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Abstract

This paper reviews and assesses some of the Productive Development Policies currently being implemented in Uruguay. Three horizontal and three vertical policies are considered in light of the market and public failures they attempt to address and minimize. Horizontal policies comprise Innovation, Industrial Promotion and Directives for Industrial and Technological Development. Vertical policies include the analysis of Forestry Law, Meat Traceability and the Sustainable Production Project in the agricultural sector.

JEL Classification: H41, L50, O14, O25

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1. Introduction

The development strategy of the Uruguayan economy has evolved from inward-looking, based on state interventionism and import substitution protectionist policies, to outward-looking, based on the market as a resource allocation mechanism and exports as the growth engine. This change started in the 1970s, when a first phase of trade liberalization took place accompanied by a quick financial liberalization process. During the 1990s, a second phase of trade liberalization took place. This phase combined a deepened gradual unilateral tariff reduction with the creation of Mercosur, an imperfect customs union signed with Argentina, Brazil and Paraguay. In addition, a stabilization program based on an exchange rate anchor was undertaken. This policy considerably reduced inflation—which had climbed to three digits figures at the beginning of the decade—to an actual annual rate of around 13 percent, but it was simultaneously accompanied by a significant real appreciation of the peso, especially vis-à-vis the currencies of non-Mercosur countries.

Uruguay is a small economy whose industrial structure was in the mid-1980s basically composed of a small number of traditional-products exporting firms and of sectors developed under the import-substitution process. Most industries showed very high concentration levels, giving firms considerable market power and thus allowing them to set prices substantially above marginal costs. This kind of productive structure, highly concentrated and dependent on protection, had as a byproduct a high degree of formalization in industry employment and also placed unions in an advantageous position in wage negotiations.

Although Uruguay started to open its economy in the 1970s, only in the 1990s was local industry affected by the lowering of tariffs to no more than 30 percent. In June 1991 Argentina, Brazil, Paraguay and Uruguay started a process of programmed trade reductions that in 1995 allowed a wide range of products to be freely traded among Mercosur countries.

In 2002, Uruguay suffered a profound financial crisis triggered by contagion effects from a depositor run on banks, massive currency devaluation, and gigantic default on sovereign debt that took place in next-door Argentina. In the wake of a run on its own exceedingly dollarized banking system, Uruguay's government was forced by the ensuing loss of international reserves to let the currency depreciate rapidly. Subsequently, it had to provide support to some financial institutions while taking over several failing private-sector banks, for which purpose massive financial backing from the Washington-based multilateral agencies was obtained. Eventually, the

government also had to arrange for a market-friendly restructuring of the public debt. Starting in the fourth quarter of 2003, however, the Uruguayan economy staged a vigorous recovery and the government regained access to the domestic and international capital markets.

Overall, the economic performance of Uruguay in the last half-century has been disappointing. Per capita GDP grew at relatively modest rates¹ (1.10 percent annually), well below the growth rate of more dynamic countries in Latin America (e.g., Brazil with 2.4 percent average growth for the same period), and East Asia (e.g., Korea or Thailand, with annual growth rates above 4 percent).

The October 2004 presidential election marked an inflection point in Uruguayan history. A coalition of leftist parties that had acted as the main opposition party over the two decades since the restoration of democracy won the presidential election and assured itself a majority in the legislative branch of government. One of the main ideas stressed during the campaign was “Uruguay Productivo” vis-à-vis “Uruguay Financiero” and it was presented as a change in the development vision of the country. Although many productive policies in Uruguay were already in place, after the election the political momentum of recent years favored the discussion of the efficiency of such policies and the development of new ones.

In this paper, after a brief review of the Productive Development Policies (PDP) system, we focus on three horizontal and three vertical policies and analyze the principal characteristics of these PDPs in terms of the market and coordination failures that each tries to address. Horizontal policies include the Investment Promotion Bill of 1998 and its 2007 modifications, the current state of the Innovation Policy, including the many changes put in place by the Vázquez Administration, and the Directives for Industrial Development announced by the Government in May of 2009. We also describe and analyze process by which those productive development policies (PDPs) are established, that is, the institutional structure that includes public and private actors and their interactions. Vertical policies include the modifications to the Forestry Law implemented by the current administration, policies attempting to assure meat quality and differentiation from other countries’ exports, and a project of sustainable (responsible) production in the soy industry.

¹ Average rate for the 1950-2000 period.

2. Overview of the Uruguayan PDP System

The 1980s were generally characterized by the abandonment of explicit industrial policies in Latin America. This period meant the adoption of structural reforms away from import substitution strategies and an active development role for the state towards a process of allocation of resources by means of free and unregulated markets (IDB, 2001). By the mid-1990s, economic and social conditions had shown that the radical shifts of the 1980s had not achieved the desired outcomes of sustainable and equitable growth.

The 1990s witnessed the adoption of a new set of policies throughout Latin America. Most countries adopted medium and long-term explicit industrial policies and strategies generally based on the belief that economic growth and development did not involve choosing between the state and the market. Instead, a cooperative process involving both was needed (Melo, 2001).

The key features of the new industrial policies can be characterized by two elements: i) macroeconomic stability consistent with sustainable investment and long-term growth, and ii) microeconomic incentives aimed at the correction of market and public failures to improve productivity and the international competitiveness of domestic production. The latter represented a shift in the international strategy of the countries of the region from inward-oriented policies towards export development and diversification.

Macroeconomic conditions in Uruguay have traditionally depended on economic and social conditions in Argentina and Brazil. Until recent years, financial and trade integration with those countries have had significant effects on Uruguayan international competitiveness and financial conditions mainly through the impact on the capital account (capital flows) and the level of real exchange rates.²

The recent history of Uruguayan industrial policies also needs to be considered within Mercosur. It was tacitly agreed that the Uruguayan role within Mercosur was heavily restricted to development in land-intensive agriculture, financial services and tourism (mainly from Argentina).³ As preliminary evidence of this, in 1999 foreign direct investment (FDI) as a

² The Brazilian devaluation of 1999 and the 2002 political and economic crisis in Argentina are the most recent episodes that affected macro and microeconomic conditions in Uruguay.

³ Causal evidence of this is the recent conflict with Argentina due to foreign direct investment in a pulp and paper factory in Uruguay.

proportion of GDP in Uruguay was 0.7 percent, compared to almost 3 percent in Argentina and Brazil. Table 1 summarizes the country's industrial policies.

Table 1. Horizontal and Vertical Industrial Policies in Uruguay

	Horizontal	Vertical
Public Input	Macroeconomic Instability Volatility of Real Exchange Rate Educated Labor Force Acceptable Business Climate Poor National Innovation System	Very limited due to public financial restrictions
Market oriented	Export credit lines Working Capital credit lines Export Insurance Tax rebates to export industries Exemption of import duties for inputs to export products Temporal Admission Scheme Export Free Zones Credit lines for Investment projects	Tax incentives to Oil, graphics, logistics, forestry, military, airlines, theatres, and film industries.

Source: IDB (2001).

More recently, Hausmann, Rodríguez-Clare and Rodrik (2005) analyze the scope for new growth opportunities in Uruguay in the context of “self-discovery,” that is, the development of new products and processes tailored to export growth.⁴ That work, a significant improvement over the IDB study of 2001, constitutes the basis for our present project.

Briefly, Hausmann, Rodríguez-Clare and Rodrik (2005) find an adequate institutional environment for productive development. However, they note that the country's Industrial Promotion Legislation remains neutral in regard to new investment opportunities and creates incentives for activities with few demonstration effects (i.e., non-tradables), which in their opinion, constitutes a major drawback for self-discovery and growth. Export Promotion Zones do not provide adequate linkages to the rest of the economy, possibly due to coordination failures in industries such as Information and Telecommunications. They also note that exchange rate policy has not contributed to the long-term development of the country, in part due to domestic policies but also due to macroeconomic volatility in Argentina and Brazil. The National Innovation System does not provide adequate horizontal support due to internal inconsistencies among the different components and because of financial constraints. Finally, vertical policies (“picking winners”) seem to be the product of historical circumstances and chance.

⁴ “New products,” meaning the development of products which are not produced in the country.

The time when those authors performed their comprehensive analysis leaves us an “easy picking” (to paraphrase Paul Samuelson’s words in his now popular development of the Stolper-Samuelson Theorem): their paper refers to a situation right before a new government was elected in October 2004. The government that took office in 2005 has implemented a series of institutional innovations that modify the scale and scope of support for the productive development of Uruguay.

There have been significant recent modifications to the institutional setting (i.e., actors and activities) in support of productive development. The new actors, created by the government, are the following:

- a) The Department of Support to the Private Sector under the Secretary of Finance,
- b) The National Agency for Research and Innovation, intended to improve support for innovation and self-discovery.

The new activities are as follows:

- a) With IDB support, The Office of Planning and Budget (OPP) has set up a program of productive cluster development (PACC, or Programa de Apoyo a la Competitividad de Clusters y Cadenas Productivas).
- b) A “one-stop-shop” (“Uruguay fomenta”) for local and foreign investors was created in July 2008.
- c) Congress has also approved a bill that allows for the creation of Export Consorcios to overcome the scale and knowledge problem that many small Uruguayan companies face when trying to integrate into the international market.
- d) The Bill of Industrial Promotion has been modified to include new tax incentives to be granted to qualified investment projects.
- e) Other activities to boost industrial production have included the implementation of so-called “productive gas-oil” to reduce production costs of farmers and manufacturers.
- f) Tax exemptions have been granted for tourists when consuming in restaurants and other tourist attractions during the high season.

The Government also modified the general approach to social problems. For example, the Secretary of Economic and Social Development was established in 2005 to implement an Emergency Plan to help the poorest and the indigent. This Secretary has further developed a plan of inclusion of citizens in more productive activities. On the labor side, salary councils (where workers, firms and government officials discuss and agree upon labor conditions) were re-established after 18 years.

At the regulatory level, the Government has sent to Congress an Education Bill to reform the current educational system, while the National Health system was reformed in 2007. The tax code was also reformed in 2007, primarily through the implementation of a Personal Income Tax and the suppression and/or modification of existing direct and indirect taxes. The reform nonetheless has direct productive development implications.

As for international integration and innovation activities, Uruguay has recently signed a trade and investment agreement with Chile and has consolidated the institutional framework of the Pasteur Institute. Trade and investment agreements with countries outside of Mercosur are considered useful as an instrument to attract foreign direct investment and foster a process of sustainable development. Likewise, the Pasteur Institute is recognized as a leading institution in areas such as biotechnology, which is considered one of the most prominent development areas. On the other hand, Uruguay could not achieve internal political agreement on starting free trade agreement negotiations with the United States.⁵

3. Horizontal Policies

3.1. Innovation

3.1.1 Introduction

The current administration has assigned the largest budget ever to education and innovation programs in Uruguay, with public education scheduled to reach 4.5 percent of GDP in 2009. Innovation in Uruguay remains low in comparison with developed countries, but in recent years there have been various institutional and policy changes aiming to increase research efforts and link them to productive activities.

The first institutional change promoted by the Vázquez Administration was the conformation of the “Gabinete Ministerial de la Innovación” (GMI, Ministerial Innovation

⁵ Alternatively, both countries signed a Trade and Investment Framework Agreement (TIFA).

Committee) by Decree 136 of February 2005. This committee is made up of delegates of the Ministers of Education, Economy, Industry and Energy, and Agriculture, respectively, and of the director of the Budget and Planning Office (Oficina de Planeamiento y Presupuesto). The main objective of this committee is to coordinate the actions of all public institutions related to innovation, science and technology.⁶ The decree also requests from the committee the formulation of a National Strategic Plan on Science, Innovation and Technology (PENCTI for its acronym in Spanish, Plan Estratégico Nacional de Ciencia, Tecnología e Innovación).

In September 2007 the PENCTI was made public.⁷ The first paragraph of the PENCTI presents a broad set of actors involved in the plan. In particular, it mentions that the process of continuous innovation necessary in the modern world can only be attained with the commitment of public authorities, entrepreneurs, workers, “third sector” organizations and Uruguayan scientists and Uruguayan innovative entrepreneurs living abroad.

The definition of innovation is broad as well. According to the PENCTI, innovation is a social process implying the creation and use of new knowledge, products, process, goods, services, tools or forms of organization. The diagnostic of the current situation presented in the PENCTI can be summarized in three points. First, most of the existing ability to generate and develop new scientific and technological knowledge is concentrated in the public sector.⁸ Second, much of this new knowledge is disseminated only among the academic community and has no impact on productive activities. Third, firms in the private sector have low demand for innovations.

The PENCTI does not discuss the determinants of the current situation, a silence that may result from political economy issues. The document does, however, point out that in the past the political system was able to alter innovation system model proposals and to generate its own designs. These ad hoc designs were primarily the product of successive negotiations and lacked a study of the strengths and weaknesses of the proposed models. The PENCTI seeks to improve on this situation and to present a model backed by the executive branch of government.

⁶ “...cuyo objetivo principal será la coordinación y articulación de las acciones gubernamentales vinculadas a las actividades de Innovación, Ciencia y Tecnología para el desarrollo del País” (Decree 136/05 Article 1).

⁷ There are several important annexes that are not yet publicly available. Annex I is supposed to present basic indicators on science, technology and innovation in Uruguay. It is important as the benchmark to compare the evolution of the programs in this area. Annex II argues in detail why the market by itself does not efficiently allocate resources for innovation and therefore justifies the Government’s participation as an active player in the design and execution of science, technology and innovation policies.

It is interesting that the plan discusses the enforcement of the priorities defined by the GMI. This enforcement is relevant only for public sector actors and, to a certain extent, the Universidad de la República. The actors of the private sectors (private universities, firms, etc.) will adhere to the PENCTI priorities voluntarily if they find the incentives proposed of interest. In other words, there will part of the Innovation policy that will be provided as a public input and other part that will work through market mechanisms.

3.1.2 Commitment for Active Policies

The PENCTI has made a commitment to active promotion policies but notes that this will be done without neglecting the market as a source of discipline in sorting out economic alternatives. Active policies are presented as necessary to solve market failures.

Relevant market failures are the following: i) limited appropriability of generic technologies, ii) information failures between actors, and iii) risks associated with the intangibility of assets.

Immediately after arguing the need for state intervention, the plan points to the risks involved in that intervention: i) dynamic inconsistency (difficulties in implementing policies with short-run costs and long-run benefits), ii) rent capture, and iii) principal-agent problems.

The PENCTI considers a wide range of policies. First, the plan mentions that a necessary (but not sufficient) condition is the creation of an appropriate environment for the development of innovations and its applications to new technologies. To do so, the government has created the National Research and Innovation Agency (ANII) in order to make the government's commitment as credible as possible.

Second, the plan mentions the use of horizontal policies to promote the generations of innovations.⁹ These horizontal policies include i) greater investment in human capital formation, and ii) changes in legislation and regulations that may directly or indirectly hamper the development of innovations. For instance, the Tax Reform Bill (Bill 18.083) passed in December 2006 establishes incentives for activities leading to innovation. Examples of these activities are favorable tax treatment of personnel education spending and tax exemptions for the acquisition of research equipment.

⁸ Universidad de la República, Instituto Clemente Estable, Instituto Nacional de Investigación Agropecuaria (INIA), Laboratorio Tecnológica del Uruguay (LATU), Instituto Nacional de Carnes (INAC).

Third, vertical policies are also deemed necessary. According to the document, vertical policies should seek the interaction of knowledge-intensive sectors with traditional natural resource-intensive sectors such as agriculture, tourism, and energy. Export potential is an objective in these interventions.

In respect to the financial sources, the PENCTI mentions that innovative firms have often financed their activities through retained earnings due to the lack of external sources. Private finance sources of innovations are considered fundamental, and therefore it is important to promote the emergence of venture capitalists who could provide seed and “angel” money.

3.1.3 PENCTI's Objectives

The Program's Objectives and Goals can be summarized as follows:

1. To increase the interaction of researchers with the social environment and production activities;
2. To promote firms' innovations;
3. To foster the development of science, technology and innovation human capital;
4. To promote innovation and quality in small and medium firms;
5. To foster innovations with social goals;
6. To use innovations for public sector governance;
7. To develop regional innovations not concentrated only in the capital city;
8. To advance scientific and technologic knowledge;
9. To facilitate investments in scientific and technologic infrastructure;
10. To finance innovations;
11. To promote interaction with international science and technology networks;
and
12. To develop mechanisms for impact evaluation.

The plan also discusses the actions that should be taken in regard to each objective. A detailed analysis of all those actions, however, lies beyond the scope of this paper.

⁹ As the report notes, “...es relevante que existan políticas transversales para fortalecer el apoyo a los procesos innovadores en general independientemente del sector en el cual se pretenda aplicar el incentivo”.

3.1.4 *Research Networks*

The team in charge of the PENCTI hired the School of Social Sciences of the Universidad de la República to study the state of research and innovation networks between research centers and firms. Although the resulting paper (Pittaluga et al., 2007) is not an official document,¹⁰ it provides the rationale for the main policy motivation.

In Pittaluga et al. (2007) there is a strong emphasis on the creation of networks as a solution to the limited appropriability of innovation market failure. Networks will transform the public good innovation into a club good in which all of the beneficiaries of the innovation are part of the club. If the network works properly the free riding problem is substantially reduced. The authors present a set of recommendations to foster the development of networks based on 25 case studies of networks and research policies applied in Uruguay between 2002 and 2007.

There are a series of requisites needed for the consolidation of networks. First, the programs should be long run and stable. They should have sufficient economic resources, be flexible to adapt goals according to partial results and be subject to evaluation. Coordination between different policies is important in order to avoid superposition, which has happened in the past. Any set of policies to promote innovation networks should use both horizontal and vertical policies.

After arguing that the market by itself produces suboptimal results, the authors warn of failures associated with state intervention. One of the findings from their case studies is that very often there is a wide range of programs, but with insufficient resources. They suggest that, trying to avoid selection biases, it is important for promoted programs to have the appropriate budget. In other words, it is important to determine whether a higher priority is given to the impact of programs or to covering a wide range of alternatives. A second failure refers to the human capital in charge of managing the programs. Many of these managers have strong backgrounds in the network-program area of expertise (e.g., agriculture, biotech, etc.) but are not as strong in modern management techniques, negotiations techniques and business plan follow-up. A third problem with state intervention regards the need to make public policies jointly coherent and to avoid superposition problems. Finally, as networks could transform innovations into club goods, partnerships among research centers, labs and firms have considerable potential. Care should nonetheless be taken not to make the formation of partnerships a goal in itself. Rather than being

¹⁰ But it is available from the ANII webpage.

rewarded for partnerships per se, programs should be rewarded with respect to innovation performance.

3.1.5 National Research and Innovation Agency

The creation of the National Research and Innovation Agency (ANII, Agencia Nacional de Investigación e Innovación) is the most important institutional change in the area of research and innovation. Article 256 of the Budget Bill of December 2005 provided for the creation of an Innovation Agency to be in charge of the organization and management of policies to promote innovation, science and technology, and in doing so promote coordination among institutions and consider the social and production needs of the country. The bill gave the President 180 days to present to the Congress a proposal detailing the juridical nature of the Agency, the details of its goals and its internal organization.

Established in December 2006 by Bill 18.084, ANII was constituted as a non-governmental state institution (“persona jurídica de derecho público no estatal”) which means that for anything that is not explicitly established in the Bill the Agency will act as a private institution (e.g., accountancy, exemptions of personnel from consideration as civil servants, procurement and selling). This may grant the ANII flexibility and speed in decision-making.

In line with the PENCTI, the main objectives of the ANII are the following:

1. to generate and manage programs for the promotion and development of science, technology and innovation following the strategic and political guidelines of the executive branch of government;
2. to promote the coordination of actions between public and private actors; and
3. to facilitate (with other innovation institutions) the development of evaluation mechanisms.

The board of directors of the ANII is made up of seven members. The Government selects five, and the other two are selected by the National Innovation, Science and Technology Council (CONICYT, Consejo Nacional de Innovación, Ciencia y Tecnología). The CONICYT was created by Law 17.296 of February 2001 with basically the same objectives as the ANII.¹¹ Bill 18.084, which created the ANII, did not eliminate CONICYT but rather re-defined its goals.

¹¹ Previously, other public sector agencies were in charge of science and innovation.

The main change is that after 2006 CONICYT started to act more as a consultative body. At this point it should be noted that CONICYT consists of 21 members: 5 representing the executive branch of government, 1 representing other public enterprises, 4 representing the Universidad de la República, 2 representing private universities, 1 member selected by researchers active in the National System of Researchers (SNI, Sistema Nacional de Investigadores, a program of the ANII), 5 representing the productive sector and named by industry associations, 1 representing municipalities, 1 representing labor unions, and 1 representing the institution in charge of primary and secondary education. CONICYT's president is selected by this 21-member directory board.

3.1.6 National Research and Innovation Agency and the Private Sector

The ANII has four basic programs targeted to firms in the private sector. The first program, the Young Firms Program (Programa de Empresas Jóvenes), is directed to start-ups. The background of this project is Ingenio, a business incubator in the Information and Communication Technology (ICT) field, created as a joint initiative by the Laboratorio Tecnológico del Uruguay (LATU) and Universidad ORT Uruguay with financial support from the Inter-American Development Bank. Ingenio builds on the joint effort of the Government, the universities and the private sector to foster the development of the information and communication technology industry as key to the economic growth of the country. An evaluation of the Ingenio program found that, although generally successful, it could be improved by giving entrepreneurs more time to complete their projects. The Young Firms Program provides a subsidy of US\$20,000 for one year, providing a monthly salary of up to US\$600 per entrepreneur, with a limit of two per project, to help them to focus on their project without the need to moonlighting. These projects are approved directly by the ANII committee without external technical evaluations. In the call for projects held in 2002, some 22 projects were presented and 10 were approved.

The second program, which targets existing firms, subsidizes 40 to 60 percent of a project's cost of the project. The percentage of the subsidy depends on the size of the investment (small, medium or large project) and the extent of the innovation proposed. This program operates in an "open window" system in which firms can present an outline of their request at any time. Within two weeks program directors evaluate the request and invite selected firms to present a full proposal. A technical expert and a financial expert evaluate the full proposal.

About 60 outlines were presented in 2008, the year prior to this paper's writing, with an approval rate of about 10 percent. Although the program is horizontal, according to Fernando Brun (director in charge of the firms programs of the ANII), there is a bias in favor of technological sectors. Brun noted that, although this program has been successful, there is the need to complement implementation of industry funds (e.g., energy, biotech) with more vertical measures.

The goal of the third program is to improve the efficiency and to obtain quality certifications of small and medium firms. This program operates under an open window system and has very few requirements, providing a subsidy of up to 50 percent of the cost of the firm's proposal, with a maximum subsidy of US\$12,000). The directors are presently considering profound changes in this program, including additional application requirements (e.g., funding only of export-oriented projects) and a significant increase in the maximum subsidy.

A question always surrounding subsidy-based policies is whether they really promote new production lines within established firms and facilitate the entrance of new players or merely transfer rents to firms that would have acted exactly in the same way in the absence of the subsidy. This question cannot be readily answered. One of ANII directors noted that in many instances they must make decisions on the basis of intuition. In most cases this intuition is that, although the subsidy goes to projects that would have been carried out anyway, the subsidy permits faster and better development of them.

Finally, the fourth program promotes the formation of networks. This program has two steps. In the first step, a group of firms can request for ANII assistance in hiring someone to work with them to develop a proposal addressing a common problem. The ANII subsidizes 100 percent of the coordinator's salary for the first 6 months and, if needed, 50 percent of that salary for an additional 6 months. The second step involves the evaluation of the proposal, which could in theory be subsidized by the ANII. Up to now, however, no project has reached this second stage, and there are only three networks working on the first stage. According to Brun, the club good concept that inspires this program has a very strong theoretical basis but is very difficult to implement.

3.1.7 Summary

In recent years there has been a greater emphasis than ever before on innovation policies in Uruguay. There has always emerged an acute awareness that public sector innovation processes must work hand-in-hand with production activities and the private sector. It is too early to determine the success of this effort, but the programs being implemented seem to be in line with the general objectives of the Government.

3.2 Directives on Industrial Strategy

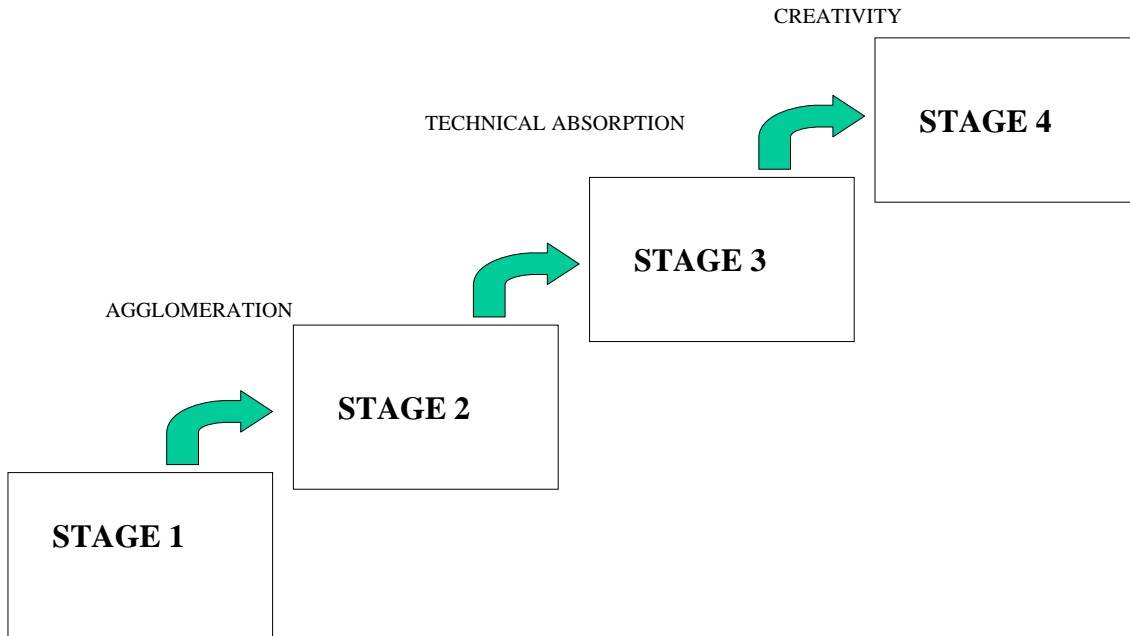
3.2.1 Introduction

The following data gathered in 2007 provide an overview of the Uruguayan industrial sector:

- Industrial production represents around 25 percent of GDP (some US\$5.5 billion in 2007).
- Total investment in equipment totaled US\$750 million, less than 13 percent of GDP.
- Total foreign investment reached US\$600 million.
- Industrial exports were at their historical maximum: US\$2,139 million.
- Industrial exports were also were at their historical maximum: US\$5,469 million, of which US\$3,661 were raw materials and US\$782 million were investment goods.
- Although exports have boomed, future growth may be limited by the fact that primary, non-sophisticated products have been the mainstay of that impressive growth.

Second, it is the opinion of the Secretary of Industry that Uruguay is located at the lowest stage of industrial development, as shown in Figure 1 below, which was taken from the May 2008 document “Directivas de Desarrollo Industrial.” This first stage corresponds to the production and exports of agricultural products and less sophisticated manufactures:

Figure 1. Stages of Industrial Development



Source: Ministry of Industry.

Stage 2 corresponds to the existence of poorly developed support industries that are poorly developed in technological terms. Firms in Stage 3 are capable of producing acceptable quality products and show knowledge of existing technologies. Finally, in Stage 4 firms can innovate and design high-quality products at the international level.

In other words, Uruguay's productive structure is not the most appropriate for achieving long-term, sustainable growth. Policies should therefore be targeted to solve two main problems. First, while international experience shows that successful countries incorporate as much as 40 percent in value added, Uruguay incorporates only 27 percent in value added. Second, although modern production needs technological development, Uruguay is still producing unsophisticated products, most of which are considered commodities.

3.2.2 *Characteristics of Directives of Industrial Policy*

Current plans for Uruguayan industrial policy focus on all technologically based industrial sectors, including the energy sector. Uruguay's Industrial Strategy defines eligible industries as follows:

1. Successful industries capable of introducing technology and value added: meat, dairy, leather, rice, wood, pulp and paper, mining, fisheries.
2. Skilled labor-intensive industries: software, automobiles, pharmaceuticals, textile processes, construction, energy, shipbuilding.
3. New industries: chemicals, plastics, agricultural equipment, non-mineral materials, renewable energy, biotechnology.
4. Support services: software, engineering, logistics, transport, communications.

Each of these industries is eligible for protection and promotion either through public inputs and/or market oriented incentives (see below).

Since the proposal above defines "Strategic Industries," it would be tempting to think in terms of vertical productive development policies. However, as described in the previous paragraph, the scope of industries included as strategic is so wide that in practice practically includes all relevant industrial sectors. In other words, although some clusters have been and will be selected (see below), no industry is excluded *ex ante*. We will therefore consider the proposal as horizontal, and the unit of reference will be a productive cluster or value chain.

Government will concentrate on the active promotion of industrial sectors that are technology-based and regionally integrated. Promotion includes support for financially weak corporations. Nonetheless, Government will not necessarily participate in the production of goods and services, which is left mainly to the private sector.

Consistently with the analysis developed by the Secretary of Finance, the Secretary of Industry has agreed that the main restriction on Uruguayan economic and social development is the lack of relevant productive investment. Uruguayan restrictions do not stem from the quality of its labor force, nor from participation rates, but from the lack of capital investment.

One difference between the strategy supported by the Secretary of Finance and the Secretary of Energy is that the former is a pure horizontal strategy while the latter considers cluster formation an important element. This industrial strategy is based not only on the

development of new products, but also on the development of new production processes taking advantage of globalization (outsourcing) and clusterization, with goals including the achievement of economies of scale in a section of the value chain.

The strategy presents the measures described below as an optimal regional integration policy. First, there is the need to study recent global trends in each industry and industrial process. Second, a comparison of cost structures and competitive abilities between international and Uruguayan competitors will define the gap to be eliminated. Third, the gap will be addressed by concrete measures using appropriate incentives

According to the directives, incentives will necessarily be temporary so as to avoid permanent support of inefficient production. Public support, moreover, will not discriminate between domestic and foreign investors: the government views long-term investment as naturally good regardless of who the residual claimant may be. Incentives will not be general but problem-specific, that is, targeted to solving particular and well-identified problems, subject to control and evaluation. According to the directives, incentives need to be transparent, subject to counter duties and socially negotiated (i.e., by relevant, interested parties).

The directives set forth several goals: i) economic growth, ii) incorporation of value added, iii) technological development, and iv) promotion of environmentally friendly projects. More specific objectives are the following:

1. Annual industrial production growth of 10 percent for the period 2008-2015.
2. A threefold increase in production meeting international technological standards by 2015.
3. Increasing renewable-based energy production (not including hydroelectric) to at least 15 percent of total domestic consumption by 2015.

3.2.3 Market and Public Failures

According to Government officials, Uruguayan industrial development faces several restrictions of diverse nature and significance. The most relevant restrictions include the following:

1. Uruguay lacks an adequate supply of skilled workers. The Directives therefore create an institutional body, the Productive Cabinet, which will create and coordinate specific human capital formation programs with

other relevant public institutions.¹² The ultimate goal is to check market conditions periodically and to adapt current programs to changes in those market conditions.

2. While industrial development requires low-cost and efficient energy resources, Uruguay faces notable natural resources restrictions. New sources of energy such as solar, wind and others still face information problems and credit restrictions, which require the participation of the public sector.
3. There is a shortage of physical and administrative infrastructure. This coordination failure requires large investments, some of which need to be financed and probably carried out by the public sector.
4. Both quality and quantity of information needs to be improved. In particular, rules on project selection, monitoring, credit conditions and other requirements must be made available to investors. Progress has been made through the implementation of legislation including the Industrial Promotion Bill, the soon to be approved Bankruptcy Bill, and the Consumer Protection Bill.
5. Long-term investment requires specialized inputs in terms of human capital. Such investment additionally requires informed analysis of current and future market conditions, which extends beyond firm-specific research. The directives call for the creation of an institutional framework to improve interaction among the Productive Cabinet, the Agency for Development and the ANII. Long-term research is thus seen as a public good that needs to be publicly supplied in order to avoid innovation restrictions.
6. New strategies of industrial development include as an important component the participation of and cooperation between the public and private sectors. Government representatives are currently discussing what institutional structure is best suited for industrial development, and their

¹² Such as the ANII analyzed in last subsection.

main concerns involve the potential capture of public officials by private interests, leading to inefficient results

7. Long-term investments also require protection, as innovation in new technologies is risky because of the uncertainty of future profits (see analysis of Innovation Policy below).
8. Finally, economies of scale are an impediment for regional and international integration. Uruguayan firms should have the opportunity to integrate into global value chains through the formation of productive clusters so as to avoid this coordination failure.

According to representatives of the Secretary of Finance, the strategy is tailored to attack two market failures: information problems and coordination failures that prevent an increase in productive investment. In this sense, the program does not try to identify each particular market failure associated with a particular market but instead addresses the key factor associated with low investment. It is argued that a boost in productive investment is a necessary condition for long-term development.

3.2.4 Instruments of Industrial Policy

The government has defined several instruments to achieve the objectives described in previous sections. The following table outlines the main development policies.

Table 2. Principal Industrial Development Policies

	Horizontal/Vertical PDPs
Public Inputs	<ul style="list-style-type: none"> • Institute for Commercial Promotion including an Export Promotion Fund (Agency for Industrial Development) • Cluster formation (PACCPYMES AND PACC) • Productive Cabinet and other Public Institutions • Support (unspecified) to industries where risks are high and/or no FDI exists • Possible promotion of a participatory institutional framework to achieve consensus on policy
Market Oriented	<ul style="list-style-type: none"> • Tariff exemptions for selected industrial inputs • Promotion of domestic production of selected inputs through selective protection • Production Subsidies for selected sectors • Tax exemptions for selected sectors

3.2.5 *Evaluation*

Many of the PDPs outlined in the previous section are included as part of the Industrial Promotion Bill passed in 2007 and are analyzed in a separate section of this document. Here we concentrate on some aspects of the Bill relative to industrial promotion and on two issues: the institutional context and cluster formation.

Relative to horizontal market incentives, the directives point to the Promotion Bill of 2007, wherein market measures such as tax benefits and production subsidies are included among the instruments to be used to achieve industrial development. Since the granting and maintenance of benefits depend on pre-established and agreed indicators (instead of the presentation of a business plan), it is interesting to summarize a preliminary assessment of the consistency of the relation between failures, instruments and potential biases.

The main objective is to promote investment in physical and human capital, which is considered as the main economic restriction to economic development. A secondary and implicit objective is to minimize specific market and public failures of specific markets. This is not to say that efficiency issues are ignored, however, since officials admit the existence of pervasive failures such as corruption, rent seeking and market information and coordination problems.

Our main concern is related to dynamic efficiency issues, that is, the biases that the incentives systems can potentially create. Since the system works on the basis of a flexible set of indicators, the process of selection and change of those indicators becomes relevant. The system is flexible in that indicators can be changed according to policy decisions. For example, if decentralization becomes important, an indicator that promotes investment in certain regions of the country could be incorporated. The weight (which measures the relative importance assigned to the indicator) can also be changed according to policy.

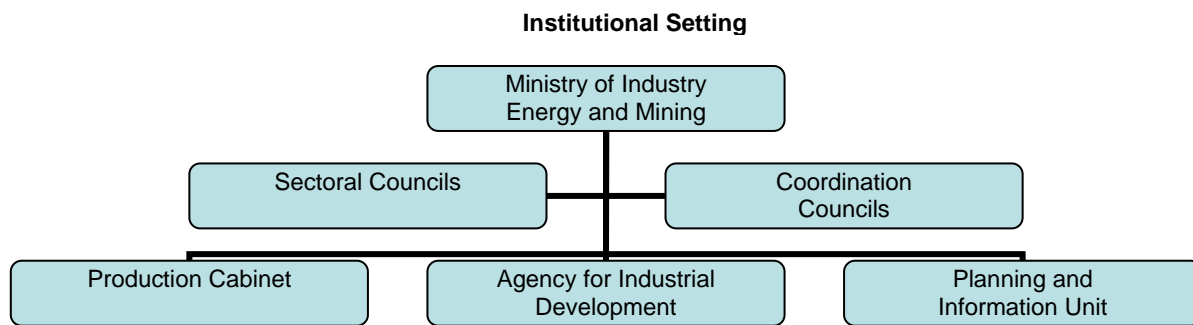
Officials admit that this is a potential problem in terms of efficiency, but they argue that the system is somewhat more isolated from rent-seeking activities and corruption. In terms of dynamic inefficiency, officials argue that the indicators are permanently monitored to correct for possible biases in policy.

3.2.6 Institutional Context

The relevance of the institutional context within which development policies are executed has gained momentum in recent years, especially after the successful development experience of small open economies such as Taiwan, South Korea, New Zealand and Ireland.

According to officials of the Ministry of Finance who instrumented the modifications to the Industrial Promotion Bill, three cases were considered potential benchmarks to be applied to Uruguay: China, Germany and Ireland. Permanent participatory institutions were nonetheless discarded as valid instruments for promoting industrial development in Uruguay because of fears of capture by special interests. The view held by officials at the Ministry of Industry is somewhat different, and they have proposed the institutional structure shown in Figure 2.

Figure 2. Proposed Institutional Structure



The Production Cabinet will include representatives of different public offices such as the Office of Coordination and Planning, the Ministry of Labor, the Ministry of Agriculture, Cattle and Fisheries and the Ministry of Industry, Energy and Mining. The Cabinet will exercise leadership in regard to sectors selected for promotion, and the Agency for Industrial Development will plan, execute and control the industrial strategy. Not included in the diagram above is the National Advisory Council for Industrial Development, made up of the “most relevant social actors for industrial development,” which remain unspecified. The Sectoral Councils will include representatives of the public and private sectors, including both management and labor, with the principal purpose of exchanging information and advice. The

Coordination Councils will work with other public agencies on issues such as commercial Policy, Research and Development and Human Resources.

According to public officials at the Ministry of Industry, Energy and Mining, this institutional setting is under evaluation and being negotiated with other Secretaries and the President. However, according to one official the setting described above will be modified. This official further specified that the benchmark for this setting was analogous structures in Brazil and South East Asia.

At this point we can reasonably conclude that the Sectoral and Coordination Councils will not be a part of the framework. Policy will be defined by the Production Cabinet and implemented by the Agency for Industrial Development. Private sector participation will take place as necessary but will not be institutionalized as a permanent body. This view parallels that of the Ministry of Finance, where the fear of capture by special interests is predominant.

3.2.7 Cluster Formation

There are two main cluster programs in Uruguay: PACCPYMES,¹³ a Program undertaken by the Secretary of Industry and PACC,¹⁴ undertaken by the Office of Planning and Budget.

PACCPYMES consists of three main subprograms: a) Clusters (PC), b) Firms (PF), and c) Networks (PN). We are interested in the first of these programs.

The PC Program targets interested private companies so that they may cooperate with each other and with public officials to improve the competitiveness of each firm through a joint venture, or cluster. The process of cluster formation includes several stages: i) selection and briefing of interested parties, ii) collection and evaluation of relevant information, iii) diagnosis and strategic planning, and iv) execution. Selected firms will obtain the following benefits: i) a coordinator/facilitator, ii) support in logistics and dissemination of experience, iii) expert support for strategic planning, and iv) a subsidy of up to 100,000 Euros to co-finance the entire process.

Clusters are evaluated and selected according to their potential for the development of non-primary products. An important prerequisite is the existence of a critical mass of firms capable of working in association with other firms. Firms must be willing to risk their own resources and able to prepare a feasible action plan, or strategy.

¹³ Programa de Apoyo a la Competitividad y Promoción de Exportaciones de la Pequeña y Mediana Empresa Secretary of Industry, Energy and Mining.

¹⁴ Programa de Competitividad y Conglomerados de Cadenas Productivas, Office of Budget and Planning.

After a critical mass of firms is detected, representatives of would-be clusters are asked to present their projects. Several factors are evaluated at this stage: firm's commitment to objectives, contribution to the goals of the PC Program, and internal consistency. This stage ends with the selection of 10 proposals. An Evaluation Committee then evaluates the institutional capacity, the level of social cohesion between the partners and the long-term profitability of the project. This stage ends with the selection of the best five proposals

Finally, the selected proposals' potential for replication is evaluated. There are several clusters and value chains currently in formation. The Secretary of Energy is working on seven Clusters,¹⁵ and the Office of Budget and Planning is also working on several projects.¹⁶

3.2.8 Market Failures Related to Clusters

This program attempts to minimize major restrictions on the development of a sustainable network of small firms. First, while scale economies limit the development of these firms, scale economies can be obtained if firms associate in joint production. Second, coordination failures between small and larger firms can be minimized through the formation of clusters. Information asymmetries can also be minimized through means such as credit negotiations with financial institutions. Last but not least, small firms are labor-intensive and can contribute to relaxing the restriction of high unemployment and its attendant social costs.

3.2.9 Summary

Industrial Directives, a new initiative of the Vázquez Administration, attempts to develop targeted industrial sectors and solve market and public failures by using market incentives, supplying public goods and creating an institutional environment where policy is formulated on a consensual basis. As the proposed institutional context is still largely under discussion by officials, it is too soon to evaluate the initiative's success.

¹⁵ Wine, Tourism (2), Life Sciences, Cheese, Logistics and Transportation, Naval Industry, and an Agricultural project on the western coast of Uruguay).

¹⁶ Beekeeping, Blueberries, Shoes, Software, Tourism, Clothing.

3.3 Investment Promotion

3.3.1 Introduction

State intervention to promote industrial development was justified on the basis of “Open Regionalism,” and a Bill on Industrial Promotion was passed to take advantage of the potential attractiveness of MERCOSUR in 1998. The bill had two fundamental objectives. First, it aimed to improve investment conditions through market-oriented policies such as tax incentives. Second, the regulatory framework was modified to assure non-discrimination against foreign investors, private property guarantees and the permanence of tax treatment. There was also an attempt to increase transparency and reduce bureaucratic costs.

The current administration concluded that some unintended consequences of the Bill needed to be evaluated. These include bureaucratic delays, lack of transparency in the selection of investment projects, discrimination against small investment projects,¹⁷ biases towards selecting investments in physical assets, insufficient tax-exemption periods, and limitations on tax benefits to projects financed by retained earnings or capital investment (Canalización del Ahorro).

3.3.2 New Framework

In 2007, the Vázquez Administration passed Presidential Decree 455/07,¹⁸ which introduced modifications aimed at correcting the deficiencies mentioned above. It also passed new criteria for investment evaluation and selection to be used by the Application Commission (Comisión de Aplicación, COMAP). These criteria represented a change in the attitude towards investment and a new “shock” strategy to attract investment. The main objectives of the new framework are the same that were stated in 1998 law:

1. To improve competitiveness through technical progress;
2. To facilitate development of more and new exports, especially those that incorporate local value added;
3. To generate productive employment;

¹⁷ Free Zones attracted foreign and primarily large-scale investments, while the Bill was used by large and mid-size investors, leaving benefits inaccessible to small projects. The costs associated with the presentation of the promotion were prohibitive for small firms, and businesses other than corporations (Sociedades Anónimas) were effectively discriminated against.

4. To facilitate the formation of productive chains, or value chains
5. To facilitate the creation of new small and medium size companies
6. To facilitate economic (industrial, agricultural, services) and social decentralization, as a means to achieve sustainable development.

The investment promotion system consists of an executive committee (“Comisión de Aplicación”, COMAP) made up of delegates from the Ministry of Economics and Finance (coordinator), the Ministry of Agriculture, the Ministry of Industry, the Ministry of Labor, the Ministry of Tourism and the Budget and Planning Office. This commission recommends the promotion of projects to the executive branch in a rather automatic way after ensuring that all requirements have been met, and selected projects are granted tax benefits.

Also involved is new office at the Ministry of Finance: the Private Sector Development and Investment Support Unit (“Unidad de Apoyo al Desarrollo y la Inversión en el Sector Privado”). This unit works as a front desk in project presentations and facilitates firms’ relationships with the public sector.

3.3.3 Main Characteristics

Projects are evaluated according to investors’ commitment to the objectives to be achieved rather than exclusively on a proposed investment project and the history of the investor(s). Paperwork is kept to a minimum and has to be presented only at a one-stop window. There is a 60-day period to decide on the project, but a tacit approval follows if no explicit declaration is made after 60 days.

As shown in Table 3, investment projects are classified according to amount to be invested and to their contribution to Gross Domestic Product.¹⁹

¹⁸ The administration essentially maintained the goals of the original Investment Bill but changed norms that relate to its implementation.

¹⁹ One of the objectives is to facilitate presentation of projects by small companies

Table 3. Classification of Investment Size

	Amount of investment²⁰	Investment as percentage of 2008 GDP²¹
Small	Less than 0.3	Less than 0.001
Mid-size 1	0.3 to 1.2	0.001 to 0.004
Mid-size 2	1.2 to 6.0	0.004 to 0.020
Large 1	6.0 to 12.0	0.020 to 0.040
Large 2	12.0 to 42.0	0.040 to 0.145
Large 3	42.0 to 600.0	0.145 to 2.00%
Of Great Economic Significance	More than 600.0	More than 2.00%

In addition, as shown in Table 4, incentives²² and achievement of objectives are specifically linked through a Matrix of Indicators.²³

Table 4. Criteria for Classification

Indicator	Criteria
Employment	Jobs (Full time equivalent) created
Geographic Decentralization towards poorer regions	Local Human Development Index
New Exports	Relative to no-project situation
Domestic Value Added	Change in the participation of local salaries and inputs in sales
Clean Technologies	% of “Clean Investment” on total investment
R&D and Innovation	% of R&D on total investment or number of R&D jobs created
Impact on GDP	For each 0.003% of GDP of investment
Labor Agreement	Collective Agreement approved by Govt.

The period over which tax benefits (rent) are granted ranges from a minimum of three to a maximum of 20 years. Moreover, benefits can be used at a decreasing rate: the maximum 90 percent income tax (IRAE) exemption can be used during the first half of the period, with gradual reduction in second half.

²⁰ US\$ million in September 2008.

²¹ 2008 GDP is estimated at US\$30 billion.

²² Benefits include the amount of the exemption and the period of exemption.

The term “Industry” means not only manufacturing, but also services and commerce. In other words, benefits can apply not only to investments in traditional industrial sectors but also to new sectors such as software, logistics, and transportation. Additionally, benefits can apply to investments in fixed assets and “intangibles” as well as equipment.

Those benefits are strongly concentrated in giving a robust signal to investors by increasing their rents: the average fiscal incentive was established three times the monetary amount of the old regime. Benefits are also strongly associated with the successful achievement of agreed objectives (measured by the indicators shown above). Moreover, benefits are protected against domestic inflation, as they are expressed in terms of Indexed Units, which means that benefits will be increased according to the rate of domestic inflation,

Benefits can be easily modified if new investments are made or if objectives are surpassed. The intention is to provide flexibility to adapt cost structures to an uncertain environment, rewarding “self-discovery” by automatically updating incentives to the more productive reality.

3.3.4 Market and Public Failures

Although the government focused on the broad goal of increasing investment without directly addressing specific market failures, Table 5, based on informal discussions with officials, attempts to link proposed indicators to relevant failures.

Table 5. Objectives and Restrictions

Objectives of Fiscal Incentive	Restrictions to be Minimized
Increase of Employment	Lack of spillover of tax exemptions Lack of skilled labor
Exports increase (US\$)	Scale economies Market size
Geographical decentralization to poorer regions	Income distribution Agglomeration Externalities
Increase of Value Added	Lack of skilled labor Availability of Natural Resources Appropriability of Self-discovery
Environment-friendly investments	Negative externalities
R&D	Underdeveloped Academic Research Asymmetric information
Modern Labor Relations	Asymmetric Information Principal-Agent problem

²³ Small projects are allowed to choose only one and unique indicator which will determine the extent of the benefit received.

The new investment framework is tailored to minimize two relevant public failures, corruption and rent seeking, and does so by setting a up framework that applies across the board and includes clear and quantitative measures of evaluation. To receive benefits, investors need to meet different predetermined objectives during the life of the project. These pre-determined objectives are set by policy, and each objective is weighted by policy as well—a framework that may lead to granting excessive benefits relative to efficiency and/or to distortions in the allocation of resources (bad selection of indicators). Officials acknowledge this potential problem but contend that the system is flexible enough to be changed whenever distortions and /or errors are detected. Since the priority is given to increasing investment, officials believe this framework to be the best mechanism.

3.3.5 Summary

Investment promotion provides the PDP scheme with a powerful horizontal tool. Its main features are that it is general, transparent and designed to provide coverage. The new framework substantially increased tax benefits, relegating cost-eficacy issues to a secondary priority. At this stage policy was designed to produce a positive shock in expectations, attract investment and even put Uruguay on international listings of the best places to invest. Potential problems with this framework nonetheless include the following: i) selection of appropriate indicators, ii) their calibration, and iii) potential unintended biases. Indicators and parameters need to be constantly revised in order to adequately represent changing circumstances.

4 Vertical Policies

4.1 Sustainable Production Project²⁴ in the Agricultural Sector)

4.1.1 Motivation: Explosive Growth in Soybean Production

Probably the most important structural change of the last decade in the Uruguayan agriculture is the development of the soybean sector. While the Sustainable Production Project is not the official response to the challenges posed by the soy sector as such, understanding the issues raised by the sector's explosive development are useful in explaining the working of the Sustainable Production Project.

²⁴ In Spanish: “Proyecto de Producción Responsable”.

At the beginning of the century soy was almost entirely absent from Uruguayan agriculture, but since 2000 that crop has grown enormously both in absolute value (tons and monetary value) and as a share of total agricultural production. By 2006, soy production accounted for 17 percent of total agricultural production, and by 2007 soy exports totaled more than US\$200 million, representing one third of agricultural exports. These increases resulted from rising prices as well as larger harvests. Soy prices rose from \$164 per ton to \$288 per ton (a price increase of 75 percent in seven years). The area planted with soy also increased in absolute and relative terms. By 2007 the area devoted to soy production was the largest of all agricultural products, even above rice.

Almost all of the soy produced in Uruguay is transgenic. Using genetic engineering techniques it is possible to alter the genetic material of living organisms, producing what are called genetically modified organisms (GMO). These techniques allow the combination of DNA molecules from different sources into one molecule to create a new set of genes. This DNA is then transferred into an organism that acquires enhanced or novel traits. In 1995, Monsanto, an international corporation, introduced Roundup Ready (RR) soybeans. These RR soybeans have had a copy of a gene from the bacterium *Agrobacterium* sp strain CP4 inserted into its genome, which allows the transgenic plant to survive being sprayed by the non-selective herbicide Roundup (the active ingredient of which is glyphosate). This allows farmers to reduce tillage or even sow the seed directly into an unplowed field.

4.1.2 Market Failures

On the basis of the related academic literature, the public press and informal discussions with relevant parties, it is apparent that several market failures exist in soy development; such market failures may also exist in regard to other agricultural product. It is important to note, however, that there is no consensus on the severity of these market failures, and the range of opinions is quite wide. For instance, a consulting firm (SERAGRO) argued in the press that a temporal ban imposed by the government on the introduction of new GMO (January 2007) was a terrible policy mistake in contradiction with the innovation policies fostered by the government. The ban would delay the development of the agricultural sector and, since increasing soybean production has a positive impact on livestock (cattle) production, the ban would negatively affect the latter sector as well. On the other extreme, in a recently published book by RAP-AL²⁵ (Blum et al.,

²⁵ RAP-AL Uruguay is a member of PAN International (Pesticide Action Network).

2008) it is mentioned that most transgenic soy producers in Uruguay are foreigners renting land at low prices without concern for soil and the environment. According to the authors, these firms make profits in the short run, but Uruguay faces long-run impacts of soil erosion, water pollution and health effects for the industry's workers.²⁶

Given the great distance between the views of SERAGRO and RAP-AL, among other actors, any discussion of possible market failures and policies to solve them should be undertaken with care. While some actors in the industry view market failures as minimal (if they in fact exist) and have no real impact, others argue that those failures are significant and that the government has been negligent in addressing them, to the extent that increasing soy cultivation works against the country's development. The discussion here is confined to the economic rationale of the most important potential market failures and how the Sustainable Production Project is supposed to deal with them. We do not estimate the severity of any market failures, nor do we assess whether the policies implemented had the desired impact.

The most important market failure mentioned by several actors and members of the government is the negative externality of transgenic soy in the environment. Particularly cited were soil erosion, water pollution and potential impacts on animal and plant biodiversity.

Others have further argued also that transgenic soy has negative externalities to other sectors. Gudynas (2007) notes that cattle producers are concerned about the proliferation of transgenic soy because of the risk it represents to meat labeled "organic," which is supposed to come from cattle that are not raised in transgenic fields or given transgenic feed. Palomeque (2008) mentions that many honey producers have complained about the decrease in the number of bees in areas surrounding transgenic soy fields. To the best of our knowledge, however, no public institution has taken action to establish the validity of these complaints.

A third market problem has to do with innovation. Although RR soybeans have been patented by Monsanto, there is a need for research on how to adapt them to the weather and soil

²⁶ In their words (in Spanish): "*Gran parte de los cultivadores de soja transgénica en nuestro país son "empresarios extranjeros" que arriendan las tierras a un bajo precio y el cuidado de la tierra es lo que menos les importa. El beneficio económico que obtienen estas empresas es logrado en un período muy corto (seis meses), pero al país le cuesta muy caro, ya que una vez hecha la cosecha el suelo queda degradado y sin cobertura vegetal. Es decir, que a Uruguay solo le queda el destrozo y la erosión de la tierra, contaminación del agua y efectos en la salud de los trabajadores y pobladores locales. Este tipo de monocultivos destructivos se consolida y profundiza año a año y la pérdida de nuestras tierras agrícolas se intensifica, lo que implica una agudización de la pérdida de soberanía nacional y alimentaria del país*".

characteristics of Uruguay. The market failure here is a result of the incomplete appropriability of this research.²⁷

Finally, the growth of the soy sector and its strong export orientation demands infrastructure to transport produce, store it in appropriate conditions and finally ship it to its destination. Lack of such infrastructure may have created coordination problems that could have jeopardized the development of the soy sector.²⁸

4.1.3 Sustainable Production Project

The Sustainable Production Project is being carried out under the Secretary of Agriculture. The main goal of the project is to foster the adoption of efficient systems of production based on natural resources (including biodiversity) that are both economically and environmentally sustainable.²⁹ As this is a very broad objective, it is important to understand the diagnostic of the agricultural sector that this project is trying to address.

According to the Operation Manual of the Project, the main problems detected are the following:

1. Problems of soil erosion, difficulties in the implementation of conservation practices and problems with the change from traditional tillage to no-till farming.³⁰
2. Inefficiencies in the use of watering due to lack of equipment.
3. Degradation of pastures and genetic resources (especially those on pasturelands) due to overgrazing or improper grazing and to the lack of national-level consensus on the concept of “environmental services.”

²⁷ This is not a goal of the Sustainable Production Project. The National Seed Institute (INASE, Instituto Nacional de Semillas) is devoted to promoting and contributing to the development of seed-related activities by furthering use and production of superior-quality seed. The goal of the National Institute of Agricultural Research (INIA, Instituto Nacional de Investigación Agropecuaria) is to contribute to the development of the agricultural sector by generating, incorporating and adapting knowledge and technology. The Mesa Tecnológica de Oleaginosos was created in December 2005 following the initiative of several public actors and 11 private firms. The goal of the consortium is to create a framework to analyze the competitiveness of the sector. One of its specific objectives is to co-finance projects of mutual interest. In this sense a public good can be transformed into a club good (as analyzed in the innovation section of this paper), and the free riding effect vanishes or at least is significantly reduced.

²⁸ This is also not a specific concern of the Sustainable Production Project. The Plan Nacional de Silos and the Secretary of Infrastructure and Public Works are more related to this issue.

²⁹ In Spanish “promover la adopción de sistemas de manejo integrado y eficiente de los recursos naturales de uso agropecuario, incluyendo a la diversidad biológica, que sean económica y ambientalmente viables”.

³⁰ No-till farming is a technique where the producer sows the seed directly into an unplowed field. It is traditionally associated with less soil erosion and lower impact in wildlife habitat.

4. Lack of a modern system of information and monitoring of natural resources that could help to manage climatic risk such as drought.
5. Lack of identification of elements of biodiversity with productive potential.
6. Lack of a comprehensive national understanding that could perpetuate the genetic and natural biodiversity.
7. Problems in water provision not only in quantitative terms but also in qualitative terms due to pollution.
8. Excessive and inadequate use of herbicides.
9. Problems due to inadequate post-harvest activities including agricultural waste.
10. Pests such as parrots (*Myiopsitta monachus*), wild pigs or boars (*Sus scrofa*) and other species

4.1.4 Projects

As of June 2008, the Sustainable Production Project had approved 2,838 projects, subsidizing an average of 70 percent of total investment. The subsidies were approved in four categories of projects according to Table 6.

Table 6. Overview of Sustainable Production Project Subsidies

	2006	2007	2008	Total
Natural resources management	328	657	1,261	2,246
Biodiversity	3	26	76	705
Drought prevention		208	271	479
Fishery		6	2	8
Total	331	897	1,610	2,838

4.1.5 The Economic Rationale for the Project's Goals

The Sustainable Production Project served as a direct subsidy to producers to implement processes addressing the problems noted above. The subsidies range from 80 percent of total investment for small producers to 20 percent for large producers. The emphasis on small and medium producers has been very strong in the implementation of the program. Even to the extent that in an interview with the head of the program, Alfredo Bruno, he remarked that the main

point of the program is to help (subsidize) small agricultural producers while production improvements were of secondary importance. Somewhat at odds with the official statement of purpose, the project seems to have acted more as a tool for social policy than as a PDP.

We understand how water pollution and vegetal biodiversity can be subject to externalities, and in the spirit of the Coase Theorem spirit there is an impact on them because property rights are not well defined. But from an economist's point of view it is more difficult to understand the impact on soil erosion and why this impact on soil erosion (if there is any) is above the social optimum level. Land is privately owned and the owner of the land should care about the net present value of the income from this land. If he decides to produce soy without alternating with other products or even without alternating soy and cattle production (as is more traditional in Uruguay), it must be that he believes this is his best course of action. It has been argued that "foreign" entrepreneurs rent lands and they do not care about soil erosion, only short-run profits. But this also does not make sense. If the owner of the land decides to rent the field he should know what he is doing. Likewise, we do not have regulations to control the renting of apartments in the summer at seaside resorts. It is natural that house renters care about the building less than owners, but if the owner chooses to rent it to an Argentinean tourist it is because that is what is best for him. With property rights well defined the market provides the social optimum level of soil erosion.

The fact that the soil is a non-renewable production factor does not affect the argument that under well-defined property rights the market produces the social optimal outcome. But, if this social optimal outcome is attained by a process of trial and error, the impact of mistakes on soil is much worse than in the case of renewable factors of production.

Therefore in order to argue that there is a need for government intervention to control soil erosion we need to argue that i) land is not really private property, ii) land owners are myopic, or iii) there are information asymmetries. We have not found any of these arguments in official statements, but during an interview the head of the Sustainable Production Project mentioned that the current administration views soil as a "social good," clearly implying some limits to private property rights to land. Nonetheless, soil regulation is not a new concern, but rather is one of the first environment concerns addressed by Uruguayan governments. In fact, a decree-bill of 1981 (during the military dictatorship) states that the government has the duty to prevent and control soil erosion, though the details of implementation of this bill were only put into

practice by a Decree in 2004. Concerns about explosive soy growth motivated a new decree in August 2008 with more details on the type of actions in agricultural production that were considered inappropriate. The latter explicitly included among exploits justifications growth of agricultural products that do not protect the soil such as the “explosive expansion of soy.” A new soil protection bill is under discussion.

4.1.6 Summary

The Sustainable Production Project goals refer fundamentally refers to natural resource management (especially soil and water) and bio-diversity. It is clear that water pollution and bio-diversity are subject to market failures but it is much less clear how reasonable are the regulations on soil use. Besides this, the Sustainable Production Project has been very active in the last years. Finally, its focus on small establishments has more to do with social policies rather than productive development policies.

4.2 Meat Traceability

4.2.1 Motivation: Human Health and Product Differentiation

Particularly since the appearance in England in the mid-1980s of Bovine Spongiform Encephalopathy (BSE), commonly known as Mad Cow Disease (MCD), the Food and Agriculture Organization (FAO) and other institutional institutions have been concerned with the sanitary conditions of food products and their effect on human health. Attempts are being made to enhance safety conditions through the establishment of efficient traceability systems

The increase in fresh food choice is affecting consumer demand for more and more product information. The identification of the origin of feed and food ingredients and food sources is of prime importance for the protection of consumers, particularly when products are found to be faulty. Many producers and public officials believe that an efficient traceability system would enhance safety conditions while allowing them to differentiate their products and obtain economic rents. Traceability should facilitate the withdrawal of foods (if needed) and should enable consumers to be provided with accurate information concerning safety characteristics and management technologies of implicated products. In addition to the increase

in consumer demand, market opportunities and regulators³¹ are demanding that traceability of meat and fresh produce be addressed as quickly as possible.

Traceability of cattle provides numerous benefits including access to restricted markets (such as the European Union), improved pre-slaughter management, quick and accurate tracking of disease, and improved firm management and production decisions through more detailed information (e.g., inventory management and logistics).

In food processing, traceability refers to the recording of all movements of the product and of the steps within a given production process. In situations where an efficient traceability system is in place, it is possible to precisely identify the product's origin and how and when it was produced. In the case of meat products, traceback systems make it possible to link the final beef a consumer is eating at, say, a French restaurant, to the animal from which that beef was produced, probably bred at an Uruguayan farm and slaughtered at a U.S. processor. Such traceability implies the use of data such as barcodes and Radio Frequency Identification (RFID) that can be traced through the entire production flow from the farm to the processors and beyond, connecting all the stages of a given business.

Traceability systems vary because different sectors (industries) face different costs and benefits from such systems (USDA, 2004). Hobbs (2003) states that some countries set up mandatory systems while other countries rely on voluntary systems. Moreover, some systems include tracing from the farm to the processors while others also include tracing of individual cuts of meat cuts up to the retail sector. Besides food processing, traceability systems have been adopted in different economic industries such as logistics, materials, blood analysis and software.

4.2.2 Market Failures and Traceability

Insufficient traceability in food markets can arise due to information problems (asymmetries or absence of information) among suppliers (e.g., cattle ranchers and processors) and between consumers and suppliers.

Briefly, traceability efforts to supply information on credence attributes to differentiate products will not be maximized if firms regard those efforts as not having value to consumers. On the other hand, if potential problems are not firm-specific but involve the whole industry,

³¹ For example, Harmonized EU control measures were introduced in 2001 to combat the spread of BSE. New elements are contained in the EU Regulation (1292/2005) which amended Annex IV of the Regulation (999/2001)

firms will not have incentives to supply information on their products. In other words, if safety problems are common to the whole industry and out of the control of individual firms, they may not be willing to supply information that would expose them to liabilities. Additionally, even if problems are not common to the industry, firms may value anonymity if supplying information on products and processes exposes them to legal sanctions. Finally, traceability will be undersupplied when disclosure requirements are partial or incomplete and when innuendo is pervasive. In all these cases, government policies can be thought of as necessary.

Alternatively, private supply of traceability information would be less than optimal due to the presence of externalities or the public good features of traceability. With respect to food safety, supply of traceability services will not be at its social optimum if the public health benefits of traceability are larger than the firm's private benefits. This will happen if firms regard some level of anonymity as convenient, and if they cannot transfer the private cost of setting up traceability systems to the product price.

4.2.3 Meat Traceability in Uruguay

Uruguayan Meat Traceability system can be divided in two subsystems: a) Traceability proper (TP), and b) Black Boxes (BB). The former implies the tracking of data from the farm up to the processors, while the latter consists of tracing information on meat cuts at the industrial (processor) stage to the retail stage. The link between the two systems should allow for the tracing of beef cuts from the retail level to the farm of origin.

The Secretary of Agriculture (MGAP) has defined the objectives of the TP as follows:

1. Food Safety
2. Create a Data Base about data on cattle characteristics and management practices
3. Certification of Production Processes
4. Certification of Origin
5. Creation of Trade Marks such as "Uruguay Natural"
6. Genetic Improvement
7. Tracking of diseases
8. Smuggling Control

from 1 September 2005. The EU is also requiring exporters to the EU to meet sanitary requirements regarding these

4.2.4 Traceability (TP)

Animal traceability is a part of a more general system of Animal Identification³² but goes beyond identification alone. The program allows the tracking of a specific animal throughout its life (Tracking of Products), and the tracking of how the animal was raised (Tracking of Process). Data collected include date and place of birth, owner, sex, breed, etc. The program also provides information on the route followed by the products (food) extracted from the animal, on the characteristics of those products, and on the middlemen involved in their trading up to delivery of the animal to the processors.

Uruguay implemented the first group traceability program in 1973. Information problems arising at the industrial stage relative to the real weights of each animal and the corresponding prices paid to cattle ranchers and taxes paid to the Government showed the need for a more efficient information system. After the 1986 outbreak of BSE in England, Uruguay began implementing individual TP as a mandatory requisite to meet international standards.

After a process of consultation with interested parties (cattle ranchers, middlemen, processors, and retail operators), the Government launched the TP system, which aims at the identification of each animal and its movements within the country. The current version of the program, in effect as of September 1, 2006³³ and aims at tracing every animal in the country by 2010. As of June 2008, the Government has reached half of that goal, that is, it has traced 5,821,585 animals, or 264,716 animals per month. Each registered interested party can access the available information supplied by the Government through the SNIG.

As an indication of the interest of the different parties, the SNIG publishes the number of monthly visits to its web page: it has increased from an average of 5,000 in 2006 to an average of more than 17,000 in 2008.

TP and market failures. The 1973 system was created to obtain more reliable information on the births, deaths and movements of cattle and on the tons of meat processed and sold by

diseases (see below)

³² National System of Livestock Information (Sistema Nacional de Identificación Ganadera, SNIG)

³³ Initially, the system only allowed for group identification. A second stage included individual identification.

processors. The main objective of the system was fiscal, that is, to control the flow of taxes paid by cattle ranchers and meat processors.³⁴

The TP subsystem has been created to assure food safety according to international standards. For a country like Uruguay, a net exporter of meat products, food safety represents not only a formal procedure to comply with international standards, but also a requirement to preserve current export markets and obtain new ones. Thus, food safety can be seen as a public good with environmental consequences. Public officials and representatives of cattle ranchers' organizations agree on the public good nature of TP. One representative of a supplier of software services on traceability declared that "collecting money from producers to fund the TP program would be like supplying vaccines without syringes."³⁵

Accordingly, the TP system has been funded through public funds. Producers have not directly paid for either the hardware or the software needed to implement the system. Nor have they paid for its maintenance, which is carried out by the MGAP.

Should cattle ranchers and meat processors pay for the system? Would traceability be socially undersupplied in this case? We need to gauge at the private costs and benefits and the social costs and benefits of such a system. This case seems to fit perfectly under the "private benefits-social benefits" dilemma. It seems clear that safety issues are a public good and that there are good reasons to believe that government should fund the costs of the TP program. Cattle ranchers apparently do not see TP as a program that justifies the private burden of its costs—especially if they depend on other producers to tag their animals—although they admit that it is a desirable program. This gives support to the theoretical argument outlined above that traceability (TP) would probably be undersupplied in Uruguay.

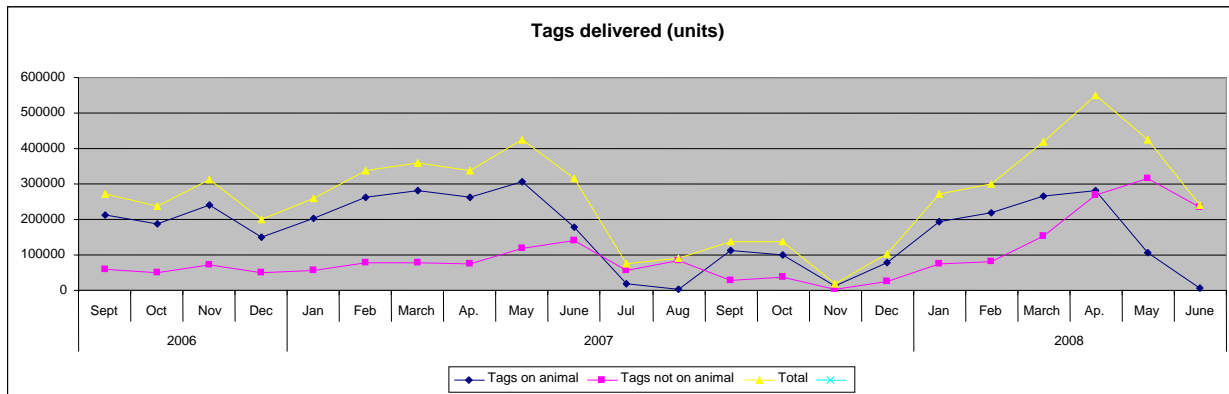
That said, data collected from SNIG and other sources, as well as statements by public officials, give cause for concern. Figure 3 below shows the evolution of the total number of tags delivered to cattle ranchers from September 2006 until August 2007. The graph also shows the number of tags attached to the animal as well as those not attached.³⁶

³⁴ Since cattle ranchers are paid by processors according to the weight of the animals delivered using scales own by those same processors, there are conflicts between ranchers and processors on the fair value of cattle (see the Black Box system)

³⁵ J. Barreto, Director of Proyecto Farming Services, 2006.

³⁶ Each producer has 60 days to attach the tag to the ear of the animal.

Figure 3. Attached, Unattached and Total Cattle Tags, September 2006-June 2008



From the launching of the system to August 2007, the (monthly) average number of tags delivered to consumers was 268,750. That number, however, shows a sharp decline in June and July of 2007, reaching less than 83,000 delivered tags per month. While the number of tags delivered to cattle ranchers begins to rise significantly by the end of 2007, so does the number of tags that *are not being attached* to the animal. Moreover, the total number of tags delivered again declines significantly after April, 2008. If one assumes a total of 11.5 million head of cattle in Uruguay, to meet European Union requirements by 2010, it would have been necessary to deliver more than 315,000 tags to cattle ranchers each month and have more than 434,000 tags attached to animals each month from June 2008 to December 2009.³⁷ Given the rate and trend of compliance shown in Figure 3, it appears unlikely that these requirements have so far been met.

If all relevant actors agree on the need for TP and the way it is being funded, then, why is traceability not fully implemented? Are there any other market or public failures that need to be addressed in order to get closer to the 2010 target? What are the potential consequences, say, in terms of food safety and export markets? Clearly, no Uruguayan meat will be allowed into the EU if there are animals left to be traced.

One explanation for this problem is that cattle ranchers estimate the number of births and request tags based on that estimation. Through the press and personal contacts, we have been told that the number of births has been less than the number forecast. This accounts for some of the difference but does not provide a full explanation.

³⁷ An animal is not traced until the tag is registered in MGAP. The number of traced animals by this criteria totaled only 3,745,861 which makes the situation even worse.

Others point to the fact that the modifications to the old system of cattle registration and monitoring have not yet proved satisfactory: the transition from a system based on physical support (paper) to an electronic system has proven more difficult than expected (El País, Sunday, May 6, 2005, Editorial). Additionally, the new system implies the emergence of a new agent: the operator. Operators are individuals or firms registered at the Sistema de Información y Registro Animal (SIRA in Spanish).³⁸ Operators must have the appropriate training and infrastructure to supply electronic information on livestock movements and changes of property, and the operator is responsible for the appropriate collection and recording of the needed data. This new agent, moreover, needs to have basic knowledge of software and other computing technologies, which is a scarce factor of production in most Uruguayan rural areas.

One important limitation is the lack of internet connections in some Uruguayan rural areas. This has significantly reduced the number of registered animals, according to statements of Juan Magallanes, director of SIRA. The extent of the coordination failure and its potential impact on the whole system need to be further evaluated.

Institutional context. As mentioned above, the TP in its current version was proposed by the Vázquez Administration and discussed with relevant parties such as cattle ranchers and associations of cattle ranchers, slaughtering and processing firms and their corresponding associations, transportation companies and retail operators.

The SNIG includes the creation of the Committee for the Evaluation of the Cattle Information System (“Comisión de Evaluación del Sistema de Información Ganadera”), where representatives of the Government and the private sector discuss the evolution of the TP program.

Conclusion. Regarding public safety issues, the TP policy seems to point in the right direction, despite all the implementation problems noted above. Public funding of TP, either through direct subsidies or tax rebates seems to be necessary to achieve the 2010 goals. Potential coordination problems arise due to lack of appropriate internet connections in rural areas, especially those related to the delivery of tags, the registration of animals by cattle ranchers and the efficiency of the operators.

Public funding of TP as an instrument for product differentiation is more debatable. This issue is treated in more detail when we discuss the second traceability subsystem, Black Boxes,

³⁸ System of Animal Information and Registration

but a word in advance is worthwhile here: consumers do not seem to value traceability per se as much as safety and quality guarantees.

Accordingly, the policy of public funding of TP plus the strategies to assure healthy international standards as carried out by the current administration seem to be an adequate productive development policy.

4.2.5 *Black Boxes (BB)*

The initial goal of the BB project was to obtain reliable information related to taxes paid by meat processors.³⁹ The project developed into a more comprehensive electronic information system aimed at two main objectives: to complement the TP project at the industrial stage, and to increase business transparency.

The BB project complements the TP system because it allows traceability to reach the individual cut of meat delivered to final consumers. BB begins by recording the data contained in each of the tags attached to the ear of the cattle (weight, age, origin, sex, etc.) and links this identification to each subsequent industrial process. The system thus allows the traceback of every cut of meat to the individual animal. The link of the two policies constitutes an asset to assure that Uruguayan meat meets quality and sanitary international standards so as to increase consumer confidence. In particular, this nexus guarantees the “natural” characteristics of Uruguayan meat, that is, there is no use of antibiotics, hormones or proteins in animals feed. Also, the system allows checking if cattle have been confined to yards or feedlots and if cattle are grass-fed.

The Black Box system also improves business transparency. The data contained in the tag are kept in every subsequent phase of the BB process, which is mainly a system of electronic scales located in each subsequent (seven) production stage.⁴⁰ The scales are connected to a local server where the weights at each stage are stored. The system also includes a set of printers and bar codes.

³⁹ The first bid to incorporate electronic scales at processors plants took place in 1998. The Vázquez Administration encouraged the National Institute of Meat (INAC) to further develop the project into a more comprehensive system to allow for more fluid interaction between processors and ranchers. See Institutional Analysis below.

⁴⁰ The seven stages are: 1) Reception of cattle, 2) Bleeding, 3) Dressing, 4) Classification, 5) Boneless, 6) Packing, and 7) Delivery. The project is being implemented in two phases: Phase 1 includes Stages 1 through 4 and it is completed. Phase 2 includes Stages 5 through 7 and is 70 percent completed. See next footnote.

All registered processors and ranchers have access to the information contained in each production stage. Ranchers can then link the weights at each stage to their cattle.⁴¹ Since ranchers are paid according to the weight of each animal, the BB project has made a significant contribution by incorporating an independent weighing system. Ranchers and processors are at this point discussing which of the scales is the most appropriate to determine the weight that will be considered as the basis for payment.⁴²

According to INAC President Fratti: “Each processor will have a local area network including a circuit of electronic scales, computers, printers, scanners and other hardware which cannot be hacked, that are connected through their own servers to an extended area network whose main server is in INAC. The data obtained from the different scales throughout the slaughterhouse network during the production process can be read as many times as necessary but cannot be modified by anyone.”

BB and Market Failures. The cost of the BB project was estimated at US\$ 7 million. Ranchers, processors and the government have agreed that US\$ 1 dollar for every animal processed will be used to fund the project. However, this dollar will be compensated for through a tax rebate on current taxes. In other words, the money is coming out of fiscal revenues. Although the project is supported by public funds, ranchers have questioned the method, arguing that it may affect the prices they receive from processors.⁴³

Perhaps not surprisingly, actors in the sector hold divergent views on BB. Ranchers regard BB as a significant improvement with respect to the information received on the weights paid by processors. In turn, while processors generally support BB, some consider it a form of “unnecessary sophistication.”

Those differences of opinion are clearly rooted in the system’s features and effects. First, the implementation of the new system minimizes the problem of asymmetric information between ranchers and processors. This is consistent with explicit support by ranchers and less enthusiastic support by processors.

⁴¹ For technical information on the BB project, see:

http://www.inac.gub.uy/innovanet/macros/Home_2_4P.jsp?contentid=1092&version=1&channelid=1

⁴² Before the new system was implemented, the weights were determined by the processors using their own scales at the reception of the cattle. The new system incorporates a series of scales that are managed and controlled by INAC (see below)

⁴³ Note that processors are “retention agents”: they collect revenues from exports and domestic sales, from which they pay ranchers for their cattle and pay taxes to the government.

On the other hand, the system is enthusiastically supported by the Government. BB represents an effective control on the industry and on the revenues collected through taxes. Since all information is stored and managed at INAC, the government actually has control on inputs and outputs processed by slaughterhouses.⁴⁴ According to some officials, BB actually acts as a “big brother”! This is also consistent with the positive but less than warm support by processors. The government additionally supports both TP and BB projects as complements to certification programs on meat quality and safety conditions.

Third, some officials argue that BB represents an opportunity to develop a competitive advantage over other countries in the international meat market. The argument that “small is beautiful” applies to this case. As the BB project actually comprises almost 100 percent of all ranchers and processors, virtually the entire national cattle herd can be traced. This has proven to be an impossible task for larger countries such as Brazil and Argentina, traditional competitors. Thus, while product differentiation is a powerful argument for officials, ranchers and processors, however seem to disagree.

Finally, there is consensus on the benefits with respect to quality assurance and safety issues. The benefits arise in two ways: first, BB and TP systems allow for almost immediate identification of the origin of a disease.⁴⁵ When BB is full in operation, a consumer will be in a position to identify the origin of the T-bone steak he/she is eating at a New York restaurant. If consumer’s health is harmed by potentially traceable meat, rancher and processors would be liable and subject to payments in line with the damage produced. This brings us to the second benefit: both ranchers and processors receive positive incentives to assure appropriate meat quality. Despite these positive incentives, as we have shown, the intensity of support for the system varies among interested parties.

The above analysis shows that, although BB is supported in general, some actors say it is basically an “unnecessary sophistication.” Why does this different evaluation arise? Is traceability an appropriate policy to minimize information failures between ranchers and processors, and between them and consumers?

⁴⁴ At INAC, we were shown how the system warns (a beep is heard) controllers every time a carcass passes through the different electronic scales. Information on weight, cut, origin, etc. is displayed on the monitor. Beeps sound every five or six seconds!

⁴⁵ In October, 2008, a warning of potential Foot and Mouth disease (FMD) disease triggered the traceability control system and it took less than 10 minutes to identify the affected ranch and the cattle. It turned out to be a false warning.

First, there is no doubt that BB has contributed to increasing transparency between ranchers and processors. In this respect, traceability improves efficiency and transparency and should be supported as such. Since BB would have been undersupplied if left to processors, the government has funded the system because it considers BB a public good.

Second, does BB increase the consumer's confidence? This is more debatable. Would traceability per se reduce consumer costs ex-ante, that is, before purchase? Hobbs (2003) finds that Canadian consumers value traceability less than other factors such as safety conditions and animal treatment. In other words, when choosing among different cuts of meat, consumers are willing to pay more for those cuts that supply objective assurance⁴⁶ of meeting international quality and safety standards with respect to those cuts that only assure that, in case of problems, the original rancher can be traced back and be subject to liability. So BB, considered just as a system that allows tracing the meat cut up to the rancher, does not seem to "add value" per se and does not seem to be an efficient policy aimed at product differentiation in international markets.

The Uruguayan BB system is partially mandatory. This means that processors must proceed to install the necessary infrastructure in order to be able to operate the system. However, the actual functioning of the system is voluntary, that is, processors are not required to offer BB in the marketplace if not required by consumers. This is consistent with the view of BB as an "unnecessary sophistication," and it is also consistent with the findings of Hobbs (2003): consumers do not seem to be willing to pay more for just traceability. In this sense, BB per se is not justified as a public good and should not be publicly funded.

There is however, one very important reason to consider BB a public good. It creates a positive externality on the supply of adequate safety conditions on the part of ranchers and processors. This is because BB, together with TP, makes both ranchers and processors subject to liabilities if they are caught violating international standards. That is, the information contained in BB and TP allows checking if cattle is fed and managed according to international standards at the ranch level and if processors comply with sanitary industrial conditions. In this respect, both BB and TP seem to be right conceived. Moreover, one of INAC's main activities consists on implementing certification programs to assure consumers the appropriate quality standards.

⁴⁶ By International Certified and Independent Programs

Institutional Context: INAC. INAC's mission is to develop collective actions tailored to incorporate value added and promote the economic development of the "meat value chain" (cadena cárnica).

More specifically, INAC has a special interest in regulating and monitoring industrialization and international trade of meat products. INAC is a public-private joint venture that includes the participation of private farmers (two members), private packers (two members) and two public officials (the Secretary of Agriculture and the Secretary of Industry, Energy and Mining).

INAC's responsibilities include the following:

1. Provision of adequate information on market research and coordination of policies with other public agencies.
2. Authorization and registration and administration of meat exports. INAC can also set reference prices.
3. Formulation of product quality norms according to international standards.
4. Management of Meat Transportation Means.
5. Control of the retail trade.
6. Imposition of sanctions.
7. Control and management of slaughters and industrialization
8. Advice on technological issues
9. Supervision of private farmers and packers

Decisions are generally made by consensus, although the President has the final vote if no majority is achieved. The composition of INAC includes representatives of all interested parties, except retail operators.

4.2.6 Summary

TP and BB seem to represent different things for different actors. The Government considers both projects as correcting for some information asymmetries between ranchers and processors, while at the same time acting as mechanisms of revenue control. Both projects are additionally seen as complementing efforts to assure adequate safety and quality conditions in international markets. INAC also considers BB a powerful instrument of product differentiation and regards the program as a public good. INAC further views BB as providing competitive advantages over

direct competitors such as Argentina and Brazil, that is, acting as a self-discovery instrument of new products and markets.

Ranchers are mainly concerned about their relationship with processors and the information problem stemming from the weighing and payment system. In this sense, they are strong supporters of BB. However, they do not necessarily support BB as product differentiation strategy, which they view as the “processors’ problem.” On the other hand, ranchers support TP and the fact that it is publicly funded. They see the government as showing leadership in establishing a system of information for disease prevention.

Some processors, however, consider BB an “unnecessary sophistication.” First, they see information asymmetries with ranchers as relatively unimportant. Second, they think processors should be allowed to offer BB voluntarily to international customers, since they are not sure the market pays for the costs. In contrast, processors support TP as an instrument for protection against the spread of diseases such as FMC and BSE.

All actors are consistently satisfied with the institutional framework represented by INAC. They find INAC to be providing useful services to the industry, although some think INAC is overstaffed.

In our opinion, TP is justified as a mechanism to prevent the spread of disease and as a guarantee of product healthy conditions. In this sense, it is a public good, as BB complements TP in allowing the tracing of unhealthy meat if needed. The public good characteristics of BB are nonetheless more debatable. While both projects would allow for some product differentiation of Uruguayan meat in international markets, some studies show that consumers are more willing to pay for safety and quality than for traceability per se. It seems that at some point BB may be more appropriately left to the private sector.

4.3 Forestry

4.3.1 Introduction

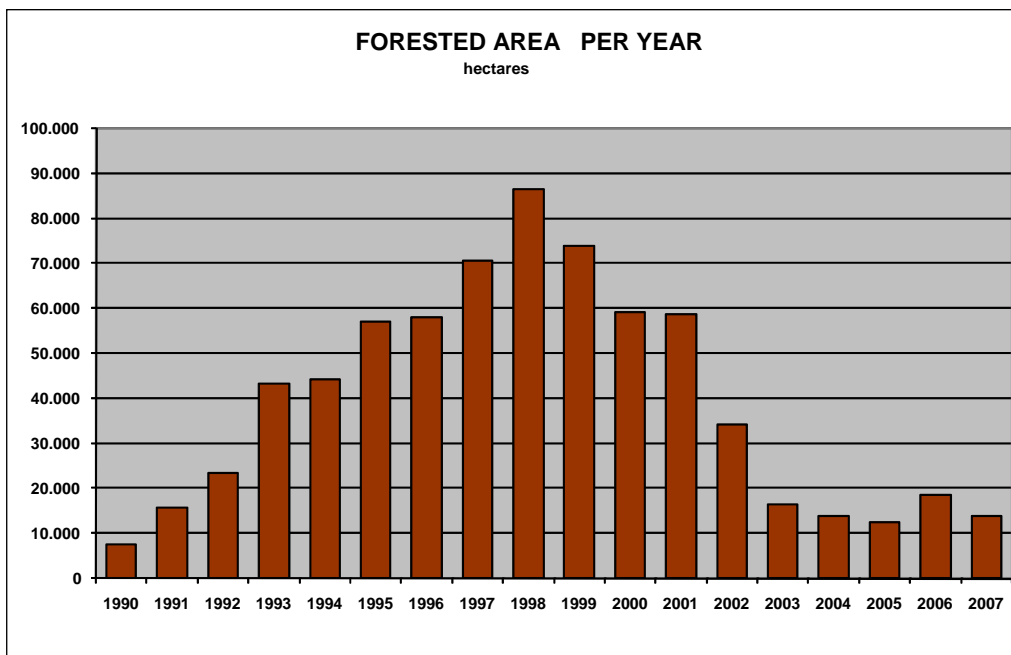
One of Uruguay’s notable vertical productive development policies relates to forestry and wood industrialization. Promotion has been justified in terms of comparative advantages given by abundant natural resources and a latitude favoring the cultivation of forests,⁴⁷ As the characteristics of the land and climate characteristics allow trees to grow more quickly than in

other regions. The legal framework, passed in 1987, aimed at granting long-term guarantees to potential investors, subsidized planting costs of plantations (but not the purchase of land), and provided tax exemptions. The Chilean model was used as a benchmark.

Soil not suitable for agriculture and livestock was chosen, and production subsidies and tax exemptions were put in place so as to achieve competitive scales of production in forestry and promote diversification within small agricultural productive units. Promotion targeted two relatively quick-growing species, eucalyptus and pine, so as to achieve scale economies in a relatively short period of time. Once production of raw material in the country had achieved the scale needed for industrialization, it was expected that related industries such as pulp and paper, construction materials and furniture would locate in Uruguay.

Figure 4 below shows the number of hectares forested per year.

Figure 4.



Source: Forestry General Agency (DGF), Secretary of Agriculture (MGAP)

Once the production of raw material in the country achieved the scale needed for industrialization, related industries such as pulp mills and sawmills announced their interest in investing in Uruguay. Investments by large companies generally involve vertical integration,

⁴⁷ Other important factors mentioned in the interviews are a stable macroeconomic environment, a stable democratic regime, and education of the labor force.

ensuring an adequate supply of raw materials for operation, and facilities are usually located a relatively small distance from forests (usually no more than approximately 300 km) to minimize transport costs.

In 2002 the country entered a deep financial crisis and the government performed a fiscal adjustment, postponing the payment of subsidies and deciding upon the gradual reduction of new forestry projects. Local investors, highly indebted to the state-owned Banco República, attempted to sell their plantations to large international enterprises in order to eliminate their debts and obtain financial liquidity for their core business, livestock.

In subsequent years pulpwood plantations began to mature and the harvest brought new problems of transport infrastructure like inadequate roads, lack of development of rail and insufficient port capacity. The installation of the first pulp mill (Botnia) on the coast of the Uruguay River created a conflict with neighboring Argentina. In turn, as the forested area increases, the risk of fire and disease becomes a more prominent policy concern. The Vázquez Administration retained the strategic outline of the 1987 Bill but introduced some modifications related to its implementation. First, production subsidies were to be eliminated over a two-year period. Second, the following new policy goals were formulated:

1. To avoid overproduction and overspecialization of pulpwood species.
2. To diversify production of new species and to encourage the development of downstream industries
3. To diversify geographical location of plantations, allowing new ones in the northeast of the country and reducing the use of areas near the agriculture and livestock zone and the coastal west of the country.
4. To develop a productive structure based on the externalities of forestry with livestock production (agroforest or silvopastoral system).
5. To encourage the participation of small producers as wood suppliers.

4.3.2 Main Stakeholders

Public Sector. At the policy level, the Secretary of Agriculture (MGAP) is responsible for the National Forestry Policy that is conducted by the Forestry General Agency (Dirección General Forestal, DGF). Also within the Secretary of Agriculture, the Renewable Natural Resources Agency (Dirección General de Recursos Naturales Renovables, DGRNR) determines which soil

is to be classified as suitable for forestry. This division has played an important role in the discussion about the extension of potential forestry areas to the east of Uruguay. Additionally, if a forestry project involves more than 100 hectares, approval is needed by the Secretary of Housing and Environment.

On research, the public Universidad de la República and the Laboratorio Tecnológico del Uruguay (LATU) are key players.⁴⁸ The National Institute of Agricultural Research (INIA) has defined six strategic areas related to forestry issues for the 2007-2011 period, and research is conducted in close partnership with the private sector. The so-called “Grupo de Trabajo Forestal” includes representatives of private firms, farmers and other private institutions, and dates back to 1992. In 1995, the Government created the “Mesa Tecnológica de la Madera” with participation of representatives of private and public institutions. In general, private firms have developed their own research departments.

Private sector. The private sector is represented by the Union of Forestry Producers (Sociedad de Productores Forestales SPF) which includes independent producers, forestry companies, investment funds, nursery companies, service providers, and the industrial sector and the Union of Wood Manufacturing Industries (Cámara de Industrias Procesadoras de la Madera).

Finally, the industry is characterized by the presence of many NGOs and lobby groups, mainly concerned with environmental issues and with some influence on policy.

4.3.3 *Diversification Policy for the Forestry Sector*

As mentioned above, the Vázquez Administration maintained the overall character of the 1987 Bill but introduced several modifications designed to increase diversification.

The following objectives were targeted for fiscal year 2008:

1. At least 25 percent of projects should be small, involving mainly family businesses.
2. At least five projects should involve the joint participation of cattle ranchers and/or dairy producers.
3. At least 100 hectares of new species (as defined by INIA) should be planted.

⁴⁸ The School of Agronomy and the National Agriculture Research Institute (Instituto Nacional de Investigaciones Agropecuarias INIA), are the divisions within the public university that conduct research on forestry.

The official policy objective and statements by relevant private and public actors allow us to characterize current forestry policy as one that aims at diversification. This diversification has several dimensions:

1. Avoiding excess supply of and dependency on eucalyptus and increasing the use of more productive species in the wood pulp industry that can incorporate more value added.
2. Development of downstream sectors (such as furniture) that are both more technologically up-to-date and labor-intensive.
3. Geographical diversification, allowing plantations in the east of the country and preventing overconcentration in the west.
4. Raising the number of productive units, increasing the participation of small producers as wood suppliers and developing a productive structure consistent with other traditional agricultural production such as livestock.
5. Avoiding conflicts with traditional agriculture (e.g., cattle and dairy).
6. Avoid conflicts with environmental NGOs.

4.3.4 Policy Instruments

The main policy instruments that have characterized forestry promotion in Uruguay have been the following:

1. Restricted soil selection;
2. Production subsidies of up to 50 percent of planting costs;
3. Tax exemptions on accrued rent and capital, and on imports of equipment;
4. Favorable credit conditions;
5. Tax rebates on exports; and
6. Public goods dedicated to research (INIA, LATU, and UDELAR).

The Vázquez Administration has implemented the policy objectives described above through a variety of measures. Soils located in the Southern and Western regions of the country have been eliminated as eligible for forestry projects, and soils located in the Eastern part of the country have been updated as eligible for forestry projects. Final decisions on soil classification, however, are made by the Secretary of Agriculture. This raises issues of discretionality and rent-seeking activities and may have effects on land prices.

In addition, forestry projects of more than 100 hectares now need to obtain environmental approval from the Secretary of Housing and Environment (they were previously exempt from that requirement), and tax exemptions discriminate in favor of “high quality” wood⁴⁹ and against pulpwood production with short rotation techniques. Subsidies have been eliminated, moreover, with that elimination made effective 2005 rather than 2007 as originally planned. The private sector has accepted this measure as a natural consequence of the evolution of the industry. Additional measures are being undertaken in regard to other aspects of the industry. While production subsidies to small producers are intended to diversify industrial firms’ sources of wood supply, so far only 14 projects have been approved, and the Vázquez Administration intends to generalize this instrument in order to boost supply diversification. Research and development remains a policy priority, as mentioned above, especially in relation to the development of new species suitable for high-quality wood production. In regard to sanitary conditions and fire prevention, public goods with strong externalities, the Government has established quality standards through measures such as the implementation of a best practices booklet (“Código de Buenas Prácticas Forestales”).

4.3.5 Market and Public Failures that Justify Diversification Policy

Promotion of new soils in Eastern Regions. This policy is justified in terms preventing the spread of forestry to regions that are more suitable for dairy production and cattle raising, and to avoid concentration. While the western region is not currently saturated, two pulp mill projects there (BOTNIA and ENCE) led to an international conflict with Argentina.

The bureaucratic management of this policy entails potential problems. As forestry authorization in the east is granted on a case-by-case basis, there exist incentives for rent-seeking and corruption that may distort commercial negotiation with landowners.

Prior environmental authorization. While this measure has been justified on the basis of ensuring appropriate use of water, no clear objective criteria are offered for granting or denying authorization. Some entrepreneurs have informed us of potential delays, especially because authorization is granted only after the project has been approved by the DGF, generating inconsistencies between bureaucratic times and productive times

⁴⁹ Wood more than 15 years old from plantings with a density of between 100 and 450 trees per hectare. more than 15 years, coming from plantings with density between 100 and 450 trees per hectare. Additionally, more than 20 percent of the harvest must be used as raw materials by sawmills.

Tax incentives for production of high-quality wood. One of the objectives here is to avoid the negative externalities of the current mode of production, highly specialized in eucalyptus and pulpwood. High-quality wood is especially appropriate in downstream industrial sectors which are labor intensive and present scale economies.

The negative incentive for pulpwood production has been criticized by some investors, who see this policy as “too much intervention” in a very dynamic market characterized by uncertainty regarding future demand conditions.

Elimination of productive subsidies. This measure has been justified by public officials because the objectives of financing long-term risks and obtain appropriate scales economies had been achieved.

Subsidies for projects including both forestry and cattle production. Joint production has positive externalities because trees supply adequate shelter to cattle and cattle clear brush from the soil, reducing fire risk. On the other hand, since forestry threatens other productive activities such as cattle and dairy production, efforts towards joint production (e.g., forestry and dairy in the same unit) prevents rural migration to urban locations. This externality is recognized by the private sector, and there is an interesting development of contracts and projects of joint production without public sector intervention. The downside of this policy is that no clear criteria for the granting of subsidies have been established, leading to discretion and potential rent-seeking. In addition, implementation is time consuming and has a high administrative cost.

Research and Development. The goal here is to supply a public good for the development of new species and increase of productivity. INIA has taken the initiative in developing research programs. There so far seems to be a lack of appropriate interaction with the private sector, especially with respect to the market opportunities of new species.

4.3.6 *Summary*

Overall, the set of legal modifications established since 2005 seem to be consistent with the objectives of greater diversification in production, environmental protection, decentralization, and minimization of social conflicts.

Weaknesses seem to arise in the lack of public resources to manage the process for achieving those objectives. In general, public decisions are made on a case-by-case basis, which is subject to rent-seeking activities, since there are no clear rules. Both private and public actors

seem to think of this stage as experimental, since both parties are learning how to deal with each other. Some interaction between private and public actors has occurred in academia and through research and development. Moreover, private investors and the Government have overcome their initial differences and fears and state they have an acceptable relationship. Some investors, however, worry about potential negative discrimination in light of the pulpwood experience.

The following conclusions can be drawn:

1. There are elements that lead us to think of a consistency between incentives and objectives of public and private actors.
2. Participation of the private sector in the design, selection, and implementation of productive policies is not homogeneous.
3. Some public actions are seen as too much intervention, subject to public failures.
4. There is no institutionalized learning mechanism through which errors are corrected and policies changed based on consensus.
5. There are coordination problems with other industrial sectors and different horizontal policies, such as infrastructure policy.
6. Self-discovery is promoted through Research at INIA and LATU, although some uncertainty remains about changes in rules.

5. Final Words

In this paper we have reviewed and assessed some of the Productive Development Policies currently being implemented in Uruguay. We have selected three horizontal and three vertical policies, and we consider them in light of the market and public failures they attempt to address. We also describe and analyze the process by which those productive development policies are established, that is, the institutional structure that includes public and private actors and their interactions. Horizontal policies comprise Innovation, Industrial Promotion and Directives for Industrial and Technological Development. Vertical policies include the Forestry Law, Meat Traceability and the Sustainable Production Project in the agricultural sector. Although we found that in principle the policies studied could be understood as attacking market or coordination failures, and we did not find any obvious contradictions among them, we did find problems in

their implementation and sometimes even differences in the approaches of the authorities and the letter of the law or regulation.

An important generalized change is the commitment to more active policies than in past years. While those policies imply significant fiscal costs that were affordable in boom years, the fiscal sustainability of these policies over the business cycle is uncertain.

Finally, it is generally too early to evaluate the success of the policies in terms of welfare improvements, an issue beyond the scope of this paper.

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