



UNITED NATIONS
UNIVERSITY

UNU-MERIT

Working Paper Series

#2019-031

**Modern industrial policy in Latin America:
Lessons from cluster development policies**

Carlo Pietrobelli

Maastricht Economic and social Research institute on Innovation and Technology (UNU-MERIT)
email: info@merit.unu.edu | website: <http://www.merit.unu.edu>

Boschstraat 24, 6211 AX Maastricht, The Netherlands
Tel: (31) (43) 388 44 00

UNU-MERIT Working Papers

ISSN 1871-9872

Maastricht Economic and social Research Institute on Innovation and Technology

UNU-MERIT

UNU-MERIT Working Papers intend to disseminate preliminary results of research carried out at UNU-MERIT to stimulate discussion on the issues raised.

Modern Industrial Policy in Latin America: Lessons from Cluster Development Policies *

Carlo Pietrobelli

University of Roma Tre and UNU-MERIT

carlo.pietrobelli@uniroma3.it

pietrobelli@merit.unu.edu

https://www.merit.unu.edu/about-us/profile/?staff_id=1560

Forthcoming in Arkebe Oqubay and Justin Yifu Lin (Eds.),
The Oxford Handbook of Industrial Hubs and Economic Development, Oxford University Press, 2019.

Abstract

Industrial clusters have developed in many regions and countries of Latin America. Active public policies have often supported them at the national (federal) and local levels, sometimes with the financial and technical assistance of international organizations. These experiences have been most remarkable, and share several elements of the 'modern' industrial policies that enjoy an increasing consensus in the literature. The vast experience of locally based forms of active policies that have proliferated in Latin America reflects a modern approach to industrial policies, and an example for other developing countries. Such approach has typically included clever interactions of private and government sectors, a process of search and discovery of the necessary public policy inputs, and an interactive design and implementation of these policies.

JEL codes: O25, O43, L14. Keywords: Industrial policy, innovation policy, innovation and learning, clusters.

* Comments from the editors and from Padmashree Gehl Sampath are gratefully acknowledged.

A widespread problem of insufficient productivity and industrial development occurs in many countries, notably in Latin America (Grazzi and Pietrobelli 2016). This has spurred governments and international organizations alike to experiment with active policies to promote development. In many developing as well as advanced countries, highly diverse industrial and innovation policies have been developed in response to different circumstances and contexts, often as a result of complex political processes. After long discussions and ideological divides, a relative consensus on their usefulness, and on the main features required for ‘modern’ industrial policies, seems to have emerged. This chapter argues that a specific form of industrial policy—those required to develop enterprise clusters in Latin America—displays many of the characteristics of such modern versions of industrial policies, positively contributing to the development of industry and competitiveness in many regions.

Key traits of modern industrial policy

On the basis of the literature, and of all the many interventions tried in many countries, what are the main desirable traits of industrial policies? In the minimalist approach, industrial policy is equated with an improved business climate that might include, for example, the enforcement of property rights, and the administrative norms and practices required to carry out business (World Bank 2018, WEF 2017). However, these policies often fall short of providing comprehensive support to industrial development that should include selective and vertical interventions, together with the strengthening of the institutions required (Crespi et al. 2014). According to the burgeoning literature (Pietrobelli 2016), modern industrial policies should explicitly share at least the following traits:

1. Rethinking industrial policies for development requires a pragmatic approach, empirically based. Lessons from past successes and failures need to shape the design of future policies, and to this end solid evaluations are required. Conclusions are dependent on the context, and there is no best practice to emulate. Rather than recommendations based on best practices defined in a vacuum and supposed to work in different circumstances, clever solutions need to be worked out each time.
2. Industrial policies require a sharp, analytical approach to justify, define, and implement them. They need to be based on the premise that markets alone would not produce a desirable result. Traditional justifications for industrial policies were based on a strict definition of market and coordination failures. Policy makers in market economies can benefit enormously from an understanding of the apparently failed behaviour of market agents, and need to ask what prevailing market and coordination failures are inhibiting market functioning. However, the design and implementation of actual policies often fails to reflect this understanding, as does the analysis of whether policy remedies were actually the best tools to address failures.
3. A new policy paradigm is emerging which suggests that industrial policy is a *learning process*.¹ Policy makers live in a world characterized by vast uncertainties and imperfect information. They

¹ Among authors proposing this idea are Matthew Andrews, Yevgeny Kuznetsov, Ricardo Hausmann, Lant Pritchett, Dani Rodrik and Charles Sabel.

cannot know beforehand what the right policy interventions are, and need to set up a process to *discover* them. Such a discovery process involves substantial learning based on tentative, even experimental, policy design and implementation with a built-in capacity to iterate and adjust as a matter of refining policy (Sabel and Zeitlin 2012, Kuznetsov and Sabel, 2011). Experimentation must be encouraged and rewarded, and a calibrated risk of failure taken into account. Policies should be evaluable and be discontinued unless validated by a pertinent evaluation, in order to allow the necessary learning (Crespi et al. 2014).

4. The process of discovery of the appropriate industrial policies requires smart collaborations between the government and the private sector. Modern industrial policies need the complementary pieces of knowledge available to the private and public sectors, and enhanced collaboration is required to harness them (Fernández-Arias et al. 2017). The private sector has privileged knowledge of some aspects of business and a profit motivation that deviates from the collective welfare perspective. The public sector has different direct knowledge concerning policy design, implementation, and evaluation. Both are needed and collaboration needs to be nurtured.
5. The institutions behind the policies play an essential role, and condition success and failure. Institutional capabilities are needed to explore, design, implement, monitor, and evaluate policies. Without them, the policy treatment may be worse than the disease (Crespi et al. 2014, Lall 2004). Policy interventions need to be chosen in light of the existing institutional capabilities and of the efforts to build such capabilities and induce institutions to learn over time. The institutional capabilities required include—among others—the ability to coordinate actions across public-sector agencies, to protect agencies from undue political pressure, and to ensure public–private collaboration. If institutions are weak, the preferred industrial policies should be simple and consistent. However, the process of strengthening appropriate institutions is an essential part of modern industrial policy.
6. The debate on what is industrial policy and what is innovation policy is not useful, indeed is often misleading. Innovation is an essential component of industrial policy. Long-term development is intrinsically tied to technological innovation, and the development of industry requires innovation to be nurtured and supported.
7. Industrial policies aim at inducing structural transformation in open competitive international markets. The outward orientation is central in this approach, as it provides a key benchmark for comparisons, as well as the opportunities of knowledge flows from abroad. Structural change is also a fundamental objective of these policies.

Productive Agglomeration and Coordination Failures

The previous section argued that *coordination* and *policy ‘discovery’* are two essential dimensions of industrial and innovations policies, given the context of industrial organization and international relations currently prevailing worldwide. This section briefly discusses how policies to promote enterprise clusters of productive agglomeration may be a powerful and effective policy instrument. The

literature has traditionally dealt with enterprise clusters by showing the advantages of geographic agglomeration for productivity and innovation, and the role that clusters may play in enhancing coordination of economic activities. Let us explore each of these arguments.

Economies of Geographical Agglomeration

The role of industrial agglomeration and inter-firm linkages in the economic development of countries and regions has drawn the attention of both academics and policy makers. Agglomeration economies—first identified by Marshall (1920), studied by Arrow (1962) and Romer (1986), and further analysed by several scholars²—originate from industry- and location-specific externalities due to knowledge or technology spillovers, input/output sharing, and labour-market pooling.³ Evolutionary economists have also contributed to the discussion on the role of space and agglomeration by analysing the role of linkages among firms, and between firms and other agents. According to this view, the linkages firms set up as they carry out market transactions provide advantages beyond the market transaction itself. In fact, these linkages enable the transfer of essential tacit components of knowledge that require interpersonal relationships and trust, and foster knowledge spillovers. The learning process builds on the complementarities between external knowledge and internal capabilities, allowing the firm to better exploit and build its own knowledge. The linkages and networks created facilitate organizational learning and act as a locus of innovation through interactive learning (Lundvall 1992).

Furthermore, local social embeddedness may play a useful role, and firms with linkages may participate in social networks leading to positive outcomes: reduced transaction costs, increased efficiency, stronger originating and sharing of tacit knowledge, reduced uncertainty as a result of stronger bargaining and lobbying power, and stronger and more effective cooperative action.⁴

The existence of agglomeration economies is backed by abundant empirical evidence.⁵ In fact, empirical analysis of the effect of agglomeration began in the 1970s with contributions from Shefer (1973) and Sveikauskas (1975). Ciccone and Hall (1996) were the first to address the fact that firms benefit from agglomeration because of externalities and that the most successful and productive firms locate close to other companies. They showed that doubling employment density increases average labour productivity by around 6 per cent in US gross state output. More recently, Ellison, Glaeser, and Kerr (2010) used establishment-level data from the manufacturing sector in the United States for the period 1972–97 to compute pairwise co-agglomeration measurements for manufacturing industries. They also measured the relevance of Marshall’s three mechanisms of industry agglomeration: (i) input-output tables for the importance of transport costs; (ii) correlation across industries in terms of employment composition for the potential gains from labour-market pooling; and (iii) technology flows and patent

² For a review of this topic, see Rosenthal and Strange (2003).

³ Because of Marshall’s seminal work, this phenomenon is often referred to as Marshallian externalities. In more generic terms, the literature has also referred to the concept of industry-specific local externalities.

⁴ Guerrieri and Pietrobelli 2006; Granovetter 1985; McDermott, Corredoira, and Kruse 2009; Mesquita and Lazzarini 2008; Schmitz, 1995.

⁵ Other papers presenting evidence of agglomeration economies include Combes et al. (2008, 2010), Dumais et al. (2002), Ellison and Glaeser (1999), Ellison et al. (2010), Rosenthal and Strange (2003 and 2010).

citations for technological spillovers. The analysis of the relationship between co-agglomeration indices and these three measures showed evidence to support each of the mechanisms.⁶ These results suggest that input-output relationships (i.e., as a result of firms locating near their customers and suppliers) are the most important agglomeration factor, followed by labour pooling.

Productive agglomeration has also been studied because of its expected effects on innovation. Indeed, several studies have documented that certain non-codified industry-specific knowledge is spatially bound in the location in which it originated, because its transmission requires direct social interaction or even the transfer of the human resources that generated it (Feldman and Audretsch 1999). Therefore, gains from knowledge spillovers may only be realized among firms concentrated in the same locality and the same industry. Evidence shows that input sharing leads to industry-specific and location-specific externalities when there are benefits from specialization among input suppliers, increasing returns in the production of intermediate goods, and gains from the proximity of suppliers and final users of such goods (Fujita, Krugman, and Venables 1999), and from technology users and producers (Lundvall 1988). These conditions are very likely to occur in cases of industry-specific services, such as business consulting, machine repair, and quality certification. Finally, it is worth noting that the effect of agglomeration economies is not only static, but also dynamic because a higher rate of learning by doing and by interaction encourages a higher rate of productivity growth and a more intense and effective process of innovation (Rodríguez-Clare 2005).

Production agglomeration often takes the form of industry clusters, and various definitions of clusters have been proposed over time. A baseline definition conceives an industrial cluster as a geographical concentration of firms and organizations specializing in the same or related productive activities. Becattini defines the concept of industrial district as a localized social and productive “thickening”, held together by a “complex and tangled web of external economies and diseconomies, of joint and associated costs, of historical and cultural vestiges, which envelops both inter-firm and interpersonal relationships” (Becattini 1989: 132). A simpler definition is derived from the work of Michael Porter (1990), who defines industrial clusters as “a geographic concentration of competing and cooperating companies, suppliers, service providers, and associated institutions”.

Coordination failures

Production and investment decisions in upstream and downstream segments of industry are often interdependent. Therefore, a firm’s productivity depends not only on its own efforts and abilities, and on the macroeconomic and legal context in which it operates, but also on the actions of other firms and organizations influencing infrastructure, regulation, and the provision of public goods.

The problem arises as the markets for these (intermediate) goods and services are beset by market failures, and this is due, among other factors, to economies of scale, thick market effects, knowledge spillovers, and tacitness. As investments by one firm can have a positive effect on the profitability of investments by other firms (via the increase in aggregate demand, and ensuing economies of scale

⁶ To address reverse causality, they applied instrumental variables using UK measures as an instrument for US industry characteristics.

affecting productivity everywhere else), everybody would be better off if everybody else were also investing (i.e., at the high-investment equilibrium). Market forces cannot take the economy from a low-investment to a high-investment equilibrium. Some form of coordination is needed to move to good equilibrium. If the economy stays in bad equilibrium, this is due to a ‘coordination failure’.

This is not a new story. Paul Rosenstein-Rodan (1943) was the earliest author to write of *underdevelopment traps*, related to the possibility that the potential offered by the simultaneous industrialization of many sectors of the economy could not be exploited through market forces alone. In fact, as no sector would be profitable industrializing alone, the lack of explicit coordination would not induce development.⁷ The obstacle to industrial development is not technological opportunities, knowledge, or resources, but the failure to coordinate choices. In countries that have implemented the reforms essential for industrial development—i.e., built adequate institutions and an appropriate legal framework—the lack of coordination between private and public actors, firms and workers, research and technology institutions and the productive sector, and between service and infrastructure providers and the enterprise sectors, are all possible determinants of inferior performance and underdevelopment traps. In such conditions, market forces alone do not have the capacity to move the economy to the ‘best’ equilibrium.⁸

One can think of many examples of coordination failures that are relevant for developing countries today (Rodríguez-Clare 2005). A large-scale irrigation project would not be profitable if only a few farms used modern technologies, but using such technologies is profitable only if there is adequate irrigation. A university specializing in fashion design would be useless in the absence of firms demanding such human resources, but the absence of specialized professionals prevents firms from developing towards fashion design.

As these examples show, although coordination failures may occur at the economy-wide level, they also frequently occur at local or cluster level. However, geographical agglomeration may make coordination easier, and offers the possibility of higher productivity and better performance through some kind of coordination. In other words, this amounts to stating that productive agglomeration alone offers only some (limited) ground for what has been called “collective efficiency” (Pietrobelli and Rabellotti 2007, Schmitz 1995). External economies may also be exploited without explicit and purposeful coordination, but it is only through joint collaborative actions and better coordination at the local level that the greatest benefits are obtained from agglomeration. This changes the scope for policy interventions to a remarkable extent.

As should be clear from the examples above, the coordination failure approach has remarkable and comprehensive policy implications, and many current approaches to industrial policy find their rationale in this conceptualization. As a general principle, within this framework the role of government policy is to move the economy out of bad equilibrium into a good one. In theory, this can be accomplished in

⁷ This has been studied, among others, by Rodrik (1996 and 2004), Rodríguez-Clare (2005) and Hoff (2000).

⁸ However, Rodríguez-Clare (2005) clearly shows that coordination failures may prevail also in the absence of multiple equilibria, for example with activities that are never profitably provided by private firms (e.g., non-exclusive public goods that should be delivered by the government).

many different ways. In his early studies Rosenstein-Rodan argued that there could be coordination 'from above', with the government planning the process of industrialization and remedying what we call coordination failures today. A more modern approach argues that coordination should be induced through bottom-up approaches, and should involve coordination among public entities (see, for example, Devlin and Pietrobelli 2016).

Cluster Development Policies as Examples of 'Modern' Industrial Policy

However, if agglomeration and coordination are beneficial for firm performance, why do firms not choose it spontaneously and why is public intervention needed? The explanation is that sometimes clusters and the linkages within them do not develop as strongly and deeply as is desirable, and they do not produce all the possible results, because of several market and coordination failures, as well as incomplete and asymmetric information. Sometimes agents organize themselves and internalize the benefits of these externalities, and the market itself generates a solution that provides sufficient coordination, for example in the form of an export business association or a credit cooperative. However, in many cases, an appropriate institutional arrangement to help organize collective action needs to be discovered, and this 'discovery' is supported by policies to promote clusters.

Solving coordination failures is one of the key objectives of cluster development policies (CDPs). These interventions create formal and informal institutional frameworks to facilitate collaboration among firms and between firms, the public sector and other institutions such as universities and research centres. To induce more collective action among private firms, programs often strengthen a local business association, or help create a new cluster association. Several countries in Asia, Europe, and more recently in Latin America, have adopted policies to exploit the potential advantages offered by the agglomeration of production activities through cluster development programs.⁹

However, clusters are not the final objective. Rather, clusters are the instruments, or the intermediate objective, to overcome coordination failures. Most importantly, although enterprise agglomerations are often generated naturally and many linkages already exist, they are often not sufficiently structured, and firms fail to exploit their full potential beyond the realization of market transactions.¹⁰ A number of factors may affect this failure, coordination failures being the most important.

Tourism is an important example where coordination failures affect the development of the sector. Private investments in tourism services are not only strongly interrelated (e.g., the profitability of a hotel may strongly depend on the local availability of a variety of restaurants or on the availability of organized attractions), but also depend on the quality of public investments in utilities and infrastructure. In turn, the economic return on these public investments would also strongly depend on

⁹ For examples of different policies and programmes see Casaburi et al., 2014, Cassiolato et al, 2003, Guerrieri et al., 2003, OECD, 2007, Pietrobelli and Rabellotti, 2007, Rasiah, 1994, Yusuf et al., 2008, Zeng, 2010.

¹⁰ The formation of linkages per se is also potentially affected by coordination failure. In fact, the investment that firm A makes in creating a link with firm B produces various (network) externalities on B and on the firms connected with A and B (for a review of this topic, see Maffioli 2005). For this reason, on their own, firms may fail to create the socially desirable level of inter-firm linkages.

the success of vibrant tourism business activities. In this case, the lack of public–private coordination may lead to levels of business linkages and investment that are socially suboptimal. Similar problems emerge in value chains, where success often largely depends on effective coordination of the relationships between a variety of providers and buyers and other intermediate firms and institutions (Pietrobelli and Rabellotti 2007, Pietrobelli and Staritz 2018).

In many cases, the individual pay-offs of the coordination problem could be such that optimal equilibrium is not achieved, and an appropriate institutional arrangement to help organize collective action needs to be found.¹¹ Once an improved arrangement is found, with the support of CDPs, higher investment and innovation rates may be achieved, in turn improving prospects for employment and income growth.

Most importantly, coordination failures are often especially damaging for innovation and technology (Crespi et al. 2014, Lall 2004). Sometimes innovation policies may be used in a very specific way, that is, to solve specific coordination failures in clusters that ultimately lead to low innovation (Casaburi et al. 2014, Rodríguez-Clare 2005). The idea of promoting innovation at the cluster level is supported by evidence that knowledge spillovers—in spite of globalization and market integration—are weakened by distance; moreover, spillovers are stronger for firms in related sectors of activity (in the same sector, or participating in the same value chain, and ‘speaking the same technological language’). Finally, innovation that leads to wider and more frequent spillovers should be supported. Thus, for example, wider spillovers occur from research carried out in universities than in corporations, or where there is a long tradition of collaboration and exchange of information and knowledge, such as in some advanced industrial clusters in Italy and Germany. Appropriate policies to address coordination failures detrimental to innovation in clusters might include, for example, grants and prizes for innovative projects and firms, joint research efforts involving local research centres and firms, and long-term collaboration between local training centres, universities, and business associations (Casaburi et al. 2014, Chatterji et al. 2013).

Cluster development policies share many of the essential features of modern industrial policies described above. These policies arise in a context of imperfect information, and generate the institutional mechanisms to promote government–business interaction and collaboration to *discover* the missing policy interventions. Moreover, policies and programmes are often tested and useful *learning* enables improvements in the design and implementation of the policy tool. The struggle to create and strengthen the appropriate institutions is also central in these interventions, of which innovation policy is often a core component.

The following section briefly describes a specific version of CDP that has been used experimentally and then widely implemented in Latin America and the Caribbean, with the support of national and local governments, as well international organizations like the Inter-American Development Bank and the World Bank.

¹¹ For example, along these lines, Paul Romer (1993) proposes the creation of self-organizing industry investment boards to implement national technology strategies.

Cluster Development Policies in Latin America

The spread of CDP throughout the Latin American sub-continent has been fast and relatively recent, although the process started a few years later than the pioneering European programs. Several CDPs can be found at different levels of government—local, regional, and national. Several international institutions financed many of the earlier CDPs, contributing to a sort of ‘technology transfer’ as they helped disseminate this new approach to industrial policy within Latin American policy circles. In some ways, these institutions fulfilled the role that the EU played for several European countries in the launching of their early versions of CDP (Casaburi et al. 2014).

Some of these earlier programs in Latin America aimed at reducing the transaction costs of inter-firm collaboration, generally promoting networks of SMEs, like UNIDO’s business networks, CORFO’s *Programas Asociativos de Fomento* (PROFO) and MIF’s productive integration programs. The PROFO was probably the earliest policy instrument of this kind to be implemented as a national policy in the region. It promotes joint projects among groups of at least five SMEs, to improve their access to markets and, to a lesser extent, to help them innovate. It has reached approximately 10,000 SMEs (Casaburi et al. 2014), and several evaluations since 2001 have shown its positive impacts for the beneficiaries in several policy objectives, including management capacities, willingness to innovate, and ability to reach foreign markets.

Cluster development policies began to be implemented in Latin America in the 2000s, with some limited experiences in the late 1990s.¹² The earlier cases were individual programmes in particular locations, most of them financed by international donor agencies, including the Multilateral Investment Fund of the Inter-American Development Bank, The US Agency for International Development and the European Union. They were limited in that they were not representative of a larger shift in policies, and they were rather small-scale experiments. However, they often acted as important pilot cases that could later be scaled up by public policy at the national or subnational level.

Most CDPs in Latin America, in particular those supported by international institutions, follow a similar structure. Typically, a public institution is in charge of implementing the program and receives funding to carry out activities to strengthen selected clusters in the country (or the state/province). The activities usually involve: (i) mapping and selecting clusters to be supported in the targeted territory; (ii) identification of challenges and needs for policy intervention at the individual cluster level; (iii) implementation of actions identified in stage ii; and (iv) monitoring and evaluation.

In order to solve coordination failures, these programs create formal and informal institutional arrangements and frameworks to facilitate private–private, public–private and public–public collaboration. To induce more collective action among private firms in a given cluster, the programs generally strengthen a local business association, help generate a new one, or generate a new cluster association that firms may join, as the common interest of firms in a cluster may not coincide with existing sectoral-type chambers of commerce. Public–public coordination has been the most difficult of

¹² Policies supporting clusters are also very common in emerging economies such as India and China (Lin 2011; Pietrobelli 2010; Yusuf et al. 2008; Zeng 2010).

the three, even though microeconomic interventions of this kind require a high level of collaboration among multiple public agencies. The expectations when most of these CDPs were designed was that once they generated a detailed diagnostic of the cluster’s strategic needs, and missing public and semi-public inputs were identified, multi-level coordination of interventions within public agencies would be easily achieved. However, differences over mandates, bureaucratic processes, strategic views and short-term political considerations among public actors trumped the collaboration opportunities.¹³ This was probably because, first, public–public coordination on industrial policy is extremely difficult and successes are rare, and second, cluster policies are not the core instruments in any Latin American country without the necessary clout to overcome turf politics.

Overall, CDPs are public interventions that foster the beneficial effects of economies of agglomeration by creating a set of incentives to overcome coordination failures, thereby discovering and implementing the necessary policies. The Inter-American Development Bank (IDB) has very actively financed such public programs in Latin America. More than 300 clusters were supported between 2000 and 2015, with funding exceeding US\$500 million—and additional co-financing from interested parties (such as federal or subnational government or private-sector federation)—in the form of loans and grants (Maffioli et al. 2016). At the same time, many other programs were developed by each country, notably Brazil, where clusters have represented a common approach to local industrial policy for over a decade (Cassiolato et al. 2003).

In practice, these programs typically involve the following series of activities. First, studies and exercises are carried out to map the clusters and prioritize among them in relation to the objectives that are being pursued, such as reducing inter-regional development gaps, or promoting specific regions and sectors. Taking a pragmatic and flexible approach, the IDB defined a cluster as a productive agglomeration to exploit local linkages in order to generate and strengthen competitive advantages.

<p>BOX</p> <p>The electronics cluster in Santa Rita de Sapucaí, Minas Gerais, Brazil</p> <p>Santa Rita de Sapucaí, in Minas Gerais, Brazil, is a successful electronics cluster that in less than 20 years has managed to host over 150 firms employing about 14,000 people and exporting to more than 40 countries. Local investment in R&D reaches almost 9 per cent of total sales. The origin of this cluster can be traced back to three technology training institutions set up in the 1960s: The Electronics Technical School, The Institute for Telecoms Engineering (INATEL), and the Faculty of Administration and Informatics (FAI). The Federal University of Itajubá (UNIFEI), only 40 km from Santa Rita, has been training the personnel employed by these institutions. This agglomeration of technical competences fostered a strong entrepreneurial attitude. In contrast with other electronics clusters in Brazil dominated by large MNCs (e.g., Manaus), Santa Rita has been characterized by a population of small and medium-sized enterprises, sharing a strong local identity. These shared tacit rules helped reduce transaction costs and facilitate collaboration in technological projects within local unions and federations of industries. Cluster development programs financed by the local government, the state</p>

¹³ A Chilean program that created regional development agencies in each of that country’s fifteen regions is a good example. In each of the regions, the newly created agencies were expected to support at least three clusters. Since Chile’s policies are still very centralized in the national government, the program design included an inter-ministerial board at the national level to facilitate high-level policy coordination affecting the selected clusters. At the local level, the program created instances in which local representatives of national PDP agencies could coordinate their instruments to meet the identified demands of each cluster. As it turned out, the national-level coordination unit barely met, while at the local level there were many instances in which previously uncoordinated interventions improved their joint actions around each cluster’s strategic plans.

government and the Inter-American Development Bank have contributed to strengthen local institutions, finance business incubators, and further enhance technical training.
Sources: http://www.em.com.br/app/noticia/tecnologia/2015/06/22/interna_tecnologia,660561/potencia-tecnologica.shtml, and <https://techinbrazil.com/brazilian-electronic-valley> (accessed 9 March 2018).

Once governments and policy makers have selected the cluster's policy objectives, an important role for local actors is to raise awareness of the existing potential and induce them to participate in defining a strategy for the cluster development that has been started. This involves diagnostic studies to understand the weaknesses, challenges, and potential for the cluster's competitiveness. Importantly, these are not desk studies, and all the actors concerned in the development and success of the cluster need to be involved—private firms, with the government, universities, training and research centres, and government agencies. This process very closely resembles that of modern industrial policy (see above). IDB-financed CDPs typically included some form of public–private advisory board where the visions and interests of firms and policy makers can converge toward common objectives. The aim was to create governance mechanisms to facilitate collective actions between private and public actors, in an explicit *search to discover* the missing input that deserves public support.

The process typically ended with the setting up of an action plan, a concrete strategy defining the extent and the details of the specific actions that both the private sector and the government need to undertake. This often resulted in specific policy decisions, such as government financing for a sectoral training centre or laboratory for research and testing, or the creation of an exporters' association to promote collective actions that could benefit local firms, or the introduction of an R&D subsidy.

An example: the Tambaú red tile cluster in the state of Sao Paulo, Brazil.

Tambaú, in the state of Sao Paulo, Brazil, has a large concentration of producers of ceramic products, mostly red roof tiles. The origin of this cluster is a large red tile deposit where extraction began in the early twentieth century. As the deposits spread over a wider region, other agglomerations of firms in this sector emerged in nearby districts, three of which were also supported by the CDP. In Tambaú there are 67 firms in the sector, mostly SMEs, representing 48 per cent of the total manufacturing firms in the district and 66 per cent of manufacturing employment (IDB 2013). Some small firms extract the clay to supply these firms, mostly in the informal sector.

The intervention using a cluster approach had three different phases (IDB 2003). In 2004–06, the Industry Federation of the State of Sao Paulo (FIESP) chose Tambaú for its cluster project in the state. It was a modest start, but it was significant in that it was the first time firms in the region had considered their collective needs. In the period 2006–08, the Development Ministry (SD) of the State of Sao Paulo included the Tambaú cluster as part of its cluster program and acted with the local SEBRAE-SP agent to mobilize local actors, helping create an inter-institutional governance mechanism that proved effective and sustainable. The new program financed the preparation of an action plan that addressed several of the local demands. In parallel, the city government prepared a territorial development plan, focused mainly on the environmental problem created by the informal clay-mining firms. The program created a governing body for the cluster, with representatives of the city government, the local business

association, the CCB (Ceramic Centre of Brazil),¹⁴ FIESP, SEBRAE-SP, and SENAI, the Industrial Workers Training Service, managed by the federation of industries that provides labour training and technical service facilities.

Since 2008 the CDP has built on the previous experiences and institutional development to create a more sophisticated cluster business plan. The new one proposed a move by local firms from ‘tile suppliers’ to ‘building solutions suppliers’, integrating their business with others from related sectors and catering directly to end consumers. The strong local governance managed to integrate this high-level strategy with the more down-to-earth local needs already identified. A set of interventions was finally agreed to allow these clusters to move to a more sophisticated supply of building solutions, but there were also more concrete and short-term actions to improve collective efficiency.

One policy intervention exemplifies the process described above very well. One of the first collective challenges identified was the environmental damage caused by the local clay-mining activities. This affected all firms because they were all dependent on a reliable supply of good-quality clay, and they all suffered from the environmental liabilities that unsustainable mining was creating. The first solution proposed was the creation of a new single mining and clay-processing facility administered collectively. This proposal never took off because it was too complex and did not address the reality of existing informal mining firms. Then the city government commissioned a report to analyse the problem and propose solutions. The report came up with new alternatives, including ways to improve the way mining firms were working. This report later informed the city government’s territorial development plan, which both took account of the tile firms’ needs and challenges, and complemented the cluster strategic plans. Finally, when SENAI became part of the cluster management group, it offered a solution that was far better than the creation of a single collective clay-processing plant. It agreed to build a new facility in Tambaú to train mine workers and provide laboratories and testing facilities to help local mining firms upgrade their technologies and environmental standards.

The local government did not know beforehand what specific industrial policy instruments were required; these were *discovered* over time, thanks to cleverly engineered processes of public–private interactions and consultations. Moreover, the selection of the best policy tools changed over time, due to a process of *learning from experimentation* and careful analysis of the results.

Do Cluster Development Policies Work?

Cluster development policies require constant and repeated rigorous evaluations, like all public policies. However, their evaluation involves some specific difficulties. First, these are complex interventions, mainly indirect, facilitative, and system oriented. There is no standard ‘treatment’ (like a vaccination in health programs), but rather a menu of specific interventions, where the definition of interventions for each cluster follows a detailed and participatory analysis involving public and private sectors. Second, interventions take a long time to fully show effect, often between three and five years, which implies several strategic and operational problems: governments favour quick results that can be seen within

¹⁴ This was a national-level technical association that had not been active in that region before.

the period of their mandate. Third, these programs target extending and strengthening spillovers, effects that are especially hard to measure.

In spite of these difficulties, recent evaluations of many CDPs exist, and confirm the qualitative evidence of success described above. Thus, in the many CDP experiences in Latin America analysed by Maffioli et al. (2016), the policies often succeeded in creating the incentives and promoting the public support needed to facilitate interaction and coordination among all agents. Inter-firm collaborations and joint actions as well as better coordination with the public sector and among government institutions were strongly enhanced by the programs. In addition, the coordination of the clusters' actors was often followed by the 'discovery' of the required intervention, and the co-financing of public infrastructure and club goods could often become a catalyst for new investment projects.

The methods used by these authors include econometric evaluation with control groups built with propensity score matching (PSM) and difference-in-differences (DD) methods, combining the use of cluster firms' data with census data. The results for clusters in Brazil (Sao Paulo and Minas Gerais states) reveal positive and significant effects on employment, probability of exporting, and export levels. Indirect effects on the probability of exporting were also detected in local firms in the clusters' area of influence. Other studies used social-network analysis to evaluate the impact of the CDP in Córdoba, Argentina during 2003–07, and found that networks became less dense and more hierarchical. Central enterprises became stronger over time, ensured network connectivity, and created links between treated and untreated firms (Maffioli et al. 2016).

Case studies carried out during the same project helped to inform future CDP program design and implementation. Thus, for example, CDP was shown to have longer time horizons than policy makers think, leading to frustration or premature withdrawal of support from actors subject to the political cycle. Moreover, given the vast heterogeneity of clusters, CDPs work better when they are flexible and adapt to local needs. However, unlike successful cluster policies in regions of advanced countries, the Latin American cases show that these policies have not yet become a central feature of governments' industrial policies, and they work mostly on the margins.

Most examples managed to create the conditions at the local level for increased private–private, public–private, and public–public collaboration that could have hardly happened spontaneously. The emerging collaborative governance structures in more recent CDPs have the potential to become a platform on which more sophisticated collective actions can take place. Interestingly, capture and rent seeking seem to be lower than expected due to the checks and balances introduced by multi-level actor participation.

Conclusions

Active policies undertaken at the national (federal) and local levels have often supported industrial clusters in many regions and countries of Latin America, sometimes with the financial and technical assistance of international organizations. These experiences have been most remarkable, and share several elements of the modern industrial policies that enjoy an increasing consensus in the literature,

with clever interactions of private and government sectors, a process of search and discovery of the necessary public policy inputs, and an interactive design and implementation of these policies with special attention to the learning generated. Such policy experiences offer several remarkable insights into the positive role that industrial policies in specific locations and with an intense and structured interaction between the private and public sectors may play in the search for and discovery of the right approach to industrial policy.

REFERENCES

- Arrow, K. 1962. "Economic Welfare and the Allocation of Resources for Invention." In R. Nelson (ed.), *The Rate and Direction of Inventive Activity*. Princeton, NJ: Princeton University Press.
- Audretsch, D. B., and M. P. Feldman (1996) 'R&D Spillovers and the Geography of Innovation and Production', *American Economic Review* 86(4): 253–73.
- Becattini G. (1989) 'Sectors and/or districts: some remarks on the conceptual foundations of industrial economics', in E. Goodman and J. Bamford (eds), *Small Firms and Industrial Districts in Italy*, Routledge, pp. 123–35.
- Casaburi, G., A. Maffioli, and C. Pietrobelli (2014) 'More than the Sum of its Parts: Cluster-Based Policies', in G. Crespi, E. Fernández-Arias, and E. H. Stein (eds), *Rethinking Productive Development: Sound Policies and Institutions for Economic Transformation*. Washington, DC: Palgrave Macmillan and Inter-American Development Bank.
- Cassiolato, J. E., H. M. M. Lastres, and M. L. Maciel (eds) (2003) *Systems of Innovation and Development*. London: Edward Elgar.
- Chang, H.-J. (2002) *Kicking Away the Ladder – Development Strategy in Historical Perspective*. London: Anthem Press.
- Chatterji, A., E. Glaeser, and W. Kerr (2013) 'Clusters of Entrepreneurship and Innovation.' Working Paper No. 19013. Cambridge, MA: The National Bureau of Economic Research (NBER).
- Ciccone, A., Hall, R., (1996) 'Productivity and the density of economic activity', *American Economic Review* 86 (1): 54–70.
- Combes, P., G. Duranton, L. Gobillon, D. Puga, and S. Roux (2012) 'The Productivity Advantages of Large Cities: Distinguishing Agglomeration from Firm Selection', *Econometrica* 80(6): 2543–94.
- Crescenzi R., Pietrobelli C., Rabellotti R. (2014) 'Innovation drivers, value chains and the geography of multinational corporations in Europe', *Journal of Economic Geography* 14(6): 1053–86.
- Crespi, G., E. Fernández-Arias, and E. Stein (eds) (2014) *Rethinking Productive Development: Sound Policies and Institutions for Economic Transformation*. London: Palgrave.
- Devlin, R. and Pietrobelli, C. (2016) 'Modern Industrial Policy and Public–Private Councils at the Subnational Level: Empirical Evidence from Mexico', Inter-American Development Bank, IDB-TN-1122, <http://dx.doi.org/10.18235/0000474>
- Devlin, R. and G. Mognillansky (2013) 'What's New in the New Industrial Policy in Latin America?' in J. Stiglitz and J. Lin (eds), *The Industrial Policy Revolution I*. New York, NY: Palgrave Macmillan.
- Dumais, G., Ellison, G., Glaeser, E. (2002) 'Geographic concentration as a dynamic process', *Review of Economics and Statistics* 84 (2): 193–204.

- Ellison, G., Glaeser, E. (1999) 'The geographic concentration of industry: Does natural advantage explain agglomeration?' *American Economic Review* 89 (2): 311–16.
- Ellison, G., Glaeser, E., Kerr, W. (2010) 'What causes industry agglomeration? Evidence from coagglomeration patterns', *American Economic Review* 100 (3): 1195–1213.
- Feldman, M. P., Audretsch, D. B. (1999) 'Innovation in Cities: Science-based Diversity, Specialization, and Localized Competition', *European Economic Review* 43: 409–29.
- Fernández-Arias E., Sabel C., Stein E., Trejos A. (2017) 'Two to Tango: Public-Private Collaboration for Productive Development Policies.' IDB Working Paper IDB-WP-855, Washington, DC: The Inter-American Development Bank.
- Fujita, M., Krugman, P. and Venables, A. (1999) *The Spatial Economy: Cities, Regions and International Trade*. Cambridge, MA: MIT Press.
- Giuliani, E., Pietrobelli, C., Rabellotti, R. (2005) 'Upgrading in global value chains: Lessons from Latin American clusters', *World Development* 33(4): 549–73.
- Glaeser, E.L. (ed.) (2010) *Agglomeration Economics*. Chicago, IL: University of Chicago Press.
- Glaeser, E.L., Kallal, H.D., Scheinkman, J.A., Shleifer, A. (1992) 'Growth in Cities', *Journal of Political Economy* 100: 1126–52.
- Granovetter, M. (1985) 'Economic action and social structure: The problem of embeddedness', *American Journal of Sociology* 91: 481–510.
- Grazzi, M. and Pietrobelli, C. (2016) *Firm Innovation and Productivity in Latin America and the Caribbean. The Engine of Economic Development*. London and New York: Palgrave.
- Guerrieri, P. and Pietrobelli, C. (2006) 'Old and New Forms of Clustering and Production Networks in Changing Technological Regimes: Contrasting Evidence from Taiwan and Italy', *Science, Technology and Society* 11(1): 9–38.
- Guerrieri, P., S. Iammarino, and C. Pietrobelli (2003) *The Global Challenge to Industrial Districts: Small and Medium Sized Enterprises in Italy and Taiwan*. Cheltenham, UK: Edward ELGAR.
- Hanson, G. (2001) 'Scale economies and the geographic concentration of industry', *Journal of Economic Geography* 1 (3): 255–76.
- Hausmann, R. and D. Rodrik (2003) 'Economic Development as Self-Discovery', *Journal of Development Economics* 72(2): 603–33.
- Hausmann, R., and D. Rodrik (2006) 'Doomed to Choose: Industrial Policy as Predicament.' Discussion Paper. Cambridge, MA: Kennedy School of Government, Harvard University. Available at: <https://www.sss.ias.edu/files/pdfs/Rodrik/Research/doomed-to-choose.pdf> , accessed 8 February 2017.
- Henderson, V., Kunkoro, A., Turner, M. (1995) 'Industrial development of cities', *Journal of Political Economy* 103 (5): 1067–90.
- Hoff, K. (2000) 'Beyond Rosenstein-Rodan: The Modern Theory of Coordination Problems in Development.' In Proceedings of the Annual World Bank Conference on Development Economics. (Supplement to the World Bank Economic Review), Washington, DC: World Bank.
- Kuznetsov, Y. and C. Sabel. 2011. New Open Economy Industrial Policy: Making Choices without Picking Winners, PremNote no. 161, World Bank, accessed at <https://openknowledge.worldbank.org/handle/10986/11057> [11 July 2019].
- IDB (Inter-American Development Bank). 2003. "Programa de apoyo a la modernización productiva de la Provincia de Rio Negro." Propuesta de préstamo, AR-0279. Washington, DC: IDB.

- Lall, S. (2004) 'Reinventing industrial strategy: the role of government policy in building industrial competitiveness.' G-24 Discussion paper, 28, United Nations, <https://pdfs.semanticscholar.org/1bac/21f4e522ac957e935328a875d8963927b217.pdf> accessed 15 Jan 2018.
- Lin J.Y. (2011) 'New Structural Economics: A Framework for Rethinking Development', *World Bank Research Observer*, 26(2):193–221.
- Lundvall B.-Å. (1988) 'Innovation as an interactive process: from user-producer interaction to the national system of innovation', in G. Dosi, Freeman, C., Nelson, R., Silverberg, G., Soete, L. (eds), *Technical Change and Economic Theory* pp. 349–69. London: Pinter.
- Lundvall, B.-Å. (1992) *National Systems of Innovation: Towards a Theory of Innovation and Interactive Learning*. London: Pinter.
- Maffioli, A. 2005. "The Formation of Network and Public Intervention: Theory and Evidence from the Chilean Experience." ISLA Working Paper 23. Milan: University Commerciale Luigi Bocconi.
- Maffioli A., Pietrobelli C., Stucchi R., (eds) (2016) *The Impact Evaluation of Cluster Development Programs. Methods and Practices*. Washington, DC: Inter-American Development Bank. <https://publications.iadb.org/en/impact-evaluation-cluster-development-programs-methods-and-practices>
- Marshall, A. (1920) *Principles of Economics*, 8th Edition. London, UK: Macmillan & Co., Ltd.
- Martin, R, Sunley, P. (2003) 'Deconstructing clusters: chaotic concept or policy panacea?' *Journal of Economic Geography* 3: 5–35.
- McDermott, G.A., Corredoira, R.A., Kruse, G. (2009) 'Public-private institutions as catalysts of upgrading in emerging market societies', *Academy of Management Journal*: 52 (6): 1270–96.
- Mesquita, L.F., Lazzarini, S.G. (2008) 'Horizontal and vertical relationships in developing economies: implications for SMEs' access to global markets', *Academy of Management Journal* 51(2): 359–80.
- Nishimura, J. and Okamuro, H. (2011) 'R&D productivity and the organization of cluster policy: an empirical evaluation of the Industrial Cluster Project in Japan', *The Journal of Technology Transfer* 36(2):117–44.
- OECD (Organisation of Economic Co-Operation and Development) (2007) *Competitive Regional Clusters. National Policy Approaches*. Paris: OECD.
- Padilla, R. (ed.) (2014) *Fortalecimiento de las cadenas de valor como instrumento de la política industrial*. Comisión Económica para América Latina, Naciones Unidas, Santiago, Chile.
- Pietrobelli, C. (2016) 'Políticas industriales modernas para el cambio estructural en América Latina: coordinación e integración productiva', *Boletín Informativo Techint*, 353.
- Pietrobelli, C. (2010) *Independent Review of UNIDO Cluster and Networking Development Initiatives*. Vienna: UNIDO, United Nations.
- Pietrobelli, C. and Staritz, C. (2017) 'Cadenas Globales de Valor y Políticas de Desarrollo', *Desarrollo Económico*, 56 (220).
- Pietrobelli, C. and Staritz, C. (2018) 'Upgrading, Interactive Learning, and Innovation Systems in Value Chain Interventions', *European Journal of Development Research*, <https://doi.org/10.1057/s41287-017-0112-5>
- Pietrobelli, C., Rabellotti, R. (2007) *Upgrading to Compete. Global Value Chains, Clusters and SMEs in Latin America*. Cambridge, MA: Harvard University Press.
- Porter, M. (1998) 'Clusters and the new economics of competition', *Harvard Business Review* 76 (6): 77–91.
- Rasiah, R. (1994) 'Flexible production systems and local machine-tool subcontracting: electronics components transnationals in Malaysia', *Cambridge Journal of Economics* 18 (3):279–98.

- Rodriguez-Clare, A. (2005) 'Coordination failures, clusters and microeconomic interventions', *Economía* 6 (1): 1–29.
- Rodriguez-Clare, A. (2007) 'Clusters and comparative advantage: implications for industrial policy', *Journal of Development Economics* 82 (1): 43–57.
- Rodrik, D. (1996) 'Coordination Failures and Government Policy: A Model with Applications to East Asia and Eastern Europe', *Journal of International Economics* 40: 12.
- Rodrik, D. (2004) *Industrial Policy for the Twenty-First Century*. Harvard University for UNIDO, September 2004.
- Romer, P. (1993) 'Implementing National Technology Strategy with Self-Organizing Industry Investment Boards', *Brookings Papers in Economics: Microeconomics* 2.
- Romer, P. (1986) 'Increasing Returns and Long Run Growth', *Journal of Political Economy* 94: 1002–37.
- Rosenstein-Rodan, P. (1943) 'Problems of industrialization of Eastern and South-Eastern Europe', *The Economic Journal* 53 (210/211): 202–11.
- Rosenthal, S., Strange, W. (2003) 'Geography, industrial organization, and agglomeration', *The Review of Economics and Statistics* 85 (2): 377–93.
- Rosenthal, S., Strange, W. (2010) 'Small establishments/big effects: agglomeration, industrial organization and entrepreneurship', in Glaeser, E.L. (ed.), *Agglomeration Economics*. Chicago, IL: University of Chicago Press, pp. 277–302.
- Sabel, C.F. and Zeitlin, J. (2012) 'Experimentalist Governance', in D. Levi-Faur (ed.), *The Oxford Handbook of Governance*. Oxford: Oxford University Press, doi: 10.1093/oxfordhb/9780199560530.013.0012
- Schmitz, H. (1995) 'Collective Efficiency: growth path for small-scale industry', *Journal of Development Studies*, 31: 529–66 .
- Shefer, D. (1973) 'Localization economies in SMAs: a production function analysis', *Journal of Regional Science* 13 (1): 55–65.
- Stiglitz, J. E. (1989) 'Markets, market failures and development', *American Economic Review*, 79(2):197–202.
- Sveikauskas, L. (1975) 'The productivity of cities', *The Quarterly Journal of Economics* 89 (3): 393–413.
- World Bank, 2018, *Doing Business 2018*, Washington D.C.: The World Bank
- World Economic Forum (2017) *Global Competitiveness Report 2017-18*. Geneva: World Economic Forum.
- Yusuf, S., K. Nabeshima, and S. Yamashita (eds) (2008) *Growing Industrial Clusters in Asia: Serendipity and Science*. Washington, DC: World Bank.
- Zeng, D.Z. (2010) 'How Do Special Economic Zones and Industrial Clusters Drive China's Rapid Development?', in D.Z. Zeng, pp.1–54.
- Zeng, D. Z., (ed.) (2010) *Building Engines for Growth and Competitiveness in China: Experiences with Special Economic Zones and Industrial Clusters*. Washington, DC: World Bank.

The UNU-MERIT WORKING Paper Series

- 2019-01 *From "destructive creation" to "creative destruction": Rethinking Science, Technology and innovation in a global context* by Luc Soete
- 2019-02 *Do young innovative companies create more jobs? Evidence from Pakistani textile firms* by Waqar Wadho, Micheline Goedhuys and Azam Chaudhry
- 2019-03 *What gains and distributional implications result from trade liberalization?* by Maria Bas and Caroline Paunov
- 2019-04 *FDI, multinationals and structural change in developing countries* by André Pineli, Rajneesh Narula and Rene Belderbos
- 2019-05 *The race against the robots and the fallacy of the giant cheesecake: Immediate and imagined impacts of artificial intelligence* Wim Naudé
- 2019-06 *The middle-technology trap: The case of the automotive industry in Turkey* by Ibrahim Semih Akçomak and Serkan Bürken
- 2019-07 *The impact of a mathematics computer-assisted learning platform on students' mathematics test scores* by Marcelo Perera and Diego Aboal
- 2019-08 *Health insurance and self-employment transitions in Vietnam* by Nga Le, Wim Groot, Sonila M. Tomini and Florian Tomini
- 2019-09 *Knowledge economy and economic development in the Arab region* by Samia Mohamed Nour
- 2019-10 *Migration of higher education students from the North Africa region* by Samia Mohamed Nour
- 2019-11 *Job automation risk, economic structure and trade: a European perspective* by Neil Foster-McGregor, Önder Nomaler and Bart Verspagen
- 2019-12 *The breadth of preferential trade agreements and the margins of exports* by Rod Falvey and Neil Foster-McGregor
- 2019-13 *What a firm produces matters: diversification, coherence and performance of Indian manufacturing firms* by Giovanni Dosi, Nanditha Mathew and Emanuele Pugliese
- 2019-14 *Brazilian exporters and the rise of Global Value Chains: an empirical assessment* by Caio Torres Mazzi
- 2019-15 *How has globalisation affected the economic growth, structural change and poverty reduction linkages? Insights from international comparisons* by Aradhna Aggarwal
- 2019-16 *R&D, innovation and productivity* by Pierre Mohnen
- 2019-17 *Domestic intellectual property rights protection and exports: Accessing the credit channel* by Gideon Ndubuisi
- 2019-18 *The role of early-career university prestige stratification on the future academic performance of scholars* by Mario Gonzalez-Sauri and Giulia Rossello
- 2019-19 *The employment impact of product innovations in sub-Saharan Africa: Firm-level evidence* by Elvis Korku Avenyo, Maty Konte and Pierre Mohnen
- 2019-20 *Embodied and disembodied technological change: the sectoral patterns of job-creation and job-destruction* by G. Dosi, M. Piva, M. E. Virgillito and M. Vivarelli
- 2019-21 *Can we have growth when population is stagnant? Testing linear growth rate formulas and their cross-unit cointegration of non-scale endogenous growth models* by Thomas H.W. Ziesemer

- 2019-22 *Technical progress and structural change: a long-term view* by Alessandro Nuvolari and Emanuele Russo
- 2019-23 *No evidence of an oil curse: Natural resource abundance, capital formation and productivity* by Mueid al Raee, Denis Crombrughe and Jo Ritzen
- 2019-24 *Far from random? The role of homophily in student supervision* by Giulia Rossello and Robin Cowan
- 2019-25 *Semi-endogenous growth models with domestic and foreign private and public R&D linked to VECMs* by Thomas H. W. Ziesemer
- 2019-26 *Characterizing growth instability: new evidence on unit roots and structural breaks in long run time series* by Emanuele Russo, Neil Foster-McGregor and Bart Verspagen
- 2019-27 *Measuring attitudes on gender equality and domestic violence in the Arab context: The role of framing, priming and interviewer effects* by Ann-Kristin Reitmann, Micheline Goedhuys, Michael Grimm and Eleonora E. M. Nillesen
- 2019-28 *Imported intermediates, technological capabilities and exports: Evidence from Brazilian firm-level data* by Caio Torres Mazzi and Neil Foster-McGregor
- 2019-29 *Japan's productivity and GDP growth: The role of GBAORD, public and foreign R&D* by Thomas Ziesemer
- 2019-30 *The decline in entrepreneurship in the West: Is complexity ossifying the economy?* by Wim Naudé
- 2019-31 *Modern industrial policy in Latin America: Lessons from cluster development policies* by Carlo Pietrobelli