

Afterthoughts on urban economic theory and its focus

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ABSTRACT: An interesting part of the present scientific debate in urban economics concerns the appropriateness of some theoretical—and consequently empirical—definitions of the city and its role, underlining the reductive character of purely functional approaches in terms of agglomeration economies. Many scientific achievements have been attained exploiting the virtues of these approaches, residing in their strong internal consistency (within their logical assumptions) and sophisticated formalization. What appears to be left is the inspection of the true nature of cities, going far beyond their agglomerated physical form and the consequent benefits on transactions and communications.

The paper suggests that the geographical-functional approach should be complemented by two other approaches, implicit in classical economics and in evolutionary economic theory, which allow the inspection and (perhaps) a proper interpretation of other constituents of the nature of cities: what I call the relational-cognitive approach —interpreting the city as a cognitive *milieu*, generating knowledge, creativity and innovation—and the hierarchical-distributive one, interpreting the relationships with the non-city, the «countryside» of classical economists, in terms of control and monopolistic determination of relative prices. The former approach looks at the intrinsically generative role of the city and its capability of developing continuously new activities and functions; the latter at power relations on space and control on income distribution.

If the functional approach looks nowadays quite consolidated, the cognitive one needs still in depth reflections, as it implies the (at least partial) abandonment of methodological individualism that permeates neoclassical economics, with the advantage of better utilizing the conceptual achievements of other social disciplines. On the other hand, the hierarchical and distributive approach looks today quite unexplored.

At the end, a tentative, formalized model of agglomeration economies is presented, with the goal of stimulating the attention on the empirical measurement of the effects of the cognitive and control roles of the city. Two main open issues emerge, both referring to income distribution: how are the advantages of increasing returns to urban scale being distributed among the internal production factors (and urban social classes, including land owners) and how could we measure the urban power in terms of income distribution in space.

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Keywords: Urban economics; functional approaches; relational-cognitive approach; hierarchical-distributive approach; creativity; income distribution; urban power.

RESUMEN: Un interesante aspecto del actual debate científico sobre economía urbana se refiere a la apropiación de algunas definiciones teóricas —y en consecuencia, empíricas— de la ciudad y de su papel, señalando al mismo tiempo el carácter reductivo de las aproximaciones puramente funcionales en términos de economías de aglomeración. Muchos resultados científicos se han logrado explotando las virtudes de estas aproximaciones funcionales, basándose en su fuerte consistencia interna (a partir de sus lógicas restricciones) y su sofisticada formalización. Lo que parece que se ha olvidado es la toma en consideración de la verdadera naturaleza de las ciudades, yendo mucho más allá de su forma de aglomeración física y de los consecuentes beneficios en relación con las transacciones y las comunicaciones. El artículo sugiere que la aproximación geográfico-funcional debería complementarse con otras dos aproximaciones, implícitas en la economía clásica y en la teoría económica evolucionaria, que permiten la investigación y (quizá) la adecuada interpretación de otros aspectos que constituyen la naturaleza de las ciudades: lo que yo llamo la aproximación cognitiva-relacional —interpretando la ciudad como un *milieu* de conocimiento, generador de pensamiento, creatividad e innovación— y la aproximación jerárquico-distributiva, interpretando las relaciones con la no-ciudad, el *countryside* o área rural del entorno de los economistas clásicos, en términos de control y de determinación monopolística de los precios relativos. La primera de estas aproximaciones se fija en el papel intrínsecamente creativo de la ciudad y en su capacidad para desarrollar de forma continua nuevas actividades y funciones; la segunda pone su atención en las relaciones de poder en el espacio y de control sobre la distribución de la renta. La aproximación funcional se encuentra actualmente muy consolidada, pero la cognitiva todavía necesita algunas reflexiones en profundidad puesto que implica (al menos de forma parcial) abandonar el enfoque metodológico individualista de la economía neoclásica, con la ventaja de utilizar mejor algunos logros conceptuales procedentes de otras disciplinas sociales. Por otra parte, la aproximación jerárquico-distributiva todavía se nos presenta hoy como bastante inexplorada. El artículo incluye al final, a modo de tentativa, un modelo formalizado de economías de aglomeración, con objeto de estimular la atención hacia las mediciones empíricas de los efectos de los roles cognitivo y de control de la ciudad. Dos importantes problemas abiertos surgen a raíz de este ejercicio, ambos referidos a la distribución de la renta: cómo son las ventajas de los rendimientos crecientes a escala urbana que se distribuyen entre los factores de producción internos (y entre las clases sociales urbanas, incluyendo a los propietarios del suelo), y, por otra parte, cómo sería posible medir el poder urbano en términos de distribución espacial de la renta.

Clasificación JEL: R10; R12; O49; O31, B51.

Palabras clave: Economía urbana; aproximación funcional; aproximación cognitiva-relacional; aproximación jerárquico-distributiva; creatividad; distribución de la renta; poder urbano.

1. Introduction

Along with the new attention to the role of cities in economic development and policy that took place in the last fifteen years, a parallel attention was—hopefully—paid to the urban economics discipline: manuals, handbooks and monographies have flourished in recent time, structuring the underlying theory, enriching the field with new relevant issues and more recently suggesting a necessary reorientation of conceptual and methodological approaches.

Earlier works, at the beginning of this century, were mainly addressing the relatively new theme of urban sustainability, underlining the specificity of the concept with respect to the general accepted definition linked to natural environments (Willis *et al.*, 2001; Paddison, 2001) and sometimes trying to include the theme as a new dimension in self-organizing complex systems analysis (Bertuglia *et al.*, 1998). Later on it was the turn of a new general issue, namely the role of cities in the new globalization era (Scott, 2001; Taylor *et al.*, 2007), while other contributions tried to include new conceptual approaches coming from other, less formalised disciplines, particularly geography, sociology and planning, pointing out the fruitful results that could derive from a scientific convergence among differentiated conceptual and methodological codes (Capello and Nijkamp, 2004 and 2009; Capello, 2015).

In more recent years, a dichotomy is emerging between contributions that bring the application of mainstream economic tools to a huge sophistication level (Duranton *et al.*, 2015) and some critical contributions emphasising new conceptual roles of the urban «milieu», residing in creativity-enhancing and knowledge creation (Fusco Girard *et al.*, 2011; Cusinato and Philippopoulos-Mihalopoulos, 2016). These latter contributions, which were accompanied by many critical and innovative reflections on the conceptual and methodological side, imply a relevant turn in the way the city is interpreted in economic terms: the functional approach to the city that is typical of mainstream spatial economics and of economic geography, both old and «new», should be at least complemented by a cognitive approach acknowledging the specific and non-mediated role of the city as a collective learning device, producer of knowledge, codes and symbols.

This turn is by no means simple or straightforward: in fact it does not only imply a change of research perspective but rather a change in a basic credo and epistemological habit of (mainly neoclassical) economists—the ones that reached the highest scientific achievements in urban location theory in the last fifty years—the abandonment of methodological individualism and the acknowledgement of the existence and theoretical relevance of collective agents (like the city). Furthermore, such a paradigm shift could be achieved not just showing a necessary new logical pathway but building along it a set of consistent new axioms, concepts, theories and formalisations liable to empirical testing.

Since the appearance of regional science as an autonomous discipline, many intuitions and conceptual proposals can be found, here and there in a casual way, but they did not generate sufficient consensus and above all the inter-disciplinary cooperation that is a necessary precondition for a paradigmatic advancement. No academic or research center could claim today to be the depositary or the hub for the development

of the new paradigm. This could be one of the main research challenge for urban economists in the next years, opening a series of new scientific questions and related sub-fields of inquiry; and this is the main subject of this paper, trying to put together in a logical sense the scattered suggestions that were put forward by many scholars, including myself, and taking inspiration from the fathers of other social sciences and disciplines: great historians, sociologists, geographers and political scientists.

Cities exist since there was history, civilization and progress; we find and found them in all latitudes; the concept, and the archetype of a city is so embedded in our mind and so familiar in daily life that economists for a long time did not pay but rare attention and curiosity to it —preferring to explore the time dimension first rather than the spatial one. They never tried to define the city as a special and specific form of organization of society, or a device, capable of self-organisation, for the achievement of the maximum welfare and development of human society. Was it blindness or humility? Probably both, but what is certain is that economic studies were mainly an application of the methods and tools of economics to the city as an object rather than an inspection of the «urban» as an original organisational model of economic and social activities and an interpretative paradigm of reality (Camagni, 1992, Introduction).

A great historian like Fernand Braudel long ago gave us his relevant conclusion after years of analyses of historical developments: «A city is always a city, wherever located, in both time and space. [...]. Cities speak necessarily the same fundamental language: the continuous dialogue with the countryside, first requirement for daily life; the provision of people [...]; their self-respect and willingness to distinguish from other cities; their necessary position at the center of short and long-distance networks; their relationships with suburbs and other cities» (Braudel, 1979, p. 548, author's translation). Therefore Braudel, accompanied by the entire French school of the *Annales* and by other great historians like Pirenne, Le Goff or Roncayolo, justifies this generalisation concerning the concept of the «urban», against the position of those scholars in love with the specificity of each city, like Abrams (1978: «New York = Timbuctoo?») or of those who more recently claimed that no relevant Marshallian and «milieu» effects come from agglomeration and proximity (Amin and Robin, 1991; Amin and Thrift, 2002). Cities can be assumed as collective (economic) actors and are not the simple result of individual actions oriented towards the individual advantage¹.

But this generalization was never accepted by official economic theory. It is true that great results were achieved by economists inspecting the internal structure of cities and the logics of location of economic and residential activities around an —unexplained— singularity called «center», following the pioneering intuition of Heinrich

¹ Some time ago, justifying the concept of territorial or urban competitiveness, I wrote: «if individual firms and individual people undertake collective activities, facilitated by (and creators of) trust and local social capital; and if significant cognitive synergies, readily apparent in the local *milieu*, result from their various interactions; and finally if these actions and these processes draw additional vitality from cooperation with local public administrations; then it appears justifiable to go beyond methodological individualism—which regards only single firms as operating and competing—arguing the logical validity of a “collective” concept such as that of *territory*, and to affirm that territories compete among themselves, using the creation of collective strategies as their instrument» (Camagni, 2002, p. 2406).

von Thünen; it is true that economists taught planners and sociologists the true nature of urban land rent, which does not depend on land speculation but on locational advantages; but did all this tell us anything at all about the nature of cities? And when the concept of agglomeration economies was coined in order to explain why cities exist, did economists realise that scale economies in the production of goods and public services and «pecuniary» externalities attained through market transactions do not explain the huge gap in efficiency, wealth and dynamism between the very large and the small city? Did economists realise that, considering the city under the form of an agglomeration, they were proposing the same reductionist action put in place when the rich Marshallian and Becattini's concept of industrial district (Becattini, 1979 and 1990) was equated to that of «cluster»?

We owe to cities the idea, and the practice, of civilization, culture, liberty, democracy, modernity: doesn't this suggest us anything concerning the «generative» role of cities? Cities in all times were hosting the crucial functions of the respective social, economic and technological regimes: defense, organization of large public works, administration, astronomy, justice in ancient times; finance, commerce, culture and education afterwards; industry in modern times; headquarter, tertiary and information-intensive functions in the last century; knowledge-intensive, scientific and creative functions nowadays. Isn't this fact something on which an economic analysis, mainly addressing the spatial division of labour and income distribution, could fruitfully intervene?

The inclusion of territorial power and control in the scientific representation of the nature of cities and the related question of income distribution in space —on which some fundamental inspiration comes from some classical economists like Smith and Marx— is the second issue that this paper tries to underline as a crucial task for the incoming years.

The main idea underlying this general reflection is that three methodological approaches have to merge if a non-partial, interpretative picture of the urban realm has to be achieved: the traditional functional-geographical (section 2), the new cognitive-relational (section 3) and the still unexplored hierarchical-distributive ones (section 4). A simple tentative model interpreting agglomeration economies in the wider sense is presented in section 5. The relevance of this research programme does not reside only in abstract scientific advances, but in two potential practical uses: as an orientative compass for the exploration of likely trends in urban structure and performance and as a guide for new consistent policy goals and related tools.

Of course, these afterthoughts are not systematic nor fully consistent, as the main goal is to raise interest and curiosity, not to build a new economic theory of the city.

2. The traditional functional-geographical approach: the city as agglomeration

The functional approach to the nature of cities represents the traditional one, and encompasses both a spatial and a network point of view. In the first case the city is equated to an agglomeration, and agglomeration per se delivers economic advantages

in terms of scale economies and urban externalities. In the second case, the city is perceived as a node, or better an interconnection inside differentiated long distance networks—physical networks, communication networks, cultural and power networks (Camagni, 2001). «One of the central features of urbanization has always been its efficiency-generating qualities via agglomeration» and the fact that «cities have *always* functioned as nodes in systems of long-distance trade» (Scott and Storper, 2014, p. 4).

Agglomeration economies account for the possibility of exploiting scale economies in production and local public services; of developing internal specialization and division of labour; the advantages represented by large local labour markets and those deriving from the presence of numerous sub-contracting and ancillary firms (Krugman, 1991). Beyond that, an urban context supplies easy inter-personal communication possibilities through face-to-face contacts, pecuniary externalities due inter-industry transactions and urbanization economies coming from presence of public goods, services and infrastructure. Density of contacts, proximity and sectoral differentiation, which represent the distinctive characters of cities (Jacobs, 1969), allow information circulation, reduction of transaction costs and consequently enhance productivity of the typically small urban companies; on the other side, global connectivity raises tremendously the effectiveness of the activities involved.

In the course of time, this interpretation of the role of cities in terms of agglomeration economies was partially improved, especially with reference to the component of face-to-face contacts. Roland Artle (1973) presented probably the first model considering the city and its center as a public good characterised by non-excludability and interaction among users, where utility increases with the number of users («sharing-and-interaction»). Glaeser (1999) presented a similar model of urban learning, where people absorb knowledge through contacts with other people working in the same industry, whose probability increases with city size. Storper and Venables (2003) interestingly analyse F-2-F contacts as a communication technology allowing high frequency, rapid feedback, inclusion of visual and body language cues, easier detection of lying, acquisition of shared values; all this allows an easier interpretation of information and enhances the efficiency of transactions, and this is why individuals working in scientific, creative, economic, financial and government fields are eager to enter «the buzz environment» through co-location in cities. Finally, Duranton and Puga (2004) built a micro-founded model of interaction («sharing»), job search («matching») and information flows («learning») in order to explain agglomeration economies. In all cases a conceptual advancement is present, but the link information → knowledge → innovation is not explained and the role of local economic space remains linked to the sum of interacting agents.

All these approaches fail in the interpretation of urban growth and in particular leave us with the —superficial— idea that, in the economics of cities, bigger is always better. Influential scientists and institutions are recently supporting the idea that very large cities, because of the existence of agglomeration economies, present also the highest growth rates, are the true drivers of development and deserve the highest policy support (World Bank, 2009; Glaeser, 2011). When agglomeration economies are assumed to directly lead to urban growth the presence of a logical shortcut is very clear. The superior efficiency and productivity of large cities is totally accepted but it emerges

from a static, or a comparative static, representation: a size derivative, which is different from a time derivative (Camagni *et al.*, 2016). As Henderson (2010) puts it, the «association between urbanization and development [...] is an equilibrium not causal relation» (p. 518) and «urbanization per se does not cause development» (p. 515).

Krugman, trying to justify the equation «superior efficiency → higher growth», refers to the locational choice of the single firms: they will chose to move and locate in large cities rightly because they are more efficient (Krugman, 1991). But also in this case the answer is unquestionable: firms do not decide location on the basis of a differential in gross advantages between the large and the small city, but on the basis of a differential in net advantages, including the higher costs of the large city (Camagni *et al.*, 2016). Net advantages show a much more homogeneous condition throughout the urban hierarchy than gross ones.

The picture that emerges from the functional representation of the city remains intrinsically static, as confirmed by the citation at the beginning of this section, speaking of «efficiency-generating qualities via agglomeration» (p. 4)². Advantages which are attributed to the city emanate directly from the location of activities and urban facilities and from the relative, individual locational decisions. Internal interactions end up in an upgrading of efficiency of individual firms and in the consequent reduction in transaction costs or in pure enlargement of revenues. No generative endogenous process is perceivable, possibly leading to novelty, invention, innovation.

3. The cognitive-relational approach: the city as *milieu*

If urban growth is intended as development, structural change and innovation, there is nowadays sufficient agreement that the city should be analysed as, and equated to, a *milieu* (Camagni, 1991; Rémy, 1999 and 2000; Crevoisier and Camagni, 2000; Cusinato, 2007 and 2016b; Cusinato and Philippopoulos-Mihalopoulos, 2016). In this way in fact static agglomeration externalities become dynamic ones, generating not just a reduction of costs and an expansion of revenues but a reduction of dynamic uncertainty, typical of innovation processes, and an expansion of Schumpeterian profits through novelty, effective entrepreneurship and innovation (Camagni, 1992 p. 63). The approach becomes a cognitive one and the nature of the city turns to a generative one: of creativity, knowledge and socio-cultural innovation.

Two concepts of a *milieu* are present in literature: in sociology and in regional economics. The first is Emile Durkheim's one, where the *milieu* is intended as a device generating original social facts, «an aggregation of individuals that give rise to a psychological individuality of a new kind [...] that acts in a completely different way with respect to its single members» (Durkheim, 1895, p. 101 of Italian edition). Cusinato interprets this definition of a *milieu* as «an institution consisting of values, conventions, norms representations and goals shared inside a local system, generating original behaviours [...] and characterised by «dynamic density» of social relationships» (Cusinato, 2007, p. 54).

² Cusinato (2016a) has underlined this surprisingly traditional approach, which in my opinion represents a step back with respect to other contributions of these authors.

Jean Rémy borrows Durkheim's concept of «dynamic density» in order to explain the urban *milieu*'s potential for the creation and valorization of knowledge: this potential resides in the transmission of formalized information coupled by the access to informal and undetermined information whose pertinent content is unknown ex-ante (Rémy, 1999). The city thus becomes «a specific production unit generating, along original processes, some products in which it maintains a monopoly power»: namely «knowledge», which can be used as «a final consumption good, an investment good or a production factor» (pp. 1 and 2; author's translation). The core process is one of «exploration» and possibly of innovation, when «the city becomes a place of non-intentional convergence among a plurality of individual and collective trajectories ending up in a solidarity of effects» (Rémy, 2000, p. 41). It is important to note that, according to Rémy, learning processes and creation of new codes happen thanks to the plurality and even the conflict among existing and differentiated codes inside the city, given the internal diversity of the city itself (a «*milieu of milieux*»). Along similar lines two sociologists stated that the city «produces intelligence: it chokes internal uniformity and develops with the shock of diversity» (Ansary and Schoonbrodt, 1989, p. 18, author's traslation).

In regional science, and referring to a special case of agglomeration, that of local production systems and industrial districts, a *milieu* was defined as a system of actors and activities characterised by a high density of relationships; sharing of languages, behavioural and cognitive codes; sharing of values, representations and sense of belonging. All these characteristics facilitate cooperation, synergies, ex-ante coordination of actors; and most of all generate a reduction of dynamic uncertainty and processes of collective learning (Camagni, 1991; Capello, 1999a)³.

The generation of these last two dynamic processes represents the conceptual and original role of local economic space. First of all, uncertainty, which pervades and hampers innovation, is reduced through important collective processes: socialized selection, screening and in particular transcoding of information, mainly taking place thanks to F-2-F contacts; ex-ante coordination among actors for the development of «collective actions» (namely the private production of public goods and commons) or for joint projects and investments. The second, intrinsically cognitive role of local space is the hosting of «collective learning» processes that can take place, outside the single firms but embedded in the local context, through internal mobility of skilled labour and the dense cooperation and synergy processes among firms (Camagni, 1991; Capello, 1999b).

The use of these conceptualisations —originally introduced for the interpretation of industrial districts and local production systems— to interpret the urban agglomeration came naturally, given the logical value added provided by the differentiation of urban activities, the nature of «*milieu of milieus*» that the city may assume, its «functional» characteristics linked to size and global connectivity (Crevoisier and Camagni, 2000).

Recently, the interpretation of the city as a cognitive *milieu* has been enriched through a hermeneutic approach: the symbolic aspects of the urban context were inspected, underlining the relevance of public physical spaces symbolically recognized

³ This conceptualization mainly came from what was called «evolutionary regional economics» (Calafati, 2009). See: Camagni, 1991; Capello, 1999a; Crevoisier and Camagni, 2000.

and appropriated by a local community in an identitarian way. This in turn generates enjoyment, emotion, an atmosphere of relationality and even affection and, through this, reflexive forms of learning, creativity and knowledge creation (Cusinato, 2016b).

The highlights of the relational-cognitive approach are sketched in Table 1, together with the other two approaches presented in this paper. As said before, the first

Table 1. The nature and roles of the city: a theoretical taxonomy

<i>Spatial Logic</i> <i>Hermeneutic Logic</i>	<i>Territorial Dimension</i>	<i>Network Dimension</i>
FUNCTIONAL-GEOGRAPHIC DIMENSION	<p><i>CITY AS AGGLOMERATION</i></p> <ul style="list-style-type: none"> — Volume and density of contacts. — Internal heterogeneity. — Specialization. — Concentration of externalities. — Reduction of transaction costs. — Space for selective or casual meetings — Coexistence of interaction and anonymity. 	<p><i>CITY AS INTERCONNECTION</i></p> <ul style="list-style-type: none"> — Node in multiple and interacting transport, economic and communication networks. — Interconnection between place and node. — Supplier of global connectivity.
RELATIONAL-COGNITIVE DIMENSION	<p><i>CITY AS MILIEU</i></p> <ul style="list-style-type: none"> — Relational density, sharing of codes and values. — Sense of belonging, identity. — Substratum for collective learning — Uncertainty-reducing operator through: <ul style="list-style-type: none"> • Socialized transcoding of information. • Ex-ante co-ordination (collective action). — Image space, shared symbolic representations. — Provoker of enjoyment, affection, emotions. — Enhancer of reflexive forms of learning. 	<p><i>CITY AS KNOWLEDGE-CREATING MILIEU</i></p> <ul style="list-style-type: none"> — link among global milieus. — creator and global exchanger of symbols, codes, and languages. — city as powerhouse/transformer of internal and external energy. — blending of different forms of knowledge: analytic, synthetic, artistic.
HIERARCHICAL-DISTRIBUTIVE DIMENSION	<p><i>CITY AS TERRITORIAL CONTROL</i></p> <ul style="list-style-type: none"> — Capability of continuously recreating crucial, strategic and driving functions. — Construction and maintenance of a monopoly power on urban functions. — Control on spatial division of labour. 	<p><i>CITY AS CONTROL ON INCOME DISTRIBUTION</i></p> <ul style="list-style-type: none"> — City as control over space and time. — City as symbol of territorial mastery. — Exploitation of monopoly powers on typical urban functions in terms of income distribution.

Source: adapted from Camagni, 2001 and 2016a.

approach, the functional-geographic, is rather traditional and relatively consolidated; the cognitive one is still to be improved and carried out in more depth, especially concerning the critical passage from information to knowledge and to innovation. The third approach, the hierarchical and distributive one remains. Still quite unexplored and looks fertile of potential scientific returns.

4. The hierarchical-distributive approach: the city as territorial control

«The greatest division of material and mental labour is the separation of town and country. This antagonism begins with the transition from barbarism to civilization [...] and runs through the whole history of civilization to the present day» (Marx and Engels, 1970, p. 49). This sentence of the young Marx concerning the «contradiction» between city and countryside looks as the conceptual and theoretical starting point of the third approach to the nature of cities.

Great historians have subscribed to this research programme. Let's read Fernand Braudel once again. Cities «were born from the most ancient, the most revolutionary division of labour: countryside and agriculture on the one side and so-called urban activities on the other»; «cities are kind of electrical transformers: they emphasize tensions, accelerate exchanges, continuously stir human lives» (Braudel, 1979, p. 547; author's translation). Between the two archetypal spaces profound relationships were established, the former providing knowledge and tools, the latter food for the survival of cities, produced beyond the necessities of rural people (Jacobs, 1969).

Marcel Roncayolo follows up, going in depth into the city-countryside relationship: the city is not only, in functional-geographical terms, «the topographic and social device that guarantees the highest effectiveness to exchange among men» but, in economic and hierarchical terms, «presents itself, in different degrees, as the place from which a territorial control is established» (Roncayolo, 1990, p. 27 and 29; author's translation).

These relationships were never just functional ones, of pure technical division of labour. They implied a mutual dependency —for subsistency on the one side and for productivity-enhancing inputs of an institutional, economic and cognitive nature on the other. These bilateral relationships were easily exploited in history by the stronger partner, using military power or more sophisticated economic means (Camagni, 1992, Introduction).

Plato, in his *The Republic*, showed to be perfectly aware of this political issue. As long as the city remained linked to primary needs and activities, an equilibrated functional specialization and exchange with the countryside took place; but when, in the course of time, it became «feverish», turning to secondary needs and developed the full array of service activities, from health to justice, arts and leisure, it needed a wider hinterland to feed its citizens, and consequently it «went to war» (Plato, 1990, p. 62-3). In Marxian terms, the city-countryside relationship turns into a «contradic-

tion» (Friedman, 1969) and economic space becomes a «relational space» of functional but also hierarchical interactions (Camagni, 1980).

In modern times, the use of strength is no more accepted, but the «contradiction» remains and is managed in economic terms, through monopoly power and control on income distribution between the two spatial archetypes. In fact, the privileged condition of the city appears in three different ways: as control-space on the social division of labour; as location of specific, selected and high-ranking activities; as ruling space on income distribution through the determination of the relative prices of urban vs. rural productions (*terms-of-trade*) (Camagni, 1992, Introduction).

According to Adam Smith, the functional division of labour between city and countryside assigns to the city the top directional activities concerning government, order, security and liberty, but also technology, administration and infrastructure management; activities that are at least partially traded against food and raw material from the countryside. The public share of these activities is financed through taxation, i.e. through power relationships. The private share - encompassing services addressed to upgrading of rural productivity (or nowadays, of the productivity of decentralized industrial activities), namely technological, organizational, financial and commercial services - finds the rationale for an urban location in its information-intensive and knowledge-intensive nature and is priced through the market; a market, however, particularly sensitive to the scarcity of supply and to monopolistic conditions.

But still in Adam Smith we find a perfect description of the unbalanced fixation of relative prices between city and countryside, taken from the medieval times, witnessing his awareness of the fact that the functional division of labour hides often a hierarchical, unbalanced relationship. «The government of towns corporate was altogether in the hands of traders and artificers, and it was the manifest interest of every particular class of them to prevent the market from being overstocked, [...] which is in reality to keep it always understocked. Each class was eager to establish regulations proper for this purpose, and was willing to consent that every other class should do the same. In consequence of such regulations, indeed, each class was obliged to buy the goods they had occasion for from every other within the town, somewhat dearer than they otherwise might have done. [...] So that in the dealings of the different classes within the town with one another, none of them were losers by these regulations. *But in their dealing with the country they were all great gainers; and in these latter dealings consists the whole trade which supports and enriches every town*» (p. 102, emphasis added...). The inhabitants of a town, being collected into one place, can easily combine together. [...] The inhabitants of the country, dispersed in distant places, cannot easily combine together» (Smith, 1976, pp. 103-104).

Recalling that in all times the city was hosting the strategic and crucial functions, and that this implies not just the capability of retaining these functions but also of continuously recreating and substituting these with new ones, we understand what Braudel sometimes called the «growing tyranny of cities» (Braudel, 1977, p. 16). Can we forecast any sort of possible «vengeance of the countryside», as consequence

of the pervasive, non-space-sensitive effects of information technologies and internet? I personally have doubts on this: the use-capability of information is still very space-selective and the evolutionary process sketched here is destined to be continuously replicated, in space (new forms of the north-south divide) and time (the ongoing revolution of creativity and knowledge-intensive activities). A formalized model illustrating possibilities and conditions for an urban/rural monopoly game on knowledge-intensive functions was built by this author many years ago (Aydalot and Camagni, 1986) and remains one of the few attempts in this direction.

Early evidence on the most recent trends in urban development following the new economic paradigm shift towards creativity, culture and knowledge shows the emergence of an already visible divide in social and also spatial terms. The new cultural and cognitive paradigm which is emerging is generating a new social polarization between a class of workers endowed with intellectual and creative skills, operating on symbols and codes and a class of low-wages manual and service workers (Scott, 2005). In a spatial perspective, this social polarisation may result in the striking confrontation of new rehabilitated and glamour neighborhoods and clusters, hosting creative production activities but also residential, cultural and leisure activities, mainly located in the inner city, vis-à-vis displaced peripheries left in squalor conditions, hosting lower and impoverished lower-middle classes. In other words, the core of the large metropolises, hosting leading edge activities, might shrink in physical size, hugely expanding its wealth, while peripheries might expand and lag behind, crashed between the impossibility of capturing advanced functions and the growing tendency of its recent specialization sectors, namely manufacturing and low quality services, to be transferred off-shore.

The hierarchical and distributive approach to the nature of cities, not sufficiently practiced up to now, raises important questions and problems in terms of its empirical testing. How to measure relative prices (terms-of-trade) between city and countryside, or between urban advanced services and rural industry and agriculture? How to disentangle the effects of the different production mix, in sectoral but also in quality terms, between the city and the non-city? How to separate the pure functional element given by quality of productions —very difficult to measure in the case of services— from the monopoly element acting directly on prices of urban productions? And, at last but more basically, how to define empirically the non-city in a (western) world where more than 80% of population is defined as urban? From which city-size does the distributive-monopolistic effect start?

A first attempt carried out in tentative and first approximation terms is presented in the following section.

5. A tentative model of income distribution in space

The three approaches to the nature and role of cities illustrated before might be synthesized in three elements: typology of productions, quality of productions (cognitive content) and their pricing. Models encompassing in a consistent conceptual framework the three approaches should be built, adequately formalized so that their

predictions could be verified statistically, and econometrically applied to reality. But empirical work is still very scarce on this subject.

A two-space model of trade between city and countryside was already quoted (Aydalot and Camagni, 1987), but it works on an abstract level. A tentative, partial and highly simplified model for an initial empirical investigation is presented here, as follows. A spatial production function is shown, referring the level of GDP of cities in a national context to the traditional factors: fixed capital and labour (K and L), with a term, population (P), indicating the presence of agglomeration economies. This term is divided by C (constant), an element indicating the minimum urban size for the appearance of a superior urban efficiency, that we interpret as a monopoly power of the city in the exchanges with the countryside. Arithmetically P/C is a coefficient: > 1 in case of presence of this distributional power and < 1 in case of dependency; in principle, it should be endogenously estimated by the model (equation 1).

The term A (usable area) has, in our mind, just an econometric meaning, as it avoids possible multicollinearity among the independent variables, and not an economic meaning: it is not meant as the contribution of the land factor to urban production, as land (and land rent) have only a distributive and not a productive role in classical economics. In a moment we will see that it is not easy to get rid of it in the determination of urban output.

$$Y = K^\alpha L^\beta A^\gamma (P/\bar{C})^\delta \quad [1]$$

Unfortunately, this equation cannot be estimated directly, as the C term merges into the constant term and it is not possible to define it endogenously in the present form. An alternative specification of the model in two steps looks more effective (equations 2a and 2b): the contribution of the traditional production factors is estimated first, and the residual (error term, referring to Y) is then regressed against population, in search of an evidence of the form of agglomeration economies. The best specification presents P at the first, second and third power:

$$\ln Y_r = \text{const.} + \alpha \ln K_r + \beta \ln L_r + \gamma \ln A_r + \ln \varepsilon_r \quad [2a]$$

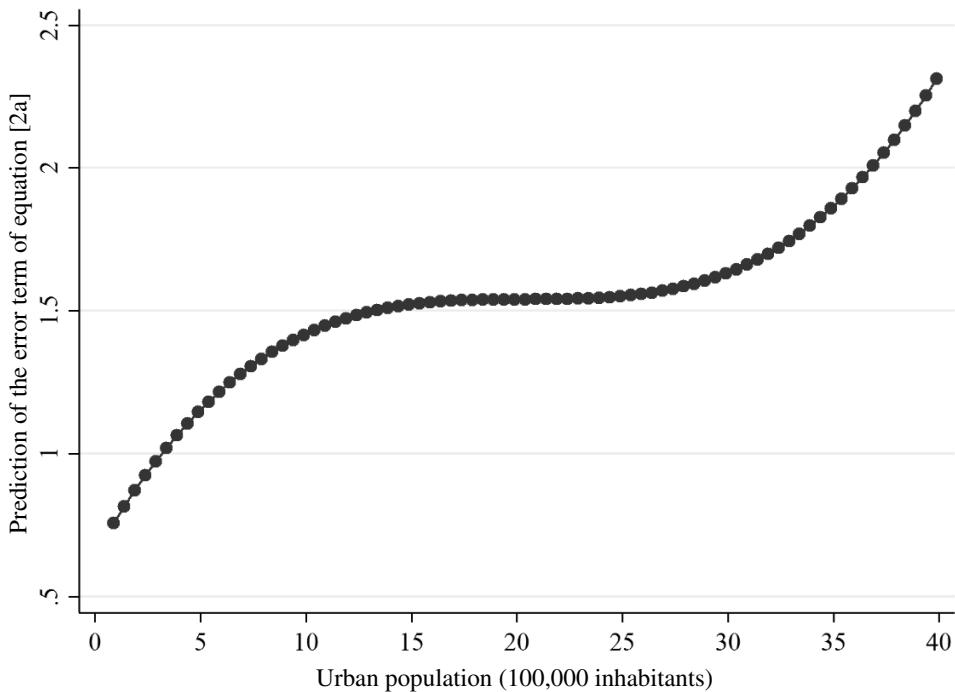
$$\varepsilon_r = \text{const.} + \delta_1 P_r + \delta_2 P_r^2 + \delta_3 P_r^3 + \omega_r \quad [2b]$$

This model is applied to the Italian metro areas, approximated by Nuts3 regions (provinces)⁴. The results look statistically robust and quite interesting: the entire model shows increasing returns to all factors altogether, decreasing returns to capital and labour and agglomeration economies clearly visible starting from the third quintile (medium-large and large metro areas)⁵ (Figure 1).

⁴ The model is estimated for year 2006; capital stock is built through the permanent inventory method; economic values are supplied by ISTAT and Eurostat; usable land comes from Corine Land Cover data, Espron database.

⁵ Some elaborations on equation 1, not shown here (with P at power 1 expressed in quintiles) indicate that the urban areas belonging to the last two quintiles, but especially to the last one, show an exponent

Figure 1. Agglomeration effects (eq. 2b): predicted values of the GDP residual of equation 2a as explained by pure population size
- Italian Provinces, 2006



Source: author's elaborations on Eurostat, Istat and Espon data.

Statistical significance of estimated coefficients in equation 2a is very good: values of α and β are reasonable also if intended as income shares; results of equation 2b are less significant statistically but acceptable given the limited ambitions of the model (Table 2 and 3).

Very large metro areas show positive and increasing returns to urban scale: size, and consequently quality and price of urban output, rise continuously at the expense of lower ranks of the urban system. Interestingly the exponent of usable land A is positive^{6,7}.

of P , namely δ , significantly higher than 1 (increasing returns to urban scale). In the other lower quintiles δ is positive but < 0 , showing decreasing returns. From Figure 1 we see that for some medium-size cities there are even no returns to urban scale.

⁶ A negative exponent was conceptually expected as expressive of the negative effects of enlarging land in presence of constant levels of the other factors. In fact, this density effect was captured in the alternative model of equation 1 recalled in footnote 5, where the exponent of A was showing a significant and negative value.

⁷ We interpret the positive exponent of A as an average contribution of land to growth and a distributive share of rents, independently to the presence of agglomeration advantages.

Table 2. Results of equation 2a: GDP generated by production factors in Italian metro areas, 2006

Variables	Coef.	Robust Std. Err.	t	P > t
Capital (ln)	0.373***	(0.115)	3.24	0.002
Labour (ln)	0.621***	(0.127)	4.88	0
Area (ln)	0.127*	(0.065)	1.95	0.054
Constant	-2.626**	(1.094)	-2.4	0.018
Observations	103			
R-squared	0.728			

Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$, $\circ p < 0.15$.

Table 3. Results of equation 2b: GDP generated by pure agglomeration economies in Italian metro areas, 2006

Variables	Coef.	Robust Std. Err.	t	P > t
Population	0.131**	(0.056)	2.35	0.021
Population ²	-0.006°	(0.004)	-1.57	0.120
Population ³	0.000°	(0.000)	1.47	0.145
Constant	0.646***	(0.149)	4.33	0.000
Observations	103			
R-squared	0.118			

Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$, $\circ p < 0.15$.

A further question and distributive issue arises at this stage: which urban social classes do appropriate the benefits achieved thanks to urban agglomeration economies? The class of urban owners of production means in terms of extra-profits? Labour, and in particular qualified labour in terms of some form of extra-wages? Probably both, at least in some part. But what about the most relevant income distribution share, the one appropriated by rent and land owners? Looking at the multiplier in unit prices of the sqm. of floorspace in the city center of large cities with respect to the centers of small cities (approximately 20 times in London and New York, 10-15 times in Milan), one would guess that rent is the major beneficiary. But also in this case, due to fuzziness of statistics on land rents and scarce attention of the scientific *milieu*, empirical evidence is scarce.

Economic theory and results achieved by the New Urban Economics may give us some hints, though referred to abstract cases. On this subject in fact a well-known theorem of rent theory states that in equilibrium the city's surplus equals, or is absorbed by, the total differential land rents (Fujita, 1989, p. 151). The surplus is rep-

resented by the difference between the total output or income generated by the city (in its equilibrium population size) and total population cost, given by the sum of transport costs, costs for purchase of all other goods and opportunity cost of land, viz. agricultural land rent; in equilibrium, it is equal to total differential land rent, appropriated by landlords. In case that a city, other things being equal —namely marginal value product of labour and transport conditions— presents a higher level of amenities and urban quality with respect other cities, it will tend to grow and will show a greater value of total land rents (*ibid.*).

But the outcome of these models depends on the general initial assumption of perfect competition on markets (and in our case monopoly powers are present!) and perfect mobility of firms and households; what does it change if the real conditions are taken into account?

Moreover, concerning profits, it is well-known that in all rent models à la von Thünen-Alonso-Fujita, in equilibrium profits are kept down to their «normal» levels by rents, which appropriate the surplus generated by social production. Given the fact that land rents are a natural condition, in spite of their nature of «non-earned incomes», and that, in a private property regime, they accrue to private land owners, the most appropriate policy philosophy in this field would be that of an equilibrated taxation (Camagni, 2016b)⁸.

The model presented has limitations and deserves more appropriate econometric specification and estimations. In conceptual terms, it could be enriched through the inclusion of other variables concerning presence of other classes of «territorial capital» — such as qualified labour and cognitive capital, innovation capability, quality of planning — in order to allow a more precise measurement of the effects of pure agglomeration. But statistical, multicollinearity problems emerge when size enters equations. Much work is —hopefully— crucially needed now on.

6. Conclusions

The paper starts from some results of the present scientific debate concerning the appropriateness of theoretical and empirical works concerning urban economics and agglomeration economies in particular, sharing the critique of the reductive character of purely functional approaches. Many scientific achievements have been attained exploiting the virtues of these approaches, residing in their strong internal consistency (within their logical assumptions) and sophisticated formalization. What appears to be left is the inspection of the true nature of cities, beyond their agglomerated physical form and the consequent (partial) economic benefits.

The paper suggests that the functional-geographic approach should be complemented by two other approaches, which allow the inspection and (perhaps) a proper

⁸ The paper presents, among other things, a prey-predator dynamic model where rents are the predator and profits are the preys, generating an urban life-cycle (Camagni, 2016b).

interpretation of other constituents of the nature of cities: what I call the relational-cognitive approach —interpreting the city as a cognitive milieu, generating knowledge, creativity and innovation— and the hierarchical-distributive one, interpreting the relationships with the non-city, the «countryside» of classical economists, in terms of control and monopolistic determination of relative prices. The former approach looks at the intrinsically generative role of the city and its capability of developing continuously new activities and functions; the latter at power relations on space and control on income distribution.

If the functional approach looks nowadays quite consolidated, the cognitive one needs still in depth reflections, as it implies the (at least partial) abandonment of methodological individualism that permeates neoclassical economics, with the advantage of better utilizing the conceptual achievements of other social disciplines. On the other hand, the hierarchical and distributive approach looks today quite unexplored.

All this opens wide space for new elaborations, on the conceptual and empirical side. A formalized model of agglomeration economies which intends to illustrate some relevant issues concerning the theme (and some econometric difficulties too) is presented here. Two main open questions emerge, both referring to income distribution: how are the advantages of increasing returns to urban scale being distributed among the production factors and urban social classes, including land owners? And how could we measure the urban power in terms of income distribution in space?

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