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Soybean prices, economic growth and poverty in Argentina and Brazil

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Soybean prices, economic growth and poverty in Argentina and Brazil

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Acronyms

AACREA	Argentine Association of Regional Agricultural Experimentation Consortiums
AGD	Aceitera General Dehesa
CPI	Consumer Price Index
ECLAC	Economic Commission for Latin America and the Caribbean
EMBRAPA	Brazilian Agricultural Research Corporation
FADE	Agricultural Foundation for Argentine Development
FOB	free on board
GDP	Gross Domestic Product
GMO	Genetically Modified Organism
GMO	Genetically Modified
GMO	genetically modified
ha	hectare
INTA	National Institute of Agricultural Technology
MHA	Million hectares
MMT	Million Metric Tonnes
MT	Metric Tonnes
NGO	Non-gorvernmental organization
TOT	Terms of trade

Abstract

This paper analyzes the relationship between international soybean prices and economic growth; and poverty in Argentina and Brazil, with an emphasis on the period after 2003. It analyzes the beginning of soybean activity in both countries, showing the importance of international prices and macroeconomic policies in the evolution of the two industries, as well as the prominence of soy as an export commodity during the 1990s. It highlights the importance of soybeans and presented the structure of the soybean value chain in both countries. We then move to analyze soybean prices and their relation to growth, including how changes in international soybean prices were transmitted to producer prices, and the relationship between prices and poverty reduction both in Argentina and Brazil. Policy implications are then analyzed as a conclusion of the paper.

I. Introduction

Soy products are prominent both in Argentina and Brazil in terms of production and exports, involving complex production, processing, and distribution networks. Both countries are major soybeans producers and exporters, accounting for almost 50 percent of world production and a similar figure of world exports. In order to show the importance of soybeans in the Argentine and Brazilian economies, we trace the beginning of this activity in both countries, showing the relevance of international soybeans prices in the evolution of the industries and evaluating the significance of soybeans in both economies through different indicators. We also describe the structure of the soybean industry in Argentina and Brazil, reviewing each link of this value chain.

The paper then explores the relationship between soybean prices, growth and poverty in both countries by addressing the following questions: How have global soybean prices moved over the past decades? Have changes in global prices for soybeans similarly transmitted to producer prices in Argentina and in Brazil? Have changes in producer prices affected growth, poverty reduction and food security in both countries? Which were the avenues through which soybean prices have had an effect on growth and poverty reduction? The paper also highlights and contrasts the macroeconomic effects of soybean exports on both economies and discuss what policies have helped soybean price increases translate into growth and poverty reduction.

The policy implications of the study conclude the analysis, deriving lessons that could be relevant to other countries where commodities are also a significant component of their exports.

II. Background and context

Soybeans, originally an Asian crop, were introduced to the Americas at the beginning of the 20 century. Even so, it wasn't until in the 1990s that soybeans began to gain prominence as an export commodity in Brazil and Argentina – two countries that were already important agricultural producers. Today, both countries are major soybean producers (the second and the third largest, respectively, behind the United States); together Brazil and Argentina account for almost 50 percent of world production and just over 50 percent of world exports of soy products, e.g. soybeans, soybean meal (pellets) and soybean oil.¹ They also represent an important portion of world harvested soy area (around 40 percent), with 47 million hectares (MHA) – an area greater than the countries of Germany, Malaysia or Paraguay. Moreover, the geographical space planted with soy in South America, covering areas throughout Argentina, Bolivia, Brazil, Paraguay and Uruguay, has been considered by some authors as a single and unified regional economic space, deemed the “Soybean Republic” (Turzi, 2011; Giraudó, 2014).

To gain background and insights for the issues that will be tackled in this paper, it is useful to first briefly recount how soy production initiated in Argentina and Brazil, and how it has expanded since the 1990s, such that both countries became leading producers and exporters of soy products in a relatively short period of time. Both stories have similar and contrasting features that help to understand the present structure of the soybean value chain, the effects of higher international prices during the first decade of the current century on the macroeconomic space, the relationship between price movements and poverty reduction and food security, and the institutional and policy environment in each country – particularly the relationship between the soybean value chain and the government.

Like most Latin American countries, in the post–Second World War period, both Argentina and Brazil implemented an import substitution strategy to promote industrialization and economic growth. In this context, the agricultural sector was heavily taxed, using both direct and indirect policies, in order to supply the growing urban population with cheap agricultural products and to finance the development of the industrial sector. Export quotas and licenses were applied, often in combination with direct export taxes, to major agricultural commodities. Imports of agricultural inputs were also controlled through licenses and other restrictions, such that the agricultural sector paid prices well above international market levels for fertilizer, agrochemicals and machinery produced by domestic manufacturers. In addition, exchange rate controls resulted in a highly overvalued currency, adding further disincentives to agricultural production.

Despite these considerations, in the 1960s the Brazilian government singled out the soybean sector for special treatment due to several factors (Warnken, 1999). A primary motive was to reduce foreign exchange expenditures, and later to generate foreign exchange. Brazil's population and food demand had grown rapidly, and vegetable oil imports began to account for an increasing share of limited foreign currency. By establishing policies supportive of the domestic soy production chain, the

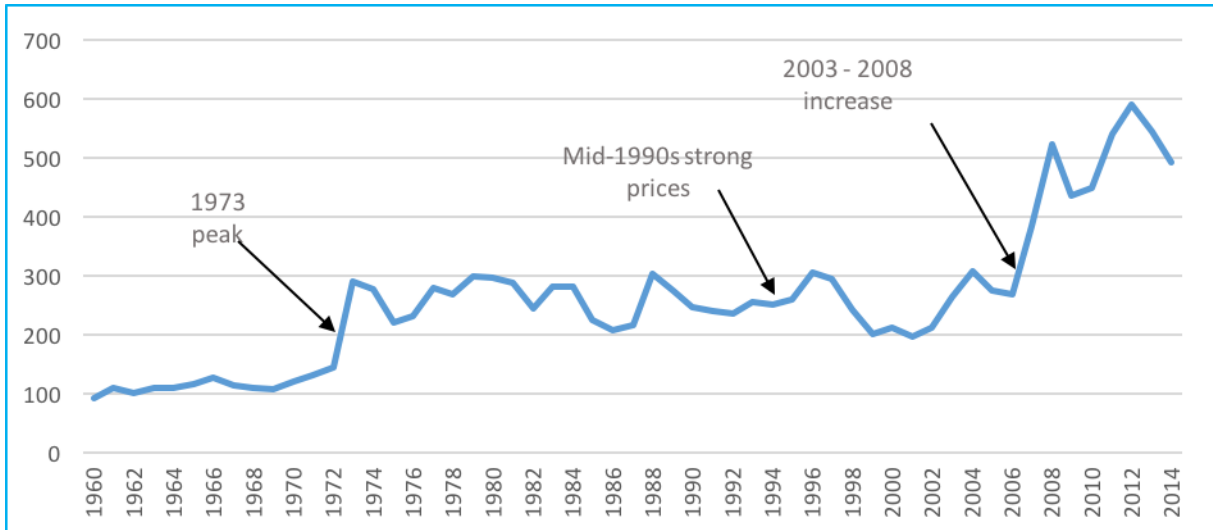
¹ Soybean meal and soybean oil are jointly produced from crushed soybeans, i.e. the production of soybean meal does not compete with the production of soybean oil for the same part of crushed soybeans.

government saw increased domestic soybean production as a means of displacing soybean oil imports, and also as a way to encourage production and exports of value-added agricultural products (particularly soybean meal). Second, soybean oil was one of the most important food items for Brazilian low-income families and was very influential in the calculation of the consumer price index (CPI). As a result, soybean oil prices were critical to food security in Brazil's high inflationary environment. Thus, with the aim of holding down food prices, the government supported policies to ensure domestic supplies of low-priced soybean oil. With a large, generally low-income population, the government also took steps to increase animal protein consumption by stimulating domestic poultry production, which in turn expanded soybean meal demand. Lastly, an important motive for supporting soybean production was a significant expansion of agricultural area in the *cerrado*. Most of Brazil's population and agricultural production was situated along the eastern and southeastern coastlines. By opening the western states to agricultural production, the government intended to better integrate this vast land (the *cerrado*) into the national economy.

In accordance with these drivers, in the 1960s the Brazilian government began implementing policies designed to support the soy industry, including publicly-funded agricultural research and development, guaranteed minimum price supports, production and marketing credit programs, agricultural input manufacturing and utilization subsidies, public infrastructure programs and supportive energy and taxation policies. In addition, several national programs oriented towards other crops (e.g. wheat, coffee and sugar cane) indirectly promoted soybean production. Finally, varying differential export taxes and subsidies on soybeans, soybean meal and soybean oil were often used to maintain incentives supportive of the domestic crushing sector.

In the early 1970s, the Brazilian soybean sector benefitted from certain international events. A surge in world demand due to growing population and higher incomes, combined with a series of weather-related crop shortfalls in major grain and oilseed-producing countries and a drawdown of global stocks, generated historically high international market prices for most major commodities. In this context, the United States imposed an export embargo on soybeans and other oilseed products in response to rapid increases in domestic prices, being replaced later by export licenses. As a consequence, international prices rose sharply, with soybean prices reaching an historic peak in June 1973 at US\$393 per metric tonne (MT) (Figure 1). The loss of confidence in the United States as a reliable supplier of agricultural products pushed Japan, one of the most important United States agricultural export markets, to look for alternative sources for soy products. Brazil provided the perfect opportunity, and Japan began investing in Brazil's emerging soybean industry. Brazilian farmers rapidly expanded their production of soybeans in response to the strong international market signals of the early 1970s.

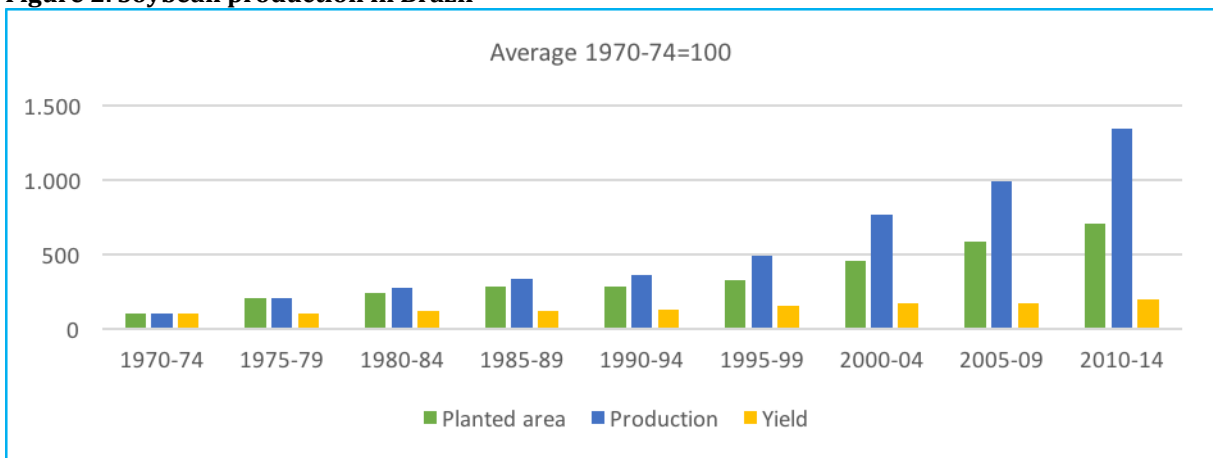
Figure1. Soybean prices (US\$/MT)



Source: UNCTAD. US, N.2 yellow, CIF Rotterdam.

Between the first years of the 1970s and the end of the 1980s, Brazil’s soybean production grew by around 235 percent, from 5.6 to 18.7 MMT (driven predominantly by an area expansion of almost 200 percent, from 3.7 to 10.6 MHA, but also partly by a yield increase of 20 percent, from 1.460 to 1.756 MT per hectare) (Figure 2 and Table 1). This growth in harvested area and yields was largely motivated by government policies and programs designed to facilitate soybean expansion into the cheap and abundant lands of the Centerwest. The Centerwest’s soybean industry began accounting for an ever-increasing share of national production, from 4 percent in the early 1970s to 34 percent in the late 1980s, mainly due to an expansion of the area under soybean cultivation in the region from 5 percent of the national total at the beginning of the period to 31 percent by the late 1980s. Even yield gains were higher in the Centerwest than in the Southeast, rising from 1.352 to 1.931 MT per hectare in the former and from 1.464 to 1.687 MT per hectare in the latter, reflecting greater economies of scale in production due to significantly larger farm sizes, more modern cultivation practices and greater use of chemical inputs. In stark contrast, area harvested stagnated in the traditional Southeast, with higher production reflecting solely rising yields.

Figure 2. Soybean production in Brazil



Source: Author’s elaboration based on data from IBGE, Brazil.

Table 1. Soybean production in Brazil, period averages

	Planted area	Production	Yield
	<i>Million hectares</i>	<i>Million metric tonnes</i>	<i>Metric tonnes/hectare</i>
1970-74	3.7	5.6	1.460
1975-79	7.7	11.7	1.539
1980-84	8.9	15.3	1.713
1985-89	10.6	18.7	1.756
1990-94	10.6	20.3	1.921
1995-99	12.0	27.5	2.294
2000-04	16.8	42.9	2.558
2005-09	21.8	55.7	2.575
2010-14	26.1	75.5	2.898

Source: Author's elaboration based on data from IBGE, Brazil.

It was the record high international soybean prices of the early 1970s that also created strong incentives for Argentina's soybean producers to emerge, lagging Brazil by more than a decade. In 1970, Argentina was already a major corn and wheat producer; however, only 38 000 hectares of soybeans were planted in that year with a production of 59 000 tonnes. Once soybean production gained a foothold, a strong natural comparative advantage over cereal production boosted plantings.² Throughout the 1970s, soybean planted area grew steadily, surpassing 2 MHA in 1979 with a production of 3.5 MT. This expansion involved both new land entering soybean production as well as a shift of existing farmland from coarse grains and pasture. Planted area and production grew significantly during the 1970s and the 1980s, reaching 4.2 million hectares and 8.2 MT, respectively, by the end of the 1980s (Table 2 and Figure 3). In the case of yields, the increase was also substantial, from 1.461 in early 1970s to 2.022 MT per hectare in the late 1980s.

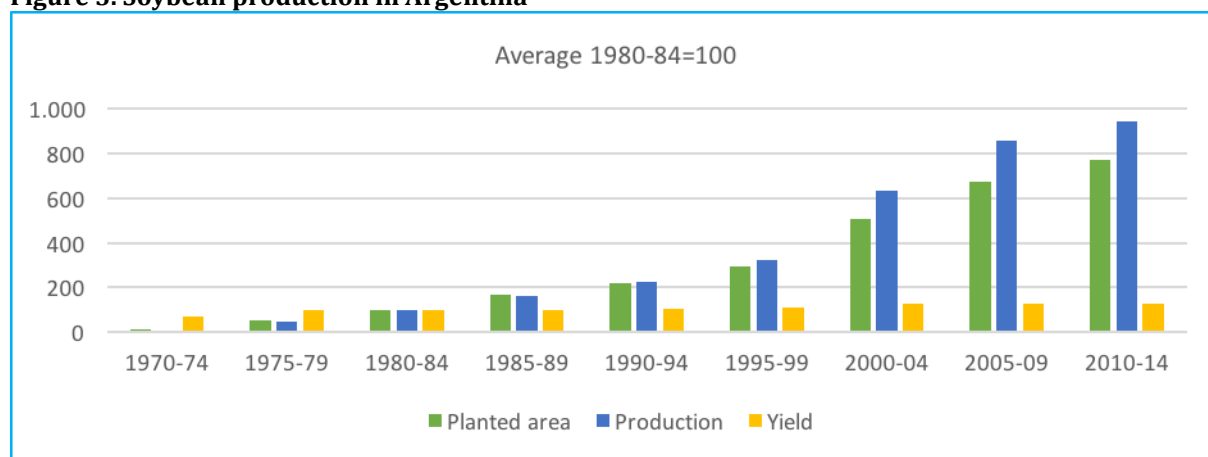
Table 2. Soybean production in Argentina, period averages

	Planted area	Production	Yield
	<i>Million hectares</i>	<i>Million metric tonnes</i>	<i>Metric tonnes/hectare</i>
1970-74	0.2	0.0	1.461
1975-79	1.2	2.2	1.987
1980-84	2.5	5.1	2.049
1985-89	4.2	8.2	2.022
1990-94	5.4	11.4	2.162
1995-99	7.4	16.5	2.261
2000-04	12.8	32.3	2.591
2005-09	16.9	43.6	2.645
2010-14	19.3	47.9	2.550

Source: Autohor's elaboration based on data from MAGyP, Argentina

² Soy's main advantage is that it can be produced in many areas, with different conditions of light, temperature and soil type, optimizing yields and minimizing risks.

Figure 3. Soybean production in Argentina



Source: Author's elaboration based on data from MAGyP, Argentina.

Soybeans' rapid rise in Argentina and Brazil is even more remarkable since, for much of this period, both countries experienced an unstable macroeconomic environment, characterized by high inflation, an often overvalued exchange rate and a heavy external debt burden. In addition, some of the measures characteristic of the import substitution strategy continued during this period. In the case of Argentina, export taxes were introduced in 1982 to help pay for national budget expenditures; they were initially set at 18 percent, but varied annually. At the end of the 1980s, taxes on agricultural exports were generating 20 percent of central government revenues (Barsky and Gelman, 2009). This general policy environment had the effect of hindering investment in the agricultural sector.

By the early 1990s, Argentina and Brazil together were a substantial force in the world soybean market, accounting for 27 percent of total world soybean harvested area; almost 30 percent of total world soybean production; 30 percent of total world soybean exports; 86 percent of total world soybean oil exports and 70 percent of total world soybean meal exports – spectacular growth from the modest figures of soybean activity at the end of the 1960s. Nevertheless, the 1990s would bring new catalysts for the soybean value chains in both countries.

During the first years of the 1990s, new governments both in Argentina and Brazil launched pro-market reforms that included important measures for the agricultural sector, e.g. the elimination of most export taxes, the removal of quantitative export restrictions and the reduction of tariffs on imported agricultural inputs. Following the reduction and/or elimination of import barriers on agricultural inputs, imports of fertilizer, agrochemicals and agricultural machinery rose sharply. These and subsequent economic policy reforms allowed for greater transmission of international commodity prices, which improved domestic producer incentives, in addition to significantly reducing production costs. They also facilitated greater participation in global commodity markets and expanded access to technological innovations in agriculture.

Peaks in soybean prices in 1996 and 1997, at US\$305 and US\$295 per MT, respectively, provided a powerful incentive to invest and expand production (Figure 1). A period of high prices shortly after the initiation of economic and policy reforms

enabled Argentine and Brazilian producers to take advantage of the increased market orientation. In the case of Argentina, production increased rapidly during the decade, predominantly as the result of continued area expansion; both planted area and production doubled during these years. Soybean planted area showed year-over-year record levels beginning in 1993 with 5.8 MHA, with planted area reaching almost 11 MHA by 2000. Soybean area, initially located in the heart of the Pampas, began to expand into the northern and northwestern region. The rapid expansion of the soybean area resulted from the widespread adoption of biotech soybeans in the late 1990s. The growing presence of major international agribusiness firms facilitated the rapid acceptance of genetically modified crops by Argentine producers, who were motivated by the labor and time savings afforded by Roundup Ready soybean seeds. Similar temperate production climates allowed rapid transfer of United States technology to Argentina, as many of the same companies supplied inputs in both countries. The new technology package included GMO seeds, glyphosate and no-till planting (Barsky and Gelman, 2009; Regunaga, 2010).

Soybean production also accelerated in Brazil during the 1990s on the strength of both area and yield growth. Planted area reached 12 MHA during the second half of the 1990s, while production surpassed 27 MMT and yield increased to 2.294 MT/HA (Table 1). Improved crop varieties and cultural practices suitable to the soils and tropical conditions of central Brazil helped large-scale, mechanized agriculture expand into Brazil's vast, undeveloped interior regions. Brazil successfully adapted temperate-zone plant varieties, particularly soybeans, to the tropical conditions of its vast interior savannas, while retaining the varieties' high-yield potential. In this matter, it is important to mention the role of the Brazilian Agricultural Research Corporation (known in Portuguese as the *Empresa Brasileira de Pesquisa Agropecuária*, or EMBRAPA) – the government agency which adapted soybean seeds to different climate conditions (Baer, 2015). Although during the 1990s, the commercial planting of genetically modified crops was prohibited, the cost savings realized from the production of biotech soybeans provided a strong incentive for a significant illicit use of biotech seeds. Approval for the commercial planting of biotech crops was tied up in Brazilian courts until 2007, when Law 11 460 amended several provisions of Brazil's first Biosafety Bill of 2005 and broadly legalized the use of biotech seeds.

The reforms of the early 1990s also affected the crushing industries of both countries. In the case of Brazil, during those years the crushing industry became concentrated and denationalized, with major United States and European Union players moving in or increasing their market share. The five largest companies – Bunge, Cargill, Coimbra (Louis Dreyfus), ADM and Granoleo – owned a substantial portion of total crushing capacity by the mid-1990s. A similar pattern was followed by Argentina's oilseed crushing and processing sector, where significant private investments took place, sharply increasing crushing capacity with a strong orientation toward soybean meal and soybean oil exports. With these developments, Argentina's soybean exports gave way to an emphasis on the export of soybean products instead of unprocessed beans. Accordingly, soybean meal and soybean oil exports grew significantly, with Argentina accounting for around 40 percent of world soybean meal exports and 50 percent of world soybean oil exports in 1999 (Table 3 and Figures 4, 5 and 6). On the other hand, Brazil's soybean exports rose to an average of 10 MT in 1999–2001, accounting for more than a quarter of world exports. Brazil's soy products exports also

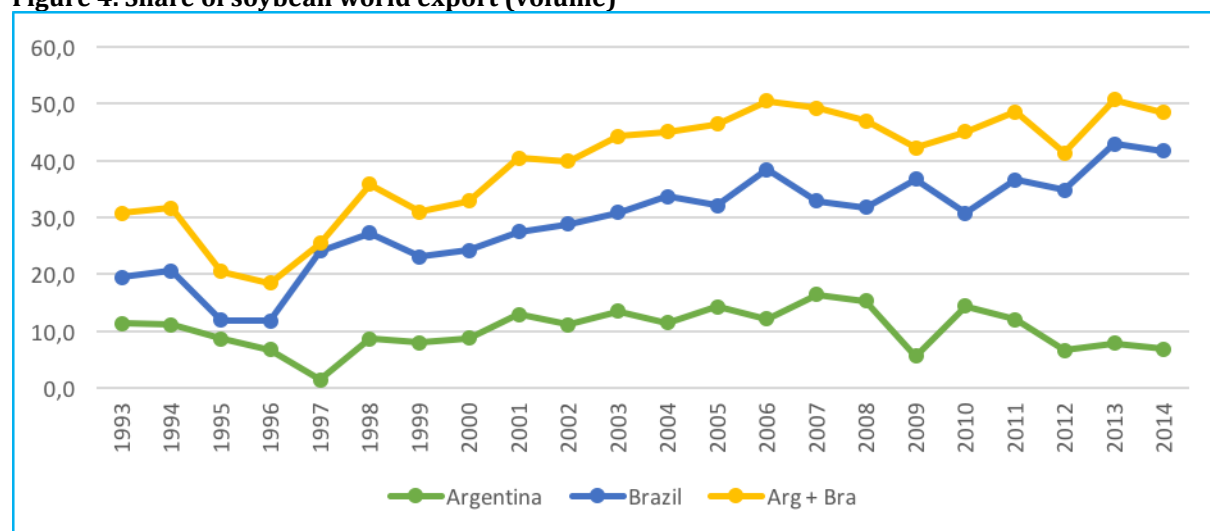
increased during the 1990s (Table 4 and Figures 4, 5 and 6). Thus, soybean production in both countries expanded faster than domestic use, thereby contributing to rising exports and reducing United States' export market share.

Table 3. Argentina exports of soybean products

	Soybeans		Soybean meal		Soybean oil	
	Million tonnes	Million US\$	Million tonnes	Million US\$	Million tonnes	Million US\$
1993	2.4	547	6.6	1,239	1.4	600
1994	2.9	690	6.7	1,146	1.5	859
1995	2.5	536	6.9	1,022	1.5	943
1996	2.1	588	8.3	1,984	1.7	901
1997	0.5	145	8.1	2,044	2.0	1,044
1998	2.9	650	11.4	1,741	2.4	1,478
1999	3.1	511	13.1	1,800	3.0	1,254
2000	4.1	778	12.9	2,169	3.0	942
2001	7.4	1,244	14.6	2,401	3.3	1,056
2002	6.2	1,119	16.2	2,561	3.4	1,346
2003	8.7	1,840	18.5	3,260	4.2	2,083
2004	6.5	1,740	18.0	3,598	4.3	2,336
2005	10.0	2,296	20.8	3,798	4.9	2,247
2006	7.9	1,779	24.0	4,363	5.7	2,790
2007	11.8	3,435	26.0	5,748	6.4	4,419
2008	11.7	4,583	23.3	7,129	4.9	4,896
2009	4.3	1,675	21.6	8,053	4.4	3,261
2010	13.6	4,986	25.0	8,195	4.9	4,136
2011	10.8	5,457	26.8	9,907	4.4	5,197
2012	6.2	3,192	24.0	10,549	3.8	4,320
2013	7.8	4,089	22.1	10,661	4.3	4,089
2014	7.4	3,777	24.7	11,841	4.1	3,468

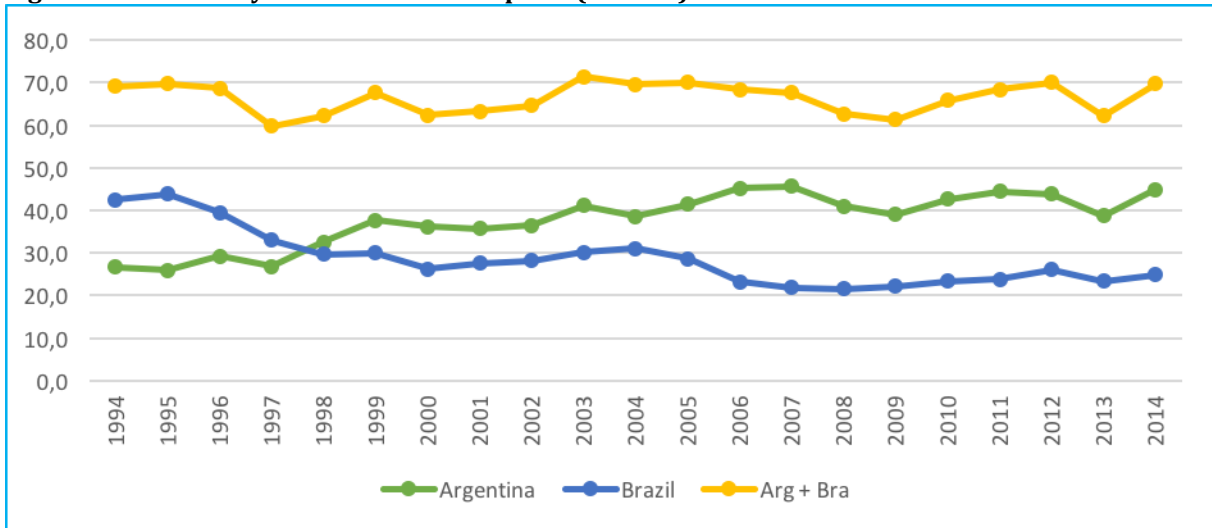
Source: Author's elaboration based on data from COMTRADE.

Figure 4. Share of soybean world export (volume)



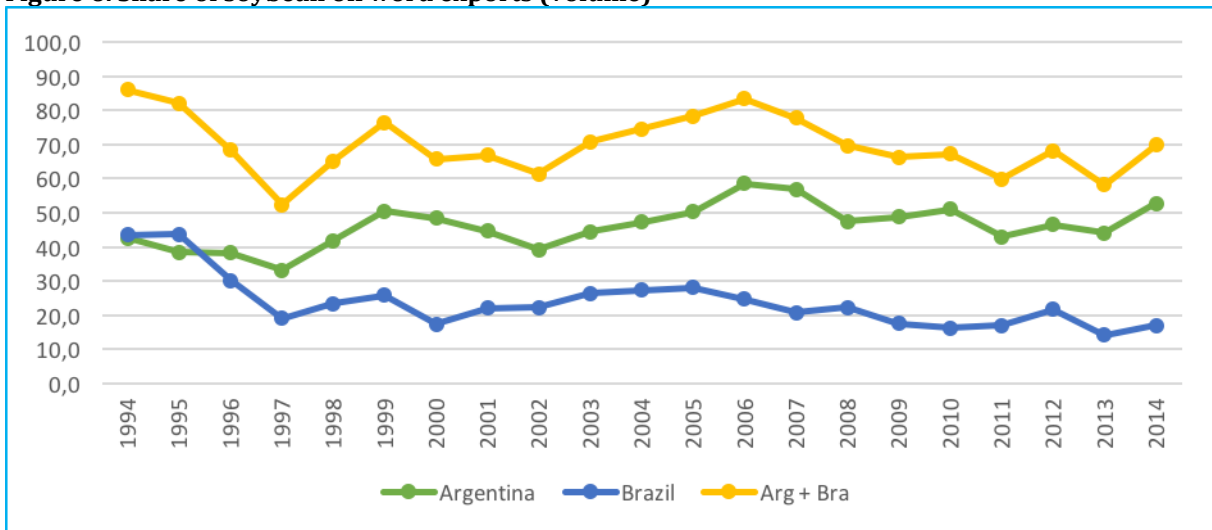
Source: Author's elaboration based on data from COMTRADE.

Figure 5. Share of soybean meal world exports (volume)



Source: Author's elaboration based on data from COMTRADE

Figure 6. Share of soybean oil world exports (volume)



Source: Author's elaboration based on data from COMTRADE

Table 4. Brazil exports of soybean products

	Soybeans		Soybean meal		Soybean oil	
	<i>Million tonnes</i>	<i>Million US\$</i>	<i>Million tonnes</i>	<i>Million US\$</i>	<i>Million tonnes</i>	<i>Million US\$</i>
1990	4.1	910	8.7	1,610	0.8	334
1991	2.0	448	7.5	1,369	0.5	213
1992	3.7	809	8.5	1,597	0.7	291
1993	4.2	946	9.4	1,817	0.7	314
1994	5.4	1,316	10.6	1,983	1.5	839
1995	3.5	770	11.6	2,000	1.8	1,053
1996	3.6	1,018	11.3	2,731	1.3	713
1997	8.3	2,452	10.0	2,681	1.1	597
1998	9.3	2,175	10.4	1,750	1.4	829
1999	8.9	1,593	10.4	1,504	1.6	687
2000	11.5	2,188	9.4	1,651	1.1	359
2001	15.7	2,726	11.3	2,065	1.7	506
2002	16.0	3,032	12.5	2,199	1.9	778
2003	19.9	4,290	13.6	2,602	2.5	1,233
2004	19.2	5,395	14.5	3,271	2.5	1,382
2005	22.4	5,345	14.4	2,865	2.7	1,267
2006	25.0	5,663	12.3	2,419	2.4	1,229
2007	23.7	6,709	12.5	2,957	2.3	1,720
2008	24.5	10,952	12.3	4,364	2.3	2,671
2009	28.6	11,424	12.3	4,593	1.6	1,234
2010	29.1	11,043	13.7	4,719	1.6	1,348
2011	33.0	16,327	14.4	5,698	1.7	2,129
2012	32.5	17,248	14.3	6,595	1.8	2,071
2013	42.8	22,810	13.3	6,787	1.4	1,366
2014	45.7	23,277	13.7	7,001	1.3	1,130

Source: Author's elaboration based on data from COMTRADE

Thus, economic reforms during the 1990s created a favorable environment for investment and growth in the soybean sector both in Argentina and Brazil, resulting in dramatic increases in production and exports. This positive trend continued during the period 2002–2008 with renewed strength, when the world economic context benefited commodity-producing countries in particular. Strong global economic growth, abundant liquidity in international financial markets and access to credit at low interest rates were some of the characterizing features of this period. At the same time, the growing participation of Asian countries in world trade, mainly China and India, notably expanded the demand for commodities, opening an “era” of increasing commodity prices. In particular, since the late 1990s there has been a sharp rise in the demand for food, not only in quantitative caloric terms, but also in terms of the type of food demanded due to the diversification of diets. Driven by population and economic growth, improved income distribution and urbanization in the developing world, global demand for food expanded significantly and food prices reached historic peaks during this period (Piñeiro and Bianchi, 2012).

Soybeans in Argentina and Brazil benefited enormously from the strong demand and surging prices. Production in both countries set new records each year during the period. In Brazil during the last half of the 2000s, production doubled relative to the second half of the 1990s, from 27.5 to 55.7 MT, while harvested area almost doubled from 12 to 21.8 MHA (Table 1 and Figure 3). In Argentina, production rose one and a

half times, from 16.5 to 43.6 MT, while harvested area doubled from 7.4 to 16.9 MHA in the same length of time (Table 2 and Figure 3). Exports of soybeans, soybean meal and soybean oil also surged in both countries, raising the combined share of world exports to 50 percent in the case of soybeans (at their 2006 peak), 70 percent in the case of soybean meal (at its 2003 peak), and more than 80 percent in the case of soybean oil (at its 2006 peak), as shown in Figures 4, 5 and 6.

From 2003 to 2008, Argentina and Brazil benefited from the favorable global economic conditions highlighted above. Moreover, their economic growth, as was also the case for other Latin America countries, was characterized by a set of features that were uncommon in previous periods of economic growth, such as export-driven demand, surpluses both in fiscal and trade positions, improvements in external debt payment and the implementation of important and extensive social programs to reduce poverty. As will be discussed in subsequent sections, many of these features were directly or indirectly linked to the improvement of terms of trade, where higher soybean prices and soybean export expansion played a significant role. Soybean planted area and production continued rising during the first half of the 2010s both in Argentina and Brazil, together with exports in the case of Brazil. The implementation of export taxes in Argentina during the first years of the 2000s and their increase in 2008 seems to have affected the evolution of exports in recent years.

After the financial and economic crises of 2007–2008 and the significant slowdown of world GDP growth and world trade in 2009, commodity prices (particularly food prices) resumed their upward trend in 2010. While the global economy was driven by growth in emerging countries, the macroeconomic environment and policies both in Argentina and Brazil had changed, affecting the complementary positive mechanisms that distinguished economic growth during 2003–2008.

In 2015, the global deceleration in growth patterns coincided with stagnant growth in the volume of world trade, which still remains lower than the levels preceding the global economic and financial crises. Weaker external demand has been accompanied by a downturn in commodity prices, and soybean activity and prices have followed these global trends. In August 2015, international soybean prices fell to US\$381 per tonne – an important contraction from previous levels and well below the 2007 average (UNCTADstat).

III. Importance of soybeans in the Argentine and Brazilian economies

As can be deduced from the previous paragraphs, soy products have become increasingly relevant both for Argentina and Brazil, both as an important part of their economic activity and, particularly, of their external trade. This section is devoted to evaluating the importance of soybeans in both economies through different indicators.

a. Share in GDP

As will become evident, when the structure of the soybean industry in both countries is discussed below, it is not appropriate to evaluate the importance of soybeans in terms of GDP by looking only at the primary production. Soybean activity has developed in recent decades in a production complex that involves activities outside of direct soybean production. For comparative purposes, it is worth mentioning that the share of agriculture in GDP was 8.2 percent in Argentina and 5.6 percent in Brazil in 2014.³ According to estimates from Ordoñez and Senesi (2015), the share of the whole soybean value chain (which includes activities outside of agriculture) in the Argentine GDP was 5.5 percent in 2014, while a similar estimate for Brazil was 2.4 percent.

b. Share of soy in total oilseeds production and comparison with total grains

For marketing year 2015/16, soybean planted area in Brazil (33.3 MHA) is equivalent to 96.5 percent of total oilseeds planted area, while soybean production (100 MMT) is 97.4 percent of total oilseeds production; soybean production is only slightly larger in terms of volume than total grains production (96.6 MMT). In Argentina, soybean planted area (20 MHA) is equivalent to 89.3 percent of total oilseeds planted area, while soybean production (57 MMT) is 92.4 percent of total oilseeds production; soybean production in terms of volume is higher than total grains production (43.9 MMT) (USDA, 2015a).

c. Employment

In the case of Brazil, the soybean value chain employs 1.5 million workers throughout the country (Da Silva *et al.*, 2011). For Argentina, it is estimated that the soybean value chain involves around 395 000 workers (O'Connor, 2014).⁴

d. Domestic consumption versus exports

The Argentine soybean chain is more integrated with world trade, since a higher share of total production is destined to international markets. In Brazil, a high share of soybean oil and soybean meal production is destined to national consumption, due to the country's large domestic market, making international markets compete more directly with domestic markets as a source of demand. With a relatively small

³ Source: World Bank.

⁴ Soybean value chain employment represents 1.6 percent of total employment in Brazil, while this figure is 2.6 percent in the case of Argentina.

population, Argentina relies mostly on international markets as an outlet for its soybean production. The comparative distribution of soybean production between domestic consumption and exports also depends on the size of the poultry and pork industries, which are intensive consumers of soybean meal; these sectors are much larger in Brazil than in Argentina, as illustrated by the relative shares of production allocated to exports versus domestic consumption. For marketing year 2014/15 in the case of Brazil, 55 percent of soybeans were exported and 44 percent were consumed domestically (including crushing);⁵ for soybean meal, 47 percent was exported and 50 percent was consumed domestically; for soybean oil, 20 percent was exported and 80 percent was consumed domestically (USDA, 2015b). In the case of Argentina, 16 percent of soybeans were exported and 75 percent were consumed domestically (including crushing); for soybean meal, 92 percent was exported and 8 percent was consumed domestically; for soybean oil, 67 percent was exported and 33 percent was consumed domestically.

e. Share in world soybean planted area and production

For marketing year 2015/16, world soybean planted area is estimated at 121.4 MHA. Of this amount, Brazil accounted for 27.4 percent (33.3 MHA), while Argentina accounted for 16.5 percent (20 MHA), resulting in a combined share of 43.9 percent of world planted area. World soybean production is estimated at 320.5 MMT. Brazil accounts for about 31.2 percent (100), while Argentina accounts for 17.8 percent (57), resulting in a combined share of 49 percent of world soybean production. Lastly, world soybean yield is estimated at 2.64 MT/ha; soybean yield for Brazil is estimated at 3.0 tonnes/ha, and Argentina's average yield is estimated at 2.85 tonnes/ha – both above the world average (USDA, 2015a).

f. Market share in world soybean trade

For marketing year 2014/15, Brazil's share in world soybean exports (126.0 MMT) was 40.5 percent (51.1 MMT), while Argentina's share was 7.6 percent (9.6 MMT), resulting in a combined share of 48.1 percent of world soybean exports (USDA, 2015b). In the case of soybean meal, Brazil's share in world exports (63.3 MMT) was 22.7 percent (14.4 MMT), while Argentina's share was 44.3 percent (28 MMT), resulting in a combined share of 67 percent of world soybean meal exports. In the case of soybean oil, Brazil's share in world exports (10.8 MMT) was 14 percent (1.5 MMT), while Argentina's share was 45.4 percent (4.9 MMT), resulting in a combined share of 59.4 percent of world soybean oil exports.

⁵ The sum of the share of products exported and the share of products consumed domestically detailed in this sentence and the ensuing one may not sum to 100 because of the presence of stocks.

g. Share of soybean exports in agro-industrial exports, total exports and GDP

The importance of the soybean exports complexity (soybeans, meal and oil) for the overall economies of the countries in question are perhaps best highlighted by the following statistics. For Argentina in 2014, the soy complex represented 51 percent of total agro-industrial exports, 28 percent of total exports and 3.5 percent of GDP. In the case of Brazil, those shares for the same year are 39 percent of total agro-industrial exports, 14 percent of total exports and 1.3 percent of GDP.⁶

h. Adoption of biotech soybeans

The global adoption rate for biotech soybeans is high, with biotech now estimated to account for 82 percent of global soy planted area. In this context, Argentina is the third largest producer of biotech crops in the world, with biotech soybeans occupying virtually 100 percent of total planted area; other important biotech crops include maize and cotton. Brazil, in turn, is the world's second largest grower of biotech crops, with biotech soybeans employed in 89.2 percent of soy planted area in 2014; similarly, maize and cotton are also other significant biotech crops (James, 2014).⁷ It should be noted that the success of biotech soybeans in Argentina and Brazil is also associated with the development of improved varieties adapted to the different agro-ecological conditions of both countries. While international firms have been important in this development, the high quality work of government agencies (i.e. the National Institute of Agricultural Technology, or *Instituto Nacional de Tecnología Agropecuaria* (INTA) in Argentina and EMBRAPA in Brazil) have certainly contributed to this effort.

i. Marketing year 2015/16 forecasts

USDA (2015a) forecasts Brazil's 2015/16 soybean production at a record 100 MMT; harvested area is forecast to increase to a record 33.3 MHA, up 1.2 MHA from the previous year. Yield is forecast at 3.00 tonnes per ha, slightly above the 5-year average. Soybean area has increased each of the last nine consecutive years, although this increase is the smallest since 2011/12. Despite lower global soybean prices, the weak Brazilian real results in higher domestic prices and is encouraging producers to expand planted area. Soybean area is increasing across Brazil, but each region has different, specific drivers. The Southern Region is expected to increase soybean area because the relative profitability of soybeans is high compared to first-season corn and first-season cotton. Centerwest states are forecast to continue expansion due to conversion from pasture. The southeast (the traditional soybean-growing areas) currently accounts for 44 percent of production, while the centerwest areas' share is 47 percent. Brazilian soybean exports are projected to rise to 56.5 MT, reflecting an increase in exportable supplies and growing competitiveness resulting from a devalued domestic currency (real). Forecasts for Argentina indicate that in 2015/16, soybean production area is unchanged at 20 MHA with production estimated at 57 MMT. Lower soybean area in less profitable regions is expected to be offset by other areas shifting plantings from corn or wheat to soybeans. Low economic returns, a strong currency and political

⁶ These estimates are the author's elaboration based on data from COMTRADE and CEPALStat.

⁷ It is interesting to note that adoption rates of biotech soybeans are also high for the other South American countries that are becoming important soybean producers, including Paraguay, 95%; Bolivia, 83%; and Uruguay, ≈100% in 2014 (James, 2014).

uncertainty are exerting downward pressure on the overall grains and oilseeds complexes.

From these figures we can deduce that soy activity is very relevant for both countries. Its importance as a generator of foreign currency through exports is undisputed. Although the soybean sector is much larger in Brazil than in Argentina, its relative weight in the economy is lower, since Brazil has more diversified production and export matrices. On the contrary, the soybean sector seems to be more economically important in the case of Argentina, mainly in the indicators linked with external trade.

IV. Structure of the soybean industry in Argentina and Brazil

The soybean value chain has experienced significant organizational and structural changes during the last two decades in both Argentina and Brazil, largely driven by the same corporate actors, mechanisms and production schemes that are present throughout the South American soybean area, which also includes Paraguay, Bolivia and Uruguay. One important driver of these changes is that soy (in its processed form) has been particularly relevant as a substitute to meat, but is also an input in the meat complex as a part of livestock rations. This new focus of transforming agricultural products like soy into inputs for processed food drove agriculture and the food sector to increasing industrialization (Regunaga, 2010; Barsky and Gelman, 2009; Baer, 2015). In addition, the evolving structure of the soybean industry in both countries had other important drivers, such as government policies, on one side, and international market dynamics, on the other, where international soybean prices heavily influenced the industry. As previously argued, these changes resulted in improved competitiveness and significant increases in planted area, production and exports in both countries. It is also important to note that soybeans have been the most common and most dynamic crop in both countries due to several factors, such as: a) its high competitiveness vs livestock, dairy production or other alternative crops, as measured by higher gross margins per hectare; b) its lower operating costs per hectare and c) its relative management ease, as the new soybean technology package is very simple.

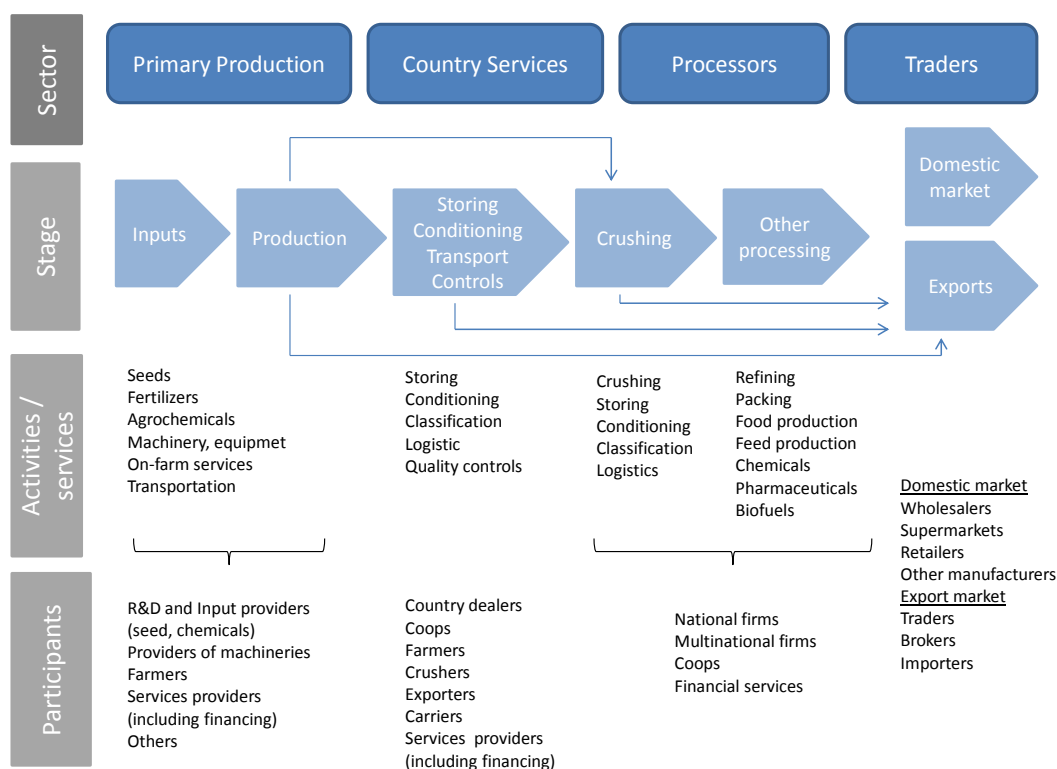
Given the sizeable area expansion in soy during the last two decades, most of the stages of the soybean value chain have experienced very substantial organizational and structural changes, beginning upstream from input and services providers for primary production, to downstream processing and distribution of commodities and value-added products. Moreover, these changes were not unique to soybeans; in the last twenty years, a global model of agricultural production has developed, spearheaded by global chemical and trading companies. In this context, the technological innovation that radically transformed soybean production was the adoption of a “technological package” that encompassed three components: genetically modified (GM) seeds, agrochemicals and no-till planting (direct sowing). Both in Argentina and in Brazil, a new organizational production and distribution model has emerged, replacing the traditional farming system. It is appropriate then to describe the soybean sector as a network of production, processing and distribution with multiple players, identified as the “agribusiness mode of production”. It is estimated that nearly all soybean

production is currently under this new model. One important consequence of this new model is that soybeans today are so technologically intensive that it can be considered misleading to characterize them as a simple commodity.

In addition to the usage of biotechnology, the fundamental characteristics of the new model are: a) a substantive portion of the land is rented; thus, land owners are replaced by production firms, who assume the risks and the benefits of the business and pay a rent for the land; b) production firms provide part of the working capital required to rent the land and to purchase inputs and services; it is also the case that some production firms manage third party investments “planting pools”; c) part of the operating capital is provided by input providers (seeds, fertilizers, and chemical products) and by trading and crushing firms; d) production firms involve different kinds of managers, e.g. owners of land who rent additional acreage to increase their scale and to diversify risk by producing in different locations, or owners of machinery who used to be contractors and also perform as producers, or specialized teams that perform the management of “planting pools”; e) traders and crushers also invest in soybean production, managed by their own firms or by the specialized production firms; f) although some farmers own their equipment, most on-farm operations are carried out by a network of service providers, with contractors usually specializing in one of three areas: tilling and sowing, crop protection or harvest; g) large production firms also develop upstream agreements with trading and crushing companies in order to better manage logistics, guarantee the quality of production, and implement forward sales for risk management.

As outlined above, the current soybean production structure involves many independent agents developing different and specialized activities. It is important to note that this model of production discourages small farms, leading to farm consolidation and larger average production unit sizes. However, when considered as a total system, this model raises up a large number of small and medium-sized specialized firms (input and service providers), with a significant impact on the social and economic development of the production region. To summarize, the actors involved in the soybean value chain include: input providers for primary production; soybean producers; service providers; crushers; international traders; producers of related food products, biofuels and other industrial inputs. Diagram 1, drawn from Regunaga (2010), shows the soybean value chain. It is estimated that in Argentina there are 73 000 firms dedicated to primary production, while in Brazil the equivalent figure is 216 000 firms.

Diagram 1: The soybean value chain



Source: Regunaga (2010).

Accordingly, besides soybean producers, the other main economic actors of this complex network include:

a. Input providers for primary production

The main inputs for soybean production are seeds, fertilizers, agrochemicals (herbicides, pesticides and other products for disease control) and machinery. Agriculture in general, and soybean production in particular, has become a very sophisticated activity, in which inputs play an important role in improving productivity, and have been the key elements of the innovations and competitiveness of soybeans. Among the most important input providers are:

- The seed industry which involves many local small and medium-sized firms, as well as the main international seed companies – most of which are also producers and distributors of chemical products, including Monsanto, Syngenta, Dow Agrosiences, Pioneer, Advanta, Bayer Cropscience, Nidera, Nufarm, and Pannar RSA, among others. The seed industry also plays an important role in technology transfer and in the financing of seeds for producers through the industry’s distribution networks.
- The fertilizer industry which is composed of a limited number of large firms. Most of them are the large grain traders and oilseed crushers, like Cargill, Bunge, Nidera, Dreyfus and AGD. Fertilizers can be produced locally or imported.

- The large international seed companies are also the main producers and distributors of agrochemicals (including herbicides and insecticides) designed for weed, pest and disease control. Among the main companies operating in both countries are Monsanto, Syngenta, BASF, Dow Agrosiences, Advanta, Atanor, Bayer Cropscience, Nidera, Dupont, Nufarm, and Merck, among others. In this market there are also medium-sized local and international firms which produce and/or import and distribute agrochemicals.
- Finally, there are many local and large international manufacturers of machinery and equipment in both countries. Implements can be either locally-produced or imported.

b. Research and development on inputs and their efficient use

The actors performing these functions have been a key factor in the development, importance and competitiveness of soybean production. From the beginning of soybean expansion, government research agencies (INTA in Argentina and EMBRAPA in Brazil) have played a leading role in research and development. More recently, the private sector has become more involved in this area, involving private firms (input providers) and several technical farm associations.

c. Service providers

Harvesting, transportation, conditioning and storage services are provided by specialized firms. More recently, some service suppliers are emerging as specialized firms, purveying “on-farm” services for crop management and technical advice for planting and for sanitary controls. In most cases, they are small or medium-sized firms, which develop their activities at the regional or sub-regional level, located in towns and small cities in the production areas.

d. Country dealers and co-ops

These entities provide most of the conditioning and storing of soybeans. Most of the fixed storage capacity is owned by many private firms and co-ops, although the crushing industry also has some capacity.

e. Carriers

Most of the soybeans produced in Argentina and Brazil are shipped in bulk by trucks from the farms to the local country dealers and co-ops, and then subsequently trucked to the crushers or ports. In Argentina, most soybeans are produced near the ports (around 200 to 300 km), while in Brazil the main producing areas are located more than 1 500 km from the ports.

f. Crushing and other processing industries

The crushing industries in Argentina and Brazil are among the most modern and competitive in the world. The main function of the crushing industry is the export of protein meal and crude vegetable oil – the two most traded processed commodities of

the soybean complex. Because of the presence of tariff escalation in most relevant markets, it is more difficult to export refined oil and other value-added products (packed, bottled and branded). However, some firms also process the oil in refineries for sales to the domestic market, as well as to the international market but in limited quantities. In recent years, some of the large crushing firms also have built biodiesel plants for the export market. As has occurred in many other countries, during the last few decades the crushing industry has become increasingly concentrated, which has involved some of the main international companies, including Cargill, Dreyfus, Bunge, Glencore, and Nidera, and some large local firms including Molinos Río de la Plata, Aceitera General Dehesa (AGD), and Vicentin, both in Argentina and Brazil. As was mentioned previously, the large crushing firms are also input providers – some of them produce seeds, while others produce and/or import chemicals and fertilizers.

g. Trading companies

The structure of the trading sector is similar to the crushing industry. During the last two decades, there has been an equivalent concentration and consolidation process in trading, resulting in a reduced number of multinational trading companies and local firms. The trading sector is comprised mostly of the same firms as the crushing industry. Companies like ADM, Nidera, Noble and Toepfer are major exporters.

Some authors contend that this agribusiness model in South America is creating a single, regionalized soybean network. This structure can be illustrated by the example of soybeans being harvested in Paraguay and then sent by barge to Brazil for export or to Argentina for processing (Turzi, 2011).

V. Institutional and policy environment

As can be deduced from the evolution of soybean production in Argentina and in Brazil, specific government policies and an adequate macroeconomic environment have been fundamental for the impressive development of this crop and the constitution of a complex technological network around it. In Brazil, specific government policies were implemented to facilitate the expansion of soybeans in the *cerrado* area. Both government research agencies (INTA and EMBRAPA) worked towards identifying varieties of soybean seeds adaptable to the different climate conditions of both countries. On the other hand, it is also evident that the soybean sector experienced higher growth (benefiting, for example, from high international prices) in periods when the macroeconomic environment was more favourable for investments.

An important and relevant issue that is tightly linked to the arguments that this paper addresses deals with the specific trade policy applied to soybeans in the case of Argentina (export taxes). Export taxes were an important component of the toolkit of the import substitution industrialization strategy implemented both by Argentina and Brazil during the postwar period. They were eliminated during the 1990s, and consequently, the incomes of soybean producers increased. Nevertheless, Argentina reintroduced them in 2002, while Brazil abolished them in 1996 and has not subsequently attempted to reapply them. Since export taxes are a fundamental determinant of the institutional and policy environment surrounding soybean activity in Argentina, and have had an important role in the effects and consequences of high international soybean prices, they deserve a closer examination.

Following the 2002 currency devaluation, the government of Argentina imposed export taxes on all but a few products, including significant export taxes on key hydrocarbon and agricultural commodity exports, in order to generate fiscal revenues, increase domestic supplies of these commodities and constrain domestic price increases.⁸ In many cases, the export taxes for raw materials were higher than those of processed products derived from those materials in order to encourage the development of domestic processing and value-adding activities. In the case of soy products, export duties were set at 23.5 percent for soybeans, 19.3 percent for soybean oil and 20 percent for soybean meal (on an *ad valorem* basis for all cases). It is worth to take note that the peso devaluation meant an important income transfer towards the export sector, especially the agricultural sector. This transfer was only partially offset by export taxes, causing large domestic price increases for food items, which consequently adversely affected food security, poverty and indigence.

In December 2007, export taxes were increased to 35 percent for soybeans and 32 percent for both soybean oil and soybean meal. Along with applying higher export taxes for soybeans, the government began to require export registration before export sales could be shipped. However, prior to these increases in export taxes, export registration was discontinued for soybeans (together with corn and wheat), such that firms that were not already registered were not allowed to do so. Nevertheless, these changes in export taxes did not affect profitability in the soybean sector, as the upward

⁸ The real value of the Argentine peso relative to the US\$ fell by more than 60 percent from 1.04 pesos per dollar in 2001 to 2.68 pesos per dollar in 2002.

trend of international prices offset the increase in export taxes. In fact, international soybean prices were rising very fast: from US\$305/tonne in June 2007 to US\$411/tonne in November, reaching US\$590/tonne in March 2008. On the other hand, a conflict between agricultural producers and the government was incubating, not yet as a consequence of policies towards soybean, but due to measures related to meat. While soybean products are not an important component of Argentines' diet (in contrast to Brazil, where soybean oil is a dietary staple), meat accounts for a substantial share of Argentine caloric intake (Barsky and Gelman, 2009).⁹ Soybeans are an important component of livestock feed rations, such that measures regulating meat production have a knock-on effect for soybeans.

In this shifting political context, a new structure of export taxes that would apply to soybeans was introduced by Resolution 125 in 2008, designed in such a way that producers would receive flat prices, independent of international price movements. As the system would have essentially eliminated transmission of price movements to Argentine producers, the measure was controversial. After a series of protests by farmers and other actors, the Congress did not approve the new system, instead maintaining the export duties established in November 2007, which remained in force and unchanged until December 2015.¹⁰

Finally, it is worth mentioning that in both countries, although more strongly in Brazil, civil society has heavily criticized the environmental consequences of soybean expansion. NGOs and indigenous organizations have insisted on publicizing the negative externalities of large-scale production in the region (e.g. deforestation, environmental degradation, soil exhaustion, destruction of biodiversity, health consequences of the use of fertilizers, expulsion of small farmers into the urban areas and land grabbing) among other socio-environmental issues.

⁹ In March 2006, meat exports were closed. In spite of higher international meat prices, in 2006 Argentine meat exports dropped 26 percent with respect to the previous year. From that year onward, in an effort to bolster domestic availability and curb rising food prices, the government has periodically imposed quotas on exports of beef in addition to export taxes. Since land is an input for both soybean and cattle and soybean meal is used as feed, there are many interconnections between the two sectors.

¹⁰ In December 2015 a new government eliminated export taxes on all agricultural goods, except for soy products. In this case, export taxes were reduced by 5 percentage points and further annual reductions of the same amount were announced. The new administration also eliminated export permits for grains and oilseeds. In addition to these policy changes, foreign exchange restrictions were removed and the Argentine peso was devalued by 45 percent.

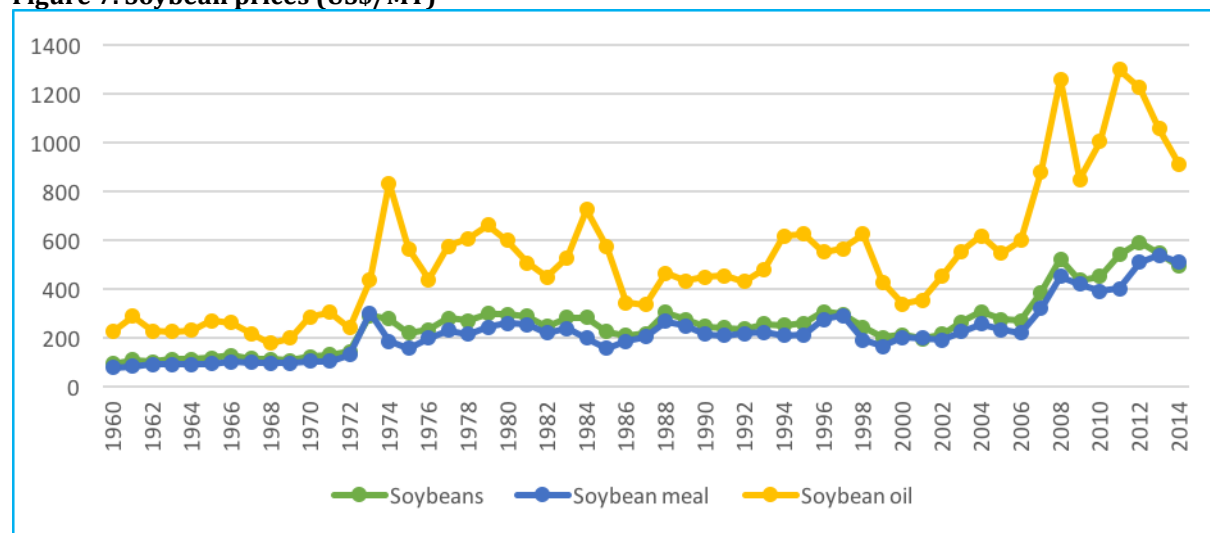
VI. Soybean prices and their relation to growth and poverty in Argentina and Brazil

In order to analyze the links between soybeans prices with growth and poverty, we first consider the evolution of global soybean prices in the last few decades before exploring the linkages between price movements and their effects on growth and poverty in both countries.

a. Global soybean prices' movements over the past decade

As previously discussed, international soybean price movements were very important drivers in the history of soybean expansion both in Argentina and in Brazil. There have been three influential surges in international soybean prices in the last decades: a) in the 1970s as the catalyst for the first steps of soybean expansion; b) in the second half of the 1990s, in the midst of a new macroeconomic environment, combined with significant changes in the agricultural mode of production with the emergence of the agribusiness model, and c) during the 2000s, the most evident rise in the past decades. Global soybean prices began to increase dramatically beginning in 2002 as a consequence of the expansion of world demand, mostly driven by China and India. Figure 7 shows the evolution of current international prices for soybeans and soybean products (soybean meal and soybean oil).¹¹ Figure 8 also shows the evolution of the same prices but in terms of indices, with the average price of the 1960s equals to 100, in order to eliminate the price differences between soybean oil and the other two products and to facilitate comparison. From Figure 8 it is clearly visible that the evolution of the prices of the three soybean products was very similar, independently from their current levels.

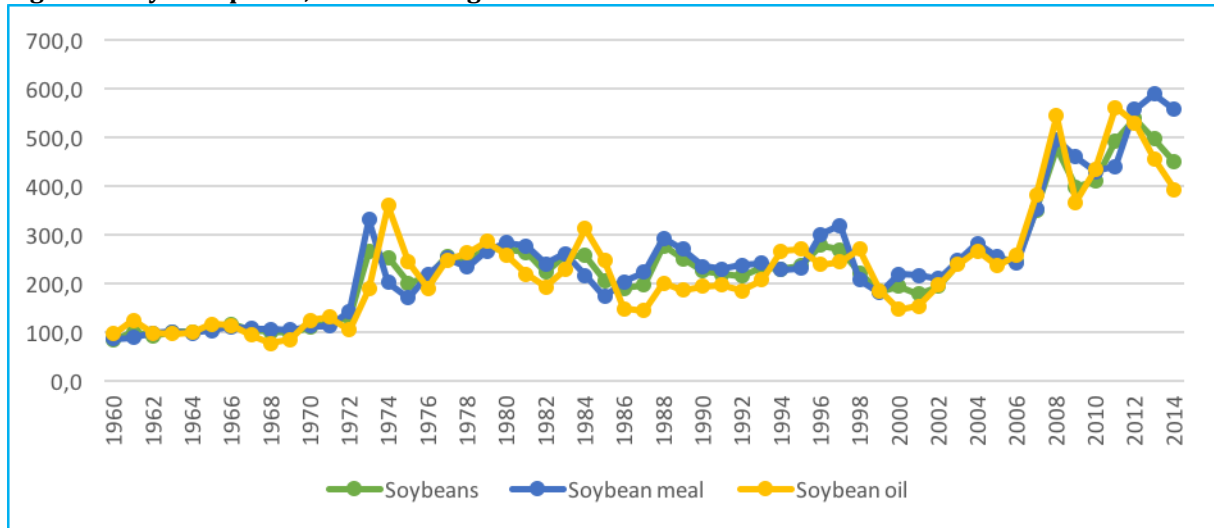
Figure 7. Soybean prices (US\$/MT)



Source: Author's elaboration based on data from UNCTAD.

¹¹ Current prices have been obtained from UNCTAD. Soybeans are United States N° 2, yellow, CIF Rotterdam; soybean meal: 44/45% protein, Hamburg FOB ex-mill and soybean oil: Netherlands, FOB ex-mill.

Figure 8. Soybean prices, 1960s average=100



Source: Author's elaboration based on data from UNCTAD.

It is important to note that the increase in international soybean prices was not an isolated event, but part of a general upsurge in commodity prices. Both Argentina and Brazil, like most Latin American countries, experienced a deterioration in terms of trade between 1998 and 2002. But the situation improved from 2003 through 2008 – so much so that in 2008, the terms of trade (TOT) of South American countries, mainly linked to agricultural commodities, showed an impressive 70 percent rise compared to their 1990s average (ECLAC, 2007–2008).

Finally, since both Argentina and Brazil account for a large share of world soybean production and trade, they must be considered as large countries for these products, with an upward sloping excess supply curve. Among many considerations that can be made, this means that climate conditions, investment levels and government policies in both countries could influence international soybean prices. In this vein, for example, Deese and Reeder (2007) used an equilibrium displacement model to simulate the global effects of changing export taxes on Argentine soybean products. They found that the removal of export taxes on soybean products reduced the world price paid by foreign importers, increased Argentine export quantities and raised Argentine domestic and exporters' prices – a conclusion that is consistent with the theoretical proposition that a country could improve its TOT by taxing exports of products in which it is a large supplier in world markets. This situation obviously impacts food security of importing countries, an issue that will be revisited later.

Thus, global soybean prices have moved upward in the last few decades, with a dramatic increase from 2003 to 2014. Furthermore, Argentina and Brazil are such large suppliers for soy products that important changes in any of the variables that affect production and exports could, successively, impact international prices.

b. Transmission of global soybean prices to producers prices in Argentina and Brazil

Due to different government policies during the 1970s and 1980s, mainly export taxes, changes in global prices for soybeans were not fully transmitted to producer prices either in Argentina or Brazil during those decades. This situation changed during the 1990s when market-oriented policies (largely the elimination of export duties) allowed a fuller transmission of international commodity prices, which improved domestic producer incentives, as previously explained.

The two countries later diverged in their export policies. While Brazil eliminated export duties in 1996 and never implemented them again, Argentina reintroduced them in 2002 to partially compensate for the significant devaluation of the Argentine peso, and then subsequently increased export taxes significantly in 2007. Nevertheless, prior to 2007, these changes in export taxes did not offset the rising profitability of the soybean sector, explaining why when international prices began their upward trend, this increase in export taxes did not result in disagreements between the actors in the soybean value chain and policymakers, or lead to a contraction in production. The significant devaluation of the peso on one side, and the high profitability of the agribusiness model of soybean production on the other, had a greater effect on soybean exports during this period than the changes in export taxes, although these limited the transmission of higher international soybean prices to domestic producers.

After the 2008 global economic and financial crises, the macroeconomic environment and policies changed both in Argentina and Brazil, in part as a consequence of the effects of the crises. One of the features of this period was a trend in the overvaluation of domestic currency against the US\$ in both countries, which adversely affected the value of export revenues expressed in domestic currency. In Argentina, a series of mini-devaluations of the peso below the rate of inflation resulted in the Argentine currency being significantly overvalued.¹² This situation was worsened in 2015, as other South American soy suppliers (including Uruguay, Paraguay, and, since late 2014, Brazil) have seen their currencies depreciate proportionate to the dollar in the past half year, but Argentina's exchange rate has appreciated, thus diminishing the competitiveness and profitability of local soybean producers since they must absorb the full impact of lower international soybean prices, high domestic inflation and export taxes. According to the information gained from the producer associations, many producers, particularly those renting land, are facing low-to-negative margins as a result of lower international prices, high production costs, high export taxes and a strong domestic currency. According to the Agricultural Foundation for Argentine Development (*Fundación Agropecuaria para el Desarrollo de Argentina*, or FADE), in 2015, the government was collecting 85.3 percent of net profits in the soybean sector (the figure is 94.1 percent for the whole agricultural sector) through the sum of national and provincial taxes and export duties. The Argentine Association of Regional

¹² It should be noted that since 2008 there is a controversy in Argentina about the reliability of the government calculation of the inflation rate (consumer prices index). Private estimates point to systematically higher rates than those released by the government. ECLAC (2013), for example, points to calculations performed by provincial agencies that show much higher inflation rates. This issue is important, since the degree of overvaluation of the domestic currency changes considerably depending on which inflation rate is considered.

Agricultural Experimentation Consortiums (*Asociación Argentina de Consorcios Regionales de Experimentación Agrícola*, or AACREA), estimates that due to declining profitability, 44 percent of planted soybean area is turning non-viable for production, since average returns in those areas are 40 percent below average costs (for example, a farm that is more than 117 km away from the port would be economically non-viable, as expected costs exceed expected returns).¹³

In the case of Brazil, despite lower global soybean prices, the effect of the weak Brazilian real has resulted in higher domestic prices, encouraging farmers to increase planted area. Since the beginning of 2015, the domestic currency has devalued by 35 percent against the US\$. At the same time, global soybean prices have dropped by over 12 percent within the same period. Since soybeans are priced in US\$ in the global market, domestic prices and forward contracting are relatively higher compared to last year, which have encouraged producers to add area to soybeans as a first crop over corn. As a consequence, Brazilian soy products exports for marketing year 2015/16 are estimated to reach a record of 53.5 MMT.

To summarize, the transmission of higher international soybeans prices to producer prices in Argentina and in Brazil has been (and remains) dissimilar. During the last historic prices spike, from 2003 to 2014, international soybean prices transmitted fully to domestic producers in the case of Brazil, since there was no trade policy affecting this link. Vice versa in the case of Argentina, due to export taxes imposed during the same period, the transmission of international soybean prices to domestic producers was only partial, depending on the value of the export duties. Finally, since international soybean prices are denominated in US\$, an important component of the transmission of international prices to producers in terms of domestic currency is the exchange rate. The contrasting results during 2015 between Argentina and Brazil are an example of the interplay of trade policies and exchange rate regimes in the transmission of international prices to domestic producers.

c. The effects of changes in producer prices (including volatility) on growth, poverty reduction and food security in Argentina and Brazil

Argentine and Brazilian agriculture have seen significant growth in output and productivity over the last few decades. Although agriculture grew over the period 1960–1990 at rates similar to the global average, it underwent major structural changes in the 1990s with the emergence of new forms of organizing production. These significant changes cleared the way for technological innovation and greater productive dynamism with spillover effects on the rest of the economy. Agriculture is becoming increasingly complex in terms of the amount and variety of products and the means of their production, as the example of the soybean network, described in preceding sections, shows. In this sense, it seems clear that the expansion of the soybean value chain both in Argentina and in Brazil, stimulated by the surge in international prices, had net positive effects on growth, as measured by its contribution to GDP. Nevertheless, the effects of the soybean sector on the rest of the economy depend crucially on the macroeconomic environment and policies adopted by governments. After these preliminary considerations, the effects on food security and on poverty

¹³ For marketing year 2013/14 the equivalent figure was 275 km.

reduction from the main episode of the international soybean price surge (2003–2014) are first considered, followed by a discussion of growth effects in the subsequent section.

i. Effects on food security

The increase in international commodity prices from 2003 to 2008 affected food security in many countries. As widely concluded previously, the rise was due to both structural and long-run causes related to food demand and supply, but also to non-food market fundamentals, related to financial markets that were independent from the food sector. In this context, Latin American countries adopted a great variety of policy instruments, which fall mainly into two categories: those aiming to restrain the rise in domestic prices and those aiming to provide access to cheap food for the poor (Bianchi and Uzquiza, 2009; Piñeiro y Bianchi, 2009; Bianchi, Piñeiro y Uzquiza, 2009; Piñeiro *et al.* 2009).

In the case of Argentina, the main policy measures were intended to restrain the rise in domestic prices by partially offsetting the international price increase through export taxes, as was previously explained, and also by increasing domestic supply through export quantity restrictions. Consumer price controls were also implemented. In previous sections, it was stressed that export restrictions played an important role in controlling the price of meat, which is a fundamental component of the Argentine diet. Export restrictions were thereafter generalized to many agricultural products, including soybean products, although soybean products are not an essential component of the population's diet (but are included in livestock feed rations, and are thus important in meat production). The prolonged application of export restrictions on meat subsequently affected producers' profitability and incentives, as evidenced by the significant decrease in the size of the national cattle herd.

In the case of Brazil, the government adopted a different set of measures than those implemented by Argentina with the intention of managing food prices. The main measures consisted of tax reductions, nutritional programs, food imports, the enlargement of safety net programs and policies oriented toward promoting agricultural production, such as low-cost loans.¹⁴ Soy products were included in these measures, as soy products are an important component of the Brazilian diet (in contrast to the Argentina).

Lastly, it is worthwhile to briefly mention the global food security effects of higher soy prices. The reliability of international trade has been called into question as a result of developments during the 2008 food crisis – in particular by the behavior of food-exporting countries, such as Argentina, which resorted to export-restricting measures in order to secure domestic food supplies, as those actions further exacerbated price increases and volatility in world markets. Net food importers rely on the international market to supply their growing demand for food at reasonable prices. Rather than pursuing costly and inefficient self-sufficiency policies, which in many cases will prove economically and environmentally non-viable, these countries want to

¹⁴ While Brazil never restricted soy sales, in January 2008, the country instituted a temporary export restriction in the case of rice.

be given assurances by exporting countries that the international market will deliver these goods. As discussed previously, in the case of soybean products, the imposition of export duties by Argentina, a large supplier, could have had adverse effects on international prices and on food security in soybean-importing countries.

ii. Effects on poverty reduction

The economic history of Latin American countries has been characterized by an “empty space” when analyzing economic growth and income inequality. It is possible to find periods of low growth with low inequality, low growth with high inequality, or high growth with high inequality, but it is harder to find periods of both high growth and low inequality (ECLAC, 2009–2010). Nevertheless, this empty space was clearly filled during the 2000s when, besides economic growth, inequality unambiguously declined, as measured by a statistically significant fall in the Gini coefficient (Lustig *et al.*, 2013). In the case of Argentina, the annual change in the Gini coefficient was a negative 1.3 percent in 2000–2011, while in Brazil the equivalent figure was minus 1.03 percent. Moreover, in both countries the decline in inequality during the 2000s was higher than the increase in inequality during the 1990s. In Argentina the Gini coefficient increased 8.2 percent from 1992 to 2002 and decreased 10.7 percent from 2002 to 2012, while in Brazil it grew 3.7 percent from 1985 to 2001 and dropped 6.1 percent from 2001 to 2011.

Another indication of the quantitative significance of the decline in inequality is its contribution toward reducing poverty. Since 2000, both the incidence of extreme poverty and of total poverty in Latin American countries have fallen (now estimated at 38 and 49 million people, respectively).¹⁵ Regionally, on average, 43 percent of the reduction in poverty is due to the decline in inequality (Lustig *et al.*, 2013). In Argentina, total poverty declined 10.6 percent from 1998 to 2011, with 60 percent of this decline resulting from redistribution and 40 percent from economic growth; in Brazil poverty declined 18.4 percent from 2003 to 2011, with 35 percent of the decline resulting from redistribution and 65 percent from economic growth.

Existing studies point to two main explanations for the decline in inequality and poverty: the first explanation is the reduction in hourly wage inequality, while the second explanation is more robust and progressive government transfers. Regarding the first explanation, Lustig *et al.* (2013) claim that for Latin America, and particularly for Argentina and Brazil it is the skill premium (or the returns to education) that has driven the decline in hourly wage inequality. In Argentina, the reduction in the skill premium appears to be related not just to the change in the composition of labour by skill, but also to the employment effects of a booming economy (mainly due to TOT effects) and the wage-differential compressing effects of active labour market policies implemented by a pro-labour union government (Gasparini and Cruces, 2010). However, attempts to link this result to changing patterns in the composition of output does not yield conclusive results. Only the role of TOT, which captures the effect of the boom in commodity prices, seems to support a demand-side hypothesis. For example, De la Torre *et al.* (2012) suggest that this boom in commodity prices appears to have

¹⁵ Extreme poverty is the percentage of the population earning daily incomes of US\$2.50 in purchasing power parity (PPP) or less, while total poverty covers those earning below US\$4.00 PPP per day.

played an important role by inducing a significant reallocation of labour from non-commodity tradeable sectors, such as manufacturing, to sectors which are less intensive in skilled labour, such as services, which in turn reduced the skill premium and wage inequality. Then, as Lustig *et al.* (2013) states, the fall in hourly wage inequality is explained by the reduction in the returns to education. Whether the latter is predominantly the result of an increase in the supply of workers with more educational attainment, a decline in the demand of workers with higher skills, or a degradation of secondary and tertiary education has not been unequivocally established.

Regarding the second explanation for the decline in inequality and poverty (i.e. higher and more progressive government transfers) from 2003 to 2008, economic growth and a prudent macroeconomic environment substantially improved fiscal revenues and allowed “a fiscal space” to finance social programs both in Argentina and Brazil. The size, coverage and distribution of public transfers were fundamental in accounting for the reduction in inequality and poverty both in Argentina and Brazil.

It is clear that in the case of Latin America, those countries that showed greater increases in fiscal revenues were those whose TOT improved substantially. Argentina constitutes a particular case, since export duties (including those imposed on soybeans exports) contributed significantly to the expansion of fiscal revenues and hence, establishes a clear link between TOT (international soybean prices, in this case) and the reduction of poverty over that time period. In Argentina, fiscal revenues originating from commodity exports accounted for 14–18 percent of total tax collection in the period 2005–2007 (ECLAC, 2008–2009). Apart from fiscal revenues obtained as a result of export duties in the case of Argentina, it must be noted that the collection of other taxes also increased in Argentina and in Brazil, both due to higher tax levels and to economic growth itself (e.g. taxes on value added, property and profits).

These increased revenues allowed for the creation of several social safety net programs in Argentina. Due to the crisis of 2001, in 2002 the government implemented a special program of large cash transfers targeting families in which the head of the household was unemployed – deemed the Unemployed Household Heads programme (*Plan Jefes y Jefas de Hogares Desocupados*). The program covered around 2 million households in 2003. It is worth noting that in May 2002, the unemployment rate reached a historical high of 21.5 percent, while in October of the same year around 14 million people were living below the poverty line, including 6 million people classified as “indigent”.¹⁶ Another important Argentine income transfer programme, implemented in 2010, is the Universal Allowance per Child (*Asignación Universal por Hijo*), which transfers funds to unemployed or informal workers who earn a monthly income below the statutory minimum wage for each child in the household under the age of 18.

Hence, the decline in inequality and poverty in the 2000s in Argentina is both a consequence of declining labor and non-labor income inequality, with the former being unambiguously predominant. The decline in non-labor income inequality is primarily linked to the expansion of the coverage of government transfers. The decline in labour income inequality is due to the equalizing changes in returns to skills; whether changes

¹⁶ The poverty line includes a basket of food and non-food goods, while the “indigent” line includes only a basket of food products that contain the minimum calories and proteins to satisfy daily nutritional needs.

in educational structure were equalizing or not remains to be seen, as results are not consistent across authors. The decline in the skill premium appears to be driven by an increase in the relative demand for unskilled workers stemming from the high GDP and employment growth, and a shift to more unskilled-labour intensive production methods across the board; it may also be driven by institutional factors such as rising minimum wages and the power of labour unions. According to Lustig *et al.* (2012), it is very difficult to disentangle the demand composition from the institutional factor effects.

In the case of Brazil, during the 2000s, labour and non-labour income inequality declined and wage differentials between workers of different skills, living in different locations, and working in different sectors (formal/informal; primary/secondary) narrowed. Also during this period, the real minimum wage increased and public transfers rose (both in terms of average benefits and coverage). On the contrary in Argentina, the contribution of changes in employment was rather limited; workers from relatively poor households were not among those that benefited the most from job creation during this period. On the other hand, since 2001 the government has increased the average amount of all transfers and broadened the coverage of well-targeted programs, such as Brazil's signature conditional cash transfer program *Bolsa Família* (or Family Allowance). While contributory social security has the largest coverage – about 30 percent of the Brazilian population lives in households receiving contributory social security benefits – the largest expansion was in *Bolsa Família*, whose coverage increased by close to 10 percentage points between 2001 and 2007, reaching 17 percent of households (Lustig *et al.*, 2012).¹⁷ In the case of social security transfers, the equalizing effect occurred primarily through an increase in the amount of the average benefit. In the case of *Bolsa Família*, the predominant factor was the increase in coverage and to a lesser extent the increase in the amount transferred.

In the case of Brazil, then, the decline in labour income inequality is the result of two main factors: i) lower skill premium (by educational level); ii) lower spatial (and sectoral) segmentation of labour markets, in particular among metropolitan and non-metropolitan areas. The fall in the skill premium seems to be caused by both changes in the composition of supply and demand as well as institutional factors such as rising minimum wages. The relative importance of each factor, however, remains to be established by future research. As with Argentina, the decline in non-labour income inequality is due primarily to the expansion in coverage of government cash transfers targeted to the poor and, in the case of formal social security, to an increase in the average transfer. Higher minimum wages were indirectly a factor here as well, because social security benefits are indexed to the minimum wage.

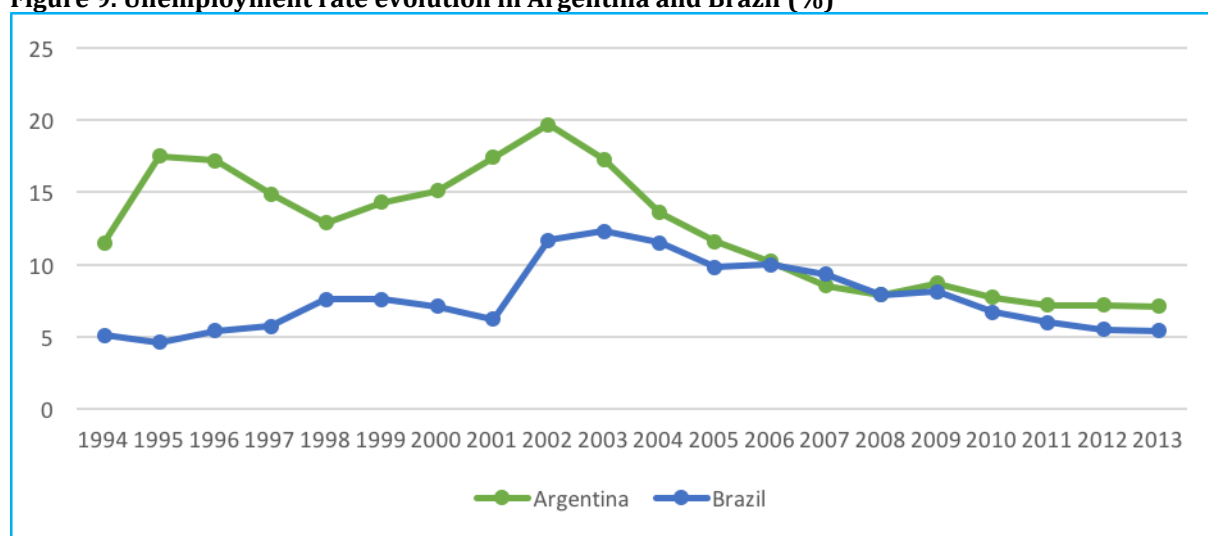
Then, the most important factor in accounting for the decline in non-labour income inequality and poverty both in Argentina and in Brazil was a significant rise in importance of the equalizing contribution of government transfers, which not only rose over time but was of such a significant magnitude that it offset the inadequate effect of other sources of non-labour income. Schemes like *Benefício de Prestação Continuada* (Brazil) and large-scale conditional cash transfers programs such as *Jefes y Jefas* (Argentina) and *Bolsa Família*

¹⁷ *Bolsa Família* is a conditional cash transfer programmes through which parents receive a fixed monthly stipend in exchange for sending their children to school and complying with different health checkups. *Bolsa Família* is one of the largest programmes of its kind in the world.

(Brazil) had remarkable redistributive power.¹⁸ The expansion of the coverage of cash transfer programmes during the 2000s was, in particular, key to both inequality and poverty reduction in Argentina and Brazil.¹⁹ In this sense, cash transfer programmes were benefited by the direct and indirect effects of high international soybeans prices.

Lastly, since the increase in employment levels is also related to poverty reduction, Figure 9 shows the evolution of the official unemployment rate both in Argentina and in Brazil. In both countries, there is a significant drop in the unemployment rate during the 2000s, with Argentina experiencing a more pronounced decline.

Figure 9. Unemployment rate evolution in Argentina and Brazil (%)



Source: Author's elaboration based on data from ECLAC.

d. Channels through which soybean prices have had an effect on growth

The economic growth in Latin American countries was modest and variable between 1960 and 2002, with lower growth and higher volatility in the period 1980–2002. In this sense, Latin America faced significant obstacles in coping with external shocks and adapting to a more competitive and volatile global economy. This vulnerability of Latin American growth to external factors has been widely discussed, and has been coined the “stop and go” model, where the lack of foreign currency was the primary limiting factor for economic expansion, together with volatility in TOT and in capital flows.

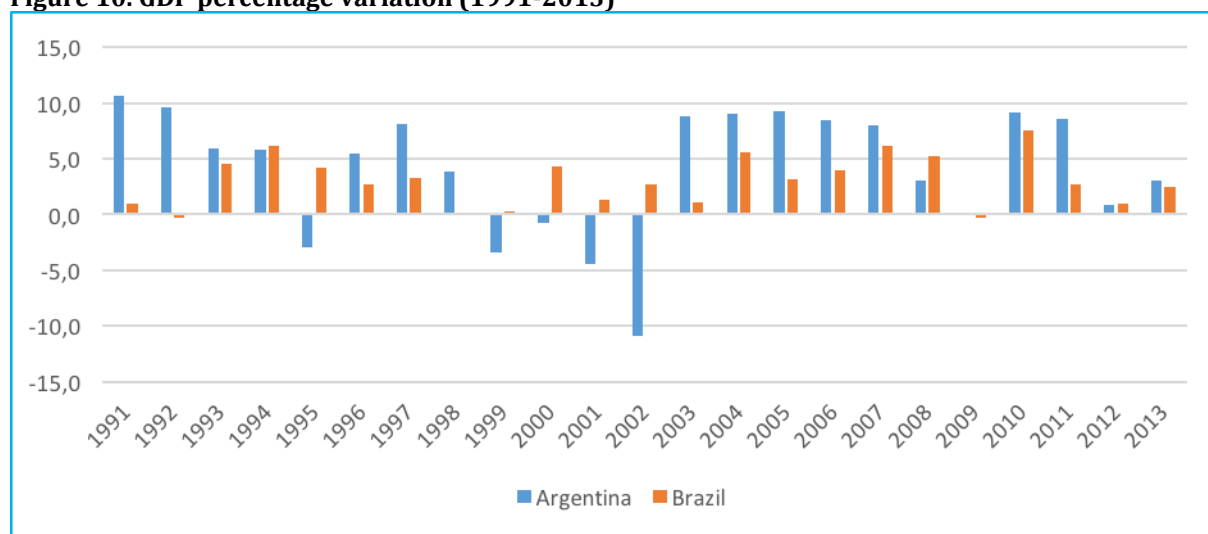
Nevertheless, during the period 2003–2008, an exceptional and unusual period of economic growth was experienced by both Argentina and Brazil (as well as many other Latin American countries), driven by the favourable world economic conditions which led to an improvement in the TOT for both countries. According to official data,

¹⁸ *Beneficio de Prestacao Continuada* is a programmes where the government pays the statutory minimum wage to workers with disabilities that prevent them from working.

¹⁹ In the case of Argentina, it is important to note that, as is the case with official data about inflation, poverty data has also been contested. The last time the Argentine government published poverty data was in October 2013, corresponding to the first semester of 2013. At that time, estimated poverty was 3.7 percent—a figure that was questioned by opposition leaders and private consultancies. A survey that is periodically realized by the Argentine Catholic University (*Universidad Católica Argentina*) estimated a poverty rate of 28.7 percent in 2014 (OSDA, 2015).

while Argentina experienced relatively high growth rates, Brazilian growth was more modest (Figure 10).²⁰

Figure 10. GDP percentage variation (1991-2013)



Source: Author's elaboration based on data from ECLAC.

This period of economic expansion was unusual by Latin America standards for the following set of reasons:

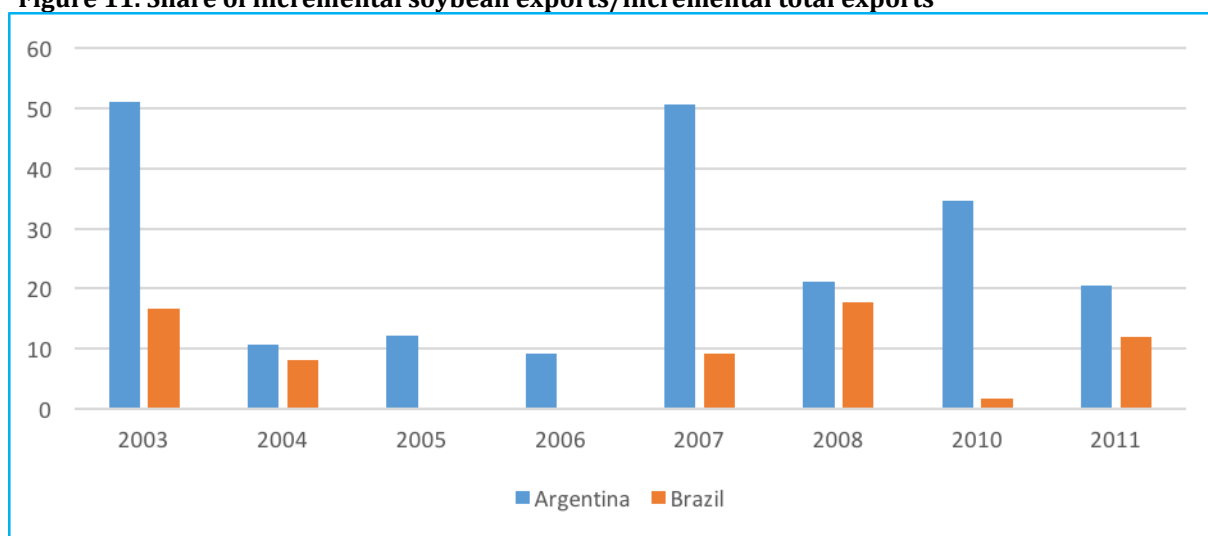
- i) The improvement of the TOT of Argentina and Brazil has been substantial, with soybean prices playing a fundamental role (Figures 7 and 8). The upturn of the TOT was not only boosted by soybean prices and the prices of other commodities, but also by “non-traditional” products and manufactures. ECLAC (2013) raises the point of the methodological difficulties in evaluating the contribution of the improvements of the terms of trade on GDP growth, since by definition the variations of GDP do not take into account price changes. Instead, it is possible to separate out the effects of TOT by decomposing the contributors to the growth of the gross national income. ECLAC (2013) finds that in the case of Argentina and in the period 2003–2011, gross national income per capita grew 7.9 percent (compared with minus 3.1 percent in 1981–1989 and 0.7 percent in 1990–2002), with the following contributors: labor productivity, 4.3 percent; increase in labor force, 2.7 percent; and TOT, 0.9 percent. In the case of Brazil during the same period, gross national income per capita rose 3.5 percent (compared with 0.2 percent in 1981–1989 and 0.3 percent in 1990–2002), with the following contributors: labor productivity, 1.2 percent; increase in labor force, 1.7 percent; and TOT, 0.8 percent. We can then observe the significant growth of gross

²⁰ As is the case with official data for the inflation rate and poverty measure in Argentina, GDP figures have also been challenged. For example, Coremberg (2014) reproduced GDP series since 1993 and found that official data and outside estimates are close from 1993 to 2006. Since 2007, the difference between the official series and estimates has accumulated a large positive bias upward – possibly due to political intervention. The author argues that these differences are due to discretionary intervention in every industry component of the GDP with the objective of showing a higher GDP growth rate. Coremberg (2014) concluded that Argentina was not the growth champion of Latin America during the recent growth period. Moreover, Argentina showed the lowest GDP growth of the region in the long run, less than Brazil and Mexico.

national income as compared with previous periods, with TOT as an important, although not the most important, driver.

- ii) An outstanding expansion of exports, both in terms of volume and value, took place, which was the main driver of aggregate demand during the initial years of this period. The growth of export earnings translated to important trade balance gains and balance-of-payment current account surpluses, easing the “traditional external restriction” and allowing greater domestic demand without stress in the external sector. Together with prudent macroeconomic policies adopted by both governments, the accumulation of foreign currency allowed for a substantial reduction in and restructuring of sovereign debt. Moreover, export growth was strengthened by more flexible exchange rate regimes. Undoubtedly, the notable expansion of soybean exports during this period (Tables 3 and 4; and Figures 4, 5 and 6) contributed to this virtuous evolution. Figure 11 shows that the contribution of the change in soybean exports to the change in total exports of both Argentina and Brazil has been significant in some years of the period when TOT, e.g. 51 percent of the change in total Argentine exports in 2003 and 2007 is explained by the increase in soybean exports, while figures are high in other years. In the case of Brazil, the contribution of soybean exports to the change in total exports has also been very high in some years, such as 2003 (17 percent) and 2008 (18 percent).²¹

Figure 11. Share of incremental soybean exports/incremental total exports



Source: Author's elaboration based on data from COMTRADE.

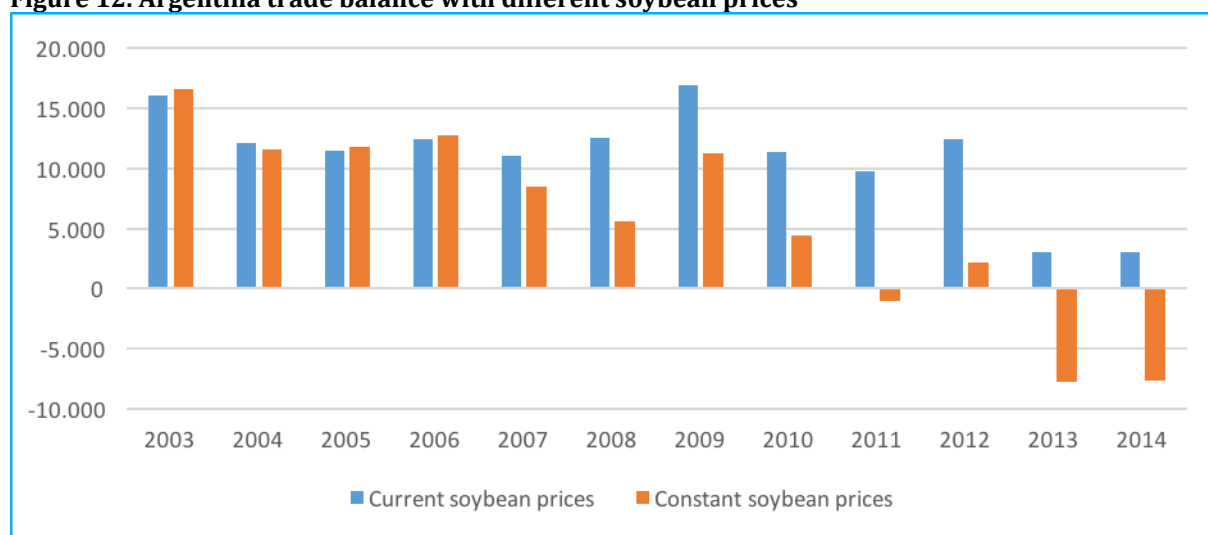
Figures 12 and 13 present the results of an exercise that shows both the importance of the higher soybean prices and soybean exports. Both figures compare the actual trade balance (i.e. with current soybean prices, with the trade balance that would have resulted if the same soybean export volumes were converted into values using the average soybean price of the 1990s).²² As expected, the combination of higher soybean

²¹ In the case of Brazil, the figures for 2005 and 2006 were not depicted since soybean exports decreased during these years.

²² The average export price was used for soybeans, soybean meal and soybean oil for the 1990s to convert the actual volumes exported into values. Then the actual soybean exports was replaced with these soybean exports “at constant prices” to recalculate total exports for each country. This exercise assumes

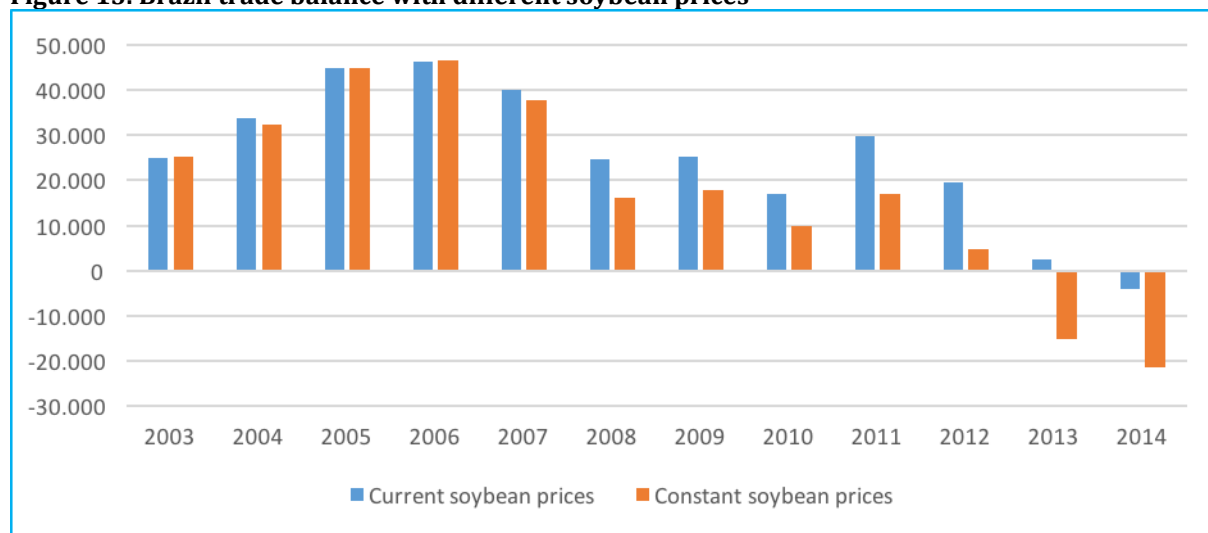
prices and soybean exports were significant for trade balances during these years both for Argentina and Brazil. When soybean exports are valued at the average 1990s prices, the overall trade balance drops by 24 percent in the case of Argentina in 2007, 55 percent in 2008, 33 percent in 2009, 60 percent in 2010 and turns negative in 2011, 2013 and 2014. In the case of Brazil, with constant soybean prices, the trade balance falls 35 percent in 2008, 29 percent in 2009, 40 percent in 2010, 43 percent in 2011 and 75 percent in 2012, turning negative in 2013 and 2014.

Figure 12. Argentina trade balance with different soybean prices



Source: Author's elaboration based on data from COMTRADE.

Figure 13. Brazil trade balance with different soybean prices



Source: Author's elaboration based on data from COMTRADE.

- iii) It was also unprecedented that economic growth in both countries was parallel to a surplus in the balance-of-payment current account (see section c. ii).
- iv) The creation of a "fiscal policy space" together with economic growth also had few precedents in the economic history of both countries.

the same volumes for actual and constant prices, although it is acknowledged that export volumes also depend on prices.

e. Highlighting and contrasting the macroeconomic effects of soybean exports on both economies

As described in the previous sections, the macroeconomic effects of soybean exports were similar for Argentina and Brazil, e.g. both countries could accumulate important amounts of foreign currency, which relaxed the external sector constraint and allowed for a reduction in public debt with foreign creditors. Both countries also improved their fiscal space, partly thanks to soy exports, allowing them to use cash transfers for poverty alleviation programs. Due to export duties, the relation between fiscal revenues, poverty alleviation and international soybeans prices is clearer in the case of Argentina. This is not the case for Brazil, which did not impose export taxes after 1996. For Brazil, the same relation seems to be indirect, i.e. international soybean prices translated into an important expansion of the soybean value chain, which contributed to economic growth and thus an implied increase in fiscal revenues. It is important to keep in mind that international soybean prices contributed to the improvement of the fiscal space both in Argentina and Brazil, but they were not the only source of improvement, other taxes, mainly those positively related with the economic cycle, were also significant contributors.

VII. Policy implications and conclusions

The experience of Argentina and Brazil with the surge in international soybean prices and their effects on economic growth and poverty is very rich in terms of lessons that can be drawn, particularly for those countries whose exports are concentrated in few commodities. From the analysis of the relationship between international soybean prices, growth and poverty in both countries, the following takeaways and policy implications should be emphasized:

a. A capital and knowledge intensive view of the agricultural sector

There is a traditional view of the agricultural sector that contends that a growth pattern sustained on agriculture implies only labor-intensive activities and low value added. The soy value chain in the case study countries (and indeed most of the agricultural sector there) cannot be identified with this traditional view anymore; instead, the agribusiness model is a complex network involving many different economic actors. As such, production of primary goods is not intrinsically inferior to other sectors in terms of its potential for higher added value as the quality of the output improves, with positive economic spillover effects, social externalities, and the development of upward and downward links in the production chain. Agricultural products do not exclusively consist of foodstuffs anymore, as illustrated by the soybean case. It is important to understand this capital and knowledge intensive view of agricultural production as a chain or a network, involving many other economic actors in addition to farmers.

b. Fiscal space and revenues from commodities

An important factor in the improvement of the fiscal space in Argentina and Brazil was the increase in commodity prices between 2002 and 2008. This raises the point, discussed extensively in the literature, that the dynamics of international commodity prices can pose challenges to macroeconomic policymaking. Commodity price movements can be particularly problematic for fiscal policy formation, as fiscal revenues obtained through natural resources tend to be more volatile than those obtained from other sources. From a strategic viewpoint, the two main goals of fiscal policy in countries dependent on primary goods are to ease public expenditure in the short term in response to income volatility in these goods, and to achieve optimal wealth management in the long term. A third key goal is to reduce income volatility by diversifying the tax base. Isolating the cost of boom and bust cycles of income from primary goods ideally requires the use of cyclically adjusted fiscal instruments combined with a stabilization fund to oblige the accumulation of savings when there are extraordinary gains in primary goods, which can then be used to stabilize spending in times of crisis for these goods. A stabilization fund can thus play a key role in stabilizing spending and also contribute to the more effective use of countercyclical fiscal policy. These recommendations, extensively discussed in the literature, were not implemented by Argentina and Brazil. The deteriorated macroeconomic situation since 2014 in both countries, with large fiscal deficits, is not a consequence of lower international commodity prices, but it shows that the lack of a stabilization fund and of a strategic fiscal policy management worsens an already adverse situation.

c. Exchange rate management

International soybean prices are transmitted to producers through the exchange rate, such that the exchange rate plays a large role in determining the final price received by domestic producers. Thus, exchange rate overvaluation can reduce the benefits from high international prices. The level and volatility of the real exchange rate have been fundamental in the performance of exports in both countries, as in most Latin American countries. Volatility and the level of the real exchange rate have an effect on the profitability of exports, uncertainty of future incomes and profits and increasing risk. On the other hand, high international commodity prices, together with an overvaluation of the real exchange rate, can generate an incentive to increased specialization in the production and exportation of commodities, increasing the vulnerability of the economy to external shocks. Real exchange rate management is also important to avoid the dynamics of “Dutch disease” (i.e. abundant natural resources produce high economic rents), with two main effects on an economy’s incentive structure: the inflow of foreign currency raises the real exchange rate and pushes up the price of non-tradable relative to tradable; on the other hand, it increases the resource’s production yields relative to manufactured goods, reducing the incentive to invest in producing those goods and thereby generating a production and export structure focused on natural resources. Finally, large devaluations also generate income transfers to exporters while adversely affecting relative prices of non-tradable products, wages and fixed incomes. Thus, real exchange rate management is very important since it affects the degree of transmission of international prices to producer prices, their relative position in the economy and the interplay of incentives and disincentives.

d. High concentration of export basket

Compared with high-income countries that also have natural resources, Argentine and Brazilian exports (together with exports of many Latin American countries) are concentrated in relatively fewer products, and soybean products account for a significant share of exports. With volatile TOT, the concentration of exports often translates into lower growth in the long term. In the case of soybean products, there is also a relatively high concentration of exports toward few importing countries.²³ High export concentration on few products and countries implies a high vulnerability to deceleration of demand in those countries. Export concentration can also bring instability in government income and difficulties in macroeconomic management.

e. Distribution effects of international commodity prices

When international commodity prices surge, there is often a policy dilemma between price stability (and income distribution) for the sake of consumers on the one hand and the competitiveness of producers of the exported products on the other. In confronting these situations, it is crucial that policy responses minimize the disincentives to production and investment for the commodities in question.²⁴ On this point, the Argentine case provides a cautionary tale. It is important to bear in mind that the economic benefits of an expansion in agricultural production are not homogeneous across different social sectors. The economic sectors linked to agricultural production will be the main beneficiaries. This unequal distribution of benefits has to be corrected through fiscal and social policies in order to ensure better income distribution, social and political sustainability of development, and food security for the country's population. Nevertheless, it must be taken into account that the reduction in poverty and inequality is driven primarily by labor market dynamics. In Latin America, 80 percent of households' income is generated by labor activities, such that it is in the labor market where the distribution of income is mainly determined (CEPAL 2009–2010). With this understanding, the capacity of an economy to generate employment is crucial.

²³ In the case of soybeans, China accounts for almost 80 percent of Argentine soybean exports, and almost 75 percent of Brazilian soybean exports. China also accounts for almost 40 percent of Argentina soybean oil exports, while India, Iran and China collectively account for 45 percent of Brazil's soybean oil exports. Soybean meal is diversified among importers in the case of Brazil, while the Netherlands and France account for almost 45 percent of Argentina's soybean meal exports (authors' elaboration based on data from COMTRADE for 2013).

²⁴ The policies controlling meat prices in Argentina provide a clear example of this tension. In 2010, the Argentine cattle herd was at its lowest level in 20 years, mostly due to policy interventions in the market (CEPAL, 2009–2010).

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