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## The political economy of the Brazilian model of agricultural development: Institutions versus sectoral policy



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## ABSTRACT

This paper analyzes the transition of Brazilian agriculture from low productivity and backwardness to its current status as a major player in international markets. Long-term investment in local agricultural technology was a crucial determinant of this transformation, but the impact of agricultural policy along this path was highly convoluted, often causing more distortions than progress. We highlight the importance of the underlying institutional setting on the impact of agricultural policy. The remarkable transformation in Brazilian agriculture only really emerged when inclusive and sustainable institutions created a fiscal, monetary and political environment in which those policies could succeed.

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## 1. Introduction

For much of its history Brazil was believed to have a predominantly agricultural vocation. Its massive land area, suitable climates and water availability made the country one of the major producers of several agricultural commodities over extensive periods of time. Yet, its agriculture has traditionally been recognized as backward and inefficient, marred by low productivity and wasteful and primitive practices. As Brazil industrialized after the 1930s, the notion of an agricultural vocation was set aside and the sector assumed a distinctively subsidiary role in the nation's policy agenda. Its task became that of supporting the industrialization effort through the production of inputs and foodstuffs as well as the generation of foreign currency. Since the 1960s, the low productivity of traditional agriculture, together with the sector's resistance to political and technological change, was diagnosed as a major impediment for the country's economic growth and development (Baer, Kerstenetzky, & Villela, 1973; Graziano da Silva, 1982; Homem de Melo, 1979; Mueller, 1983). During the decades that followed the government actively intervened through myriad programs and

reforms. Although these did manage to create a modern agricultural sector in some areas and for some products, this was only a partial success, as many problems remained unaddressed and new ones were created by those very policies (Binswanger, 1991; Brandão, 1988). By the end of the 1990s productivity had increased, but only modestly and although there were conflicting diagnoses and policy recommendations, there was consensus that the sector was highly dysfunctional and in need of further and deeper reform.

In the ensuing years, and after decades of disappointing results from erratic agricultural policy, the sector unexpectedly started to show signs of progress. By the end of the first decade of the new century Brazil found that, against all odds, it had turned into one of the breadbaskets of the world. Not only did it produce and export significant proportions of several major agricultural commodities, but this time this was done through highly productive technology and efficient use of inputs and resources (Gasques, Bastos, Constanza, & Bacchi, 2012). The endemic backwardness and archaic nature of Brazilian agriculture had undergone a remarkable and largely unforeseen transformation, as it achieved the highest growth of total factor productivity in agriculture among all countries in the world (we provide detailed data below).

As the world went through a long period of fast growing commodity prices culminating in two episodes of food price crises in 2007–2008 and 2010–2011, interest piqued in understanding how Brazil had achieved this spectacular agricultural transformation.

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Increasing output, as Brazil had done, primarily through higher total factor productivity rather than the incorporation of new land and more labor, seems to be exactly what is needed to feed an increasing and more prosperous world population, with its greater demand for food, fuel and meat, under the increasingly constraining prospects of a crowded world and climate change. In particular, this interest centered on the fact that the transformation was achieved starting from a relatively backward agricultural setting, similar to that found in many other poor and developing countries. Whereas many technological and organizational packages from developed countries have been tried throughout the world, the results have often been disappointing. The Brazilian example sparked the notion that south-south cooperation in agriculture could fare better, given the similarities involved and a purported lack of colonial vestiges (Economist, 2010). The fact that the changes in Brazilian agriculture were achieved simultaneously, though not necessarily causally, with a significant and unprecedented drop in poverty and inequality since 1995, made the lure of the Brazilian breakthrough even more enticing for poor countries. Consideration was given to whether the Brazilian model would be particularly well suited for Africa. Given that Africa holds much of the last remaining unused agricultural land in the world, Brazil's experience in turning its large savannah regions from barren wastelands (from the agricultural perspective) into an area that has achieved world class yields and total production levels, is particularly relevant.

The central hypothesis of this paper is that the virtuous evolution of Brazilian agriculture in the past 15 years cannot be traced back to specific policies, which could then be replicated elsewhere, but rather to the more general institutional environment which arose since the mid-1990s creating circumstances where the government simultaneously reduced its interference in agriculture and provided the backdrop of rule of law and greater predictability, where the private sector felt secure and able to invest and produce (Alston, Melo, Mueller, & Pereira, 2016). Agriculture, perhaps more so than other sectors, requires government policy to address market failures. But in an industrializing and urbanizing emerging economy agricultural objectives often clash with other policy objectives. Similarly, when a country's general macroeconomic situation is fragile, policymakers will often be tempted to use the agricultural sector to pursue other objectives such as controlling inflation or generating foreign exchange, in the process introducing policy reversals and inefficiencies in the sector. The Brazilian experience shows that the unprecedented cycle of investment and growth in agriculture only took place once the country stabilized its economy in the mid-1990s and put in place a series of more open and predictable political and economic institutional arrangements (Alves & Pastore, 1978; Brandão & Carvalho, 1991; Helfand, 1999; Rezende, 2003). In these new circumstances there was less need for direct policy intervention in areas such as credit and price management, freeing up policymakers to concentrate on research and other market failures, thus allowing the sector greater freedom to invest and grow (Mueller, 2009).

Especially since the early 1970s there was a strong emphasis on agricultural research with the objective of producing knowledge, technologies and varieties suited to Brazil's specific biomes and climates. This effort has been centered in *EMBRAPA* – the Brazilian Enterprise for Agricultural Research – created in 1973 by the Ministry of Agriculture, which is at the center of National System of Agricultural Research, a network that includes several state-level research units, universities and a group of federal and state financing agencies (Avila, Romano, & Garagorry, 2010; Rodrigues, Buschinelli, & Avila, 2010). This research has been a major determinant of the remarkable increases in productivity in Brazilian agriculture, as well as the main factor enabling the massive expansion of the agricultural frontier from the traditional areas to the

central savannahs (*cerrado*), greatly expanding total production and diversification.

Though the importance of investment in country-specific agricultural technology is a major lesson from the Brazilian success in agriculture, here too the importance of stable and open institutions and the resulting macroeconomic and political stability are key preconditions. It was only after the stabilization of the mid-1990s that the two decades of investment in agricultural research really started to payoff. In the previous period even *EMBRAPA* and its partners suffered from policy reversals, uncertainty and waste (Pastore, Dias, & Castro, 1976). During most of that time the importance of this research and knowledge was not widely recognized, and to most *EMBRAPA* was just another obscure government bureaucracy. The support for *EMBRAPA* and the recognition of the wisdom of having pursued the long-term investment in research only really became widespread after the fact, in the 2000s.

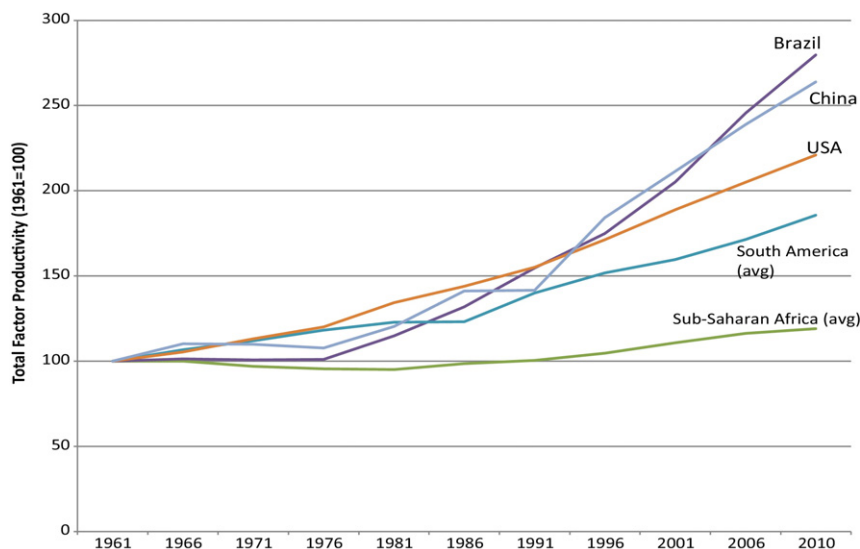
This paper proceeds as follows. In the next section we start by showing some stylized facts and data that document the recent transformation in Brazil's agriculture. We show that in terms of outcomes, this experience is truly remarkable and actually deserves to be considered as a template for other countries. Section 3 then provides evidence that the evolution of Brazilian agriculture from backwardness to high productivity was not smooth and preordained, but rather a convoluted process subject to reversals, unintended consequences and waste. Section 4 shows that this erratic process was in large measure caused by conflicting policy objectives that undermined agricultural policy that sought to reduce but, with the interference, often ended exacerbating market failures. The final section concludes by considering what lessons can be derived from the Brazilian experience as a model for other countries.

## 2. The transformation in Brazilian agriculture

The previous section alluded to a 'transformation' that Brazilian agriculture has undergone in recent years. But most countries tend to experience improvements over time in their capacity to produce more and better agricultural products with less input, as technology, capital and experience disseminate and accumulate over time. So what is so remarkable about the Brazilian experience? In this section we provide evidence and data supporting the view that Brazil has undergone a distinctively exceptional transition from being a low productivity producer of a few basic commodities into a major front-runner both in terms of volume, diversity and productivity. We do not aim to provide a comprehensive account of the state that Brazilian agriculture, but simply to establish the fact that its experience has been exceptional and merits attention. Here, we describe the main achievements, leaving an assessment of how these results emerged to later sections.

Perhaps the single most compelling evidence of Brazil's agricultural success relative to that of other countries is the evolution of total factor productivity.<sup>1</sup> Fig. 1 shows that for a select group of countries Brazil has the highest increase in TFP. The data is normalized to 1961 = 100, so the curves show each country's TFP growth relative to the level in that country at that year. Both China and Brazil exhibit very strong productivity growth over the period, with an upward inflexion around 2000 allowing Brazil to surpass the Chinese by a significant margin. Surprisingly both Brazil and China achieved higher rates of TFP growth than the US since the early 1990s, despite that country's availability of technology and

<sup>1</sup> Total factor productivity is the growth in output that is not directly due to the increase in capital, labor and land. As such, it is usually assumed to be due to innovations and technical progress that allow more efficient use of traditional inputs.



**Fig. 1.** Total factor productivity in agriculture for selected countries 1961–2010.

Source: USDA (2013).

infrastructure. This indicates that whereas the US has already realized most of the currently available margins for productivity growth, Brazil and China still have room for improvement. The figure also shows that the evolution of TFP in other South American countries and especially in Sub-Saharan Africa was dramatically weaker than in Brazil, suggesting that there might in fact be lessons from the Brazilian experience for these countries.

Today Brazil is one of the top producers of a long list of products, including sugar, orange juice, soybeans, coffee, chicken, beef, pork, maize and cotton. Table 1 shows how its participation has increased dramatically in world markets by listing its percentage of world production and its rank for the top 10 products by value in the world in 1990 and in 2011. Brazil remained the largest producer of sugar cane in 1990 and in 2011, but its share of total world production increased from 25% to 42%. Also, while in 1990 it was one of the top 5 producers of only 4 products, this list increased to 7 products in 2011. As regards livestock, Brazil went from being the 3rd, 3rd and 13th, producer of cattle, chicken and pork in 1990, to being 2nd, 3rd and 5th in 2011. More importantly, its share in each of these products increased from 8%, 7% and 2%, to 14%, 13% and 3%.

These increases are all the more impressive when one considers that during this period most other countries were also increasing their levels of production so that any gain is relative to this generally improved performance.

### 3. Uncertainty in planning and managing Brazilian agriculture

In the Introduction we argued that the evolution of Brazilian agriculture from backwardness to the current levels of high productivity and diversification was not a smooth preordained process, but rather one mired in misconceptions, reversals and unintended consequences. The purpose of this section is to substantiate this claim with a series of illustrations and examples from Brazil's recent agricultural history where policies, programs and interventions defied the intent of their formulators, leading to unintended consequences and sometimes even having the exact opposite effect than that which was sought. The examples will be described briefly due to space limitations. They necessarily involve our own interpretation of events that are by nature controversial. The point is not to

**Table 1**  
Brazil's rank in the Top 10 Products Globally by Value: 1990 and 2011.

Year	Commodity (top ten by value)	Brazilian production (Int \$1000)	% of world production (value)	Rank
2011	Rice (paddy)	3,704,682	2	9
2011	Milk	9,915,772	5	4
2011	Meat, cattle	24,637,781	14	2
2011	Meat, pig	5,179,187	3	5
2011	Meat, chicken	16,346,908	13	3
2011	Wheat	–	0	>20
2011	Soybeans	20,082,317	30	2
2011	Tomatoes	1,632,236	3	8
2011	Sugar cane	23,879,265	42	1
2011	Maize	2,753,011	5	3
1990	Meat cattle	11,071,095	8	3
1990	Milk	4,613,538	3	8
1990	Rice (paddy)	1,978,453	1	11
1990	Meat, pig	1,614,064	2	13
1990	Wheat	460,456	1	>20
1990	Meat, chicken	3,355,988	7	3
1990	Grapes	460,023	1	19
1990	Sugar cane	8,349,600	25	1
1990	Potatoes	–	0	>20
1990	Eggs	1,020,481	4	5

Source: FAOSTAT (2014) Food and Agriculture Organization of the United Nations. Rome <http://faostat.fao.org>.

**Table 2**  
Gross income per farm by farms size (2006).

Brackets (in min. wages)	Number of farms	%	Gross income %	Gross income per farm
0–2	2,904,769	66.01	3.27	0.52
2–10	995,750	22.63	10.28	4.66
10–200	472,702	10.74	35.46	34.49
>200	27,306	0.62	51.19	861.91
Total	4,400,527	100	100	10.45

Source: [Alves and Rocha \(2010\)](#) using IBGE data, cited in [Navarro and Campos \(2013, p. 15\)](#)

provide a definitive account of each case, but rather to underscore Brazil's erratic path to becoming a major agricultural power. The subsequent section will then describe how many of these problems can be traced to conflicting policy objectives, such as macroeconomic stabilization or social policy, that, in an environment of weak institutions undermined or distorted agricultural policy.

A first example involves the highly concentrated nature of land and production in Brazilian agriculture. This has been recognized as a problem that should be addressed through policy at least as early as 1946 when a new Constitution explicitly spelt out the need and the rules for land reform. Since then to the present day redistributive land reform has been a prominent part of all governments' programs, including those in the military period that saw it as a means to combat traditional rural elites' obstruction of efforts to modernize agriculture. Yet all the efforts to reverse the concentration of land systematically floundered. [Rezende \(2006\)](#) posits that the current pattern of agriculture was crucially determined by policies instituted in the 1960s, whose objectives were precisely the opposite of what effectively emerged. The Rural Labor Statute of 1963, the Land Statute of 1964 and much subsequent legislation were motivated by a desire to protect small farmers, rural laborers and landless peasants from exploitation and oppression given the unequal nature of their power *vis-à-vis* large landowners. This highly pro-worker legislation set the rules promoting redistributive land reform and extended to the rural sector labor benefits already held by urban workers, such as holidays and the 13th salary. [De Janvry and Sadoulet \(1989\)](#) argue that the unintended effect of land reform legislation in much of Latin America in the 1960s was to push some large landowners to become productive so as to preempt losing the land, which was often accomplished by evicting tenants and substituting workers for mechanization. At the same time the government started to provide highly subsidized credit for mechanization in an effort to increase productivity. The result was that despite this being a country where labor was abundant and capital scarce, factor prices got distorted, signaling cheap capital and expensive labor. This induced the adoption of a pattern of technology and organization of production leading to large mechanized agriculture failing to absorb much labor ([Hayami & Ruttan, 1985](#)).

The way land reform has been implemented is another example of how difficult this policy area is to correctly diagnose manage in Brazil. Although land reform efforts achieved few results until the early 1990s, since then much land has been redistributed from large unproductive holdings (as well as much public land) to landless peasants. This change took place once landless peasants became effectively organized. They exploited land reform provisions in the 1988 Constitution to devise a successful strategy of land invasion as a means to pressure the government to redistribute unproductive land ([Alston, Libecap, & Mueller, 2000](#)). By 2013 an area equivalent to France, Portugal, Ireland and Austria had been transferred to over one million families that represent approximately four million land reform beneficiaries.<sup>2</sup>

Surely that sounds like a successful and impactful land reform. But on closer inspection it can be seen that although much effort and resources were put into the land reform programs, the actual results were quite disappointing. Because land reform is such a controversial and politically charged issue in Brazil, the debate between the Landless Peasants' Movement (MST), farmers and government has systematically been kept in the limelight by the media. But this debate has almost exclusively centered round a single and imperfect metric of whether and how much land reform was being done: the number of families settled by the government. As it was the gauge of whether the government was or was not fulfilling its campaign promises, the incentives generated were for the government to put all its efforts into obtaining land and transferring it to beneficiaries and to skimp on efforts to make sure they were able to become independent and productive ([Alston, Libecap, & Mueller, 2010](#)). In order to reach the ambitious targets government resorted, for example, to redistributing distant and low quality land to poor but agriculturally inept beneficiaries, many of whom eventually sold or abandoned their plots. On the surface, a huge land reform appears to have been accomplished, in reality the concentrated structure of land holding and the nature of agricultural organization remained largely unchanged. [Table 2](#) shows the shocking fact that under 1% of the farms in Brazil produce over half of the gross income in agriculture, while nearly 3 million farms (66% of the total) generate just 3.27% of the gross income. The fact that so much effort and resources were spent on land reform programs over the years, with their additional cost in terms of environmental degradation (many settlement projects are in the Amazon), violence and human suffering, with limited impact on their intended objectives, reiterates our point that policymaking in this area in Brazil is not a trivial pursuit. With hindsight, it is apparent that direct transfers to the intended beneficiaries in the style of the *Bolsa Familia* or similar programs, would have probably been less wasteful and more impactful, while reaching the same results in terms of affecting the organization of agriculture.

The concentration of production in a few highly productive farms side by side with a large mass of uncompetitive units, shown in [Table 2](#), flies in the face of the massive efforts over the years to counter this trend. Even today there is still much confusion in government policy as to how this situation was reached and what to do about it, apart from continuing the same type of land reform program of the past decades based on redistributing land through expropriation and settlement projects. [Buainain, Alves, Silveira, and Navarro \(2013\)](#) criticize the perspective that underlies much of current agricultural policy which classifies agents as either 'family farms' or 'agribusiness' for the purpose of policies such as credit. The authors argue that this is an ideological and outdated view of Brazilian agriculture, as there are both very traditional subsistence operations as well as highly productive and modern operation that are officially classified as family farms. They state that this view of agricultural policy "does nothing to modify the accelerated process that is making a very large number of establishments competitively unfeasible, that could be viable if they received support through policies that are consistent with the actual structural changes that Brazilian agriculture has undergone" ([Buainain et al., 2013, p. 13](#)).

<sup>2</sup> For data on land reform in Brazil see <http://www.incra.gov.br/reforma-agraria/questao-agraria/reforma-agraria>.



It is not the case, as if often asserted, that the large number of small establishments play a preponderant role in the supply of staple crops for the domestic market. This may have been the case in the 1950s and 1960s, but ever since the production of staple crops consumed by the rapidly increasing urban domestic markets has originated increasingly in modern, high productivity segments of the Brazilian agriculture. A large part of these establishments do not produce enough for their own maintenance and rely on employment outside the farm and on programs such as the *Bolsa Família* and the rural retirement program to complement their income.<sup>3</sup>

This section has shown that agricultural policy in Brazil, especially prior to 1994, has often defied the intent of policymakers, leading to inefficiencies and unintended consequences. The examples presented above illustrate the fact that social objectives distorted narrowly understood agricultural policy. In the next section we describe how both industrial and macroeconomic policies had the same effect.

#### 4. The evolution of agricultural policy in Brazil

##### 4.1. Introduction

The agricultural sector in a developing country requires active government policy to address the myriad market failures that naturally hinder the sector's growth and development. Getting this policy right is difficult because there is a steep learning curve that involves much trial and error in the process of discovering what are the country's potentials and capabilities. But even setting aside these natural and largely unavoidable uncertainties, agricultural policy must often compete with other policy objectives for resources and attention. In a rapidly industrializing and urbanizing country, such as Brazil since the 1930s, this can lead to situations where agricultural policy originally designed to promote the sector's growth may become distorted to favor the goals of other policy areas. This not only undermines the performance of agricultural directly, as lack of resources and distorted prices instill all sorts of inefficiencies, but it also leads to frequent policy reversals and general uncertainty. The latter undermines the confidence and security that the sector's participants, such as farmers, landowners, workers, input producers, banks, etc.; confidence and security required to nurture activities, knowledge, and relationships that lead to long-term growth.

In this section we show that Brazilian agriculture suffered many of these pathologies in the process of becoming a major agricultural producer in the twenty-first century. The idea is not to present a detailed account of the evolution of agriculture in Brazil, but rather to explain the tortuous path from backwardness to high productivity as being largely determined by the level of uncertainty and security engendered by the country's institutional setting. Brazilian agriculture only achieved its dramatic transformation, realizing the potential that had until then seemed so elusive, once the country underwent an unprecedented strengthening in its institutions in the mid-1990s. This change generated a political and macroeconomic environment where agricultural policy would no longer be a subsidiary instrument for other policy objectives, fostering a dramatic reduction in the level of direct governmental interventions in agriculture. This sharply reduced uncertainty and provided greater safeguards for agents to make long-term investments and to fully pursue the country's agricultural potential.

The analysis divides the evolution of Brazilian agriculture into three distinct phases. The first is the phase of horizontal expansion,

from the end of the Second World War to the beginning of the 1970s, in which the growth of agricultural production was mainly due to the expansion of the agricultural frontier. The second is the phase of conservative modernization, from the early 1970s to the early 1990s in which the exhaustion of unused fertile lands in the frontier led to a system for technical change and policies that achieved a gradual modernization and diversification of agriculture but with high levels of concentration. Finally, a phase of low governmental intervention began in the mid-1990s with increasing participation of a substantially modernized and diversified agricultural sector in agribusiness complexes with growing importance in supplying domestic and international markets. The focus will be in showing how agricultural policy was undermined by conflicting policy objectives in the first two phases, and then on the impact of the reduction of these uncertainties in the third phase.

##### 4.2. The phase of horizontal expansion (1946–1970)

An analysis of the performance of Brazilian agriculture in the 1st phase must consider the urban bias of the import substitution industrialization strategy (ISI) adopted after WWII (Baer, 2008). The agricultural sector was then identified with backwardness, deserving attention only because of its key roles in the ISI strategy. Accordingly, agricultural strategy and policies remained second order. ISI resulted in a considerable transfer of income—achieved by the dominant urban-industrial policy network—from agriculture to the urban-industrial sector (Bacha, 1975; Oliveira, 1981). This was done chiefly through the manipulation of relative prices against agriculture. In this period, foreign exchange—primarily generated by agricultural exports, especially coffee—was consistently overvalued. Real prices of agricultural products for the domestic market—especially those of food products—were artificially compressed, via export restraints and by price fixing by decree. In contrast, prices of domestically produced industrial goods—the object of considerable protection—were free to increase.

In this period Brazil didn't have an all-inclusive agricultural policy network. The Ministry of Agriculture, created in the early 1930s, did not lead agricultural strategy and policy. It dealt mainly with regulatory aspects such as plant and animal health. Policies such as rural credit and minimum prices—virtually of no consequence in the period—were controlled by governmental organizations of the urban-industrial policy network with no concern with agricultural development. This led to policies with potentially negative effects on agriculture.

This notwithstanding, the performance of agriculture was adequate; production increased enough to assure that, by and large, the sectoral terms of trade would not negatively affect the then very rapid pace of import substitution industrialization (foreign exchange was essential for input and equipment imports), with its ensuing fast boost of urban demand for food (Mueller, 2011). In fact, regardless of a consistently overvalued foreign exchange, agriculture originated most of the country's export earnings. The adequate expansion of agricultural production for the domestic market meant that agricultural prices did not contribute towards the inflationary pressures felt during this period. In addition, agricultural production helped to generate unfavorable terms of trade between the agricultural and the industrial sectors.

Summing up, most of Brazilian agriculture remained extremely primitive during the 1st phase; yields were very low by world standards and remained so throughout the period (Nicholls, 1970). Policies to modernize agriculture were almost non-existent, an exception being the efforts to advance the production of coffee, cotton and sugar cane by organizations of the state government of São Paulo, the impacts of which were mostly limited to the agriculture of portions of that state (Pastore et al., 1976). The main policies in this period were the road building programs (Nicholls, 1970); new

<sup>3</sup> For a more detailed account of the traditional farming sector in Brazil and the role of EMPBRAPA refer to Bacha and Carvalho (2014). See also Alves and Rocha (2010).

roads enabled farmers to bring more land into cultivation, under practically the same methods.

#### 4.3. *The period of officially induced conservative modernization (1965–early 1990s)*

By the end of the 1st phase the availability of unoccupied fertile lands in the agricultural frontier had diminished significantly. There were abundant unused lands in the *Cerrado* (central-Brazil's huge savannas and in the Amazon), but technologies for their productive exploitation had yet to be developed. Fearing problems from an inadequate performance of agriculture, the 1964–85 military governments began promoting conditions for a more intensive use of land in the already settled areas and in the *Cerrado* portions not too far from the main markets; the occupation of land in the *Cerrado* and Amazon frontier continued but now mostly with geopolitical motivation (Mueller, 2012).

The basis of the development strategy of the military regime was to reinforce and accelerate the import substitution strategy aimed at the transformation of the country into a modern industrial powerhouse. An agricultural strategy was never central to the import substitution model adopted, but the regime realized the strategic role of an adequate performance of agriculture in terms of production for the domestic market and as a vital source of foreign exchange. However, the agricultural policies the 2nd phase saw the consolidation of an overall agricultural policy network involving representatives of the modernizing farm segments, pressuring increasingly for resources for credit and minimum price policies, for investments in roads and storage capacity in rural areas, and for the creation of new policy instruments (e.g. a rural insurance policy), and most of the organizations of the agricultural public sector, which were reformed and reorganized. The diversification of production and exports, together with the growing formation and consolidation of agribusiness complexes led to increasing pressure for broader policies for agriculture. However, even late in the period the increasingly influential agricultural policy network was far from capable to easily attain the policy objectives they favored. In the policy negotiations they had to contend with a highly influential group: that composed by the macroeconomic techno-bureaucracy. Regarding the agricultural sector the latter group had two sometimes conflicting goals: first, to achieve a good production and exports performance, seen as crucial to the control of inflation and the generation of foreign exchange; and second to control public expenditure. When considerations of production, supply and exports prevailed, the agricultural policy network and the macroeconomic techno-bureaucracy tended to act in tandem. However, when the threat to stabilization became pervasive the two policy networks usually diverged but, in times of economic crises the considerable power of the macroeconomic techno-bureaucracy led to the restriction – and sometimes the distortion – of policies dear to the agricultural policy network.<sup>4</sup>

With the restoration of democracy in 1985 the policy processes began to go through some transformations but agricultural policy did not change radically over the remainder of the 2nd phase (the 1985–1990 period). Brazil's was in almost constant state of macroeconomic crises during this period and the protracted approval and implementation of a new Constitution – the new charter was approved in 1988 and went into effect in 1989 – prevented significant reforms of the policy. In fact, they came to fruition only in the 1990s, during the 3rd phase.

The core aspects of the conservative modernization agricultural development model of the military regime were:

- The implementation of a broad based research system for tropical agriculture – leading to the EMBRAPA system. The first steps towards this goal were taken at the beginning of the 2nd phase but the emphasis on technological development of agriculture was more strongly felt after the 1970s. As we noted above this was probably the most important direct determinant of the productivity increases in the final period (this will be further discussed in the next section);
- The institution of a rural credit system – the National System of Rural Credit (NSRC)–, which provided, especially along the 1970s, abundant financing, in very generous terms, to commercial agriculture. It basically aimed at promoting the use of modern inputs (agricultural equipment, fertilizers, pesticides and insecticides), much of which were initially imported. The financial resources drawn by the agricultural credit policy were far from modest. After 1970, the annual value of loans (expressed in US\$), increased markedly, reaching almost US\$ 16 billion in 1974, and remained above US\$ 20 billion in all years of the 1975–82 period (this period's annual average was 23.1 billion US\$). The contribution of agricultural credit to the performance of agriculture during this period is widely recognized, although most experts considered the policy excessive and poorly conducted.<sup>5</sup> It was also criticized for reaching only a relatively small number of privileged large farmers; for its regional concentration in the Center-South of Brazil, disregarding depressed areas such as the Northeast; for focusing mostly on export commodities; for promoting rural unemployment by liberally financing investment in agricultural equipment; and – perpassing these aspects – by its effects on the concentration of income in rural areas.
- Improvement of the administration of the minimum price policy, which became dominant in the agricultural strategy in the 1980s. Due to escalating inflation in the 1980s, pressures for the control of monetary variables by international institutions, notably the IMF, was intense. This enabled the macroeconomic techno-bureaucracy to successfully press for low minimum prices, discouraging production. Conversely, in periods affected by poor harvests of specific commodities, their price would tend to be unusually high, coming to be seen as inflationary threat. In this case, the macroeconomic techno-bureaucracy would usually press for high minimum prices for the next harvest season, reinforcing instead of avoiding the resulting cobweb effect. As shown by (Mueller, 1988), in the 1980s the macroeconomic techno-bureaucracy was actually in command of the minimum price policy.
- The provision of inducements – incentives, subsidies – for the formation and the expansion of agribusiness complexes.
- It was assumed that, with the implementation of the above instruments, a dynamic rural entrepreneurial class would emerge and perform as expected in the agricultural modernization process. This assumption proved correct.
- There were marked changes in the legislation governing land reform, but which did not generate effective results. Modernization was to be achieved without major changes in the distribution of land. It was this that branded the agricultural strategy as 'conservative'.

In sum, having performed a broad reform of the agricultural support infrastructure, the regime decided to adopt market incentives instruments to assure an acceptable growth in agricultural

<sup>4</sup> The clashes between the agricultural policy network and the macroeconomic techno-bureaucracy in the context of the minimum price policy in the 1980s are discussed in Mueller (1988).

<sup>5</sup> See, for instance, appraisals in da Mata (1982), Sayad (1984), and Goldin and Rezende (1993).

production and exports, but clashes with macroeconomic objectives often undermined these efforts and generated significant uncertainty.

#### 4.4. *The consolidation of a modern, dynamic agricultural sector in Brazil*

One of the main factors responsible for the eventual success of Brazilian agriculture was, undoubtedly, the expansion of the international demand for agricultural commodities which led to a long period of quickly growing commodity prices. Nevertheless, in order to be able to take advantage of this window of opportunity it was crucial that an institutional environment had emerged where agricultural policy correcting market failures and creating conditions for investment, diversification and innovation could be adopted that was not plagued by conflicting objectives, reversals and unintended consequences. Once this had been achieved the process of private investment and accumulation actually required less government intervention than what had previously been the norm, allowing for a greater role for free enterprise in determining factor allocation. The key institutional change took place in both the political and economic dimensions. Politically the 1988 Constitution established a strong imperative for social inclusion, equality, transparency and participation, which is still a major determinant of the policymaking process in Brazil today. While this dimension led to the establishment of a strong and stable democracy for the first time in Brazil, it also contributed to deepening hyperinflation as this belief in inclusion sought to give all things to all people. Only with the rise of a belief in the fundamental and imperative importance of monetary stabilization that came about with the Real Plan in 1994, which did not displace but rather complemented the belief in social inclusion, did the country reach the institutional environment where both economic and political stability, predictability and inclusion would initiate an unprecedented virtuous process of development, poverty reduction and reduction of inequalities.<sup>6</sup> While the stabilization of the currency and the adoption of fiscal discipline were the most obvious proximate causes of the improvements of agriculture, the deeper, fundamental cause was the new institutional setting and consequent rule of law.

Three basic constituents of the expansion and modernization of agriculture in Brazil under this new environment will be discussed: the formation of an effective system of technological development; the expansion of an important class of professional, entrepreneurial, farmers; and the constitution and expansion of a dynamic agribusiness sector. The joint impact of change in these three areas had a central role in the development and modernization of Brazilian agriculture, which gathered speed along the 3rd phase.

As indicated, early in the 2nd phase the need to raise the productivity and modernize the Brazilian agriculture was prioritized. This was successfully executed and major results began to be felt towards the end of the period. The main features of the technical change system established involved the construction of the physical infrastructure of the system (research facilities built in central parts of the major producing regions or focusing on special themes), the hiring and training high level personnel sorely needed to advance the process, and the establishment of a scheme to coordinate, manage and continuously oversee and improve the system.

The construction of the research network involved the establishment by the federal government of a public corporation – *the Empresa Brasileira de Pesquisa Agropecuária (EMBRAPA)* to

coordinate the process and make it advance. Today *EMBRAPA* is quite large (Alves, 2010) but it is far from a centralized, monolithic organization. Having in view the considerable geographical size of Brazil, and the diversity of the country's habitats and social design, *EMBRAPA* was erected as a decentralized research network, composed of different centers spread throughout the country. There are regional organizations (such as centers for the savannas, humid tropics and dry lands), agricultural product organizations (such as centers for corn (maize), rice and beans, soybeans, beef cattle, and milk), and special thematic centers (such as the centers for genetics and for remote sensing). They were established in different geographical areas, guided by the characteristics of the agricultural research needs and problems. Furthermore, from the beginning *EMBRAPA* endeavored to acquire the collaboration of universities, of public institutions such as state research organizations, and of organizations of the private sector. And it also conquered the support of international organizations.

If the typical agricultural producers of Brazil were the absentee landlords motivated chiefly by political power, as sketched by many in the social sciences during the 1950s (for an interesting critical survey see Castro (1979)), the impacts of the research effort and of the injection of funds discussed above, would be of almost no consequence as far as the development of agriculture was concerned. However, in the south and southwest of Brazil and even in areas in which coffee prospered such as parts of the state of São Paulo, there was an important reserve of professional, generally full time farmers, well disposed to innovate. This was vital for the modernization that took place and which accelerated during the 2nd phase. The availability of land in the agricultural frontier and the potential for improvement in already cultivated lands with the use of appropriate technology and served by transport infrastructure, tapped this reserve of professional farmers. Sons of farmers and former small landowners in the south and of other parts of Brazil produced waves of migrants which, responding to the financial incentives lavishly provided by the government in the 2nd phase, purchased land in new agricultural areas. They took advantage of the new production methods made available by the research network. Moreover, this growing entrepreneurial reserve also started to occupy and cultivate land in the *Cerrado*, the huge savannas of central Brazil. They were encouraged not only by cheap lands, but by special governmental regional development incentives (Mueller, 2012), and – significantly – by the results of the research effort by the *EMBRAPA* network destined to create conditions for the productive cultivation of the acid, low natural fertile land in the *Cerrado* (Rezende, 2003). By the end of the 1980s, the *Cerrado* began to be regarded as an important potential area of expansion of Brazil's modern agriculture.

As shown by Montoya and Guilhoto (2000), by the end of the 2nd phase Brazil's agribusiness sector as a whole was already well established and its progress was strongly reflected in the more modern segment of the Brazilian agriculture. By the end of the 1990s it was responsible for nearly a quarter of the country's Gross Domestic Product. As for the origin of the private enterprises that compose the agribusiness complexes in Brazil, an important role has been played by multinational corporations, particularly in the production of inputs such as farm machinery and agrichemicals, and in the transformation of agricultural commodities; but the sector has seen the rise of domestic conglomerates some of which became multinationals, particularly in the area of meat processing.

It should be observed that, in the 2nd phase, agribusiness complexes came forward encouraged by market conditions and by incentives provided by the import substitution policies of the period.

In sum, over the 3rd phase the impressive development and modernization of Brazilian agriculture was the result of several initiatives, notably technical change and the incentives for the

<sup>6</sup> For a detailed analysis of the change in beliefs and institutions in Brazil from 1964–2014 see Alston et al. (2016).



expansion of an advanced agribusiness sector. It was also positively affected by the availability of entrepreneurial farmers and of new or degraded lands in which new technologies and modern inputs could be profitably applied. As for incentives policies, their role declined significantly in the period. They had an important impact in the transition stage of the 2nd phase, but later on the government struggled to disengage itself from them, transferring to the private sector part of the price support mechanism, and the financing of agricultural production. Of course, many distortions still remain. There are considerable challenges to be addressed – such as large investments in infrastructure – to ensure the continued development of the sector, and to prevent stagnation or regression.

## 5. Conclusions

In section 2 we argued that Brazilian agriculture has undergone an impressive transformation in the last fifty years from low productivity and backwardness to a frontrunner in the production and export of large portfolio of products. This success has led many other countries as well as international agencies to consider what lessons and recommendations the Brazilian experience might have for their own agricultural efforts. In particular, the Brazilian case has been suggested as a template for many sub-Saharan African countries given several geographical and economic similarities. In section 4 we detailed the evolution of Brazilian agriculture over three distinct phases in which different policies were tried and different results achieved. The transformation proper of Brazilian agriculture into its current modern and dynamic state began to take shape in the 1990s, but the earlier periods of conservative modernization (early 1970s to early 1990) and the frontier expansion period from World War II to the 1970s, marked the point where things began to fall into place. The path to agricultural modernisation did not take a straight pre-planned course, but rather moved along through trial and error, through many reversals, and was full of surprises and unintended consequences. This history has to be understood in the context of the country's political economy in which different policies necessarily redistribute rents, benefits and costs across myriad social and economic groups that try to influence these policies. In this sense, the Brazilian experience cannot be easily transplanted and emulated. Each country has its own idiosyncratic configuration of power, institutions and local circumstances, so that what worked in Brazil probably will have a very different effect elsewhere. Nevertheless, the Brazilian experience does suggest that agricultural policies work best when they reflect accommodation with various related markets. Brazilian agriculture took off once the country had reached a politically inclusive and economically disciplined institutional setting, allowing agricultural policy to become less interventionist, removing many restrictions, passing on to the private sector many tasks that these could perform better and concentrating on those areas where market failures remained, such as research, insurance, coordination, precautionary stocks, etc.<sup>7</sup> This might not make for a revolutionary policy recommendation but, as the Brazilian case has shown, it is a lesson that many governments are reluctant to recognize.

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<sup>7</sup> For a discussion of the implications of the history of Brazilian agriculture to the long standing debate in economics about the role of market versus state in development see Alston and Mueller (2016).



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