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Growth in post-industrial cities: an endogenous model

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Abstract

The role of the growth of new activities in an urban economy can be explained by means of three models: a supply, a demand, and a network model. First, the growth of the supply in a new sector may determine a corresponding increase in the demand and the product of the area considered. Second, cities may internally develop new sectors which may respond to the demand of local consumers and to the needs for intermediate inputs of exporting firms. Third, new knowledge promotes the continuous differentiation of the internal needs and demand of users and the reconversion of the specialized human capabilities and internal supply, thus enhancing the creation of new firms and employment. Economic growth is tightly linked with the turnover of productions and of firms, and it is determined by a Schumpeterian process of creation of new productions, new skills and new preferences which replace traditional productions, skills and preferences. According to this model, the role of national and local governments is to promote the growth of internal demand and to create institutions and physical infrastructures in order to facilitate the process of interactive learning, which leads to knowledge creation in urban areas.

1. Introduction

Internal demand, which is mainly concentrated within cities, can be a powerful driver of national growth, in both developing and highly developed countries. Moreover, especially in the modern economies like those of the European countries, cities are centres of service activities and hubs in the flows of information and in the generation of new knowledge, which plays a crucial role in determining the productivity increase and growth of the national economy.

This study highlights the difference between the growth models of industrial cities, such as many smaller urban centres, and of modern post-industrial cities, such as the large metropolitan areas, by building on the recent economic literature in three related fields: the endogenous development of local industrial clusters (Simmie 2005, Capello 2007), the regional development of knowledge-intensive business services (Mueller and Doloreux 2009, Cappellin 2009), and the regional factors of innovation and knowledge creation (Fagerberg 2005, Tidd, Bessant and Pavitt 2005, Asheim, Boschma and Cooke 2007).

In particular, the aim of the study is to demonstrate that economic growth in large modern cities is following an 'endogenous model' where continuous changes in internal demand play a leading role in determining the creation of new firms and employment, and to demonstrate that internal demand and internal supply are closely integrated by knowledge flows, and not only by monetary flows. This model is different from that of smaller urban centres, where the growth of industrial exports is the driving factor of the economy, according to the typical Keynesian multiplier model.

The study first analyses the factors of the increasing importance of service activities in a national economy. It then highlights the differences between traditional industrial cities and post-industrial metropolitan areas. Third, it illustrates three models: a supply, a demand, and a network model which explain that the process of economic growth in metropolitan areas is to a large extent an endogenous process based on the growth of internal supply and demand, rather than being the result of the growth of the national and international economy and of the mobility of different activities among the various locations. In this framework, the role of national and local

governments is that of providing key institutions and physical infrastructures in order to facilitate the process of interactive learning which leads to knowledge creation by firms and people. This highlights that the new engines or drivers of the economy in a modern city are increasingly the emerging needs of citizens, rather than exports, and that cities and regions may have a key role in policies aiming to stimulate a recovery of national economies from the 2008-2012 financial and economic crisis.

2. The role of services from an intersectoral perspective

The transition to a service economy, or the evolution toward a modern industry where service functions have a leading importance, is the result of the evolution of knowledge, as illustrated by Figure 1. In particular, the interdependence between goods and services can be analysed from three different perspectives: a) the structure of demand, b) the structure of production, c) the structure of the labour force (Cappellin 1986 and 2009). First, new knowledge determines the increasing importance of services in final demand and personal consumption. It then leads to increased use of intermediate services by the industrial sectors because firms may outsource service functions to KIBS (knowledge-intensive business services) and also purchase services (such as R&D and consultancy), which represent immaterial investments, from external firms. Finally, new knowledge and innovation increase the importance of service functions and occupations within industrial firms because the labour force within those firms increasingly perform non-manual or service functions, such as R&D, design, marketing, management and finance.

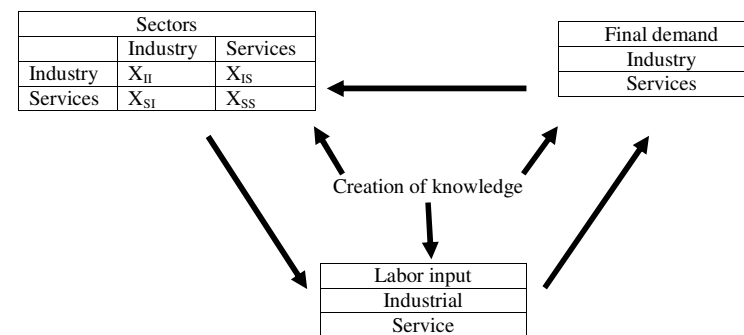


Figure 1:

Knowledge changes the demand, the production sectors and the production factors

According to a network approach (Cappellin and Wink 2009) to urban economic development, cities are clusters of service activities such as: finance, hotels, leisure, sport, personal transport, ICT, security, wellness, health, social welfare, education and culture. The firms in these sectors are linked together by intense flows of services, people, information, knowledge, and also of financial resources and investment. Hence, the relationships among the service firms within a city are very similar to the tight relationships existing among the industrial firms within an industrial supply chain or a territorial industrial cluster.

The complex interdependencies among the various service sectors in a local economy explain how the growth of a new service sector or the birth of many new firms within existing sectors increase the demand for the intermediate inputs produced by other service sectors and activate an intersectoral

multiplier effect which can be measured with an input-output model. Second, the growth of a new service sector enhances the growth of other complementary service sectors, which may be jointly used by the same customers. Third, an exogenous increase of production in a specific service sector increases the overall employment and income in the urban area considered, and it has a positive Keynesian or income multiplicative impact on the final internal aggregate demand, on demand for the other services, and also on the demand in the same new sector that initially activated the process.

3. The evolution of cities: a network approach

The transformation of the modern economies into services and the increasing concentration of these latter within cities explain how the globalization of firms, markets and knowledge is occurring, together with the increasing preference for cities by the most innovative firms and the most qualified workers.

In an industrial economy, production concentrated either in 'industrial clusters', characterized by interdependence among numerous small and medium-sized firms, or in 'company towns' organized around a large 'Fordist' or vertically integrated company. The industrial city (1900-1970) was characterized by home-to-work commuting, large physical structures such as production plants and machinery and housing, the importance of the exploitation of economies of scale and of modern technologies. Thus, medium and large industrial cities, like Milan and Turin in Italy, were characterized by the intense concentration of industrial firms until the end of the 1960s. Later, during the 1970s, industrial activities started to decentralize to less congested areas. This process contributed to the creation of the well-known 'industrial districts' (Simmie 2005, Capello and Faggian 2005, Cooke 2006) in neighbouring rural areas and it explained the increasing specialization in services by the large and medium-sized cities.

In fact, the share of industrial employment in total employment in Italy and also in the other developed economies is very low (12.3%) in the largest municipalities (with more than 250,000 inhabitants) and it is less than one third (38.9%) of that in the smallest municipalities (with fewer than 10,000 inhabitants), while the share of service employment in total employment in the largest municipalities (80.7%) is much larger than in the smallest municipalities (48.7%) (Cittalia 2009).

Much of the literature on urban growth explains urban agglomeration as the result of agglomeration economies, which are defined as the factors leading to agglomeration. This is clearly a tautology unless a micro-analytic foundation is given to agglomeration economies. Cities are also a particular form of organization which regulates the transactions among many firms and households. The various forms of spatial settlement, more or less concentrated, represent different modes of organizing the interdependent relationships among the various firms and households in a national economy (Cappellin 1988). The increasing importance of transaction costs (Williamson 1981) is related to the increasing importance of service activities in the national and urban economy, and it entails a change in industrial organizational forms and also in the organization of territorial settlements. A large city may be more efficient than a system of many smaller competing cities or a rural settlement pattern because of economies of scale in production. However, other factors may explain the crisis of an overly concentrated settlement pattern. When the number of firms is too high, transaction costs increase, and this decreases the agglomeration economies and may induce new firms to develop in smaller urban centres (Cappellin 1988). This may explain why, in the case of European countries, an urban system made up of medium and small cities is more efficient than concentration into a few large metropolitan areas – differently from what occurs in the recently

industrialized countries, where urban concentration is explained by the intent to exploit economies of scale in the new industrial activities.

In a modern economy, the increasing role of cities is closely bound up with the increasing importance of information and knowledge, and with continuous changes, such as new technologies, new production processes and new organizational forms. Cities are now at the centre of a long-term transformation of the national and international economy into the model of the knowledge economy, and new types of services, both for firms and people, are concentrating within cities.

Large firms in scale-intensive sectors, such as automobile manufacture, and small and medium-sized firms in the specialised supplier sectors, such as machine tools, are still important in developed and developing economies, but they are decentralizing to non-urban areas. By contrast, the increasing role of cities is related to the increasing importance of the following strategic sectors in a modern capitalist system:

- services for individual consumers, which mostly develop in the metropolitan areas where the largest part of the national population is concentrated,;
- large collective or network services, such as air and rail transport, telecommunications, energy networks, water networks, whose main nodes in the links with the other non-urban areas are the largest cities;
- financial services, such as banks, stock exchanges, insurance companies, which are concentrated in the global cities, where they have an easier access to information;
- high-tech firms, which are concentrated in the large city-regions where there are important universities, research centres, and large pools of high-skilled labour.

In fact, rapidly swelling mega-cities around the world have become much more important for corporations, given that the 600 largest cities account for about half of the world's economic output: a figure that is expected to rise (McKinsey Global Institute 2011, The Brookings Institution 2012).

In a modern economy based on knowledge and innovation, the relationships between the large multinational companies and the cities where they are located become tighter. Cities are the financial centres where access to capital is easier. Cities have a more diversified production structure, which makes it easier for firms to find specialized suppliers. Cities are the centres of the market for new goods and services. Cities are the locations of universities, research centres, and the pool of the skilled labour increasingly needed by innovative firms. Skilled workers belong to specialized professional communities whose hubs are the large cities, and these workers are also wealthier and more expert consumers open to the consumption of innovative products. Cities are the centres of fairs and markets and the places where it is easier for firms to access the specialized information crucial for identifying new business opportunities. Cities are the centres of the public institutions, which have great power in promoting the development of new production sectors through appropriate regulations.

The difference between the post-industrial city, which has evolved since the 1970s, and a traditional industrial city does not consist in the skyscrapers and the large office developments which, especially in newly industrialized countries, are promoted by a city marketing policy and by famous architects as the landmarks of the self-confidence determined by a recently achieved industrial strength. The key characteristics of modern cities seem rather to be the increase of flows and the need to have access to information, as indicated by: a) mobility during working time for business meetings and also during free time for shopping and for social purposes, b) the close interactions among people necessary for the creation of new knowledge by both firms and individual workers, and c) the increasing need for socialization among citizens. A second related characteristic of

modern cities is the high diversity of people, firms and actors from different sectors, cultures, regions and countries.

Thus, in a knowledge economy, the economic and social system of a metropolitan city-region resembles a 'puzzle' made up of disparate information, knowledge, structures, people, and also different policy agendas. As in the story of the city of Babel the confusion of languages divides the various groups and may render them unable to understand each other. However, this apparent disorder of the various material, human and immaterial elements which make up a modern city creates a stimulating environment and drives local actors in a continuous search for a harmony, design or formal order within the city. On the one hand, the creation of a new order or the intelligent solution of this 'puzzle' requires the creation of new knowledge, which is the original combination of previous pieces of knowledge. It also induces the policy-makers to search for a common identity, or for some forms of governance or compatibility among the various and often conflicting actors within the urban community, in order to achieve greater social cohesion, security, and well-being.

4. The endogenous process of economic growth within cities

The process of economic growth in a city is to a large extent endogenous or determined by internal factors within the urban economy considered, rather than being the result of the growth of the national and international economy and of the mobility of the different activities among various locations. The role of new activities in the growth of an urban economy can be explained by means of three models: a supply, a demand, and a network model.

This study focuses on the role of internal demand and services in urban growth because personal consumption represents 57-59% of GDP in the European countries, and private services represent almost half of the total private consumption in Europe, with their share increasing in the long term. Moreover, transport, commercial and other services are important inputs to the production of the industrial or agricultural goods demanded in an urban area. Finally, also public services should be considered. This explains why services represent more than 80% of employment in the largest urban areas of developed economies.

The sectoral diversification of the urban economy

We may suppose that the total product ($Y_{s,0}$) in period 0 is equal to sum of the products of $n-1$ sectors (Y_i):

$$Y_{s,0} = \sum_{i=0}^{n-1} Y_i$$

and that the product of each sector is equal to its demand (C_i). This latter depends on the average propensity to consume (c_i) and the total product of the local economy (Y):

$$Y_i = C_i = c_i Y$$

The average propensities to consume of all $n-1$ sectors add up to unity:

$$\sum_{i=0}^{n-1} c_i = 1$$

If there is no saving and no exports or imports, it follows that the total demand Z is equal to the total supply Y_s .

$$Z = \sum c_i Y = \sum C_i = \sum Y_i = Y_s$$

Thus, the creation of a new sector (Y_n) would determine an increase of the total product in the area considered.

$$Y_{s,1} = \sum_{i=0}^{n-1} Y_i + Y_n$$

This would require a corresponding change in the demand of the various sectors because the marginal propensity to consume (c_i) of the $(n-1)$ previous sectors should decrease in order to accommodate the demand of the new (n) sector, where 0 and 1 indicate the two time periods.

$$\sum_{i=0}^{n-1} c_{i,0} = 1 = \sum_{i=0}^n c_{i,1}$$

However, the increase between the two periods of the total product may also determine an increase in the demand of the previous $(n-1)$ sectors, and this may at least partially off-set the above indicated effect related to the decrease in the marginal propensity to consume due to the consumption of the new good.

In particular, the higher total product and the decrease in the marginal propensity to consume the previous goods may determine an increase in demand for the new good, by an amount which exactly corresponds to the initial increase in the production of this good.

This model corresponds to a classical approach where the supply creates its own demand. This indicates that in an urban area which is large enough for imports and exports to represent a minor proportion of the total product, the growth of the supply of a new sector may determine a corresponding increase in the total product of the area considered, and in the demand of the same sector, provided that there is a corresponding change in the marginal propensities to consume of the various goods and services.

The initial growth of a new sector may be due to the behaviour of innovative 'lead users' willing to try out a new good or service and to use their cash balances to finance this new expenditure. It may also be the result of public policies which provide the new good or service and finance it through taxation.

However, the result does not change if there are interregional flows of products and production factors and if we suppose, according to a neo-classical approach, a high interregional mobility of production factors such as labour, capital and technology. That implies the existence of fully competitive markets of products and services and of a perfect elastic demand of the various goods. In fact, in this case, the growth of a city would be linked to its capability to attract people and investment from other regions, and the local firms could sell all their output on the national and international market because the only limit would be their production capacity at the current national and international price. Thus, the increase in the aggregate supply determined by the creation of a new sector, oriented to local demand, would automatically increase the local product of the area considered, provided that it attracted adequate production factors from abroad.

In conclusion, this model highlights that local income and employment may be enhanced by urban policies which promote the growth of new sectors addressed to satisfying the new emerging needs of citizens in the urban area considered. This represents an alternative to the traditional policy which links the growth of an urban economy only to the growth of exports.

The increasing city concentration of services

The previous case was that of a completely autarchic economy. The reverse case would be that of a company town which exports the entire local production and where the income of the local workers is spent entirely on externally produced goods. However, we may consider an intermediate case where an urban economy is partially open to the external world and there are flows of exports and imports. In this economy, imports represent a leakage in the process of income creation, and exports represent an autonomous component of the demand. This model corresponds to the economic base model (Evans 1985, Capello 2007), and to the Keynesian approach according to which the aggregate demand determines the aggregate supply: precisely the opposite of the classical approach indicated above.

In fact, if (X) denotes exports, which are exogenous, (M) denotes imports, and if there is no investment in the economy considered, then the following identity holds:

$$Y = C + X - M$$

If consumption (C) is determined by the product (Y) and imports are determined by consumption and exports:

$$C = C_0 + c_1 Y$$

$$M = m_1 (C + X)$$

where C_0 indicates autonomous consumption and c_1 and m_1 indicates the marginal propensity to consume and to import. We thus obtain:

$$Y = C_0 + c_1 Y + X - m_1 C_0 - m_1 c_1 Y - m_1 X$$

If k , which is similar to the Keynesian income multiplier, is defined as:

$$k = (1 - c_1 + m_1 c_1)^{-1}$$

then the urban product is given by:

$$Y = k (C_0 + X) (1 - m_1)$$

According to this expression, an increase in the marginal propensity to import (m_1) would lead to: a) a decrease in the initial value of the exogenous demand components (autonomous consumption and export) and b) a decrease in the value of the income multiplier (k) as the marginal propensity to import determines a leakage in the process of income generation.

In order to increase the product of the area considered, an urban policy should seek to reduce the value of imports. This may be achieved by internally developing new sectors which may respond to the demand of local consumers and to the needs for intermediate inputs of exporting firms. In fact, a

city's economy may expand because the growth of the internal market allows the gradual overcoming of the barriers to entry into new services which were previously imported from other cities and regions.

Moreover, the local income may be augmented by an increase in exports led by policies improving the competitiveness of local productions. A third policy strategy is to increase the autonomous consumption (C_0). This last case is similar to the one considered in the previous model, where new sectors may emerge from the demand of 'lead users' who want to try new goods or services and use their cash balances to meet these new expenses. That has a positive impact on the local economy and leads to the growth of new productions.

An apparent shortcoming of this model is that it does not consider the equilibrium in the external balance between exports and imports. In fact, a traditional argument is that an urban area could not thrive in the long term if it 'lives beyond its means' or when there is a disequilibrium between internal demand and internal supply. This argument is often used to advocate the role of industrial activities in urban growth because industrial products can be exported over longer distances than services and could permanently sustain the income of the area considered. Thus, according to a traditional view, services would perform only a passive role because they were addressed to the local market, and almost by definition could not develop if there were no demand by the industrial activities. In particular, according to Thirlwall (1980), the equilibrium in the balance of trade requires that the growth rate of imports should be equal to the growth rate of exports, and this implies that the growth rate of the internal aggregate product is equal to that of exports.

However, a first reason for the ever-increasing specialization of large metropolitan areas in service productions is the fact that services initially developed for internal use are later exported, since university education, medical, legal, financial, management consulting, advertising, international trading, public administration services can be exported to distant areas. Moreover, cities attract large tourist flows which enable the accumulation of large incomes which can later be spent on the purchase of industrial goods produced in distant regions and countries.

Second, the continuously decreasing industrial base of a city may be accompanied by an increase in the production of services addressed not only to the city's local population but also to the population and firms of the surrounding areas in the same region. Thus, the industrial firms in the surrounding areas may export almost all their products to other regions and countries, and since these sub-urban areas cannot find the necessary services locally, the latter are imported from the neighbouring cities. Reciprocally, these cities cannot produce all the industrial products consumed by the local population and firms, and these products may be imported from other regions and countries. Therefore, cities may use the revenues obtained from the sale of services to the surrounding regional industrial areas in order to purchase the goods imported from other countries, so that the positive balance of trade with the neighbouring regional areas can off-set the negative balance of trade with other regions and countries.

Finally, an important reason for the persistence of a negative balance of trade between exports and imports of goods and services in a large metropolitan area is the fact that this deficit may be compensated by a positive balance in current transfers and/or in the financial account. In fact, cities are linked to other regions in the same country, and even internationally, not only by the imports and exports of goods and services but also by the flows of non-labour income (profits and interests), by public financial flows (taxes and public expenses), and by capital flows (saving and investment). In fact, the public revenues from national taxes are spent in the cities to build expensive infrastructures and create public services for the entire region or country. Moreover, saving is collected in other regions and countries by the large banks located within cities, while credit for

investment is distributed to a large extent to actors located within the cities. Finally, wealthy people from all over the world prefer to move to large and modern cities, as evidenced by the rich foreign citizens moving to London. Thus, the share of financial wealth accruing to the residents of cities is far larger than that accruing to the people in the rural or industrialized areas, and this attracts capital flows and interest and profits flows to the cities.

We may therefore conclude that the economic base of cities is not represented by the few exporting industrial activities still remaining within cities, but rather by service activities, and that the growth of internal demand in large metropolitan areas is the driver of local employment and of a process of self-sustaining long-term growth.

Knowledge and the differentiation of the aggregate supply and demand within cities

While the supply and the demand models illustrated above have an aggregate nature, a network approach allows explaining that a key factor of urban growth is technological change, and that this latter is largely endogenous within cities.

Knowledge is a special good which is not depleted with use; rather, it can develop gradually together with the same use through the original combination with previous knowledge. Technological progress is closely linked with changes in the organization of actors, ideas, and neuronal structures in individual minds. In the case of an individual worker or consumer, a change in behaviour such as an increase in his/her working capabilities, or a change in his/her consumption preferences, is the result of new neuronal connections in his/her mind. On the other hand, in the case of firms a change in technologies is linked with changes in the division of labour and in the organization of networks of relationships with suppliers, clients and competitors. Technological change can thus be interpreted as a gradual or recursive change in the organization of a regional innovation system which induces each producer and each user to identify their best role in the localized network considered (Cappellin 2003). The structure of this network evolves over time from previous structures of the same network and according to physical, organizational/institutional and cognitive proximity among the various nodes of the network.

It is clearly no easier for an industrial or regional economist to predict the evolution of technological change than it is for macro-economists to predict an economic crisis and agree on macro-policies. However, there is increasing consensus within innovation theories on a set of strategic factors which, according to a cognitive perspective, may be considered the drivers in the process of interactive learning (Lundvall and Johnson 1994). In particular, according to the 'territorial knowledge management' approach (Cappellin 2007, Cappellin and Wink 2009), knowledge creation by firms and people is the result of six drivers: a) external stimulus, b) accessibility, c) receptivity and attractivity, d) identity, e) creativity and f) governance.

The process of interactive learning and knowledge creation is thus enhanced by spatial accessibility among the various actors. From this perspective, cities enjoy a competitive advantage with respect to rural areas because the large size of the urban economy allows a greater number of both consumers and producers. Cities have large markets, and this ensures a wide variety of potential clients, a great variety of consumer preferences, and high demand for new activities. Moreover, many workers and firms are located in a city, and this ensures the access to a large pool of competencies.

Cities are also more open to the external world and they are more accessible to distant customers and/or suppliers. This ensures both an external stimulus and easy access by cities to complementary knowledge, and it accelerates the process of innovation within cities.

The greater variety within cities facilitates creativity or the original combination of the previous knowledge of producers and consumers. Moreover, it leads both to the discovery of new improved goods and services by producers and to the development of new needs by users. This process also gives rise to the creation of new firms.

Both consumers and firms interact with other consumers and firms. Consumers do not consume only for their individual physical survival; rather, they seem to search for greater visibility and reputation with other people, and this induces them to adopt a new pattern of consumption. On the other hand, firms search for competitive advantage with respect to other firms, and this induces them to develop new productions and new technologies.

Hence knowledge does not affect only the structure of the 'production function' of firms but also the 'utility function' of people, and it affects both the demand for labour by firms and the demand for goods by consumers, as indicated by the model described in Figure 2.

The creation of knowledge by firms and people does not consist of two separate processes. Rather, it is the result of the tight user/producer interaction typical in the case of services, where there are no stocks because the production and the use of a service occur at the same time. Moreover, people interact within large specific 'urban professional communities' made up of the producers and users of the same service, and this leads them to share the same know-how and to learn new needs and new production skills (Chesbrough 2011).

First, greater knowledge has an impact on the demand for and supply of labour. New knowledge induces firms to increase their demand for more skilled workers, and it induces households to supply more educated workers to firms. Firms exploit the new individual competencies of the workers and combine them in order to adopt the new production technologies needed for the production of new goods or services, and also in order to increase productivity in the traditional productions.



Figure 2: The process of urban growth and the creation of new needs and new skills

Second, greater knowledge also has an impact on both demand and supply in the markets of goods and services. It leads to the development of new needs by people and to an increase in the demand for more sophisticated and innovative goods and services. In particular, the success of the new products induces other producers to imitate the first innovators and many other users to adopt the new preferences of the 'lead users'. Thus, the new products are selected in the competition with the traditional products and gradually replace them, while they will be replaced in their turn by ever new products in the future.

The greater productivity of workers leads to an increase in wages paid by firms to workers. These higher incomes of the workers are crucial for creating the additional demand needed by the firms to produce new products and services.

Firms are stimulated to specialize and to reconvert from the production of traditional products and services to the production of innovative products and services. The tight interaction among the various firms, the availability of a skilled labour force within cities and the combination of their respective competencies stimulate the birth of new firms, which often arise as spin-offs from existing firms.

The development process in urban areas is thus based, on the one hand, on the increasing differentiation of local consumption and the growth of new needs by households and firms and, on the other hand, on the continuous reconversion of firms and the labour force from traditional services to more modern ones.

This process of continuous differentiation of the labour supply and the production capabilities of the firms, together with differentiation of the pattern of demand by urban citizens, may be defined as a process of 'endogenous growth' because it does not depend on the growth of external demand and on the attraction of investments from other regions and countries. By consequence, economic development in modern metropolitan areas is different from the export-led urban development of highly specialized 'company towns' during the early industrialization phase of the national economy, and also of the many small and medium-sized cities which base their growth on the attraction of external investments and employers in an increasing globalized economy.

Economic growth is determined by a Schumpeterian process of creation of new productions, new skills, and new preferences which replace traditional productions, skills and preferences. In fact, new productions are created and traditional productions are dismissed and a turnover of productions and firms occurs. Moreover, the process of learning in consumption induces consumers to develop new needs. Thus a turnover in demand for products/services occurs together with the turnover of products/services. In fact, the new needs are not completely new because new services replace traditional services in order to satisfy the same needs, which already existed although in a less sophisticated form, and new vertically or horizontally diversified services replace traditional services.

This process of increasing specialization and market selection is very similar to the creation of variety and the increasing division of labour through the birth of new firms described by the modern evolutionary approach, and also by Marshall (1920) in the case of the 'industrial districts' consisting of small industrial firms, where the division of labour and increasing returns are more the result of a dynamic process of learning, variety creation and specialization than the result of static economies of scale, as in Adam Smith's approach.

This model is also similar to the model developed by Pasinetti (1981 and 1992) that considers the case of producer learning, which results in productivity growth and product innovations, and of

consumer learning, which leads to the adoption of new consumer goods and a change in the composition of final demand. The diffusion of new consumer goods requires not only the use of new knowledge in production technologies but also new knowledge among consumers, who learn new preferences and discover new needs. A higher per-capita income entails a qualitative change of preferences, which shift towards higher quality goods and services. It also entails a quantitative increase in the demand for goods which allows the increase of output capacity in the aggregate supply to be balanced by an increase in the aggregate demand.

Differently from Pasinetti's model, however, the preferences of consumers in my model do not depend only on per-capita income according to the Engel's law, but also on the increasing free time allowed by higher labour productivity, and on a process of interactive learning with other consumers which may occur in the long term even if per-capita income remains constant. Moreover, my model considers not only the effect of new knowledge on the behaviours of people as consumers but also the learning activity of workers which leads to improved competencies. This is a process distinct from the learning process within firms, because the latter must introduce product and process innovations, and they must recruit workers with the skills most suitable for use in the production of those new goods and services demanded by a continuously evolving market.

A key problem in the economy is that the new demand for new goods and services does not automatically correspond to an increase in aggregate demand because the demand shifts from the traditional goods and services which enter crisis to new goods and services. Consequently, the new productions should be matched by new demand for those same productions.

This balance is more easily ensured in the case of services, where stocks are not feasible because the delivery of a service by a producer should be accompanied by the use of the same service by the customer. A second case of balance between supply and demand occurs in the case of 'user innovations' (Von Hippel 2001), where an individual actor produces a new good to respond to his/her own specific and important need. A third case is that of the above-mentioned 'innovation communities' where the correspondence between demand and supply is gradually achieved through continuous interactions and a trial and error process, since both producers and users participate in a process of interactive learning and in the development of product innovations.

Moreover, this balance is facilitated by the long-term increase in aggregate demand and aggregate supply. On the demand side, the improvement of labour competencies allows an increase in productivity and wages and an increase in aggregate demand. On the other hand, on the supply side, firms can increase their production capacity in individual productions and can leave the less profitable traditional productions, in order to reconvert to more modern productions with higher unitary prices. This leads to an increase in GDP due to both a quantity and a price effect.

This urban endogenous development model extends to the case of an urban economy specialized in service activities the cognitive-systemic approach which explains the growth of regional industrial clusters of small and medium-sized industrial firms as resulting from the greater productivity of local resources (Cappellin 2003, Cappellin and Wink 2009, Cappellin 2011).

This study has focused on the internal demand and on the immaterial investment in knowledge creation by firms and people and this focus is especially appropriate for a post-industrial urban economy, where these variables play a key role. However, the analysis may be extended to consider exports and material investments. Finally, according to this model, the role of national and local governments is that of promoting the growth of internal demand, and of providing key institutions and physical infrastructures in order to facilitate the process of interactive learning which leads to knowledge creation.

5. Conclusions and policy strategies.

This study has analysed the changing structure of production and consumption in post-industrial cities by building on the recent economic literature in three related fields: the 'endogenous development' of industrial clusters, the regional development of knowledge-intensive business services, and the regional factors of innovation and knowledge creation. It has demonstrated that the evolution to a knowledge economy enhances change in four related fields of modern metropolitan areas: a) the labour market, b) the pattern of consumption, c) the physical structure of the city, and d) the forms of governance. These changes consist in an increasing share of 'knowledge workers', an increasing need for new services, 'club goods' (Buchanan 1965) and 'relational goods' (Becchetti, Pelloni and Rossetti 2008), increasing physical mobility and social diversity of people, and the need for new governance approaches facilitating the coordination of an increasing number of different actors. Large urban areas are characterized by higher external and internal mobility, and by a greater diversity of firms and people that make them similar to a 'puzzle' or a 'network'.

Differently from the traditional Keynesian approach, where marginal increases in demand, and especially in exports to other regions and countries, lead to marginal or additional increases in supply or in GDP, services in large metropolitan areas develop according to an 'endogenous model' based on the growth and differentiation of internal supply and demand. New knowledge has an effect both on the demand for goods/services by people and on the demand for labour skills by firms. It has an effect both on the supply of product innovation by firms and on the supply of new skills by a more qualified labour force.

Hence the development of new consumption patterns is a gradual learning process because the demand for these goods and services is often only latent or implicit. New services develop owing to a process of increasing differentiation of the needs of users and of reconversion of specialized human capabilities within firms to new services.

The three models illustrated in this study demonstrate that urban growth can be determined by the development of internal demand, rather than by exports to external markets. It is also possible to state that the new engines or drivers of the economy in a modern city are the emerging needs of citizens, rather than exports.

In a modern knowledge economy, policy strategies to promote urban competitiveness and growth in large metropolitan areas should differ from the traditional 'export-led' strategy usually adopted in smaller industrial cities, and they should focus more on internal demand. In fact, post-industrial cities, and especially large metropolitan areas, are different from the traditional industrial cities, such as many small urban centres, where the economy depends on the exports of a few large industrial companies.

In developed countries like those of Europe, there are numerous economic needs and production fields which, from a long and medium-term perspective, still seem underdeveloped and which may represent opportunities for profitable investment by public and private organizations. Thus, the weaknesses of the European cities are indicative of untapped potential not only at the local level but also for re-launching national growth. New investments would not only increase the competitiveness of the national economy in the medium term, they would also have an immediately positive impact on aggregate demand and GDP.

A policy agenda for the economic development of urban areas can be based on numerous new investment initiatives, for example: material and immaterial investments in innovation, investment in research and innovation, the launching of large strategic investments organised by networks of

firms and greater than the capacities of individual firms, investments in tertiary education and continuous learning, investments in new employment of young high qualified workers, enhancement of back-to-work programmes for retired people, investments in energy saving in urban buildings and in renewable energies, protection from natural disasters and improvement of the natural environment within cities, development of healthy nutrition needs and of agro food products close to urban areas, investments in tourism, cultural activities and activities related to free time, sociability and sports, investments in health and wellness services and development of social services for an increasingly socially fragmented population, investments in metropolitan and sub-urban rail links for commuters and investments in international air links and in freight rail-transport, enhancement of social services provided by philanthropic and non-profit organizations, new housing for low income households, improvement of the efficiency and quality of the public services, investments in the fight against organized crime and in the control of corruption in public and private organizations, etc.. This strategy of development is compatible with that indicated in the "Europe 2020" communication of the European Union (European Commission 2010).

However, a change in the fields of policy action should be also accompanied by changes in the forms of public governance, and by an enhancement of the initiatives by private actors. In fact, the development of new goods and services is problematic because the new products and services often have the nature of 'club goods' or 'relational goods', and no individual actor could on its own produce the good or service considered. They require ex-ante coordination by a specific public or collective actor, which should anticipate the large investment required. In conclusion, the development of new products and services and the creation of new specialized private firms, and of new employment, require the creation of 'new markets' (or 'lead markets'). This is different from both the 'free market' and planning approaches (Hall and Soskice 2001, Cappellin 2010).

In particular, in order to enable the production of these new goods and services, it is necessary to exploit economies of scale and overcome specific thresholds. Consequently, a highly fragmented demand expressed by numerous potential users should be aggregated. Different individual needs should in some way be standardized by means of a regulation system of the production and use of the new goods and services. The definition of common standards and the adoption of procedures, protocols, and fiscal measures would enable interaction, competition, and collaboration among various actors, and it would transform implicit needs into explicit economic demands, enhancing the creation of new markets and then of new firms. A possible conclusion is that investment decisions in a modern society are increasingly collective in nature, and individual producers cannot satisfy new emerging needs because these require a collective, though not always governmental, provision.

Finally, the creation of new markets requires coordination at the local level. Cities and regions are closer to people and firms, and they can be more efficient than national governments in aggregating local needs and the capabilities of people and firms, and in stimulating private consumptions and investments. Therefore, the strategy of national development suggested by this study cannot be implemented without a greater role of cities and regions, and it cannot be left only to national governments.

6. References

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