POLITECNICO DI MILANO
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POLO REGIONALE DI COMO

Master of Science in Management, Economics and Industrial Engineering

"COMMODITIES PRICE VOLATILITY: ARGENTINA´S TRADE POLICIES 2006-2008"

Master Graduation Thesis by

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Abstract

The aim of this paper is to analyze the effectiveness of the trade policies implemented by Argentina during the years 2006 and 2008, in the context of record high international prices for commodities and unprecedented levels of volatility. These trade policies were intended to protect domestic customers from a possible price increase on their food basket; yet, the evidence suggests that the results were rather disappointing. In fact, the implementation of the policies carried out some negative and undesired consequences that damaged agricultural producers and increased the risk exposure of the country.

Lo scopo di questo lavoro è di analizzare l'efficacia delle politiche commerciali implementate dall'Argentina durante gli anni 2006 e 2008, nel contesto di prezzi internazionali record delle materie prime e livelli di volatilità senza precedenti. Queste politiche commerciali avevano lo scopo di proteggere i clienti da un possibile aumento del prezzo sul mercato interno nel loro paniere alimentare. Comunque, l'evidenza suggerisce che i risultati sono stati piuttosto deludenti. Infatti, l'applicazione delle politiche ha dato origine ad alcune conseguenze negative e indesiderate che hanno danneggiato ai produttori agricoli e hanno aumentato l'esposizione al rischio del paese.

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Executive Summary

Between the years 2006 and 2008, the volatility of commodities prices arrived to levels never seen before. In order to cope with such events, Argentina (among several other countries) decided to implement a series of policies destined to reduce the negative effects of volatility on the local economy. The aim of this paper is to analyze those policies and evaluate the effectiveness of their implementation.

We will start by reviewing the most important highlights in world production and trade of commodities to find out that, given the nature of this type of goods, both of them grow slowly but constantly and that demand will not be affected in the short term by a sudden price change.

In the second chapter, we will comment the evolution of volatility throughout the last century and the most likely causes for the unprecedented price spike of the years 2007/08. We will measure the levels of volatility for the different families of commodities and we will compare it with the volatility of industrialized goods. We will see on section 2.6 that volatility is a phenomenon mostly inherent to commodities. At the end of the chapter we will mention why price shocks are particularly damaging for the general evolution of a country.

Chapter 3 is dedicated to analyze the general situation of Argentina from a social and economic point of view. We start by taking a look at some of the most important social indicators and explaining the reason for some discrepancies in their measurement when comparing official sources versus some private consultants. It will we be shown that, despite the growth of the economy since the default of the year 2002, some social indicators still present alarming values. On the economic side, we show how important are the exports (specially food exports) for the well being of the trade balance.

The second part of the chapter is dedicated to understand which of the volatility causes mentioned in chapter 2 is more significant in the case of Argentina. For this, we select the 3 most exported commodities and we perform a statistical correlation between them and each of the volatility causes. We finalize the chapter by arguing whether if Argentina can influence somehow the causes that affect the country the most.

In the final chapter, we tackle the aim of the paper. We start by describing the general effects of volatility on a given economy and how some of the effects can be irreversible (or, at least, not in a significant period of time). Following up, we present which are the most common trade policies that a country can implement in order to modify the performance of a certain item or category and how those policies were implemented in the particular case of Argentina.

Finally we propose a simple model to analyze the effectiveness of the trade policies: we take the 3 commodities selected in the second chapter and we follow the evolution in time of:

- International price
- Price paid to producers
- Retail price paid by domestic customers

We perform the same analysis for bovine meat as well due to the high weight of that product on the domestic food basket.

We conclude that the effectiveness of the trade policies put in place is rather disappointing as they did not keep the customer price from increasing, even when the international prices were going down at the end of the year 2008. We also remark the important opportunity cost that producers had to bare when they could not take full advantage of the high international prices. Yet, the most important conclusion to our paper is that the intervention of the state created a level of uncertainty that led to some negative consequences that outweighed any possible affect that the policies might have had in the first place.

1.- Commodities: Production and Trade

1.1.- Introduction

In this chapter, we will briefly comment the most important tendencies in commodities production and trade, separating the information by geographic area and type of commodities. Before, however, we will provide the reader with some basic definitions in order to have a common and clear language during the rest of the work.

What is a commodity?

A commodity is a good for which there is a demand but it is supplied without qualitative differentiation across the market. This is called "fungibility", which means that the market treats the good in the same way regardless of who produces it.

Commodities are often used as inputs in the production of other goods and services.

The sale and purchase of commodities is usually carried out through futures contracts on exchanges that standardize the quantity and minimum quality. So, even if the quality is more or less uniform across producers, in order to facilitate the trade, commodities must meet a minimum specified standard called basis grade.

An example of a commodity is soybean. The price of soybeans would fluctuate due to the amount available and its global demand. If soybeans would suddenly become scarce, its price would go up.

On the other hand, say, electronics have specific quality and features that make a product completely different depending on the producer. Thus, the more valuable the item is perceived, the more it will cost.

More recently, the definition of commodity has expanded to include financial products such as foreign currencies and indexes. Technological advances have also led to new types of commodities. For example: cell phone minutes and bandwidth.

Types of commodities

There is no official and universal classification for commodities. In fact, this section is not intended to propose one. But we do believe that it is useful to group the commodities in families as they might present similar characteristics and behaviors. This is just a descriptive overview on the main groups of commodities and their most important examples.

- Metals: there are two main types: precious and base metals.
    - In the precious variety are gold, silver, platinum and palladium. Gold and silver are favorites among many traders as a store of value whenever there is a period of global instability.
    - Base metals are aluminum, copper, zinc, lead, nickel and tin.
- Energies: they are uses to generate power and provide heat. When energies are mentioned, crude oil springs to mind. It is the number one traded commodity in the world today. Other important energies are natural gas (especially for winter months heating), coal (many electricity plants are still coal-fired for producing electricity) and uranium (a necessary fuel for making energy in nuclear power plants). Finally, in the last few years there was an increase in the production and trade of biofuels (although this

is a "grey" case as it's very much related with agricultural commodities). For example, bio-ethanol is traded both at the Brazilian Securities, Commodities, and Futures Exchange and at CBOT.

- Agricultural: Agricultural products are divided into three main types of commodities: grains and oilseeds, softs and meats.

    o Grains would include wheat, rice, oats corn and soybeans.

    o Softs, also known as 'Food & Fiber', include coffee, sugar, cocoa, cotton, etc.

    o Meats: they are also dependent upon grains at times since they are frequently used to feed livestock.

- Financial: it is arguable to consider financial assets as commodities based on the definition and comments made in the previous section. However, we will just mention them due to the fact that sometimes the trade of financial assets (for example, the right to sell/buy a certain amount of grain at a maximum/minimum price) is bigger than the trade of the underlying commodity. Other examples of financial commodities are U.S. treasury bonds, foreign currencies, etc.

What is volatility?

Volatility is a measurement of change in price over a given period. It is usually expressed as a percentage and computed as the annualized standard deviation of the change in daily price. Volatility does not measure the direction of price changes, merely their dispersion. This is because when calculating standard deviation (or variance), all differences are squared, so that negative and positive differences are combined into one quantity.

In other words, volatility refers to the amount of uncertainty or risk about the size of changes in a commodity's value. A higher volatility means that the value can potentially be spread out over a larger range of values. This means that the price of the commodity can change dramatically over a short time period in either direction. A lower volatility means that the value does not fluctuate dramatically, but changes at a steady pace over a period of time.

We will not discuss deeply the general effects of volatility at this point. Let's just say for the moment that more stable commodities with low volatility will have a higher degree of predictability which is of great importance to both producers and customer as they can plan their activities more accurately.

1.2.- Commodities Production

1.2.1.- World Production by type of commodity

The following graphics present the production information for some repetitive items of each family of commodities

Agricultural
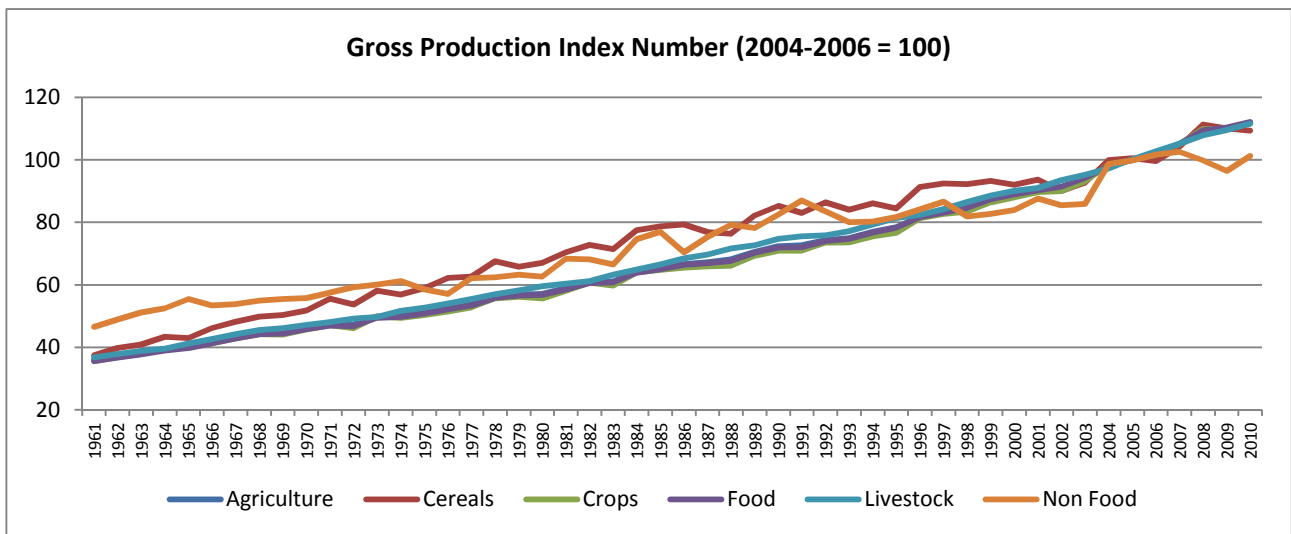
Figure 1 – World production (Agricultural)
Source: Own elaboration with data from FAO – FAOSTAT.

Minerals and Metals
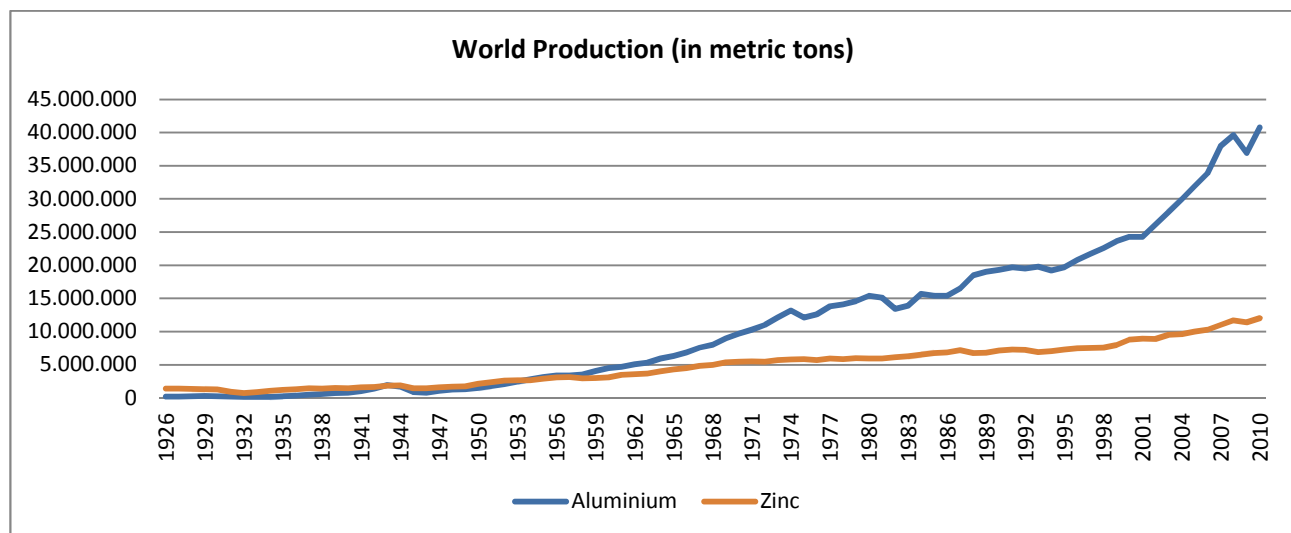
Figure 2 – World Production (Aluminum & Zinc)
Source: Own elaboration with data from US Geological Survey.
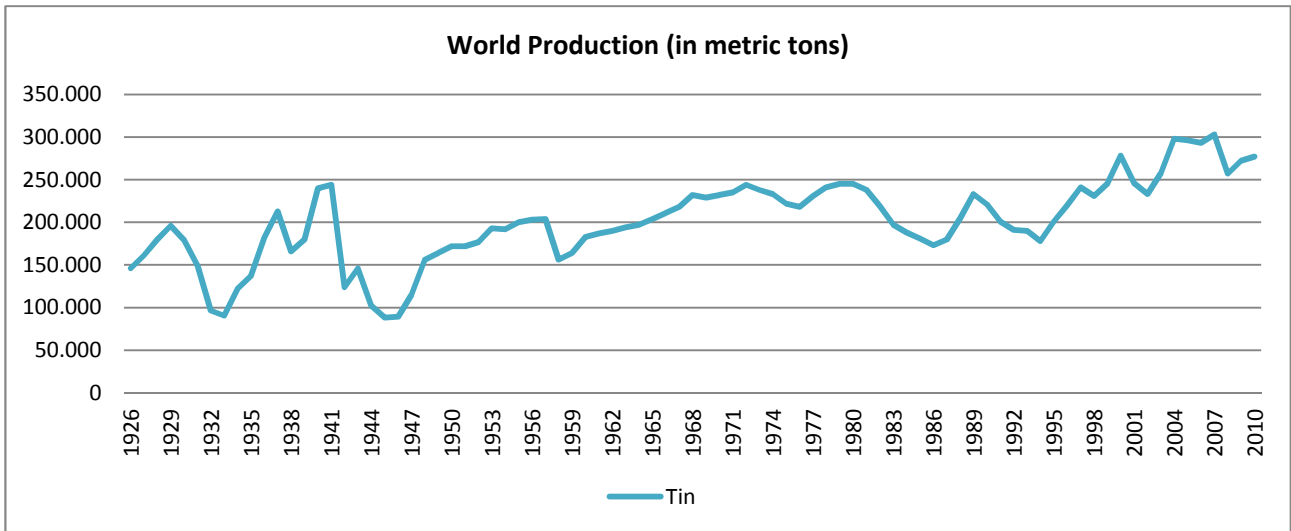
Figure 3 – World production (tin)
Source: Own elaboration with data from US Geological Survey.
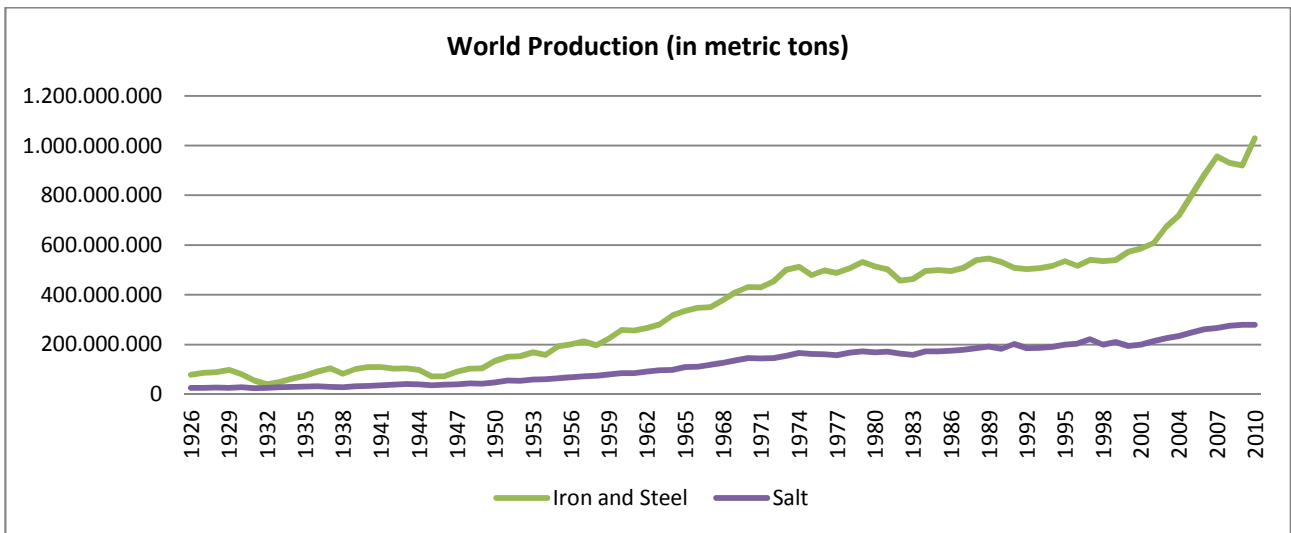
Figure 4 – World Production (iron and steel and salt)
Source: Own elaboration with data from US Geological Survey.
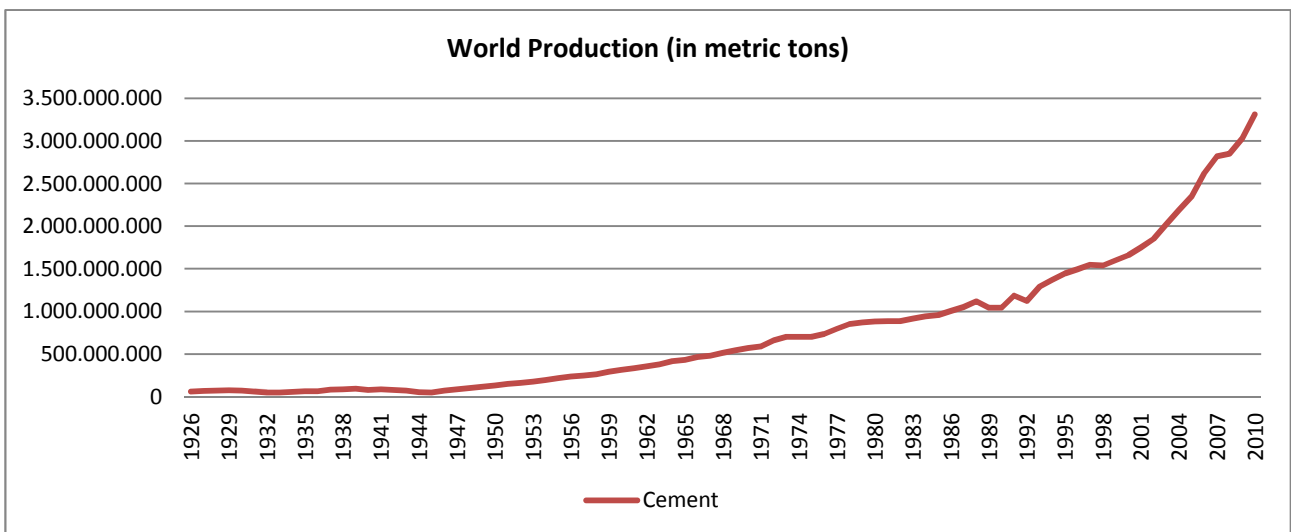
Figure 5 – World production (cement)
Source: Own elaboration with data from US Geological Survey.

Total Oil Supply (Thousand Barrels Per Day)
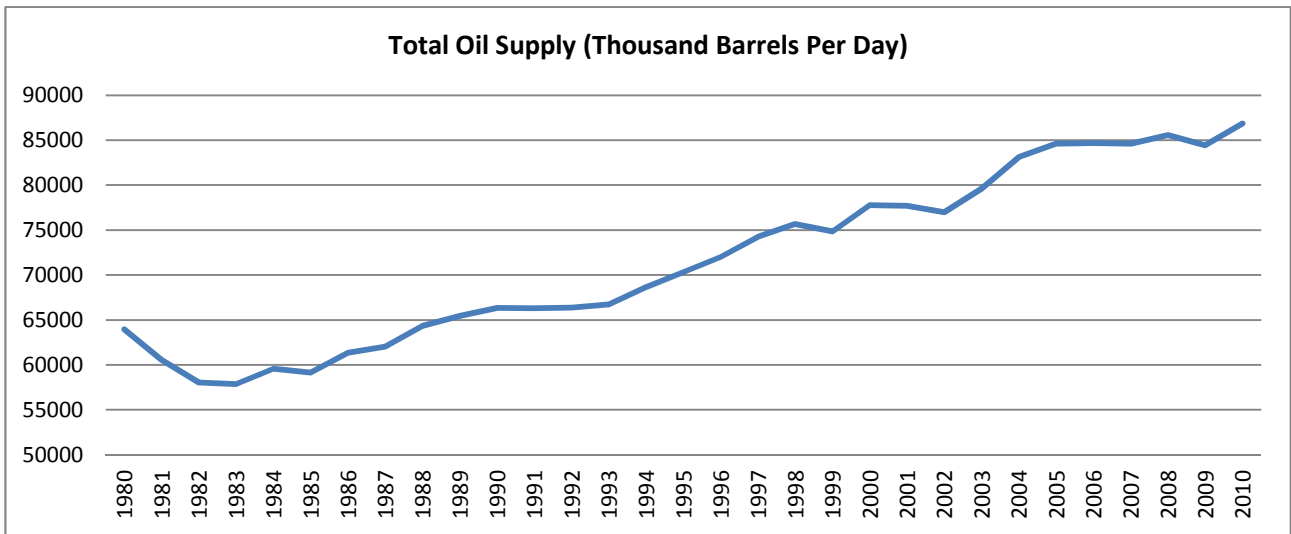
Figure 6 – Total oil supply
Source: Own elaboration with data from US Energy Information Administration.

Total Primary Energy Production (Quadrillion Btu)
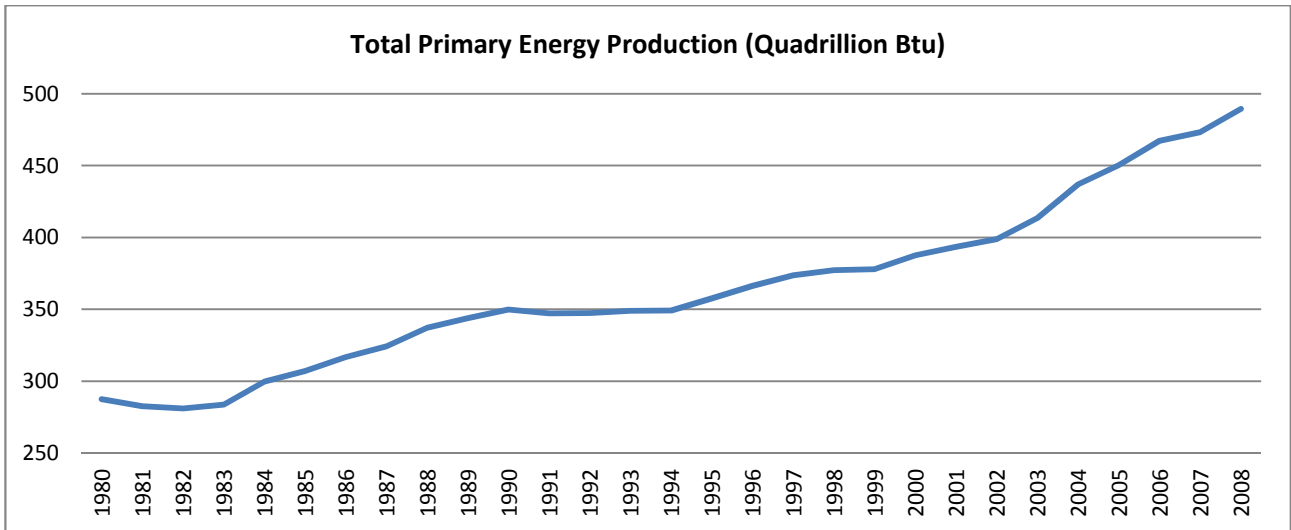
Figure 7 – Energy production
Source: Own elaboration with data from US Energy Information Administration.

1.2.2.- Volume of production by region

Table 1 – Production per region

Region	Cotton Lint		Grains		Sugar	
	Annual avg growth rate (1961-2000) %	Production year 2000 (x1000 tons)	Annual avg growth rate (1961-2000) %	Production year 2000 (x1000 tons)	Annual avg growth rate (1961-2000) %	Production year 2000 (x1000 tons)
World	1,8	18.835	2,0	1.397.047	2,3	127.200
Developing countries	2,9	13.830	2,9	636.811	2,9	88.174
Africa	*2,1*	*1.671*	*1,7*	*81.723*	*3,1*	*9.313*
America	*-0,6*	*1.031*	*2,8*	*115.623*	*1,7*	*35.034*
Asia	*3,9*	*11.128*	*3,2*	*439.451*	*4,5*	*43.505*
Oceania	*0,0*	*0*	*4,7*	*14*	*2,0*	*322*
Central and Eastern Europe	-14,6	3	-0,1	161.142	2,2	6.833
Developed countries	1,0	5.002	2,1	599.094	1,7	32.193

Source: Own elaboration with data from UNCTAD - Production and international trade of commodities.

Table 2 – Production per region

Region	Aluminum		Refined copper		Crude steel	
	Annual avg growth rate (1961-2000) %	Production year 2000 (x1000 tons)	Annual avg growth rate (1961-2000) %	Production year 2000 (x1000 tons)	Annual avg growth rate (1961-2000) %	Production year 2000 (x1000 tons)
World	4,4	24.488	2,8	14.825	2,3	849.579
Developing countries	10,7	8.645	5,2	7.269	6,9	325.854
Africa	*8,4*	*1.122*	*-1,2*	*376*	*4,2*	*13.767*
America	*13,0*	*2.167*	*6,8*	*3.732*	*6,2*	*55.896*
Asia	*10,8*	*5.356*	*8,6*	*3.161*	*7,3*	*256.191*
Oceania	*0,0*	*0*	*0,0*	*0*	*0,0*	*0*
Central and Eastern Europe	3,5	3.905	1,5	1.400	0,7	124.535
Developed countries	3,3	11.938	1,6	6.156	1,4	399.190

Source: Own elaboration with data from UNCTAD - Production and international trade of commodities.

1.2.3.- Share of production by region
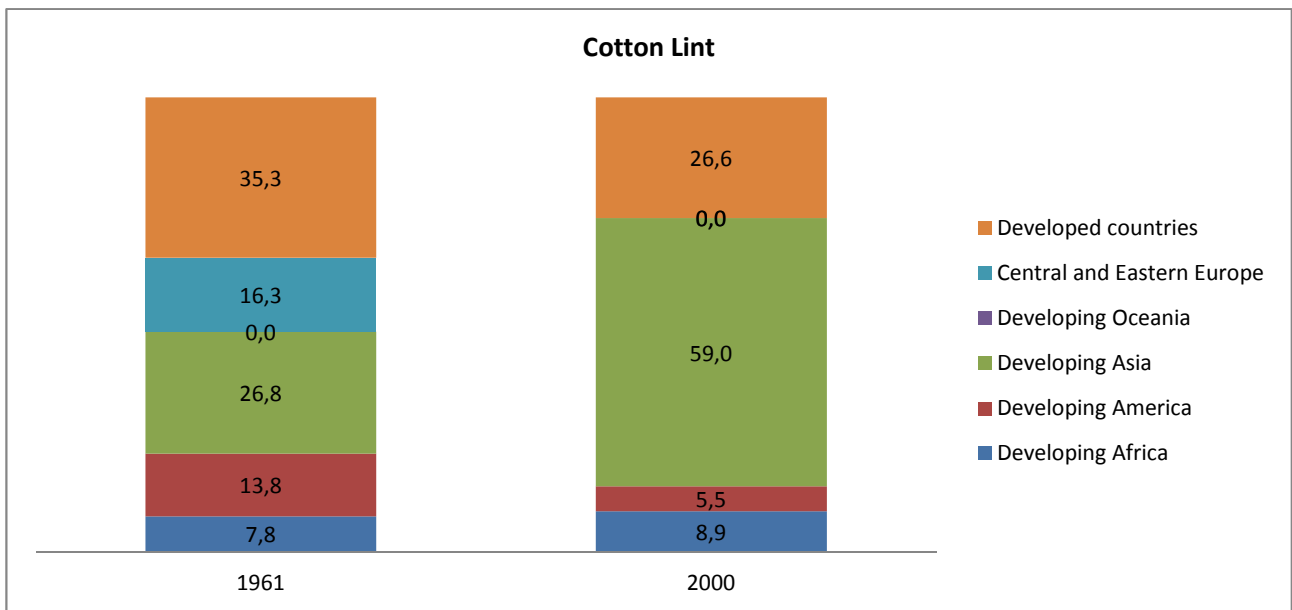
Figure 8 – Share of production (cotton)
Source: Own elaboration with data from UNCTAD.
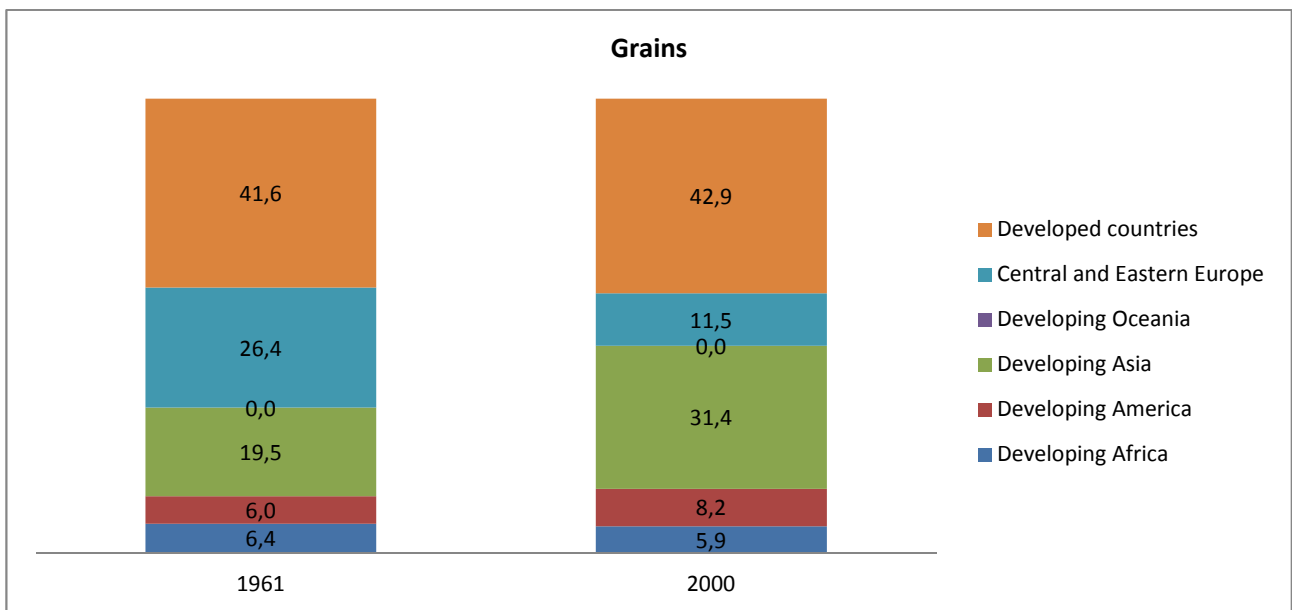
Figure 9 – Share of production (grains)
Source: Own elaboration with data from UNCTAD.
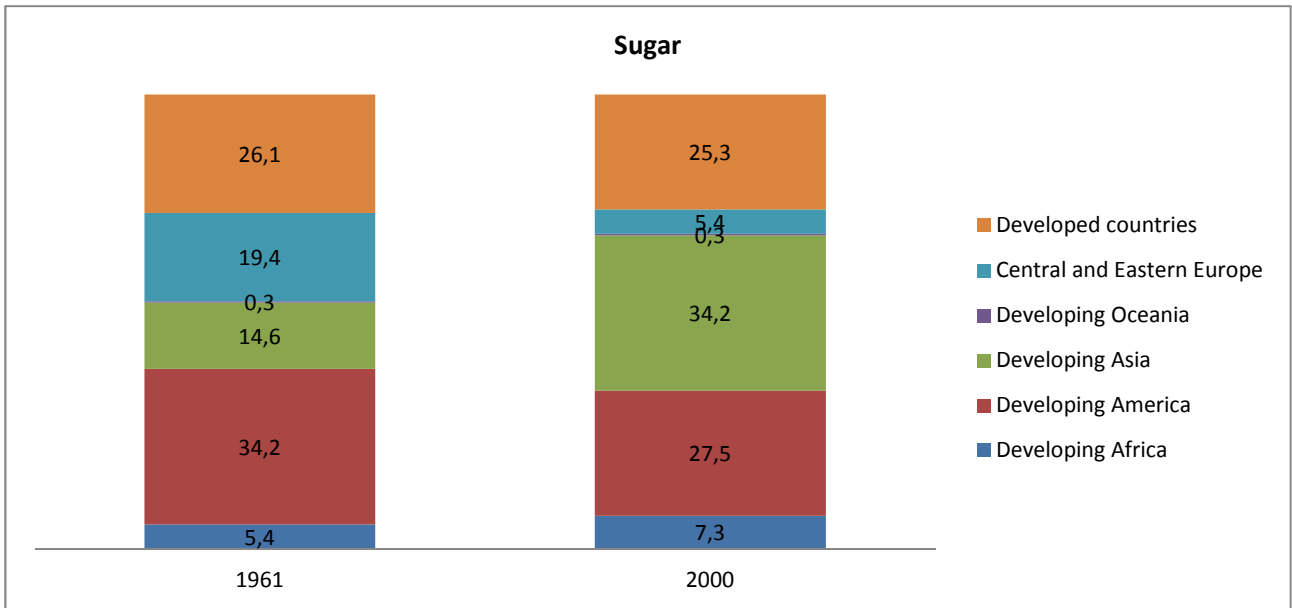
Figure 10 – Share of production (sugar)
Source: Own elaboration with data from UNCTAD.
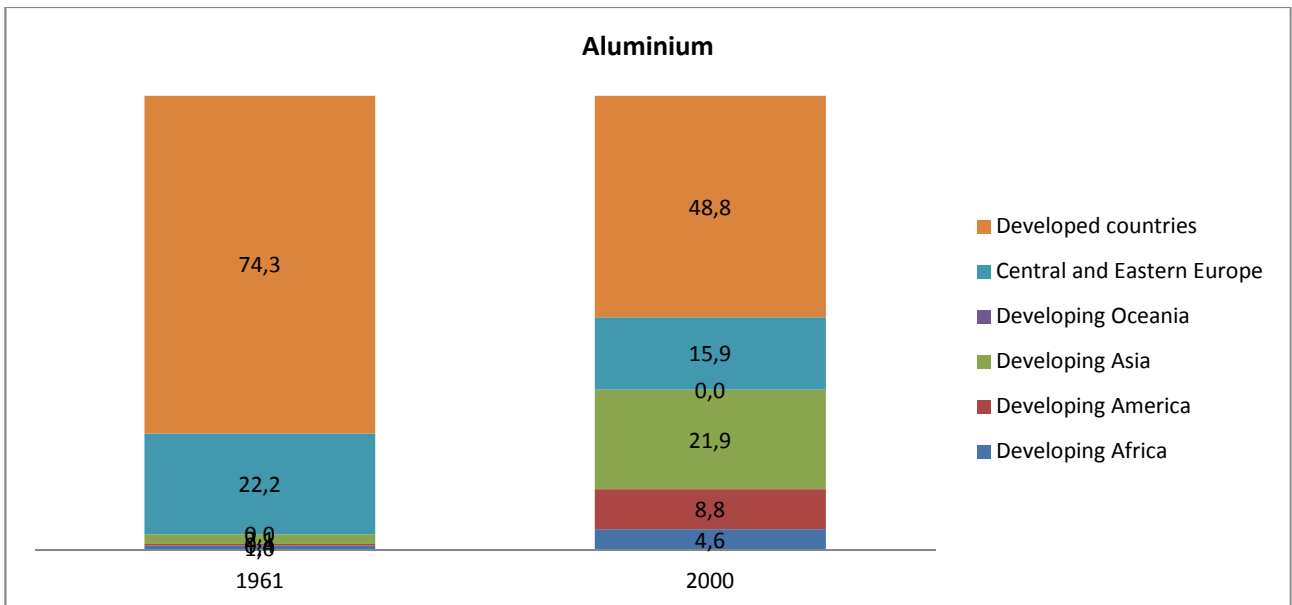
Figure 11 – Share of production (aluminum)
Source: Own elaboration with data from UNCTAD.

Figure 12 – Share of production (copper)
Source: Own elaboration with data from UNCTAD.
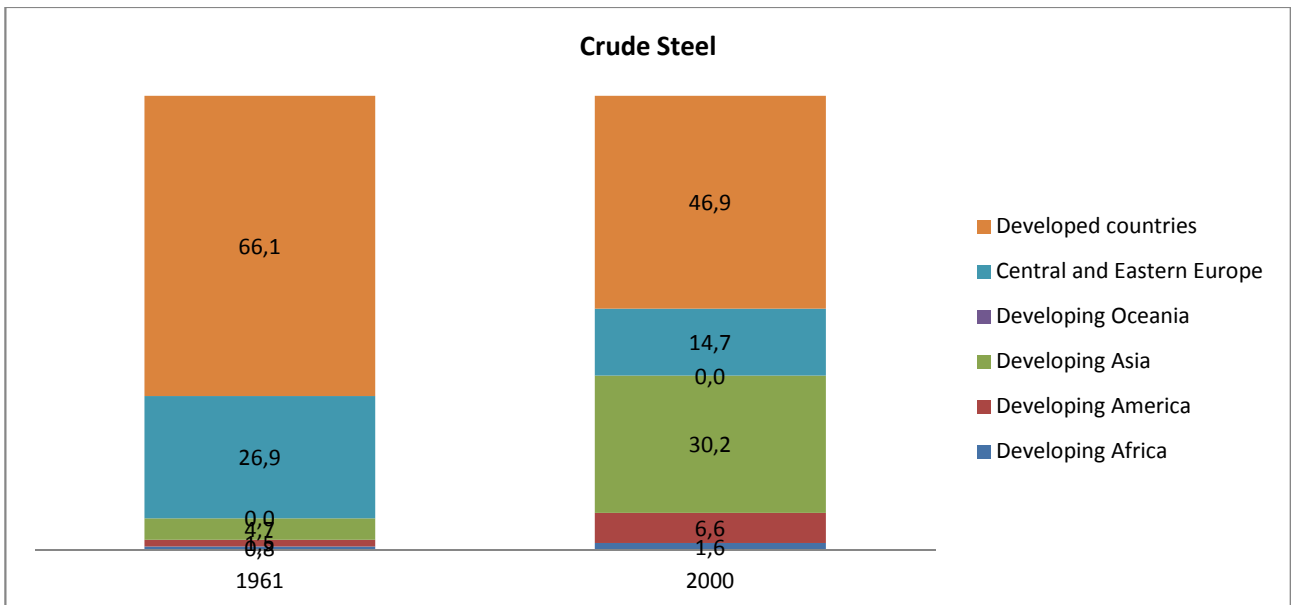
Figure 13 – Share of production (steel)
Source: Own elaboration with data from UNCTAD.

1.2.4.- Conclusion to this section

- From a total production perspective, it seems that all families of commodities grow more or less evenly since 1960. In some cases such as iron and steel or aluminum, there is an acceleration in last decades which might be related to the increasing industrialization of some nations. But, generally speaking, all families respond to the same growth pattern: production grows in the same way that world population does. There are no peaks as it might be the case for some industrial items that can have a "high popularity" period until they are substituted by a newer and more desirable product.

- Agricultural commodities: there has been an increase in the share of developing Asia while developing America and Central and Eastern Europe reduced their participation. Developed countries managed to remain constant. Growth in global production of agricultural commodities in general has been relatively

slow, owing to the fact that demand is not very sensitive to increases in income. At the same time, the composition of total demand has changed, with the share of basic foods declining and that of higher value products rising. The only group within this family that presents a slightly erratic behavior is "non-food" which might be explained by the development of synthetic fibers that can replace cotton (one of the most important non-food agricultural commodities).

- Metals: the share growth in developing Asia is overwhelming. This is the result of the rapid industrialization of the zone (specially China). Most of this growth is destined to satisfy local demand. Developing America also increased its share while the share in developed countries has decreased dramatically. It is understandable that the share of developed countries has fallen much more on metals, where trade barriers are lower, than in agricultural commodities, where tariffs are high and subsidies in developed countries make it difficult for developing countries to compete.

- Processing of commodities: developing countries made important progress towards their economic development as they increased the level of processing in their commodities. However, this trend has not been equally successful among all types of commodities. The most important one for our analysis is that developing countries have been much less effective in increasing the degree of processing of agricultural products. One reason is tariff escalation. This means that tariffs increase with the degree of processing. Another reason is that developing-country producers find it difficult to compete with the marketing efforts of large food companies in developed countries and to meet the requirements of customers from developed economies.

1.3.- Commodities Trade

1.3.1.- Total world exports by type of commodity
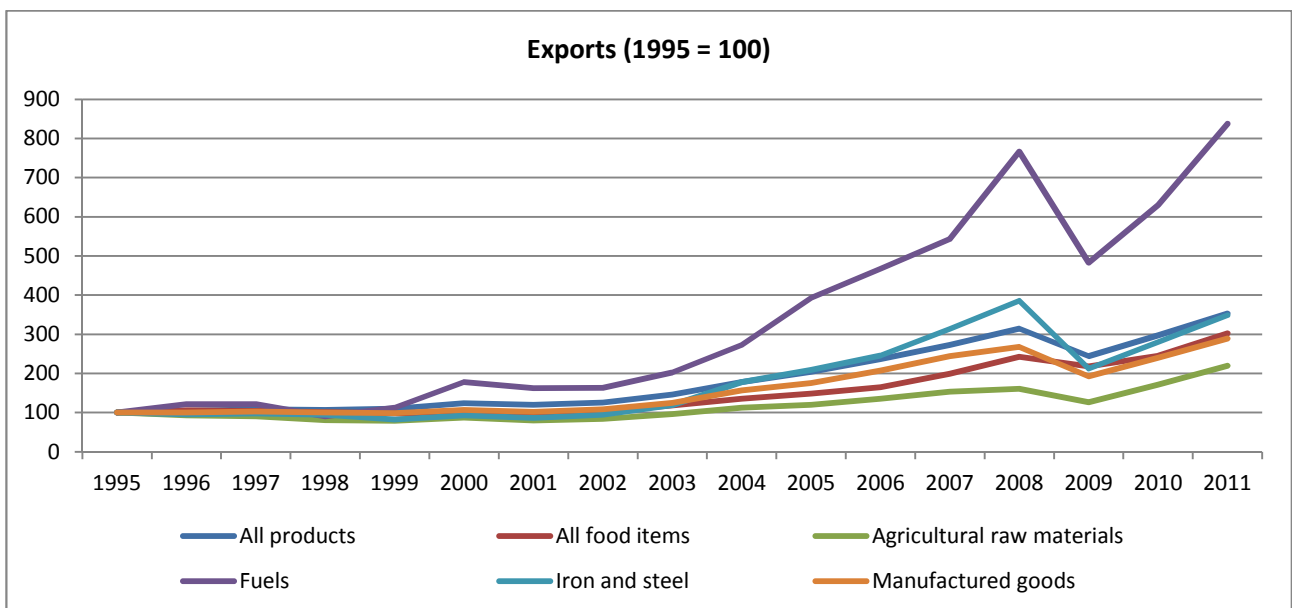
Figure 14 – World exports
Source: Own elaboration with data from UNCTAD.

1.3.2.- Share of commodity exports by region

Fuels

	1966	2000
Developed countries	24,5	28,9
Central and Eastern Europe	11,0	9,3
Developing Oceania	0,0	0,1
Developing Asia	33,7	40,4
Developing America	21,0	9,8
Developing Africa	9,7	11,4
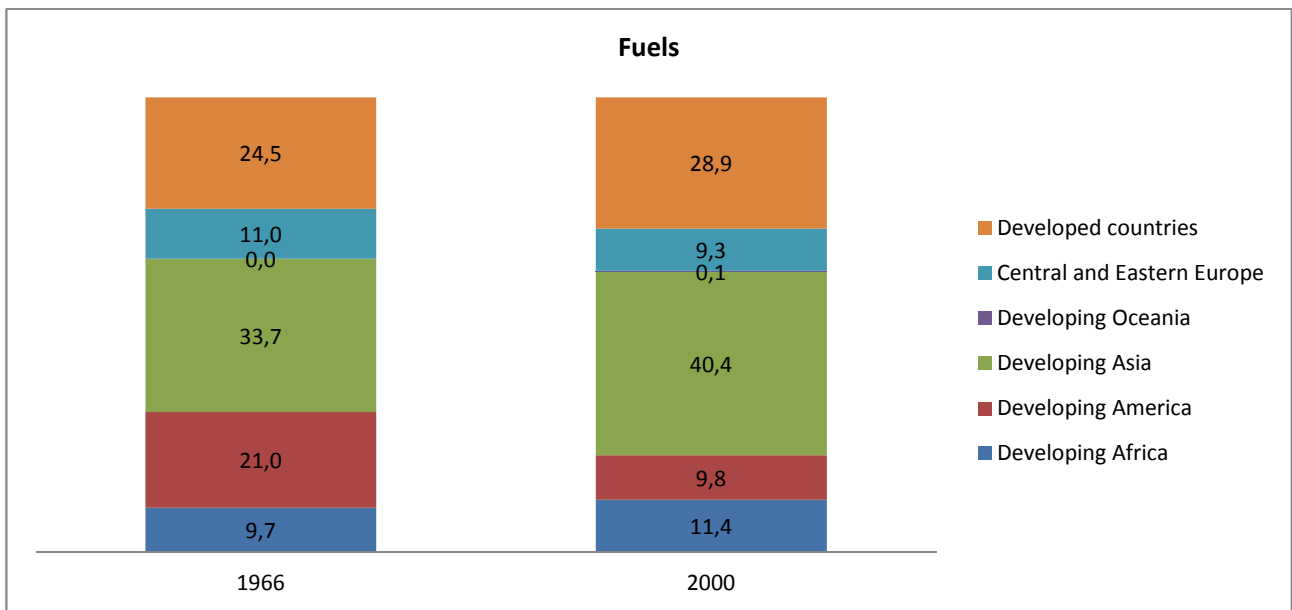
Figure 15 – Share of exports (fuels)
Source: Own elaboration with data from UNCTAD.

Minerals and Metals

	1966	2000
Developed countries	54,4	64,0
Central and Eastern Europe	8,8	4,0
Developing Oceania	0,2	0,2
Developing Asia	13,7	16,7
Developing America	13,4	11,5
Developing Africa	9,5	3,6
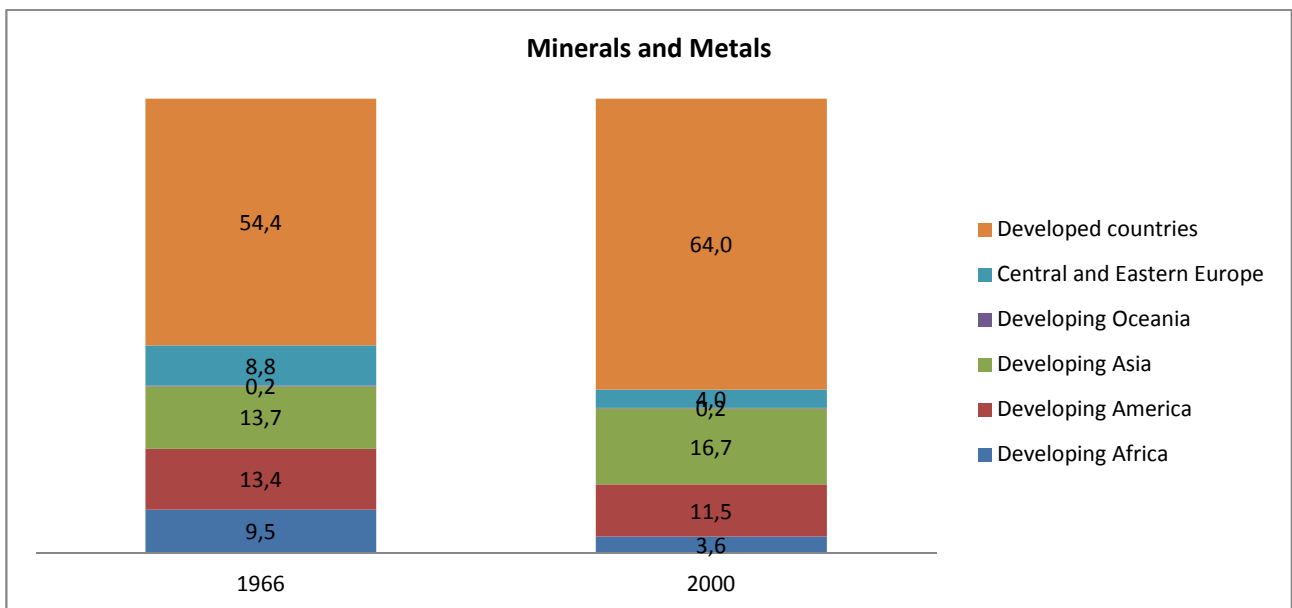
Figure 16 – Share of exports (minerals and metals)
Source: Own elaboration with data from UNCTAD.
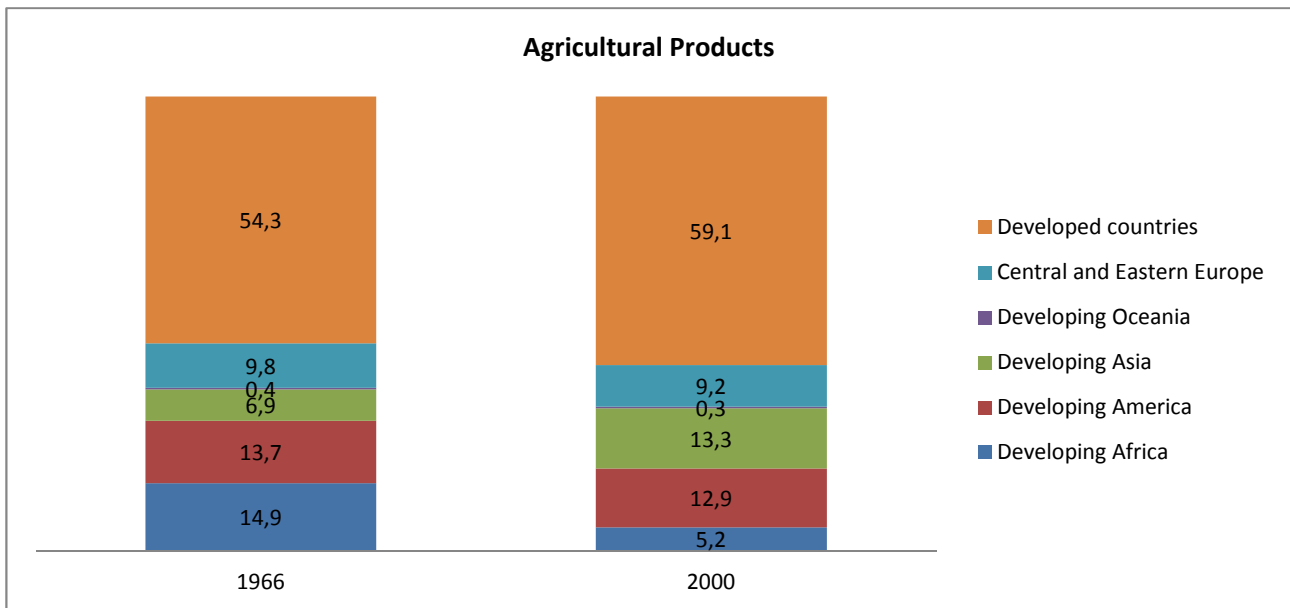
Figure 17 – Share of exports (agricultural)
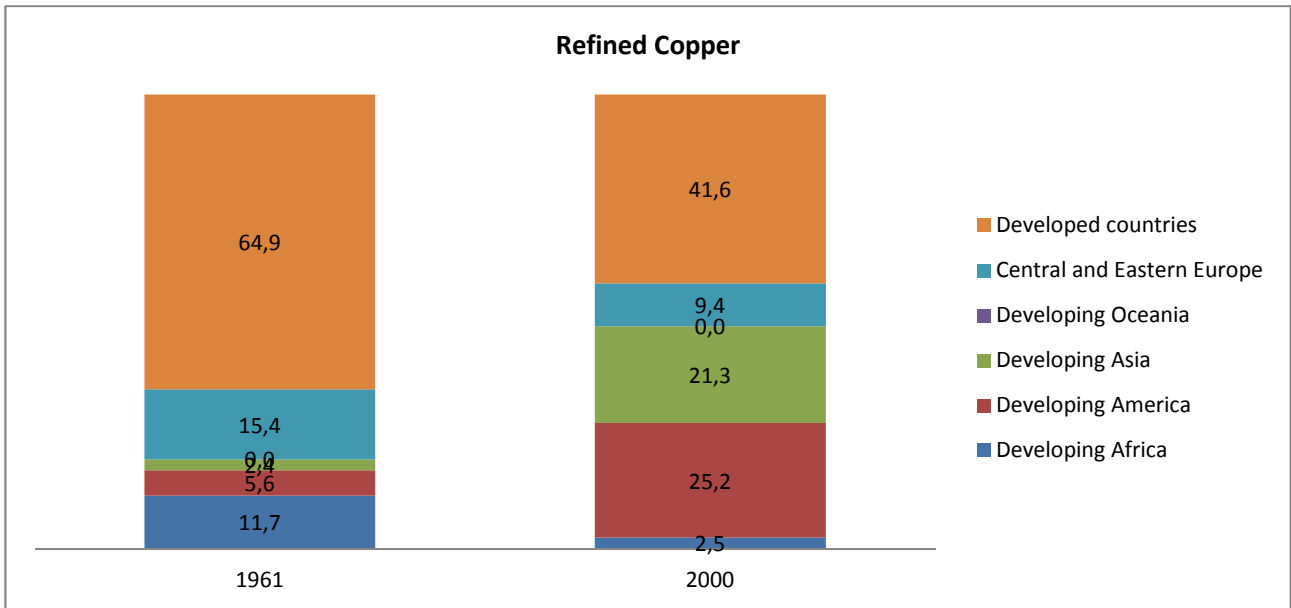*Source: Own elaboration with data from UNCTAD.*

1.3.3.- Conclusions to this section

- It is not a surprise that the trade of commodities also growths steadily in the same way as production, in line the growth of world population. In this case, the growing trend was only interrupted in the year 2009 due to an unprecedented crisis that led to recession in some of the most important countries in the word.

- It is very important to have in mind for the chapters to come the way in which food commodities behaved during the mentioned crisis. If we look at the production indexes for all families of commodities we will see that the reduction in exports is the smallest of all families with a 10% decrease while the average for all commodities was 22%. This happens because of the low elasticity of the demand for such category. During difficult times, individuals might switch to food with lower nutritional values but they will not cease their intake (with the exception of extreme poverty cases, of course).

- Developed countries' share of the world market for commodities exports has increased at the expense of the formerly socialist countries of Eastern Europe and, in a smaller percentage, developing countries. Of developing regions, only Asia has consistently increased its share of the world market for all commodity groups. Latin America has lost market share in all groups, while Africa has increased its market share for fuels but experienced severe losses for agricultural and non-fuel mineral commodities.

- Agricultural commodities: it is important to mention the key role that subsidies play in this kind of commodities. Developed countries were able to maintain or increase their share of exports thanks to this. Asian countries that have maintained technical support to farmers have been successful both in improving domestic food security and in promoting exports. On the opposite side, some African countries stopped government support to agricultural commodities production.

- Regarding minerals and metals, the drop in Africa's share resulted from the lack of confidence of investors and the decision to move to "safer" developed countries. Asian countries were able to build on rapidly growing domestic demand, which provided a secure base for expanding exports of processed metal products. Unlike agricultural products, metal products can enter developed-country markets at very low tariffs.

- Least developed countries have not kept up with the growth of the commodity sector in developing countries and industrialized economies. While commodity exports globally increased at an annual average rate of 7.2% from 1966 to 2000, the corresponding figure for developing countries was 6.8%. Least developed countries had an even lower figure of 2.2%. They are also losing market share, even in traditional commodities, for reasons related with their physical and social infrastructures, lack of technical and institutional capacity and subsidies observed in some key sectors.

- Attempts to reduce the commodities dependence by developing countries have been frustrated by restrictive trading rules. Countries such as Brazil, India and China have been rather successful in diversifying away from commodities, but most developing countries still depend heavily on commodities.

2.- Commodities Price Volatility

2.1.- Introduction

Until the beginning of this century, there was a general assumption that the terms of trade of commodities were deteriorating in relation to the prices of manufactured goods. The discussion of whether this deterioration was escalated or continuous is still open and the results vary according to the econometric model chosen. However, in the past few years there has been a series of events (a commodities price boom followed by a global financial crisis that cooled down the economy followed by a new increase in prices) that challenge the previous assumption. In fact, some specialists estimate an increase in the average prices of commodities over the next years.

In this chapter we will revise the past and recent trends in commodities prices and mention the most important causes and effects of commodities price volatility. We will also compare the level of volatility of the different families of commodities and we will try to understand if this volatility is inherent to commodities or if manufactured products also suffer the same phenomenon. Finally, we will mention the relevance of price shocks for an Economy.

2.2.- The Prebisch-Singer Hypothesis

In the early 1950s Raul Prebisch and Hans Singer concurrently formulated this hypothesis that explains why the terms of trade of primary goods deteriorates over time versus manufactured goods. What this means is that countries that export primary goods and do not have the means to manufacture goods to export will lose out in the long-run, as their goods will become relatively cheaper than the manufactured ones.

The main reason behind this is the income inelasticity of demand for commodities. Manufactured goods, instead, have a more elastic demand. So, with an increase in the income, the demand for manufactures goods would increase more rapidly than in the case of commodities.

Technology plays also a key role. Changes in technology can lead to structural changes in societies that affect final demand. For example, by making new products available or allowing new uses or features to already existing ones. But technology can also allow changes in production by reducing raw materials costs or the production of synthetic materials. These changes are important if we consider the international division of labor were developing countries specialize in the production of raw materials and developed countries specialize in manufactures. So, developing countries will grow more slowly as they would produce an excess of goods that will tend to push the prices down. On the other hand, developed countries would benefit from higher margins as they reduce their production costs.

Another difficulty that developing countries face is related to the labor market. Because of the weaker long term demand for commodities, a surplus of labor is expected. This surplus is not easily relocated in new production sectors (situation aggravated also due to migration restriction to more industrialized nations), and thus, generating a relative decline in wages that translates also in a damage to the terms of trade.

2.3.- Evolution of the commodities terms of trade since the 20th century

During the 20th centuries the terms of trade of commodities experienced an important reduction. Overall commodities prices more than halved if we compare the average of the first two decades of the 20th century and the average of the period 1998-2003.

Total real non-fuel commodity price index, 1865-2009 (1970-1979 = 100)
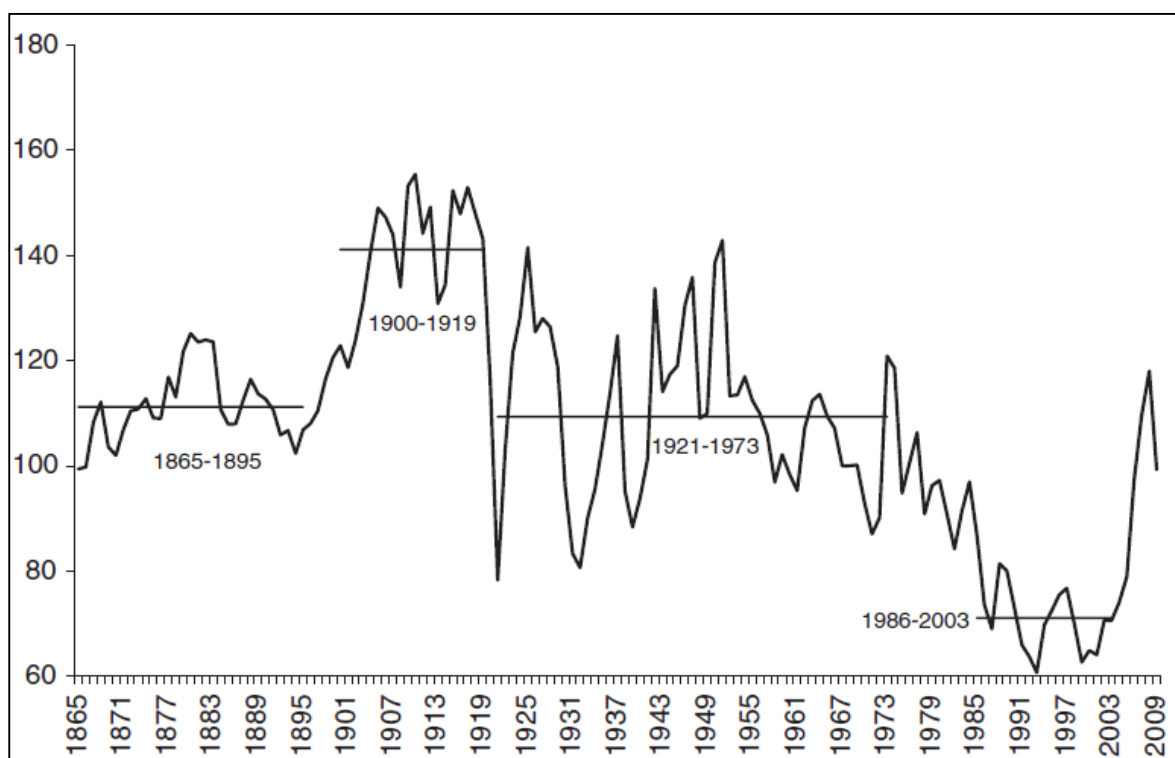
Figure 18 – Non-fuels commodity price index
Source: Ocampo/Parra-Lancourt.

It seems that rather a continuous trend, the reduction occurred in stepwise shifts that altered price levels. It is noteworthy that the largest price drops followed, with a lag, the two major slowdown in industrialized economies' long term growth rate: during the first world war and in 1973 (after the oil crisis).

In the first case, the slowdown could be explained by the deflationary crisis that took place in 1920-1921 after the first world war. This first drop was followed by a long period (1921-1979) during which the prices followed no particular trend.

In the second case, the slowdown could be linked to the monetary shock generated by the actions of the US Fed in 1979 to curb inflation, that led to the debt crisis in Latin America and other parts of the developing world. The debt crisis forced a considerable number of developing countries into a sharp reduction in their real exchange rates as part of an effort to generate trade surpluses to service debt. This would have raised profit margins to exporters in those countries; with price-inelastic world demand any resulting stimulus to supply would depress prices. Thus, if the demand for primary products is price-inelastic and supply has some price-elasticity, the macro-adjustments induced by the debt crisis could have had a downward effect on the relative price of primary commodities.

Prices failed to recover following the 1980-81 recession as the supply of almost all agricultural commodities increased substantially because of generally favorable worldwide weather conditions and policies in producing countries that encouraged continued growth of production, even in the face of falling world prices.

In this case, the evolution of prices after the event seems to adjust better to a change in the trend (from stable to decreasing) than a onetime drop as in the previous case.

The evolution of the terms of trade was not uniform among all commodities groups. Agricultural products seem to have the strongest reduction while metals the weakest (in fact, the show no reduction at all). Within agricultural, the tropical commodities suffered the most while non-tropical's reduction was softer.

Terms of trade by commodity groups (1970-1979 = 100): metals
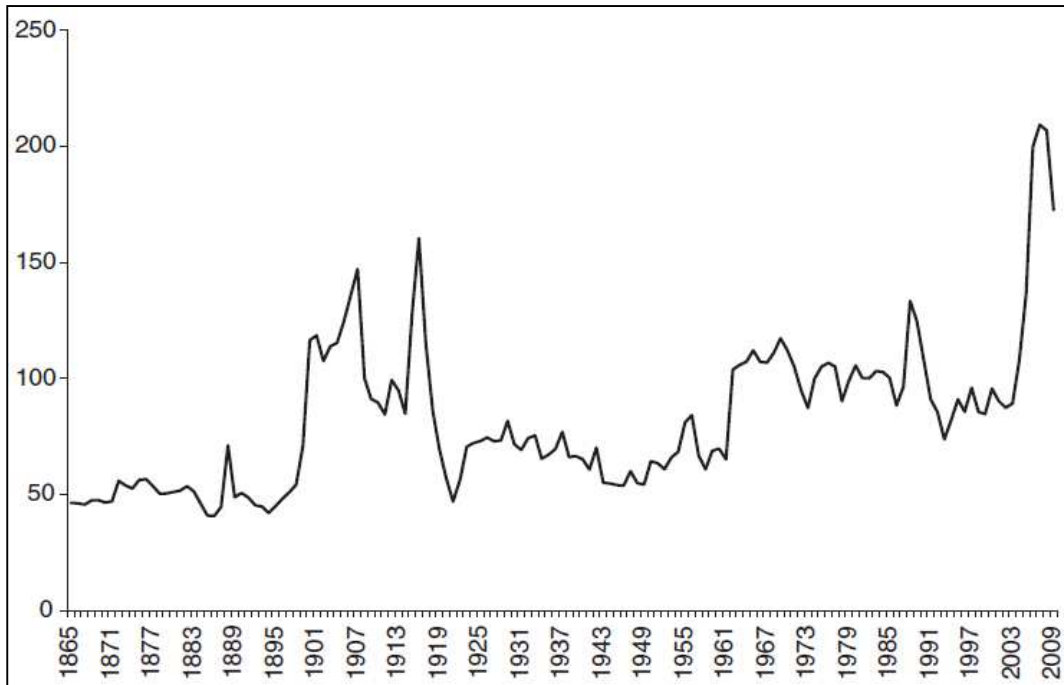
Figure 19 – Terms of trade (metals)
Source: Ocampo/Parra-Lancourt.

Terms of trade by commodity groups (1970-1979 = 100): agricultural
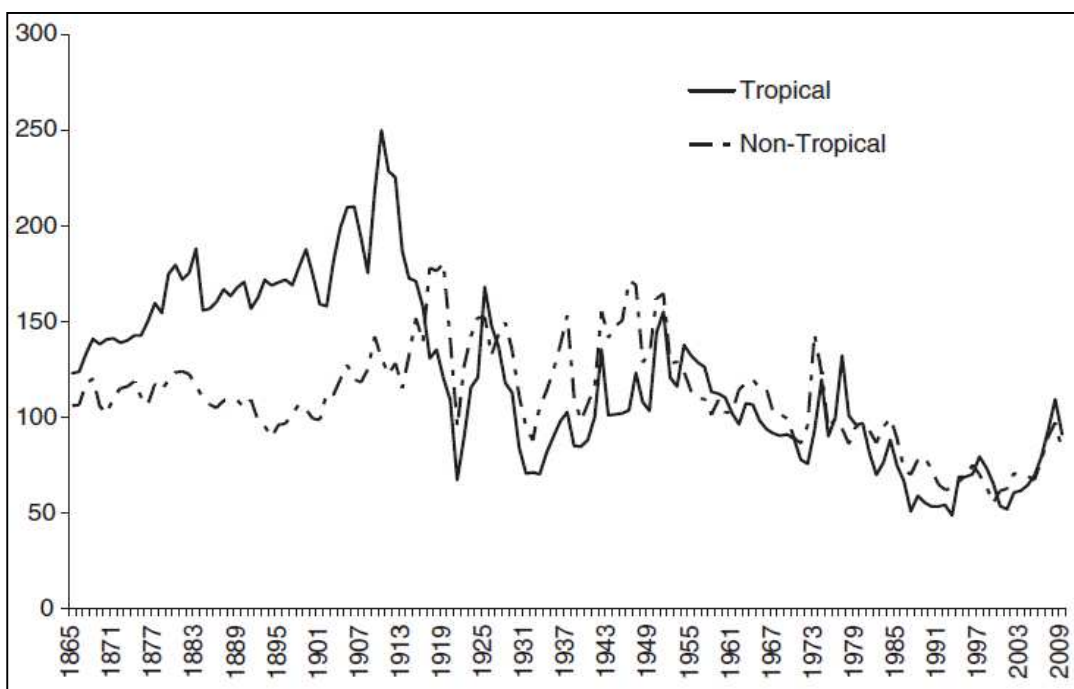
Figure 20 – Terms of trade (agricultural)
Source: Ocampo/Parra-Lancourt.

In contrast with the downward shifts, there was an upward shift in the commodities terms of trade in the early 21st century (starting in 2003/2004). This was the most important commodity boom in terms of length, coverage and intensity. In the next section we will go into further detail on this commodity boom, analyzing its most likely causes.

2.4.- The 21st century commodity boom

Beginning in around 2002/2003, commodity markets entered a strong and sustained uptrend. By its peak in mid-2008, this upswing had seen the prices of almost all classes of commodities rise substantially. For many commodities, the pace of price increase accelerated during the period between January 2006 and July 2008. The crude oil price, in particular, more than doubled over this relatively brief period.
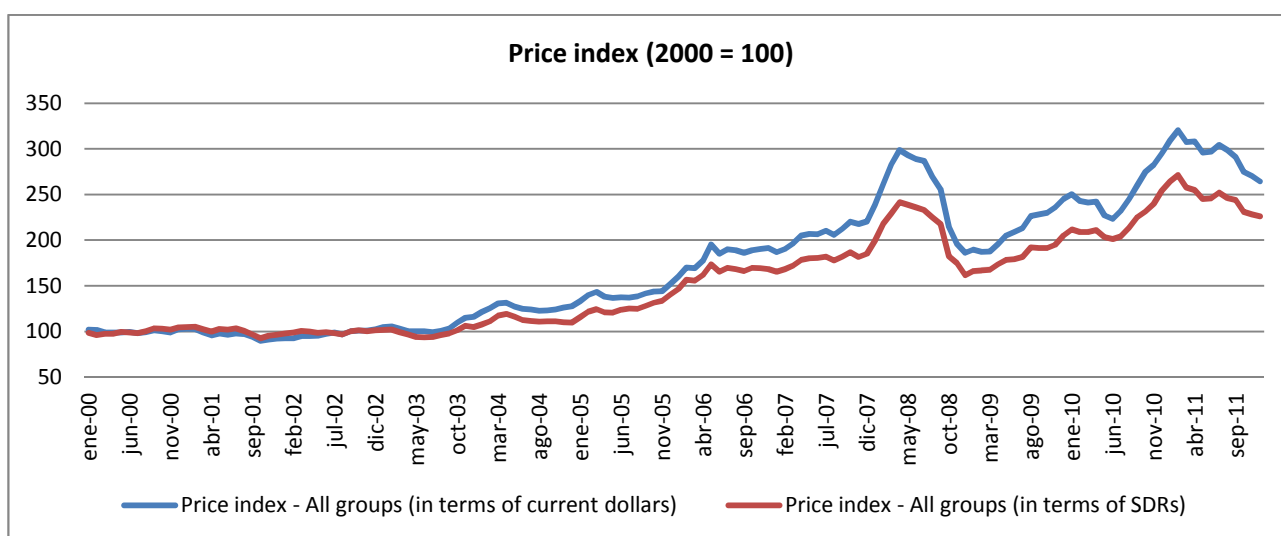
Figure 21 – Price index (all)
Source: Own elaboration with data from UNCTAD.
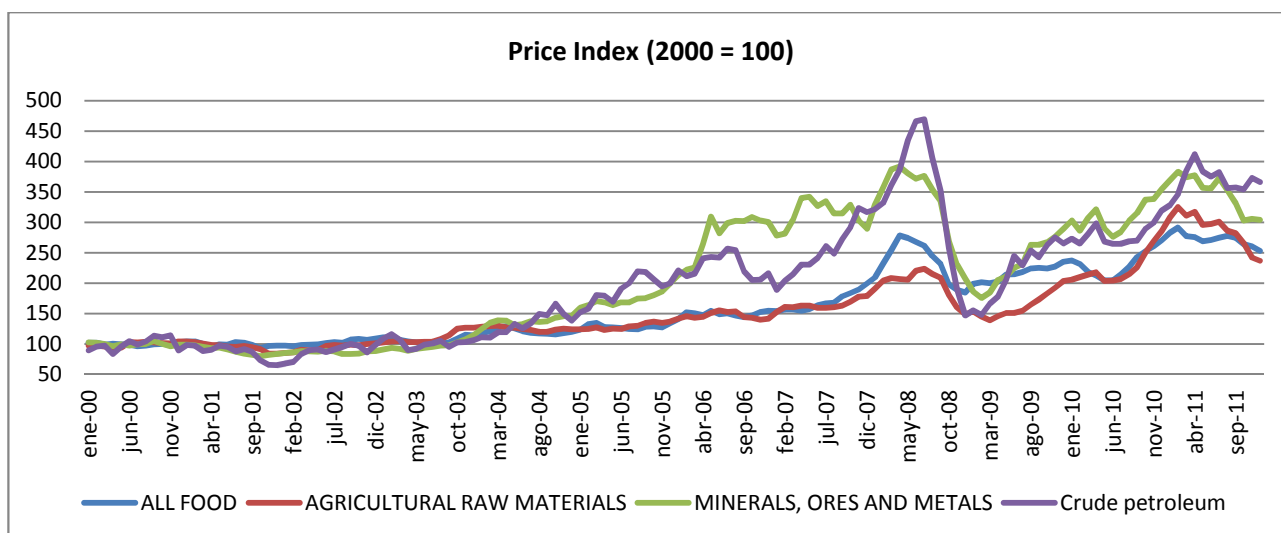
Figure 22 – Price index (by family)
Source: Own elaboration with data from UNCTAD.

During the second half of 2008, commodity prices quickly corrected with the escalating global financial crisis and associated downward revisions to forecasts for global economic growth. From July 2008 to March 2009, commodity prices fell precipitously, reversing most of the gains made over the preceding years.

Indices of commodity prices reached a bottom in March 2009. Since that, commodity prices have recovered and locate at the moment at a level comparable with the peak in mid-2008.

The causes of this commodity boom are vast and there is no unanimous consent about all of them. Moreover, some of these causes are still present so it is hard to tell if commodities will maintain this unstable behavior of if a new trend will prevail over the next years. We will make a brief recap of the most important causes describe in the current literature, even if the specific weight of each one is not clear. It's important to mention that we will describe these causes mostly from a food commodities perspective. However, most of the causes are extendable to all types of commodities.

2.4.1.- Sustained economic growth

Global economic growth averaged 5% per year between 2003 and 2007 (the strongest 5 years in the recent history). If we consider only developing economies the growth percentage is almost 7% per year. This is not a minor detail considering that, for example, China and India alone account for the 27% of world's population.

Rapid economic growth in developing countries has also resulted in very rapid growth in the demand for energy for electricity and industrial uses, as well as for transportation fuel. The associated increase in petroleum use in developing countries has contributed to rapidly rising oil prices since 1999. The oil imports of China alone grew more than 21 percent per year from 194 million barrels in 1996 to 1.37 billion barrels in 2006.
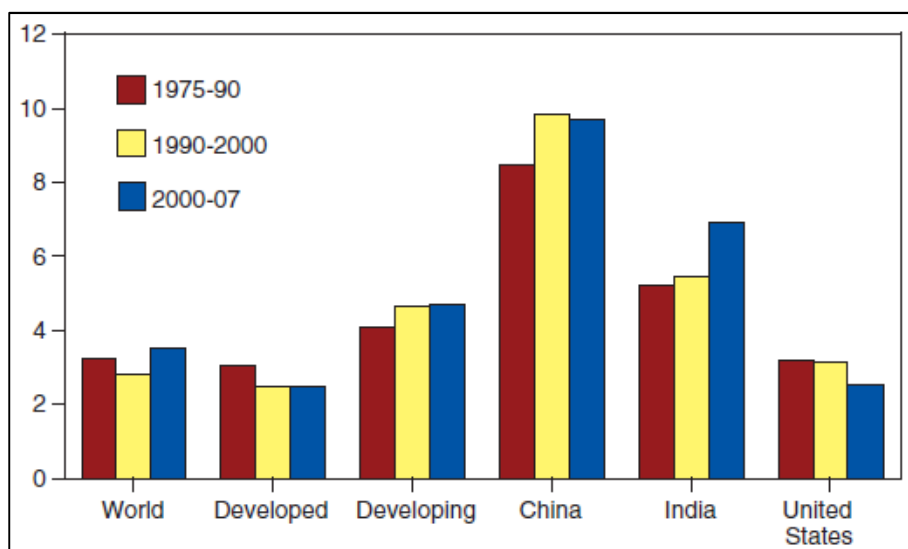
Figure 23 – Growth rates
Source: R. Trostle.

If we consider food commodities only, there is also another effect to consider. Not only the strong global growth in average income combined with rising population helped to increase the demand for food. As per capita incomes rose, consumers in developing countries not only increased per capita consumption of staple foods, they also diversified their diets to include more meat, dairy products, and vegetable oils, which in turn, amplified the demand for grains and oilseeds. As the demand for meat rises, the demand for grain and protein feeds used to produce the meat grows proportionally more quickly. Feed-to-meat conversion rates vary widely depending on the class of animal and the production practices used to produce the meat.

Table 3 – Pounds of feed needed to produce 1 pound of meat

Class of animal	Pounds of feed needed to produce 1 pound of meat
Chicken	2,6
Pork	6,5
Beef	7,0

Source: Own elaboration with data from USDA.

2.4.2.- Reduced Supply

A long period of low and declining commodity prices prior to 2002 had resulted in significant underinvestment in new supply capacity globally (particularly in extractive industries). As a consequence, the supply response to surging commodity prices from 2002 onwards was sluggish, particularly given the typically long delays between investment and production.

The annual growth rate in the production of aggregate grains and oilseeds has been slowing. Between 1970 and 1990, production rose an average 2.2 percent per year. Since 1990, the growth rate has declined to about 1.3 percent. USDA's 10-year agricultural projections for U.S. and world agriculture see the rate declining to 1.2 percent per year between 2009 and 2017.

Growth in productivity has contributed much more to the growth in production globally than has expansion in the area planted to grains and oilseeds. However, this rate of growth has been diminishing. Global aggregate yield growth averaged 2.0 percent per year between 1970-1990, but declined to 1.1 percent between 1990 and 2007. Yield growth is projected to continue declining over the next 10 years to less than 1.0 percent per year. The growth rate for area harvested, on the other hand, has averaged only about 0.15 percent per year during the last 38 years.

Reduced agricultural research and development by governmental and international institutions may have contributed to the slowing growth in crop yields. Stable food prices during the last two decades have led to some complacency about global food concerns and to a reduction in R&D funding levels.

2.4.3.- Low Inventories

The inventories of several agricultural commodities went down in the past few year to levels not seen since 1970s, further accelerating the price increase. After nearly two decades of low and stable food prices the concerns for government-held buffer stocks were considered to be less important. For the private sector, the cost of holding stocks, the use of "just-in-time" inventory management, and years of readily available global supplies provided incentives to reduce stock holding. Over the last decade, the shift toward more liberalized trade reduced trade barriers and facilitated trade, which in turn reduced the need for individual countries to hold stocks. These low inventories are not only important because they put pressure on commodities prices but also because, as shown in some studies, during low inventories periods price volatility tends to be higher.
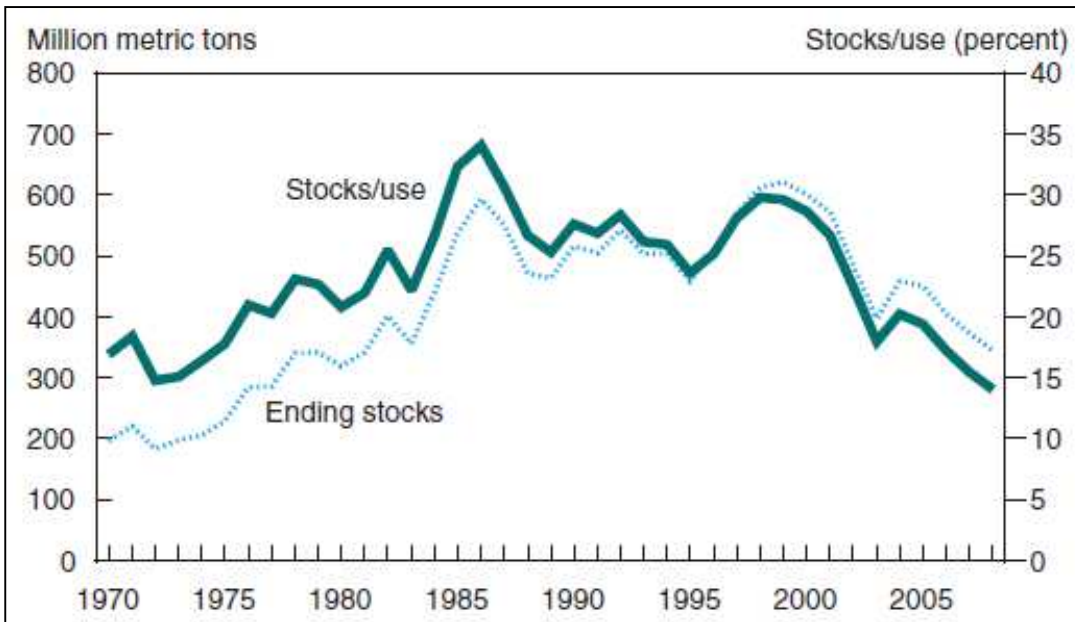
Figure 24 – Stock levels
Source: R. Trostle.

2.4.4.- Depreciation of US Dollar

Several commodities are priced in US dollars and hence movements in the dollar exchange rate may affect demand and supply. The effective dollar depreciation seen over the past few years has made commodities less expensive for consumers outside the dollar area, thereby increasing the demand for those commodities.
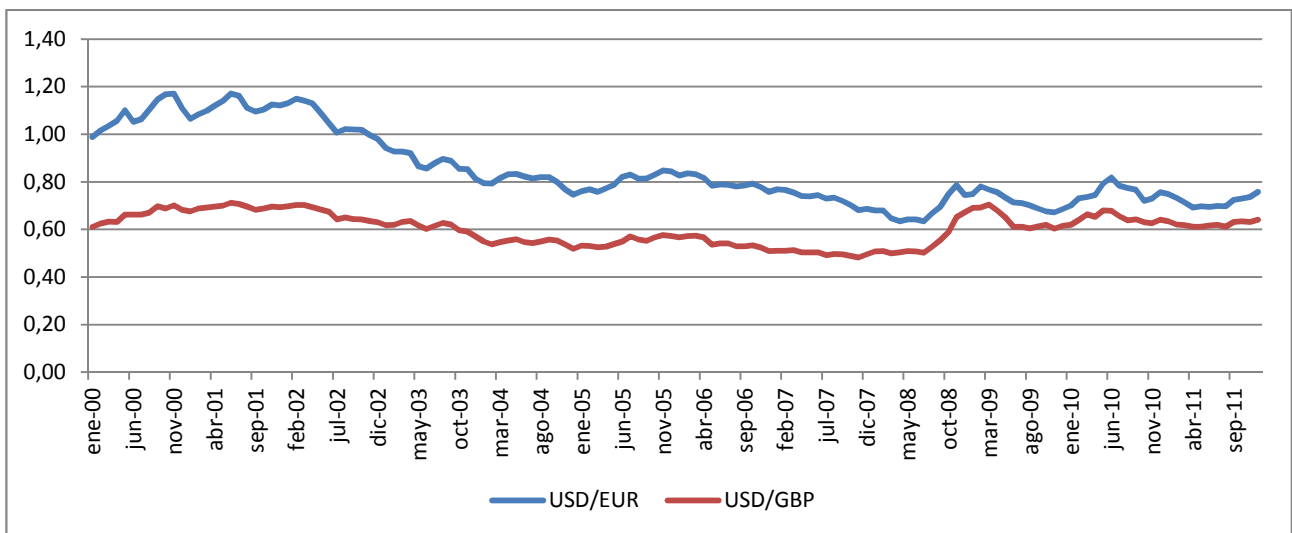
Figure 25 – Exchange rates (USD vs EUR & GBP)
Source: Own elaboration with data from OANDA.
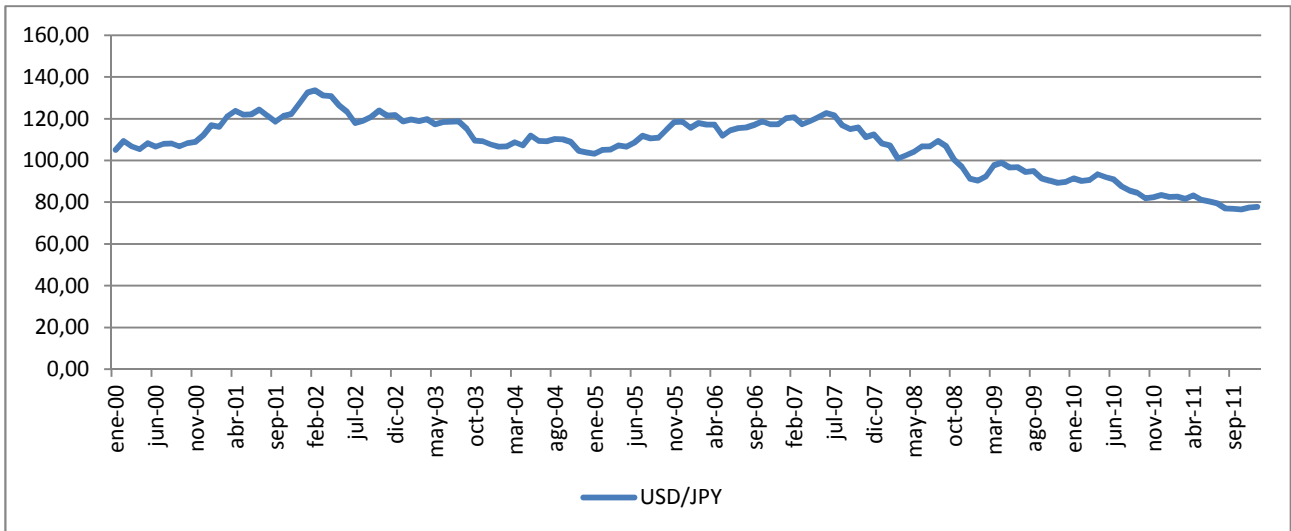
Figure 26 – Exchange rate (USD vs JPY)
Source: Own elaboration with data from OANDA.
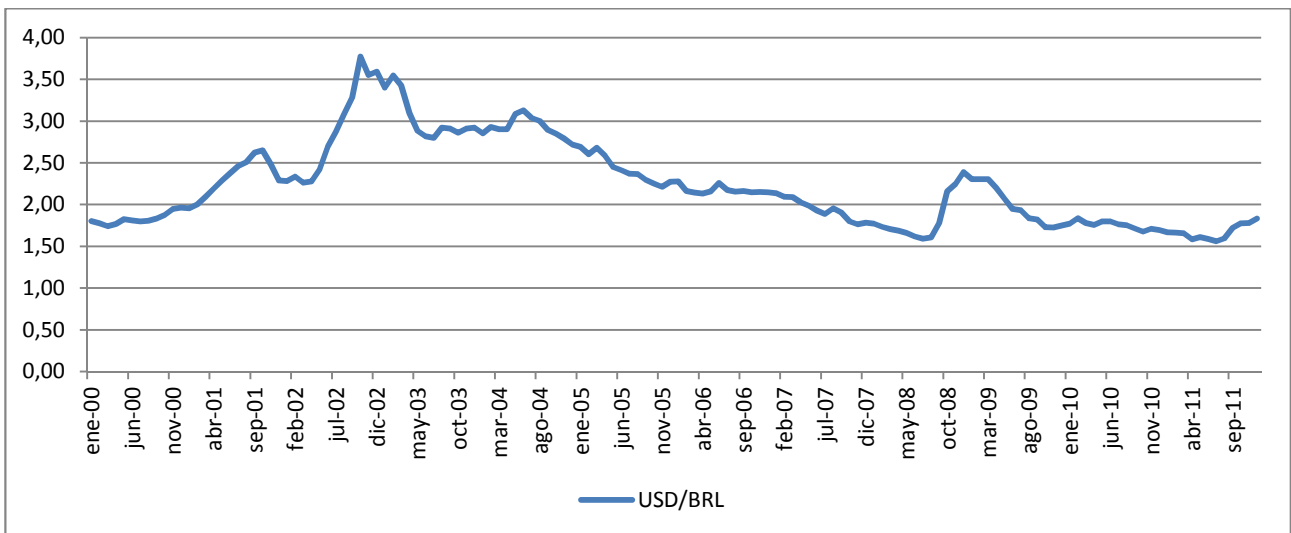
Figure 27 – Exchange rate (USD vs BRL)
Source: Own elaboration with data from OANDA.

2.4.5.- Increase in biofuels production

Another recent phenomenon that is affecting commodities prices is the increase in biofuels production. Previously, biofuels were produced in very small amounts. But, maybe due to the higher oil process or just a "greener" mentality, a bigger portion of feedstock has been diverted to the production of biofuels, generating an upward pressure on some major food commodities.

The two more important biofuels are ethanol and biodiesel. Brazil and the United States account for most of the world's ethanol production. Brazil uses sugarcane as a feedstock, while the United States uses nearly all corn. A number of other countries have policy initiatives designed to increase ethanol production, but so far the total augmentation in production capacity has been small relative to the combined capacity of Brazil and the United States.

The European Union is the largest biodiesel producer, and rapeseed oil is its main feedstock. The EU has mandated that biofuels account for 10 percent of transportation fuel use by 2020. The EU cannot produce

sufficient rapeseed to fill the mandate and will have to import either some feedstocks for producing biodiesel, or some biodiesel. Russia and the Ukraine are increasing rapeseed production destined for export to the EU as rapeseed, rapeseed oil, and perhaps as biodiesel. Brazil and Argentina are using soybean oil as a feedstock to expand biodiesel production.

Ethanol production (in million gallons)
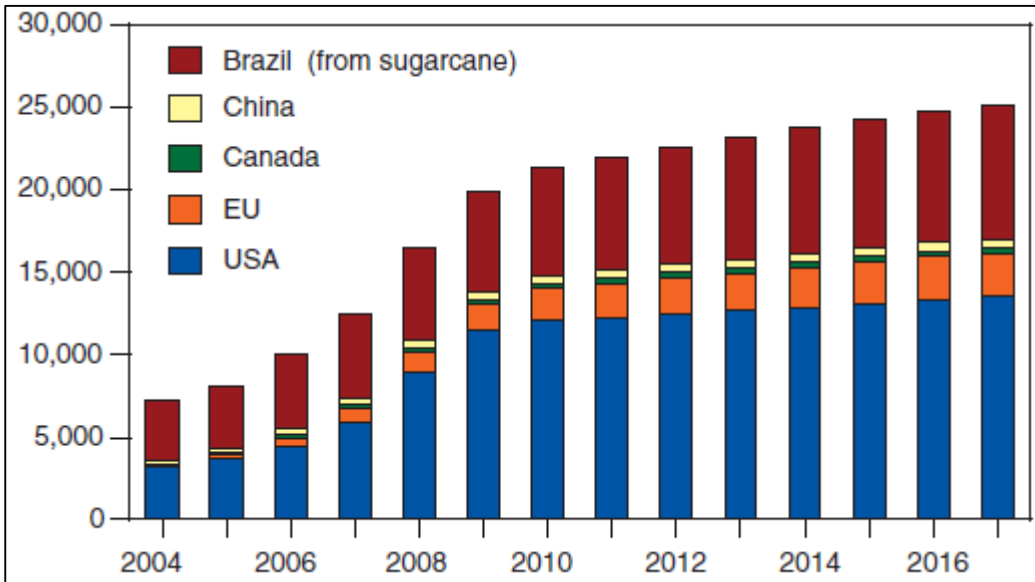
Figure 28 – Ethanol production
Source: R. Trostle.

Biodiesel production (in million gallons)
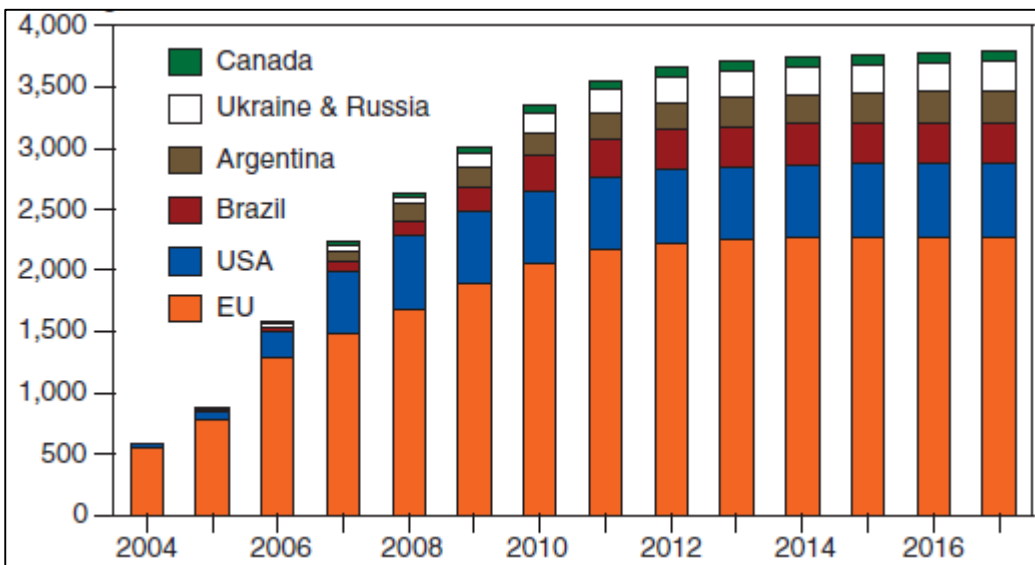
Figure 29 – Biodiesel production
Source: R. Trostle.

Some authors question the true influence of biofuels production on commodities prices. One common evidence used is that, even if the total feedstock used for biofuels production increased sensitively, the absolute figures still don't seem to justify the price increase. A rough estimate suggests that about 47.8

million acres were used to provide biofuel feed stocks in the 6 major producing countries in 2007. This would account only for about 3-4 percent of arable land in these countries.

We won't go deeper into this discussion, even if the topic is quite vast and interesting. What we do believe is important to mention is a second consequence of this increase in biofuels production: the new linkage between energy and food markets. For example, over 50 $/barrel the correlation between crude oil price and maize price is almost perfect. Regardless the price-increasing effect that this might have, what is worth to mention is that this linkage is a new source of price volatility that could spill from one market into the other.

Finally, some new developments in this field that might shape the coming years are expected, specially related with the application of some binding mandates in the US.

2.4.6.- Speculation

This is, together with the biofuels, another controversial cause for commodities prices to increase. We found in our literature review many examples in favor and against this topic. What we can conclude with a certain degree of certainty is that, at least in the short term, speculation has a effect on commodities prices and it is altogether another possible source of price volatility. In the long term, though, the fundamentals of supply and demand should prevail.

"Speculation" is often referred to as the assumption of the risk of loss in return for the uncertain possibility of a reward. It usually entails the purchase of an asset for resale rather than for use, or the temporary sale of a borrowed asset with the intention of repurchase at a later date in the hope of making a profit from a price change in the intervening period.

According to the previous definition, a "speculator" would be a non-traditional investor (meaning that normally he wouldn't operate in the commodity market; e.g.: index funds) betting on price movements with no interest in physically acquiring the underlying commodity. By entering the commodities market, non-traditional investors try to diversify their portfolios by acquiring assets that are negatively correlated with other assets of their property (usually financial assets such as stocks and bonds) and, thus, diversifying the total risk.

Other reasons that foster the participation of non-traditional investors in commodities markets is the development of instruments that makes investment in commodities more accessible to a larger number of people (e.g.: index certificates).

To have an idea of the importance of this issue, let's consider the following examples.

Between the second half of 2007 and the first half of 2008 production of petroleum increased from 85.8 million barrels per day (mb/d) to 86.8. Consumption fell from 86.5 mb/d to 86.3 mb/d. Prices should have fallen... However, in December 2007, crude oil averaged US$ 90/barrel while in June 2008 it averaged US$ 132/barrel, almost 50% up.

Stocks of key food commodities are 20% higher in 2009/10 compared to 2007/08; yet the nominal food price index averaged 23% higher in December 2009 compared to a year before.

It would seem that there are other reasons than market fundamentals creating a "divergence" in commodities prices. This divergence of prices from their fundamental values may be explained as follows. When prices go up, it generates word-of-mouth enthusiasm and heightens expectations for further price

increases. In turn, this increases investor demand, and thus generates another round of price increases. If this feedback is not interrupted over a period of time, it creates a speculative bubble, in which high expectations for further price increases support high current prices. The high prices, however, are ultimately not sustainable, since they are high only because of expectations of further price increases. Hence, the boom is followed by a bust.

It is important to say that not all the influence of increasing participation of non-traditional investors is to be considered negative. Financial markets can enhance the liquidity of commodity trades, help to determine market prices and contribute to the efficient allocation of risk. Small producers can also reduce the hedging costs.

2.4.7.- Adverse weather conditions

In 2007, a number of adverse weather events affected yields across the globe, including:

- Northern Europe had a dry spring and harvest-time floods.

- Southeast Europe experienced a drought.

- Ukraine and Russia experienced a second year of drought.

- A large area of the U.S. hard red winter wheat area had a late, multi-day freeze that killed some of the crop and reduced yields over large areas.

- Canada's summer growing season was hot and dry, resulting in lower yields for wheat, barley, and rapeseed.

- Northwest Africa experienced a drought in some of its major wheat and barley growing areas.

- Turkey had a drought that reduced yields in its non-irrigated production areas.

- Australia was in the third year of the worst multiyear drought in a century. Grain yields were very low and exports plummeted.

- Argentina had a late freeze followed by drought that reduced corn and barley yields.

2.4.8.- Foreign trade policies

The lower production contributed to the decline in inventories and created a world market environment characterized by concern among importers about the future availability of supplies.

By late summer 2007, some importers were aggressively contracting for imports of grains and oilseeds. Even though prices were at record highs, importers were buying larger volumes, not less. Some countries that usually imported sufficient quantities of grain to meet their needs for the following 3-4 months began to contract for imports to meet their needs for the following 5-10 months.

The rapidly increasing world prices for food grains, feed grains, oilseeds and vegetable oils caused domestic food prices at the consumer level to rise in many countries. In response to rising food prices, some countries began to take protective policy measures designed to reduce the impact of rising world food commodity prices on their own consumers. However, such measures typically have a negative impact on supply that force international prices to go up even more.

A partial list of these policy changes follows:

Eliminated export subsidies:

- China eliminated rebates on value-added taxes on exported grains and grain products. The rebate was effectively an export subsidy that was eliminated.

Export taxes:

- China, with food prices still rising after eliminating the value-added tax rebate, imposed an export tax on a similar list of grains and products.
- Argentina raised export taxes on wheat, corn, soybeans, soybean meal, and soybean oil.
- Russia and Kazakhstan raised export taxes on wheat.
- Malaysia and Indonesia imposed export taxes on palm oil.

Export quantitative restrictions:

- Argentina restricted the volume of wheat that could be exported even before raising export taxes on grains.
- Ukraine established quantitative restrictions on wheat exports.
- India and Vietnam put quantitative restrictions on rice exports.

Export bans:

- Ukraine, Serbia, and India banned wheat exports.
- Egypt, Cambodia, Vietnam, and Indonesia banned rice exports. India, the world's third largest rice exporter, banned exports of rice other than basmati, significantly reducing global exportable supplies.
- Kazakhstan banned exports of oilseeds and vegetable oils.

Early in 2008, importing countries also began to take protective policy measures to combat rising food prices. Their objective was to make high cost imports available to consumers at lower prices. This put more pressure on the demand side of the equation.

A partial list of policy changes follows:

The following countries reduced import tariffs:

- India (wheat flour)
- Indonesia (soybeans and wheat; streamlined the process for importing wheat flour)
- Serbia (wheat)
- Thailand (pork)
- EU (grains)
- Korea and Mongolia (various food commodities)

Subsidizing consumers:

- Some countries, including Morocco and Venezuela, bought food commodities at high world prices and subsidize their distribution to consumers.

Other decisions by importers:

- Iran imported corn from the United States, something that has occurred rarely (only when they could not procure corn elsewhere at reasonable prices).

The combination of reduced supplies from exporters and increased demand from importers, at a time when the inventories were unusually low, boosted world market prices even more.

2.4.9.- Summary to this part

Many were the possible causes of the 21st century commodities boom and their single specific weight is still a matter of debate. In order to better understand the impact of all those causes, in chapter 3 we will analyze the statistic relationship between them and the prices of the most important commodities of the Argentinean Economy. In this way, we hope to find which volatility triggers have a more meaningful impact for our study case. In the meantime, we find the following chart very useful in order to keep track of all the mentioned causes.
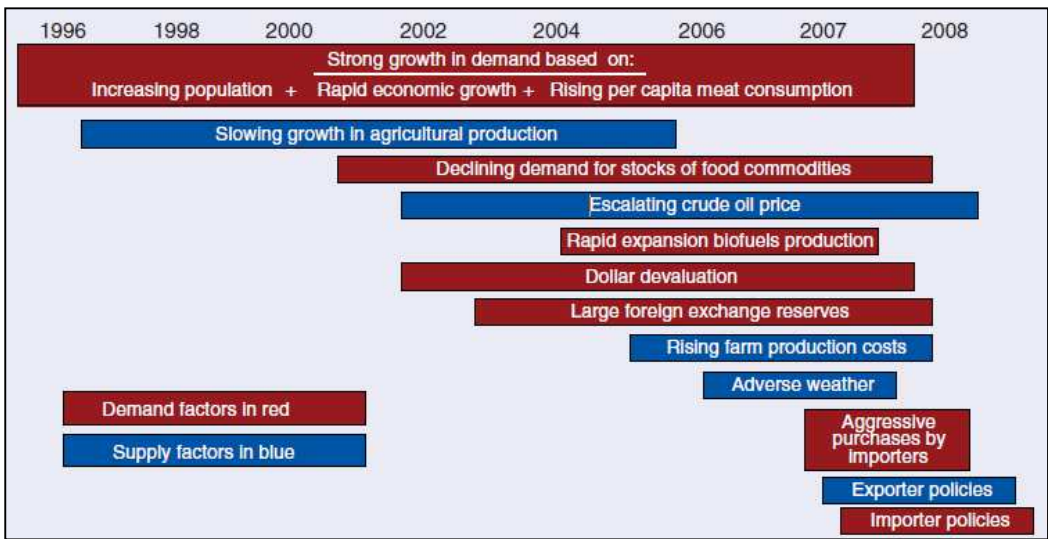
Figure 30 – Probable causes for volatility (summary)
Source: R. Trostle.

2.5.- Price Volatility

As we said in chapter 1, volatility is a measure of the change in price over a given period of time and a common method to quantify it is the standard deviation. To make the analysis easier, we present the following graphic were we can see:

- Yearly average price index: calculated as the simple average of the monthly price indexes of the year. It is represented in the graph with a **black square**.

- The range of monthly price indexes for the year: It is represented as a **vertical red line**. The higher end of the line indicated the maximum price index value of the year and the lower end of the line indicates the lowest monthly price index value of the year.

- Standard Deviation: It is calculated for each year considering the monthly values for the period. It is represented in the graph with a **blue line**.
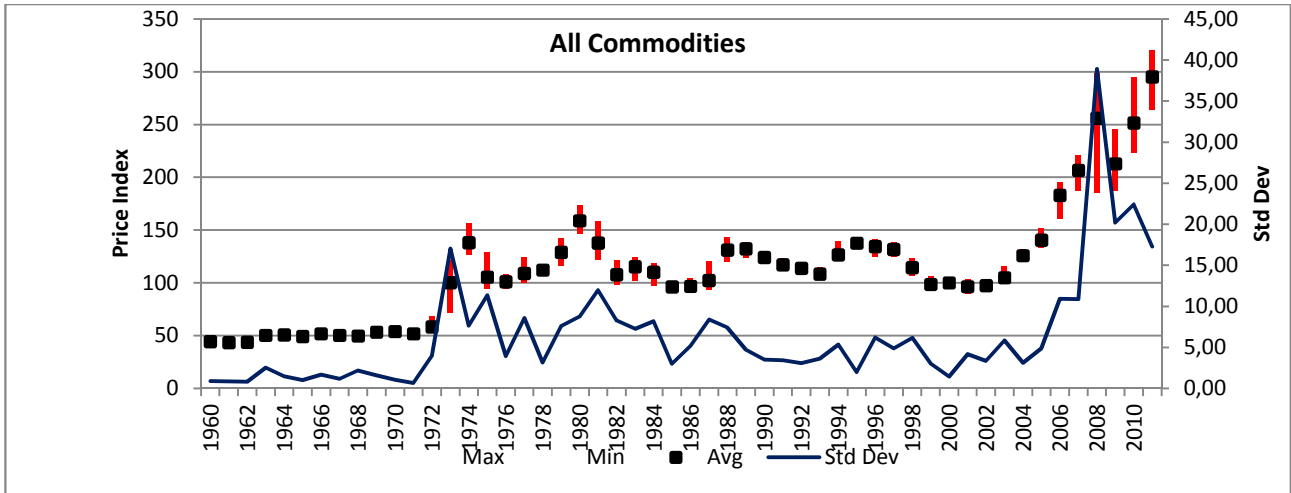
Figure 31 – Price volatility (all)
Source: Own elaboration with data from UNCTAD.

We can clearly see two periods of great volatility:

The first is in the early 1970s, matching the first oil crisis. After this event, the standard deviation seems to diminish slowly but never reaching the levels before the oil crisis.

The second period is more recent and it starts approximately around 2006 and it lasts until the present. The volatility arrived to levels never seen before and there are still no signs of and end. The standard deviation for the year 2011 was 17,28 that is more than triple of the value for the previous 15 years (something less than 5).

It is also interesting to see how volatility was affecting the different types of commodities.
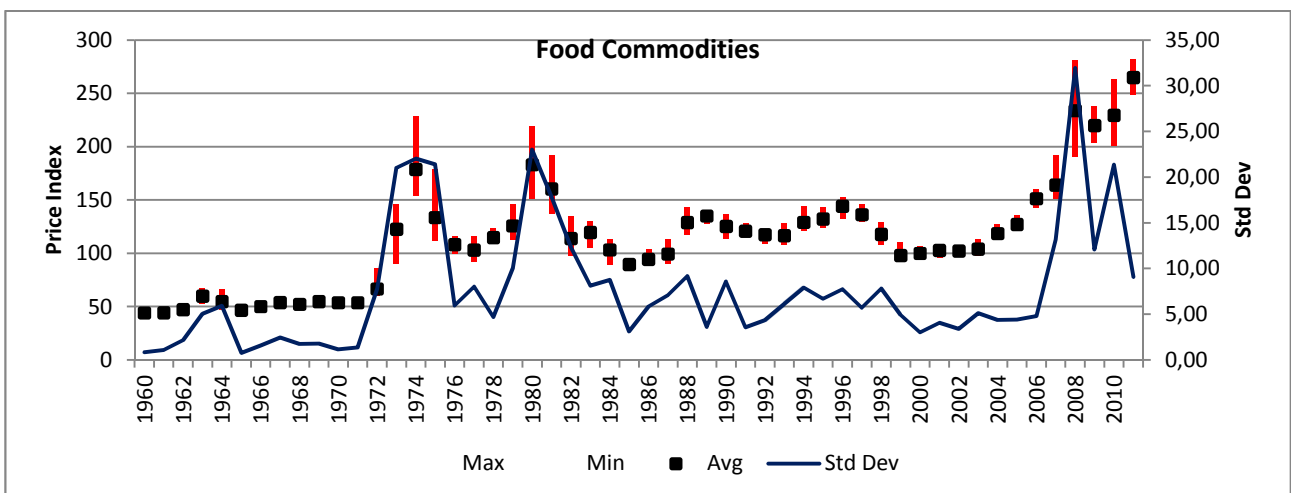
Figure 32 – Price volatility (food)
Source: Own elaboration with data from UNCTAD.

Figure 33 – Price volatility (oil & seeds)
Source: Own elaboration with data from UNCTAD.

Figure 34 – Price volatility (agricultural raw materials)
Source: Own elaboration with data from UNCTAD.
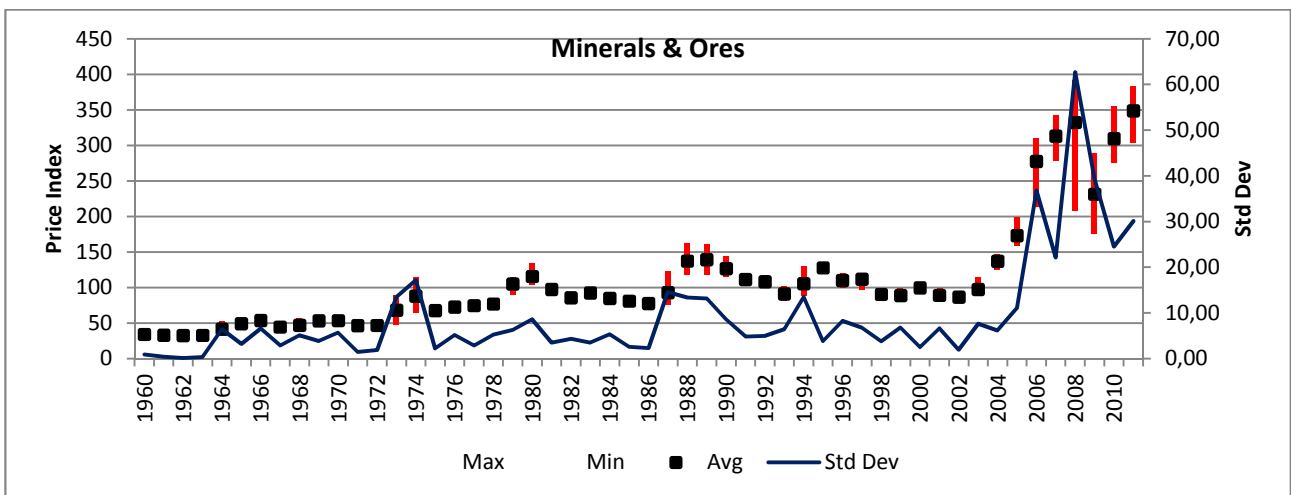
Figure 35 – Price volatility (minerals & ores)
Source: Own elaboration with data from UNCTAD.

Figure 36 – Price volatility (crude)
Source: Own elaboration with data from UNCTAD.

The volatility in the different types of commodities is more or less similar to the behavior shown by the aggregated of all commodities. For example, all groups show the highest peak for the standard deviation in the present time. Also, all of them have a previous peak in the 1970s.

There are of course some differences. The value of the standard deviation in the present is not the same for all groups. Minerals & Ores and Crude have the highest peaks. Food and Agricultural Raw Materials see to have a longer period of instability lasting almost all 1970s decade while Minerals & Ores and Crude have lower peaks and more concentrated in a couple of years.

What is important to have in mind is that volatility is not a new phenomenon. It has always been present but it has manifested more strongly in specific period of history (let's not forget that, even if it's not shown in the graph there was another period of major volatility after the First World War). It has just never been present to a level this high as seen in the past few years.

2.6.- Normalized volatility

As we have seen in the previous paragraphs, it seems that we are experiencing a recent period of increased volatility. What we need to do next is to make sure that this volatility is inherent to commodities alone and that it is not the effect of the hole world economy reflected on them.

In order to do this, we will use what we call "normalized volatility". We calculated this parameter as the result of the ordinary volatility and a second parameter that is representative of non-commodity price evolution. We selected the Producer Price Index (or PPI), which measures average changes in prices received by domestic producers for their output. This is calculated by the United States Department of Labor and the prices included in the PPI are from the first commercial transaction for many products and some services. In our case, we used the PPI for total manufacturing industries. It's important to mention that the PPI data is available only since 1986 so we limited our analysis to that period.

The calculation methodology consisted in dividing the monthly prices of commodities used in section 2.5 by the PPI of the same month, obtaining in this way a "normalized price". With this new prices we proceeded in the same way as before:

- Yearly average price index: calculated as the simple average of the monthly price indexes of the year. It is represented in the graph with a black square.

- The range of monthly price indexes for the year: It is represented as a vertical red line. The higher end of the line indicated the maximum price index value of the year and the lower end of the line indicates the lowest monthly price index value of the year.

- Standard Deviation: It is calculated for each year considering the monthly values for the period. It is represented in the graph with a blue line.

The results are shown in the next graphics:
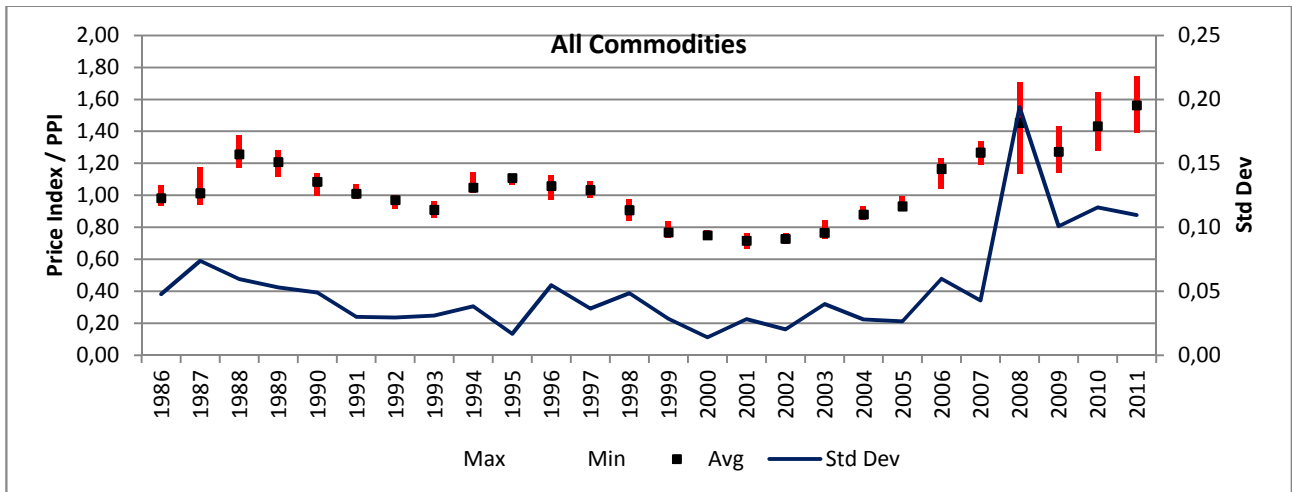
Figure 37 – Normalized volatility (all)
Source: Own elaboration with data from UNCTAD and USDA.
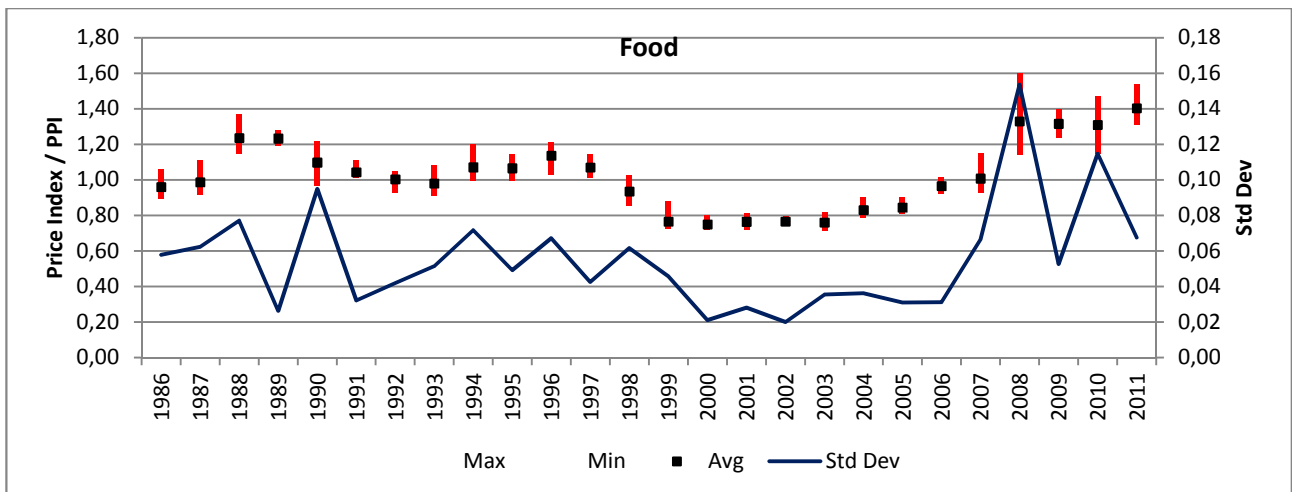
Figure 38 – Normalized volatility (food)
Source: Own elaboration with data from UNCTAD and USDA.
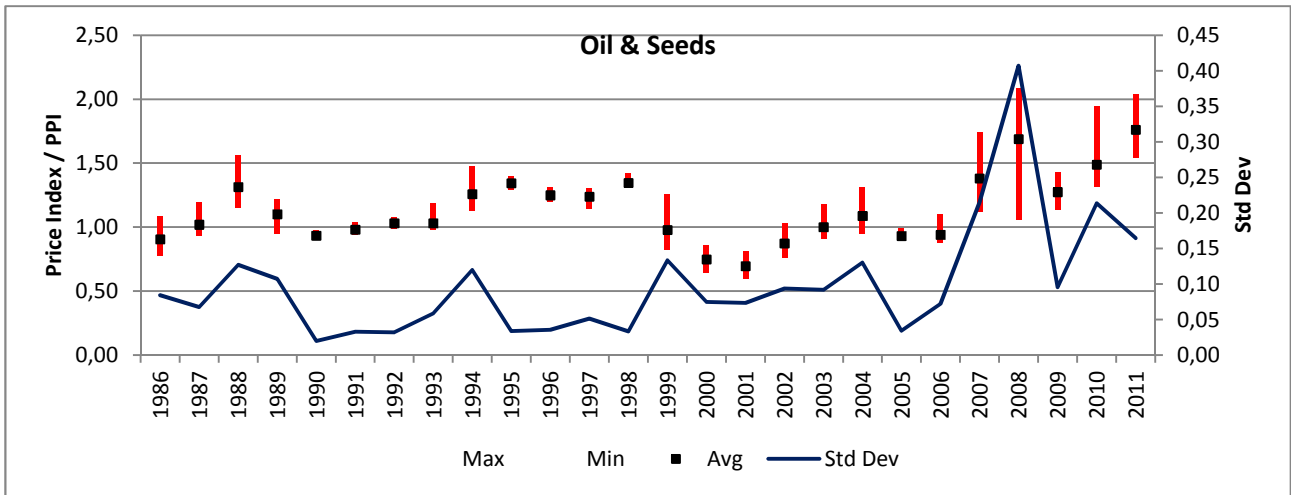
Figure 39 – Normalized volatility (oil & seeds)
Source: Own elaboration with data from UNCTAD and USDA.
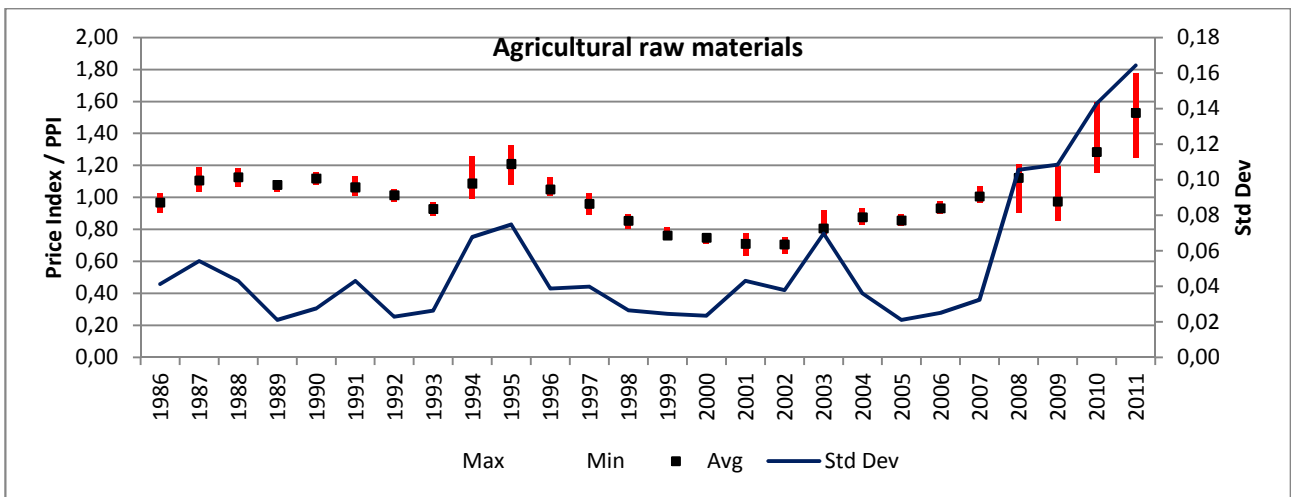
Figure 40 – Normalized volatility (agricultural raw materials)
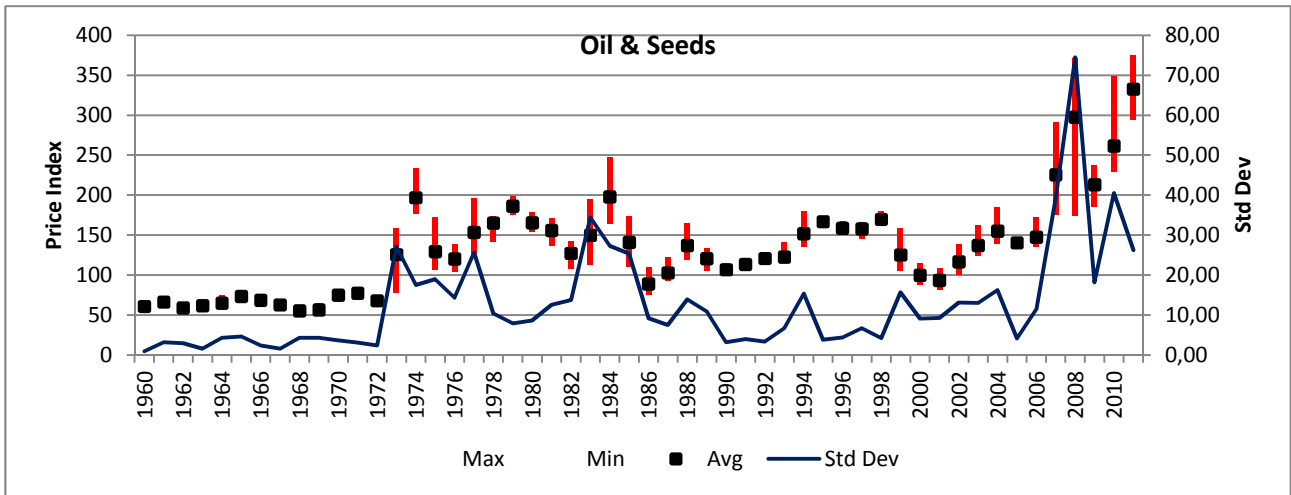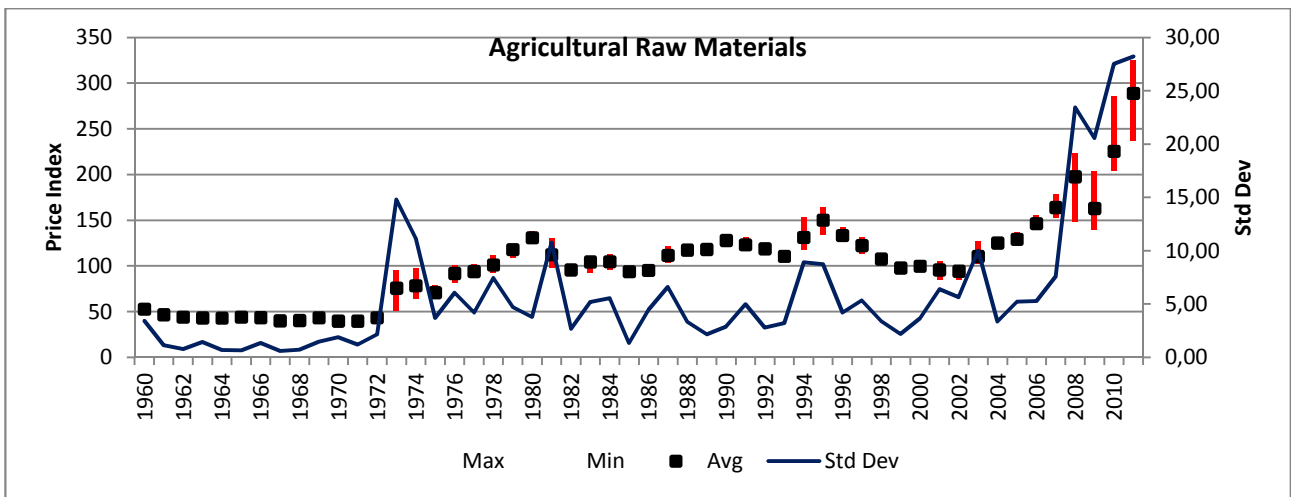*Source: Own elaboration with data from UNCTAD and USDA.*
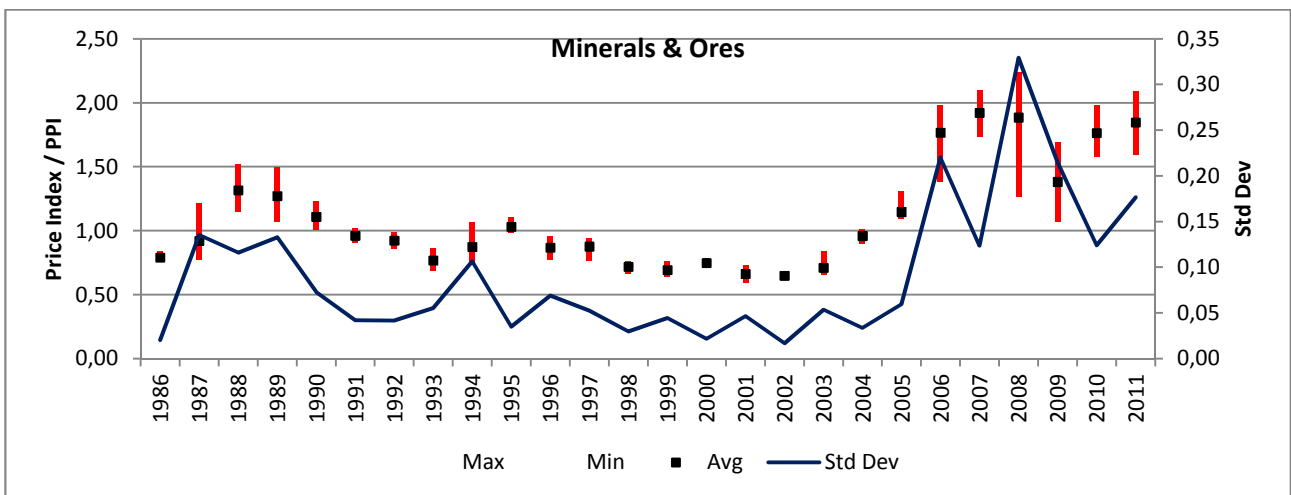
Figure 41 – Normalized volatility (minerals & ores)
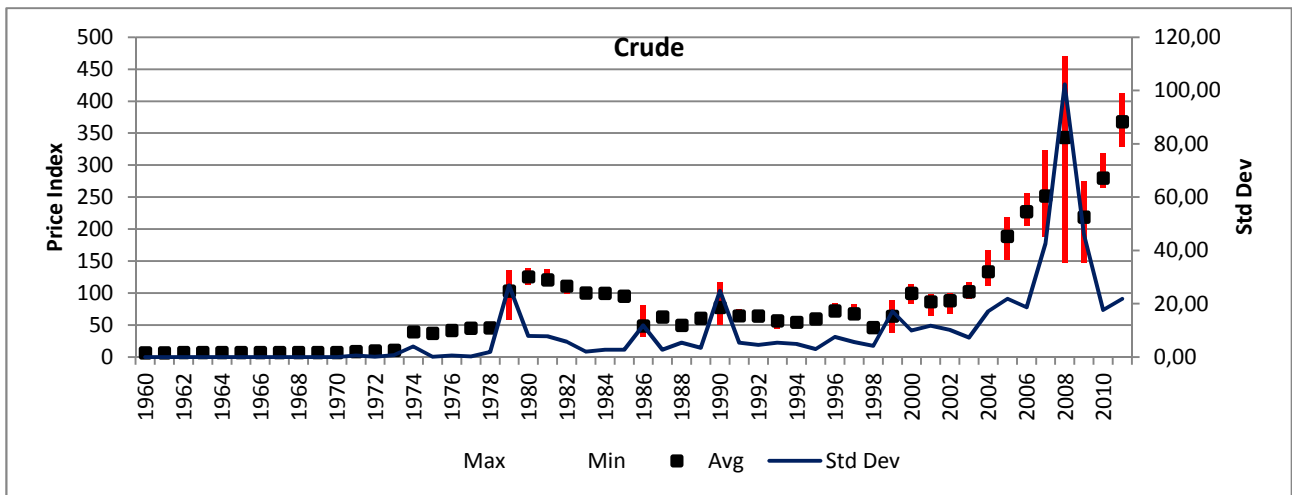*Source: Own elaboration with data from UNCTAD and USDA.*
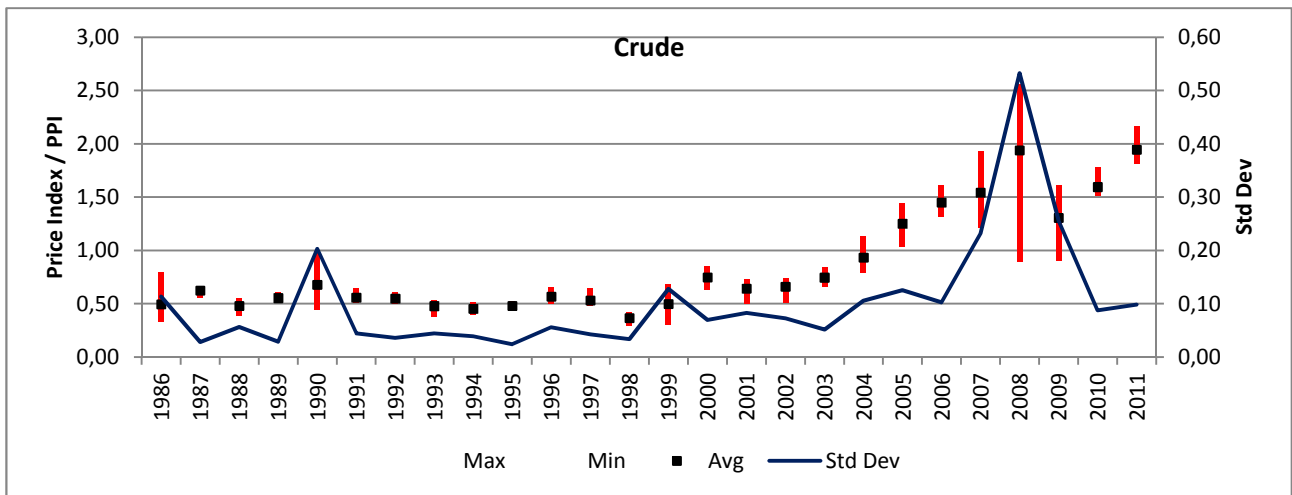
Figure 42 – Normalized volatility (crude)
Source: Own elaboration with data from UNCTAD and USDA.

The conclusions that we can draw are in line with the ones obtained previously. We see a more or less stable period of volatility with a sharp increase around the year 2008. This result is the same for the aggregate of all commodities but also for the different sub-groups. Only in the case of minerals and ores the increase begins before the year 2008 but it is in this year were the category achieves its peak.

We can now say with a certain degree of confidence that the volatility experienced during the studied period is only related (or, at least, related in a higher degree) to commodities. Manufactured goods, on the other side, have presented a more stable price level throughout the years.

2.7.- Relevance of Shocks

Commodities price volatility present serious challenges for many developing countries, especially the ones highly depending on the exports of such goods. These countries are particularly exposed to shocks on international prices because of the large impact on both their Current Account balance and Government budgetary positions.

<div align="center">Exports = Price x Volume</div>

The amount of the exports is determined by demand volume and price of the exports. In the case of items such as commodities, the demand has small to non price elastic in most of the cases. It is more usual to see some fluctuations in the demand of items such as fashion or technology (regardless of the price changes that the item might experience). Or, what is the same, commodities demand should stay more or less constant despite any price changes. This is why we can assume that in a given period of time (not too extensive, of course) an export shock will be the result of a price shock and not to a demand one.

Balance of Payments

In a country's economy that highly depends on exports, shocks may produce a deficit in the current account, which has to be financed with foreign investments or placing debt on the market.

In a situation where the shock is accompanied by economic instability, investors may eventually lose confidence and take their money out or they may require higher interest rates to persuade them to keep

investing in that Economy. As a consequence, higher interest rates tend to depress domestic consumption and investment.

Terms of Trade

A deterioration in the balance of trade means that a country is importing more than what is exporting. Therefore, more capital will be leaving a country, causing deterioration in the terms of trade. This would mean cheaper exports and more expensive imports.

Consumption and Employment

An increase in the prices of imported goods will be translated into a reduction of purchasing power and real income. If the increase is very sharp or sustained for a long time, both consumption and employment will decrease as they are a function of the income and this will ultimately lead to recession.

If the prices to increase were the ones of exported goods, there could a benefit in the short term for net exporting countries if we maintain the hypothesis that demand will not change during that period of time. However, higher export prices could also be transmitted to the domestic market, creating some inflationary pressure that could ultimately influence consumption and employment and, thus, canceling the original benefits of the price increase.

2.8.- Conclusions to this chapter

There is no discussion whatsoever about the levels of volatility that we experienced in the last 5 or 6 years. Also, it has been shown in this paper that this volatility is not necessarily experimented by other types of goods (such as manufactured products) but it is something inherent to commodities.

The commodities terms of trade had been decreasing for almost a century until less than 10 year ago when they experienced a sudden change as commodities prices started to rise. The reasons for those record high prices and the price volatility linked to them are many and their individual importance is still and will continue to be a subject of discussion. Most of those causes are beyond the grasp of political action by the different Governments. However, on chapter 3 we will see if, in the particular case of Argentina, there are possible measures to be taken. Finally, on chapter 4 we will investigate the effectiveness of the trade policies implemented by Argentina during the years 2006-2008.

3.- Argentina: Socioeconomic Context

3.1.- Introduction

After a decade of convertibility (the fixation by law of the local currency to a more stable one, USD in this case), Argentina had a radical change on its balance of trade. From 2002 the growth in the exports encouraged by a deep devaluation and some others external factors, left the balance of trade with a growing surplus.

At the beginning of this chapter we will revise the evolution the Argentina's social and economical context for the last years, and we will show how this radical change on 2002 affected the specialization of the country.

Then in the section 3.4 we will analyze the relationship between the most important commodities of Argentina (in terms of exports) and the probable causes of the increase in volatility mentioned on chapter 2. In this way, we will be able to understand to which "volatility triggers" Argentina is more exposed.

3.2.- Argentinean Social Context

The most immediate way to assess the social conditions of a country is by taking a look at some common indicators such as level of growth, poverty, inflation and employment. Normally, this would not be a problem. But in the case of Argentina there has been some controversy during the last few years about the way in which the mentioned indicators are measured and, thus, distorting the real situation. Even though this paper is not intended as a "witch hunt" we do need to mention these differences, as the result of the analysis will vary according to the sources taken into consideration.

3.2.1.- Level of Growth

One of the most common indicators for growth is the GDP. We will comment the evolution of GDP in detail on section 3.3. In the meantime, it could be interesting to analyze how GDP growth is translated into an improvement in social conditions.

The Growth Elasticity of Poverty measures the percentile reduction in poverty for each percent increase of the GDP.

$\varepsilon = -\Delta \text{Poverty} / \Delta \text{GDP}$

The following table contains the data of GDP and Poverty since 2003:

Table 4 – GDP & poverty (Argentina)

	2003	2004	2005	2006	2007	2008	2009	2010	2011
GDP	1.024	1.117	1.219	1.322	1.437	1.534	1.547	1.689	1.838
Poverty	54,0%	44,3%	38,9%	31,4%	23,4%	17,8%	13,9%	12,0%	8,3%

Source: Own elaboration with data from INDEC. GDP is measured in millions of 1993 ARS.

If we calculate the elasticity for the period 2003-2005 and 2006-2008 we will arrive to the following results respectively: 1,47 and 2,71. This means that the poverty should have been reduced more during the years

in which the commodities boom happened (meaning, higher food prices all over the world) than in the years after the Argentinean default and devaluation which were marked by great economic growth and reactivation. Even if this is not a conclusive proof by itself, it makes us wonder about the accuracy of the poverty level measured in last few years. Further ahead, we will compare the Official poverty levels with some calculated by some private agencies.

3.2.2.- Inflation

Starting from January 2007, the methodology to calculate the Official inflation rate[1] had changed by including the use of official or indicative prices instead of "true" market prices. These indicative prices are taken from price agreements that the Commerce Secretary signs with some links of the supply chain of the different products (i.e.: associations of bakeries, butchers, big supermarkets, etc.). Usually these price agreements have a subsidy as a counterpart but we will mention this in details later on. The important thing to mention here is that the products within the price agreement are very difficult to find as they are only available in limited quantities or in very specific points of sale that are not reachable to the whole population. This makes the prices taken for the calculation of the Official inflation rate not representative of the real market situation.

The following is a comparison of the Official inflation rate and some private estimations:

Table 5 – Inflation: official vs private estimations

Inflation	2008	2009	2010	2011	2012
INDEC	7,2%	7,7%	10,9%	9,5%	7,8%
Price Stats	22,0%	14,8%	22,9%	21,3%	21,6%

Source: Own elaboration with data from INDEC and Price State.

High and persistent inflation is a major explanation for understanding why the incidence of poverty measured with true market prices, is well above INDEC's figures, and why the poverty-growth elasticity is much lower than that implicit in official poverty estimates.

The question now is why the Government needs to distort the cost of living. There is of course no official explanation but there is a general consensus about the following 2:

- The first suggests that the Government sought to control expectations at a moment when inflation was on a growing path. The initial distortions to the price indexes took place in January 2007 shortly after export controls were strengthened.

- The second has a financial bent and refers to a distortion that assisted Argentina to reduce service payments on its sovereign debt where some bonds have inflation adjustment clauses. Some estimates put these savings around 7.000 million dollars in the past 5 years. In fact, early in 2012 the IMF urged Argentina to re-evaluate and correct this figures and, later on, in September the country was warned that if no measures are taken before December 17th it might be the first country ever to be punished with a "censure" from the IMF.

In any case, since January 2007 the official cost of living index has not reflected consumer prices and has seriously underestimate inflation.

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[1] The Official inflation rate is calculated by the INDEC, which is an office that depends from the Economy Minister.

3.2.3.- Poverty

The cost of the Basic Food Basket (BFB) or poverty line determines together with the income level of the individuals, the incidence of poverty and indigence:

- People and households below the poverty line are indigent (their income is lower than the cost of the BFB)

- People and households with incomes below the cost of the Total Consumption Basket (TCB) are poor. Approximately, TCB = 2 x BFB.

The different results in the poverty rate calculation is the consequence of taking the basic food basket and using Official prices on one hand and "real" market prices on the other. In the following charts we present the comparison between the Official poverty rate calculated by INDEC and a private estimation:

Table 6 – Poverty: official vs private estimations

Poverty	2007	2008	2009	2010	2011
INDEC	23,4%	17,8%	13,9%	12,0%	8,3%
ODSA UCA	25,9%	28,2%	29,0%	26,6%	21,9%

Source: Own elaboration with data from INDEC and EDSA UCA.

Table 7 – Indigence: official vs private estimations

Indigence	2007	2008	2009	2010	2011
INDEC	8,2%	5,1%	4,0%	3,1%	2,4%
ODSA UCA	7,4%	9,7%	10,2%	7,7%	5,4%

Source: Own elaboration with data from INDEC and EDSA UCA.

The unofficial numbers reflect a serious nutrition problem. For example, a 10.2% incidence of indigence during 2009 implies that in a country of around 40 million people, 4 million were undernourished.

Even though in 2009 the National Government launch the program "Asignación Universal por Hijo (AUH)" with the goal to reduce undernourishment, the food security conditions in a country that is a major food producer and exporter, remains alarmingly low and undernourishment alarmingly high.

3.2.4.- Unemployment

In this case, there is a general consensus about the descent of the unemployment rate from around 20% in the first trimester of 2003 to 7,2% in the third trimester of 2011. Even if private estimations are 1 o 2% higher, there is no doubt about the improvement in this category. What still represents a challenge for the current administration is the "quality" of the employment. The figure for those whose incomes are at the lower fourth of the distribution is 18%. From this group, 57% hold information jobs that carry no social benefits (40% of the total population) while 61% has no health insurance (33% of total population).

3.2.5.- Conclusions to this section

In spite of the strong growth of recent years, the incidence of poverty and indigence remains high. Apparently the main cause is the evidence showing that inflation in Argentina, and particularly food inflation, is much higher and persistent than the official figures published by INDEC.

3.3.- Argentinean Economic Context

3.3.1.- Basic Definitions

The following are definitions of indexes used to denote the position of an economy in terms of trade:

Trade dependence index is one of the most widely used trade statistics. Also termed the openness index, it measures the ratio of international trade (total exports plus total imports) to the total value of net output (gross domestic product or GDP). A high index value is often interpreted as indicating a more open economy (hence the second terminology) although the index is biased by other factors, including economic size. There are two variations of Trade dependence index that may be more useful in understanding an economy's vulnerability to certain types of external shocks (e.g., exchange rate movements).

The first is the *Import Penetration Index*, which measures the proportion of domestic demand that is satisfied by imports. It is also termed an import dependency index and an aggregate self-sufficiency index.

The second is the *Export Propensity Index*, which measures the share of exports in GDP.

3.3.2.- Argentina's GDP and trade Indexes

During the 90 decade the GDP was primary composed by the service sector that computed for more that 60% of the share, with a slightly increasing tendency. It's important to mention that this was happening not because the sector was expanding but because the others (specially the industry) were contacting due to the recession that stroke Argentina during those years.

After the crisis of 2001 the agricultural sector experienced a radical change increasing its role in the Argentinean economy.

While the service sector now represents little bit less than 60 percent of GDP and the goods-producing sector the remaining part, the latter experienced, between 2002 and 2010, a growth rate bigger than the service sector.
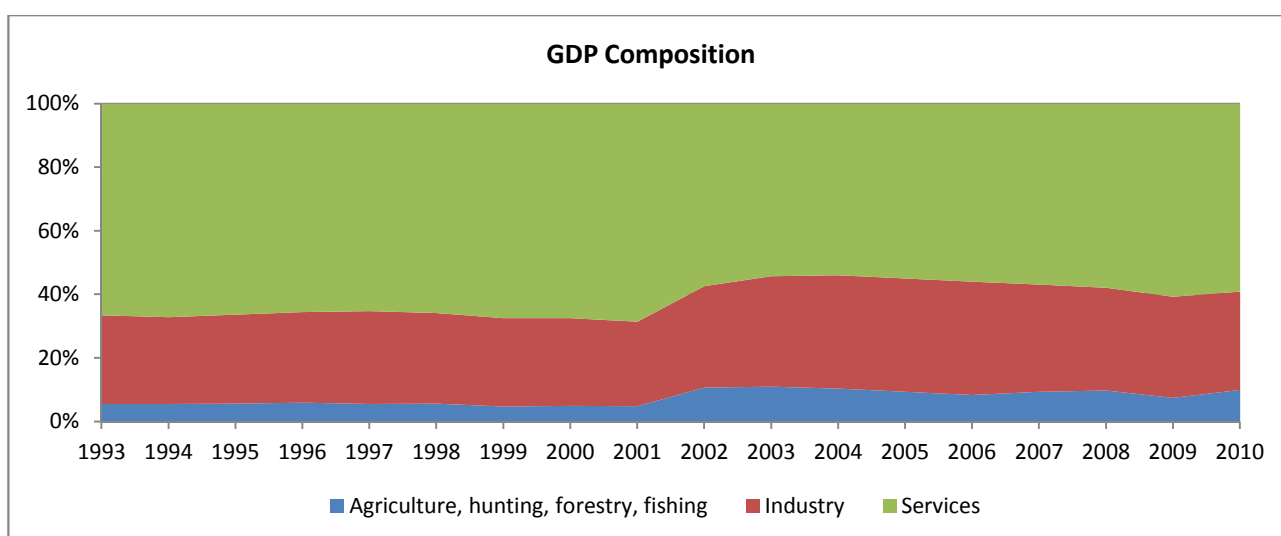
Figure 43 – GDP composition
Source: Own elaboration with data from UNCTAD.
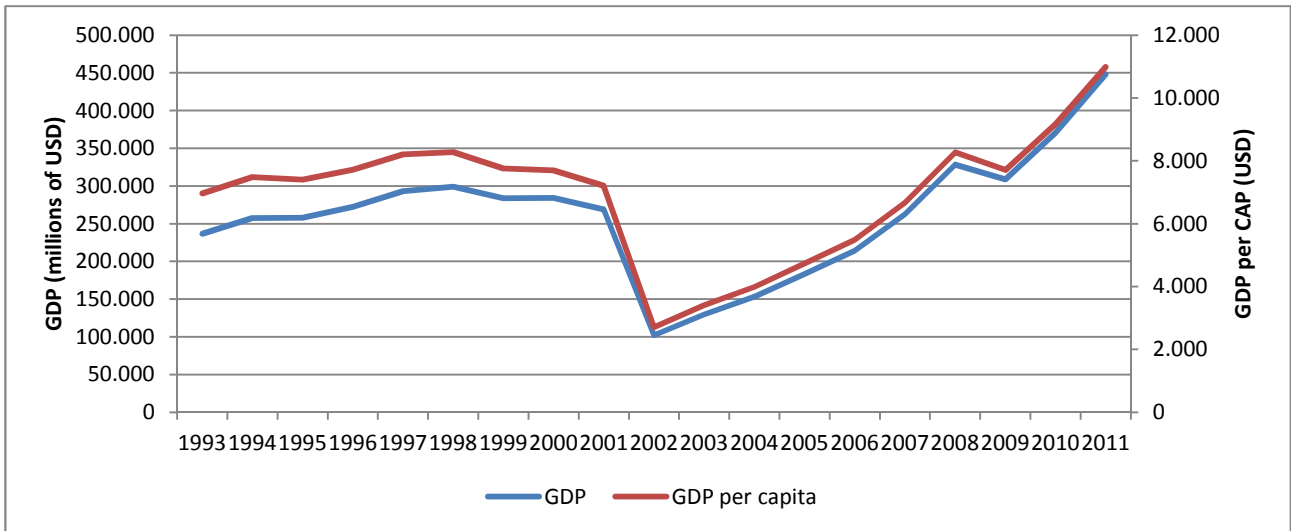
Figure 44 – GDP and GDP per capita
Source: Own elaboration with data from UNCTAD.

The trade dependence index of Argentina's economy went from 11% to 38% for the years between 1992 and 2008. This revels how the international trade had become an important factor on Argentina's economy.

In 2002 the devaluation of the Peso generated 2 effects on the Trade Dependence Index:

- It corrected the nominal GDP in Dollar terms, making it smaller (and, thus, the TDI got bigger).

- It created a better relative price for exports that improved the performance of the sector.
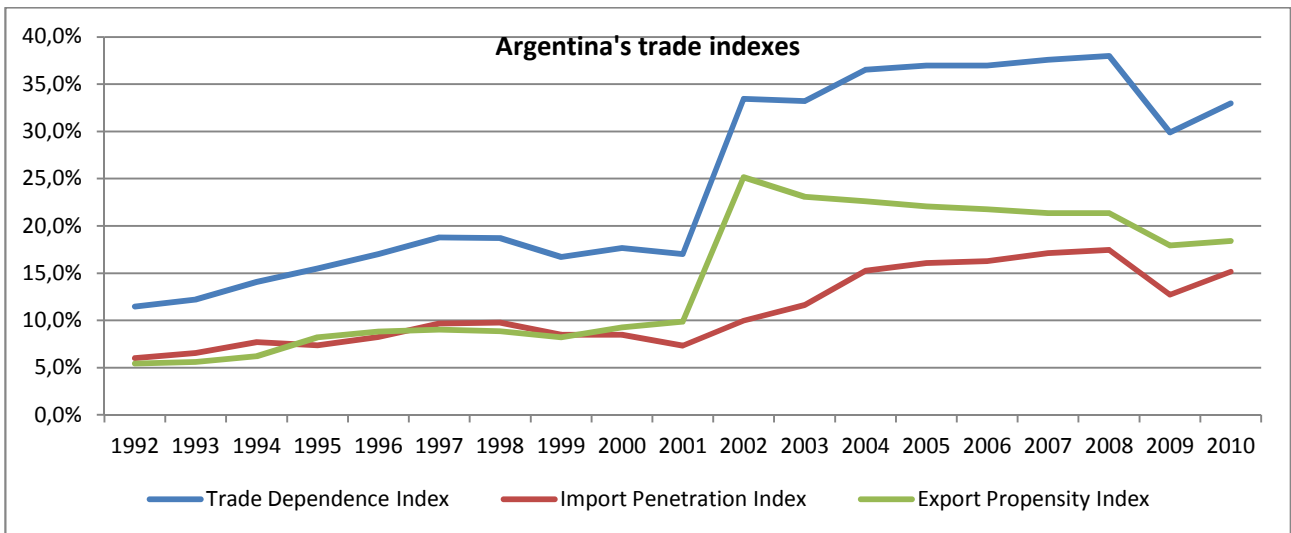
Figure 45 – Trade indexes
Source: Own elaboration with data from INDEC.

Argentina's Exports first located around U.S. $ 12 000 million in 1994, jump to U.S. $ 25 000 million in 1996 and stayed at this level till ends of 2000. Then since 2002 exports grew steadily, currently located near U.S. $ 70 000 million.

After devaluation in 2002 imports decreased significantly. The following years, imports started to grow exceeding in 2006 the maximum value in 1998. In recent years the economy is growing at sustained rates and simultaneously maintaining substantial trade surpluses.

After 2002, the devaluation of the local currency operated as an entry barrier and a stimulus to imports replacement by local production, even if the *Import Penetration Index* does not reflects it for the period 2002 – 2005 due to the correction on the real value of the GDP.

On the other hand, high rates of growth of domestic demand and activity held from 2004 to 2010 boosted its expansion, while the excellent performance of exports shifted any concerns about external constraints.

3.3.3.- Evolution of the Exports

Argentine exports grew between 2002 and 2008 about 106%, against a GDP growth of 47% (at constant prices). Its contribution to growth was essential since the second quarter of 2002; from then until mid-2004, the more proactive role as engine of growth for local production was clearly assumed by domestic demand. Since the third quarter of 2004, there was another jump in exports, whose dynamics is maintained until today, originated mainly in the increased volumes exported in 2005 and also by the positive development of prices in 2006. This performance put sales again into an important source of growth, but always behind domestic demand.
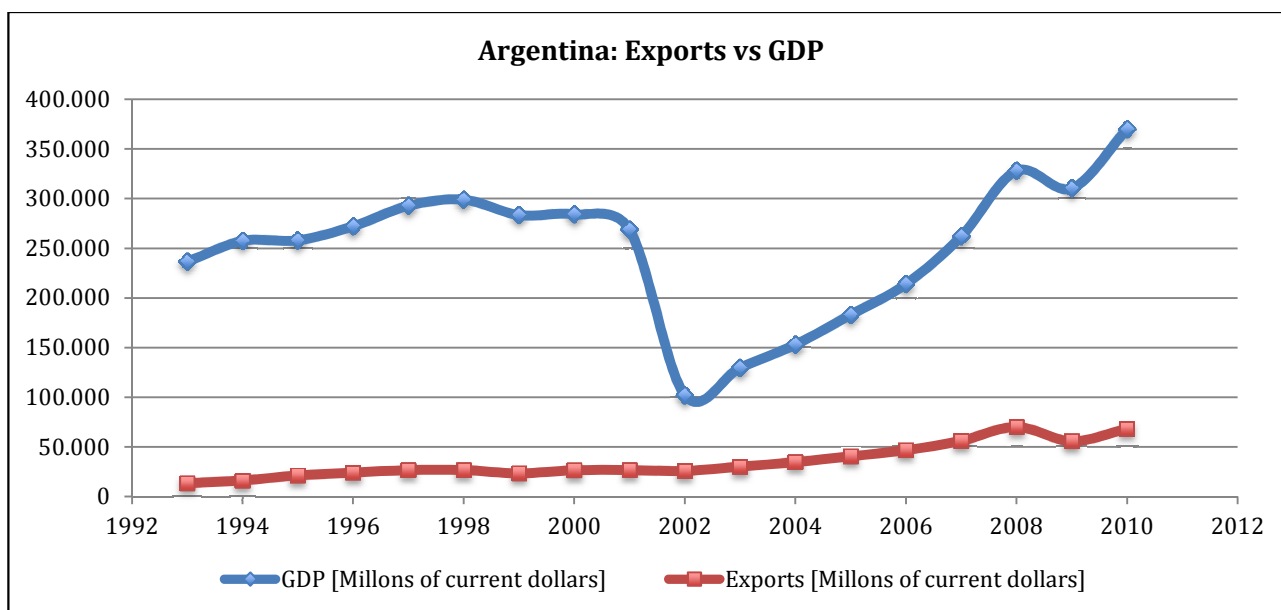
Figure 46 – Exports vs GDP
Source: Own elaboration with data from INDEC.
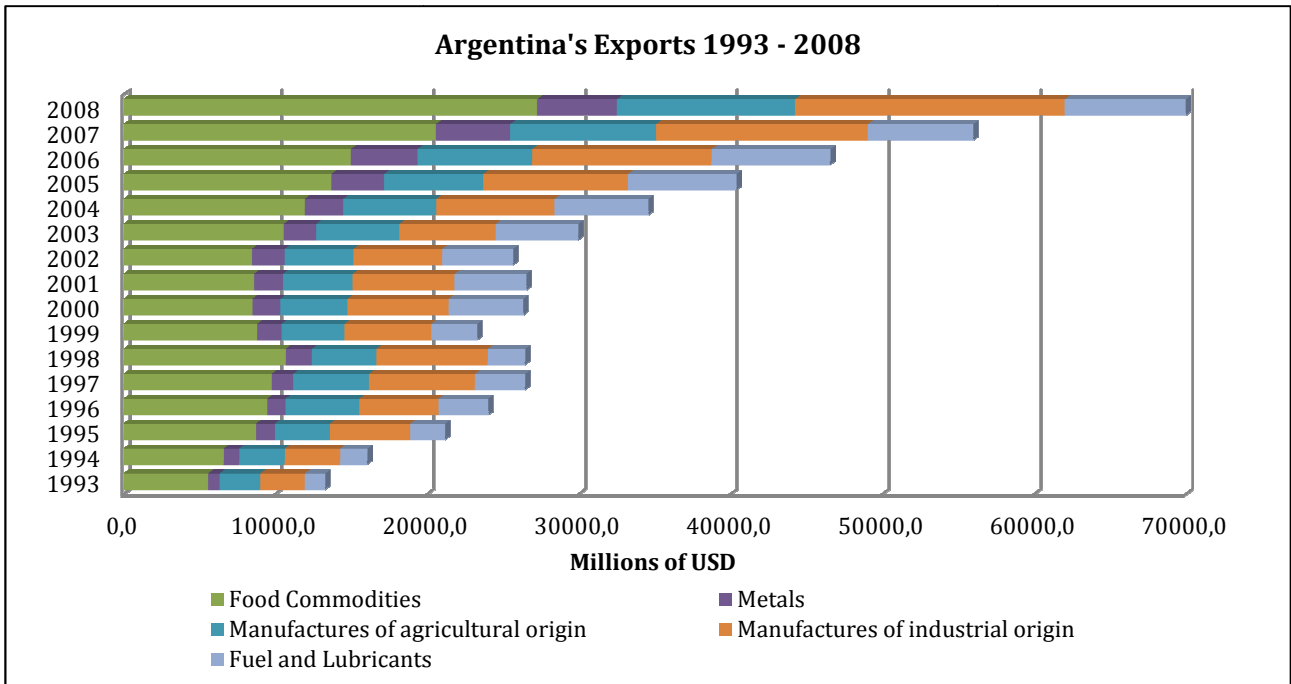
Figure 47 – Exports by sector (USD)
Source: Own elaboration with data from INDEC.

In 2002, exports declined significantly over the previous year. Several factors combined to explain this. First, there was a drop in the price of main commodities exported by Argentina (agricultural, agro-industrial and oil). Second, foreign buyers pushed to lower dollar prices in some product segments, in order to "share" the benefits of the devaluation. Third, uncertainty about the future level of the exchange rate led some sectors postpone sales, waiting for a better conditions. Finally, the crisis experienced by the Brazilian economy, the main trading partner, also negatively affected the Argentine export performance.

From 2003, a consolidated growing trend in foreign sales result five consecutive years of record levels. This was linked to the stabilization of exchange rate and the relative normalization of the banking system. Two important influences in the Argentina's growth were the revival of the Brazilian economy from 2004, mainly encouraged the Argentina's recovery in manufacturing exports, and the steady growth in the prices of soybeans, oil, meat, dairy, steel and aluminum. The rising trend of exports remained until 2008, supported by a good performance of the industrials manufacturers, which were benefited mainly because of the Latin America's overall growth.
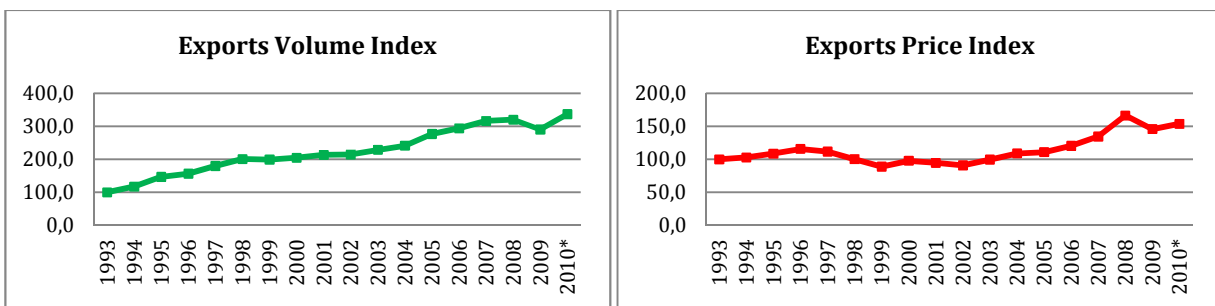
Figure 48 – Exports volume and price
Source: Own elaboration with data from INDEC.

For the period 2002-2010 exports of Food Commodities, Agriculture Manufactures and Industrial Manufactures were beneficiated by higher export prices and a notable increment in their demand volumes.

The evolution of fuel exports for this period was affected by a price rise and the decrease on exported volumes. Domestic demand, due to stagnation of production, was absorbing the exportable stocks.
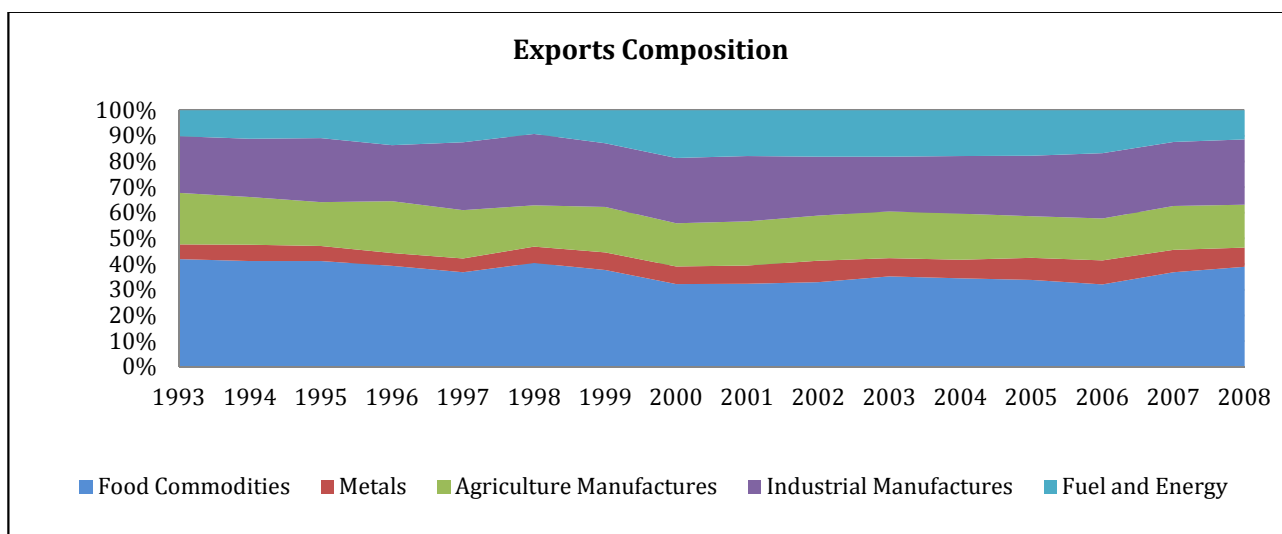
Figure 49 – Exports by sector (share)
Source: Own elaboration with data from INDEC.
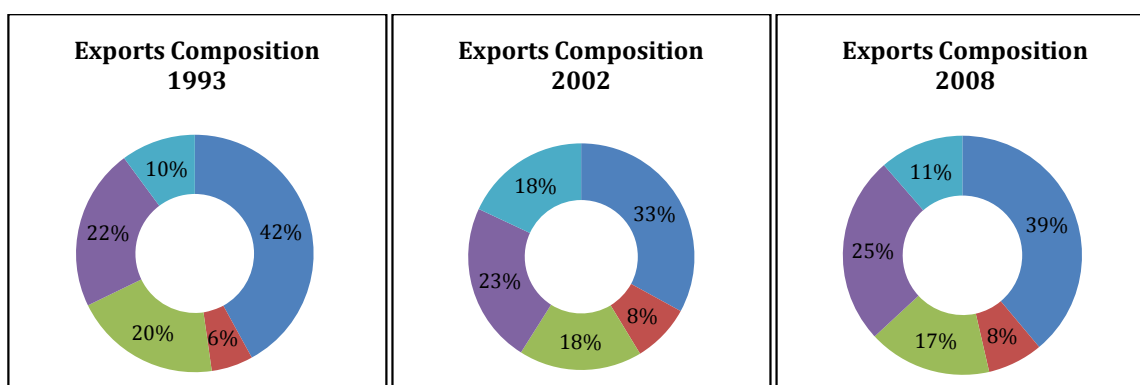
Figure 50 – Exports by sector (share)
Source: Own elaboration with data from INDEC. Same color reference as the figure 49.

The following is a brief summary of the situation in each segment of the Economy during this period

Industrial Manufactures

The total value of industrial manufactures exports declined in 2002 and 2003, affected by the sharp decline in automotive sales to Brazil. Also other relevant products decreased their volumes relevant, such as chemicals and textile machinery and equipment. These falls could not be compensated by the increases in steel products, steel pipes for oil and rolled and sales of minerals.

From 2005 Industrial Manufactures exports became the comparatively more dynamic category, in that year, grew even faster than exports global. The recovery of the Brazilian market and the redefinition of the American supply strategy in the case of the automotive sector and rising industrial commodity prices (steel, aluminum, plastics, chemicals) are the main explanatory factors for this performance. The steel industry, meanwhile, large and concentrated its production capacity and took advantage of the situation of international prices to increase its penetration in the U.S. market.

An interesting feature of the export performance of the Industrial Manufactures in this period is the installation of a trend of more buoyant sales of finished products compared with that of intermediate inputs.

Energy and Fuel

In the case of exports of fuels and energy there is a strong drop in shipments in 2002, and then perform well, with a deceleration in 2006. During the crisis, its significant reduction is mainly explained by the reduction of the quantities released and to a lesser extent, in prices. The dynamism exhibited between 2003 and 2005 had to do with good international petroleum prices. In 2006, although it remained high fuel prices, increased exports was barely visible due to lower shipments in physical terms due to reduced oil production under the depletion of some deposits.

Food Commodities evolution

Food commodities had a positive development during the critical 2002. Within a relatively widespread growth, the most dynamic sectors were the vegetable oils and waste, meat and meat preparations.

This trend continued in 2003 and 2004, highlighting particularly the oilseed industry sales, boosted by record soybean harvests and rising international prices and absorbed by the extraordinary growth of demand in China and India.

During 2005 there was a significant slowdown in export growth, following the decline in prices of major export products, especially products of oilseeds. In 2006, again the soybean complex behaved dynamically, returning to exports to its previous growth path, helped the new harvest record and rising international prices driven by a sustained international demand again. It should be noted that the main component of Argentine Exports are the Food Commodities. The values of these always remained close to 40% of total exports.

3.3.4.- Evolution of the Imports

Argentine imports, which had reached its historical high of U.S. $ 31.403 million in 1998, began to shrink in the late nineties, as a result of the downturn of the cycle and the beginning of the recession. After a fall of 19% in 1999, foreign credit rationing and the deepening recession in 2001 led to reduced imports by 19% again. The outcome of the crisis, the macroeconomic regime and subsequent devaluation prompted a collapse in external purchases, which fell 56% in 2002, reaching, in current dollars, a value of just over a quarter of registered only four years earlier.
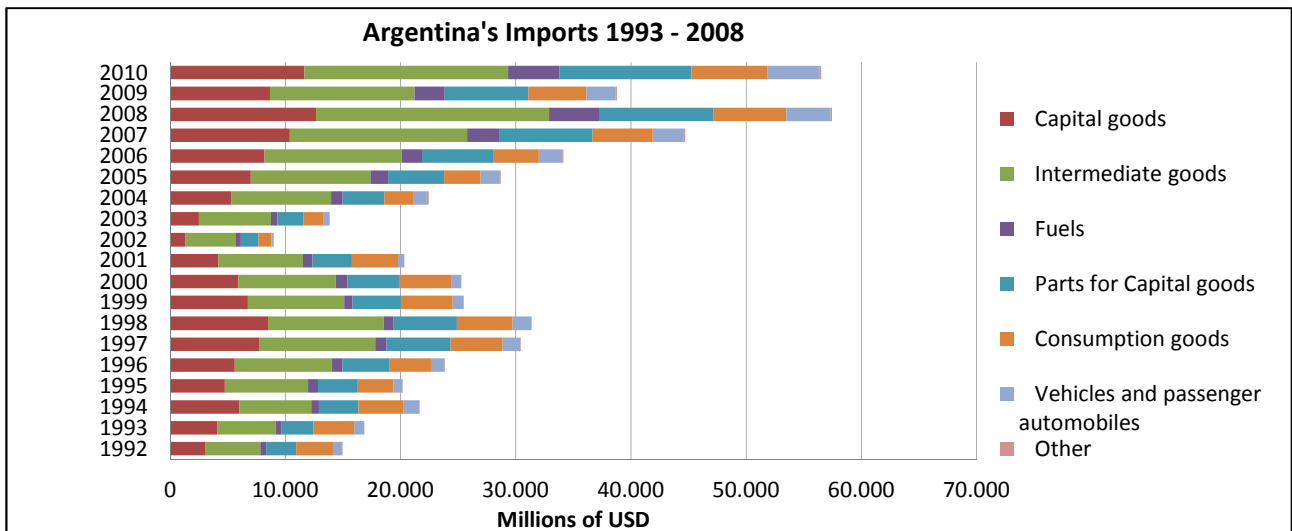
Figure 51 – Imports by sector (USD)
Source: Own elaboration with data from INDEC.

The greatest reduction in 2002 occurred in imports of consumer goods, capital goods and automotive. After reaching the minimum in April, foreign purchases began to recover along with the first signs of recovery in the level of domestic activity. Since 2003, this trend was consolidated and began to accelerate, initially, the movement was led by purchases of intermediate goods and parts and accessories of capital goods, much later, we see some recovery in imports machinery, closely associated with the re-equipment of agriculture (tractors, planters, harvesters and their parts), that was through a period of record harvests. Imports of consumer goods and cars remained depressed during the first months of 2003.

During 2005 and 2006, import growth continued to be sustain, surpassing the high of 1998. Imports of capital goods remained very active in all areas, adding some specific equipment for various industries such as precision machinery and for use in mechanical, metal, rubber, textiles, printing, food, mining and electrical equipment, etc. In the case of intermediate inputs, growing more measured than the other major categories, highlighted the rise in steel, fertilizers and cotton, driven respectively by the particular dynamics of the automotive industry, high levels of agricultural planting and the strong recovery in the textile sector. Fuel imports fell in volume but increased in value because of the evolution of international prices.

From 2002, the devaluation, produced that imported goods became relatively more expensive and may have operated as a entry barrier and a stimulus to its replacement by local production, on the other hand, high rates of growth of domestic demand and activity held during the last four years boosted its expansion, while the excellent performance of exports shifted any concerns about external constraints.

Most of the increase in the value of imports over the period is explained by an increase in volume, except for certain items including Fuels and lubricants. Indeed, between 2002 and 2010, total imports grew 285% in current values as a result of an increase of 245% in the quantities and prices 23%, much of this average increase in prices is explained by a 130% price increase in Fuels and lubricants for the period.

Imports Volume Index

Import Price Index
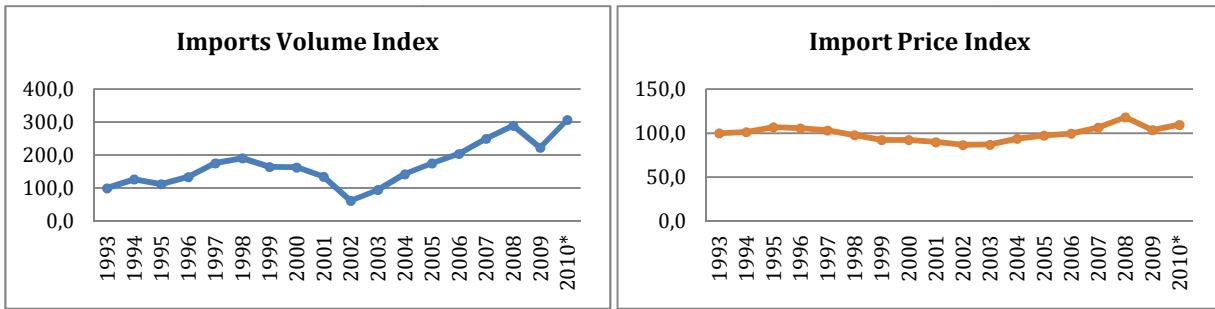
Figure 52 – Imports volume and price
*Source: Own elaboration with data from INDEC. *estimated value.*

3.3.5.- Evolution of the Trade Balance

During the Convertibility regime (1990 - 2001), particularly in the growing stages, the logic for the balance of payments was based on financing the growing current account deficit through both, the capital and financial account. Enough capital inflows allowed an increase in international reserves, compatible, with the current monetary regime, with monetary expansion and domestic credit claimed by the evolution of the local economy. Throughout the period of convertibility, there was a significant accumulation of reserves, supported primarily by the placement of public debt, which compensated the emergence of private sector deficit, especially during contractive periods.

In 2001, after three years of economic recession, the balance of payments recorded simultaneously deficit on the current account and on the capital and financial account, consequently, a significant drop in international reserves. With the new macroeconomic scenario opened by the devaluation and the subsequent recovery of economic activity, allowing, together with improved balance of capital movements, the emergence of a new phase of accumulation reserves held since 2003. The early repayment of debt with the IMF in January 2006, a magnitude of almost 10,000 million dollars, temporarily changed this situation, but in early 2007 the strength of the current account surplus brought up the level of reserves prior to such payment.

Balance of Trade vs GDP

Argentina's Balance of Trade
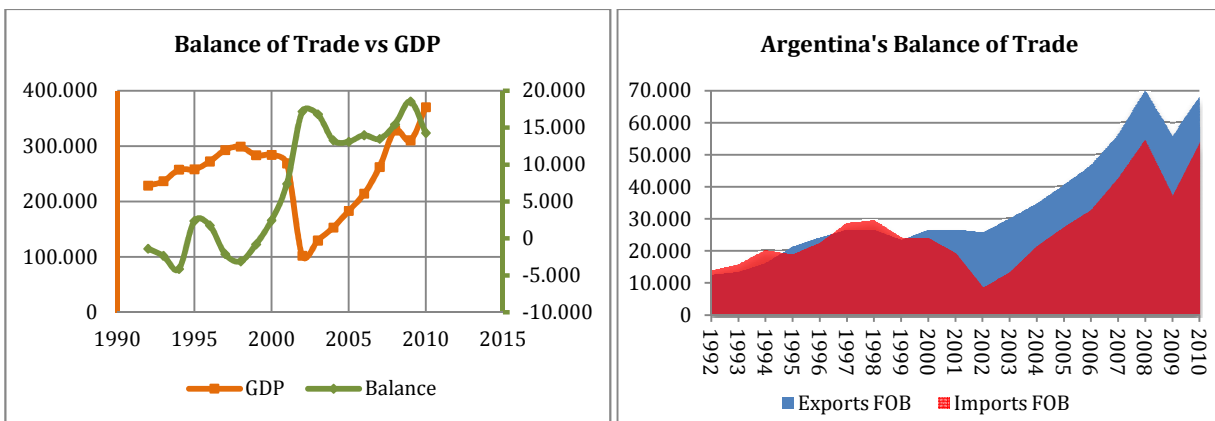
Figure 53 – Trade balance
Source: Own elaboration with data from INDEC.

3.3.6.- World Context: Importance of exports in world's most important economies.

In the previous sections, Argentina's exports were discriminated in different groups such as food commodities, metals, agriculture and industrial manufactures. It was shown how important are the food commodities exports on the Argentina's trade balance and how the radical change that took place in 2002

affected on the specialization of the country. During the last years the share of food commodities to total exports was around 40 to 50%.

To have a better comprehension of this numbers we believe that it might be useful to also take a look at the situation in some other countries. For this reason, we selected several countries from every continent with different socioeconomic situations and we prepared the chart bellow were we analyze 3 things:

- Total Exports to GDP, previously named as *Export Propensity*.
- Food Exports to Total Exports.
- Food Exports to GDP.
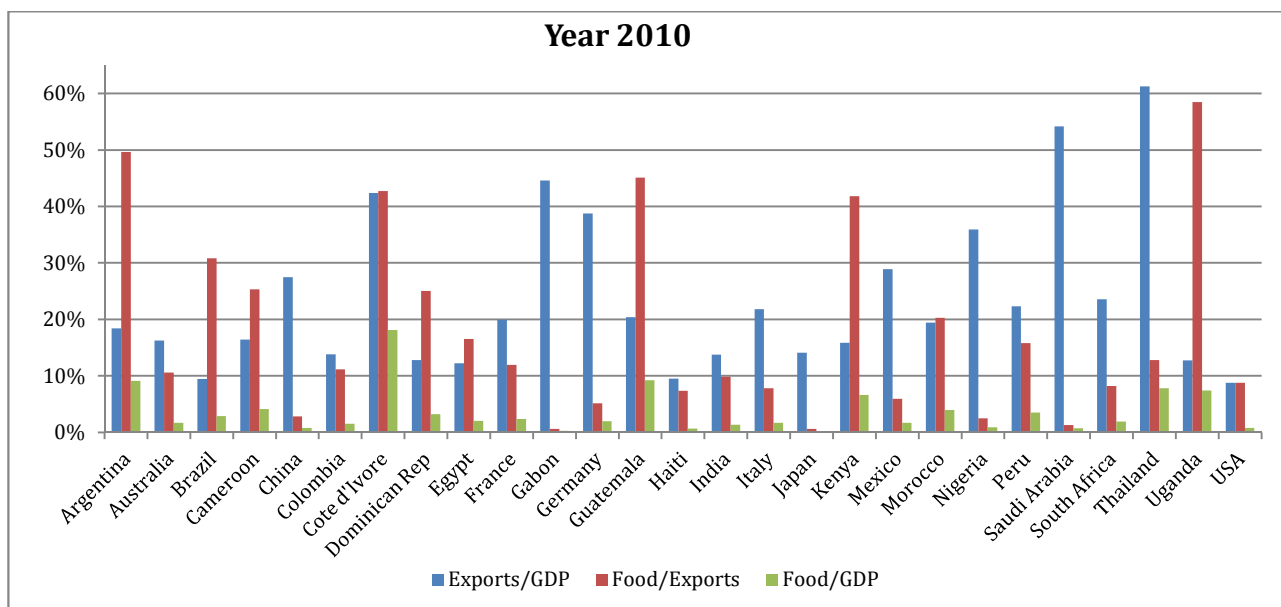
Figure 54 – Relative weight of exports
Source: Own elaboration with data from UNCTAD.

Main conclusions:

- Argentina is not necessarily one of the most export dependent countries, such as Gabon or Thailand. The internal market is not minor (nor huge), which is good news in case of a period with low international demand or economic turbulence.
- On the other hand, the weight of the Food commodities is among the highest. This means that, as almost half of the income from exports comes from Food, any disturbance in this area can be of great importance to the country (positive or negative).

3.4.- Correlation between commodities prices and probable causes of volatility

The first thing that we need to do to carry on with this analysis is to select the most important commodities exported by Argentina. So, if we disaggregate the information from Section 3.3.5 about Argentinean Exports we will find that the following 3 commodities are responsible for generating more than 15% of the Export Incomes (data for the year 2008):

- Soybeans: 6,6%
- Maize: 5,1%
- Wheat: 3,7%

This numbers get more dramatic if instead of considering only the plain commodities we would consider the Export Complex[2] related to the underlying commodity. The Export Incomes climb from 15,3% to 33,3% for the year 2008. So, we will concentrate the analysis of this section to the mentioned commodities due to the important role that they have as generators of revenues for Argentina but the same analysis could be extended to practically all commodities.

In the following graphics we can see the yearly medium price evolution for the selected commodities plus yearly maximum and minimum prices and yearly standard deviation. The prices are measured in current US Dollars per ton. It is clear that all 3 commodities individually show the same volatility profile as we saw for all groups of commodities in Section 2.5.
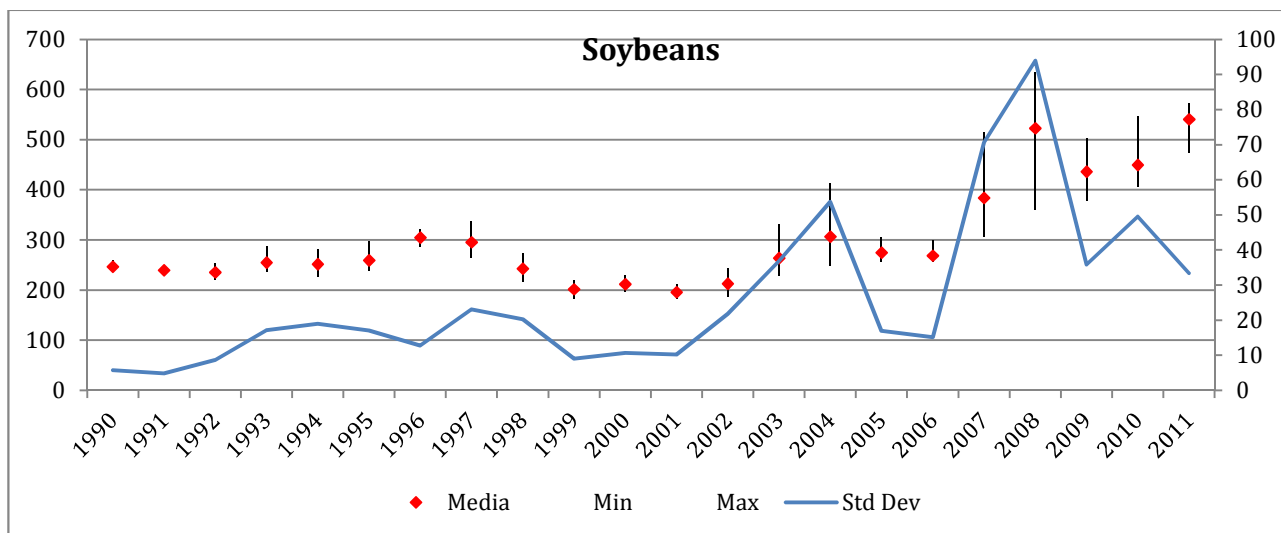
Figure 55 – Volatility (soybeans)
Source: Own elaboration with data from UNCTAD.
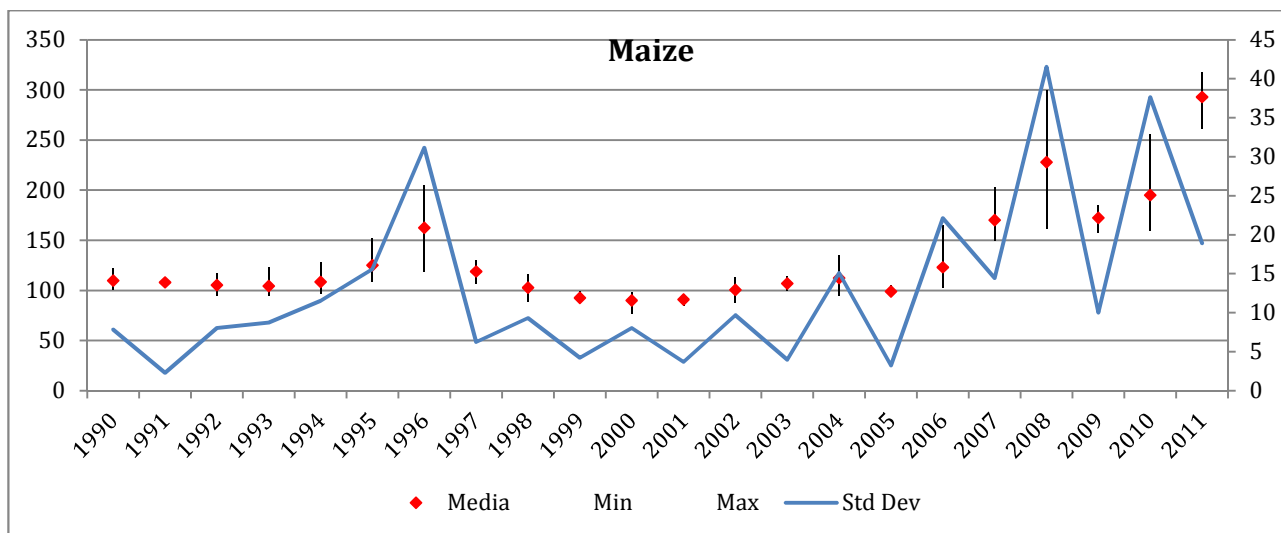
Figure 56 – Volatility (Maize)
Source: Own elaboration with data from UNCTAD

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[2] The INDEC (National Institute for Statistics and Census) defines "Export Complex" as the sum of all customs codes or positions related to the same productive chain. In this way, we can better understand the role of a product in the local Economy.
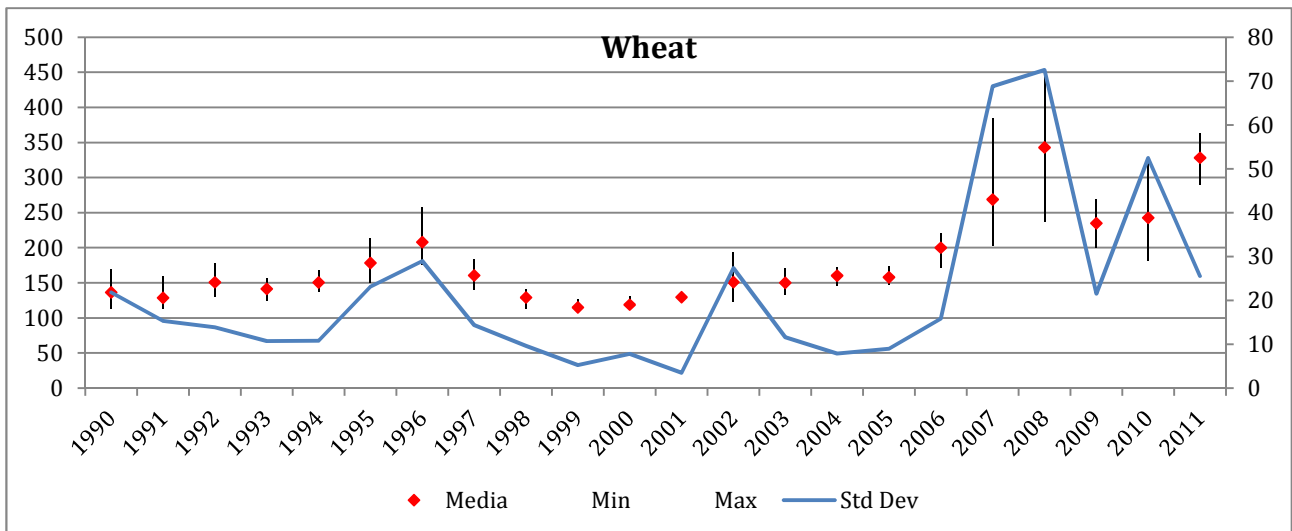
Figure 57 – Volatility (wheat)
Source: Own elaboration with data from UNCTAD

Proxies for volatility

In the section 2.4 we mentioned some of the most likely causes for the increase in the volatility of commodities prices. These causes were:

- Sustained economic growth

- Reduced Supply

- Low Inventories

- Depreciation of US Dollar

- Increase in biofuels production

- Speculation

- Adverse weather conditions

- Foreign trade policies

The aim of this section is to statistically correlate these causes to the prices of Soybeans, Maize and Wheat in order to understand which of them are the most important. But to do this, as a first step, we need to select a "proxy" variable for the above mentioned causes in order to be able to measure them. Then, we will correlate this proxy variable with the prices but also with the standard deviation of those prices. At the end of the section we will draw some general conclusions.

3.4.1.- Sustained economic growth

The most natural indicator to assess the economic health and standard of living of a country is the GDP. We will then use the world GDP as a proxy for economic growth. As we wish to disregard the natural economic growth related to population growth we will use the GDP per capita. We expect to see higher prices and volatility associated with periods of higher GPD per capita. Here are the results:
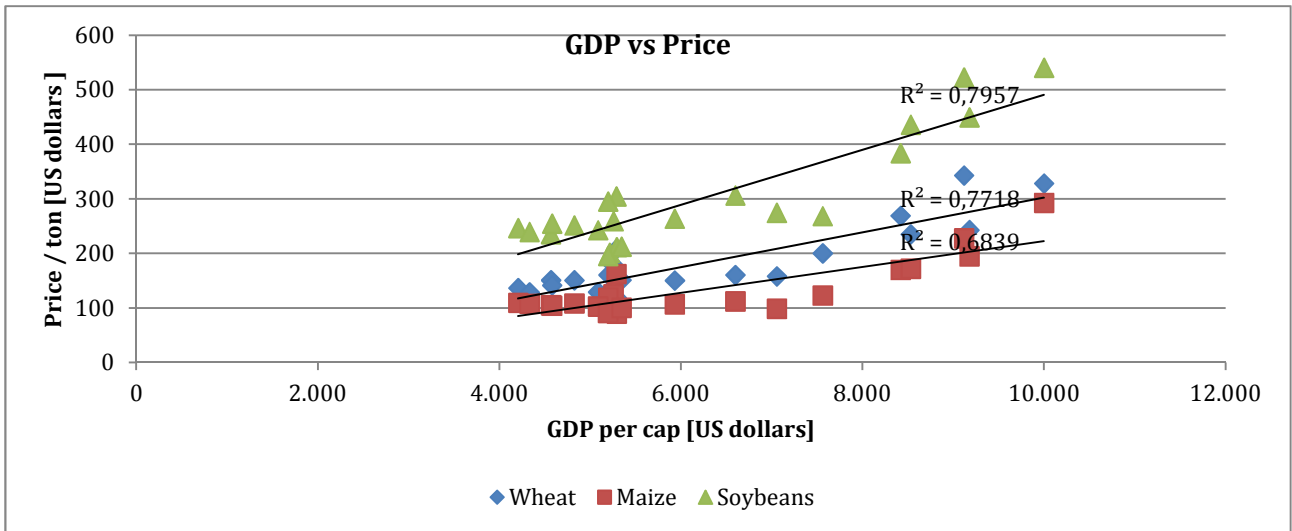
Figure 58 – Correlation GPD vs price
Source: Own elaboration with data from UNCTAD.
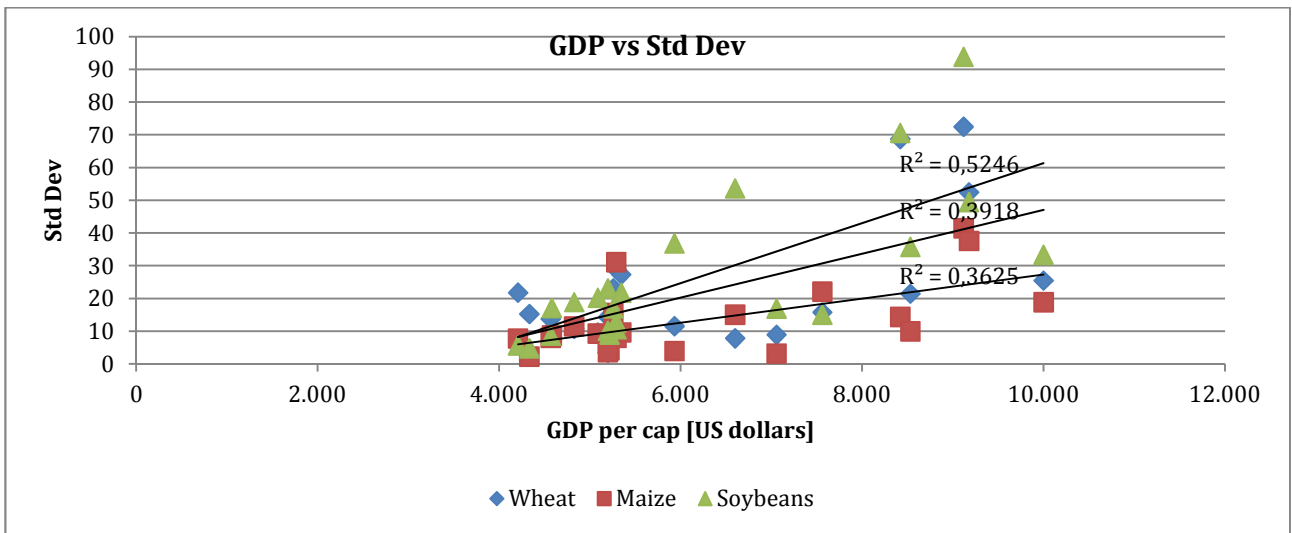
Figure 59 – Correlation GDP vs std dev
Source: Own elaboration with data from UNCTAD.

3.4.2.- Reduced Supply

The proxy that we chose in this case is the production per capita of the different commodities. We expect to find an increase in the volatility in the periods were the production is lower.

Figure 60 – Correlation production vs price
Source: Own elaboration with data from UNCTAD.
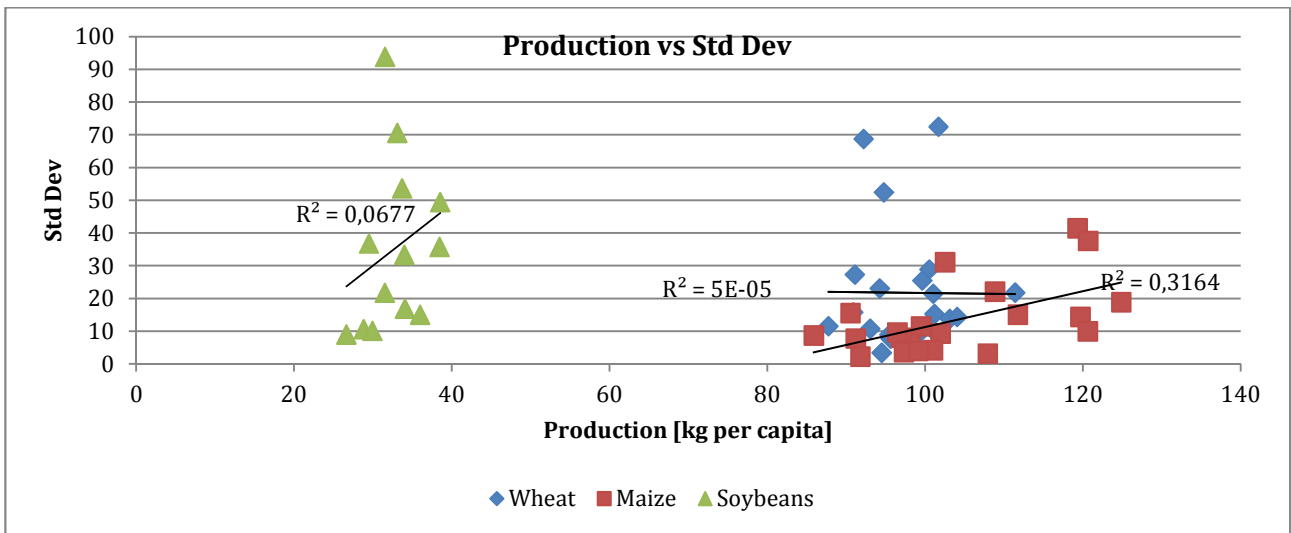
Figure 61 – Correlation production vs std dev
Source: Own elaboration with data from UNCTAD.

We can see that the results are not very encouraging. At this point we think that it might be a good idea to run the test again but this time, instead of correlating the data from the same year, we will correlate the production of the year N with the prices and volatility of the year N+1. Our assumption is that the market will react once the crops are collected and the information about production is available. We shall refer to this variable as "lagged".
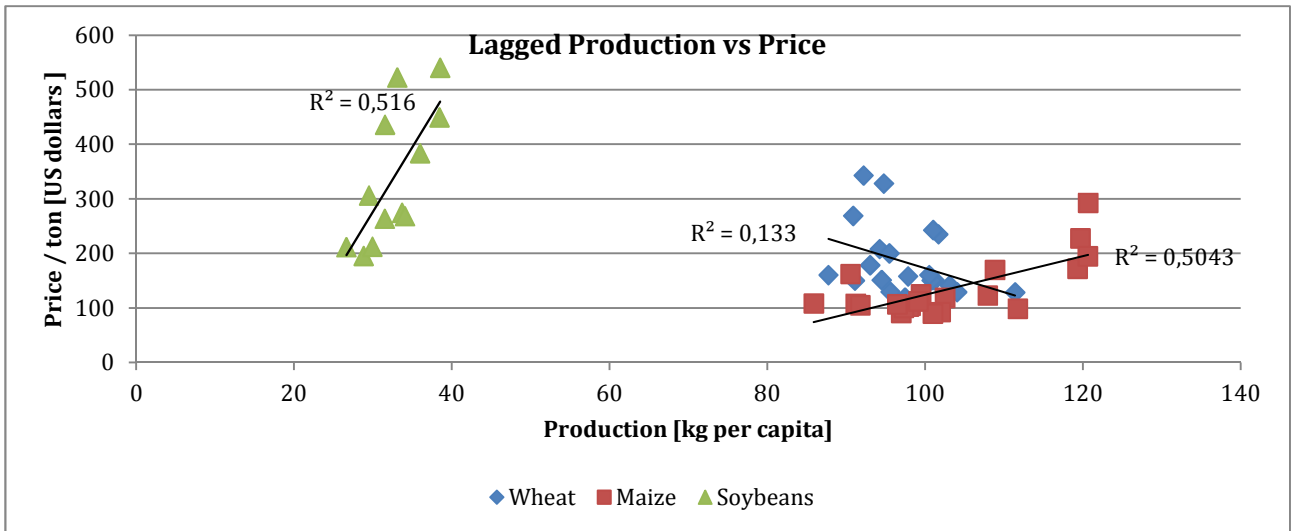
Figure 62 – Correlation lagged production vs price
Source: Own elaboration with data from UNCTAD.
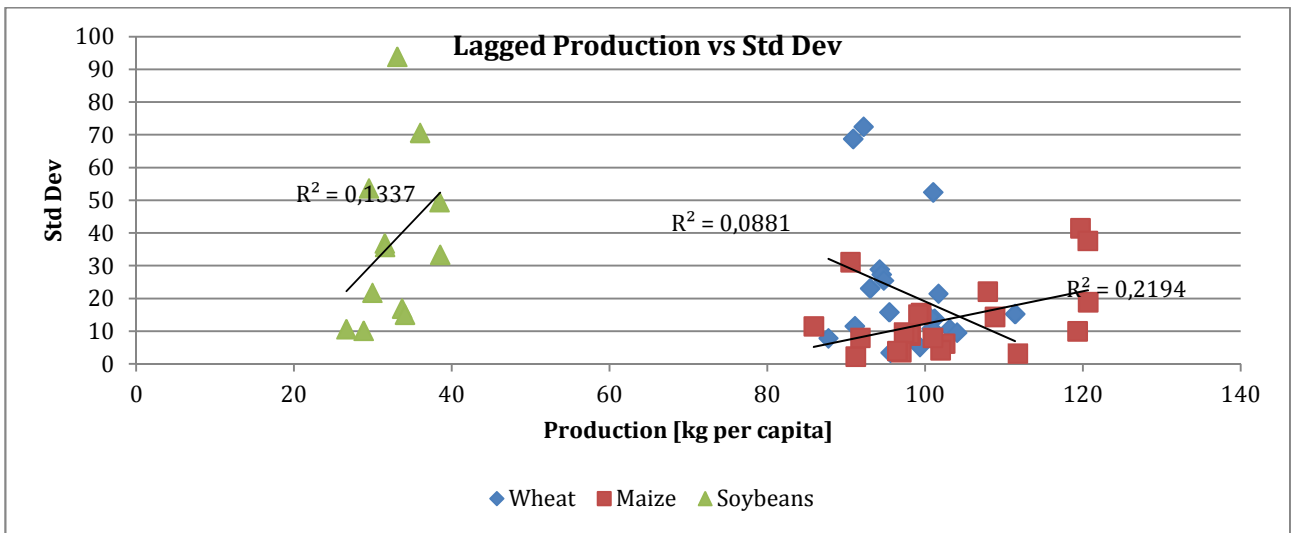
Figure 63 – Correlation lagged production vs std dev
Source: Own elaboration with data from UNCTAD.

Once again, the results show no statistical importance.

3.4.3.- Low Inventories

In this case, the proxy variable is very obvious. We will use the world ending stocks per capita. We expect to see higher prices and volatility in periods were the inventories are lower.
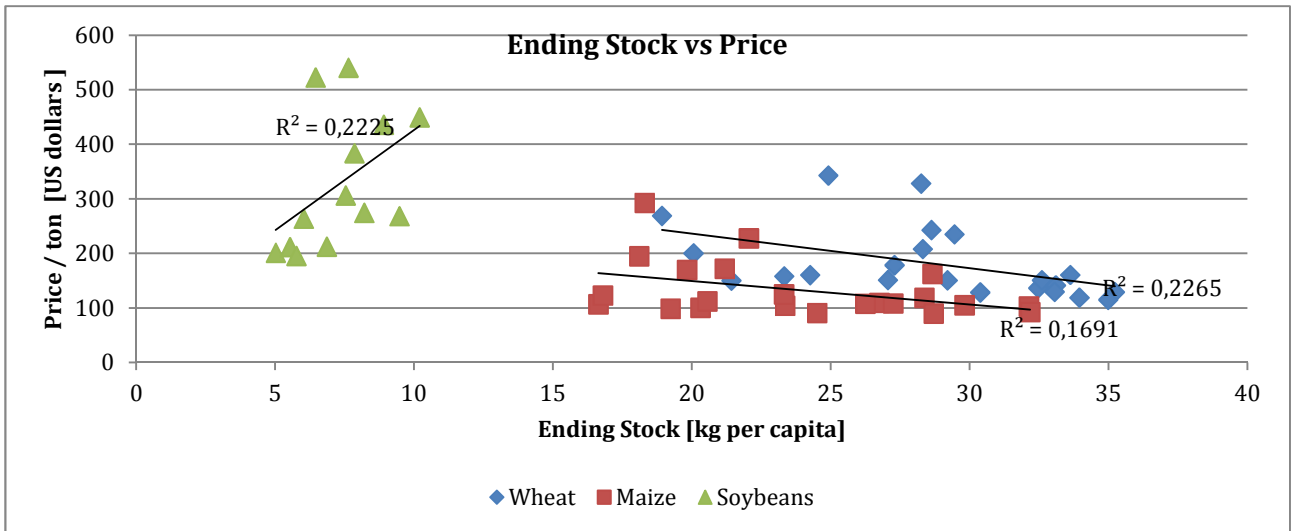
Figure 64 – Correlation ending stocks vs price
Source: Own elaboration with data from UNCTAD.
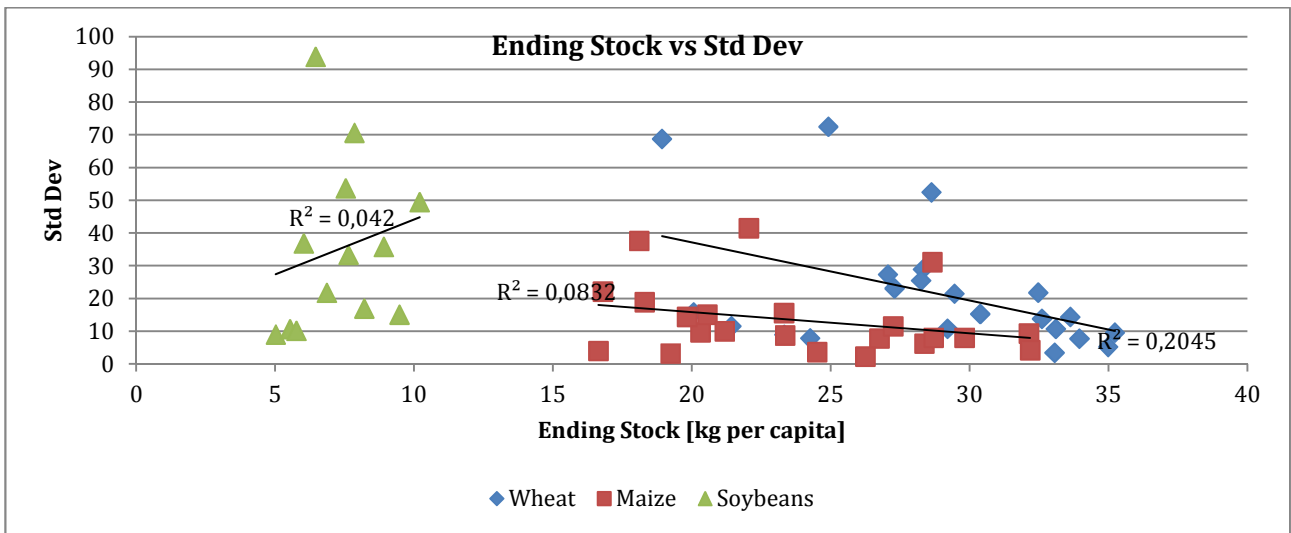
Figure 65 – Correlation ending stock vs std dev
Source: Own elaboration with data from UNCTAD.

Is this case, we will do the same thing as in the previous case to see if there are any improvements in the results. So, we will match the prices and volatility to the ending stocks of the year before.
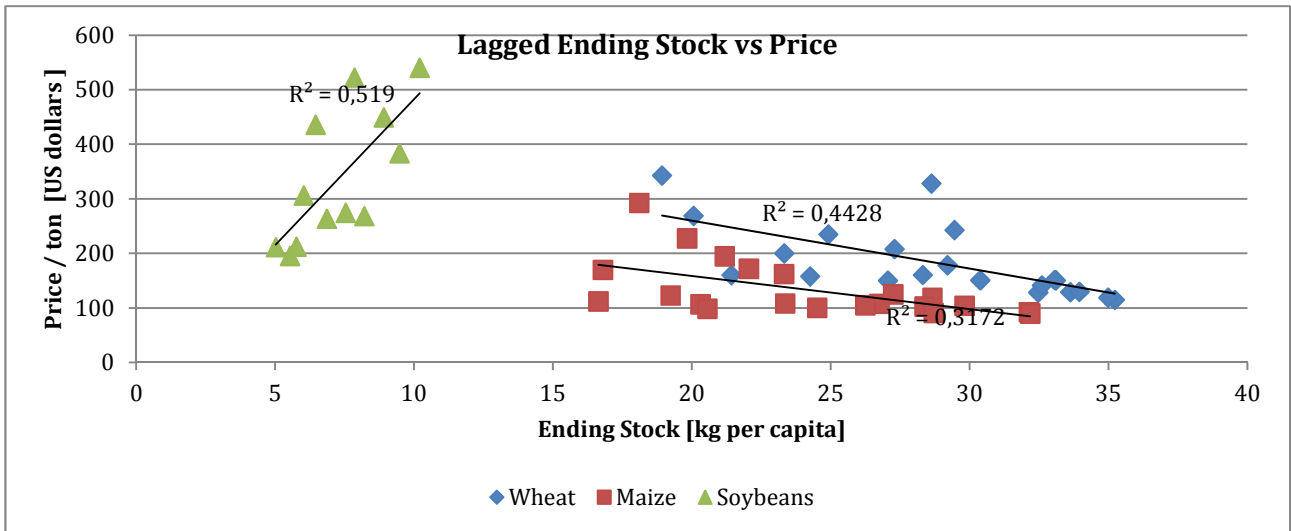
Figure 66 – Correlation lagged ending stocks vs price
Source: Own elaboration with data from UNCTAD.
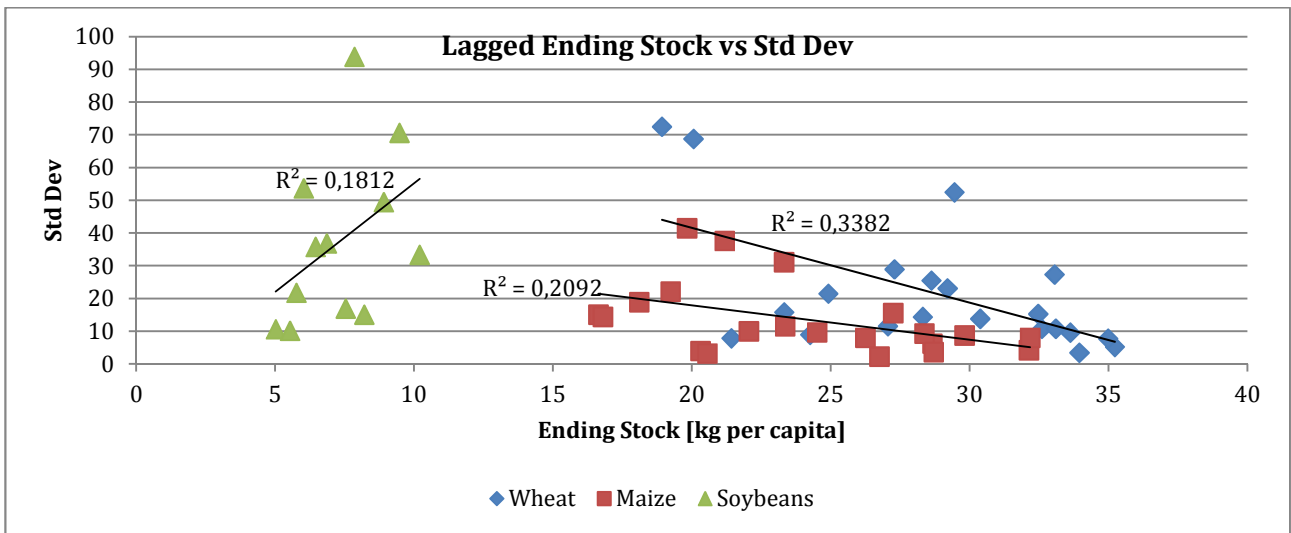
Figure 67 – Correlation lagged ending stock vs std dev
Source: Own elaboration with data from UNCTAD.

We can see some improvement but not to a significant point.

3.4.4.- Depreciation of US Dollar

Instead of choosing only one representative currency to calculate the exchange rate and use it as proxy, in this case we will us the Nominal Major Currencies Dollar Index[3] (NMCD). This index (created by the Federal Reserve of the United States) is a weighted average of the foreign exchange values of the U.S. dollar against a subset of currencies that circulate widely outside the country of issue. The country of issue is also a major trading partner with the US.

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[3] Summary Measures of the Foreign Exchange Value of the Dollar - Federal Reserve
http://www.federalreserve.gov/releases/h10/summary/default.htm
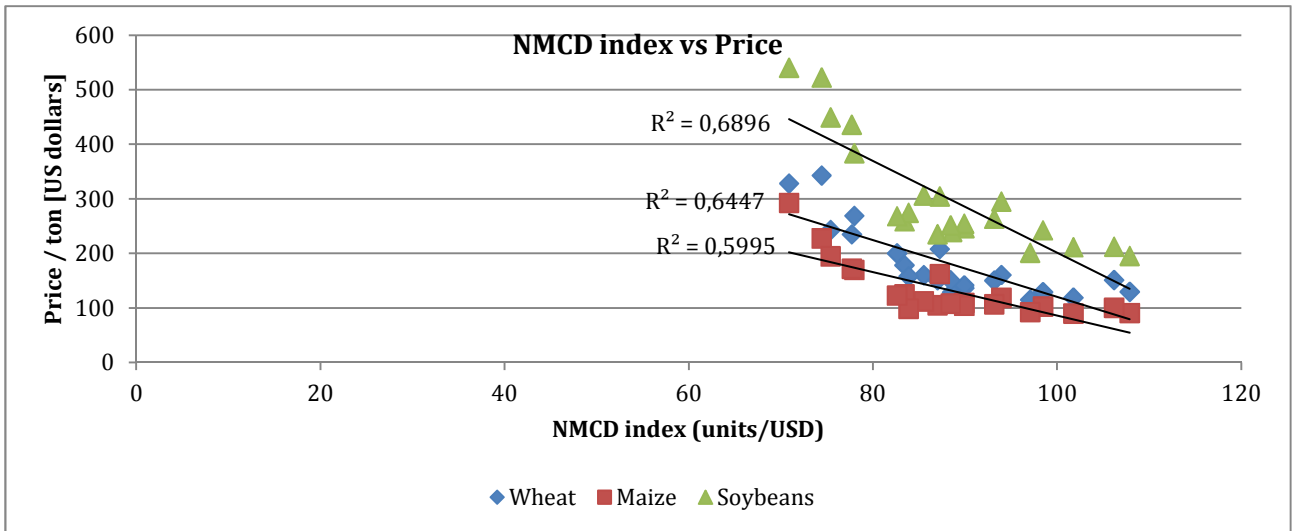
Figure 68 – Correlation NMCD index vs price
Source: Own elaboration with data from UNCTAD and Federal Reserve.
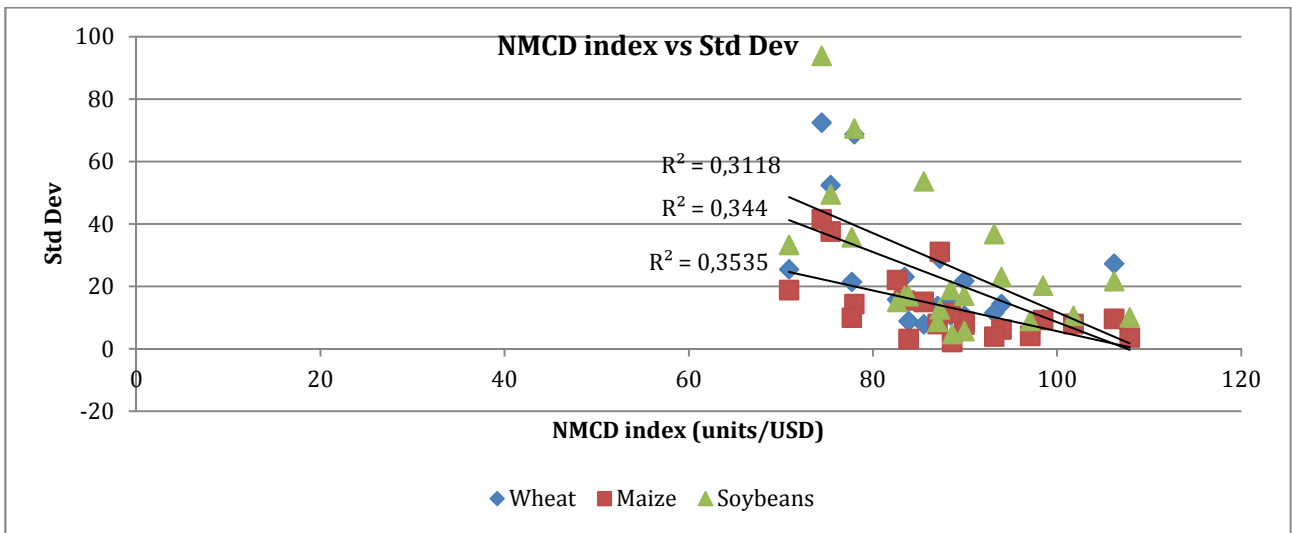
Figure 69 – Correlation NMCD index vs std dev
Source: Own elaboration with data from UNCTAD and Federal Reserve.

3.4.5.- Increase in biofuels production

As we mentioned in Second Chapter, the 2 most important biofuels produced are Ethanol and Biodiesel. The first one is made through the fermentation of sugars, being the most popular sources the corn (in the case of the USA) and sugar cane (in the case of Brazil). In the case of biodiesel, the raw material used is vegetable oil of different types (soybean oil in the case of Argentina). The following table has the biofuels production data for the year 2010 measured in thousand barrels per day.

Table 8 – Production of biofuels (volume and share)

	World	Argentina	%
Biodiesel	335,7	36,0	10,7%
Ethanol	1520,0	2,1	0,1%

Source: Own elaboration with data from EIA.

Even if Argentina's share on total world production is smaller for Ethanol, we will choose this fuel as a proxy for 2 reasons:

- Total world production is much bigger so any market change will have more impact on a global level.

- We have world production data for biodiesel only for the last decade so the statistical importance of the analysis will be smaller.
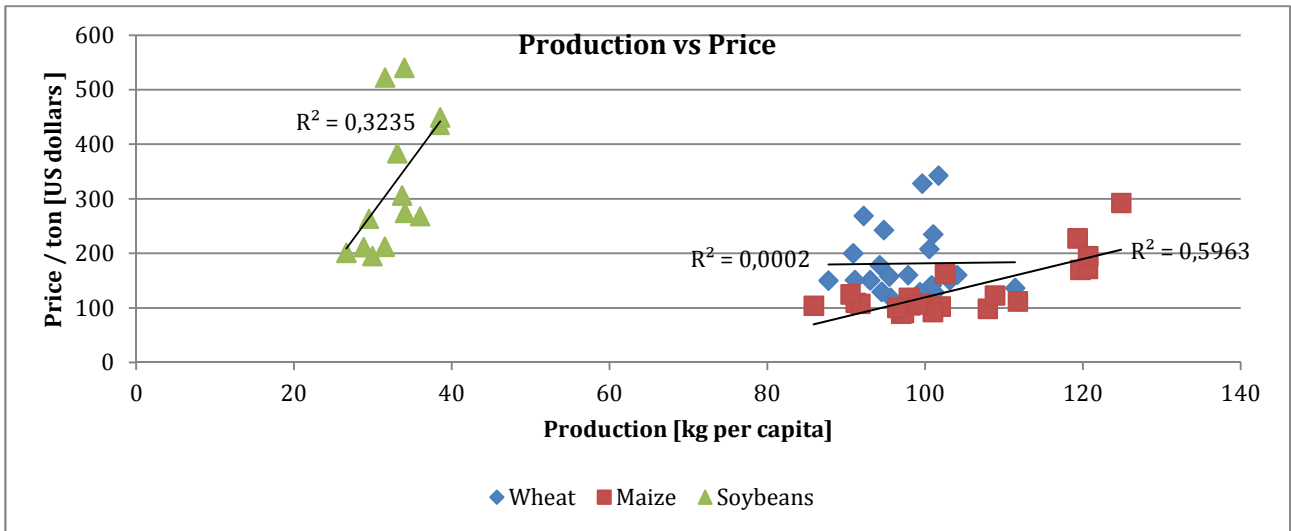
Here are the results:
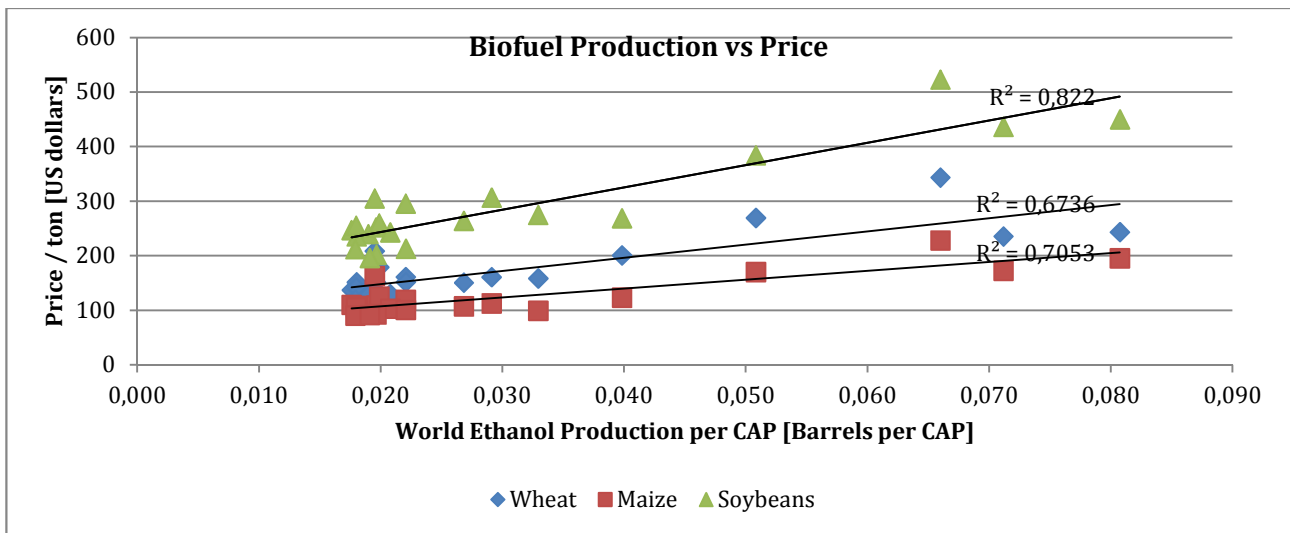
Figure 70 – Correlation biofuels production vs price
Source: Own elaboration with data from UNCTAD.
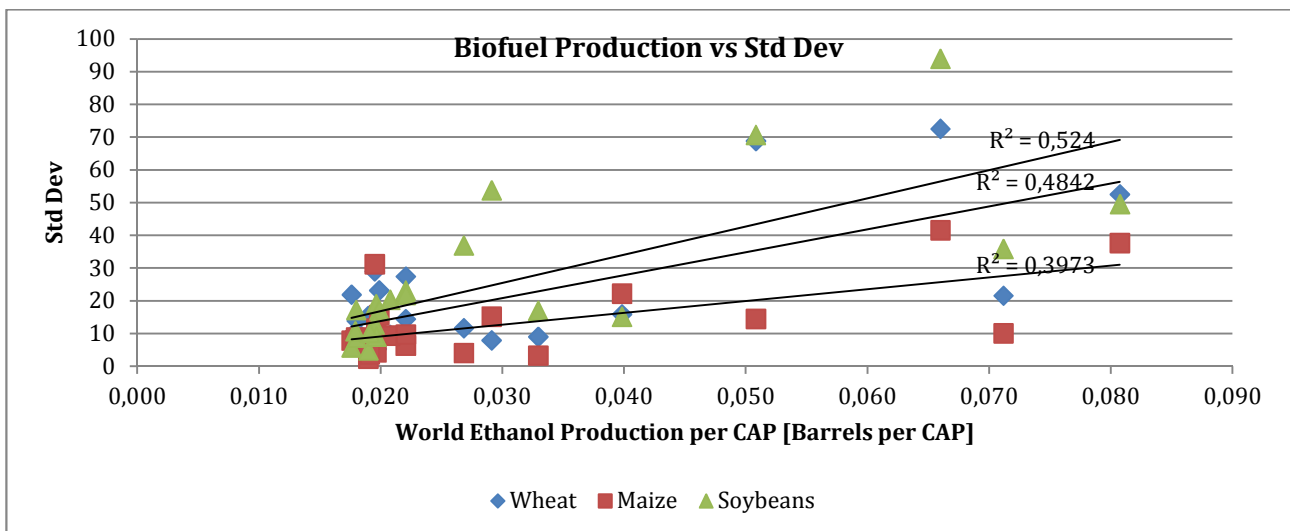
Figure 71 – Correlation biofuels production vs std dev
Source: Own elaboration with data from UNCTAD.

3.4.6.- Speculation

As we mentioned before, speculation is maybe the most controversial of the possible causes of volatility. Not only because of its real impact on commodities prices but also because it's more difficult to measure than other variables, which are more concrete.

We also said before that speculation is caused when a non-traditional investor is betting on price movements with no interest in physically acquiring the underlying commodity. So, in order to select a proxy, we need to understand how can an investor operate in derivatives market. There are 2 major ways to trade derivatives:

- Over-the-counter (OTC) derivatives: contracts are traded directly between two parties (usually banks and hedge funds), without going through an exchange or other intermediary.

- Exchange-traded derivative (ETD): contracts are traded via exchanges. A derivatives exchange is a market where individuals trade standardized contracts that have been defined by the exchange. A derivatives exchange acts as an intermediary to all related transactions, and takes initial margin from both sides of the trade to act as a guarantee.

We will assume that higher speculation means a higher volume of derivatives trade and, thus, our proxy shall be the notional amounts outstanding of commodity derivatives. In particular we will take the OTC derivatives, as this is the largest market for derivatives.
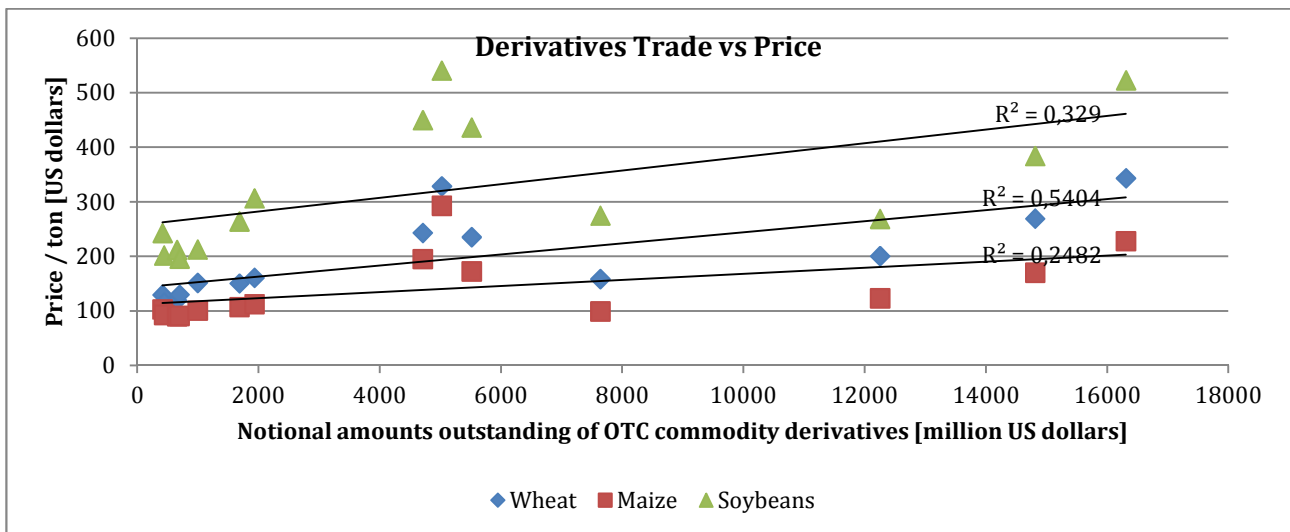
Figure 72 – Correlation derivatives trade vs price
Source: Own elaboration with data from UNCTAD.
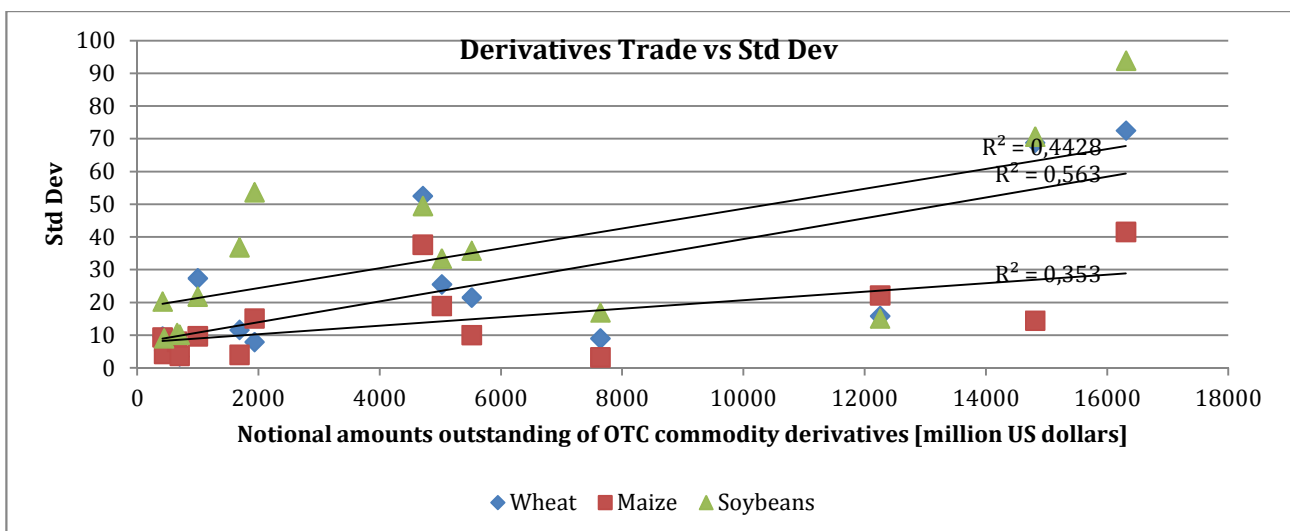
Figure 73 – Correlation derivatives trade vs std dev
Source: Own elaboration with data from UNCTAD.

3.4.7.- Adverse weather conditions & Foreign trade policies

We will not carry a correlation test for this two causes as the proxy for them would be too subjective and it might not be representative of the reality. We refer to Chapter 2 where we commented on their implication on modifying the normal balance between supply and demand.

3.4.8.- Conclusions to this part

In the following table we show all the results of the analysis performed in section 3.4. In order to keep it simple, we will classify the level of correlation in: no correlation ($r^2<1$), weak correlation ($0,1<=r^2<0,4$) or strong correlation ($r^2>=0,4$):

Table 9 – Correlations results

Volatility Causes	Proxy	Correlation with Price			Correlation with Std Dev		
		Wheat	Maize	Soybeans	Wheat	Maize	Soybeans
Sustained economic growth	GDP per cap	Strong	Strong	Strong	Weak	Weak	Strong
Reduced Supply	Production per capita	NC	NC	NC	NC	NC	NC
	Production per capita (lagged)	Weak	NC	NC	NC	NC	NC
Low Inventories	Ending Stock	Weak	Weak	NC	Weak	NC	NC
	Ending Stock (lagged)	Weak	Weak	NC	Weak	Weak	NC
Depreciation of US Dollar	NMCD	Strong	Strong	Strong	Weak	Weak	Weak
Increase in biofuels production	World Ethanol Production per Capita	Strong	Strong	Strong	Strong	Weak	Strong
Speculation	Notional amounts outstanding of OTC commodity derivatives	Strong	Weak	Weak	Strong	Weak	Strong

Source: Own elaboration.

- In general, causes tend to correlate better with Price than with Std Dev. The only exception is the case of speculation.

- Not all 3 products behave in the same way: wheat is the one that correlates the better. Soybeans present correlations in half of the cases but almost always in a strong way.

- The causes that correlate the better throughout all 3 products are: Increase in biofuels production, Sustained economic growth, Depreciation of US Dollar and Speculation.

- Both causes related with the supply side of the equation (production and inventories) seem to have no significant correlation even when they improve a little after lagging the series 1 year.

3.4.9.- Policy Responses

Now that we have an idea of which are the volatility triggers to which Argentina is more exposed, we should ask ourselves if there is something to be done in order to diminish the negative impacts of high prices and volatility. Of course, most of these triggers are international and far away from the influence of a country like Argentina. So, we don't intend to propose a series of measures to be implemented but to understand if there is any variable that the domestic Government could act on in order to open the debate.

- Sustained economic growth: in this case, there is nothing to be done. Argentina cannot influence the level of growth of other countries.

- Depreciation of US Dollar: we mentioned before that the depreciation of the US Dollar favored demand by making commodities (normally priced in USD) cheaper for the rest of the countries. In Argentina, since 2008 there has been an appreciation of the dollar versus the local currency as a result of the strong demand of this currency by people trying to protect their savings against the high inflation. This led into an intervention of the currency market by the local authorities[4]. Thus, even when the exchange rate USD/ARS could be a suitable variable for the Government to influence in order to cope with volatility it would be very hard to predict the possible effects on a market that has already been intervened. We left this issue for a later debate.

- Increase in biofuels production: the production of biofuels amplifies the demand for raw materials such as soybeans. So an increase in the production of biofuels like the one experienced in the past few years puts more pressure on the market, increasing prices and volatility. The Government could intervene this market by rising the export taxes or changing the mandate for mixing regular fuels with a percentage of the bio ones[5]. However, this might also have some undesirable effects. As we will see on chapter 4, protective measures tend to have a disappointing effect on the local Economy. It would not be a surprise that the same thing could happen by intervening the biofuel market. Also, the exports of this type of products is an increasing source of revenues for the country so we have to consider as well the opportunity cost that could be generated by reducing the exports.

- Speculation: many authors believe that speculation is the main reason for the increase in price volatility. In fact, if we look at the results from section 3.4.8 we will see that speculation is the cause that better correlates with volatility so our analysis confirms the importance of this phenomenon. We must also remember that futures' market provides farmers and companies with the necessary tools to reduce their risks by ensuring minimum sale prices or maximum costs for their supplies. This is a subject that needs to be addressed globally and not only by Argentina. This problem calls for clear trading rules internationally in order to reduce the speculative activity but without depriving the traditional market players of the financial instruments that they need. The "how" is something that exceeds our qualifications and the aim of this paper.

[4] Citizens can't buy foreign currency unless they receive a special authorization from the local Tax Collection Agency.
[5] Even when it's not clear if the mandate was fully applied, since January 1st 2010 the law 26.093 forces to mix 5% of bioetanol with gasoline and 5% of biodiesel with diesel.

4.- Argentina's trade policies 2006-2008

4.1.- Introduction

Trade policy interventions were relatively common in developing countries during the world food crisis, with at least 55 countries using trade policy instruments to mitigate the impacts of the world food crisis of 2006-2008, being Argentina one of them. This presents special interest due to the role that the country has a food producer and exporter. What we want to analyze in this chapter is the effectiveness (or lack of it) of those measures destined to keep the prices from spiking.

We will start the chapter with a review of the general effects of volatility. Later on, we will investigate if there is any visible deterioration in the local Economy after the moment in which the volatility was significantly increased, despite the preventive measures implemented by the local Government.

4.2.- General Effects of Volatility

Before analyzing the Argentinean case, we will briefly revise some of the general effects of volatility. Due to the fact that, usually, high volatility tends to be correlated with high prices[6], we will also mention some of the effects of the latter.

4.2.1.- Price effects

We can talk about prices in 2 different levels: international and domestic.

In the first case, we refer to international prices, which will directly impact the National Accounts of the country. The macroeconomic impacts of commodity prices are important because they affect the level of per capita income, which ultimately is a key determinant of living standards for individuals and families. Generally speaking, high international prices for food commodities benefit countries that export those products, while low prices benefit importing countries. In the short-to-medium run, exporters benefit at the expense of importers, and vice versa. In the longer term, however, higher prices could cause some importing countries to invest in their agriculture and reduce imports, or even become exporters. Such investment is crucial for the development of the agriculture sector and sustainable reductions in poverty and food insecurity. Of course, the more the weight of exports/imports on the trade balance, the more important the effects.

From a fiscal point of view, higher prices means higher tax collection for the Government but also greater costs if subsidies are in place. For importers, the subsidies budget will have to increase to offset the higher prices. For an exporting country that subsidizes the domestic consumption of a good, there will be an important impact in opportunity cost. In both of these cases, high levels of subsidies can reduce funds that otherwise could be spent on agricultural research, education, health, etc.

The second level of prices that we can consider is the domestic one. Domestic prices are directly related with poverty and nutrition of individuals. It is important to mention that international and domestic prices may or may not be aligned depending on the policies of the local Government. We will thoroughly discuss these policies and its effects when we comment the particular case of Argentina in the following sections.

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[6] Initially, high prices encourage people to draw down their stocks, which can moderate price changes that would otherwise have been caused by supply and demand shocks. However, once stocks have been drawn down, the system is vulnerable to a further supply or demand shock; the absence of the buffer means that price variation will tend to be greater than if stocks were available.

For the moment, we will just analyze effects of domestic prices regardless of their relationship with the international ones.

Poor people spend a large majority of their income on food, while many farmers derive much of their income from producing food. This suggests that changes in food prices will have large effects on the welfare of both farmers and poorer consumers (this segments of the population are very important in the particular case of Argentina).

In urban areas, higher food prices may substantially hurt the poor because, typically, little food is produced in such areas. In order to cope with the reduction in disposable income resulting from higher food prices, households will engage in new economic activities, sell assets or borrow in order to mitigate the decline in consumption. They also commonly reduce expenditures on health and education and shift dietary patterns towards cheaper foods and away from micronutrient-rich foods such as milk, meat, fruits and vegetables. Energy intake will also decline in cases where people are so poor that they simply cannot afford the same amount of calories at the new higher prices.

In rural areas, higher food prices will tend to have smaller negative effects on net food buyers because many households produce a substantial share of what they consume, and hence are only marginal food buyers. On the other hand, farmers who are net food sellers are likely to benefit from higher prices, which other things being equal, will tend to increase their income. However, it is important to mention that small farmer with little land might not benefit at all from higher prices as they might not have access to credit or productive assets that are required in a short time to take advantage of those higher prices.

4.2.2.- Volatility Effects

Volatility in food prices can also have important effects even if average prices remain constant over a period of time. This volatility can be more or less predictable. The most classic example of predictable volatility is seasonality but even in this case the month of highest or lowest price can change from one year to the other. Furthermore, even perfectly predictable changes in prices can cause problems for poor households that are unable to borrow when prices are high and thus are unable to "smooth" their consumption over time.

The main effects of volatility are:

Poverty traps: there are situations in which periods of high prices can cause effects on net food buyers that are not reversed by periods of low prices. For example, a sharp increase in staple food prices during the first 1000 days of a child's life can cause sub-optimal nutrition that could translate into lower productivity during adulthood. For net food sellers, periods of low prices will temporarily reduce income, causing similar effects. Temporary reductions in disposable income due to price shocks can also lead families to draw down on their capital. Poverty traps usually refer to episodes where a one-time shock can cause permanent (or long term) effects. For example, households may engage in distress sales of land or livestock in order to maintain food intake in the face of an economic shock but reducing their future production capability.

Reduced farm-level investment: farmer, specially the smaller ones, will be reluctant to make any productive investments when facing great price volatility and, thus, adopting a low-risk, low-return strategy that slows downs the long-term development process. This effect might be even stronger in developing countries were the access to credit is difficult or inexistent. Other fundamental decisions, such as choice of crops and fertilizer use, seem to be negatively affected by volatility.

In some particular cases, volatility can carry along some benefits for certain people. For example, rich consumers who can buy in bulk when food prices are low and then store the food for later use are able to buy more food when prices are low and less when prices are high, thus paying, on average, a lower price

for food. Another example would be those people who can afford to buy the assets that poorer households sell at very low prices when desperate for funds when facing a price shock. In general, however, the costs of unstable and unpredictable prices would seem to far outweigh any benefits such as these, especially for the poor and food-insecure.

It is also important to mention that high prices are not bad per se. What generates the previously mentioned poverty traps is the sudden change in prices and the uncertainty about future prices. Constant, high and predictable prices can be good for farmers as they will be motivated to invest in order to increase their production and income. This, in the long term, will have a corrective affect on prices, reducing them.

But the fact that the costs of unstable prices are greater than the benefits does not necessarily imply that instability should be reduced. Before making this assertion, the costs of unstable and unpredictable prices must be compared with the costs of reducing that instability or of mitigating its impacts.

4.3.- Trade Policy Instruments

In this chapter we intend to analyze the effects of the implementation of some export barriers during the last few years in Argentina. These export barrier were intended to protect the social conditions of the inhabitant during a period in which the prices of food were growing rapidly in the world by "decoupling" local prices from world prices. The aim of these policies is clearly explained in all the resolutions issued by the Economy Ministry. We will just quote a fragment of Resolution ME 125 08 to provide the reader with an example:

"*Considering that:*

…The international prices of cereals and oilseeds registered a significant increase in the last years, with an elevated volatility rate.

The persistence of such scenario could negatively impact on the whole Economy trough higher domestic prices, lower distributive equity and a growing uncertainty about investment decisions by the agricultural sector…

The Economy and Production Ministry resolves…"

As we said before, the international prices of commodities may or may not be aligned with the domestic ones depending on how those prices are transmitted.

Price transmission from world markets to domestic markets is affected by several factors, including transport costs, countries' levels of self-sufficiency, exchange rates and domestic shocks. But trade policy is perhaps the most fundamental determinant of the extent to which world price shocks pass through to domestic markets. In particular, the key factor that affects price transmission is the degree to which the government determines the volume of trade (either exports or imports), as opposed to allowing the private sector to make the decision.

In order to do this, the Government has a series of tools that can be implemented and that we comment below:

- Quantitative restrictions (quotas): the Government directly determines a maximum quantity that can be exported or imported. Export quotas can reduce pass-through of high world prices to the domestic economy, while import quotas can prevent the pass-through of very low world prices. But even when controls on trade volumes do serve to stabilize domestic prices, there are costs to such policies. In terms of losses to the domestic economy, there are short-run economic efficiency losses from not allowing domestic prices to follow world price movements. In the short term, supply

response is impeded and there are losses in export revenue. In addition to the losses imposed on the domestic economy, export restrictions also result in world prices being higher and more volatile than they would otherwise have been, imposing costs on other countries.

- Taxes/Tariffs: in many cases taxes/tariffs will not impede transmission of world price shocks to domestic markets unless they are varied in response to changes in world prices. A constant import tariff will raise the domestic price of food (and an export tax will lower it), but if the private sector is allowed to choose the amount they import at a given tariff, changes in world prices will often be completely transmitted to domestic prices until world prices or the tariff get so high that there are no more imports. For big exporting countries, taxes can be an important source of revenues for the Government. So, higher prices mean higher revenues for the Government as well.

- Subsidies: the Government can make a product more affordable by subsidizing it. Basically, the Government will cover a part of the cost of the good, thus reducing the final price but maintaining the margin for the producer or distributor.

Despite any negative consequence that these policies might have had on the international market (the lower supply most likely pushed prices up and contributed to increase the volatility level), the measures taken didn't contradict any rule from the WTO. There was also no specific retaliation to the country except some mild attempts to change supplier. However, we found no evidence of such retaliations being harmful.

We will now comment the application of these instruments in Argentina.

4.3.1.- Export Taxes

The implementation of export taxes in the recent years of the Argentinean history is not only linked to record high world food prices. At the beginning of 2002, the country was shut off from international financing as a consequence of the default of its sovereign debt. The treasury levels were low as a result of the deep recession of the previous years so new funds were required in order to mitigate the increasing levels of poverty and export taxes seemed to be a good solution at that time. It was also a good way to stabilize internal prices in light of the dramatic increase in real exchange rate after the devaluation of the Peso.

The following chart shows the evolution of export taxation since 2002 as a result of the different resolutions of the Economy Ministry:

Table 10 – Resolutions by the Economy Ministry

Resolution	Issue Date	Sunflower	Soybean	Wheat	Maize	Bovine Meat
ME 11 02	03/03/2002	13,5%	13,5%	10,0%	10,0%	15,0%
ME 35 02	08/04/2002	23,5%	23,5%	20,0%	20,0%	15,0%
ME 10 07	01/01/2007	23,5%	27,5%	20,0%	20,0%	15,0%
ME 368 07	09/11/2007	32,0%	35,0%	28,0%	25,0%	15,0%
ME 125 08	12/03/2008	41,0%	41,4%	33,0%	24,4%	15,0%
ME 64 08	02/06/2008	41,0%	46,0%	33,0%	31,4%	15,0%
ME 80/1/2 08	21/07/2008	32,0%	35,0%	28,0%	25,0%	15,0%
ME 26 08	23/12/2008	32,0%	35,0%	23,0%	20,0%	15,0%

Source: Julio J. Nogués

After the implementation of the taxes in 2002 (which was in 2 steps) we see no changes until the years in which food prices start growing substantially. So, during 2007 and 2008 we can see several updates in order

to follow the price spike. Only bovine meat maintains a constant tax where, instead, export quotas were much more important than in the case of cereals.

The case of the resolution 125 worth mention due to the social consequences that its implementation generated. This resolution, in opposition to the previous ones, defined the levels of taxation according to different prices levels for each commodity (the values on the chart reflect the taxes on the issue date). The higher the price, the higher the tax. In fact, the price paid to the exporter (International price - Tax) was asymptotic to a certain value a as per the growing taxation. At the time of the implementation, the tax levels were the highest of the decade.

In order to protest against this resolution, the major associations of agricultural producers (historically confronted with each other) united in a common front organizing national protests and blocking highways. So after only a few months, the resolution was sent back to the Congress for its discussion. The decision was to return to a fixed tax system again.

Export taxes on agro industrial products have become a key element in the Economic Policy of the country. First of all, it is the 3rd most important source of revenues of the treasury after Value Added and Income taxes (in 2008 it stood for 6,6% of the treasury and 1,7% of the GDP). But the most important difference is that export taxes are not regulated by Federal sharing rules. Instead, are discretionally managed by the Executive Power.

4.3.2.- Quotas

As international price increases accelerated in 2006, quantitative export restrictions began to be implemented. Initially these restrictions fell primarily against bovine meat and wheat exporters but over time they were extended to some other products, specially on inputs of food products that have the highest incidence on the basic food basket. The following table shows the volumes produce and exported of the 3 most important cereals:

Table 11 – Exports/production

CEREAL		**2006**	**2007**	**2008**	**2009**	**2010**
Wheat	Production	12,6	14,5	16,3	8,4	7,5
	Export	9,4	9,4	8,5	5,0	3,0
	Ratio E/P	74,6%	64,8%	52,1%	59,5%	40,0%
Maize	Production	14,4	21,8	22,0	13,1	22,7
	Export	10,3	14,7	15,0	8,3	14,5
	Ratio E/P	71,5%	67,4%	68,2%	63,4%	63,9%
Soybean	Production	40,5	47,5	46,2	31,0	52,7
	Export	8,2	12,0	11,8	4,5	11,7
	Ratio E/P	20,2%	25,3%	25,5%	14,5%	22,2%

Source: Julio J. Nogués – Volumes in million tons.

We see similar tendencies for all commodities until 2009: higher international prices motivated production even if smaller percentages were exported. After a catastrophic year marked by record draughts, producers needed to decide on which product to allocate the land. Some wheat producers, facing the uncertainty of the quota mechanism (there are no written rules by which the Government would select the recipients of the quota and this has been a subject of great controversy in the Politic scene), decided to use their land for soybeans. Soybean exports have been essentially free of bureaucratic controls. Only a small percentage (in comparison with the other products) is exported as beans and the bulk of the production is transformed into oil which is later exported. There is a very small participation of this oil in the local food basket so there

is no need for the Government to intervene heavily on the exports. This explains why the production of wheat did not recover after 2009 and why the soybeans bounced back in such a positive way.

On the other hand, Maize recovered its pre-2009 level despite facing the same uncertainty as the wheat producers regarding quota assignations. If Maize producers were not able to export their harvest they had the possibility of selling internally to meat producers (specially bovine but also pork and chicken) due to the increase of the feed lot system utilization (traditionally Argentina had been an "extensive" and not an "intensive" producer of meat).

Finally, it is important to have in mind quotas not only affect local producers by increasing the level of uncertainty but they also create tension with import partners as some previously existing contracts might end up unfulfilled.

4.3.3.- Subsidies

The initial subsidies were granted in the beginning of 2007 to wheat and maize mills but since then they were expanded to several other food products, especially the ones with the highest weight in the food basket. The goal was to influence retail food prices. The Government targets a price at which the intermediate food processor (mills, for example) should sell to the domestic market. If the market price is higher, then the government pays subsidies for the difference. In the following table we present the subsidy authorizations for the period 2007-2009:

Table 12 – Subsidies

Product	Number of payments	Total subsidies (million ARS)
Wheat flower (mills)	1.477	1.714
Maize flower (mills)	45	13
Dairy firms	181	616
Chicken farms	860	1.275
Milk producers	153.989	782
Wheat producers	25.613	339
Pig meat producers	2.048	89
Bovine feed lots	4.506	1.324
Other	778	12
Total	189.497	6.163

Source: Julio J. Nogués

The first thing to say is that this type of policy is not cheap. If we consider the average exchange rate for the period (3,32 ARS/USD), the total budget for subsidies was USD 1.856 million.

Second, we see a higher concentration of subsidies for the processing links of the supply chain in comparison with the ones received by producers. For example, wheat mills received 406% more money than wheat producers. This means that a smaller number of entities received a bigger portion of the cake. The reason is that producers are normally smaller entities, dispersed and unable to organize in demand of more equal treatment.

4.4.- The effects of trade policies in Argentina

The effects of trade policies are many and their measurement is not simple. In order to chose a suitable "quantification system" we need to have in mind the objective of those policies in the first place. So, if all

measures described in section 4.3 were meant to decouple local food prices from the spike of world commodities during the years 2006-2008, then the first thing that we need to do is to check the prices that customers had to pay for food during those years. The level of price transmission will be the primary measurement to consider.

Also, right between world prices and retail prices, we have the price paid to producers. Analyzing the evolution of these prices is key in order to understand the effect of the measures on this group of interest. Thus, by calculating the difference between world prices and the price paid to producers, we will find a sort of "opportunity cost" that was lost due to the taxes and restrictions.

We chose to analyze on this paper the period between 2006 and 2008 because it covers not only the first price spike but also the return to pre-spike values, giving us the possibility to see what happens with domestic prices during both upwards and downwards movements on international prices.

We will present now a full analysis about the case of wheat and wheat related products. Maize and soy, even if they are an important part of Argentina's food exports, don't have a significant weight on the local food basket so we will not discuss the evolution of consumer prices. We will, however, show the cost of opportunity for producers. Finally, we will also tackle the case of bovine meat because it represents around 30% of the local basic food basket.

4.4.1.- Wheat

Wheat products stand for approximately 17% of the Argentinean food basket, being bread and pasta the most important items within the category. In the following graph we present world prices and prices paid to producers on the left hand axis (both of them expressed in ARS/ton) and retail prices for bread and pasta on the right hand axis (prices are expressed in ARS/unit; 500 grams package of pasta and 580 grams package of bread).
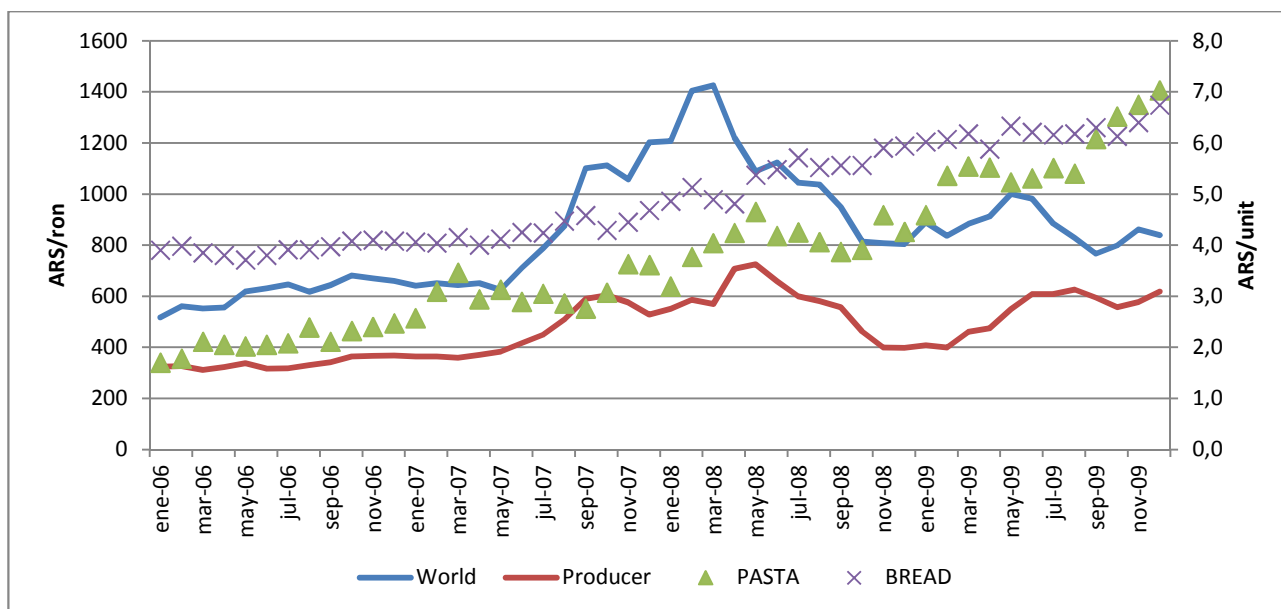
Figure 74 – Prices comparison (wheat)
Source: Own elaboration with data from LaNacion.com, Bolsa de Cereales and UNCTAD.

While world prices increase during 2007, trade policies prove to be somehow effective in diminishing the growth of prices paid to producers. One would expect to see also a reduction in the growth rate of retail prices as a result of this as well. However, in this case consumer prices continue to grow even when world and producer prices start to descend after the peak of 2008. It is clear that trade policies have failed in this

case to protect consumers and that inflation in Argentina is not significantly related with world prices but to other factors that are not the object of this paper.

To understand this better we propose to analyze the cost structure of common bread. According to Nogués[7], the incidence of wheat in the cost of mills is around 48% while the incidence of flower in the cost of bread is around 20%. Therefore, the incidence of wheat in the cost of bread is approximately 10%. If we consider the period from April to September of 2007, we see a world price increase of nearly 69%. Based on the previous estimations, these should translate (all things being equal) into a 6,6% increase in the retail price of bread. Yet, in that same period the bread price increased by 14,5%. Apparently, most of the price increase of bread comes from other components other than wheat such as labor costs, rents, energy, etc.

As we said before, we can measure the opportunity cost for producers as the difference between world price and the price that they effectively received. The full line indicates the difference in percentage while the other one shows the difference in ARS/ton. It is clear that producers benefited only partially of price increase as the gap got bigger during 2008. Considering that retail prices also went up, the result is a lose-lose situation.
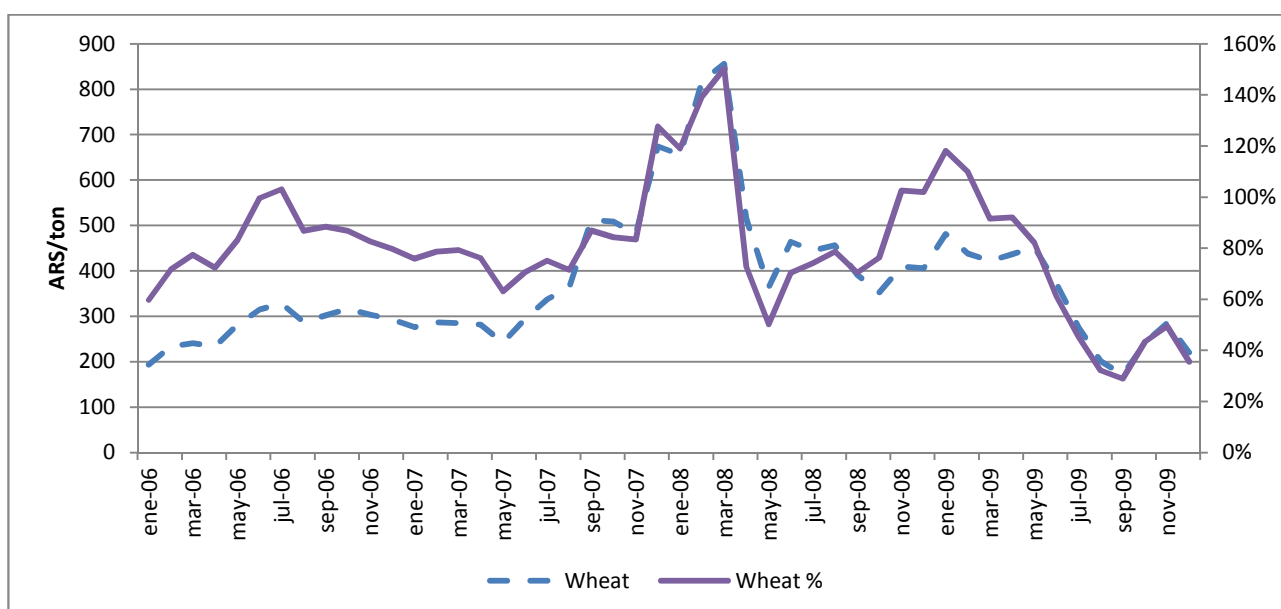
Figure 75 – Producers' opportunity cost (wheat)
Source: Own elaboration with data from Bolsa de Cereales and UNCTAD.

4.4.2.- Maize

Even if maize products represent a very small share of the food basket, we present the same graphic as in the case of wheat.

Broadly speaking, the evolution of the prices is more or less the same than in the previous case in the sense that customer prices continue to grow even when world and producer prices start to decline. In this case, the opportunity cost of producers is not as big as with the wheat. This might be explain by the fact that maize is an important feed for cattle so the producer has the option of selling maize locally to meat producers when facing export restrictions.

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[7] Julio J Nogués: Agricultural Export Barriers and Domestic Prices Argentina during the last Decade – 2011.

Figure 76 – Price comparison (maize)
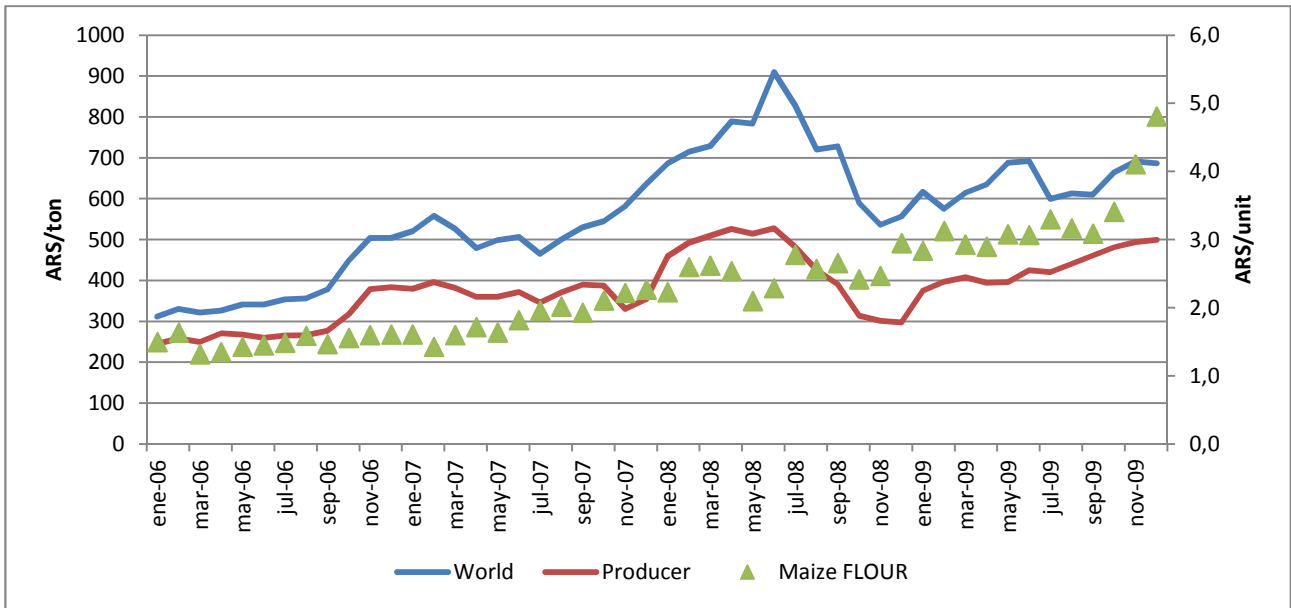*Source: Own elaboration with data from LaNacion.com, Bolsa de Cereales and UNCTAD.*
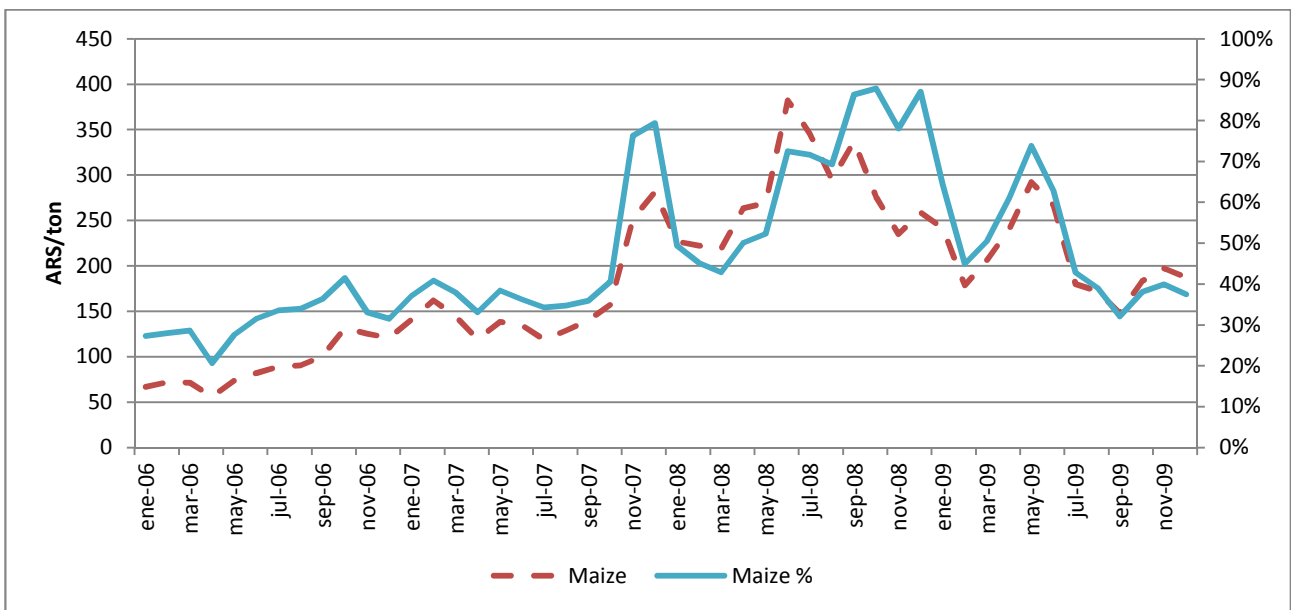
Figure 77 – Producers' opportunity cost
Source: Own elaboration with data from Bolsa de Cereales and UNCTAD.

4.4.3.- Soybeans

In this case we include no soy product reference, as they have almost no participation in the food basket. Nevertheless, we analyze the opportunity cost of producers.
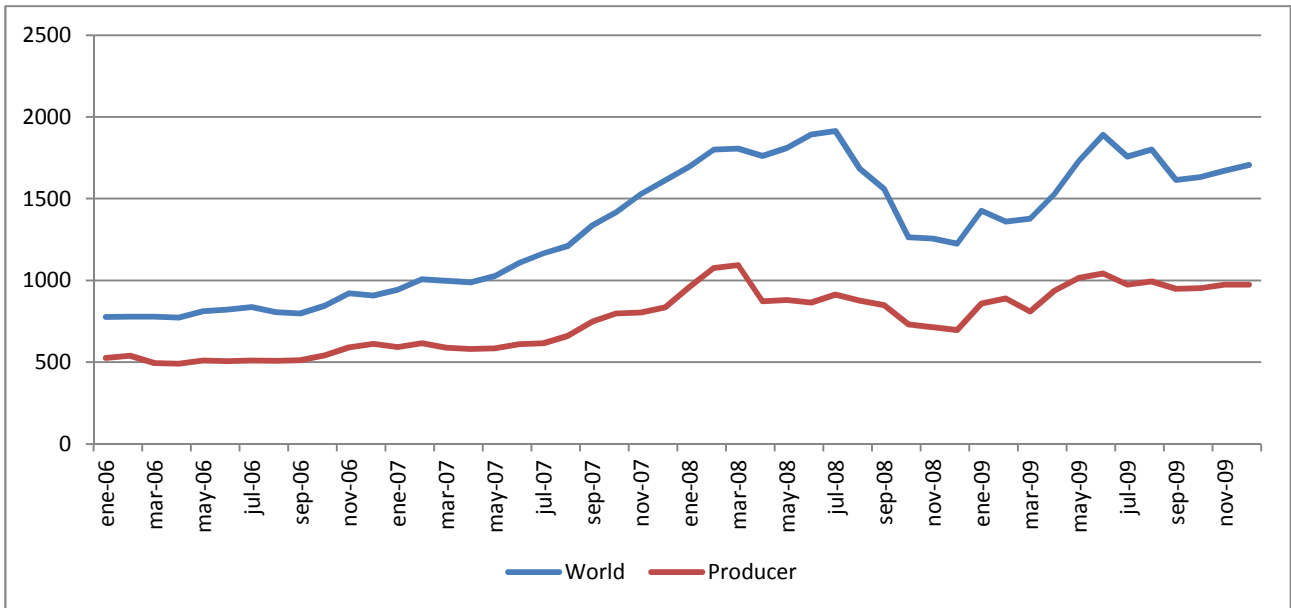
Figure 78 – Price comparison (soybeans)
Source: Own elaboration with data from Bolsa de Cereales and UNCTAD.

World and producer prices seem to be more in sync that in both previous cases. In fact, the opportunity cost series of soybeans has the smallest standard deviation of the three. The explanation is also linked with the lack of participation in the food basket. Like we said in the previous section, the Government has no need to discourage the exports of this product because they have no impact on the final consumer. Actually, being an important source for the treasury, the only policy applied on soybeans is the ad valorem taxation (there are no quotas) so the price spread is big but relatively constant.
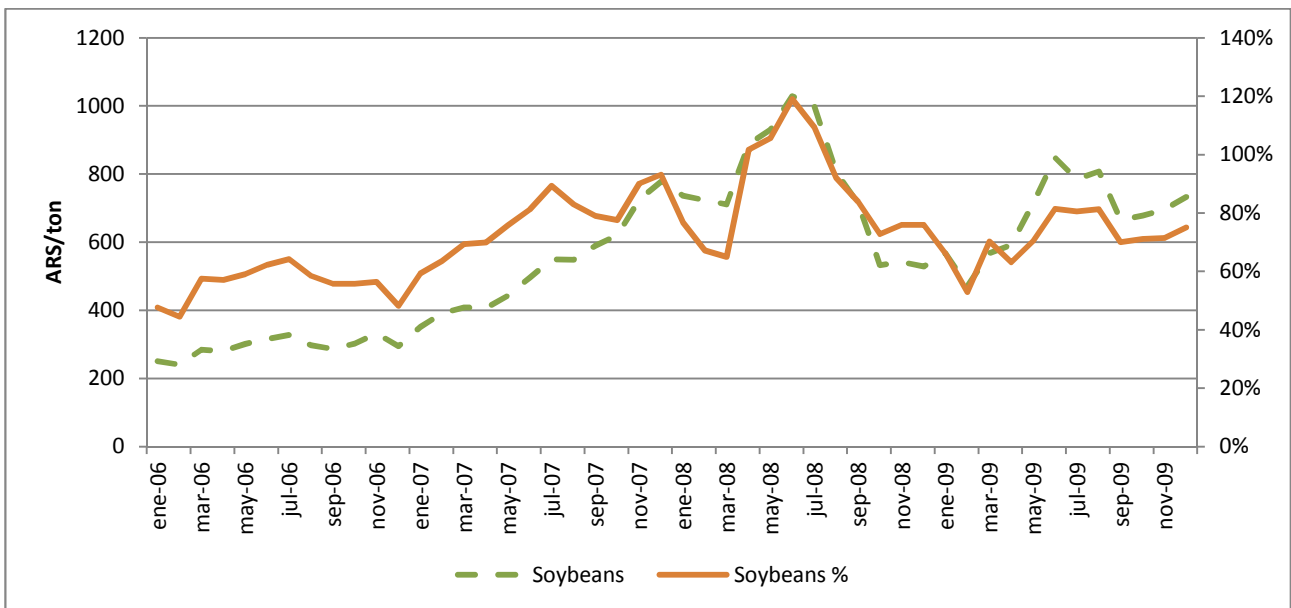
Figure 79 – Producers' opportunity cost
Source: Own elaboration with data from LaNacion.com, Bolsa de Cereales and UNCTAD.

4.4.4.- Meat

Comparing meat prices is a bit more difficult than in the cases of cereals.

First of all, there is not an unique world price for meat because there are several cuts of different qualities that can be obtained from a single cow[8]. Actually, not all the cuts are exported. Lower quality cuts might be preserved for the local market because they have a more affordable price while higher quality cuts will be normally exported. Trade policies will be focused mostly (but not exclusively) on the first type as a result of the Government desire of increasing their availability in groceries.

Second, the unit of measurement is not the same for world prices and producer prices. In the first case a price per kilo or ton is preferred. This price will of course be significantly different according to the cut of meat exported. It will also vary if it is frozen or fresh. In the second case, the producer will receive a price per live animal[9]. And this price also varies depending on the type of cow. Younger animals will be more expensive as their meat should be more tender.

So, in order to make a comparison we need to make a few decisions regarding which prices to take in each case if we want to have a more robust analysis:

World price: in order to cope with the difficulties of having multiple reference prices we will use the FAO Bovine Meat Price Index. This index is composed by 3 different products of meat and is weighted by the average world trade of them.

Producer price: we will use the prices of the category "novillo", which represents approximately 25% of the total cattle destined to meat production. The "novillo" is a young male that has been castrated in order to achieve a more peaceful animal that would make feeding more efficient and the meat more tender. We will refer to the prices published by "Liniers Market" which is the most important cattle market in the country.

Consumer Price: once again we face the problem of having several cuts to chose from but in this case we will not use an index. Due to some problems with the availability of the information, we will select a representative cut called "Nalga". This cut is largely consumed in Argentina in different types of preparations so it has been subject of the trade policies implemented by the Government. But, being a middle range cut, it is also exported regularly. We performed also the same analysis with other cuts and the results were similar.

In the following graphic we present the results. All the values are expressed in a 100 base (price in January 2005 = 100) in order to cope with the different units of measurement. The period of analysis has been increased for reasons that we will explain in the following paragraphs.

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[8] When we talk about meat in this section we refer only to cow meat that is the most consumed in Argentina.
[9] In Argentina this is called "standing price", making reference to the animal which is on his feet while the sale takes place.
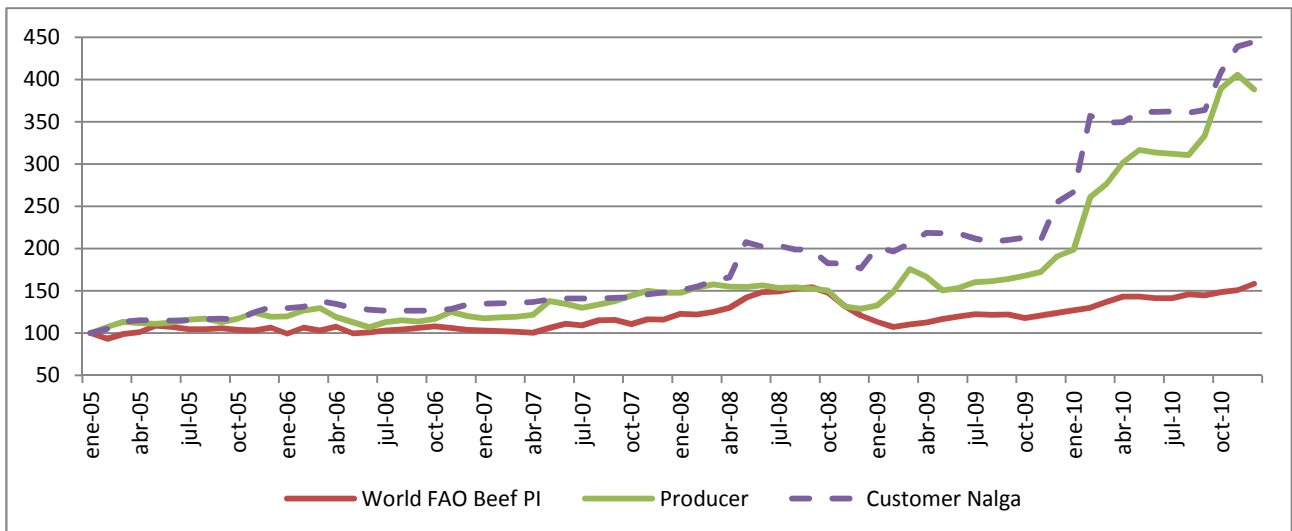
Figure 80 – Prices comparison (meat)
Source: Own elaboration with data from IPCVA, Mercado de Liniers and FAO.

The results might not be as clear as in the previous cases but this is the result of the complexities previously described. We can still draw some very interesting conclusions.

Consumer and producer prices are more synchronized than in the case of cereals. This might be the result of the higher weight of cattle price in the final cost of meat (this is not the case for wheat and bread as was shown before).

Trade policies seem to have fail in this case as well. In 2008, when world prices started to rise, so did consumer prices even if producers did not benefit as much from this price increase. However, the most interesting thing is the sudden price increase for producers and consumers at the end of 2009 in a context of world prices increasing at a much lower rate. The reason for this is the biological lag in the production of meat that is longer than in the case of cereals. A rough calculation indicates that 3 years are needed since the birth of the calves before they are ready to be sold to slaughter houses. So even when the implementation of trade policies started at the beginning of 2007, the meat supply for the following 3 years was more or less assured due to the mentioned lag. It's no wonder that meat producers would not continue to invest for coming years in a context of export restrictions and uncertainty. So, finally, by the end of 2009 meat was much less available and producer price had to go up regardless of the restrictions.

Regarding opportunity cost, we cannot perform the same analysis as before due to the mentioned differences in world and producer prices measurement. But we can safely presume that with such big quantitative restrictions, producers did not obtained the full benefit that they might have in another context.

4.5.- Conclusions to this chapter

The trade policies implemented by the Argentinean Government during the years 2006-2008 proved to be ineffective in preventing domestic customer prices from increasing. The cases of wheat and meat (the 2 most important categories in the local basic food basket) show that customer prices continued to increase even when world prices were returning to pre-spike levels. This suggests that the high level of domestic inflation has very little to do with the increase in international prices and that there are other intrinsic factors triggering it.

Producers also suffered from these policies; they had to bare a high opportunity cost when they could not benefit from the increasing international prices.

5.- Final Conclusions

For almost 100 years, the terms of trade of commodities followed a decreasing trend that culminated a few years ago with a sudden price spike that took international prices to new record levels. Not only the prices reached that threshold but also the volatility associated with them. We thoroughly commented the main reason for this phenomenon in chapter 2 and one thing is clear: most of those factors are not likely to disappear in the coming years.

On chapter 1, we mentioned that one of the most important features of commodities is their very small demand elasticity to any price changes. This means that customers will continue to buy more or less the same amount they need regardless of a price increase or decrease. There are of course some exceptions: some developing countries consumed more meat as a result of better economical conditions or purchased more metals to support their industrialization. But we can assume without great risk that in a certain period of time the demand for commodities will be stable, especially for food commodities. This is the reason why the production and trade of commodities grow steadily but slowly. It was not a surprise to find on chapter 2 that volatility is a phenomenon mostly related to commodities while industrial goods showed a more stable behavior.

If prices suddenly increase, net-importing countries will be forced to bare a much higher cost for their supplies, as they cannot reduce their purchases. This effect prevents the market from correcting itself in the short term because there is no impulse that pushes the prices down.

Exporting countries are also exposed to these price shocks. On one hand they could benefit from the higher export prices but on the other they could have an inflationary effect on the domestic market. This is the reason why Argentina, among many other countries, decided to implement a series of trade policies destined to reduce the price transmission to the local economy and to protect it from the sudden changes in prices.

We analyzed these policies and their effectiveness on chapter 4 and we showed how, by intervening the market, the Argentinean Government increased significantly the level of uncertainty among producers, originating some negative consequences that out weighted the benefits of the policies.

It is hard to estimate which would have been the customer price level without trade policies in place. On one hand, trade policies normally have a discouraging effect on prices so we can assume that the price increase would have been bigger without them; but if we refer to what was commented on section 4.4 about the cost structure of bread, we can argue about the extent of that increase. On the other hand, export restrictions have a negative effect on producer prices that will most likely reduce their level of investment and, thus, reducing future crops output. The lower amount of product available on the market would create an upward pressure on the prices that would compensate to some extent the original benefit of restriction.

The way in which the trade policies were implemented might have caused greater uncertainty. Export taxes were adjusted periodically (the case of resolution 125 is the most paradigmatic case), the mechanism of quotas assignation was not clear and, what is worse, it was subjected to the Executive's particular choice instead of, for example, a meritocratic system or some other type of clear criteria. And subsidies (whose assignation was also destined to bureaucratic controls and political willing) were directed to the middle links of the different supply chains instead of the much larger base of producers; producers that were indirectly financing those subsidies with the ad valorem taxes on their crops.

Maybe the most important effects of the uncertainty that the strong and cloudy participation of Government fostered are the changes in the allocation of land on the different crops and activities. Since the early 1990, cattle activities started to migrate to more marginal areas thanks to the implementation of

feed lots that released the more productive lands for harvesting. So, during the recent decade, the share of lands allocated to cereals grew steadily until the campaign 2007/2008 when there was a dramatic shift in the allocation of land for wheat and soybeans. We show the numbers in the following chart.
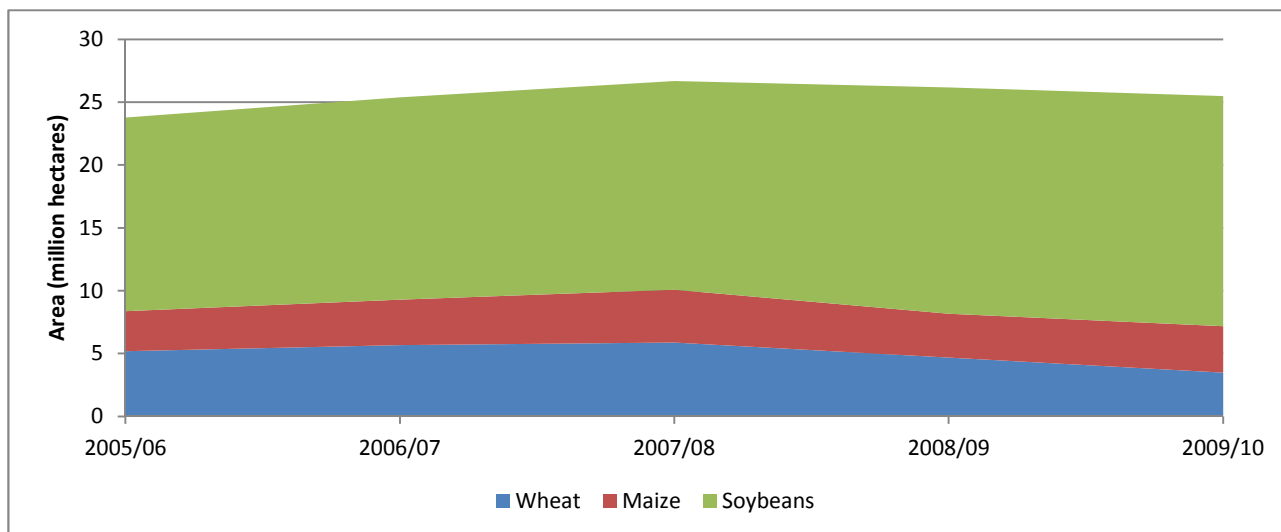

Figure 81 – Allocation of land (hectares)
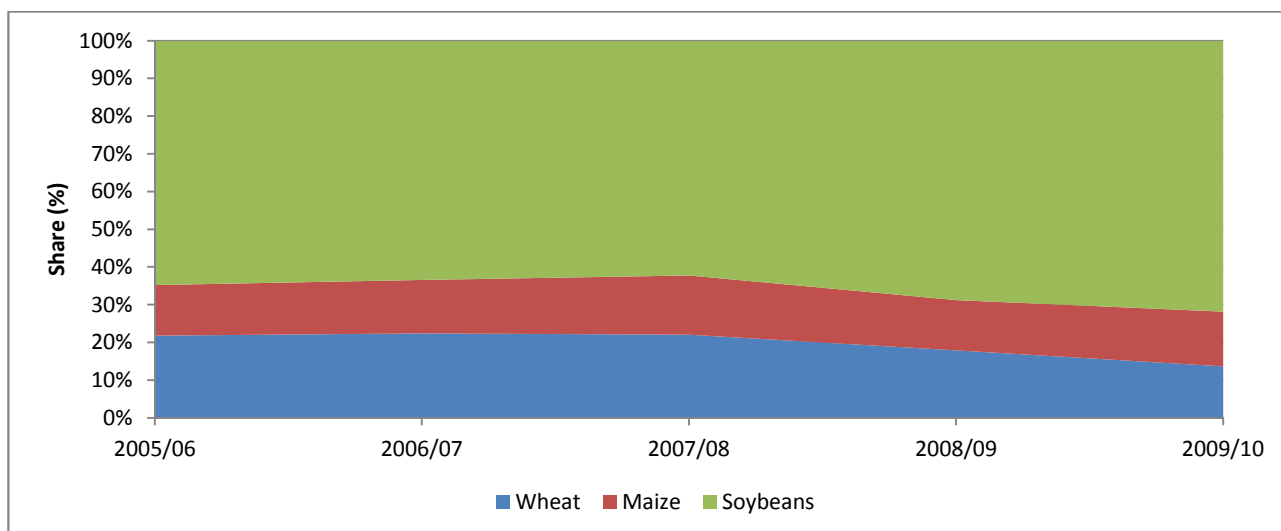*Source: Own elaboration with data from Nogués.*

Figure 82 – Allocation of lands (%)
Source: Own elaboration with data from Nogués.

The total harvested area decreases in 2 consecutive years after the campaign 07/08, indicating a slowdown in the whole agricultural sector even when commodity prices were climbing back up during the second half of 2009.

The share of maize lands decreased slightly and then stabilized. This happens because even when facing export restrictions, maize will be demanded by meat producers to use as feedstuff. Instead, lots of wheat producers were discouraged by the high taxes and restrictions and decided to switch to soybeans. Because soybeans have almost no participation on the domestic food basket, they had been free of bureaucratic controls and even with record high taxes they were a more profitable activity than wheat.

The meat industry is also going through a similar situation. The Government succeeded in reducing the export volumes using the same bureaucratic controls and political pressure. Facing an increasing uncertainty, producers reduced their level of investment (in some cases switching to soybeans as well)

leading to a reduction in the number of animals during the last couple of years and a slowdown in the activity. A clear example of this is the fact that Argentina did not satisfy 100% of the Hilton Quota[10] assigned to it in any of the last 5 years. This same intervention that punished producers was not successful in maintaining consumer prices down forcing them to reduce the consumption of bovine meat.
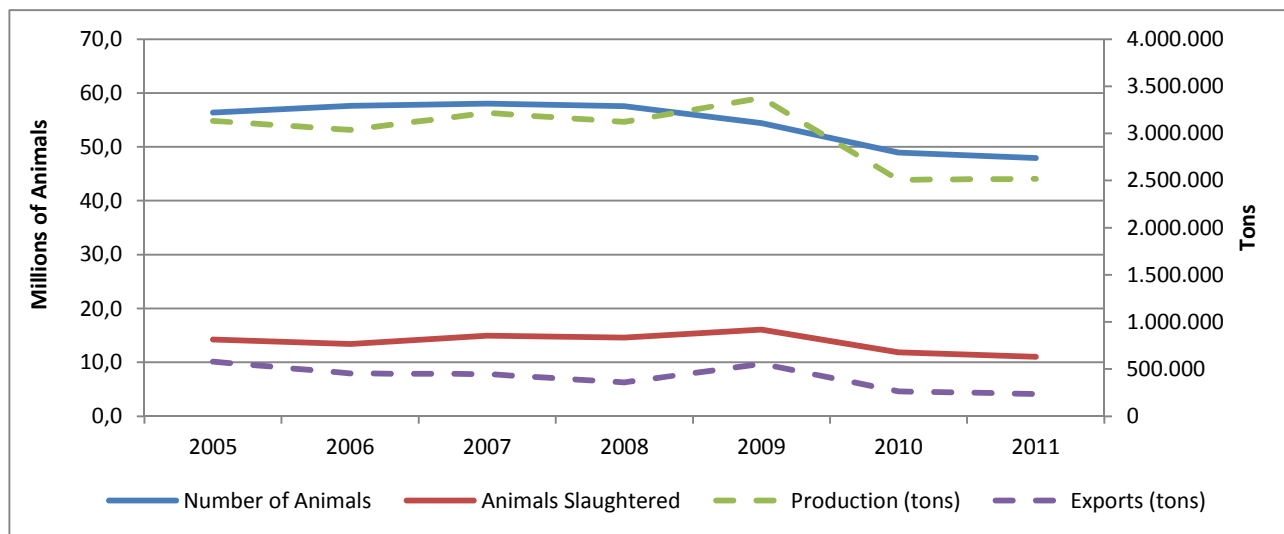

Figure 83 – Number of animals & activity level
Source: Own elaboration with data from IPCVA.
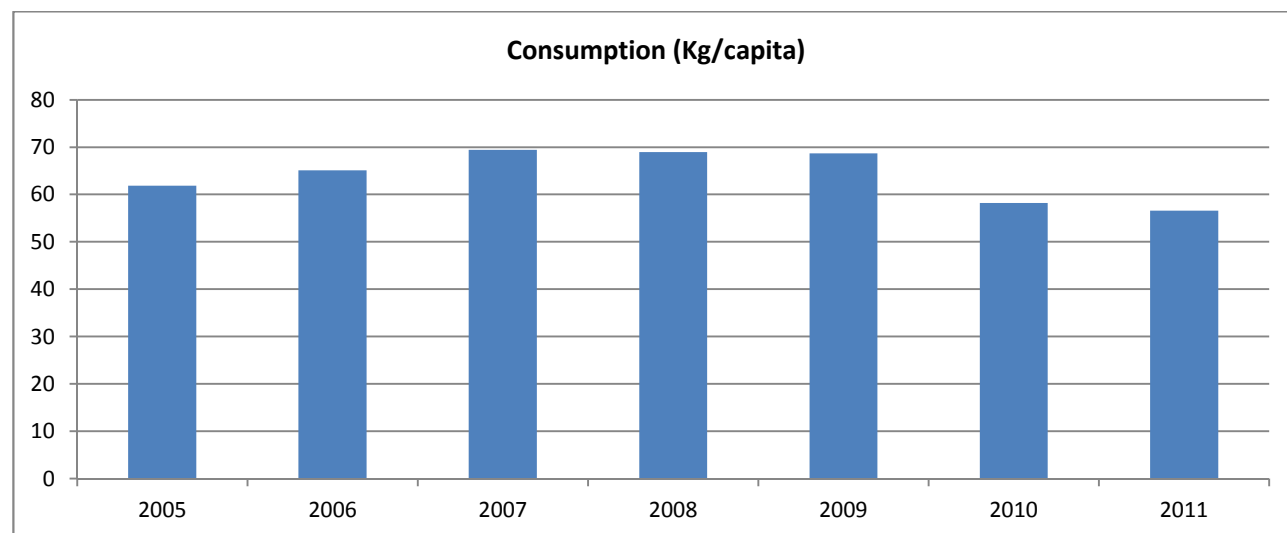
Figure 84 – Meat consumption
Source: Own elaboration with data from IPCVA.

The tendencies explained above, presents some negative aspects:

From an economical point of view, concentrating on a single item will increase the risk exposure of the country. Food exports represent around 45% of the total exports so a sharp decrease of commodities prices would damage significantly the trade balance. In fact, the developing countries that presented the highest growth during the last years (Brazil, China and India) were able to diversify their economies from commodities, promoting more industrial goods.

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[10] In 1979, as a result of the GATT negotiations, the EU agreed to compensate the countries harmed by the commercial restrictions applied to some products with a duty free quota of bovine meat. Argentina was most favored country with a share of 28.000 tons that later became 29.350. A rough calculation indicates that Argentina lost an approximate amount of USD 435 millions.

If the tendency continues and more and more land goes to soybeans, the output of the rest of the crops will continue to diminish, creating additional upward pressure on the domestic price. Also, the harvest of soybeans requires very little labor so an increase in soybeans production may lead to an increase of the unemployment in rural areas.

From a technical point of view, an excessive soybeans activity can have some long-lasting negative effects on the soil. Soybeans leave no crops residue on the soil when harvested exhausting the natural nutrients of the terrain. In order to avoid degradation, the land needs to rest between campaigns. This is achieved by rotating regularly the type of crops or utilizing the prairies for cattle feeding. So, if these other activities have lower returns, producers might be tempted to continue to grow soybeans in the same area, removing a larger amount of nutrients from the soil than normal and reducing the output rate (tons/hectare) on the following campaigns.

Finally, an important number of producers are using trans-genetic seeds that provide a higher output with lower costs. To achieve the cost efficiency promised by the manufacturer, a special type of herbicide (called glyphosate) is needed. This is a total herbicide, so it eliminates all vegetation except the genetically modified seed. There is no consensus among the scientific community about the possible effects of trans-genetic seeds and glyphosate. Some authors claim that there might be some health hazards related with this type of seeds and excessive soil degradation due to the glyphosate.

Final considerations

As we said before, most of the possible causes for volatility are likely to continue in the next few years. Therefore, the Government needs to continue working on this matter. The following are some humble suggestions from the authors:

The first thing would be to reduce the current level of uncertainty among producers of different areas. Therefore, some of the trade policies implemented might need to be revised on that matter. Even when the trade policies were not very effective in keeping domestic prices from increasing, a sudden removal of them could cause even greater price inflation. Any new change would have to happen in a gentle way.

For example, the current subsidies program should be slowly removed because it only favors wealthier customers with the means to take advantage of the reduced-price products (having a car in order to travel to the few places where this products are available and enough money to buy several weeks of supplies when the products are actually available). Also, the subsidies are directed to the middle links of the productive chain where the cost of raw materials has little weight. Instead, the subsidies should be slowly transferred to producers in order to encourage investment and to social assistance to the most needed.

Perhaps the most damaging policy is the quota mechanism and, above all, the unclear way in which they are approved. Carefully removing them (or at least reducing them and making the process more dynamic and transparent) would give some extra thrust to the level of investment in the production of crops other than soybeans.

Reducing export taxes is maybe a more delicate matter considering that they account for a big source of revenues for the treasury. The tax level on soybeans could continue to be high and some minor reductions on wheat and maize could take place. But we believe that clarifying the current situation of subsidies and quotas are a more important factor in creating the proper conditions for investment and crops diversification.

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