

Agglomeration Economies in Semi-industrialized Countries: Evidence from Argentina

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Abstract: This paper identifies and problematizes three gaps in the existing literature on agglomeration economies. First, it argues that the ontology of agglomeration economies, the way in which these economies are conceptualized, needs to be revised. Far from being something “in the air” for all firms to profit from them, tapping these economies requires a conscious and sustained effort from firms. Second, it takes issue with the idea that the functioning of agglomeration economies in semi-industrialized countries can be read off simply from the experience of industrialized ones. Third, the paper challenges current ideas on the geographical extent of urbanization and localization economies within a metropolitan area. The empirical evidence gathered from a detailed survey of 134 manufacturing firms in the automotive and steel sectors located in the Buenos Aires Metropolitan Region (BAMR, includes the city proper and the surrounding suburbs) allows us to conclude that localization economies are not necessarily confined to neighbourhoods.

Keywords: agglomeration economies, Argentina, automotive industry, external economies, linkages, semi-industrialized countries, steel

JEL classifications: R12, P23, P25

1. Introduction

The central argument of the paper is that the analysis of external economies in a country such as Argentina provides an excellent opportunity to challenge the way in which these economies are normally visualized. The paper focuses on three issues related to external agglomeration economies: (i) the ontology, the way in which these economies are conceptualized; (ii) their specificity in semi-industrialized countries; and (iii) the geographical reach of these economies.

Firstly, whereas the traditional view is that such economies exist within a certain city or part of a city as a result of the agglomeration of economic

activity, we will argue that far from being “in the air” (Marshall, 1890) they only exist when firms are capable of profiting from them. The paper provides empirical evidence that shows a correlation between internal capabilities and the appropriation of external economies. Thus the paper also responds to speculative arguments in the literature about the need to examine external economies in their connection to the inner workings of the firms (Caniëls and Romijn, 2005; Rasiah, 2009). In a semi-industrialized country such as Argentina, certain structural conditions (size and shallowness of markets, economic instability, lack of trust)¹ limit the extent of external economies. This means that only those agents with higher internal capacities can actually benefit from external economies (Yoguel and Boscherini, 2001). Thus, the specific Argentinean case may provide a unique opportunity to show that these economies require a very active role from the firm side. As we will argue further on in this paper, the general assessment we make of agglomeration economies in a country such as Argentina is somewhat sombre and challenges the views held by other writers such as Scott (2002) and Fan and Scott (2003), about the recent experience of less industrialized countries. For Scott and others, at least some regions in some semi-industrialized countries seem to be arriving at the land of increasing returns and cumulative causation. Our view is a little bit more cautious at least with respect to agglomeration economies associated with firms’ interactions and the morphology of production networks. Our view can be more incisive because it is based, in part, on a very detailed empirical study where we have actually gone beyond the general perspective which can be gained from secondary data.

Secondly, the paper argues that the existing literature has underemphasized differences between production networks in industrialized and semi-industrialized countries and a specific statement about semi-industrialized countries is needed. Agglomeration economies provide a perspective which is particularly geared to a qualitative examination of these networks. So far the literature has recognized historical variations in agglomeration economies but has only hinted at their geographical variation (Phelps and Ozawa, 2003). This is very surprising because a sizeable part of the bibliography on agglomeration economies can be found in journals of geography and urban planning. Even some recent papers that deal with production networks and agglomeration economies in semi-industrialized countries such as Turkey and India make little effort in theorizing the specificity of these cases and their differences from industrialized countries. Can these cases be interpreted in the existing theoretical framework derived to a large extent from the experience of industrialized countries without allowing for their own specificity?

Argentina has attained an intermediate level of development. Perhaps it can be placed a step behind some of the larger BRICS countries (Brazil,

Russia, India, China, and South Africa) though it shares with them a number of traits. This intermediate level of development can be appreciated not only in the general economic aggregates but also in more subtle ways such as the structure and functioning of production networks. This means, for example, that although the country produces steel and cars and has been able to build some capabilities in academic and technological areas, Argentina has been unable to make a more systemic exploitation of these productive and scientific advances. In this regard, what Argentina and a number of other countries (perhaps to a much lesser extent Russia itself) share is the inability to connect and to organize dispersed and underutilized assets (a general characteristic of underdevelopment identified long ago by Albert Hirschman based on his practical development experience in Colombia). A potentially fruitful way of examining to what extent firms are able to tap resources located beyond their legal limits but within their physical proximity, is the examination of production networks through the lenses of external economies. This paper thus joins a line of writings by writers who have tried to problematize the intangible (and critical) dimensions of productive networks (Storper, 1997; Maskell, 2001 among others).

Thirdly, the paper challenges two premises held in the literature on economies of agglomeration on geographical reach – that geographical proximity need not translate into greater interaction and that urbanization economies are evenly spread over a whole metropolitan region.

2. Theoretical Considerations

In this section we will discuss the concept of agglomeration economies in terms of the three issues we will explore empirically in the rest of the paper – their ontology, their specificity in the context of semi-industrialized countries and their geographical reach in a metropolitan region. The discussion of these specific points is preceded by a brief overview of the concept and related ideas.

2.1 Agglomeration Economies

These economies are external to each firm and when firms are able to tap them they result in lower internal production costs. Although the literature is increasingly recognizing that some of those economies may be generated at a distance, most authors have emphasized that they are part of agglomeration economies, that is, economies that are generated in geographical concentrations of economic activity. Agglomeration economies are generally divided into two groups: urbanization and localization economies. Not always is it possible to separate neatly, urbanization from localization economies and

in many cases the distinction is only a matter of the point of the observer (Lloyd and Dicken, 1977; Wood and Parr, 2005). The literature of the last two decades has also shown that the term “agglomeration economies” includes very diverse situations that can materialize at very different geographical scales, even within a metropolis (Phelps and Ozawa, 2003).

Urbanization economies are the economies generated by the concentration of diverse economic activities in discrete areas over the surface of the earth. Urbanization economies are normally said to be present at the level of a whole city and include things such as physical infrastructure and the availability of general services. Localization economies are related to the concentration of firms producing similar or complementary goods and services. There are three major areas in which localization economies may reduce internal costs – labour (availability of trained workers and training institutions), inter-firm relations (specialist and capacity subcontractors), and technological spillovers (Goodall, 1987). This characterization derives from questions already identified by Marshall, for whom in industrial districts a number of positive externalities were generated such as those in the labour market, in inter-firm linkages and in technological spillovers (Van der Panne, 2004).

Most authors recognize at least two kinds of agglomeration economies – economies of scale and of scope (see for example, Scott, 1993: chapter 2). Scale economies are generated by the reduction in unit costs attained by a larger production volume. Economies of scope are generated through the new commercial, technological and organizational opportunities opened by the production of a new good or service. Some authors identify a third set of agglomeration economies – economies of complexity (Wood and Parr, 2005).

Only recently has the literature emphasized non-pecuniary externalities, that is, agglomeration effects in terms of the incorporation of intangible assets (such as knowledge) in firms’ production processes, beyond what Marshall and other authors, such as Skitovsky (1954) had suggested. It is in that line of inquiry that work by Malmberg and Maskell (2002), can be placed. They suggest that the search for knowledge is the central drive behind the process of agglomeration in modern economies. Storper (1997) suggests that agglomeration is the path to create untradeable interdependencies and agreements and conventions which strengthen a geographically concentrated production network.

The idea of agglomeration economies has a lineage which connects it to ideas in conventional microeconomics and needs to be revised under the light of diverse investigations which suggest that those economies are not a given. On the contrary, and more so in less developed countries, they are socially and economically constructed in interaction (Rullani, 2000). That interaction also presupposes the previous existence of certain capabilities on the part of

agents. Yet, conventional formulations of agglomeration economies can still be read in economic geography manuals such as the one by Hayter (1997). In the following section we will question this way of conceptualizing agglomeration economies. In the second part of the paper we will present empirical data that support our perspective.

2.2 *Ontology of Agglomeration Economies*

At least some agglomeration economies can be understood as relational, that is to say, they materialize in the interaction process. In that direction, Porter (1998) indicates that clusters are a concentration of “interrelated” companies. Other authors argue that a correct theorizing of this idea requires the use of evolutionist theories of the firm (Boschma and Lambooy, 1999; Caniëls and Romijn, 2005). In addition, the appropriation of external economies is not an automatic process. It requires a conscious effort on the part of each company and is dependent on the efforts and activities undertaken by other firms and institutions within the scope of action of that firm. Interaction will only be possible if there are certain internal capacities and, in a semi- or little-industrialized context, this means that a more intense external search for agents will be needed (Yoguel *et al.*, 2007; Yoguel *et al.*, 2009). In that sense, the linkages that a firm can establish backwards, horizontally or forward in the productive chain, involves a decision with respect to “make or buy”, a search and evaluation of suppliers or clients and a variable formalization of that relation (Holmes, 1986). Far from being a simple transaction, it is an extremely problematic process in which objective and subjective elements play out and where there is an explicit action on the part of the firms involved. The appropriation of external economies and the possibility of gaining access to the reduction of costs that this supposes do not constitute an automatic process that arises by the mere fact of co-location, but require the fulfillment of at least two things. On the one hand, it is necessary for interaction indeed to take place and for that there has to be certain proximity authors have called cultural or organizational. In this sense, the heterogeneity which characterizes the spectrum of firms to be found in semi-industrialized countries conspires against the development of symmetric interactions and shared interests. On the other hand, that proximity must go in hand with certain capacities and minimum internal resources to initiate, to maintain and to continue interaction in such a way that it is possible to take control of externalities.

For some authors such as Maskell (2001) the economic geography literature has concentrated excessively on firms’ relations without attempting a more systematic examination of the micro foundations of those relations and, in particular, firms’ nature and characteristics. A correct conceptualization

of the idea of agglomeration economies is a particularly fruitful exercise in countries like Argentina where their materialization depends much more on firms' demands than on the supply of these economies. Following this line of thought, we argue that agglomeration economies tend to be less robust in countries such as Argentina. The analysis of agglomeration economies in a country such as Argentina can provide general elements applicable to other countries in an intermediate development stage in Latin America, Asia, and Africa, but it can also provide insights to analyze this topic in industrialized countries. The characteristics of those singularities are described and analyzed in the paragraphs that follow.

2.3 The Specificities of Production Systems in Semi-industrialized Countries

Although authors such as Phelps and Ozawa (2003) point out correctly that there are historical and geographical differences in the agglomeration process and in the morphology and type of external economies, very little is said in that paper (and in most of the literature in English) about the specificities of the production systems of semi-industrialized countries. It is a paradox that many of these papers are published not in journals of economics, sociology or history, but in geography or urban planning journals where we would expect a greater sensibility to differences among places. Thus, we find in two recent papers on production systems geographically concentrated in Chile and Italy and in Turkey, that there are very limited references to the micro, meso, and macro specificities in which these systems operate in these countries (Giuliani, 2007; Eraydin and Fingleton, 2006).

Even more paradoxical is the contrast with things already said, even in industrial geography manuals or in general geography dictionaries:

The particular ways in which external economies of scale and scope are realized depends on the specific nature of interrelated entrepreneurial networks and labour markets networks that exist within industrial districts and how these networks are organized for learning and innovation (Hayter, 1997: 332).

The extent to which any firm or plant can enjoy economies of scale depends upon the size of its market, the variability of demand for its products through time, the level of technological knowledge and the skills of its managers (Goodall, 1987: 146).

It is clear that neither firms' networks nor job markets nor their organization regarding learning and innovation take the same form in both industrialized and semi-industrialized countries. In the same manner, there are fundamental differences in markets, in the characteristics of demand, technological knowledge and managerial skills.

In the case of many countries such as Argentina (in contrast with what we find in certain virtuous regions in some countries), many external economies (particularly non-pecuniary economies) do not materialize even though in many cases there is a potential for that to happen. For example, as we will see further on in the analysis, in the Buenos Aires Metropolitan Region (BAMR) there are firms and technological centres but there is little connection between them. On the one hand, many firms do not have the necessary capacities for accessing certain knowledge sources and for interacting. On the other hand, the existing technological supply tends to be little oriented to fulfilling the real needs of users. Moreover, in the BAMR and in Argentina there are serious problems of technological translation. That is, agents have difficulties in relating to each other and in identifying areas in which to undertake joint actions (Yoguel *et al.*, 2009).

The morphology of most production systems is quite different in Latin America from what we find in Europe and North America. Production linkages among enterprises are few, subcontracting networks are thin, institutions are weak and have few and shallow relations with enterprises, local governments have little political autonomy and tend to depend economically on higher levels of the administration (provincial or state and national scales).² In the demography of firms, small and medium-sized enterprises (SMSEs) tend to be few. One element which explains the lack of SMSEs is a skewed and unequal income distribution; because most entrepreneurs who are capable of developing a firm of a certain size tend to emerge from middle-income sectors (Katz, 1987: 29).

Part of the international literature of the 1980s had argued that market instability could be associated with the emergence of vertical disintegration (with the associated process of creation of SMSEs), even in less-developed countries (Sabel, 1986; Storper, 1990). Yet, the Latin American case shows that a very high degree of instability leads exactly to the opposite. That is, in addition to more balanced income distributions, for vertical disintegration to emerge there has to be a certain measure of long term macroeconomic stability, something absent during many decades in a number of countries of the region. Although in what follows, we will concentrate on the impact of inflation over transactions and the degree of intra-firm integration, macroeconomic instability can also take the form of rapidly changing (and unpredictable) foreign exchange rates and regulations, volatile interest rates, abruptly changing levels of exposure to foreign markets, and meandering fiscal policies.³ Although not widely recognized by all schools in economics, there is a meso-economic dimension between the individual firm and the macro dimension (Dopfer *et al.*, 2004). Moreover, though it is beyond the aims of this paper, micro and meso behaviour also have an influence on macroeconomic indicators.

Very unstable markets will not lead necessarily to vertical disintegration, but to the opposite behaviour. Rapidly changing prices make long-term subcontracting relationships very difficult, for compensations have to be continuously negotiated. As it is known, although price indexes can be calculated, they reflect average price increases. That is, not all goods and services increase their prices simultaneously nor they do so at the same rate. In a context of high inflation (such as 5 per cent a month) and more so in hyperinflations (over 50 per cent a month), the gap among relative prices conspires against the adoption of a single (or even a combination) of indicators by the parties engaged in a long term relationship. When the inflation rate is very high many firms will simply stop selling for they run the risk of burning their working capital. When prices are moving rapidly a firm can only be assured of its own prices, but not of the price at which it will be able to replace its stock of inputs and tools.

Macroeconomic instability in general (as defined above) also feeds vertical integration in other ways. Firms smooth rapidly changing markets not only by diversifying their mix of products and product lines, but also by doing everything they can in-house. In this manner, firms maintain a reasonable level of occupied capacity. They certainly incur additional costs, but are thus better prepared to maintain at least a core of skilled workers. As these firms carry out tasks which are many times peripheral to the main line(s) of products of the firm, they acquire expertise in a number of areas. This, in turn, potentiates their capacity to shift products and models and can be associated with the development of economic groups, as we will explain below. Yet, firms incur diseconomies of scale and scope and thus the benefits accruing from agglomeration economies may be limited.

The recurrence of crises has a bearing on firms' expectations and behaviour. With each crisis a number of suppliers and clients disappear. Uncertainty undermines long term projects. Firms tend to adopt short term strategies and their innovation decisions tend to be limited to the opportunistic acquisition of equipment and machinery (Katz, 1996; Peirano and Porta, 2005). In addition, in certain cases firms adopt "wait and see" strategies, supplying their clients with imported products instead of investing in increasing their production capabilities. The consequence, in aggregate terms, is low rates of investment and a slower rate of economic growth than what could be expected, even in the face of rapidly increasing domestic and global demand (and the last ten years have been a good example of that).

The large research effort led by Katz (1986, 1987) shows that Latin American firms tend to internalize a larger portion of their production than firms in industrialized nations and that they have little connections with technological centres and with academic institutions. Thus, firms in this region are more vertically integrated than in Europe or in North America.

In Latin America the network of firms is less dense and less complex than in industrialized countries. In the absence of a dense fabric of capable specialized subcontractors, firms cannot disintegrate part of their production. Historically, firms had to solve most needs from their own resources and not through the market. Services or goods available in the local production system may not meet some firms' requirements in terms of quality or price. To fill these services and goods gaps, many firms even need to encourage the development of subcontractors. The history of some firms producing consumer goods at the beginning of the 20th century shows this very clearly.

More recent studies show that some of these problems still remain. Vispo and Kosacoff's (1991) study of the IBM plant in Martínez (Argentina) illustrates this point. They found out the managers at that plant had to go out and find and "develop" suitable subcontractors. In contrast, managers at IBM plants in the US had a waiting list from where prospective subcontractors were screened. The IBM officials in the US could well take the very existence of subcontractors as a given, as something the market could provide.⁴ The search for a contractor or a service provider might lead a firm to an area of potential profits and to an underexploited market niche. This seems to be the basis for explaining the emergence of economic groups in less industrialized countries as argued by Leff (1978: 666-667).⁵

2.4 Definitional Vagueness

Phelps and Ozawa (2003) show through a typology of ideal historical cases (protoindustrial, industrial, postindustrial) that the idea of agglomeration economies has been used in very different instances. The same may be said of the application of this idea, synchronically, within a country. That is, for example, in a country such as Argentina the conceptualization of agglomeration economies should be adjusted at least in terms of an array of agglomeration types: BAMR; large cities (over 500 thousand people and below the BAMR); middle-sized cities (100 thousand up to under 500 thousand); small cities (35 through 100 thousand people); and rural-urban agglomerations.

In the specific case of large cities in Latin America, it could be argued that in contrast to the other types of urban areas, the geographical scale of urbanization economies would be different from the scale of localization economies. While the former would apply to the whole urban region the latter would be restricted to smaller geographical units. This is the kind of argument held by authors such as Chakravorty *et al.* (2005) who analyze this issue in the large cities of India. However, the practical resolution these authors propose to define the precise scale of localization economies seems somehow weak since

they measure industrial plants' geographical agglomeration at the geographical scale of postal codes. The paper does not provide complementary information showing that indeed there is interaction and at what geographical scale. On the other hand, postal codes seem to be a very small geographical unit.

The question of the geographical scales associated with agglomeration economies is something that has already been identified in the literature, but has been somewhat explored empirically (Phelps and Ozawa, 2003). For example, Walker (1985: 249) notes that "The geographic scale of agglomeration also has not been carefully addressed. What is the effective range of proximity?" While according to Rosenthal and Strange (2003: 1), "An important gap in our understanding of agglomeration economies, therefore, is that we do not know the geographic extent of agglomerative spillovers". Furthermore, "Agglomeration economies attenuate with distance ... These findings suggest that agglomeration should ideally be studied at a much refined geographic level than has been the norm" (Rosenthal and Strange, 2003: 4).

This raises the question, to what extent is it true that certain economies, like those of urbanization (general infrastructure, concentration of the demand, diversity and density of economic activities) are widely available within a metropolis whereas localization economies have a more limited "geographic reach"? To what extent are agglomeration economies increasingly "relational", that is, less anchored in strict proximity and more spread within metropolitan regions or "urban fields" of increasing extension? If certain non-pecuniary agglomeration economies connected to the incorporation of technical progress require intense and frequent face-to-face interaction, is it possible to define spatial subunits in the interior of an urban region such as that centred in Buenos Aires? In other works we have identified and discussed this idea and proposed that within the BAMR a substantial part of a firm's linkages takes place in geographical units smaller than the metropolis though much larger than postal codes. Moreover, the units we have tentatively defined include several counties and neighbourhoods and are structured by the major transportation axes (Borello *et al.*, 2004).

3. Empirical Evidence

The BAMR includes the city of the same name, plus the counties or portions of counties agglomerated to the city (that is, physically connected to it), in addition to some localities that, without being physically welded, have an intense functional relation with the city.⁶ That functional relation is expressed in the suburban transport network made up of railroads and buses (Kralich, 1995). The distances between the end points of that region are approximately 140 km along the river front and around 120 km inland. Altogether, over 14 million inhabitants live in this region.

The BAMR concentrates more than 50 per cent of the national industrial product and a still greater proportion of certain command functions such as the headquarters of the main national and transnational companies. The region concentrates, also, a still greater proportion of the national total of certain very specialized services (such as medical care), of certain new activities (like software production and film making) and of the scientific, technological and artistic production. More significant still in terms of this paper, the region concentrates a large proportion of the total national auto parts producers and of the suppliers of the iron and steel mills.

3.1 Main Characteristics of the Firms Surveyed

The present investigation is based on a survey used in 2006 with a set of 194 companies located in the BAMR, and in the cities of Córdoba and Rafaela (province of Santa Fe). For the analysis undertaken in this paper we selected only the 134 firms located in the BAMR. This set of enterprises can be divided into four groups, according to the relation they have with the nuclei of each production network: on the one hand, within the automotive production network, those companies that sell to car terminals (38 per cent) and those that sell to the auto parts replacement market (12 per cent); on the other hand, in the iron and steel network, suppliers (34 per cent) and clients (16 per cent) of the nuclei. The presence of FDI (foreign direct investment) is significant amongst the companies that sell to car terminals (43 per cent) and, to a lesser extent, to the suppliers of the auto parts replacement market (14 per cent). The siderurgical network, on the other hand, is made up almost completely of national companies, 18 per cent of them belonging to local economic groups. The siderurgical production network is made up mostly of small and medium-sized companies – 52 per cent of the suppliers and 27 per cent of the clients have 25 or less employees. In the automotive network, on the contrary, firms of greater size predominate, although a strong presence of small and medium companies also exists. As far as the commercial dependency with the nucleus (understood here as the degree of concentration of the sales or purchases that each firm maintains with it), there are different situations according to the place that the companies occupy in the production network. Thus, whereas the dependency is strong in the segment of “sales to car terminals” – where 66 per cent of the companies sell 60 per cent or more of their production to the company nucleus/nuclei (as it is to be expected) – the “replacement market” and the “iron and steel suppliers” are located at the opposite end, with a reduced direct participation of the nucleus in their sales. The clients of the iron and steel sector, on the other hand, are in an intermediate situation.

Almost all the clients of iron and steel makers sell exclusively in the domestic market, and 71 per cent of the suppliers of this network have

the same sales orientation. In the automotive network, on the contrary, the percentage of companies that export more than 20 per cent of their total sales is 41 per cent, amongst those that sell to terminals, and 37 per cent, amongst those that sell to the replacement market. Exports are significantly higher amongst the larger companies, those belonging to national conglomerates or having FDI.

Table 1: Characteristics of the Sample of Firms Surveyed in the Automotive and Siderurgical Sectors

Position in the network	% of FDI	Belong to a national conglomerate				
		Over 20% in Exports	Up to 25 employees	26-100 employees	Over 100 employees	
Sells to car terminals	43%	49%	41%	8%	45%	47%
Sells to the Reposition market	14%	20%	37%	13%	50%	38%
Siderurgical suppliers	7%	18%	29%	52%	32%	16%
Siderurgical clients	0%	18%	s/d	27%	32%	41%

Source: UNGS Survey of the Siderurgical and Automotive Production Networks, 2006.

Table 2: Percentage of Sales to the Nucleus (Purchases in the Case of the Firms which are Clients of the Iron and Steel Industry)

Position in the network	Percentage of sales to the nucleus				
	0%	1-15%	15-30%	30-60%	60-100%
Sells to car Terminals	10%	8%	4%	12%	66%
Sells to the Reposition market	44%	56%	0%	0%	0%
Siderurgical Suppliers	25%	50%	25%	0%	0%
Siderurgical Clients**	13%	29%	12%	14%	32%

Note: ** Percentages are of the purchases to the nucleus.

Source: UNGS Survey of the Siderurgical and Automotive Production Networks, 2006.

Most of the firms surveyed are located in the northern half of the BAMR. The location of the 134 firms contacted reflects both historical and more recent location factors. It is in this part of the region where some of the large automotive assembly plants are located (Ford, Volkswagen, Peugeot). It is also in the northern part of the region where a large steel plant is located (Siderca). Although some of the suppliers of both production networks included in the survey cluster around the terminal plants, the location of most firms also reflects other general location factors such as accessibility, land prices, and land use regulations, but also more idiosyncratic factors such as the location of the owners and key technicians.

3.2 Overview of Production Networks

As we argued previously, at least one part of the Argentine and Latin American bibliography on industrial organization has been showing that the country and the continent's production networks tend to be squalid – few and small firms, little interconnected among themselves and with very few relations with universities and technological centres (Bisang *et al.*, 2004; Pietrobelli and Rabelotti, 2004; Cassiolatto *et al.*, 2003; Altenburg and Meyer-Stamer, 1999; Yoguel *et al.*, 2000). Firms were and are relatively integrated, although since the late 1980s, some peripheral services and activities tend to be outsourced to specialized firms (i.e. cleaning of plants, logistics and transportation, legal and accounting services, catering, training, etc.). At the same time, diverse studies show that policies in place during the 1990s (such as the lowering of import tariffs and the appreciation of the local currency), prompted many companies to import a larger proportion of their inputs from other countries. This phenomenon has been reverting intensely since 2002 in Argentina, supported in a brutal change in relative prices after the devaluation that took place early that year.

From the perspective of production networks, one of the main traits of the firms studied in this survey is their poor interaction with agents and institutions. Isolation and vertical integration are a widespread characteristic of the firms studied, even in these relatively complex and mature networks such as the automotive and the iron and steel industry. The geographic reflection of that isolation and that vertical integration is the existence of geographic proximity with interactional distance. That is, firms in similar or related industries can be geographically close but may not have relations amongst themselves. The empirical evidence we will discuss in the next section was gathered from a survey made in the middle of 2006 in the City of Buenos Aires and its suburbs. That evidence is meant to illustrate and to probe the premises outlined at the beginning of the paper and fleshed out in the previous section.

3.3 Evidence of Agglomeration Economies

On the question of the ontology and more generally of the conceptualization of the idea of agglomeration economies, the case studied has the virtue to show with extreme crudity that in a production system of a country like Argentina, agglomeration economies are not apples waiting for somebody to pluck them from a tree, on the contrary, their materialization depends significantly on the characteristics of the firms that are to take advantage of those economies. The analysis that follows is concentrated on examining one dimension of agglomeration economies, namely inter-firm relationships. As can be gleaned from the tables that follow, there is a strong and statistically significant association between external links and internal capacities. This can be appreciated by looking at the quality of the linkages between the firms studied and a number of agents and institutions applying a methodology developed in Roitter *et al.* (2007), to the exclusive case of the BAMR. *The content of the variables and the way indicators were constructed can be provided upon request.*

Relations with the Nuclei of the Production Networks

Table 3 shows that the few cases where the nucleus has provided technical assistance to the firms surveyed also correspond to those firms with greater internal competencies, although there are some intermediate situations that

Table 3: Technical Assistance of the Nucleus and Firms' Competencies

Technical assistance of the nucleus	Indicator of firms' competencies			Total
	Low	Medium	High	
No assistance	24 30.0%	35 43.8%	21 26.3%	80 100%
Low	4 20.0%	8 40.0%	8 40.0%	20 100%
Medium	1 6.7%	3 20.0%	11 73.3%	15 100%
High	3 16.7%	4 22.2%	11 61.1%	18 100%
TOTAL	32 24.1%	50 37.6%	51 38.3%	133 100%

Source: UNGS Survey of the Siderurgical and Automotive Production Networks, 2006.

Table 4: Quality of the Objectives of Linkages with Different Agents by Firms' Endogenous Competencies

Quality of the objectives of linkages with different agents	Indicator of firms' competencies			Total
	Low	Medium	High	
Minimum	24 34.3%	26 37.1%	20 28.6%	70 100%
Intermediate	2 6.7%	12 40.0%	16 53.3%	30 100%
Superior			4 100%	4 100%
TOTAL	26 25.0%	38 36.5%	40 38.5%	104 100%

Source: UNGS Survey of the Siderurgical and Automotive Production Networks, 2006.

should be examined in more detail. Thus, for example, 73.8 per cent of the cases without technical assistance from the nucleus were firms with low or medium technical competencies whereas almost the same percentage, 73.3 per cent, of the cases with medium technical assistance corresponded to high technical competencies. In the same sense, over 60 per cent of the firms with high technical assistance are firms with high competencies.

Linkages with Other Agents

The same phenomenon can be appreciated in Table 4, which shows the relations between competencies and the quality of the objectives pursued by the firms surveyed in their linkages with a set of other agents. Thus, the survey gauged firms' linkages with a diversity of agents: other plants of the company; other national and international companies of the group; national and international clients and suppliers; firms' associations; technological centres and universities. These agents include firms and institutions located inside and outside each production network. In terms of agglomeration economies, some of these interactions correspond to urbanization and others to localization economies. The set of questions that probes these interactions focuses on activities of cooperation and on the exchange of information that go beyond merely pecuniary relations. Table 4 depicts an index that weighs in a qualitative way firms' linkages based on the objectives that motivated the interaction from a scheme developed in another paper of this same research project (Roitter *et al.*, 2007). It can be appreciated in Table 4,

that the firms with more significant connections with a variety of agents are those with more developed endogenous competencies. At the same time, it can be seen, nevertheless, in that same table, that a significant proportion of the firms contacted have very poor connections with other agents. Thus, for example, the companies with low and average endogenous competencies are over-represented as far as the minimum quality of the linkage objectives. On the contrary, more than 50 per cent of the companies that appear with intermediate quality in their linkage objectives correspond to companies of high endogenous competencies. Finally, all (of the few) firms with “superior” quality objectives correspond to companies of high endogenous competencies.

The empirical information analyzed enables us to argue that far from being something “that is in the air”, as Marshall (1890) suggested, agglomeration economies require not only a supply of goods and services, but also internal capacities of the firms that are going to reduce their average costs by taking advantage of those economies. Thus, the conventional view that in certain places, “there are” external economies must be revised. The ontology of those economies is much less “a thing that is” and becomes a complex interaction for which agents must work in a conscious manner. We can consider hypothetically that in semi-industrialized countries such as Argentina (and more so in those regions inside the country where production systems are more limited), firms will need to develop greater endogenous competencies to be able to capture positive externalities, especially in the case of non-pecuniary ones associated fundamentally with knowledge and learning.

3.4 Particular Forms of Agglomeration Economies

In the previous section we probed the idea that we need to re-conceptualize agglomeration economies in terms of their ontology. We also argued that these economies may be less significant for firms in semi- and little-industrialized countries, even in large cities and for the case of relatively mature industries. In this section we will examine in more depth this idea through the empirical analysis of part of these economies in the Buenos Aires Metropolitan Region and, again, for the case of two production networks – auto parts and siderurgy.

We are looking at two sets of manufacturing activities initiated in Argentina in the early 1910s (for car assembly), in the early 1950s (for large scale vehicle production), and in the early 1950s (for iron and steel). In fact, the median age for the auto parts firms contacted is over 40 years old, while the median age for suppliers and clients of the iron and steel industry is over 35 years old. The firms surveyed are located in a very large city, one of perhaps four largest concentrations of economic activities south of the

US-Mexican border. Moreover, the survey was undertaken in 2006, after four years of sustained economic growth in the country.

We will now turn to examine firms' linkages as far as services and connections with car terminals and steel manufacturers (that is the nuclei of these production networks) and with a set of other commercial, institutional and technological agents. We will then probe to what extent the firms surveyed do indeed appropriate themselves of certain urbanization and localization economies.

Use of Services

By looking at the use of services, we can examine some urbanization economies. As we saw, some authors argue that in the less industrialized world firms can benefit more from these economies than from localization economies. However, the literature seems to argue that it is sufficient for a firm to be located within a city (without specifying where exactly within it) to take advantage of urbanization economies, something that, as we will see further on in the text, has to be revised and recast under the evidence coming from this and other studies.

Measuring the use of services enables us to assess indirectly the volume and the quality of the services available. We may argue that a greater utilization of external services would be associated with a reduction in the internal costs of those firms contracting those services. In contrast, our survey shows that firms have difficulties in the process of contracting outside services which are clearly not their core business, thus incurring, in this manner, greater costs than what could be reasonable in the case from a dense and varied supply of specialized firms and outside professionals.

The analysis of the services used enables us to have an overview of the degree of vertical integration or disintegration. The use of eight types of services was asked in the survey: (i) transportation and logistics; (ii) advertising and marketing; (iii) industrial safety; (iv) training; (v) professional consulting and services (legal services, accounting, human resources, etc.); (vi) maintenance and equipment repairs; (vii) informatics and related services; (viii) waste disposal.

The survey shows that, on average, 40 per cent of the firms contacted solve their needs connected to these services by using their internal staff (Table 5). Around 24 per cent of the firms combine their internal capacities with outside help from specialized firms and professionals, while, on average, 37 per cent of the firms use external services. These percentages vary amongst different types of services.

If we group all the cases of exclusively internal provision and mixed services provision in one category, we can see that the exclusive use of

Table 5: Use of Services by Firms in the Auto Parts and Siderurgical Production Networks

Type of service used	Percentages				
	Internal	External	Mixed	Total	Internal and mixed
Transportation and logistics	41	35.7	23.3	100	64.3
Advertising and marketing	56.6	26.4	17	100	73.6
Industrial safety	34.7	50.8	14.5	100	49.2
Training	31	22.2	46.8	100	77.8
Professional services	21.6	53.6	24.8	100	46.4
Maintenance/ equipment repairs	56.5	8	35.5	100	92
Informatics	40.8	41.6	17.6	100	58.4
Waste disposal	34	50	16	100	50
Others	46.2	53.8	0	100	46.2
TOTAL	38.85	35.72	25.43	100	64.28

Source: UNGS Survey of the Siderurgical and Automotive Production Networks, 2006.

external services in many instances is relatively marginal and it is only relevant in those services which involve skills and knowledge which are clearly foreign (or complementary) to the firms' (such as professional consulting and services) or where it is necessary to certify firms' internal decisions with the signature of an outside professional (so as to comply with specific labour and environmental legislation, i.e. industrial safety, environmental issues). In the rest of the cases, the provision of services is covered mostly by the firms' own resources and personnel.

Linkages with the Nuclei of Each Network and with Other Agents

Although the general results of the survey show that the percentages of firms which sustain some kind of linkages with other firms and institutions is relatively significant – bearing in mind what other similar surveys undertaken in Argentina tend to show – when we analyze what are the motivations or objectives of the firms in sustaining certain linkages, the results are less encouraging. The survey also took into account, besides the use of services and the connections with the nuclei, linkages with other agents – national and

international clients, national and international suppliers, firms' associations, consultants, technological centres and universities.

With respect to the connections with the nuclei, Table 6 shows nuclei assistance (which has been weighted in a qualitative manner) with the volume of sales to the nuclei. In this way we can see if there is an association between these two variables. Totals in the table show that 63 per cent of the firms do not receive any assistance from the nucleus. For one fifth of those firms, the nucleus represents over 60 per cent of their sales and for over half it represents more than 15 per cent of their sales. Amongst those (few) firms which do receive assistance from the nucleus, we find an association between volume of sales and importance of the technical assistance provided by the nucleus. This shows that some non-pecuniary externalities are created though the framework of an intense commercial relationship.

Firms' Linkages with Other Agents

In previous sections we already made references to linkages between firms and other agents. The survey also collected more detailed information with a question asking firms to identify the three most important connections

Table 6: Technical Assistance and/or Technology Transfer from the Nucleus by Sales Volume to the Nucleus (Purchases in the Case of the Clients of Siderurgy)

	Technical assistance and/or technology transfer from the nucleus				
	No assistance	Low	Medium	High	Total
No sales or purchases to the nucleus	12 80.0%		3 20.0%		15 100%
1 to 15%	21 70%	5 16.7%	2 6.7%	2 6.7%	30 100%
15 to 30%	9 90.0%		1 10.0%		10 100%
30 to 60%	12 70.6%	1 5.9%	1 5.9%	3 17.6%	17 100%
Over 60%	13 38.2%	5 14.7%	7 20.6%	9 26.5%	34 100%
TOTAL	67 63.2%	11 10.4%	14 13.2%	14 13.2%	106 100%

Source: UNGS Survey of the Siderurgical and Automotive Production Networks, 2006.

Table 7: Top Three Most Important Linkages with Diverse Agents

Top three most important linkages	Other domestic firms	Other firms of the same conglomerate	Domestic suppliers	International suppliers	Domestic clients	International clients	Firms' associations	Consultants	Technological centres	Universities
First	15	15	41	5	17	2	4	0	2	0
Second most important	5	3	5	25	7	49		2	1	1
Third most important	3	3	22	6	29	11	5	7	5	7
TOTAL	23	21	68	36	53	62	9	9	8	8

Source: UNGS Survey of the Siderurgical and Automotive Production Networks, 2006.

with such agents. (The exact question alluded to: “the top three connections in terms of the strategy of the company”). In Table 7, we have tabulated the responses to that question. The table shows, on the one hand, a lack of linkages with technological centres and universities. On the other hand, the table shows that there are limited (and little prioritized) relations with other private agents such as firms’ associations and consultants. Moreover, the few times that consultants, technological centres and universities are mentioned, they appear as low priorities to the firms contacted. Table 7 also shows that companies value linkages associated to their commercial pattern of transactions and not those more clearly intangible and connected to the acquisition of knowledge, to information exchange and to joint learning.

As a synthesis and having reviewed the use of services, the pattern of technical assistance of the nucleus, and the linkages with other agents, we can attest that the companies benefit from few economies of agglomeration, at least of the type we have studied here. Firms have integrated in their own structures the provision of a set of services and they tend to have very few relevant linkages with other agents. The lack of significant linkages occurs not only with public or semi-public agents, but also with private ones, such as consultants and firms’ organizations.

3.5 Geographical Scales Associated with Agglomeration Economies

At the beginning of this paper we argued that the literature has been relatively silent insofar as it relates to the geographical scales associated with each type of agglomeration economy. In the case of large cities, the literature differentiates between urbanization and localization economies - the former seem to apply to the whole of a metropolitan area, while the latter seem to refer to more restricted areas within a large city. We need to identify some of the premises on which these ideas rest. Localization economies are based on the idea that geographical closeness leads to interaction and that interaction tends to be established, more intensively, in geographically restricted areas of a large city. The conventional understanding of urbanization economies seems to rest on the idea that firms can profit from those economies anywhere within a metropolis.

In previous sections we saw that the firms surveyed had taken limited advantage of urbanization (use of services) and of localization (linkages with other firms and institutions) economies. We can see that there are important restrictions for those firms trying to benefit from external economies.

We can now turn to examine these two assumptions on which one dimension of agglomeration economies rest. In terms of localization economies, as we can appreciate in Table 8, over 40 per cent of the auto part suppliers contacted in our survey are located outside of the BAMR. This, by itself,

Table 8: Automotive Production Network – Location of the Five Main Suppliers and Clients of the Service Providers

	City of Buenos Aires proper	Suburban counties	Córdoba province	Rest of the country	Mercosur	Multiple locations	Rest of the world	TOTAL
Main suppliers	4%	57%	6%	10%	10%	0%	13%	100%
Main Clients	6%	66%	7%	10%	6%	0%	6%	100%
Services	26%	54%	1%	7%	1%	11%	0%	100%

Source: UNGS Survey of the Siderurgical and Automotive Production Networks, 2006.

questions the idea that firms can benefit from external economies associated with geographical proximity. The structure of the automotive production network, in itself, with an important volume of purchases located outside of the BAMR and even outside of Argentina, limits the possibilities of generating external economies. Note, also, that the firms surveyed are suppliers either of car terminals or of the firms in the auto part aftermarket and thus, their suppliers are, to a large extent, third ring suppliers. We also know, through other sources, that car terminals buy, in turn, a significant part of their parts and components from other countries. Thus, the structure itself of the Argentinean automotive production network is organized in such a way that two great opportunities of creating external agglomeration economies are missed – through the third ring suppliers and through the foreign firms supplying directly the car terminals. The empirical evidence advanced also suggests that the geographical units where firms interact with other agents and draw some localization economies are relatively large, much larger than postal codes zones. We may conclude that, in the case of these two production networks, we are far from the intense interaction and the geographical closeness assumed in some case studies often mentioned in the industrial districts literature.

As for urbanization economies, the utilization of services by a portion of the auto parts suppliers shows a greater concentration in the BAMR. Thus, whereas 80 per cent of the service providers are located in the BAMR, only 61 per cent and 72 per cent of the suppliers and clients are located there. In turn, data from the use of services show clearly the relevance of the city of Buenos Aires proper in the location of services. A detailed analysis of the utilization of different services shows, again, that the BAMR is rugged, that not all agglomeration economies associated with the urbanization process can be accessible in the same way in any part of the metropolis.

Summarizing what we have seen in previous paragraphs, we can see that part of the localization economies from which firms could profit is lost due to the structure of purchases of the production network itself. At the same time, we may hypothesize that some of the connections with suppliers located outside of the BAMR, in the rest of Argentina but also in foreign countries, may be a way to profit from external economies, especially those that are intangible and associated with information and the incorporation of knowledge. The latter questions the idea of localization economies themselves – in connection with the growing development and use of ITs (video and phone conferences, e-mail, chat, etc.) external economies may be generated in the framework of organizational closeness even if there is no physical proximity.

As for urbanization economies, they are not evenly distributed in the metropolis. At least in the case of the services we examined, the data collected show that to use those services firms need contact services providers located

mostly in one part of the metropolis, the city of Buenos Aires proper. Based on other information we may even argue that many of the firms providing services are located in one part of the city proper – the downtown area or Central Business District (CBD). In turn, a detailed analysis of the utilization of services shows that there are important intra-metropolitan variations by type of services.

4. Conclusions and Implications

The study of agglomeration economies has been an important topic of inquiry in economics since at least Marshall's writings. A number of authors have in recent decades given this topic a renewed importance (Fujita and Thisse, 1996; Krugman, 1991, 1992). In this paper we have identified and characterized three major problems in the conceptualization of these economies by drawing on the existing literature and on empirical data gathered in the city of Buenos Aires. As we have shown, these externalities do not emerge automatically and are not just there to be used, they emerge from interaction. Moreover, it is not just proximity and interaction that fosters the creation of external economies, they require on the part of the agents that interact, a certain threshold of previous competencies. Thus, the empirical information presented in this paper enables us to challenge the conventional ontology of agglomeration economies: these economies are not there for all and any agent to take advantage of them; they are not a given; they do not exist as something that can be taken from a shelf to be used.

The discussion we have presented in this paper questions the idea that the geographical concentration of similar and related activities inevitably leads, through some magic effect, to external economies. In this sense our idea of revising the conceptualization of external economies as "something that is" to become "something constructed in interaction" leads us to look inside the agents themselves. In this way our findings are in line with some recent, and specific, empirical studies, such as the one by Giuliani (2007) and with more general arguments connected with two other topics – a more social and cultural vision of economic activities where the role of "agency" becomes important, and a "relational" view of economic activities (Yeung, 2002).

Revising the ontology of agglomeration economies is a particularly fruitful exercise in theoretical and practical terms for a country such as Argentina and other countries of the semi-industrialized world. From a theoretical perspective, it enables us to unfold a series of analytical instruments and to open the black box of external economies. From a practical side, it questions certain public policies such as those oriented to "clusters" – policies which are based on the supposed existence of linkages amongst

firms and institutions (linkages that in many cases do not exist), even if there are geographical concentrations of similar or related economic activities. Yet, as proposed by Rasiah (2011), “Governments can create or strengthen the institutions to promote agglomeration effects”.

The data and arguments presented show that, in the BAMR, agglomeration generates limited external economies (both in terms of localization and urbanization), even if there are a series of positive effects for the economic activities in the city, such as closeness to markets and decision makers and the creation of a labour pool. This should not come as a surprise because this situation is the mere reflection of underdevelopment and semi-industrialization. In this sense, it seems necessary to connect the literature on economic development with that on industrial organization. Put in a different way, economic activities are not organized in the same fashion in industrialized and semi-industrialized countries. This specificity seems to require new theorizations and a dialogue with the existing literature. This is a process already initiated by authors like Katz (1987), Fajnzylber (1990), Chudnovsky *et al.* (1993), Kosakoff and Ramos (2007) among others, although it has not yet had substantial impact in the main scholarly journals in economics and related social sciences of industrialized countries.

In the intersection between the literature on economic development and that on industrial organization, the emergence of a new techno-productive paradigm (Pérez, 2004) enables us to appreciate more clearly the consequences of the absence of external economies in cities such as Buenos Aires. Specifically, the new forms of competition which have become increasingly relevant in the last decades are associated with the capacities to differentiate products and thus avoid a competition centred only on prices, and thus escaping economic structures based on low salaries. Yet, the capacity for product differentiation is closely linked to the capacity to innovate and, in general, to firms’ internal competencies – two dimensions closely associated with non-pecuniary interactions with firms and other institutions. In other words, the global scheme of competition pushes different national economies to undertake development processes which require growing interactions amongst firms and institutions, because knowledge creation and appropriation are more successful where there is a fluid dialogue amongst agents. In this sense, this paper shows that there are limited agglomeration economies of the relational type, economies which are central under the present techno-productive paradigm for the acquisition of technological rents and, hence, are essential in the capital accumulation process within the production networks of any national economy. We do find, however, to a greater extent, those agglomeration economies which are not relational, such as specialized suppliers and trained labour. These are extremely important but are not sufficient to face the new global competitive challenges.

Our exploration has been somehow more limited in terms of looking at the question of the geographic reach of agglomeration economies. Nevertheless, data for the BAMR show that far from assuming that economies of urbanization are something that can be taken advantage of in any place of the metropolis, intra-metropolitan variations were identified as very significant. In the case of certain services, these seem to be available, in greater profusion, in the centre of the city. We can also see here the limitations of the productive system of a semi-industrialized country, limitations that are expressed in relatively high levels of auto-provision of services, something that suggests limitations in the deepening of the division of the labour process. Indeed, in many semi-industrialized economies, the division of labour is shallow and the increasing returns associated with the deepening of the labour process are limited (Gibbs and Browning, 1966; Amsden, 1977; Chudnovsky *et al.*, 1983). These limitations are associated with macroeconomic instability, incomplete markets, and restrictions in the process of creation of new enterprises. The restrictions in the process of new firm creation should not be associated only with the lack of enterprising spirit, but also with the limited resources and incomes available to the would-be entrepreneurs (related also to deep income inequalities and to limited examples of successful processes of firm formation in many districts and regions of a country like Argentina).

The agglomeration of population and of economic activities also generates diseconomies, a fact that is very evident in large Latin American cities, but it can also be observed in intermediate-sized centres. Cities like Buenos Aires would be, then, in the worst position, since, on the one hand, their companies would only be taking advantage of limited external economies which at the same time are generating diverse diseconomies that affect not only their own activities, but also society as a whole. In the large Argentine and Latin American cities those diseconomies are mainly associated with environmental pollution and affect with particular intensity the daily lives of the poorest families.

In methodological terms, our exercise here enables us to show the potential offered by a focused and detailed examination of some aspects of the idea and empirical application of agglomeration economies. It appears as especially interesting to examine what capacities agents have and the way in which those economies are constructed socially. There are also more anthropological approaches that could be applied with good results to investigate many of these questions in greater detail and depth. The evidence also calls for a need to examine interactions from the side of other agents – for example, the companies that provide services and the institutions (both public and private) which both foster connections and provide tangible and intangible inputs to firms. There are very few studies of firms' services in

Argentina and, in general, in Latin America, little research has been carried out on firms' associations, technological centres, and other institutions with which firms must have greater relations.

In terms of policies, the paper suggests the need to concentrate actions in a systemic approach that takes into consideration, at the same time, the need to generate relations but, also, and fundamentally, the need to develop firms' competencies. The acquisition of competencies is a systemic process and, therefore, policies should not be too focused in one aspect of firms' structures and actions. The unprecedented growth of Argentina since 2002, but also the recent growth of other countries in the developing world also opens a renewed opportunity for policy making.

Although this paper has taken a static approach to the analysis of agglomeration economies, those economies are moving (firms open and close, plants relocate, interactions are initiated, new deals are closed, partnerships are explored). The scenario opened in many countries of the Latin American region and beyond in recent years will probably improve the sombre picture we have painted here. Yet a more intense and comprehensive action from both the state and firms' and workers' associations will be needed.

Notes

- * Corresponding author. This paper is part of a larger study funded by the Argentinean Ministry of S&T and coordinated by the Universidad Nacional de General Sarmiento (the larger study includes wine-making, fruit-processing, software for the agricultural sector, energy, and the suppliers' network of INVAP – Argentina's producer of satellites and nuclear reactors). Funding was also provided by Fundes Internacional, Organización Techint and IDRC, Canada, through FLACSO, Mexico. A previous version of this paper was presented at the Globelics 2010 international scientific meeting held in Kuala Lumpur, Malaysia. We gratefully acknowledge the funding provided by the local organizers, by the University of Aalborg, by the Universidad Nacional de General Sarmiento and by the Argentinean Ministry of S&T to attend the meeting at Kuala Lumpur. Some of the ideas presented in this paper were first presented, in Spanish, in Borello *et al.* (2009). We acknowledge comments received at this meeting and a number of useful suggestions given by the editor and an anonymous referee.
1. Fanelli and Frenkel (1995) argue that whereas we may assume a certain degree of economic stability in industrialized countries, in Latin America the opposite might have been the norm, at least in the past. *We shall make more precise comments on this point further on in the paper.*
 2. See two critical contributions on this same line by Paunero (2001) and Rodríguez (2004).
 3. We recognize (but do not aim to solve) the profound theoretical problems associated with an adequate definition and shared ontology of the units that constitute the economic realm. We also recognize the difficulties in connecting

- micro behaviour (at the level of the firms) with macroeconomic changes (Fanelli and Frenkel, 1995; Katz, 1996; Dopfer *et al.*, 2004).
4. What we have said so far conspires against the emergence of all kinds of subcontractors. Yet despite the significant capital outlay which specialized subcontractors have to incur, it is more likely that they, instead of other types of subcontractors, will emerge. This is so because specialized subcontractors pool orders from hundreds of firms and thus can surmount some of the problems we have outlined above. See Vera-Cruz and Dutrenit (2005) for a very interesting study of the development of specialized subcontractors in precision machining in the Maquila area of Northern Mexico. See also Borello (1994).
 5. “The group pattern of industrial organization is readily understood as a micro-economic response to well-known conditions of market failure in the less developed countries ... The group can be conceptualized as an organizational structure for appropriating quasi rents, which accrue from access to scarce and imperfectly marketed inputs ... The institution of the group is thus an intra-firm mechanism for dealing with deficiencies in the markets for primary factors, risk, and intermediate products in the developing countries”.
 6. Around 40 suburban counties comprise the BAMR. The cities of La Plata, Luján and Zárate-Campana are also included.

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