	1,67	1,37
325	MANUFACTURE OF MEDICAL AND DENTAL INSTRUMENTS AND SUPPLIES	795,19	408	1,23	1,20	1,13	1,10	1,06
329	OTHER MANUFACTURING N.E.C.	112,98	59	2,67	1,76	1,28	1,50	1,01
331	REPAIR OF FABRICATED METAL PRODUCTS, MACHINERY AND EQUIPMENT	3.838,12	853	1,12	1,07	1,08	1,12	1,07
332	INSTALLATION OF INDUSTRIAL MACHINERY AND EQUIPMENT	575,42	157	0,88	0,84	0,95	0,93	1,01
351	ELECTRIC POWER GENERATION, TRANSMISSION AND DISTRIBUTION	2.330,52	181	1,47	1,25	1,09	1,08	1,06
352	MANUFACTURE OF GAS; DISTRIBUTION OF GASEOUS FUELS THROUGH MAINS	68,08	14	0,91	0,82	0,84	0,84	1,05
353	STEAM AND AIR CONDITIONING SUPPLY	133,04	3	0,00	0,00	0,00	0,00	0,00
360	WATER COLLECTION, TREATMENT AND SUPPLY	1.945,59	136	0,91	0,77	0,86	1,01	1,15
370	SEWERAGE	171,44	38	2,56	1,90	1,93	1,08	1,01
381	WASTE COLLECTION	3.154,62	143	0,85	0,72	0,77	0,81	0,92
382	WASTE TREATMENT AND DISPOSAL	640,62	62	1,99	2,04	1,89	1,48	0,93
383	MATERIALS RECOVERY	829,09	121	1,57	1,70	1,38	1,19	1,16
390	REMEDIATION ACTIVITIES AND OTHER WASTE MANAGEMENT SERVICES	460,75	31	1,10	1,07	1,05	1,47	1,31
411	PROJECT MANAGEMENT ACTIVITIES RELATED TO CONSTRUCTION	27,03	34	1,24	1,14	0,91	1,00	1,12
412	CONSTRUCTION OF BUILDINGS	16.941,03	6658	1,48	1,36	1,25	1,16	1,09
421	CONSTRUCTION OF ROADS AND RAILWAYS	1.294,50	169	2,96	2,05	1,89	1,66	1,35
422	CONSTRUCTION OF UTILITY PROJECTS	597,55	24	2,27	2,45	1,86	1,66	1,21
429	CONSTRUCTION OF OTHER CIVIL ENGINGEERING PROJECTS	971,63	163	1,97	2,01	1,66	1,39	1,20
431	DEMOLITION AND SITE PREPARATION	1.292,21	603	1,60	1,57	1,52	1,43	1,33
432	ELECTRICAL, PLUMBING AND OTHER CONSTRUCTION INSTALLATION ACTIVITIES	10.214,67	3528	1,01	1,00	1,00	1,00	0,99
433	BUILDING COMPLETION AND FINISHING	8.855,54	4111	1,48	1,38	1,28	1,14	1,09
439	OTHER SPECIALIZED CONSTRUCTION ACTIVITIES	818,21	292	1,87	1,66	1,45	1,23	1,10
451	SALE OF MOTOR VEHICLES	2.225,87	478	1,25	1,23	1,18	1,16	1,09
452	MAINTENANCE AND REPAIR OF MOTOR VEHICLES	5.589,60	2450	1,06	1,07	1,06	1,03	1,03
453	SALE OF MOTOR VEHICLE PARTS AND ACCESSORIES	1.413,70	500	1,02	1,02	1,01	1,02	1,05
454	SALE, MAINTENANCE AND REPAIR OF MOTORCYCLES AND RELATED PARTS AND ACCESSORIES	303,00	129	1,19	1,15	1,00	1,01	1,00
461	WHOLESALE ON A FEE OR CONTRACT BASIS	5.579,76	4750	1,29	1,27	1,22	1,14	1,12
462	WHOLESALE OF AGRICULTURAL RAW MATERIALS AND LIVE ANIMALS	659,77	227	1,97	1,95	1,69	1,44	1,29

463	WHOLESALE OF FOOD, BEVERAGES AND TOBACCO	4.612,96	1216	1,35	1,26	1,17	1,09	1,07
464	WHOLESALE OF HOUSEHOLD GOODS	2.802,74	926	1,37	1,32	1,31	1,25	1,19
465	WHOLESALE OF MACHINERY, EQUIPMENT AND SUPPLIES	689,80	269	1,38	1,35	1,24	1,20	1,14
466	WHOLESALE OF OTHER MACHINERY AND EQUIPMENT	1.180,50	397	1,31	1,26	1,24	1,21	1,15
467	OTHER SPECIALIZED WHOLESALE	3.951,95	1050	1,09	1,07	1,05	1,02	1,01
469	NON-SPECIALIZED WHOLESALE TRADE	586,01	155	2,11	1,33	1,33	1,22	1,20
471	RETAIL SALE IN NON-SPECIALIZED STORES	15.552,01	2877	1,09	1,09	1,09	1,07	1,05
472	RETAIL SALE OF FOOD, BEVERAGES AND TOBACCO IN SPECIALIZED STORES	6.813,51	3944	1,21	1,17	1,14	1,09	1,06
473	RETAIL SALE OF AUTOMOTIVE FUEL IN SPECIALIZED STORES	1.770,97	684	1,05	1,10	1,11	1,05	1,06
474	RETAIL SALE OF INFORMATION AND COMMUNICATIONS EQUIPMENT IN SPECIALIZED STORES	753,20	298	1,24	1,19	1,10	1,09	1,05
475	RETAIL SALE OF OTHER HOUSEHOLD EQUIPMENT IN SPECIALIZED STORES	6.652,42	2831	1,14	1,15	1,13	1,09	1,07
476	RETAIL SALE OF CULTURAL AND RECREATION GOODS IN SPECIALIZED STORES	2.816,48	1566	1,02	1,03	1,02	1,02	1,00
477	RETAIL SALE OF OTHER GOODS IN SPECIALIZED STORES	16.100,63	7336	1,04	1,04	1,02	1,01	1,00
478	RETAIL SALE VIA STALLS AND MARKETS	2.402,54	2020	1,92	1,59	1,40	1,28	1,17
479	RETAIL TRADE NOT IN STORES, STALLS OR MARKETS	707,32	333	1,24	1,26	1,18	1,10	1,10
491	PASSENGER RAIL TRANSPORT, INTERURBAN	495,16	11	0,88	0,78	0,64	0,52	0,46
492	FREIGHT RAIL TRANSPORT	-	0	-	-	-	-	-
493	OTHER PASSENGER LAND TRANSPORT	4.956,76	727	0,84	0,84	0,87	0,91	0,97
494	FREIGHT TRANSPORT BY ROAD	6.618,10	2050	1,39	1,31	1,25	1,13	1,11
495	TRANSPORT VIA PIPELINE	-	0	-	-	-	-	-
501	SEA AND COASTAL WATER TRANSPORT	593,84	114	7,17	7,55	5,67	3,72	3,62
502	INLAND WATER TRANSPORT	80,52	7	3,00	2,75	2,23	1,42	1,24
503	INLAND PASSENGER WATER TRANSPORT	12,44	2	0,00	0,00	0,00	0,00	0,00
504	INLAND FREIGHT WATER TRANSPORT	-	0	-	-	-	-	-
511	PASSENGER AIR TRANSPORT	815,28	7	4,42	1,13	0,34	0,33	0,21
512	FREIGHT AIR TRANSPORT	-	0	-	-	-	-	-
521	WAREHOUSING AND STORAGE	381,67	64	1,84	1,70	1,40	1,32	1,21
522	SUPPORT ACTIVITIES FOR TRANSPORTATION	5.174,72	669	1,40	1,24	1,28	1,17	1,13
531	POSTAL ACTIVITIES	3.792,12	436	0,48	0,86	0,98	1,05	1,06
532	COURIER ACTIVITIES	283,98	106	1,11	1,09	1,06	1,01	1,01
551	HOTELS	7.000,48	744	3,28	2,99	2,92	2,68	2,36
552	OTHER SHORT TERM ACCOMODATION ACTIVITIES	1.710,03	644	3,47	3,33	3,26	2,90	2,42
553	CAMPING GROUNDS, RECREATIONAL VEHICLE PARKS AND TRAILER PARKS	502,42	85	7,98	5,97	4,36	4,12	2,68
559	OTHER ACCOMODATION	27,73	15	0,09	0,08	0,07	0,23	0,35
561	RESTAURANTS AND MOBILE FOOD SERVICE ACTIVITIES	14.983,97	4568	1,22	1,19	1,17	1,12	1,08
562	EVENT CATERING AND OTHER FOOD SERVICE ACTIVITIES	2.236,96	250	1,01	0,96	1,00	0,98	1,01
563	BEVERAGE SERVING ACTIVITIES	11.296,64	4627	1,20	1,18	1,14	1,12	1,07

581	PUBLISHING OF BOOKS, PERIODICALS AND OTHER PUBLISHING ACTIVITIES	596,88	118	1,61	1,54	1,48	1,45	1,34
582	SOFTWARE PUBLISHING	3,00	3	116,96	58,77	29,31	26,28	16,06
591	MOTION PICTURE, VIDEO AND TELEVISION PROGRAMME ACTIVITIES	266,54	100	1,39	1,45	1,39	1,31	1,20
592	SOUND RECORDING AND MUSIC PUBLISHING ACTIVITIES	15,54	14	1,59	1,57	1,45	1,49	1,43
601	RADIO BROADCASTING	116,83	39	1,48	1,41	1,29	1,20	1,13
602	TELEVISION PROGRAMMING AND BROADCASTING ACTIVITIES	238,50	19	1,74	1,60	1,38	1,27	1,15
611	WIRED TELECOMMUNICATIONS ACTIVITIES	1.723,74	41	0,87	0,74	0,67	0,74	0,77
612	WIRELESS TELECOMMUNICATIONS ACTIVITIES	1.043,18	8	5,50	3,28	2,55	2,22	2,01
613	SATELLITE TELECOMMUNICATIONS ACTIVITIES	-	0	-	-	-	-	-
619	OTHER TELECOMMUNICATIONS ACTIVITIES	234,24	78	1,39	1,41	1,39	1,34	1,41
620	COMPUTER PROGRAMMING, CONSULTANCY AND RELATED ACTIVITIES	2.409,85	619	1,44	1,31	1,53	1,49	1,47
631	DATA PROCESSING, HOSTING AND RELATED ACTIVITIES; WEB PORTALS	2.440,21	1081	1,16	1,12	1,07	1,07	1,02
639	OTHER INFORMATION SERVICE ACTIVITIES	148,87	61	1,50	1,48	1,57	1,20	1,09
641	MONETARY INTERMEDIATION	5.354,60	633	0,73	0,83	0,87	0,93	0,95
642	ACTIVITIES OF HOLDING COMPANIES	2,56	20	1,00	0,85	2,28	1,96	1,70
643	TRUSTS, FUNDS AND SIMILAR FINANCIAL ENTITIES	-	0	-	-	-	-	-
649	OTHER FINANCIAL SERVICE ACTIVITIES, EXCEPT INSURANCE AND PENSION FUNDING ACTIVITIES	662,52	93	1,88	1,67	1,49	1,40	1,26
651	INSURANCE	288,01	44	2,04	1,86	1,57	1,39	1,30
652	REINSURANCE	-	0	-	-	-	-	-
661	ACTIVITIES AUXILIARY TO FINANCIAL SERVICE ACTIVITIES, EXCEPT INSURANCE AND PENSION FUNDING	658,28	485	1,42	1,41	1,26	1,28	1,21
662	ACTIVITIES AUXILIARY TO INSURANCE AND PENSION FUNDING	2.267,10	1183	1,16	1,12	1,07	1,05	1,02
663	FUND MANAGEMENT ACTIVITIES	-	0	-	-	-	-	-
681	BUYING AND SELLING OF SELF-OWNED REAL ESTATE	387,59	320	1,70	1,43	1,56	1,52	1,44
682	RENTING AND OPERATING OF SELF-OWNED OR LEASED REAL ESTATE	1.919,40	1521	1,43	1,37	1,33	1,29	1,23
683	REAL ESTATE ACTIVITIES ON A FEE OR CONTRACT BASIS	1.365,45	1023	1,53	1,49	1,43	1,39	1,31
691	LEGAL ACTIVITIES	4.551,68	3364	1,77	1,63	1,39	1,27	1,18
692	ACCOUNTING, BOOKKEEPING AND AUDITING ACTIVITIES; TAX CONSULTANCY	5.052,63	3059	1,25	1,21	1,10	1,08	1,04
701	ACTIVITIES OF HEAD OFFICE	59,13	22	2,30	1,99	1,57	1,44	1,42
702	MANAGEMENT CONSULTANCY ACTIVITIES	940,11	691	1,30	1,26	1,14	1,15	1,12
711	ARCHITECTURAL AND ENGINEERING ACTIVITIES AND RELATED TECHNICAL CONSULTANCY	6.866,45	5856	1,09	1,07	1,06	1,04	1,04
712	TECHNICAL TESTING AND ANALYSIS	508,44	175	1,25	1,16	1,22	1,14	1,12
721	RESEARCH AND EXPERIMENTAL DEVELOPMENT ON NATURAL SCIENCES AND ENGINEERING	230,08	174	2,33	1,62	1,52	1,47	1,35
722	RESEARCH AND EXPERIMENTAL DEVELOPMENT ON SOCIAL SCIENCES AND HUMANITIES	65,00	34	1,70	1,70	1,54	1,54	1,30
731	ADVERTISING	388,74	255	1,23	1,24	1,14	1,12	1,09
732	MARKET RESEARCH AND PUBLIC OPINION POLLING	53,20	39	1,61	1,32	1,35	1,31	1,30

741	SPECIALIZED DESIGN ACTIVITIES	368,55	302	1,06	1,10	1,05	1,06	1,06
742	PHOTOGRAPHIC ACTIVITIES	438,15	317	0,94	0,95	0,95	0,99	0,99
743	TRANSLATION AND INTERPRETATION ACTIVITIES	75,92	71	1,23	1,29	1,07	1,09	1,13
749	OTHER PROFESSIONAL, SCIENTIFIC AND TECHNICAL ACTIVITIES N.E.C.	2.243,88	1685	1,14	1,10	1,06	1,05	1,02
750	VETERINARY ACTIVITIES	356,76	286	0,98	1,00	1,02	1,03	1,05
771	RENTING AND LEASING OF MOTOR VEHICLES	332,71	132	2,61	2,15	2,03	1,95	1,66
772	RENTING AND LEASING OF PERSONAL AND HOUSEHOLD GOODS	251,86	164	2,47	2,49	2,48	2,23	2,15
773	RENTING AND LEASING OF OTHER MACHINERY, EQUIPMENT AND TANGIBLE GOODS	750,18	344	1,91	1,82	1,74	1,53	1,53
774	LEASING OF INTELLECTUAL PROPERTY AND SIMILAR PRODUCTS, EXCEPT COPYRIGHTED WORKS	-	0	-	-	-	-	-
781	ACTIVITES OF EMPLOYMENT PLACEMENT AGENCIES	10,26	6	2,00	2,78	2,17	1,86	1,68
782	TEMPORARY EMPLOYMENT AGENCY ACTIVITIES	2.649,51	51	1,06	1,24	1,33	1,29	1,24
783	OTHER HUMAN RESOURCES PROVISION	-	0	-	-	-	-	-
791	TRAVEL AGENCY AND TOUR OPERATOR ACTIVITIES	841,45	305	1,21	1,19	1,13	1,16	1,15
799	OTHER RESERVATION SERVICE AND RELATED ACTIVITIES	229,70	131	2,60	2,51	2,29	1,59	1,39
801	PRIVATE SECURITY ACTIVITIES	2.888,89	90	1,28	1,30	1,15	1,05	0,97
802	SECURITY SYSTEMS SERVICE ACTIVITIES	11,30	2	0,00	0,00	0,00	0,00	0,00
803	INVESTIGATION ACTIVITIES	85,38	33	2,86	2,59	2,30	2,11	1,97
811	COMBINED FACILITIES SUPPORT ACTIVITIES	99,02	51	2,50	2,34	2,37	2,25	2,34
812	CLEANING ACTIVITIES	8.230,67	985	1,04	1,00	0,99	1,04	1,06
813	LANDSCAPE CARE AND MAINTENANCE SERVICE ACTIVITIES	1.213,86	426	2,05	1,86	1,80	1,49	1,38
821	OFFICE ADMINISTRATIVE AND SUPPORT ACTIVITIES	396,00	201	1,37	1,28	1,14	1,16	1,06
822	ACTIVITIES OF CALL CENTERS	2.372,72	102	1,27	1,06	1,93	1,80	1,75
823	ORGANIZATION OF CONVENTIONS AND TRADE SHOWS	138,86	64	2,37	1,90	1,90	1,77	1,65
829	BUSINESS SUPPORT SERVICE ACTIVITIES N.E.C.	2.856,75	1022	1,09	1,08	1,04	1,09	1,06
851	PRE-PRIMARY EDUCATION	659,07	109	1,73	1,76	1,68	1,38	1,29
852	PRIMARY EDUCATION	67,11	5	4,05	3,46	2,68	2,21	1,98
853	SECONDARY EDUCATION	86,56	19	1,25	1,11	0,92	1,10	0,97
854	HIGHER EDUCATION	13,99	11	1,27	1,09	1,19	1,01	1,47
855	OTHER EDUCATION	1.028,75	467	1,06	1,01	0,99	1,02	1,01
856	EDUCATIONAL SUPPORT ACTIVITIES	30,84	24	0,55	0,70	0,84	0,56	0,90
861	HOSPITAL ACTIVITIES	1.398,07	26	1,48	1,31	0,99	1,40	1,39
862	MEDICAL AND DENTAL PRACTICE ACTIVITIES	6.724,14	4604	1,14	1,14	1,07	1,06	1,04
869	OTHER HUMAN HEALTH ACTIVITIES	2.538,87	1347	1,20	1,18	1,10	1,11	1,09
871	RESIDENTIAL NURSING CARE FACILITIES	708,41	33	2,88	1,66	0,77	0,61	0,51
872	RESIDENTIAL CARE ACTIVITIES FOR MENTAL RETARDATION, MENTAL HEALTH AND SUBSTANCE ABUSE	418,90	23	0,33	0,70	0,87	1,13	1,21
873	RESIDENTIAL CARE ACTIVITIES FOR THE ELDERLY AND DISABLED	1.799,23	136	2,11	1,76	1,82	1,81	1,63
879	OTHER RESIDENTIAL CARE ACTIVITIES	1.274,56	83	1,12	1,34	1,29	1,21	0,93

881	SOCIAL WORK ACTIVITIES WITHOUT ACCOMODATION FOR THE ELDERLY AND DISABLED	3.524,85	221	1,45	1,33	1,30	1,26	1,19
889	OTHER SOCIAL WORK ACTIVITIES WITHOUT ACCOMODATION	2.583,20	365	1,16	1,16	1,12	1,14	1,14
900	CREATIVE, ARTS AND ENTERTAINMENT ACTIVITIES	538,05	399	1,22	1,27	1,20	1,18	1,12
910	LIBRARIES, ARCHIVES, MUSEUMS AND OTHER CULTURAL ACTIVITIES	898,56	146	1,75	1,57	1,56	1,66	1,59
920	GAMBLING AND BETTING ACTIVITIES	453,16	126	1,31	1,27	1,09	1,03	1,02
931	SPORTS ACTIVITIES	595,42	285	1,29	1,15	1,04	1,06	1,02
932	OTHER AMUSEMENT AND RECREATION ACTIVITIES	1.183,92	464	1,42	1,41	1,28	1,24	1,17
951	REPAIR OF COMPUTERS AND COMMUNICATION EQUIPMENT	368,55	187	1,15	1,00	1,05	0,96	0,99
952	REPAIR OF PERSONAL AND HOUSEHOLD GOODS	629,48	426	1,13	1,12	1,04	1,08	1,00
960	OTHER PERSONAL SERVICE ACTIVITIES	8.674,69	4152	1,01	1,01	1,01	1,01	1,00
	TOTAL	**340.774,93**	**116.620**					