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THE (INCOMPLETE AND BRIEF) RETURN OF INDUSTRIAL POLICY: THE CASE OF ARGENTINA 2003-2015

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Abstract

Against the backdrop of global economic growth, the widening of technology gaps, and the adverse evolution of prices for industrialization, Argentina is one of the countries in Latin America that has seen the (partial and temporary) return of public policy to the economic policy agenda. This paper poses the hypothesis that in spite of the revival of industrial policy actions and instruments to promote technological capabilities and foster a framework of incentives favorable to industrialization, a new industrial policy has failed to emerge in light of weak coordination and the absence of a senior body in the hierarchy to implement it.

Keywords: Industrial policy, industrialization, technological capabilities, planning, fiscal and financial incentives.

INTRODUCTION²

This paper discusses the return of industrial policy to the economic policy agenda in Latin America in the aughts. Argentina is broadly relevant because it is one of the few countries in the region where the reinstatement followed decades of absence.

Towards the mid-nineteen-seventies, the Argentine economy had risen to become Latin America's most relatively diversified and least heterogeneous industrial structure following a long period of industrialization. Later, at the end of the nineteen-seventies and into the nineties, the country underwent one of the sharpest regressive industrial shifts in the entire world, adopting a set of trade liberalization and openness policies that prompted the destruction of the technological (and institutional) capabilities accumulated in the post-war era.

Industrial policy reappeared in Argentina in the aughts, not because the country managed to assimilate past experiences, but rather because it was compelled to react to the issue of foreign currency shortages, a problem inherent to demand-driven growth (Abeles *et al.*, 2013). Thus, after five years of growth, in 2008, this need was exacerbated by, at least on one side, a suffocated foreign currency supply (the aforementioned "stop and start" cycles), made worse in 2013 when the terms of exchange for raw materials deteriorated even more and the global economy began to contract once again, translating into a surplus of imported products.

It is worth asking, on the one hand, if these responses to changing internal and external conditions pushed the country to shift from an intervention model inspired by the concept of the facilitator State with a limited role in resolving "market failures" or whether these changes took the form of an industrial policy in the strictest sense, meaning a set of coordinated actions dealing with technological capabilities and incentives designed to spur structural change, defying (to a greater or lesser extent) comparative advantages.

With this question in mind, this paper is organized as follows: Section 1 briefly discusses how economic theory has treated industrial policy; Section 2 proposes a conceptual framework to analyze various industrial policy instruments and actions. There is a brief overview of the background of Argentina's industrial policy in Section 3; Section 4 furnishes a conceptual matrix of the main actions and instruments in place, aiming to identify changing patterns of intervention in the industry in the timespan 2003-2015. Finally, Section 5 introduces some experiences in industrial policy planning, and the paper concludes with a discussion of the most salient aspects analyzed and some broad lessons to take away from the industrial policy experience in this time period.

1. INDUSTRIAL POLICY: FROM MARKET FAILURES TO CAPACITY-BUILDING

If there is a field in which, with a few exceptions, there is an evident lack of recognition for industrial policy, it would be economic theory. The legacy of Alexander Hamilton (1791) and Friedrich List (1841), who laid the groundwork for this theory, has been restricted to a small group of "heretic" economists who have tended to stay on the sidelines (or outside altogether) of the main currents of economic theory. The significant contributions made by these economists were driven by the challenges posed by late industrialization more than the curiosity of the researchers.

In recent years, a "market failures" approach has been used to justify so-called "productive development" policies (Hausmann & Rodrik, 2002; Lin & Monga, 2011; Lin, 2012; Crespi, Fernández-Arias & Stein, 2014). Seen that way, more than just providing public goods (such as rules, standards, and R+D), information externalities are seen as the principal market failure when it comes to industrial diversification in developing countries. Hausmann and Rodrik asserted that a

firm that enters a new industry generates an externality for the rest of the potential candidates, to the extent that this firm generates new information about the viability of the new activities, which is not offset by the risk it takes on.

With that said, selective subsidies can be justified for these firms in the form of loans or guarantees. In line with these arguments, Justin Lin acknowledged that developing countries need to diversify into those tradable products and services that developed countries produce "with similar factor endowments and income per capita around 100% greater than their own" (Lin, 2012, p. 161).

Beyond the arbitrariness of the figure of a 100% difference in per capita income, changes to the productive structure should be gradual, because they are limited to information externalities within the same industry or to activities with similar factor endowments. In that framework, the State should minimize the costs of poor specialization, taking on the role of development "facilitator" without defying the principle of competitive advantages.

In an essay jointly authored with other evolutionist authors, Joseph Stiglitz—one of the principal backers of the market failures approach—asserted that it is not that market failures do not exist, but rather that the world is plagued with them (Cimoli, Dosi, Nelson & Stiglitz, 2006). The argument could be made even stronger considering that the dynamics of a capitalist economy are based precisely on the endogenous generation of market failures: competition through the introduction of new products and processes.

In the face of this lack of an operating theory for industrial policy, a suite of recent papers with an evolutionist and New Schumpeterian bent (Lall, 1992; Cimoli *et al.*, 2006; Cimoli, Ferraz, Primi, 2009) are reviving the original nascent industry hypothesis from List and Hamilton and emphasizing the different skills that developing countries have in using and developing technology—or what these papers refer to as "technological capabilities"—and, in particular, the high costs involved in adopting and absorbing imported technology. From that angle, technological and institutional capabilities are the outcome of learning processes and, therefore, are endogenous to changes in the productive structure.

The fact that technology contains a large tacit component derived from experience (learning by doing), it is very difficult to climb the "industrialization ladder" gradually as a result of initial comparative advantages. This learning is not limited to the firm, but is rather embedded in the productive structure. There are certain "engineering-intensive" industries, like specialized suppliers, that have greater learning potential and, therefore, potential for growing external returns (Pavitt, 1984; Bell & Pavitt, 1995). In this sense, these activities play a key role in the spread of technologies between sectors, including the capital goods industry, which, together with the software industry, continues to be one of the prime technology-disseminating activities (Bell & Pavitt, 1995).

The development of these sectors was not endogenously induced, insofar as relative prices do not reveal future technological opportunities. In times of technology paradigm shifts, when comparative costs are drastically modified, the problem is even greater, in light of radical uncertainty, and industrial policy is forced to resort to deliberate actions to generate new sectors.

This vision entails significant implications for the design and implementation of industrial policy, to the degree that it is necessary to selectively and deliberately coordinate a set of actions both in order to build technological capabilities and to foster incentives to achieve structural change.

2. CONCEPTUAL FRAMEWORK FOR THE ANALYSIS OF INDUSTRIAL POLICY

Taking these general considerations as a springboard, it is possible to build an exploratory matrix based on Lavarello and Mancini (2017) to examine intervention areas and levels consistent with different institutional industrial policy configurations (see Figure 1). The columns contain the main intervention areas, derived from analysis of infant capabilities and various experiences in catching up from throughout history (Cimoli *et al.*, 2006; Peres & Primi, 2009; Evans, 1995).

Intervention areas include, on the one hand, all actions that are conventionally associated with technology policy and affect science and technology (S&T) opportunities, through financing for Research and Development (R+D), as well as anything designed to bolster technical education and provide incentives for technology capacity-building for firms to accelerate technological learning; on the other, all industrial policy actions are those that through different types of instruments—tariff, fiscal, government procurement, financial, intellectual property, regulatory—selectively affect economic signals and/or firm selection contexts.

These industrial policy intervention areas may have varied scopes in terms of policy selectivity, acting at different levels: a) areas operating at the macroeconomic and regulatory framework level, whose overarching objective is to give rise to general economic conditions (for example, investment finance rules, competition advocacy); b) horizontal microeconomic instruments designed to have a direct impact on how firms behave through various incentives (fiscal or financial) for innovation or investment, with no regard for sector or firm; c) regional instruments, which through very different policies range from traditional regional development regimes to cluster policies designed to *ex ante* boost development in certain regions; d) selective instruments with a clear focus and priority placed on technology level, sector, or even firm selection in the framework of promoting national champions; e) selective and structuring instruments oriented around a set of actions divided into large projects whose missions have the potential to lend traction to the rest of the economy.

The plethora of combinations of intervention areas and instrument scopes can be merged into different policy configurations, which have been analyzed in the literature (Johnson, 1982; Evans, 1995). First, Johnson's "regulatory state," the prevailing view taken by the United States Congress,³ in which the state is limited to setting the overarching regulatory conditions through macroeconomic or horizontal instruments, with no action on technological capabilities beyond some type of horizontal incentive instrument for R+D.

By contrast, there are intervention configurations in line with the idea of the nascent industry inspired by F. List's legacy, combining instruments meant to build firms' technological capabilities with a regulatory framework and highly selective incentives. This configuration is consistent with French industrial policy experiences in the years leading up to the nineteen-eighties (Cohen, 2007), and Johnson's vision of the "developmentalist state" (1982), derived from his study of Japan, which was later expanded to studying experiences in Korea and Taiwan (Amsden, 1992; Evans, 1995).

Finally, to the extent that many countries have been able to close their technology gaps, a third intervention model emerges, which Evans (1995) referred to as the "gardening" model, in which the state, without questioning "market prices," does assume a facilitating role, seeking to boost company initiatives—the garden's "flowers"—without defying comparative advantages.

Each of these intervention modes entails different institutional arrangements, which, through market, network, or hierarchical mechanisms aim to solve coordination problems in the face of the complementarities of inter-sectoral investment, the type of relationship between finance and industry, and interactions between suppliers and users.

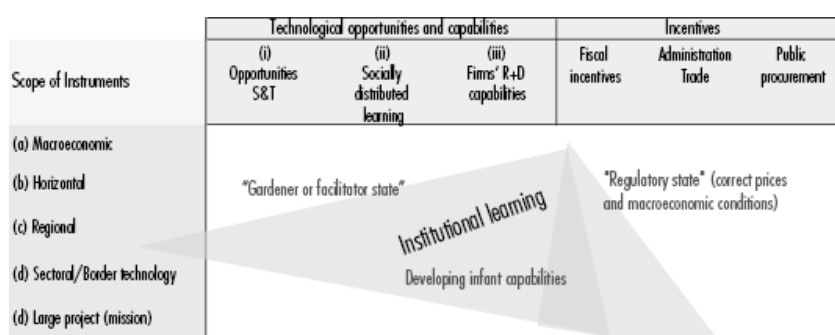
The mere existence of a set of actions designed to promote industry does not mean, of course, that industrial policies are necessarily effective. This discussion has been revived since the nineteen-eighties, with new arguments arising that emphasize implementation-related problems. The argument pursuant to which highly concentrated natural resource ownership can impede structural change if said change negatively affects the interests of the resource owners is well known (Cimoli & Rovira, 2008).

In this sense, Peter Evans' (1995) concept of "embedded economy" gains currency, suggesting that effective industrial policy requires, on the one hand, the state—understood as the set of agencies intervening in implementing the policy in this case—to enjoy a relative degree of autonomy. And, on the other, a certain degree of embeddedness in institutionalized relations with the capitalists. While embeddedness without autonomy translates into rent-seeking behavior and the potential for the private sector to capture agents, autonomy without embeddedness gives rise to isolation, making it difficult to identify opportunities and follow up on policy.

In these conditions of an embedded autonomy, it is possible to make progress in institutional learning when it comes to policy implementation. As Peres and Primi (2009) maintained, greater selectivity for policy instruments will depend, on the one hand, on the resources allotted and the sophistication of the instruments in the possession of the agency or body involved and, on the other, the institutional capabilities to carry out the policies.

Thus, in countries in which intervention is limited to regulation, institutional capacities and the resources given to industrial policy agencies are weaker, and these countries are more likely to harbor horizontal policies predicated on the provision of public goods through a limited tool chest (technical assistance, compliance with sanitation and health standards, Science and Technology (S&T) infrastructure, human resource training). As the institutional capabilities of the agencies involved develop, it is possible to advance towards the policies found in a "facilitator or gardener state," and it is only when monitoring capabilities, the resources involved, and the hierarchy of the agencies implicated in the state are strong enough that it becomes possible to implement developmentalist interventions to promote infant capabilities with support for specific sectors (and firms) by way of large formative programs (see Figure 1).

Figure 1. Industrial and Technology Policy Matrix



Source: Created by the author based on Lavarello and Mancini (2007).

Several aspects pose a dilemma for industrial policy: on the one hand, the sectoral industrial policies required to overcome underdevelopment demand institutional capabilities, which, if a country had them, it would probably not be an underdeveloped country. Accordingly, the institutional learning curve is neither linear nor harmonious and requires, as Albert Hirschman (1958) wrote, creating, at certain moments in time, a policy imbalance effect to trigger a sequence of institutional linkages and learning.

The following sections set out to illustrate the track record of institutional learning for these policies, asking questions like whether progress has truly been made, as shown in the gray area of Figure 1, from the conception of a regulatory state to a configuration in which technology capacity-building support instruments, fiscal incentives, and regulatory frameworks reflect a wider variety of tools, while also becoming more selective and structured when it comes to large projects.

3. INDUSTRIAL POLICY BACKGROUND IN ARGENTINA

Ever since Argentina first became a nation-state, it has failed to implement deliberate structural change that defies comparative advantages (Azpiazu & Notcheff, 1995). Industrialization emerged in response to the “bottlenecks” derived from foreign currency shortages and strategic objectives bound up in national autonomy (Katz & Kosacoff, 1998). Actions to support industrialization became more relevant between the end of the nineteen-sixties and seventies with deliberate efforts targeting strategic sectors tied to heavy industry, by way of large public enterprises (or national groups) in the steel and metalworking (aluminum) industries.

Even so, the lack of articulation between the scientific subsystem, the various technology subsystems, and incentives meant to create the conditions to protect nascent industry, all translated into an inability to mobilize actions designed to close the technology gap (Ferrer, 1974).

By the end of the nineteen-seventies, as part of a drastic liberalization process along with currency appreciation, the institutions and agencies charged with implementing industrial promotion policies were being dismantled. At the same time, and paradoxically, a wide range of regionally-targeted development regimes emerged, such as Tierra del Fuego, the Régimen Cuatro Provincias, and Puertos Patagónicos (Azpiazu, 1987). Similarly, in the nineteen-nineties, as part of the second wave of currency appreciation and liberalization, the regional regimes were largely extended, and new sectoral regimes were introduced, such as that of the automotive industry⁴ (Filadoro, 2007; Cantarella *et al.*, 2008; Lavarello & Saller, 2007).

Moreover, a new phase in adding novel instruments began to become evident in 1996, with a new generation of horizontal policies to support MSMEs and the first signs of support for technology capacity-building, beginning with the recognition of technological asymmetries.⁵

In short, by 1976, Argentina was already well on its way in a long process where its vision of industrial policy shifted, going from an import substitution industrialization approach to an approach that combines liberalization with regional and sectoral regimes, and towards the end, the advent of horizontal policy instruments. Just as in Brazil, and unlike what has happened in Asia, this passage did not take place due to the replacement of instruments, but rather to the addition of geological layers, largely buttressing any weaknesses in implementation (Baruj *et al.*, 2006; Lavarello & Sarabia, 2015).

4. THE (BRIEF AND INCOMPLETE) RETURN OF INDUSTRIAL POLICY TO ARGENTINA IN THE EARLY AUGHTS: QUANTITATIVE ASPECTS

In the aftermath of the collapse of the second round of liberalization and currency appreciation, between 2000 and 2013, the share of the manufacturing industry in Argentina's total added value in the economy began to recover, following five years of a systematic downswing. Accordingly, the country began to walk back a 26-year cycle of deindustrialization, raising the share of the manufacturing industry in the gross domestic product (GDP) at current prices from 18.5% in the time period 1995-2000 to 21.7% on average between 2003 and 2012 (estimated using the UNCTAD database).⁶

This evolution shows how the manufacturing industry has managed, in aggregate terms, to withstand the deindustrialization process predominant in the region. It bears asking which economic policy actions were behind this reindustrialization process.

The first evidence of the resurgence of industrial policy is the increase in fiscal and financial resources allocated to industrial policy. Throughout the timespan, the amount of fiscal and financial resources allotted to the industry by way of public sector instruments or programs increased clearly and systematically, accompanied by the expansion of intervention areas and the advent of more selective instruments.

The total amount of fiscal and financial system resources allotted to the industry either directly or indirectly rose from 0.9% of GDP on average in the sub-period 2004-2006 to 1.4% of GDP on average in the time period 2010-2013 (Lavarello & Sarabia, 2015).

Aiming to quantify the resources, this paper's research focused not only on tax spending derived from regional economic development regimes, but also on the specific allocations to programs run by the Ministry of Industry, the Ministry of Science, Technology, and Productive Innovation, the Ministry of Planning, and the Ministry of Health (see statistical Appendix).

One aspect to underscore is that horizontal fiscal incentives were the principal mechanism to support the industry, amounting to approximately 0.6% of GDP. It is notable that in spite of their persistence as a subsidy mechanism for the sector, the horizontal fiscal incentives and export duty exemptions implemented in the nineteen-nineties diminished, the counterpart to the rising weight of promotional regimes, pointing to the persistence of geological layers of policy design in the seventies and eighties.

In spite of the persistence of actions dominated by geological layers, several changes came about in terms of industrial and technology policy. Such is the case in the increase in resources allotted to policies to support S&T infrastructure opportunities and firms' technological capabilities implemented by the Secretariat of Science and Technology (beginning in 2008, it was promoted to the Ministry level). This early-phase intervention in the aughts adhered to the facilitator state model promoting development through horizontal capacity-building instruments for companies and support for technology-intensive enterprises. In particular, notably, policies designed to boost firms' technological capabilities, spearheaded by the National S&T Agency, rose from 2.4% to 3.5% of the total resource allocation, hand in hand with significant institutional learning that allowed the country to make progress in horizontal policy instruments specific to sector and technology.

Starting in 2010, the selective support policy underwent its second big metamorphosis in the timespan with the introduction of Treasury-backed subsidies given to state enterprises looking to undertake structuring projects with an incipient mission-oriented approach. As part of these projects, capacity-building was funded for a set of public enterprises and suppliers in the air and space, nuclear, and defense industries, bumping resources from 0.01% to 0.14% of total GDP (and from 0.2% to 1% of the manufacturing GDP), accounting for 9.8% of total resources pouring into the industry.

Finally, a third noteworthy aspect is the push given to the financing policy beginning with the reform of the Central Bank of the Republic of Argentina's (BCRA) Charter. Although new instruments were designed to finance new investment in industrial plants or fortify productive capacities at MSMEs, they did not prioritize technological capabilities as such, but rather had a clear anti-cyclical bent in a context of macroeconomic slowdown. As such, these instruments began to shift the object of credit from financing capital formation to financing labor capital entirely divorced from any industrialization strategy or strategy to close the technology gap.

5. TOWARDS A PERIODIZATION OF INDUSTRIAL POLICY IN THE AUGHTS

After a review of the fiscal and financial support furnished to the industry, the question arises as to whether these renewed efforts were tied to the multiplicity of visions and problems to which partial responses were given or whether, either explicitly or implicitly, coordinated actions emerged that go beyond the industrial policy vision as a reactive response to market failures.

5.1 The sub-period 2004-2006: export duties as an industrial policy instrument

Paradoxically, the principal instrument operating over the incentives defying comparative advantages was not strictly an industrial policy instrument, but rather a macroeconomic policy instrument. A differentiated export duties scheme, favoring lower duties for industry vis à vis primary and agro-industrial activities, was implemented.

Table 1. Industrial and Technology Policy in Argentina Matrix (in Average Percentage of GDP)

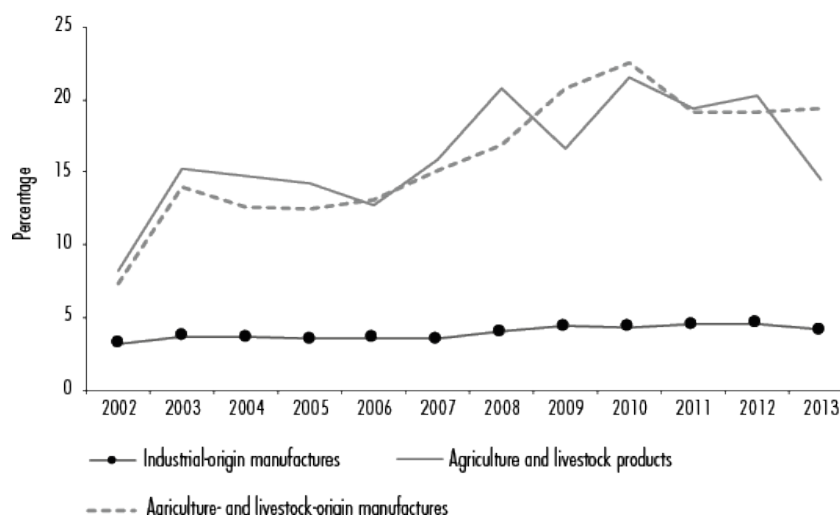
Scope of instruments		Technological opportunities and capabilities			(iv) Incentives framework			Total
		(i) Opportunities S&T	(ii) Training	(iii) Firms' R+D capabilities	Fiscal and tariff incentives	Financing	Public procurement	
(a) Macroeconomic	2004-06					0.00		0.00
	2007-09					0.00		0.00
	2010-13					0.32		0.32
(b) Horizontal	2004-06	0.01	0.02	0.02	0.28	0.14		0.47
	2007-09	0.01	0.03	0.02	0.22	0.05		0.34
	2010-13	0.02	0.04	0.02	0.17	0.07		0.31
(c) Regional	2004-06			0.00	0.24			0.24
	2007-09			0.00	0.21			0.21
	2010-13			0.01	0.41			0.42
(d) Sectoral / Generic technology	2004-06			0.00	0.08			0.08
	2007-09			0.02	0.08			0.09
	2010-13			0.02	0.05			0.07
(d) Large project (mission)	2004-06	0.02		0.01	0.01		0.04	0.08
	2007-09	0.02		0.02	0.02		0.04	0.10
	2010-13	0.04		0.14	0.02		0.08	0.28
Total	2004-06	0.03	0.02	0.03	0.61	0.14	0.04	0.87
	2007-09	0.03	0.03	0.06	0.52	0.05	0.04	0.74
	2010-13	0.05	0.04	0.19	0.65	0.39	0.08	1.40

Sourced: Based on the Economic Commission for Latin America and the Caribbean's (ECLAC) (Buenos Aires office) information on the basis of Budget, DNAF, Investment Account of the Ministries of the Economy, Public Works, and Public Services, MINCYT.

This was the main—if not the only—mechanism aiming to affect incentives by defying comparative advantages via price signals. For that reason, it should be considered a core part of the industrial policy experience in the early aughts. This mechanism, in addition to driving effective demand through a series of measures to repair the social-labor situation, fueled the rising share of industrial-origin manufacturing activities in added value.

To elucidate the influence of instruments of this sort, one option is to measure the average aliquot implicit in the data on collection for export duties and the value of exports in the different periods. As seen in a stylized fashion in Figure 1, the aliquots incorporated to exportation duties in the industrial-origin manufacturing industry (IOM) turned out, significantly, to be lower than the respective aliquots of the sectors for which the country enjoys natural comparative advantages, like the primary sectors and even more so agriculture- and livestock-origin manufactures (AOM).

Figure 1. Export Duties; Implicit Aliquots by Economic Area



Source: Lavarello and Mancini (2017), based on information from the Economic Commission for Latin America and the Caribbean (ECLAC) (Buenos Aires office), on Budget, DNAF, Investment Account of the Ministries of the Economy, Public Works, and Public Services, MINCYT.

Beyond a competitive exchange rate with differential export duties, tax exemptions and tax models to defer payments associated with regional development regimes in place since the nineteen-eighties continued to be the primary tools in terms of the fiscal resources involved. A mechanism of this sort, epitomized in the Tierra del Fuego regime, had faced, since its onset in the early nineteen-eighties, significant underlying design and implementation problems related to the low degree of monitoring provided for in the institutional design (Filadoro, 2007).

Amongst the geological layers of the economic policy instruments, plus the regional programs, the automotive regime stood out. Implemented in the nineteen-nineties, it played a crucial role in adjusting how the affiliates of multinational companies were operating in the face of changes imposed from their headquarters. Beginning in the latter half of the nineteen-nineties, there was an effort to reformulate the regime to include car parts suppliers, but this inclusion translated into negative tariff protections and even weaker national integration requirements than what had been in practice previously at the affiliates. Starting in the aughts, a set of fiscal incentives were undertaken to (unsuccessfully) alleviate the negative effects of the aforementioned regime on the car parts sector (Lavarello & Saravia, 2015).

However, the new fiscal incentives failed to repair the structure of a sector in which the configuration of the car parts industry regionwide limited production in the country to certain peripheral components for which there are already highly competent suppliers (valves, belts, etc.) and very expensive "systemic" components for transportation (mudguards, seats, etc.). With a few standout exceptions, like transmissions and the assembly of motors with some degree of local integration for a few brands in particular, the most complex sets and subsets are imported from Brazil.

This time period also saw the advent of new sectoral development instruments joining the automotive system. In particular, a model was created to promote the production of capital, computer science, telecommunications, and agricultural machinery goods. This mechanism was hardly effective to the extent that the subsidies did not come with any strings attached in terms of performance requirements or monitoring mechanisms, which limited the potential for import substitution in technology-intensive components (Lavarello & Goldstein, 2011; Peirano, 2013).

Subsequently, against the backdrop of the inertia of the earlier regional and sectoral regimes, paradoxically, it was macroeconomic policy that was the main tool for industry support. This tool was offset by the push given to effective demand through a set of measures to mitigate the social situation, leaving behind the trade liberalization of the nineteen-nineties.

5.2 The sub-period 2007-2009: bolstering technological capabilities

In this sub-period, important institutional lessons came of age thanks to the horizontal policies to develop technological capabilities and support MSMEs implemented in the decade prior. In 2008, it became possible to design a new range of selective support instruments for technological capabilities in new technology paradigms (software, nanotechnology, and biotechnology). The year also saw the launch of the program to shore up technical education and engineering education with a clear turn towards the manufacturing sector.

Although in this time period Argentina continued to display weaker efforts in technology than the developed countries, starting in the mid-aughts, spending on R+D and the number of engineers began to rise significantly. According to statistics compiled by the RICyT,⁷ in the nineties, R+D spending accounted for 0.38% of the average GDP that decade, rising to 0.47% on average between 2003 and 2010. Similarly, the number of engineers increased from 1.5 in 1990 to 2.6 out of every 10,000 residents in the year 2013.

These actions match the policies to boost technological capabilities and opportunities implemented in the time period. When it comes to support for firms' technological capabilities, there is a clear shift from horizontal instruments to

mainstreaming-technology instruments and productive agglomerates.

Among the projects that have made the most progress and had the greatest impact on the rise of a productive tapestry is the notable development of the agricultural machinery cluster in the central region of Santa Fe and Córdoba (Lavarello & Goldstein, 2011). In line with institutional learning, this cluster had a track record in providing regional technical assistance to this sector (longer than 10 years) (Moori Koenig, 2010).

This cluster was the result of earlier institutional learning at the National Science and Technology Policy Agency, and permitted greater connectivity between knowledge supply and demand, integrating different lines of support for generating technological capabilities and capabilities related to financing science and technology.

5.3 The sub-period 2009-2015: The state as a producer and user in an adverse economic setting

In the face of an eroding exchange rate as a mechanism to incentivize industry in the framework of burgeoning uncertainty derived from the international crisis, new protection mechanisms arise predicated on trade management and the reemergence of the state as a producer and user under a new mission-oriented intervention model.

When it comes to creating technology opportunities, the country launched, on the one hand, a series of technology projects in R+D, related to satellite, energy, and defense technologies with a “top-down” scheme and, on the other, progress was made in (partially) redirecting support funds for S&T to technology capacity-building with a big emphasis on biotechnology activities. This support increased from 3% of total resources in the time period 2004-2006 in financing applied R+D to 5% in the period 2010-2013.

The weight given to structured actions pursuant to missions in large state projects with the potential to give traction to the private sector is striking, whether through state procurement or direct financing to state enterprises. The resources for these programs rose from 0.3% to 1.7% of industrial added value, and explain the rising share from 7.7% to more than 13% of total support. The recovery of YPF, large satellite, nuclear, and defense projects, as well as government procurement in the healthcare sector, all ushered in a new industrial policy stage, which took off starting in 2010.

There is a suite of instruments whose significance cannot be accurately reflected just through fiscal resources. Such is the case of the aforementioned differential exchange rate schemes and, later on, the recovery of managed trade policy through different non-tariff mechanisms—first, non-automatic import licenses (LNA) and later, Advanced Sworn Import Declarations (DJAI)—permitted the state to recover its ability to carry out selective protection mechanisms. Since 2012, the DJAI would gradually replace the LNA. In spite of initial difficulties related to the absence of institutional capabilities, the instrument was adapted little by little and made it possible to set up mechanisms to interact with the private sector, agreeing on production, job, and investment goals, with subsequent monitoring conducted by the enforcement authority.⁸ Later, even if the implementation of non-tariff mechanisms entailed successive adaptations in response to the conditions set by the World Trade Organization (WTO), economic policy helped recover the capacity to intervene deliberately in market selection conditions.

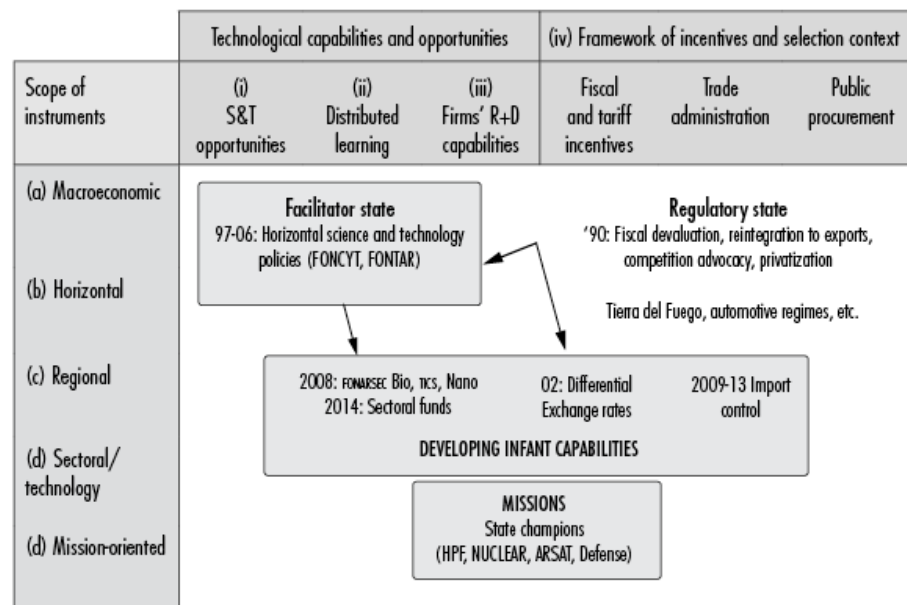
5.4 The trajectory of industrial policy throughout the sub-periods

Analysis of the various sub-periods leads to the inference of an intervention trajectory, beginning with the regulatory state and advancing to a government playing a more active role in industrial policy, which reemerged with the facilitator state model. The return of industrial policy is expressed under this new model in the PEI 2020 strategic industrial plan released in 2011.

Nevertheless, starting in 2011, there appears to be a shift from a facilitator state to a government that begins to promote infant technological capabilities more selectively, by technology or sector, bolstered with the creation, renationalization, and strengthening of companies in the satellite, energy, and nuclear sectors. The advent of a large mission-shaped projects approach is the latest intervention mode.

This shift from a facilitator state to intervention designed to develop infant capabilities has not been borne out in a plan with an institutional hierarchy integrating various instruments and actions. This limitation has translated into as of yet still weak articulation between technology capability support instruments, the diverse pre-existing incentive mechanisms, and the promising revival of financing policies (see Figure 2).

Figure 2. Industrial Policy in Argentina: Different Institutional Trajectories



Source: Created by the author.

5.5 Early initiatives to link up instruments: industrial plans and plans for innovation in Argentina

Between 2010 and 2015, two industrial and technology planning initiatives emerged from different areas of the state (see Figure 3). The first was the 2020 Industrial Strategy Plan, whose genesis was subject to the limits facing the growth process due to external restrictions.

The definition of PEI guidelines, done through a participatory process, began with the need to identify "bottlenecks" in each chain (Stumpo & Rivas, 201). To do so, 11 forums were assembled with representatives from the productive sector, the national and/or provincial ministries, academia, education, and applied research. These forums led to the formation of 11 implementation roundtables that would subsequently take part in tracking and identifying new "bottlenecks" as they developed.

Figure 3. Industrial and Technology Policy Planning Initiatives

	2020 INDUSTRIAL STRATEGY PLAN	2020 INNOVATIVE ARGENTINA PLAN
Conceptualizing and designing the objectives	<p>Overarching objective: Make growth sustainable.</p> <p>Pre-selection of 11 chains: horizontal policy perspective (no priority chains) → 11 forums (1 per chain)</p>	<p>Overarching objective: Drive productive innovation building on the framework of existing S&T opportunities.</p> <p>35 "Socio-Productive Nuclei": articulating technologies, sectors, and regions. Roundtables (only chambers and academia).</p>
Scope and strategy	<ul style="list-style-type: none"> • General import substitution beginning with 11 chains, turn towards local development and integration. • "Facilitator" state: problems with coordination due to information asymmetries between the supply of instruments and the private sector. 	<ul style="list-style-type: none"> • Focus on sectoral technological capabilities (HEALTH, AGRO-INDUSTRY, ENERGY, ENVIRONMENT, to a lesser degree, metal mechanics and electronics). • Weak support for capital goods sector and large projects (nuclear, air and space).
Implementation	<ul style="list-style-type: none"> • Weak match between targets and instruments available for the plan. • Institutional learning: low. 	<ul style="list-style-type: none"> • Better match between targets and instruments (FS). • Institutional learning: burgeoning <i>ex ante</i> selectivity.
Institutional accountability	<ul style="list-style-type: none"> • The undersecretariat tasked with implementation accompanies the process (without own resources). • Greater integration across ministries (formal). 	<ul style="list-style-type: none"> • The undersecretariat tasked with implementation accompanies the process (with gradual access to resources). • Weak integration across ministries (exc. Secretariat of Agriculture).

This plan was characterized as being very broad-spectrum in sectoral selection, encompassing the totality of manufacturing chains. In spite of its participatory character, the plan's ambition did not match up well with the resources allotted to it, which limited its effective reach. The success of any given roundtable was reliant not only on the *ex-ante* prioritization of the sectors from a strategic standpoint, but also on the makeup and strengths of the private-sector institutionalism.⁹

Simultaneously, institutional learning at the MINCyT gave rise to the 2020 Innovative Argentina Plan, with better-matched objectives, instruments, and coordinating and implementation capacities than the Industrial Strategy Plan (PEI). In this case, strides forward were made towards more selective actions and instruments with the definition of 35 "strategic socio-productive nuclei" combining the selection of a sector, region, and technological base.

One of the principal limitations facing this plan is low articulation with other industrial and technology policy areas, manifest particularly in the 2020 PEI and state efforts to develop satellite and defense applications, where the state played the role of entrepreneur in this time period. This intervention model did not lead to certain poles mobilizing different industrial policy actions.

In both cases, the lack of a coordinating body with the necessary hierarchy and institutional capabilities to align different instruments as a function of sectoral goals or missions meant that, with the exception of a few sectors with well-developed public-private institutionalism, these plans' goals did not translate into actions and results.

6. FINAL REFLECTIONS AND POTENTIAL PATHS FOR INDUSTRIAL POLICY

This paper shows that in spite of the inertia of the "geological layers" of the preceding regional development regimes, and without constituting a comprehensive industrial policy, in 2003-2015, a set of instruments and institutions were implemented, designed to generate technological opportunities and capabilities, financing, and selection mechanisms, giving rise to an incipient, but incomplete, industrial policy revival.

- When it comes to technological capability development and opportunity creation, on the one hand, there has been a set of projects in the realms of satellite, energy, and defense in a "top down" model in which the Ministries of Planning and Development played a major role in driving various public agencies. On the other hand, progress was made in increasing the sectoral selectivity of support funds for S&T from the MINCyT.
- For their part, a set of instruments were implemented whose importance is not fully reflected in the fiscal resources allotted to the sector. Such is the case, as already mentioned earlier, of the differential exchange rate regimes and later the recovery of trade policies administered through various non-tariff mechanisms (LNA, DJAI), that allowed the state to recover its ability to carry out selective protection measures.
- This progress did not come along with a senior policy implementation body in which plans were matched with resources and the Agency (or Secretariat) had the necessary institutional hierarchy. This absence translated into weak coordination across different intervention areas and instruments, limiting the potential for success in any technology learning experience in the framework of an industrialization strategy.

This implementation failing was exacerbated by the challenges involved in setting relative prices that would favor the dynamic sectors in a country in which traditional sectors tied to the production of basic raw materials hold veto power over the direction of economic policy. Industrial policy in developing countries requires the state to undertake deliberate actions, which in turn requires a command unit for the process so that the country does not end up merely reproducing the pre-existing productive structure.

It can thus be asserted that although Argentina did witness the partial reappearance (or revaluation) of a set of actions promoting industrialization, predicated on gradual actions and instruments, but becoming increasingly selective. Despite this, this set of actions was poorly coordinated. In this sense, although the return of industrial policy entailed significant institutional learning, it was also incomplete and temporary.

With the change of administration at the end of 2015, the government began to review its actions in terms of incentives and selective protections to boost the manufacturing industry. The differential export duties scheme was phased out, with the consequent recrudescence of "correct market signals." Against the backdrop of budget cuts, large structuring projects began to come under fire again, seeking foreign capital. The technical teams at agencies or implementing bodies that had learned the most were suppressed or reassigned to other areas. At the same time, older regional development schemes began to be combined with gradual openness to imports.

STATISTICAL APPENDIX

In order to estimate public resources allocated either directly or indirectly to promote and/or sustain activities bound up in local manufacturing production, the information was organized systematically based on instruments with key variables, such as: intervention area, policy type, benefit type, and scope—horizontal, sectoral, or regional.

Tax spending derived from economic development regimes and specific allotments made by the Ministry of Industry and Ministry of Science, Technology, and Productive Innovation (MINCyT) programs constituted the main pillar. Allocations were prioritized according to:

1. Specific information about the amounts spent and/or paid out for each program, whenever it was public and systematized (National Small and Medium-Sized Enterprises Development Fund—FONAPyME, Argentine Technology Fund—FONTAR, etc.).
2. Investment accounts, whenever it included spending by program. The software development regime series, for example, corresponds to tax spending, with the exception of 2011-2013, where it is based on the investment account due to major statistical discrepancies.
3. The line items allocated pursuant to the annual budget act, adjusted by percentage actually paid out for each program, pursuant to the investment account.

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² This paper takes a critical stance to discuss a set of empirical results obtained in previous research conducted by the author, in particular, in Lavarello, P. J., and Sarabia, M. (2015), "La política industrial en la Argentina durante la década de 2000," *Serie Estudios y Perspectivos*, num. 45, Cepal. The author would like to acknowledge the comments and suggestions received at numerous seminars about a previous version of this document coauthored by Matias Mancini (2017). Nevertheless, the way the results and conclusions are organized in this version is the exclusive responsibility of the author.

³ According to various authors, this vision is merely partial and does not consider the highly selective interventionist role prevailing in American industrial policy by way of government procurement and major programs implemented by the Department of Defense (Wade, 2014; Mazzucato, 2013).

⁴ At the same time that it ushered in tariff breaks on the importation of vehicles and components headed for local production, beginning in 1994, a regime was established to enable national terminals, on the one hand, to set up a managed exchange scheme with Brazil, and to incorporate cars manufactured with up to 40-42% of the value of the vehicles with imported car parts, setting a timeline to gradually reduce this figure, which would accelerate towards the end of the period.

⁵ In 1996, the National Science and Technology Promotion Agency was created under the auspices of SECYT, an authority given its mandate in Law 23.877 to promote science and technology activities.

⁶ <http://unctadstat.unctad.org/EN/>

⁷ Science and Technology Indicators Network: Ibero-American and Inter-American (RICYT). S www.ricyt.org

⁸ In 2014, 633 agreements were set up with large companies, representing USD 52.491 billion in imports that year, and 3,086 with MSMEs for a value of USD 4.677 billion (another 1,500 were added in 2015). In total, excluding purchases abroad of fuel, planes, and trains, the new trade administration regime encompassed 87% of imports in 2014 (estimated to reach 90% in 2015), with an impact on foreign currency savings of USD 1.230 billion, excluding the automotive and electronics sector.

⁹ Such was the case of the farm machinery and pharmaceutical industries in which the presence of a domestic industry made it possible to define concrete actions (Lavarello & Goldstein, 2011; Lavarello & Sarabia, 2015).

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