Trade Liberalization and Food Security

The Case of Bolivia after the Structural Reforms of 1985

Keywords: Bolivia, Food Security, Trade Liberalization, Economic Reforms

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Abstract

This research shows the relationship between trade liberalization and food security for the Bolivian case. As a result of the severe economic crisis of the early-1980s, Bolivia adopted a series of market-oriented reforms in 1985. The reforms included the liberalization of the trade regime and the promotion of non-traditional exports. The trade liberalization had an important effect on the performance of cash crops, especially in the development of the soybeans industry. However, food crops did not have such a great dynamics. Vegetables and starchy roots declined in per capita terms and the increase in imports were not enough to compensate the decline. Trade reforms mostly favor a small group of large-scale farmers in the lowlands, who had historically been granted land in the region. In this sense, Bolivia’s involvement in a trade liberalization process has not been reflected in an overall improvement of the country’s food security.
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Trade Liberalization and Food Security: the Case of Bolivia after the Structural Reforms of 1985

Mauricio Giovanni Valencia Amaya

1. Introduction

During the 1980s and 1990s, many developing countries adopted market-based structural reforms; these reforms were based mostly on the guidelines of international financial institutions, such as the International Monetary Fund (IMF) and the World Bank, and were aimed at promoting economic growth, lowering inflation, maintaining a viable balance of payments, and achieving an equitable distribution of income (Williamson, 1990). Among the set of market-oriented policies included in the reforms was trade liberalization. By dismantling tariff and non-tariff trade barriers, developing countries were expected to both stimulate economic growth and improve food security; however, neither the relationship between trade liberalization and economic growth is clear-cut, nor is the extent to which trade liberalization is linked to national food security.

In response to the economic crisis of the early-1980s, Bolivia adopted a set of market-oriented policies called the New Economic Policy (Nueva Política Económica) in 1985. The principal aim of the reform was to “restore sustainable economic growth as well as to enhance the allocative efficiency and international competitiveness of product and factor markets” (Spatz, 2006, p.6). The reforms helped Bolivia to overcome the economic crisis, but the expected economic growth was not reached and the country continued being exposed to external shocks (Spatz, 2006). Moreover, the reforms were not successful in saving the country from poverty; in fact, Bolivia remains being a poor country: 64.6 percent of its population lives below the national poverty line, of which 82.2 percent live in rural areas (World Bank, 2008). Accordingly, it is estimated that a large part of Bolivia’s poor population is food insecure (Melgar-Quinonez et al., 2006). Between 1990-92 and 2001-03, there was even an increase in the prevalence of undernourishment, indicating a setback in the hunger reduction objective from both the World Food Summit and the Millennium Development Goal Targets (FAO, 2006).

Bolivia was one of the early reformers in Latin America, and was even classified by the IMF in early 1990s as an open economy (Jenkins, 1997). However, Bolivia remained being one of the poorest countries in the region, with a large part of its population being food insecure. It is then pertinent to study the relationship between trade liberalization and food security, especially when there is a lack of studies that analyze this issue for Bolivia. In this context, the aim of this research
is to examine the relationship between the trade liberalization process started in 1985 and Bolivia’s national food security, using an adaptation of a food security methodological framework developed by the Food and Agriculture Organization of the United Nations (FAO). This research will then answer the question: What has been the effect of the liberalization of the trade regime in 1985 on Bolivia’s national food security? This question will be answer by using a long-term perspective. The findings of this study are expected to contribute to the ongoing debate on the effects of trade liberalization on food security.

The research is divided into eight sections, including this introduction. The second section presents the conceptual framework. It is stated that food security will be influenced by changes in the trade policies through the effects of those changes in the performance of the agricultural sector (in terms of quantities, prices and trade volumes). The third section introduces the concept of food security and how this concept has changed throughout time. The fourth section analyses the debate on the effects of trade liberalization on food security, including some ex ante case studies for developing countries. The fifth section presents the methodological framework. The sixth introduces an overview of Bolivia’s economic history with emphasis on the relationship between the mining and the agricultural sectors. It also shows the effects of institutional changes on the country’s agricultural development and ends up with the factors that led to the economic crisis of the early-1980s. The seventh section presents the empirical framework in accordance with methodology presented in the fifth section. It initially presents an overview of the main changes introduced by the trade reforms; afterwards, it analyzes the agricultural sector performance, comparing the pre- and the post-reform periods; finally, it shows the dynamics of the country’s food security for both periods. The eighth section concludes.

2. Conceptualizing Food Security

The most broadly used definition of food security is the one given by the Food and Agriculture Organization (FAO): “[Food security is] a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life” (FAO, 2001).

As with any other security issue, food security is closely interlinked with political goals and actions (Maluf, 1998; Jenkins and Scanlan, 2001). This is reflected in the malleability of the concept, which has enriched its scope throughout time. In the 1940s, the main concern was increasing food availability (the supply side); in the 1980s, the accessibility and ‘micro-food’ security (the demand...
side); and in the 1990s, the appropriateness and nutritional adequacy, giving a more important role to the individual behavior and its constraints (Lang and Heasman, 2007; Barrett, 2002).

These changes are also reflected in the three paradigm shifts identified by Maxwell (1996, p.156): (a) from the global and the national to the household and the individual; (b) from a ‘food first’ perspective to a livelihood perspective; and (c) from objective indicators to subjective perception. In this context, the paradigm shifts have changed the focus of the food security discourse: “Instead of a discussion largely concerned with national food supply and price, we find a discussion concerned with the complexities of livelihood strategies in difficult and uncertain environments, and with understanding how people themselves respond to perceived risks and uncertainties” (Maxwell, 1996, p.160).

Following these paradigm shifts, Maxwell based his definition of food security on the proper working of a country’s food system. Moreover, he stresses the importance of food accessibility for the poor and vulnerable: “A country and people are food secure when their food system operates in such a way as to remove the fear that there will not be enough to eat. In particular, food security will be achieved when the poor and vulnerable, particularly women and children and those living in marginal areas, have secure access to the food they want” (Maxwell, 1988, cited in Maxwell, 1996, p.159).

But having access to food is not a sufficient condition to achieve food security. Food utilization (nutrition security) is also required; that is, consuming and assimilating the necessary micro and macronutrients that the body needs in order to guarantee people’s health and productivity (Tweeten, 1999; Barret, 2002; Smith et al., 2000). In this sense, the concept of food security has evolved to include complementary nonfood services, such as education, health care, sanitation, and public infrastructure, which are considered to be important means for food security, as they affect the process of transforming food into energy and physical wellness (Tweeten, 1999; Barrett, 2002).

The ultimate importance of food security lies then in its ability to improve the human capital of a country via enhanced nutrition and health, creating a virtuous circle of development and growth, which would further guarantee food availability at the macro level either through national production or imports (Smith et al., 2000). It is important to note though that food security is an ex ante stage of health and nutrition, but it is not a sine qua non condition: “Food security is sufficient but not necessary for freedom from hunger but neither necessary nor sufficient for adequate nutrition” (Barrett, 2002, p.5); and this is so because of the need of the aforementioned complementary nonfood services.
The food insecurity situation of a country can be classified as (1) transitory or (2) chronic, depending on its regularity and severity. Transitory food insecurity is related to temporary shocks that affect food availability at the macro level; it can be categorized as (a) *periodic*, usually associated with seasonal cycles in crops’ prices and production; (b) *regular*, related to quasi-periodic events, such as pandemics, extreme climate events, and business and political cycles; and (c) *conjunctural*, associated with irregular calamities, such as wars and turmoil. Chronic food insecurity is related to persistent structural problems that hinder people’s access to food at all times (Barrett, 2002).

Whereas transitory food insecurity situations put to the test a country’s resilience in the event of expected or unexpected shocks, chronic food insecurity situations can be the manifestation of more deep-rooted problems such as poverty. In fact, poverty was found to be the most important determinant of food insecurity in developing countries in the 1990s (Smith et al., 2000). Barret (2002) and Smith et al. (2000) have shown that the food availability issue has been overcome in most developing countries, but food insecurity persists because access to food continues to be an unresolved situation (Barret, 2002; Jenkins and Scanlan, 2001; Smith et al., 2000). This situation is mainly caused by poverty and the rise in the age-dependency ratios (Foster, 1992; Von Braun et al., 1992; Alexandratos, 1995; Serageldin, 1995; Maxwell, 1996a, cited all by Smith et al., 2000; Jenkins and Scanlan, 2001).

The concept of food security has evolved then from a macro-perspective, focusing on supply issues such as availability, towards a more micro-perspective, where the center of attention is the quality and nutritional adequacy of food. Equally important is the attention pay to complementary nonfood services. But in the end, the ultimate goal of being food-secure is to guarantee a healthy life, as a way to improve the human capital of a country. Food security is also related to the proper working of a national food system. Securing availability, access, stability and utilization requires then the harmonization of policies at different levels, including trade policies.

3. **Trade Liberalization and Food Security**

The effects of trade liberalization on food security have been hotly debated by researchers. On the one hand, it is argued that: “neoliberal structural adjustment programs mandated by the World Bank and International Monetary Fund are central to the problem of malnourishment in underdeveloped economies […] Sadly, structural adjustment programs are at odds with food security goals. Economic contraction, increased inequality, and exacerbated poverty are the typical results, and market forces supplemented by minimum state intervention cannot succeed in eliminating hunger.”
(Gera, 2004, p.354-355). On the other hand, in a scenario of both increasing world population and growing per capita income, households demand for food is expected to increase, which means that production will have to keep step with this rising demand. In this perspective, it is claimed that “trade will be increasingly vital to food security. Because cereal production in the developing world will not keep pace with demand […] developing countries need freer trade to feed themselves” (Runge and Senauer, 2000, p.41).

3.1. The Positive Side of Trade Liberalization

One part of the research community argues that economic growth and trade liberalization are important means for attaining food security (Tweeten, 1999; Dorosh, 2001); the line of reasoning is that food insecurity is a manifestation of poverty, and poverty is overcome by increasing economic growth; more specifically, by raising both the national productivity levels and the real income of the poorest (Tweeten, 1999). Factors such as low purchasing power or unaffordable food prices, which can hamper food accessibility for the poorest, can be overcome by improving the economic performance and productivity of a country (as a way to raise income), as well as by removing barriers to trade (as a way to stabilize food prices and guarantee availability) (Tweeten, 1999).

Based on panel data analysis, Jenkins and Scanlan (2001) claim that trade liberalization can increase the food supply of developing countries without having negative impacts on their food security. This argumentation conflicts with the idea that the increase in global imports and food aid has worsened the food security situation of the less developed countries (Friedman 1982, 1993, cited in Jenkins and Scanlan, 2001; McMichael 1996, cited in Jenkins and Scanlan, 2001). More specific studies also show a positive relation. For instance, Maasdorp (2005) has shown that trade within the Southern African Development Community (SADC) is likely to improve the food security of the region, particularly of its landlocked members, by providing better prices and timely deliveries. Based on historical experience and model simulations, another study showed that trade liberalization can offset the price and production volatility of maize (the main staple food in Africa) in the Sub-Saharan region (Dorosh et al., 2009).

Nevertheless, there are also balanced approaches that recognize that trade liberalization alone is not a sufficient condition to attain food security; complementary policies are needed, and developed countries must open their economies and lower their subsidies and trade barriers as well (Zedillo et al., 2005; Díaz-Bonilla et al., 2002).
3.2. The Negative Side of Trade Liberalization

Empirical evidence shows that the trade liberalization process started by a large number of economies since the early 1980s has not been successful for most of them. On the contrary, for those countries, the trade reforms brought about deindustrialization, slowdown of exports, and increasing vulnerability of the local economies to external shocks. Furthermore, the reforms fell short in promoting private investment, a fundamental factor affects economic growth in developing countries (Shafaeddin, 2005).

Most of the concerns regarding the negative effects of trade liberalization on food security focus on the increase in both the mean price and volatility of food staples, as well as on the greater vulnerability of being exposed to the ups and downs of international markets. These factors are claimed to put at risk the food security of a large part of the population of developing countries that are net buyers or small farmers (Barret, 1998; Pinckney, 1993; Francisco, 2000).

Trade liberalization is also thought to affect the traditional crops and land uses of developing countries by shifting resources and land from food crops towards cash crops produced for the international markets (Patnaik, 1996). Moreover, it is claimed that the earnings from cash crops exports will be either repatriated by the multinational corporations or used to import manufactured goods for the urban population, counter-arguing the claim that these earnings will be used to import food; and that the competition from other developing countries will reduce the export earning over time, worsening the terms of trade and making food import even more difficult (Patnaik, 1996).

On the export side, the promotion of cash crops for export does not always raise income levels or improve food security. The cash crop policy generally promotes a single export crop. Farmers who are enrolled in the production of the leading crop are often granted subsidies and access to complementary services that are usually not available for traditional farmers (Francisco, 2000). Furthermore, the benefits of the export activity are likely to remain in the hands of large producers. This is because, in developing countries, the type of crop produced is related to the size of the farmer, and large farmers are more prone to engage in the production of cash crops, whereas smaller farmers are more oriented towards food crops. This situation is usually attributed to differences in (1) the intensity of the factors of production; (2) the degree of risk aversion of the farmers; and (3) the degree of dependence on food crops for self-subsistence (Fafchamps, 1992).

In this sense, trade liberalization and the single commodity export culture behind it are expected to support the prevalence of an international division of labor that prevents long-run growth in the less
developed countries (Jenkins, 1997). It is important to note that many of these countries function under a mix of market and non-market economies, and that non-market institutions, such as barter markets, have been found to be a sustainable food system in some developing countries (Marti and Pimbert, 2006). In this regard, trade liberalization and export-oriented agriculture had become a threat to non-market economies. This is so because these processes operate under the logic of capitalism, which is based on growth, accumulation and competition, and favors monetary rather than non-monetary transactions (Francisco, 2000).

Not functioning with the logics of the market economy becomes then a drawback when less developed countries engage in trade liberalization. That is why it is claimed that in order for a country to expect benefits from free trade, it must already have attained a minimum degree of development (Helleiner, 1986, cited in Jenkins, 1997). Similarly, “in a largely undiversified economy with low levels of productivity, reforms aimed at altering market signals in order to align domestic prices with international prices are clearly not sufficient, in and of themselves, to initiate or carry forward a timely process of structural change. Change takes place, but too slowly and with weak, or lagging, pulls on investment and economic growth” (Agosin and Ffrench-Davis, 1997).

3.3. Some Ex Ante and Ex Post Case studies

A series of ex ante studies for developing countries (YCSG, 2005) provided the background information for the United Nations Development Programme (2005) report “Trade for Development”, analyzing the effects of multilateral trade liberalization on poverty and food security under two different case scenarios: (1) A business-as-usual scenario (limited multilateral trade liberalization) and (2) an ambitious scenario (extensive multilateral trade liberalization). The conclusions from the simulations point at the welfare gains of poor households when countries reduce their tariff and non-tariff barriers. In the case of Zambia (Balat et al., 2005), Cambodia (Soloaga, 2005), and Nicaragua (Gómez and Soloaga, 2005), under the business-as-usual scenario small negative impacts on the household’s welfare are expected; whereas under the ambitious scenario poverty levels are likely to be reduced, especially in the rural areas, where most of the poor people live. A drop in the prices of food is then expected to have a positive effect on households’ income, particularly when food holds a large stake in the total expenditures. Under both scenarios, it is concluded that complementary policies aiming at facilitating the access of local farmers to national and international markets are important and might help minimize the losses of the first case scenario and maximize the gains of the second. In this sense, the extension of agricultural services and the improvement of road infrastructure are considered to have a positive effect on the income of the poorest families.
However, the simulations were not always positive for all cases. For Ethiopia (Nicita, 2005a) and Madagascar (Nicita, 2005b) the results were modest in both scenarios. The poorest and rural segments of the population are expected to gain less than the richest and urban ones. Reasons for this are found in the persistence of a low-productive subsistence economy where exports have a small share of the GDP, and where the lack of connectivity and proper infrastructure hinders both the price transmission and the supply response. In this scenario, a price increase derived from trade liberalization will negatively affect the households’ income, especially that of the poorest, since the food price increase will not be counterbalanced by a raise in production, exports and employment. Nevertheless, a positive effect might be expected only if the trade liberalization is accompanied by complementary domestic policies such as productivity improvements in the agricultural sector.

Finally, in the cases of Vietnam (Isik-Dikmelik, 2005) and Bolivia (Lara and Soloaga, 2005), multilateral trade liberalization is expected to have differentiated effects depending on net position of the household as a net buyer or a net seller. For Vietnam, in the event of an increase in the price of rice after the liberalization process, urban households are projected to be the losers due to the consumption effect, whereas rural households are expected to be the winners due to their position as net sellers of rice. Wealth might be then redistributed from net buyers to net sellers. For Bolivia, multilateral trade liberalization is expected to create jobs in the commercial agricultural and manufacturing sectors (textile in particular), as a result of the estimated export expansion of cash crops and textile products; it is then claimed that most of Bolivia’s welfare gains will stem from switching from subsistence to wage labor, rather than from the changes in prices and quantities.

According to ex post studies for Africa, the results of trade liberalization on food security have been less than satisfactory. In the case of Malawi (Chilowa, 1999), the market-based structural adjustment policies implemented in the early 1980s, which included trade liberalization, failed in reducing poverty, in achieving better livelihoods and welfare for the population, and in improving the food security situation of the country. While focusing on market-based strategies, the reforms overlooked non-market obstacles and production constraints that were hindering economic growth. In the end, the adjustment policies left winners and losers; net sellers were the winners, while net buyers, which comprise the majority of the population, were the losers (Chilowa, 1999). As in the case of Zambia, the effects of trade liberalization on food security were not straightforward, since several factors could have reinforced or counterbalanced the causal relationship: the effects of other reforms carried out jointly (fiscal and monetary, for example), the lack of complementary reforms, the implementation process, and the persistence of structural problems, such as the lack of proper infrastructure (Seshamani, 1998).
In the case of Bolivia, the trade liberalization process did not bring about a diversification in the country’s export portfolio, which has concentrated on low added-value commodities. Nor did it help to open new international markets or boost economic growth (Jenkins, 1997; Muriel and Barja, 2006). Moreover, the number of companies involved in the export business remained low (Jenkins, 1997). The lack of success of the trade liberalization process in terms of economic growth has been attributed to both the low degree of investment and the absence of proper infrastructure; factors that have deterred a stronger supply response (Sturzenegger, 1995, cited in Jenkins, 1997; Cardoso and Helwege, 1992, cited in Jenkins, 1997; Agosin and Ffrench-Davis, 1993, cited in Jenkins, 1997; Morales and La Torre, 1995, cited in Jenkins, 1997). The low levels of investment are, in turn, the result of the poor credit policy, the lack of proper infrastructure, and the incipient internal demand (Jenkins, 1997).

On the whole, the relationship between trade liberalization and poverty is not simple. Theoretically, trade liberalization is expected to have a positive effect on poverty reduction in the long run, especially via productivity improvements (Winters et al., 2004). However, trade liberalization implies changes in the distribution of welfare, and this might negatively affect the well-being of the poor, especially in the short run; besides, trade liberalization is not necessarily the panacea for poverty alleviation. In addition, several factors might influence the final balance: (1) the characteristics of the poor, (2) the initial setting at the moment of the reforms, and (3) the prevailing institutions. It is stated that the final effect of trade liberalization on poverty will be country- and case-specific; and even if it could be a cost-effective policy towards poverty reduction, complementary policies might be needed. This is especially true when the poorer households lack of resilience or are unable to take advantages of the policy changes (Winters et al., 2004).

Opening up an economy to the international markets is exposing a national food system to the ups and downs of the international trade. In this sense, having a strong national food system is then a prerequisite before a country can take advantage of free trade without putting at risk its national food security. Having a free trade regime can guarantee availability of food in cases when the domestic food supply is insufficient or when the country faces a transitory food insecurity situation. But at the same time, for developing countries with lack of power either to set or change the rules of international trade, opening up their economies can increase their vulnerability to external shocks and expose their economies and national food systems to the logics of global capitalism, whose interests are not necessarily shared.
4. Conceptual Framework

According to FAO (2003), the food security status of a country can be affected by a series of factors (causal factors), which can be both internal to the country, such as changes in policies and the introduction of structural reforms, or external to the country, such as climate events and international policies. Causal factors will influence food security through changes in the relative prices, in the quantities produced and consumed, and in the trade volumes (intermediate effects). In turn, these changes will modify the production and consumption decisions of farmers and consumers, affecting the performance of the agricultural sector. Finally, the resulting changes in the agricultural sector will affect the food security situation of the country (outcomes). A complete causality assessment must consider the country’s institutional environment, the prevailing agro-climatic conditions and the level of human and physical capital, since these parameters will influence the transmission process. This two-stage causal relationship is depicted in Figure 1.

Figure 1. Trade Reforms and Food Security: A Simplified Conceptual Framework

Source: Adapted from FAO (2003).

4.1. Causal factors

Reforms are considered to have an important influence on the agricultural sector incentives. Indeed, a country’s agricultural sector can not only be affected by reforms specifically related to the sector, but also by reforms external to it. Examples of the first (agricultural sector reforms) include: agricultural trade liberalization, nontraditional cash crops promotion, crop diversification policies, and credit and subsidy policies. The second type of reforms (external to the agricultural sector) include, for instance: macroeconomic reforms, institutional reforms, and reforms carried out in
other economic sectors. Even though both types of reforms are recognized to have an influence on the incentives structure within the agricultural sector, it is important to recognize that external shocks, such as extreme climate events or wars, and international economic conditions can modify or alter the transmission process. On the whole, while the analysis will be centered on the effects of trade liberalization (as the main causal factor) on the agricultural sector incentives, it is necessary to conduct such an analysis considering the context in which the reforms takes place, that is, considering the extent to which associated reforms, national and international economic events, and other external shocks might also influence such incentives (FAO, 2003).

### 4.1.1. Modifying Parameters

It is argued that by eliminating tariff and non-tariff restrictions that distort the prices of tradable commodities, trade liberalization is expected to (1) smooth the price transmission process from border to farmer, and to (2) improve farmers’ ability to react. However, as was mentioned before, the institutional and policy environments can modify the transmission process. More specifically, (1) markets functionality, in terms of (a) market access and (b) market integration, and (2) access to productive assets (as well as to social, natural, infrastructural and finance capital) are considered to be important factors that can influence the depth of price transmission and farmers response. These three categories can be defined as follows: market access refers to “the ability of producers to engage in the production of marketed crops and/or to obtain marketed inputs” (FAO, 2003, p.239); market integration “relates to how well changes in prices in one market […] are reflected as changes in other related markets” (FAO, 2003, p.239); and access to productive assets refers to the extent to which market and non-market institutions facilitate or hinder producers to access marketed and non-marketed assets.

### 4.2. Intermediate Effects

Once there has been a change in the incentives, as result of a trade reform, the agricultural sector’s reaction can take the form of changes in one or more of the following variables: the production levels and value, the relative prices, the productivity levels, the export earnings, the food import requirements, and the crop mixture (food vs. non-food, tradable vs. non-tradable, traditional vs. non-traditional) (FAO, 2003). It is important to note that the final response may vary according to the type of farmer, the crops being grown, and the farming systems used.
4.2.1. Modifying Parameters

Once the agricultural sector has reacted to the new incentive structure, the final impact of the supply reaction on the food security status can be affected by the economic and institutional context of the country. This is because “changes in the incentives facing the agriculture sector do not usually occur in isolation [that is], other economy-wide changes, for example in non-agricultural employment and income levels, can offset or even negate the potential impacts of any change in agricultural production” (FAO, 2003, p.244). Therefore, a second set of modifying parameters that reflect the economic-institutional context needs to be considered. These parameters include, for example: (1) the economic structure of the country and the role of the agricultural sector within it; (2) trade dependency; (3) food self-sufficiency level; and (4) export base diversification.

4.3. Outcomes

Finally, changes in the supply performance resulting from trade liberalization are expected to have an effect on a series of national food security indicators related to (1) availability, (2) stability, and (3) accessibility.

5. Methodological Framework

This study follows an adapted version of the methodological framework developed by the FAO (2003) for analyzing the impact of reforms on national food security levels. The methodology is approached using an *ex post* analysis and attempts subsequently to identify the relationships between the structural adjustment policies related to the trade liberalization and promotion of non-traditional exports adopted in Bolivia in 1985 and the changes in the country’s food security levels. In accordance with the conceptual framework, the investigation is formulated as a sequence of three stages: (1) an overview of the changes implemented by the trade liberalization in terms of incentives to imports and exports; (2) a comparative assessment of the agricultural sector performance before and after the reforms; and (3) an identification of the impacts of agricultural performance on national food security.

As a preamble to the trade reforms of 1985, an overview of Bolivia’s geography and economic history is presented. This preamble provides a contextualization of the long-term economic trends and physical constraints of the country. It has as starting point the evolution of the mining sector and its effects on the agricultural development. It analyses as well the effects of the reforms of 1953, which had an important impact on the country’s development during the second half of the
twentieth century. It ends up with the factors that led to the economic crisis of the early-1980s, which preceded the structural reforms of 1985.

5.1. Stage One —Causal factors

This stage presents a description of the trade liberalization reform, including a timeline of the different changes in terms of incentives to imports and exports.

5.2. Stage Two —Intermediate effects

This stage analyzes the agricultural sector performance in terms of quantities produced, area harvested, average yields, imports, exports and prices. The periods of analysis are, in most of the cases, 1961-1985 and 1986-2006, as the reforms were implemented in 1985. This stage includes an analysis of the following indicators:

5.2.1. Total Food Supply

This is calculated as the sum of domestic production, imports and foreign aid, minus exports. Years: from 1970 to 2006. The starting date is 1970 because food aid statistics are available from that year onwards. Source: FAO.

5.2.2. Agriculture Value-Added

Two sub-indicators were used: (1) an index of the value of the agriculture expressed in constant dollars of 2000; and the GDP share and growth rate of agriculture value-added. Years: from 1970 to 2006. Source: World Development Indicators of the World Bank.

5.2.3. Crops Production

This indicator expresses the quantities produced in tons by crop category. The growth rates for the periods 1961-1985 and 1986 and 2006 were decomposed in order to assess the contribution of each crop category to the overall growth rate. Years: from 1961 to 2006. Source: FAO.

5.2.4. Area Harvested

This indicator is measured in hectares. The growth rates for the periods 1961-1985 and 1986 and 2006 were decomposed in order to assess the contribution of each crop category to the overall growth rate. Years: from 1961 to 2006. Source: FAO.
5.2.5. Crops’ Yields

This indicator is measured in hectograms per hectare (hg/ha). Years: from 1961 to 2006. Source: FAO.

5.2.6. Sources of Agricultural Expansion

This indicator compares the indices of production, area harvested, and yields, using as base years 1961 and 1986, in order to identify the sources of expansion of production. The analysis is done for the different crops categories, as well as for the main Bolivian staples and cash crops, namely potato, cassava, rice, maize, wheat, sugarcane, and soybeans. Years: from 1961 to 2006. Source: FAO.

5.2.7. Indices of Concentration and Specialization

The Herfindahl-Hirschman Index (H index) is used here to measure the degree of concentration of Bolivia’s harvested area. It is calculated as \( HH = \sum_{i=1}^{N} s_i^2 \), where \( s_i \) is the participation of the crop \( i \) in the total harvested area and \( N \) is the total number of crops in a given year. The H index ranges from \( 1/N \) to 1, where 1 indicates an absolute concentration of the harvested land in one single crop, and \( 1/N \) the case where the country dedicates the same amount of land to every crop. The normalized version of the H index, which ranges from 0 to 1, is

\[
H^* = \frac{(H - \frac{1}{N})}{\left(1 - \frac{1}{N}\right)}
\]

A value of \( H^* \) higher than 0.18 indicates high concentration, whereas a value below 0.1 indicates low concentration. Any value in-between denotes moderate concentration. Note: The Index of Specialization measures the degree of specialization in a certain activity. In this case it is used to assess the degree of specialization in a certain crop, based on the share of the total harvested land.

The Index Four of Specialization measures the weight of the four most important crops, ranked according to their participation. It is defined as

\[
I4S = \frac{(L - D)}{(1 - D)}, \quad \text{where} \quad L = a_1 + \frac{1}{2} a_2 + \frac{1}{3} a_3 + \frac{1}{4} a_4,
\]

being \( a_1 \) the percentage share of the most important crop (in terms of harvested area), \( a_2 \), of the second most important, \( a_3 \), of the third, and \( a_4 \), of the fourth; and

\[
D = \frac{1}{N} \left(1 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4}\right),
\]

where \( N \) is the total number of crops. A high index means a high weight of the four main crops, and therefore, a high specialization.

Both indices are also used to measure the degree of concentration and specialization of Bolivian exports and imports.
5.2.8. Agricultural Trade

This indicator shows the evolution of agricultural imports and exports, expressed in US dollars. Years: from 1961 to 2006. Source: FAO.

5.2.9. Price Stability

The coefficient of variation of the main agricultural prices, for the periods 1967-1985 and 1986-2006, are compared in order to identify volatility changes. Years: from 1967 to 2006. Source: FAO.

5.2.10. Prices and Production Quantities

The objective here is to identify the relationship between the prices and production quantities of the main Bolivian staples and cash crops, namely potato, cassava, rice, maize, wheat, sugarcane, and soybeans. In order to do so, indices for both categories are used, having 1986 as based year. Years: from 1986 to 2006. Source: FAO.

5.2.11. Price Decomposition

According to Quiroz and Valdés (1993) and FAO (2003), changes in the domestic price (pd) of tradable commodities are the result of changes in (1) the commodity’s international price (pw), (2) the real exchange rate (Et), (3) the domestic nominal protection rate (τ), and (4) other factors (γ), such as transportation, marketing costs, and subsidies. The following equation is then used to decompose the price of commodity i at time t:

\[ p_{it}^d = p_{it}^w E_t (1 + \tau_{it})(1 + \gamma_{it}) \]

Now, in order to determine the approximate percentage contribution of the different components of the domestic price of commodity i, from one period to another, the following equation is used (FAO, 2003):

\[ (\ln p_{i1}^d - \ln p_{i0}^d) = (\ln p_{i1}^w - \ln p_{i0}^w) + (\ln E_1 - \ln E_0) + (\ln \tau_{i1} - \ln \tau_{i0}) + (\ln \gamma_1 - \ln \gamma_0), \]

where \( \ln \) denotes the natural logarithm.

Due to data constraints and in order to facilitate the analysis, the last two factors of the equation, \( \tau \) and \( \gamma \), can be combined to represent changes in domestic variables (FAO, 2003).
5.2.12. Unit Value of Agricultural Exports and Imports

The unit value of agricultural exports and imports was calculated as:

\[ UV_t = \frac{\sum_{i=1}^{n} p_{it} q_{it}}{\sum_{i=1}^{n} q_{it}} \]

Where \( p_i \) and \( q_i \) represent the price and quantity of commodity \( i \) at time \( t \), and \( n \) is the number of commodities exported or imported.

The unit value index is then:

\[ UVI_t = \frac{\sum_{i=1}^{n} P_{it} q_{it}}{\sum_{i=1}^{n} q_{it}} \times 100 = \frac{UV_t}{UV_0} \]

Years: from 1961 to 2006. Sources: FAO.

5.3. Stage Three — Food Security Indicators

This stage analyzes the changes in the following food security indicators.

5.3.1. Indicators of Inequality

Three indicators of inequality are used. (a) The Gini index; (b) The income distribution as the quintiles share of the total income; and (c) the income share held by the lowest and highest 10 percent of the population. Years 1986, 1991, 1997, 1999, and 2002. Source: The World Development Indicators of the World Bank.

5.3.2. Food Availability

Different indicators are used here to measure the changes in the food availability. The domestic food production in gross and per capita terms; the index of per capita food production by crop category; the index of per capita food imports by crop category; the total food supply by component; and the index of total food supply per capita. Years: from 1961 to 2006, except for the total food supply indicators, for which the period is 1970-2006. Source: FAO.
5.3.3. Food Deprivation

It takes into account the prevalence of undernourishment as a percentage of the total population; the total number of undernourished people and their food deficit, expressed in kilocalories per person per day. Years: 1990-1992, 1995-1997, 2003-2005. Source: FAO.

5.3.4. Food Consumption

It considers the energy (kcal/person/day), protein (g/person/day), and fat (g/person/day) dietary consumption. This indicator is used to compare the food consumption of Bolivia, Latin America and the World. This section also includes the food groups share in the daily food intake. Years: 1990-1992, 1995-1997, 2003-2005 for the comparison analysis and the food groups share, and from 1961 to 2003 for Bolivia’s overall assessment. Source: FAO.

5.3.5. Import Dependency and Self-Sufficiency Ratios

The Import Dependency Ratio (IDR) is defined as
\[
\text{IDR} = \frac{M}{D-X+M} \times 100
\]
where M are imports; D, domestic production; and X, exports.

The Self-Sufficiency Ratio (SSR) is calculated as:
\[
\text{SSR} = \frac{D}{D-X+M} \times 100
\]
where D is domestic production; M, imports; and X, exports.

5.3.6. Food Security Index

A Food Security Index (FSI) is used here to assess the relative food security situation of the country year by year between 1967 and 2003. By ranking the years, it is then possible to identify trends and breaks in the food security situation. The index comprises three aspects of food security: (1) availability; (2) accessibility; and (3) stability.

5.3.6.1. Availability Index

This index combines the following variables:

- Dietary energy supply (kcal/person/year).
- Percentage share of staples in the dietary energy supply. Since a high share represents lack of variety in the diet, the inverse of this variable is the one used as input.
- Dietary energy supply of staples (kcal/person/year)
- Cereals supply (kg/person).
• Fruits and vegetables supply (kg/person).
• Total food supply (kg/person).
• Total protein intake (g/day/person).
• Total fat intake (g/day/person).
• Share of land devoted to staples in the total arable land.
• Cereals yields (ton/ha).
• Roots and tubers yields (ton/ha).

5.3.6.2. Accessibility Index

This index combines the following variables:

• GDP per person (constant 2000 USD).
• Inflation rate.

5.3.6.3. Stability Index

This index combines the following variables:

• Cereal price change (percentage). The inverse of the absolute value of this variable is used as input.
• Roots and tubers price change (percentage). The inverse of the absolute value of this variable is used as input.
• Cereals import dependency ratio. The inverse of this variable is used as input.
• Growth rate of domestic production (percentage).
• Growth rate of the dietary energy supply (percentage).

Using the following formula, each variable is converted into a unit-free index, ranging between 0.0 and 1.0:

\[ X - \text{variable}_t = \frac{x_t - \text{Min}(x_{1967}^{1967} - x_{2003}^{2003})}{\text{Max}(x_{1967}^{1967} - x_{2003}^{2003}) - \text{Min}(x_{1967}^{1967} - x_{2003}^{2003})} \]

where, \( x \) is the variable in question, and \( \text{Min} \) and \( \text{Max} \) are the minimum and maximum values for the variable between 1967 and 2003.
Once converted, the variables were added together in their respective index (equal weights were assigned to each variable). The Food Security Index was then calculated as the average of the availability, accessibility and stability indices (equal weights were assigned to each index).

This study will be able to provide then a general assessment of the impact of trade liberalization on food security, mostly at the national level. The lack of time series at the household level is a limitation to conduct a more detailed study.

6. Bolivia’s Economic History: An Overview

6.1. Geography

Bolivia is a landlocked and sparsely populated country in South American. With a population of nearly 9.5 million (2007) distributed over a land area of 1,084,390 km$^2$, the country has one of the lowest population densities in the world and the second lowest in the Americas after Canada (World Bank, 2009). Most of its population lives in urban areas, though still a considerable part of it remains rural (Graph 1).


Source: Own calculations based on FAO (2009).

Geographically, the country is divided into three main natural regions (Map 1): (1) the Andean highlands, center of the mining industry; (2) the valley or Sub-Andean region; and (3) the eastern lowlands, center of the commercial agriculture and the petroleum industry.
Different geographical features of Bolivia’s regions, such as altitude and temperature, have determined their productive specialization over time, which, in turn, have shaped the dynamics of their relationships. In terms of agriculture production, for example, the Andean highlands produce almost 100 percent of the country’s coffee and quinoa, and it is an important producer of broad beans, barley and potatoes. The sub-Andean region specializes in the production of bananas, but it also contributes to a large part of the country’s peas and potato production. The eastern lowlands concentrate the production of sunflower, soybeans, cotton, sugarcane, sorghum, tomatoes, rice, and cassava (INE, 2009). Food crops are generally produced in the Andean and Sub-Andean regions. These crops are mainly grown for self-consumption on a small-scale and are usually prone to adverse climate conditions (Lara and Soloaga, 2005). Cash crops, on the other hand, are primarily produced in the eastern lowlands and are grown on a large scale destined for the national and international markets.

In terms of the contribution to the national economy, the GDP in 2006 was almost equally distributed among the three regions: 33 percent was generated in the Andean highlands; 32 percent in the sub-Andean region; and 35 percent in the lowlands (INE, 2009). Though during most part of its Republican history the Andean highlands were the center of the country’s economic activity, especially during the silver and tin eras, the lowlands importance increased gradually since the mid-twentieth century, mostly at the expense of the highlands, as the country’s economic activity shifted from mining to commercial agriculture and natural gas.

Being landlocked is per se a constraint to a country’s economic development (MacKellar et al., 2000). In the case of Bolivia, geography has not only limited its development, it has also hindered its integration into the world economy and made the connectivity between its own regions a difficult task. Geography helps to explain the disparities among Bolivia’s provinces in terms of poverty, labor and income (Morales et al., 2000). Likewise, geography has also affected the country’s competitiveness as Bolivia’s transportation costs rank among the highest in Latin America (IADB, 2004). In turn, the high transport costs of Bolivia are related to the lack of paved roads, whose construction and maintenance are expensive due to some of the geographical features of its regions: the “soft soil and abundant rain” of the lowlands and “the highly mountainous topography” of the highlands (Gallup et al., 2003, p.85).
Droughts and floods are the two most common natural hazards in the country. Both hazards have not only affected the productivity of Bolivian crops but have also exposed their vulnerability to climate-related events. Inundations are related to the Sea Surface Temperature Anomalies (SSTA) in the Atlantic Ocean (Ronchail et al., 2005), whereas droughts are associated with the interplay of semi-permanent systems of high and low pressure (Garcia et al., 2007). However, the most dramatic disasters in the country’s recent history have been related to droughts (two in 1983 and one in 1990) (EM-DAT, 2009), which affected mostly the highlands region.

Source: Urquiola et al. (1999), cited in Gallup et al. (2003).
Following Garcia et al. (2007), even thought the highlands climate can be classified as “tropical with moderate seasonal variation […] due to the high altitude […] the mean temperature is noticeable lower than what would be expected based on the latitude” (p.110). Moreover, “precipitation is controlled by three semi-permanent systems of high pressure, [1] the anticyclones of the Atlantic, [2] the South Pacific and [3] the Caribbean, and one system of low pressure, the intertropical convergence zone (ITCZ)” (p.110). The interplay of these systems is responsible for the unequal precipitation and temperature rates distribution in the Bolivian highlands, since the south is usually drier and warmer than the north.

The south of the highlands is characterized by special climatic characteristics, such as “low rainfall, high rate of evapotranspiration, and low water retention capacity of the soils” (Garcia et al., 2007, p.110), which combined leads to water shortages in the region. This, in turn, affects the productivity of its most important crops, namely potato and quinoa (Garcia et al., 2007; Geerts et al., 2006; Vacher, 1998). In fact, even though both crops have successfully adapted to the harsh climate conditions of the highlands, their yields remain low compared to other South American countries (FAO, 2009). As Garcia et al. (2007) state: “during dry spell periods farmers are frequently confronted with yield reductions, leading cumulative to shortages of human food and animal feed (Garcia et al., 2003; Jensen et al., 2000). In addition, plant growth is limited by frost in the southern part of Peru and Bolivia and high-salt levels in the soil, especially in the salt deserts of the southern part of Bolivia (Jacobsen et al., 2003)” (p.110). Consequently, crops in the highlands region, especially potato and quinoa, are highly vulnerable to climate change, particularly in the south, since this region has less favorable climatic conditions.

6.2. The Mining Industry

The mining industry has played an important role in Bolivia’s economy throughout its history, mainly because of their spillover effects on other economic activities, in particular on the agricultural sector. However, since Colonial times the mining industry has been characterized by being both highly dependent on a single export commodity and quite vulnerable to external shocks. In this sense, external events did not only affect the performance of the mining industry but also that of the agricultural sector. Therefore, understanding the dynamics of Bolivia’s agricultural sector and the country’s food security requires gaining an insight into the country’s historically leading sector: the mining industry.

The early stages of Bolivia’s commercial agricultural were linked to the discovery of the richest veins of silver in the Americas in the mid-16th century in the highlands region. This discovery paved
the way for the founding of Potosí and Oruro. Because of its location in a poor agricultural and arid zone, the city established strong economical backward linkages with other highland regions, such as Cochabamba, which became its major supplier of maize and wheat, and La Paz, which became an important commercial and agricultural market center (Klein, 2003). However, the exhaustion of the silver resources in the late-16th century brought about a reconfiguration of the country’s social structure and economic space. The main consequences of the silver crises were: (1) the steady decline in the region’s population and economic importance; (2) the impact on institutions like the free communities and the hacienda; (3) a drop-off in the satellite food-supplying markets, especially Cochabamba; and (4) a shift in the importance of other cities, especially La Paz (Klein, 2003).

The restructuration of the mining industry in the mid-nineteenth century created a new economic boom in the country. Just as with the sixteenth-century boom, the growth of the silver industry renewed the backward linkages with the agricultural sector. The development of the railway system not only benefited the silver mining industry but also the country’s commercial agriculture, since regions that were isolated until then were now connected to the centers of the economic activity. The infrastructure development, by facilitating the connectivity of the country, created new markets and expanded the domestic demand for foodstuff, especially wheat and maize. This, in turn, was beneficial for Cochabamba, where these crops were grown (Klein, 2003).

However, the silver mining boom also uncovered the vulnerability of the country to external shocks, especially to changes in international prices and international demand (Klein, 2003). External shocks affected not only the export sector, but also all the other sectors that were somehow linked to the performance of the mining exports. For instance, the government was affected in terms of tax collection; the importers because of the availability of foreign currency; and the backward sectors, in particular the agricultural sector, because it depended heavily on the ups and downs of the mining industry.

The international silver crash of the late-nineteenth century marked a transition point in Bolivian history. But Bolivia was well prepared to face the crisis. By then, the silver industry had the most up-to-date mining technology and the country’s railway network had already connected the pacific coast (the most important Bolivian exit to the international markets) and the mining regions. Moreover, the sudden rise in the world demand for tin, which was boosted both by the introduction of canning in the food industry and by the depletion of the European tin mines, presented an opportunity for the Bolivian mining sector to switch from silver to tin. The transition was relatively easy because tin had been a traditional byproduct of silver mining and the sector already had the
infrastructure and technology necessary to ship it to the international markets at competitive costs (Klein, 2003, Hillman, 1984).

But the backward effects of the tin boom on the agricultural sector development were rather small. By the mid-twentieth century the country had a predominantly rural population that was not engaged in market-oriented activities and the country depended heavily on the imports of foodstuffs, especially Andean starchy roots (Klein, 2003). The increase in food imports is related to the rail infrastructure development that connected Bolivia with its neighboring countries. The greater connectivity made imported food cheaper and so the national produce was eventually replaced by the imports substitutes (Preston et al., 1997). The tin boom came to an end in the 1930s, as a result of the Great Depression, which made tin prices to drop sharply; the relatively high extraction costs; and the Chaco War between Bolivia and Paraguay (Klein, 2003; Farcau, 1996). The country had to way until the 1960s for another boom to take place.

By the mid-1960s, tin production boosted, as a result of a combination of external and internal factors: (1) an increase in the international prices of tin; (2) a cut back on the labor force and a reduction of wages; and (3) an increase in foreign capital inputs. Moreover, the liberalized investment code of 1965, plus the government subsidies and support to private medium-sized mining companies, took the industry out of its backwardness, and so, when the price boom of the 1970s started (international prices of tin almost doubled between 1973 and 1974), the whole industry was able to get the most out of it. This time, the boom positively affected the Bolivian economy, since the value of total exports doubled, and the country began to diversify its export portfolio to include oil (although the bonanza did not survive the decade); natural gas (which became its most important export commodity in the late-twentieth century); smelted and processed tin; and agricultural products (cotton and sugar, which was the second-fastest-growing exports commodities in the first half of the 1970s, after natural gas) (Klein, 2003).

The end of the tin age coincided with the debt crisis of the 1980s and the decline of the world commodity prices. Together these factors brought Bolivia into one of the worst recessions in its recent history. During the first half of the 1980s, Bolivian tin production declined sharply and permanently. The decline was so severe that by the early 1980s Bolivia had already lost its position as the largest producer of tin in Latin America; at the same time, tin stopped being Bolivia’s main export commodity, as it was replaced by natural gas (Klein, 2003).
6.3. The Agricultural Sector and the Agrarian Reform of 1953

By the 1950s, Bolivia’s agricultural sector was still backward. The country was characterized by a subsistence agriculture sector producing just a few commodities for the internal market (Gallo, 1991). A large part of the country’s rural society was marginal from the national economy, and the sector, despite being the largest employer (accounting for more than 70 percent of the economically active population), represented only 33 percent of the Gross National Product. Even more important though was the fact that the sector could not even provide enough food to satisfy its population increase. The country had to rely more and more on the international markets, even for the provision of traditional food crops, such as cassava and potato (Klein, 2003). The agricultural sector in the 1950s was then qualified as “inefficient, unproductive, and unjust” (Klein, 2003, p.211), with a large proportion of the labor force operating outside the market (Clark, 1968).

In 1953 the civilian government under the MNR (the Nationalist Revolutionary Movement) carried out the first agrarian reform in the country. The reform marked the end of the hacienda system in Bolivia. Almost 80 percent of the country’s agricultural land was expropriated (FAO, 1998). Small plots of land were assigned to indigenous people all over the country, except in the regions of Santa Cruz, which was scarcely populated; Monteagudo, where some medium-sized capital-intensive farms were operating; and the Cinti Valley, a small-scale vineyard region (Klein, 2003). The redistribution of land gave way to the creation of new markets and set the beginning of a new market economy (Clark, 1968). It is important to note, though, that the reform also granted large plots of land to non-indigenous people in the lowlands, as a way to promote large-scale agriculture (Klein, 2003).

However, the reform was not able to improve the food provision in the country, at least not in the short run (Klein, 2003). Right after the agrarian reform there was a shortage of foodstuff in the cities, mainly because the beneficiaries of the reform increased their self-consumption of agricultural products (FAO, 1998), which had to be compensated by a rise in food imports. Moreover, the response to the fiscal imbalance, which was exacerbated by a substantial increase in the public expenditure, was printing money; this brought about inflationary pressures to the country, which further aggravated the situation (Klein, 2003, p.216). In consequence, the immediate result of the reform was severe famines in the urban centers due to the reduced availability and accessibility of agricultural products.

This situation, in turn, led the government to accept food aid from the United States, in order to lessening the impact of the food crisis (Zunes, 2001; Klein, 2003). Under the Public Law 480, the
American government sent a cargo of food to Bolivia, worth $9 million (Zunes, 2001) and doubled its aid program to the country (Klein, 2003). However, the United States food aid had a price: apart from demanding support for American multinational companies, it also requested an economic reform and a stabilization plan under the guidance of the International Monetary Fund (Zunes, 2001; Klein, 2003). The United States assistance not only stabilized the economy, but also helped to avoid a significant social unrest in the country; in addition, the help provided resources for the development of infrastructure in the Santa Cruz region (Klein, 2003).

6.4. The Emergence of Santa Cruz

The deepening of the Agrarian Reform, as well as the colonization of the Bolivian lowlands continued well into the 1970s, under the conservative military rule of Banzer, who strongly supported the development of the lowland’s agriculture (Kaimowitz, 1997; Eckstein, 1983). It is worth noting that the Banzer’s regime especially favored the Santa Cruz region (Banzer’s home province). Between 1972 and 1975, the government allocated a large share of the country’s resources to this region, in terms of land concessions and subsidized credits, favoring mainly a small group of large-scale commercial farmers as well as members of the oligarchy who had their highland’s and valley’s properties sized in the 1950s (Morales and Sachs, 1998; Eckstein, 1983). The average size of the agricultural fields granted in Santa Cruz by the late 1960s was approximately 8,000 hectares (Clark, 1974, cited in Eckstein, 1983).

As was mentioned earlier, the increase in the international prices of minerals during the first half of the 1970s had, once more, a deep impact on Bolivia’s economy. The boom had a particular effect on the agricultural sector, and more specifically on Santa Cruz, where new domestic and foreign investments, mostly from the national mining sector and Brazil, were directed towards the development of commercial agriculture (Klein, 2003; Gallup et al., 2004). Most of these investments were aimed at improving the region’s connectivity with the national and international markets (Gallup et al., 2004). However, Santa Cruz development was also the result of a premeditated strategy started in the 1940s and led by the United States government to propel the region’s growth and diversify the country’s economy (Lehman, 1999). The initial expansion of the agricultural frontier in the region, back in the early 1950s, was aimed at increasing the domestic food supply; however, by the 1970s Santa Cruz was generating surplus agricultural production, especially sugar and cotton, and was now aiming at the international markets (Pacheco and Mertens, 2004). In this sense, between the 1950s and the 1970s, Santa Cruz had an outstanding development and became the center of commercial agriculture of Bolivia. Furthermore, the region showed some signs of improvement to external shocks, as it could easily switched from sugar to cotton when the
sugar prices declined in the mid-1970s (Klein, 2003). Given the increasing importance of this region, the subsequent events of the 1980s, that is, the debt crisis, the crash of the international tin prices, and the structural reforms, simply accelerated the shift towards the East, and so Santa Cruz grew to become the center of the Bolivian political and economic activity.

6.5. The Crisis of the 1980s and the Structural Reform of 1985

Governments can play an important role during the initial stages of a country’s economic development (Adelman, 1999). However, the imbalance between (1) people’s expectations and demands, and (2) government’s capacities and actions can seriously deteriorate a government’s potential to induce development. Between 1952 and 1985, Bolivia was characterized by a state capitalism model, which was followed regardless of whether the government was from the left or the right. Both political ideologies relied heavily on foreign borrowing as a way to achieve their respective redistributive programs (Morales and Sachs, 1988). However, the lack of a solid institutional structure, together with the frail capacity of the government to fulfill its mandate, prevented the model from being fully functional (Morales and Sachs, 1988; Dove, 2002). As a consequence, the income distribution conflict had severe effects on Bolivia’s economic performance as well as on its political system. The embezzlement of public funds to achieve either private or party goals led to fiscal imbalances and to the manipulation of the economic policies for political gain (Morales and Sachs, 1988). Moreover, this political misguidance, together with the commodities prices decline in the late 1970s and the slowing down in the oil and mineral production, had a profound negative effect on both the public sector budget and the private sector performance (Klein, 2003).

In this context, in the early 1980s, Bolivia suffered one of the most severe economic crises of its history. As was mentioned before, both internal and external factors were responsible for the country’s poor economic performance at the time: (1) The mismanagements of the country’s public finances that led to one of the world’s worst hyperinflation cases of the twentieth century; (2) the tin production collapse, plus the fall of the international export prices of Bolivia’s main commodities; and (3) the rise in the international interests rates in the early 1980s, which came after the international lending boom of the 1970s (Klein, 2003; Morales and Sachs, 1988). In order to save the economy from an imminent collapse, the president at the time, Víctor Paz Estenssoro, carried out an orthodox stabilization program in 1985: “By the terms of decree 21060 on August 29, 1985, the national currency was devaluated; a uniform and free floating exchange rate established; all price and wage controls eliminated; public sector prices substantially raised; government expenditures severely restricted; and real wages of government employees reduced” (Klein, 2003, p.245). The so
called “New Economic Policy” was therefore a set of market-oriented policies, related to the deregulation of product markets and factor markets; the privatization of state-owned assets; and the liberalization of the trade and foreign direct investment regimes. This orthodox shock had as immediate objective restoring the country’s economic performance, and, as a long-term aim, improving the country’s international competitiveness (Spatz, 2006).

7. Empirical Analysis

7.1. Causal Factors: Trade Liberalization

The aim of the trade liberalization program started in 1985 was to reduce tariff and non-tariff barriers as well as to promote the diversification of trade by promoting the export of non-traditional products. Consequently, the tariff structure was simplified. Before the reforms the tariff rates varied according to the tariff code from 0 to 150 percent (Spatz, 2006). The trade reform introduced a compound tariff, which consisted of a fixed 10 percent on the CIF value plus 10 percent of the existing tariff. The tariff structure was further simplified with the establishment of a unified import duty rate of 20 percent in 1986, which was afterwards lowered to 17 percent in 1988, 16 percent in March 1990, and 10 percent in August 1990. Imports of capital goods had a preferential treatment. Initially, in 1987, importers of capital goods were allowed to defer the corresponding tariff’s payments to up to three years plus one grace year. Later on, in 1988, a preferential duty of 10 percent for selected capital goods was established. The list of capital goods with preferential treatment was later extended in 1988 and 1990, and in 1990 the tariff was reduced to 5 percent.

Table 1 presents the chronology of the trade liberalization decrees that affected imports.

In order to promote and diversify exports, especially non-traditional, in 1987, Bolivia established the Tariff Drawback Certificate (CRA), which compensated for the tariffs paid by exporters for imported inputs. The CRA was set at 10 percent of the net value of non-traditional exports and 5 percent of the traditional exports. In 1988, it was abolished for traditional exports; in 1990, it was reduced to 6 percent (applied only for non-traditional exports); in 1991, the CRA was abolished and replaced with the Draw Back, which refunded 4 and 2 percent of the FOB value (excluding minerals, hydrocarbons, live animals, sawed wood, leather, and similar products). In 1990, Bolivia established the regime of Free Trade Zones, Free Industrial Zones, Temporary Internment and Maquilas; in 1993, the country established the tax neutrality principle. Table 2 presents a chronology of the different decrees that affected exports incentives.
Table 1. *Bolivia: Trade Liberalization Decrees Affecting Imports*

<table>
<thead>
<tr>
<th>Decree</th>
<th>Date</th>
<th>Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>DS. 21060</td>
<td>Aug-1985</td>
<td>-Regime of free import and export</td>
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<td></td>
<td></td>
<td>-Introduction of a compound tariff: 10 percent of the CIF value plus 10 percent of existing tariff</td>
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<td></td>
<td></td>
<td>-Elimination of Non-tariff barriers</td>
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<tr>
<td>DS. 21094</td>
<td>Oct-1985</td>
<td>-Preferential tariffs for inputs for agro-industry and agriculture</td>
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<tr>
<td>DS. 21098</td>
<td>Oct-1985</td>
<td>-Import license for raw or refined sugar</td>
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<tr>
<td>DS. 21937</td>
<td>May-1988</td>
<td>-Import license for wheat flour and derivatives thereof</td>
</tr>
<tr>
<td>DS. 22193</td>
<td>May-1989</td>
<td>-Import license for edible oils</td>
</tr>
<tr>
<td>DS. 22374</td>
<td>Nov-1989</td>
<td>-Import license for wheat flour</td>
</tr>
<tr>
<td>DS. 21367</td>
<td>Aug-1986</td>
<td>-Establishment of a unified import duty rate of 20 percent of the CIF value (exceptions: imports under the Investment Law, the Hydrocarbon Law, donations, regional integration schemes, and imports of gold and wheat)</td>
</tr>
<tr>
<td>DS. 21660</td>
<td>Jul-1987</td>
<td>-Ratification of the unified import duty rate of 20 percent</td>
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<td>-In order to encourage capital goods imports, importers were allowed to defer tariff’s payments up to three years plus one grace year (interest-free)</td>
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<td></td>
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<td>-Formalization of additional import duties</td>
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<tr>
<td>DS. 21910</td>
<td>Mar-1988</td>
<td>-Establishment of a preferential duty of 10 percent for selected capital goods</td>
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<tr>
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<td></td>
<td>-Establishment of a gradual tariff reduction program from 20 to 10 percent, with quarterly reductions of 1 percent, from the 1st of April 1988 until the 1st of January 1990</td>
</tr>
<tr>
<td>DS. 21979- DS. 21987</td>
<td>Aug-1988</td>
<td>-Extension of the list of capital goods with preferential duty rate</td>
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<td></td>
<td>-Abolition of the import license for wheat flour</td>
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<tr>
<td>DS. 22103</td>
<td>Dec-1988</td>
<td>-Abolition of the gradual tariff reduction program</td>
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<td></td>
<td>-Establishment of a unified import duty rate of 17 percent (excluding capital goods)</td>
</tr>
<tr>
<td>DS. 22401</td>
<td>Jan-1990</td>
<td>-Extension of the list of capital goods with preferential duty rate</td>
</tr>
<tr>
<td>DS. 22407</td>
<td>Jan-1990</td>
<td>-Reduction of the capital goods tariff to 5 percent during two years</td>
</tr>
<tr>
<td>DS. 22466</td>
<td>Mar-1990</td>
<td>-Reduction of the unified import duty rate to 16 percent (excluding capital goods under DS. 22407)</td>
</tr>
<tr>
<td>DS. 22585</td>
<td>Aug-1990</td>
<td>-Reduction of the unified import duty rate to 10 percent of the</td>
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</table>
CIF value (excluding capital goods under DS. 22407)

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<tr>
<th>Decree or Law</th>
<th>Date</th>
<th>Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>DS. 22617</td>
<td>Oct-1990</td>
<td>-Extension of the list of capital goods with preferential duty rate</td>
</tr>
<tr>
<td>DS. 29349</td>
<td>Nov-2007</td>
<td>-Establishment of a new import duty scheme with tariffs of 0, 5, 10, 15, and 20 percent</td>
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Table 2. Bolivia: Fiscal Incentives for Exporters

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<tr>
<th>Decree or Law</th>
<th>Date</th>
<th>Measure</th>
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</thead>
<tbody>
<tr>
<td>DS. 21367</td>
<td>Aug-1986</td>
<td>-Abolition of both the Regime of Fiscal Incentives for Non-Traditional Exports (RIFENT) and the Certificate of Tax Refund (CERTEX), which existed since 1977 in order to stimulate non-traditional exports</td>
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<tr>
<td>Law 843</td>
<td>May-1986</td>
<td>-VAT refund to exporters when they buy inputs locally</td>
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<td>-Establishment of the Certificate of Tradable Credit Notes (CENOCREN) for the VAT refund of exported products</td>
</tr>
<tr>
<td>DS. 21530</td>
<td>Feb-1987</td>
<td>-Exporters are able to get a VAT refund of up to 10 percent of the exported value</td>
</tr>
<tr>
<td>DS. 21660</td>
<td>Jul-1987</td>
<td>-Establishment of the Tariff Drawback Certificate (CRA), which compensates for the tariffs paid by exporters for imported inputs.</td>
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<td></td>
<td></td>
<td>-The CRA was set at 10 percent of the net value of non-traditional exports and 5 percent of the traditional exports</td>
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<td>-The CRA was exchangeable through Redeemable Treasury Bonds (BTRs), issued in local currency, transferable, and with no expiration date</td>
</tr>
<tr>
<td>DS. 21910</td>
<td>Mar-1988</td>
<td>-Abolition of the CRA for traditional exports</td>
</tr>
<tr>
<td>DS. 22585</td>
<td>Aug-1990</td>
<td>-Reduction of the CRA to 6 percent</td>
</tr>
<tr>
<td>DS. 22753</td>
<td>Jan-1991</td>
<td>-Abolition of the CRA</td>
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<td></td>
<td>-Establishment of the Draw Back (replacing the CRA), which refunds 4 and 2 percent of the FOB value of exports (except for minerals, hydrocarbons, live animals, sawed wood, leather, and similar products)</td>
</tr>
<tr>
<td>DS. 22410</td>
<td>Jan-1990</td>
<td>-Establishment of the regime of Free Trade Zones, Free Industrial Zones, Temporary Internment and Maquilas</td>
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<tr>
<td></td>
<td></td>
<td>-Simplification of the customs procedures</td>
</tr>
<tr>
<td>DS. 22526</td>
<td>Jun-1990</td>
<td>-Establishes the necessary norms for the implementation of DS. 22410</td>
</tr>
<tr>
<td>Law 1489</td>
<td>Apr-1993</td>
<td>-Establishment of the export law</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-Establishment of the tax neutrality, the special export regime</td>
</tr>
</tbody>
</table>
(temporary internment, free trade and industrial zones) and tax refund for exports
- Regulation for the National Board of Exports (CONEX)

| DS. 23574 | Jul-1993 | -Regulations for the tax refunds for exporters |
| Law 1963 | Mar-1999 | -Modifications of the articles 12 and 13 of the Law 1489 | -The Law broadens the tax refund regime to include the expenses and costs related to the export activity |
| DS. 25465 | Aug-1999 | -Regulations for the tax refund for exporters | -Establishment of the Certificates of Tax Refund (CEDEIM) |
| DS. 25706 | Mar-2000 | -Regulations for the Regime of Temporary Entry for Active Improvement (RITEX) |


7.2. Agricultural Sector Performance

This section compares the Bolivian agricultural sector performance before and after the trade liberalization process. For most of the analysis, the pre-reform period comprises the years between 1961 and 1985, whereas the post-reform period comprises the years between 1986 and 2006. However, in some cases, due to data constraints, the initial date of the pre-reform period, and the last date of the post-reform period will vary.

7.2.1. Total Food Supply

Between 1970 and 2006, Bolivia’s total food supply increased (Graph 2), but its average annual growth rate declined after the trade liberalization process from 4.5 percent between 1970 and 1985 to 2.7 percent between 1986 and 2006 (2.1 to 0.3 percent in per capita terms). The relative importance of its components (domestic production minus exports, imports, and foreign aid) remained rather stable. By large, domestic production (net of exports) accounted for most of the country’s food supply during the whole period. The share of imports ranged between 3 and 8 percent, and its relative importance did not seem to be altered by the trade reforms: its average annual share barely increased from 4.9 percent (1970-1985) to 5.3 percent (1986-2006). Foreign food aid, which is composed mostly of cereals (Graph 3), peaked in the event of natural disasters, such as the severe droughts of 1983 (Table 3), but generally its percentage share remained low.
Graph 2. Bolivia: Total Food Supply by Components, 1970-2006

Source: Own calculations based on FAO (2009).


Source: Own calculations based on FAO (2009).
Table 3. *Bolivia: Main Natural Disasters since 1900 (Total Number of People Affected)*

<table>
<thead>
<tr>
<th>Natural Disaster</th>
<th>Date</th>
<th>Total Number of People Affected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drought</td>
<td>April-1983</td>
<td>1,583,049</td>
</tr>
<tr>
<td>Drought</td>
<td>December-1983</td>
<td>1,500,000</td>
</tr>
<tr>
<td>Flood</td>
<td>December-2007</td>
<td>485,000</td>
</tr>
<tr>
<td>Flood</td>
<td>January-2001</td>
<td>357,250</td>
</tr>
<tr>
<td>Flood</td>
<td>January-2007</td>
<td>339,495</td>
</tr>
<tr>
<td>Flood</td>
<td>January-1986</td>
<td>310,000</td>
</tr>
<tr>
<td>Drought</td>
<td>1990</td>
<td>283,160</td>
</tr>
<tr>
<td>Flood</td>
<td>February-1997</td>
<td>190,000</td>
</tr>
<tr>
<td>Mass movement wet</td>
<td>February-1994</td>
<td>165,000</td>
</tr>
<tr>
<td>Flood</td>
<td>January-2006</td>
<td>126,096</td>
</tr>
</tbody>
</table>


In consequence, Bolivia relies heavily on its own food production, and the reasons for this stem mainly from its weak internal demand. The high levels of poverty and the unequal distribution of income in Bolivia have translated into a meager domestic demand, which, in turn, have discouraged commercial farmers from entering the Bolivian agricultural market. Therefore, by the time of the reforms, most of the Bolivian staples were produced locally by small farmers, using low-productive methods (Morales, 1990). In fact, for most of the crops, the yields per-hectare were the lowest in Latin America (Morales, 1990, p.59).

7.2.2. Agriculture Value Added

Now, with the exception of 1983, the agriculture value-added increased continuously during both periods (1970-1985 and 1986-2006), though the pace was slightly faster after the reforms (Graph 4a and 4b). However, its contribution to the GDP declined gradually: from 20 percent in 1970 to 13.5 percent in 2006 (Graph 5). Theoretically, a possible explanation is given by the fact that some post-farm activities, such as commercialization and distribution, tend to be outsourced over time. Additionally, as farmers increasingly purchase more and more intermediate inputs, such as pesticides and genetically modified seeds, the final contribution of their own “labor, land and capital” will be reduced. Together, these two factors help explain the relative decline in the sector contribution to the GDP (Anderson, 1999, p.73).
7.2.3. Crops Production

Graph 6 shows the evolution of Bolivia’s crops production by crop category between 1961 and 2006. There was a general increase in the quantities produced; however, there were some differences in the growth rates of the pre- and post-reform periods, as well as in the contributions of the different categories. Between 1961 and 1985, crops production increased 195 percent. The
contribution to this growth rate by crop category were, in order of importance, sugar, 61 percent; cereals, 13 percent; roots and tubers, 12 percent; and fruits, 8 percent (Graph 7). The per capita growth rate was 69 percent. After the trade liberalization reforms, between 1986 and 2006, the growth rate was lower but still positive: 105 percent for the gross production and 34 percent in per capita terms. The contributions to the overall growth rate by crop category were, in order of importance, sugar, 50 percent; oil crops, 25 percent; cereals, 16 percent; fruits, 6 percent; and vegetables, 2 percent; Roots and tubers, pulses, stimulants, tree nuts and others contributed all together with less than 1 percent of the total increase rate.

Graph 6. Bolivia: Production Quantity (tons) by Crop Group, 1961-2006

Source: Own calculations based on FAO (2009).

7.2.4. Area Harvested

The total harvested area in hectares increased steadily since 1961, though its average annual growth rate did not change significantly after the trade reforms (from 3.2 to 3.3 percent). Between 1986 and 2006, the total area doubled: from 1,308 thousand hectares in 1986 to 2,680 thousand hectares in 2006 (Graph 7). However, 76 percent of this increase rate was due to the expansion of oil crops alone (Graph 8). In fact, oil crops share of the total harvested area increased from 7 percent in 1986 to almost 43 percent in 2006. Accordingly, after the mid-1990s, oil crops overtook cereals and became the most important crop group in the country in terms of area.
Graph 7. *Bolivia: Harvested Area by Crop Group, 1961-2006 (has)*

*Source:* Own calculations based on FAO (2009).

Graph 8. *Bolivia: Percentage Contribution by Crop Group to the Growth Rate of the Total Harvested Area, 1986-2006*

*Source:* Own calculations based on FAO (2009).
7.2.5. Crops’ Yields

Between 1961 and 1978, there was an important increase in the overall yield level, measured in hectograms per hectare (hg/ha); however, this uptrend was reversed during the 1980s, as well as during the second half of the 1990s. After some ups and downs, in 2006 the yield level was comparable to that of 1986, indicating that there were no major gains in productivity after the trade reforms (Graph 9). In fact, comparing the pre- and post-reform periods, the average annual growth rate of this indicator decreased from 1.9 percent to 0.5 percent from one period to the other. The yield levels by crop group indicate that tree nuts, cereals and oil crops had the highest average growth rates after the reforms; however, sugar cane remained being the most productive crop (Graph 10), requiring on average 5 percent of the total harvested area to produce almost 50 percent of the total production.


Source: Own calculations based on FAO (2009).
Graph 10. *Bolivia: Yield Levels by Crop Group, 1961-2006*

Source: Own calculations based on FAO (2009).

7.2.6. Sources of Agricultural Expansion

From the previous analysis, it is possible to conclude that the overall increase in production from 1986 to 2006 was triggered by an expansion of the harvested area rather than by a rise in productivity (Graph 11a), which contrasts with the pre-reform period when productivity gains played a more important role (Graph 11b). However, the production increase after the reforms was mainly the result of the expansion of cash crops, especially of oil crops. In fact, between 1986 and 2006, 75 and 79 percent of the production and harvested area increase, respectively, were explained by the expansion of these crops. In this sense, whereas the area dedicated to oil crops and sugar cane increased more than seven-fold in twenty years (from 1986 to 2006), food crops barely increased 25 percent in the same period (Graph 12). One important remark is that the future expansion of cash crops, namely oil crops, will most probably be the result of area expansions rather than productivity gains, given the downtrend showed between 1986 and 2006.
Graph 11a. Bolivia: Sources of Agricultural Expansion, 1986-2006 (1986=100)

Source: Own calculations based on FAO (2009).

Graph 11b. Bolivia: Sources of Agricultural Expansion, 1961-1985 (1961=100)

Source: Own calculations, based on FAO STAT (2009).
Not surprisingly, the analysis by crop category shows that the most dynamic crops between 1961 and 1985 were oil crops, which increased considerably in the early 1970s, followed by sugar and stimulants (Graph 13). That is, there was an important expansion of cash crops, both in terms of quantities and area harvested. After the trade reforms, between 1986 and 2006, only oil crops kept increasing at an astonishing rate: the harvested area increased eleven-fold in the twenty-year period; other dynamic crops after the reforms were cereals and sugar, which doubled both their area and production figures (Graph 14).
Roots and Tubers

Stimulants

Pulses

Sugar

* Average yields on the secondary axis.

1961=100

Source: Own calculations, based on FAO (2009).
Graph 14. Bolivia: Production Quantity, Area Harvested, and Average Yields, 1986-2006 (1986=100)
A closer look at the performance of the main staples and cash crops commodities shows that from 1961 to 1985, there was a generalized increased in production, as the result of expansions in the area harvested; after the trade reforms, from 1986 to 2006, production of most crops increased as well, but this time at a slower pace, and driven mainly by productivity gains; however, it is important to note that the production of food crops such as potato and cassava actually stagnated or declined (Graph 15).

Between 1961 and 1985, potato production increased by almost 50 percent, and it was boosted mainly by expansions in the area harvested; however after the trade reforms, from 1986 to 2006, the crop stagnated: production barely increased 7.4 percent, while the area harvested actually declined, meaning that the expansion was supported by productivity improvements. Cassava production more than doubled during the first period, driven by area expansions; but after the reforms production fell in 11 percent accompanied with drops in both area and yields. Rice production had a five-fold increase before the reforms, explained mainly by area expansions; after the reforms, production kept rising, but this time it was boosted by both area expansions and productivity gains. In the case of maize, between 1961 and 1985 production doubled, being the combined result of area expansions and yield gains; between 1986 and 2006, production doubled again, but this time it was driven mainly by rises in the average yields, since the area harvested did not increased significantly. Wheat production increased almost 65 percent during the pre-reform period, explained by expansions in both the area harvested and the average yields; after the reforms, the production expanded at a slower pace and with more fluctuations, driven again by both area expansions and productivity improvements. Sugarcane production had an increase of 472 percent between 1961 and 1985,
explained almost entirely by expansions of the area harvested; production kept increasing after the trade reforms, but at a slower pace and driven by both area expansions and productivity improvements.

Graph 15. Bolivia: Production Quantity, Area Harvested, and Average Yields for Selected Crops: Potato, Cassava, Rice, Maize, Wheat, and Sugarcane, 1961-19865 (1961=100) and 1986-2006 (1986=100)
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<tr>
<td>Production</td>
<td>Production</td>
<td>Harvested Area</td>
<td>Harvested Area</td>
<td>Harvested Area</td>
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<tr>
<td>Quantity</td>
<td>Quantity</td>
<td>Average Yields</td>
<td>Average Yields</td>
<td>Average Yields</td>
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<td>1961</td>
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<td>2006</td>
<td>0</td>
<td>0</td>
<td>2006</td>
<td>0</td>
</tr>
</tbody>
</table>
Sugarcane

1961-1985 (1967=100)  

1986-2006 (1986=100)

Source: Own calculations, based on FAO (2009).

Soybeans production had an extraordinary increase between 1961 and 1985, mostly because it had very low levels of production at the beginning of the period, since it just started to be cultivated in the mid-1960s. The production increase was driven almost exclusively by area expansion (Graph 16). After the trade liberalization process of 1985, and until 2006, soybean production increased 10-fold, but the average yields decreased in almost 18 percent; this means that the production expansion was exclusively the result of utilizing more land. In fact, the area harvested increased 13-fold during the period, contributing with 64 percent of the area expansion of all crops. The extraordinary production increase during this time would not have been possible without (1) the structural adjustment policies implemented in the mid 1980s, which promoted non-traditional exports (Kaimowitz et al., 1999), and (2) the increasingly international demand for soybeans (Perez, 2007). However, it is important to remark that this crop also benefited from the efforts to develop the lowlands region, which started back in the 1940s.
Graph 16. *Bolivia: Production Quantity, Area Harvested, and Average Yields of Soybeans, 1961-19865 (1961=100) and 1986-2006 (1986=100)*

**Soybeans**

<table>
<thead>
<tr>
<th>Year</th>
<th>Production Quantity</th>
<th>Area Harvested</th>
<th>Average Yields</th>
</tr>
</thead>
<tbody>
<tr>
<td>1967</td>
<td>5000</td>
<td>1000</td>
<td>200</td>
</tr>
<tr>
<td>1968</td>
<td>7000</td>
<td>2000</td>
<td>300</td>
</tr>
<tr>
<td>1969</td>
<td>9000</td>
<td>3000</td>
<td>400</td>
</tr>
<tr>
<td>1970</td>
<td>11000</td>
<td>4000</td>
<td>500</td>
</tr>
<tr>
<td>1971</td>
<td>13000</td>
<td>5000</td>
<td>600</td>
</tr>
</tbody>
</table>

*Source:* Own calculations, based on FAO (2009).

7.2.7. Indices of Concentration and Specialization

The gradually and significantly increase in the cultivation of oil crops is well reflected in the concentration and specialization indices for the area harvested. As can be seen in Graphs 17 and 18, after the trade liberalization process of 1985, Bolivia’s harvested area increasingly concentrated in a few crops; within a decade the Herfindahl-Hirschman concentration index moved from the low-concentrated category to the moderate-concentrated one. In the same way, the index 4 of specialization increased from 0.30 in 1986 to 0.43 in 2006, denoting traces of a specialization process.
Graph 17. Bolivia: Herfindahl-Hirschman Index for the Area Harvested, 1961-2006

Source: Own calculations, based on FAO (2009).

Graph 18. Bolivia: Index 4 of Specialization of the Area Harvested, 1961-2006

Source: Own calculations, based on FAO (2009).
7.2.8. Crops Mix: Cash Crops and Subsistence Crops

The increasing importance of cash crop production is also reflected in the changes in the crop mix between cash crops and subsistence production. Since the trade reforms, the share of cash crops in the total production increased from 13 percent in 1985 to 48 percent in 2006 (Graph 19).

Graph 19. *Bolivia: Changes in the Crop Mix: Cash Crops vs. Subsistence Production, 1961-2006*

Source: Own calculations, based on FAO (2009).

7.2.9. Agricultural Trade: Imports and Exports

Before the trade liberalization process of 1985, Bolivia could be considered a net importer of agricultural products, thought the gap between imports and exports was not considerable. This trend was reverted after the reforms, as exports gradually began to outpace imports. In fact, for the most part of the post-reform period, the country had a growing positive balance in its agricultural trade (Graph 20). A closer look at the composition of its agricultural imports and exports will help explain the causes of this pattern change.

Source: Own calculations, based on FAO (2009).

From 1961 to 2006, imports of cereals and prepared cereals had the highest relative weight, though their importance showed a continuous decline after the implementation of the trade reforms (Graph 21). In fact, their share decreased from 67 percent in 1985 to 35 percent in 2006. The relative weights of the other food groups remained rather constant, except for oilseeds; this food group increased its share from just above 0 percent in 1985 to 16 percent in 2006. The rise in imports of oilseeds is related to the development of the soybean industry in the country after the structural reforms, since it gradually moved forward in the added value chain. In general, the import basket of agricultural products diversified, as shown by the decrease in the Herfindahl-Hirschman index of concentration: while in 1985 the index denoted a high concentration of Bolivia’s agricultural imports, in 2006 it was below the low concentration threshold (Graph 22). And although the country ended up in 2006 with a more diversified agricultural basket, the share of the agricultural imports in the total merchandise import trade declined steadily throughout the period, with no particular sign of acceleration or deceleration after the reforms (Graph 23).
Graph 21. *Bolivia: Food Imports Composition (Share of the Total Value of Agricultural Imports), 1961-2006*

Source: Own calculations, based on FAO (2009).

Graph 22. *Bolivia: Herfindahl-Hirschman Concentration Index of Imported Crops, 1961-2006*

Source: Own calculations, based on FAO (2009).
Since 1961, Bolivia’s economy experienced several agricultural export booms: Coffee in the 1960s, sugar in the 1970s, and oilseeds and its by-products from the 1990s onwards. The promotion of oilseeds, soybeans in particular, was derived from the structural reforms of 1985. In 2006, oilseeds and its by-products accounted for 70 percent of the total agricultural exports (Graph 24). The historical dependence of Bolivia’s exports on a few commodities is reflected in its high level of concentration and specialization: between 1961 and 1985, the Herfindahl-Hirschman index of concentration was mostly on the highly concentrated side, and the same was true for the index 4, but in terms of specialization (Graphs 25 and 26). After the trade liberalization process and until the mid-1990s, the concentration and specialization indices dropped, in what can be considered a transition period. After the mid-1990s the indices stepped up to the pre-reform levels, but declined after 2002, as the groups of vegetable oils and fruits and vegetables gained momentum. One final remark is the increasingly share of agricultural exports in the total merchandise export trade after the structural reforms and until the late 1990s, when it reached 36 percent (Graph 27).

Source: Own calculations, based on FAO (2009).


Source: Own calculations, based on FAO (2009).
Graph 26. **Bolivia: Index Four of Specialization of Exported Crops, 1961-2006**

Source: Own calculations, based on FAO (2009).

Graph 27. **Bolivia: Agricultural Exports as a Share of Total Merchandise Export Trade, 1961-2006**

Source: Own calculations, based on FAO (2009).

7.2.10. **Price Stability**

Food prices’ instability can have a profound impact on a country’s food security, especially when it negatively affects the poorest segments of the population (Myers, 2006). After the structural
reforms, Bolivia managed to control the hyperinflation of the early 1980s. The average inflation rate between 1967 and 1985 was 590.9 percent; in 1984 inflation rose 2,177.2 percent, and in 1985 it reached 8,170.5 percent, the highest in Latin America and one of the highest in the world at that time. The stabilization program called a halt to the hyperinflation process, and in 1986 the inflation rate slowed down to 65.9 percent. In the early 1990s, Bolivia reached one-digit inflation; between 1986 and 2006 prices increased 11.2 percent on average, a figure which is remarkably lower than the one between 1967 and 1985.

Indeed, the structural reforms stabilized the prices of most food commodities (Graph 28). When comparing the coefficients of variations of agricultural commodities prices between the pre and post-liberalization periods, it can be conclude that the period between 1967 and 1985 was one of high price volatility. After the reforms, between 1986 and 2006, prices were more stable than during the pre-reform period. The only exceptions were: cotton seeds, oats, goats, dry peas, and lemons and limes, in which case prices fluctuated relatively more after the reforms (Graph 28).

Graph 28. Coefficient of Variation of Agricultural Commodities Prices: 1967-1985 vs. 1986-2006 (Period Averages)

Source: Own calculations, based on FAO (2009).

Note: The graph plots the averages of the coefficients of variation of some agricultural prices for the periods 1967-1985 (X-axis) and 1986-2006 (Y-axis).
7.2.11. Prices and Production of Major Crops

The average annual price increase of Bolivia’s major crops between 1986 and 2006 was lower than the average inflation for the same period: potato prices rose 10.5 percent; cassava’s 8.0 percent; maize’s 8.9 percent; rice’s 7.2 percent; wheat’s 7.0 percent; soybeans’ 9.5 percent; and sugar cane’s 6.9 percent. Price variations can modify the production incentives of the agricultural sector and, at the same time, affect the income of households and farmers who are net buyers. However, changes in prices are not always followed by changes in production in the same direction or magnitude.

Graph 29 shows the relationship between price variations and quantities produced for Bolivia’s major crops. In the face of price increases, staples, such as cassava and potato had a bad performance in terms of production: cassava grew at an average annual rate of 0.4 percent, whereas potato did so at 1 percent; in the case of cassava, there was actually a decline of 11 percent in production between 1986 and 2006. Given the importance of such crops in Bolivians’ diet, a situation like this, in which prices climb up while production stagnates, might have negatively affected the food security of the country. Cereals’ production followed a different direction. Rice and wheat kept up with the price increase: rice production rose at an average annual rate of 9.1 percent, and wheat did so at 7.4 percent; maize grew at 4.7 percent, which is lower than its price growth rate. Finally, the production of soybeans far exceeded its price increase; soybeans production expanded at an average annual rate of 16.2 percent, with an increase of 981 percent between 1986 and 2006.
Graph 29. *Bolivia: Index of Prices and Production Quantities for some Crops, 1986-2006 (1986=100)*

*Source:* Own calculations, based on FAO STAT (2009).
Graph 29 (cont.). **Bolivia: Index of Prices and Production Quantities for some Crops, 1986-2006 (1986=100)**

**Rice**

**Sugarcane**

**Soybeans**

*Source:* Own calculations, based on FAO STAT (2009). *Note:* The size of the circles denotes the production quantities in relation to the base year (red circle). Prices for maize, wheat, rice, and soybeans are producer prices; prices for potato, cassava, and sugarcane are consumer prices.
7.2.12. Price Decomposition

The price decomposition analysis was carried out only for cereals, due to data availability and to the fact that most of Bolivia's imports are represented by this crop. Table 4 shows the results of the decomposition. The information is presented in lustrum averages for the years between 1971 and 2005. The results show that domestic prices followed a downtrend after the structural reforms of the mid-1980s; after increasing on average 189 percent between 1981 and 1985, Bolivia’s cereal prices stabilized, and so between 2001 and 2005 the average price variation was almost zero. The international prices of cereals had two major increases during the analysis period: the first in the early 1970s, which was reflected in the domestic prices; and the second in the early 1990s, which was compensated to a certain extent with reductions in the external tariffs. Finally, periods of strong devaluation of the Bolivian currency seemed to have exerted upward pressure on the domestic prices, as it was shown during the 1980s.

Table 4. *Bolivia: Price Change Decomposition of Cereals, 1971-2005*

<table>
<thead>
<tr>
<th>Period</th>
<th>Changes in Domestic Price</th>
<th>Changes in International Price</th>
<th>Changes in the Real Exchange Rate</th>
<th>Changes in Domestic Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>1971-1975</td>
<td>24.1%</td>
<td>20.0%</td>
<td>2.2%</td>
<td>1.9%</td>
</tr>
<tr>
<td>1976-1980</td>
<td>16.4%</td>
<td>-6.5%</td>
<td>-9.2%</td>
<td>32.1%</td>
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<tr>
<td>1981-1985</td>
<td>189.4%</td>
<td>0.1%</td>
<td>179.8%</td>
<td>9.4%</td>
</tr>
<tr>
<td>1986-1990</td>
<td>37.8%</td>
<td>1.4%</td>
<td>56.6%</td>
<td>-20.2%</td>
</tr>
<tr>
<td>1991-1995</td>
<td>6.7%</td>
<td>6.2%</td>
<td>6.1%</td>
<td>-5.6%</td>
</tr>
<tr>
<td>1996-2000</td>
<td>6.1%</td>
<td>-8.5%</td>
<td>5.1%</td>
<td>9.5%</td>
</tr>
<tr>
<td>2001-2005</td>
<td>0.3%</td>
<td>1.1%</td>
<td>7.3%</td>
<td>-8.1%</td>
</tr>
</tbody>
</table>

*Source:* Own calculations, based on FAO (2009).

*Note:* (1) Figures represent the average for the period and can approximately be interpreted as percentages. (2) Changes in domestic variables are calculated as residuals.

7.2.13. Unit Value of Agricultural Exports and Imports

During the second half of the 1980s, the unit value index of Bolivian agricultural exports remained above the 1986 level; right afterwards the index declined and except for 1997 it stayed below 100 (Graph 30). In fact, in 2006, the index was 75, which suggests a decline of 25 percent in Bolivia’s exports prices between 1986 and 2006. Therefore, the increasingly value of the country’s exports
during the period was mainly due to a larger number of quantities exported. Now, the unit value index of Bolivian agricultural imports increased steadily until 1996 when it more than doubled the level of 1986; afterwards, the index declined until the early 2000s, but rose again at the end of the period. From the late 1980s until 2006, the unit value index of imports was always higher than that of exports; that is, the country experienced a deterioration of its terms of trade, which fell by 45 percent during the period (Graph 31). Nevertheless, the situation seemed to have been worse in the period before the reforms (1961-1985), especially after the mid-1970s, when the deterioration of the agricultural terms of trade fluctuated between 78 and 55 percent.

Graph 30. Bolivia: Unit Value Index (UVI) of Agricultural Exports and Imports, 1961-1985 (1961=100) and 1986-2006 (1986=100)

Source: Own calculations, based on FAO (2009).

Graph 31. Bolivia: Terms of Trade, 1961-1985 (1961=100) and 1986-2006 (1986=100)

Source: Own calculations, based on FAO (2009).
The major changes in the agricultural sector performance are related the development of the oil crops industry. This crop category had an extraordinary increase in terms of both production and area harvested. This cash crop became the most important agricultural export and the second most important agricultural import. The outstanding performance of the crop was the result of the incentives to promote non-traditional exports, but it was also connected to the premeditated development of the lowlands region since the 1950s.

7.3. Changes in Food Security Indicators

7.3.1. Indicators of Inequality

Bolivia can be described as an unequal country and things did not seem to have improved after the trade liberalization reforms. The Gini index in 1986 was 52; it decreased in 1991 to 42, but this improvement did not last long, as it deteriorated in the years afterwards. In fact, in 2002, the index was 60, representing a worsening of 15 percent in comparison to the 1986 value (Graph 32). This deterioration is reflected in the income distribution by quintiles (Graph 33). While in 1986 the poorest 20 percent of the population had 3.9 percent of the income, in 2002 they had only 1.5 percent (a drop of more than 60 percent). The share of the second lowest quintile and the middle classes deteriorated too, but to a lesser extent. Only the highest quintile increased the share in the total income moving from 56 percent in 1986 to 63 percent in 2002 (an improvement of 12.5 percent). The picture is even worse if we compare the lowest and highest deciles income share (Graph 34). While the richest segment of the population increased their share from 40 to 47 percent between 1986 and 2002, the poorest segment moved from 1.5 to 0.3 percent.

Graph 32. Bolivia: Gini Index for Selected Years

![Graph 32. Bolivia: Gini Index for Selected Years](image)

Source: Own calculations, based on WDI (2007).
Graph 33. Bolivia: Income Distribution (Quintiles Share of Total Income)

Source: Own calculations, based on World Bank (2007).

Graph 34. Bolivia: Income Share Held by the Lowest and Highest 10 percent of the Population

Source: Own calculations, based on World Bank (2007).

7.3.2. Food Availability

Between 1961 and 1975, the value of per capita food production increased by 36 percent (Graph 35). In the years afterwards the value experienced a downtrend, which was exacerbated by the
severe drought of 1983. After the trade liberalization of 1985, the per capita gross food production value followed an upwards trend, with an average annual growth rate of 1.1 percent between 1986 and 2005, a value that was slightly inferior to the 1.3 percent between 1961 and 1985. It was only until the mid-1990s that the country reached and overtook its previous high of the mid-1970s; afterwards the per capita food production value kept increasing to unprecedented levels. For the whole after-reform period the growth rate was 30 percent.

Graph 35. Bolivia: Per Capita Gross Food Production Value (LCU 1999-2001), 1961-2005

In 1985 every Bolivian had 69 percent more available food (referred here as kilograms per person of crops produced within the country) than in 1961. All crop categories had an increase in per capita terms, except for two: vegetables (-18 percent) and roots and tubers (-2 percent). Both oil crops and tree nuts had an extraordinary increase between 1961 and 1985, 699 and 630 percent, respectively. After the trade reforms, in 2005 every Bolivian had 23 percent more available food than in 1986. Compared with the pre-reform period, almost all categories had a modest increase: Fruits, 5 percent; tree nuts, 7 percent; sugar, 16 percent; and pulses, 29 percent. Cereals had a growth rate of about 35 percent in both periods. On the contrary, vegetables (-7 percent), root and tubers (-32 percent), and stimulants (-26 percent) underperformed in 2005 relative to 1986. During this period, only oil crops had once more an outstanding performance, with an increase of 600 percent in per capita terms. Table 5 shows a summary of these results expressed in index values.
Table 5. **Bolivia: Index of Per Capita Food Production by Crop Category (kg/person/year)**

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<tbody>
<tr>
<td>Cereals</td>
<td>95</td>
<td>104</td>
<td>97</td>
<td>136</td>
<td>86</td>
<td>106</td>
<td>110</td>
<td>135</td>
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<tr>
<td>Fruits</td>
<td>140</td>
<td>159</td>
<td>132</td>
<td>129</td>
<td>111</td>
<td>108</td>
<td>113</td>
<td>105</td>
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<tr>
<td>Oilcrops</td>
<td>275</td>
<td>837</td>
<td>665</td>
<td>799</td>
<td>137</td>
<td>454</td>
<td>581</td>
<td>701</td>
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<tr>
<td>Vegetables</td>
<td>105</td>
<td>112</td>
<td>100</td>
<td>82</td>
<td>95</td>
<td>101</td>
<td>105</td>
<td>93</td>
<td></td>
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<tr>
<td>Roots and Tubers</td>
<td>107</td>
<td>118</td>
<td>95</td>
<td>98</td>
<td>83</td>
<td>68</td>
<td>94</td>
<td>68</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pulses</td>
<td>79</td>
<td>127</td>
<td>108</td>
<td>170</td>
<td>112</td>
<td>80</td>
<td>86</td>
<td>129</td>
<td></td>
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</tr>
<tr>
<td>Stimulants</td>
<td>189</td>
<td>235</td>
<td>277</td>
<td>274</td>
<td>93</td>
<td>72</td>
<td>79</td>
<td>74</td>
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</tr>
<tr>
<td>Sugar</td>
<td>216</td>
<td>309</td>
<td>357</td>
<td>329</td>
<td>121</td>
<td>119</td>
<td>90</td>
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<tr>
<td>Treenuts</td>
<td>244</td>
<td>300</td>
<td>212</td>
<td>730</td>
<td>72</td>
<td>82</td>
<td>111</td>
<td>107</td>
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</tr>
<tr>
<td>Others</td>
<td>142</td>
<td>134</td>
<td>151</td>
<td>123</td>
<td>143</td>
<td>165</td>
<td>177</td>
<td>172</td>
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<tr>
<td>Total</td>
<td>137</td>
<td>171</td>
<td>169</td>
<td>169</td>
<td>107</td>
<td>114</td>
<td>111</td>
<td>123</td>
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</tr>
</tbody>
</table>

*Source*: Own calculations, based on FAO (2009).

Per capita imports quantities (expressed in kilograms per person) increased 60 percent between 1961 and 1985, and 52 percent between 1986 and 2006; whereas imports value increased 187 percent between 1961 and 1985, and 110 percent between 1986 and 2006 (Graph 36). This difference suggests a raise in the prices of food imports, especially during the post-liberalization period. By crop category and in quantity terms, pulses, roots and tubers, and oil crops had all significant increases between 1961 and 1985 (Table 6). It is possible that Bolivia had a shortage of vegetables in the pre-reform period, since the drop in the domestic production (-7 percent) was not compensated with imports, which actually decreased in 71 percent. After the trade liberalization, all the main crop categories increased (except for cereals, which decreased 4 percent); vegetables, roots and tubers, and stimulants crops imports had positive performances, but the increases were not enough to counterbalance the domestic production drop of these categories during the period. Finally, oil crops, and in particular soybeans, had the most important increase in per capita terms after the reforms: every Bolivian had in 2005 4,476 percent more oil crops than in 1986.
Graph 36. **Bolivia: Per Capita Food Imports Index (Value and Quantities), 1961-2006 (1961=100)**

![Graph showing Bolivia's per capita food imports index from 1961 to 2006.](image)

**Source:** Own calculations, based on FAO (2009).

Table 6. **Bolivia: Index of Per Capita Food Imports by Crop Category (kg/person/year)**

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>1962=100</td>
<td>1986=100</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cereals</td>
<td>96</td>
<td>108</td>
<td>105</td>
<td>143</td>
<td>78</td>
<td>106</td>
<td>123</td>
<td>96</td>
</tr>
<tr>
<td>Fruits</td>
<td>202</td>
<td>278</td>
<td>411</td>
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<td>64</td>
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<td>45</td>
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<td>211</td>
<td>588</td>
<td>607</td>
</tr>
</tbody>
</table>

**Source:** Own calculations, based on FAO (2009).

However, imports still represent just a small amount of the total food supply of the country, defined as the sum of domestic production (net of exports), food aid, and imports (Graph 37). Between 1970 and 2006, import’s share on the total food supply ranged between 3 and 8 percent, having its peak in the early 2000s and during periods of severe crises, such as the droughts of 1983. The same is true for food aid, which, after peaking in the mid-1980s (5 percent in 1983 and 1988), gradually declined, and in 2006 it represented just 0.3 percent of the total food supply. In per capita terms,
between 1961 and 1985 Bolivia’s total food supply of crops and livestock products increased 66 percent in quantities; however, the pace declined after the trade liberalization: between 1986 and 2005 it grew only 12 percent (Graph 38). Besides, food supply growth during the post-reform period was more volatile than it was during the pre-reform period.

Graph 37. Bolivia: Total Food Supply: Domestic Production (minus Exports), Imports, and Foreign Aid, 1970-2006 (kilograms/year)

Source: Own calculations, based on FAO (2009).

Graph 38. Bolivia: Index of Total Food Supply Per Capita (Value and Quantities), 1961-2005 (1961=100)

Source: Own calculations, based on FAO (2009).
7.3.3. Food Deprivation

According to FAO figures for the 1990s and 2000s, the percentage of the undernourished population in Bolivia has been higher than the average figures for Latin America and the World (Graph 39). Between 1990-1992 and 2003-2005, Latin America and the World managed to gradually reduce the undernourishment figures by 33 and 28 percent, respectively. But Bolivia was not as successful: the figures decreased by 17 percent between 1990-1992 and 1995-1997, but rose in 2003-2005, and so the overall achievement between 1990-1992 and 2003-2005 was only 8.3 percent. In fact, in 2003-2005, Bolivia had 400,000 more underfed people than in 1990-1992. Though just slightly, one thing did improve for Bolivia: the depth of hunger, measure as the per capita food deficit of the undernourished population, which dropped from 230 to 220 kcal/person/day (Graph 40).

**Graph 39. Bolivia: Prevalence of Undernourishment (Percentage of Total Population)**

![Graph 39](image)

*Source: Own calculations, based on FAO STAT (2009).*
7.3.4. Food Consumption

Bolivia’s dietary energy, protein, and fat consumption (g/person/day) was well below the Latin America’s and World’s average for the years 1990-1992, 1995-1997, and 2003-2005 (Graph 41). Between 1990-1992 and 2003-2005, energy consumption increased 2.8 percent to 2,170 g/person/day; protein consumption, 5.5 percent to 57 g/person/day; and fat consumption, 14 percent to 57 g/person/day. These growth rates were also lower than the average of Latin America and the World.
According to figures from 2003-2005, the Bolivians diet (in terms of grams per person per day) was composed mainly of cereals (21 percent), fruits (18 percent), starchy roots (16 percent), vegetables (10 percent), and meat (10 percent); paradoxically, oil crops was the less consumed food group (0.15 percent) (Graph 42). The relative importance of the different food groups remained rather stable from the 1990s onwards. However, there were changes in the overall consumption as well as in the major food groups. From 1990-1992 to 1995-1997, the overall food intake in grams per person per day increased by 2.8 percent, supported mainly by a greater consumption of milk, cereals, meat, vegetables, and alcoholic beverages; starchy roots contributed negatively to that increase, since its consumption decreased by 22 percent. From 1995-1997 to 2003-2005, there was a reduction of 3.4 percent in the overall food intake; this drawback was the result of a decrease in the consumption of cereals, fruits, and vegetables, all of which are important food groups in the Bolivians diet. On the whole, comparing 1990-1992 to 2003-2005, each Bolivian on average consumed 0.7 percent less food; the groups that had the strongest negative impact on this decrease were: starchy roots, cereals, and fruits; meat and milk had a positive impact, but was not enough to counterbalance the decline in the other categories. More specifically, compared to 1990-1992, in 2003-2005 Bolivians consumed more milk, rice, beer, poultry and pig meat, tomatoes, and pineapples; but at the same time they consumed less potatoes, wheat, vegetables, maize, cassava, oranges, bananas, and onions (Graph 43), which are essential foods in their diets, especially in that of the poorest population.
Graph 42. **Bolivia: Food Groups Share in the Daily Food Intake (g/person/day)**

Source: Own calculations, based on FAO (2009).


Source: Own calculations, based on FAO (2009).
From 1961 to 1985, per capita food consumption (in terms of kilocalories per day) increased 22 percent; however, most of this increase happened between 1961 and 1976, when the per capita food intake grew 23 percent; this means that between 1976 and 1985, there was a reduction of almost 1 percent in the per capita food consumption. Compared to 1961, in 1985, on average, every Bolivian consumed 24 percent more protein and 32 percent more fat (fat consumption had an increase of 59 percent until 1980, but its intake declined in the years afterwards). After the trade reforms, from 1986 to 2003, per capita food consumption increased 8.3 percent; fat consumption per head kept the uptrend and rose by 42 percent; whereas per capita protein intake increased by 5.8 percent (Graph 44).

Graph 44. Bolivia: Food Consumption, Protein and Fats, 1961-2003

Source: Own calculations, based on FAO (2009).
Note: Food consumption is graphed on the secondary axis (right side).

7.3.5. Import Dependency and Self-Sufficiency Ratios

As was mentioned earlier, Bolivia’s import represents just a small part of the country’s total food supply. This fact is reflected in the low values of the Import Dependency Ratios (the share of
imports on the total food supply) and the high values of the Self-Sufficiency Ratios (the share of domestic production on the total food supply) (Tables 7 and 8).

Before the trade liberalization reforms, the supply of fruits, oil crops, vegetables, roots and tubers, pulses, and tree nuts relied heavily on national producers, since imports were scarce for these crop categories. Cereals, though mostly nationally produced, had the lowest self-sufficiency ratios; while tree nuts and stimulants were to a great extent grown for the international markets.

After the reforms, the country became less self-sufficient and more import-dependent in stimulant crops. Pulses had growing figures on both indicators, which stemmed from both the reorientation of the domestic production towards the external markets, and the growing, though still minor, importance of imports in the total crop supply. Oil crops increased its self-sufficiency ratios until the mid-1990s; after that, the expansion of the industry towards higher value-added products affected negatively the self-sufficiency ratios, since most of the production was now aimed at satisfying the internal demand in detriment of the external markets. At the same time, oil crops exports declined, and in the late 1990s and early 2000s, imports of this crop surged to levels even higher than those of exports, increasing the import-dependency ratios. Although to a lesser degree, cereals remained the lowest in terms of self-sufficiency and the highest in import-dependency. The ratios for fruits, vegetables, and roots and tubers did not experience major changes, since the importance of imports and exports of these crops remained very low.

Table 7. Bolivia: Import Dependency Ratios by Crop Group

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Source: Own calculations, based on FAO (2009).
Table 8. *Bolivia: Self-Sufficiency Ratios by Crop Group*

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*Source: Own calculations, based on FAO (2009).*

7.3.6. Food Security Index

The results from the construction of a food security index suggest that the early 1980s was by far the worst time for Bolivia in terms of food security (Graph 45). Several factors may have contributed to the situation: (1) the debt crisis of the 1980s, (2) the hyperinflation between 1982 and 1985, and (3) the severe droughts of 1983. It was not until the mid-1990s (more than a decade after) that the food security levels reached levels similar to those observed before the crisis. By the early-2000s, the country managed to regain lost ground. However, the food security indices remained still very low. Moreover, it is important to remark that the food security index does not take into account distributional factors, which have deteriorated in the country since the 1990s. And so, if the index had incorporated such factors, the results would have probably been much worse.

*Graph 45. Bolivia: Food Security Index, 1967-2003*

*Source: Own calculations, based on FAO (2009).*
8. Conclusions

This study used an adaptation of a methodological framework developed by the Food and Agricultural Organization (FAO), in order to assess the impact of the trade liberalization reforms started in 1985 on Bolivia’s food security. After the liberalization of the trade regime, there was an increase in the quantity of food produced within the country. In fact, every Bolivian had more food available in 2006 when compared to the situation in 1985. In terms of trade, the country increased its agricultural exports and imports. Furthermore, the structural reforms and the stabilization program brought about a reduction in the volatility of most food commodities prices. However, a closer look at the figures showed that the rise in both the national production and trade figures (exports and imports) was driven mostly by the extraordinary expansion of oil crops. Food crops categories such as starchy roots and vegetables actually declined in per capita terms. Moreover, this decline was not compensated with imports. Although there was an increase in the per capita imports of starchy roots and vegetables, this increase was not enough to counterbalance the domestic production drop of these categories during the period. Besides, the increasing number of undernourished people as well as the rise in the inequality indicators suggests that food access and utilization has not been fully guaranteed.

When the trade reforms of 1985 took place, the country was already in a process of consolidation on the production of oil crops in the lowlands, especially soybeans. In this context, the major effect of the trade reform was the outstanding expansion of the soybeans production, driven almost exclusively by an equally outstanding increase of the area harvested. The expansion of oil crops did not necessarily affect the performance of the major subsistence crops, since these crops were produced mainly in the highlands region. Soybeans were produced for both the national and international markets, and so both exports and imports figures were affected by this crop’s performance. Soybeans and its by-products became by far Bolivia’s most important agricultural export commodities. But it also had an impact on the import structure of the country. After the second-half of the 1990s, oil crops became the country’s second largest agricultural import. This was connected to the development of a national soybean industry that was moving towards higher value-added products.

In this sense, Bolivia’s engagement in a trade liberalization process was not reflected in an improvement of the country’s food security. The benefits of the liberalization were absorbed mainly by the lowlands and the soybeans industry. But the historical allocation of land in the lowlands region favored a group of large-scale producers, some of them of foreign origin, and so the benefits of trade were also absorbed by this class. Most of Bolivia’s rural population, which comprises most
of the poor people in the country, remained settled in the Andean highlands involved in subsistence agriculture. Some of them are even detached from the market economy. Furthermore, the geographical features of this region and the low productivity of the crops became a major obstacle for the development of the highland’s agricultural sector. Bolivia is still food insecure and being more open to the international markets did not seem to have improved the situation. However, further studies that give account of the impacts of trade liberalization on the micro and regional food security levels are still needed.

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