

# BSc-thesis

“A comparison of policy reactions by governments on short term wheat supply shocks during 2005-2010 and their consequences .”



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## **Preface**

This thesis is written as part of the study program Economics and Governance which is educated at Wageningen University and Research Centre (WUR). The study program Economics and Governance is a three year Bachelor of Science program in the field of applied economics. Dr. ir. C. Gardebroek of the chair group Agricultural Economics and Rural Policy (AEP) supervised this project from May until September 2011. During this period I investigated policy reactions by governments when global wheat markets are faced with exogenous supply shocks (e.g. drought, flooding) and the effect these shocks have on global wheat markets. With this thesis I wanted to improve my English writing skills and to do scientific research in the field of social sciences. I gained a better insight in the way these policy reactions have an effect on global wheat markets and what their consequences are.

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# 1. Introduction

## 1.1 Background

In recent years prices in global agricultural commodity markets have been very volatile. In the period 2005-2010 international food prices increased rapidly and peaked around mid-2008. These high prices caused food riots in Mexico, Pakistan, India and several West African countries (Walt, 2008). This illustrates the impact of high food prices in certain parts of the world and shows the importance of food on global security. After 2008 global food prices decreased during the financial crisis. This price decline may also partly be explained by increased agricultural production due to earlier high agricultural commodity prices. This price decrease alleviated pressure on governments, all around the world to respond on high food prices. However, in 2010 prices started to rise again, leading to new peak prices in 2011.

According to a review of 25 recent studies on the food crises three major drivers can be identified: world agricultural commodity consumption growth exceeding production growth leading to very low commodity inventories, the low value of the U.S. dollar and the new linkage between energy and agricultural markets (Abbott et al., 2009). The before mentioned drivers give an explanation for the recent rise and volatility in global food prices. However, in the media and by several authors in the field of agricultural economics, speculation in agricultural commodity markets is often seen as driving force behind high food prices and price volatility. Price formation is a complex system, with many forces that influence this process. This makes it very hard to clearly determine, which problems lay at the root of high food prices and price volatility in recent years. Besides claims that speculation, the low value of the dollar and the new linkage between energy and agricultural markets may give an explanation for the recent increase and volatility in commodity prices, government policy interventions in agricultural commodity markets may also play an important role.

Governments use trade policies (e.g. export quotas, export taxes) to insulate their domestic food market from the world market. An example of the use of trade policies by governments is rice, the dominant staple food in Asia that accounts for more than 40% of the calorie consumption of most Asians. Poor people spend as much as 30–40% of their income on rice alone. Ensuring sufficient supplies of rice that is affordable for the poor is crucial to poverty reduction (IRRI, 2008) and thus the social stability in Asia. Hence, for political reasons, very few Asian governments are willing to tolerate significant increases in rice prices and many countries have permanent trade distortions applying to rice markets (Headey et al., 2010). According to Martin et al. (2011) during the 2006-2008 price surge, market insulating policies involving rice markets explain 45 per cent of the increase in the international rice price, illustrating the important role government policy could have played during the recent price spike in global food markets.

Besides that political, economic and trade factors play an important role in explaining the recent food crisis, a very basic factor in the supply of agricultural commodities is often overlooked, which is the weather. A drought or flooding can devastate a year's work by any farmer.

For example in 2010 Russia one of the world's largest wheat producing countries was struck by a severe drought during the summer, which caused concerns about the supply of Russian wheat. This concern alone caused agricultural commodity markets to react with an increase in wheat prices of 25% during one week, which is the largest price increase experienced since 1959 (Bloomberg, 2010). This indicates the importance of weather shocks in the formation of wheat food prices.

## **1.2 Problem statement**

Although policy intervention in agricultural markets has been done for centuries, still much is not clear about the direct effect of these interventions on the price formation in global agricultural commodity markets.

Above mentioned reasons show how complicated it is to determine the causes that lay at the root of rising food prices. One thing is clear and that is, that governments all over the world play an important role in the price formation on global commodity markets. Governments tend to protect their own domestic markets in order to stabilize these markets and supply them with stable prices for agricultural commodities. Protection of domestic agricultural markets by governments is mostly done by creating price barriers around these markets.

To create this price barrier governments have a wide array of policies at their disposal. In case of a negative exogenous supply shock in domestic food markets the aim of food exporting countries is to decrease their exports in order to protect their consumers. This can be done by imposing export taxes, export quotas or export bans. All these policy interventions are aimed at decreasing export volumes and diverting these exports to domestic markets (Trostle, 2008).

The goal for food importing countries is to keep importing enough food from the world market, which can be bought at reasonable prices by domestic consumers. To reach this goal, countries can abolish import tariffs, subsidize imports or directly subsidize consumers. All these policy interventions are aimed at creating stable prices for consumers and sufficient supply of food in domestic markets. The effect of the reduction of import restricting policies is that they increase demand for food on the world market. When an increase in demand cannot be satisfied by an increase in supply by exporting countries, this will cause world market prices to rise (Trostle, 2008).

Trade policy interventions by governments have direct impact on prices and quantities traded in case of an exogenous supply shock. Which makes it very interesting to have a closer look at how these policies work and what effect they had during the period 2005-2010 on global food prices. Especially because governments often point to other factors in explaining recent developments in food markets.

### **1.3 Objective and research questions**

The objective of this thesis is to inquire and compare policy reactions by governments in case of short term supply shocks in global wheat markets caused by severe weather conditions, during the period 2005/2010 and what effect these reactions have on global wheat markets.

The period 2005/2010 is chosen, because in this period strong price increases were observed in 2007/2008 and starting from 2005 there may have been certain government policies or supply shocks caused by extreme weather conditions that contributed to these high prices.

Wheat markets are chosen to study, because wheat is the primary grain consumed by humans around the globe. About 75% of the world's wheat production is consumed directly, 15% is consumed indirectly in the form of animal products, and another 10% is used for seed and industrial use (Carter, 2001). Current (2010/2011) global wheat production is estimated to be around 649 million metric ton. Trade volume in global wheat markets is around 18% to 20% of total production. With the information of the previous paragraph and the thesis objective the following research questions can be asked:

- Which major wheat exporting and importing countries were affected by adverse weather shocks?
- What kind of policy instruments do governments have at their disposal, to act in case of an exogenous supply shock?
- Are there different policy reactions between importing and exporting countries?
- Are the effects of policy interventions on global wheat markets, positive or negative?

### **1.4 Methodology**

Literature study is the main method of information gathering for this thesis. Literature study is mainly conducted with the use of the scientific literature and internet. Besides literature study some basic quantitative analysis is conducted, mainly in the form of tables. In chapter four, three cases are discussed of countries that intervened in their domestic markets.

### **1.5 Overview of content**

Chapter two gives a global overview of the world wheat market. Some important wheat exporting countries and importing countries are identified and their annual global trade volumes are given. In chapter three an analytical framework to analyse government policy interventions is comprised, giving an overview of the main policy instruments used by exporting and importing countries when faced with an exogenous supply shock. Chapter four reviews government policy interventions of three countries and its consequences during the period 2005/2010 and investigates what the effects of these policy interventions were. The final chapter, provides conclusions.

## **2. Global wheat market**

### **2.1 Global production, consumption and trade**

Wheat is a staple food consumed and produced by virtually every country in the world. It is consumed by humans in many forms like bread, biscuits, pasta and other types of wheat based products. Besides human consumption, wheat is also used as feed for livestock in many parts of the world. The fact that it is used in so many different ways indicates that there are many different varieties of wheat. For example the USDA makes a distinction between five different wheat classes being produced in the USA, each of these classes having a different production region and nutritional values. Due to this wide variety of wheat classes, wheat is produced all over the globe in both the southern and northern hemisphere (Antle et al., 1999).

The global wheat market can be illustrated by an oligopoly in which a homogenous product (wheat) is produced and consumed. There are four major exporting countries (USA, Canada, Australia and Argentina) and two exporting regions (EU-27 and former Soviet Union countries Kazakhstan, Ukraine and Russia) which provide ninety per cent of the annual world market trade volumes. On the demand side of the market there are many different countries that import wheat. A large share of these wheat imports is taken by low income countries that are not self-sufficient in the domestic production of wheat (USDA, 2011).

Figure 1 gives an overview of global production, consumption, exports and trade during the period 1989 and 2011. Global production in trade year 1989/90 was circa 533 million metric tonnes (MMT) and consumption 531 MMT. In trade year (TY) 2010/2011 (the international trade year for wheat is July-June) production was circa 648 MMT and global consumption 659 MMT. During the period from 1989/90 until 2010/2011 total production increased 21,6 per cent with an annual production growth rate averaged around 1 per cent per year. Global consumption increased in this period with 24,1 per cent with an annual consumption growth rate around 1,02 per cent per year. Total world exports are stable, approximately 19 per cent of global production being traded each year. In this period global stocks are fairly stable with a stocks-to-use ratio of 25 per cent of total production, only during the period 1997/98 until 2001/2002 total stocks-to-use ratio was around 30-35 per cent of total production (USDA, 2011). During the period 2005/2010 global wheat trade averaged around 125 MMT per annum with a peak in trade year 2008/2009 of 143 MMT due to a higher production of wheat versus consumption of wheat

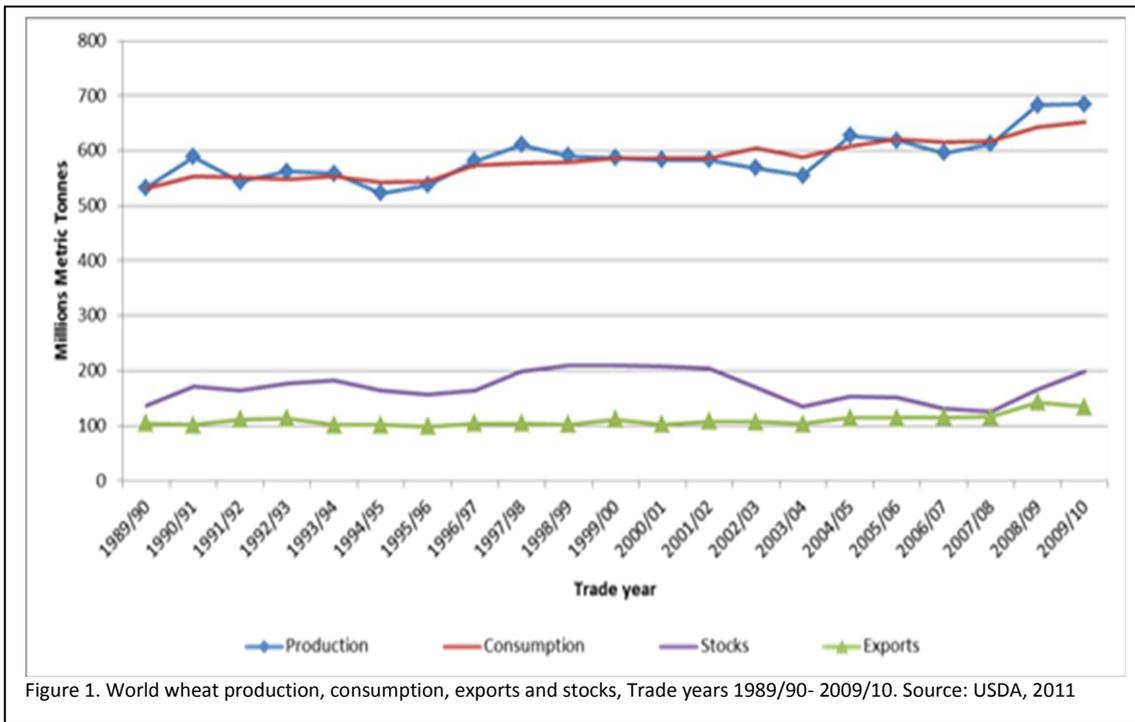


Figure 1. World wheat production, consumption, exports and stocks, Trade years 1989/90- 2009/10. Source: USDA, 2011

## 2.2 Exporting countries of wheat

Most of the wheat grown for export purposes is grown in regions with semiarid or temperate climates. USA, EU-27 and Russia are large exporters of wheat but also consume a large part of their domestic production. Canada, Australia, Argentina, Ukraine and Kazakhstan have a relative small population in relation to their wheat production. These countries have mostly export driven wheat production.

The market share a country contributes in global trading volumes may vary over time. There are several reasons why export volumes change over time. For example Australian wheat exports dropped significantly in 2007/08 due to a severe drought in the region. Figure 2 shows global wheat exports and the market share each of the exporting country or regions has.

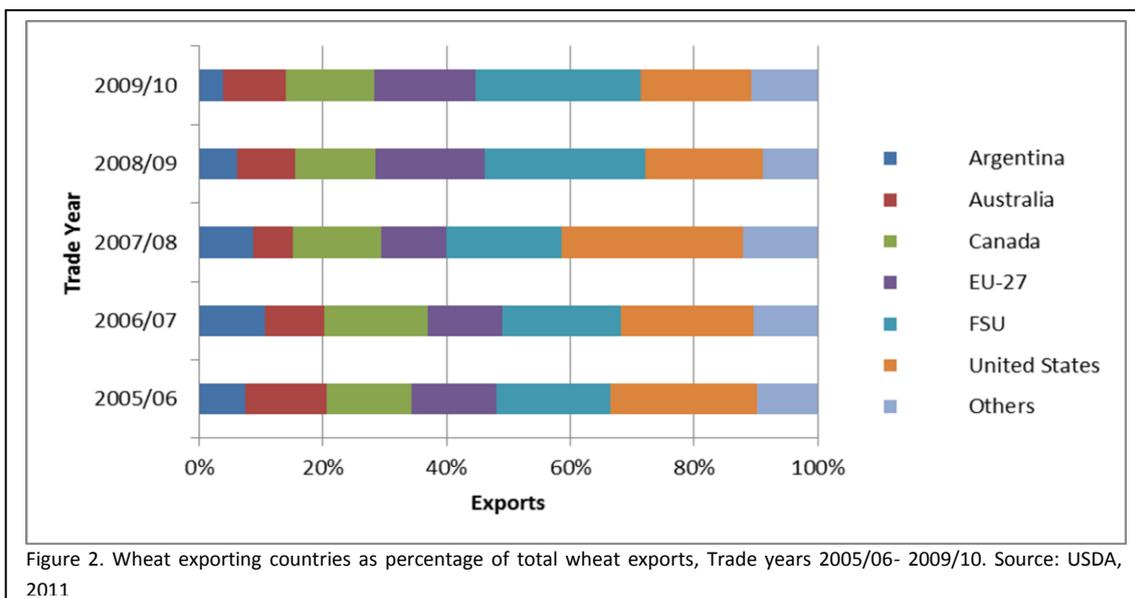


Figure 2. Wheat exporting countries as percentage of total wheat exports, Trade years 2005/06- 2009/10. Source: USDA, 2011

### 2.3 Importing countries of wheat

The importing side of the global wheat market looks rather different compared to the exporting side of the market see figure 3. There are many relatively small importing countries compared to the export market. Only a few countries have a relative large market share (> 4 MMT per trade year) in global wheat imports these countries are: Algeria, Brazil, Egypt, EU-27, Indonesia, Japan, Nigeria and South Korea.

Although EU-27 is a large exporting region, it also imports wheat. These imports mostly consist of wheat classes (e.g. Hard Red winter wheat) that are not produced in the EU-27 itself (Helming et al., 2009). But most countries that import wheat are low income countries that have an expanding population and are not capable to supply sufficient domestic staple foods (USDA, 2011)

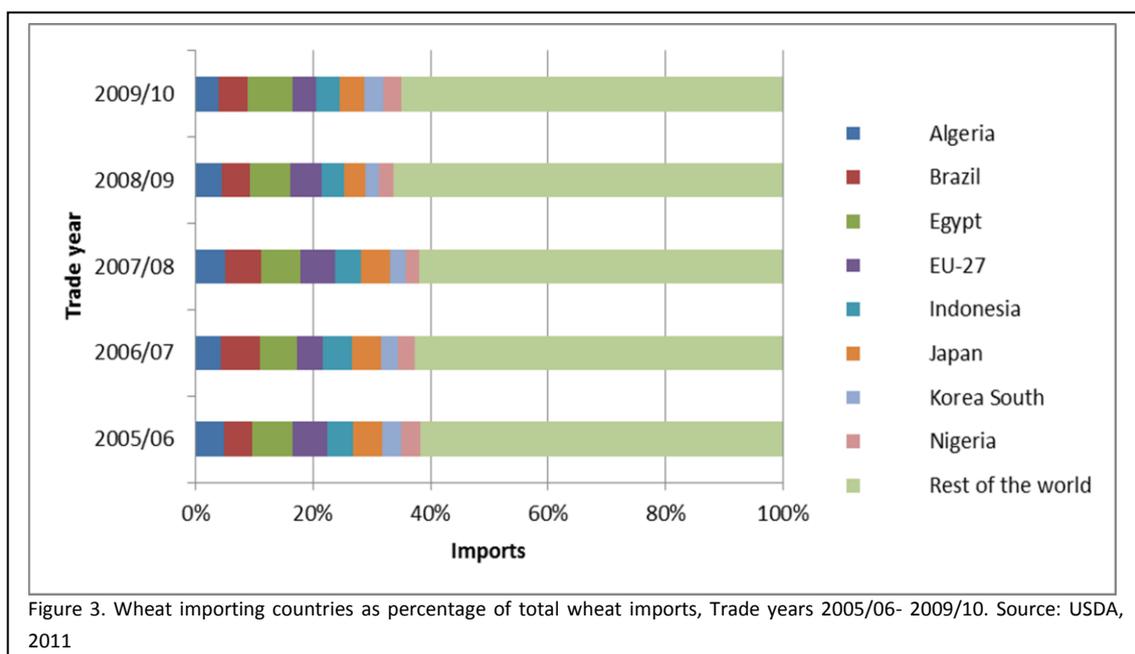


Figure 3. Wheat importing countries as percentage of total wheat imports, Trade years 2005/06- 2009/10. Source: USDA, 2011

### 2.4 Exogenous supply shocks period 2005/2010

#### 2.4.1. Wheat exporting countries

During the period 2005/10 four wheat exporting countries encountered severe weather conditions that influenced their exports to the world market. Argentina, Australia, Canada, and Russia all had to deal with severe weather during the period 2005/10 (USDA, various years).

Australia has suffered severe periods of drought during 2005/2010, which caused authorities to limit water use by consumers and producers. Especially farmers were affected by this limitation of their water use, because growing wheat requires a considerable amount of water. Figure 4 shows the decline of wheat production from the initial export level of 25173 Thousand Metric Tonnes (TMT) in TY 2005/06 to a level of 10822 TMT in TY 2006/07, a decrease of 57 per cent.

This decrease in production also had its effects on Australian wheat exports. Wheat exports decreased from 15211 TMT in TY 2005/06 to 11241 TMT in TY 2006/07, as part of the decrease in wheat production the release of wheat stocks was used to buffer the decline in wheat exports as figure 4 shows. Exports continued to decrease in TY 2007/08, with total wheat exports reaching a five year low of 7499 TMT.

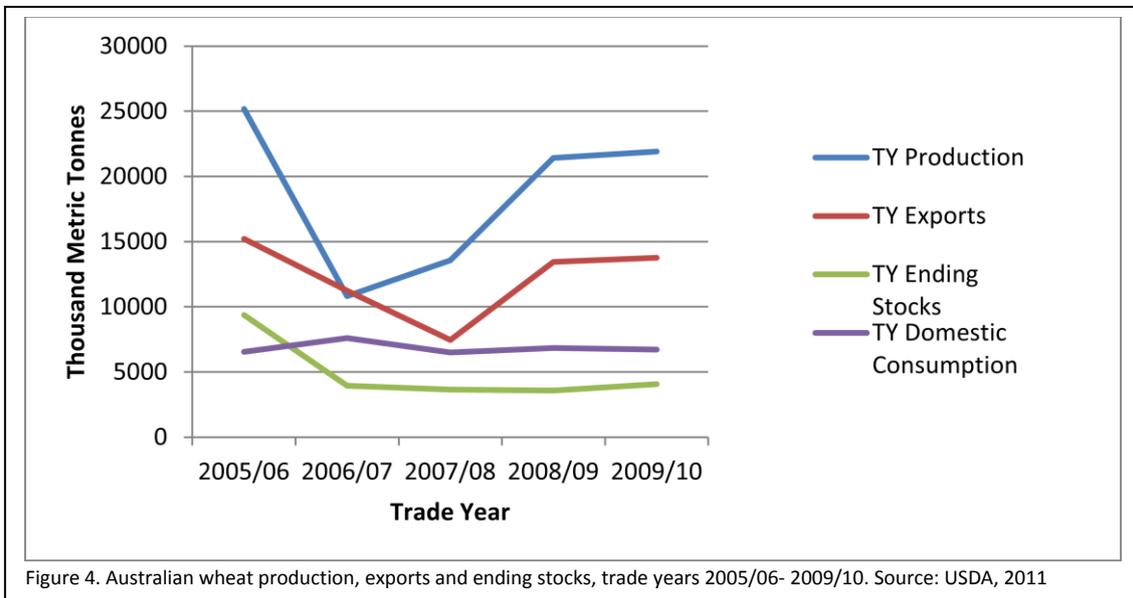


Figure 4. Australian wheat production, exports and ending stocks, trade years 2005/06- 2009/10. Source: USDA, 2011

Argentina had to deal with the same problems as Australia at end of TY 2007/08 and a large part of TY 2008/09. Argentina also encountered long periods of dryness, which affected their exports to the world market, but also domestic policy uncertainty regarding production subsidies and export policy caused a decline in domestic wheat production (USDA, 2008, 2007). Figure 5 shows the decline in exports during the period 2005/10. Trade year 2008/09 saw the largest decline in wheat production, with a total decrease of production of 7600 TMT. The already decreasing trend in exports continued further to a level of 5172 TMT in TY 2009/10.

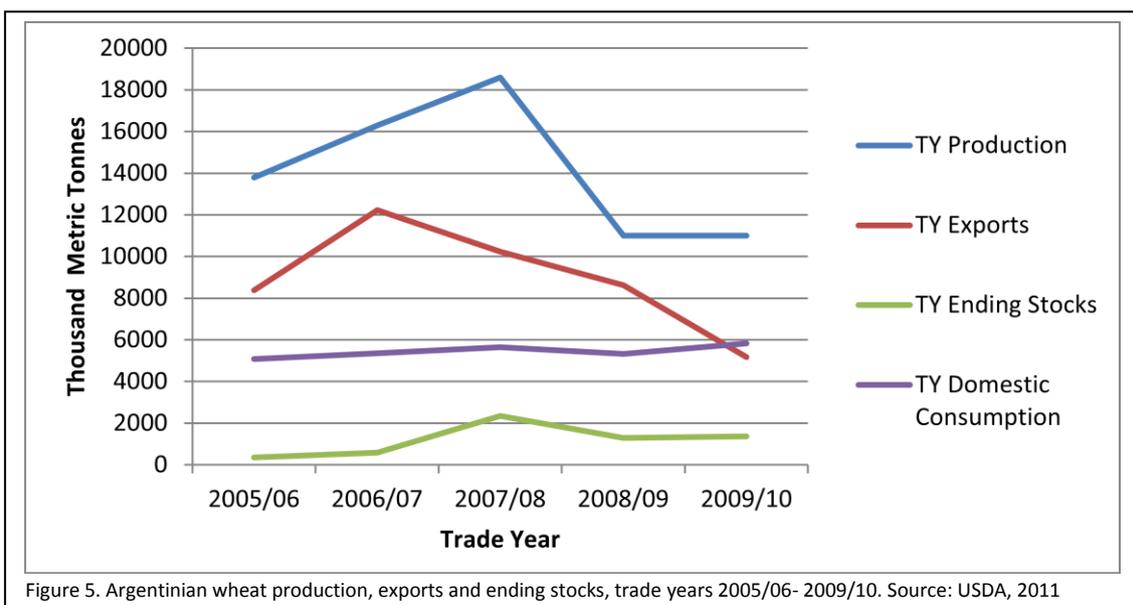


Figure 5. Argentinian wheat production, exports and ending stocks, trade years 2005/06- 2009/10. Source: USDA, 2011

The Canadian exogenous supply shock in wheat production and exports was caused by a wet spring and heat wave in the summer of 2007. This combination caused wheat production to decrease from a level of 25265 TMT in TY 2006/07 to a production of 20054 TMT in TY 2007/08 and a subsequent decrease in exports of wheat. Figure 6 shows a decrease in production due to the severe weather conditions, followed by a decrease in exports and a decrease in wheat stocks.

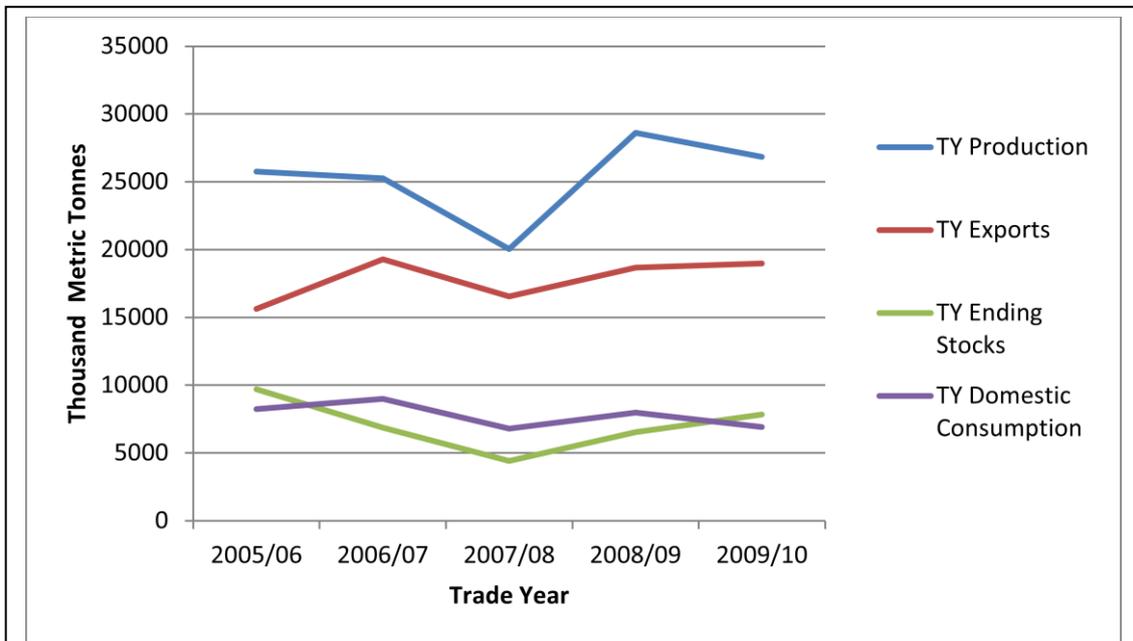
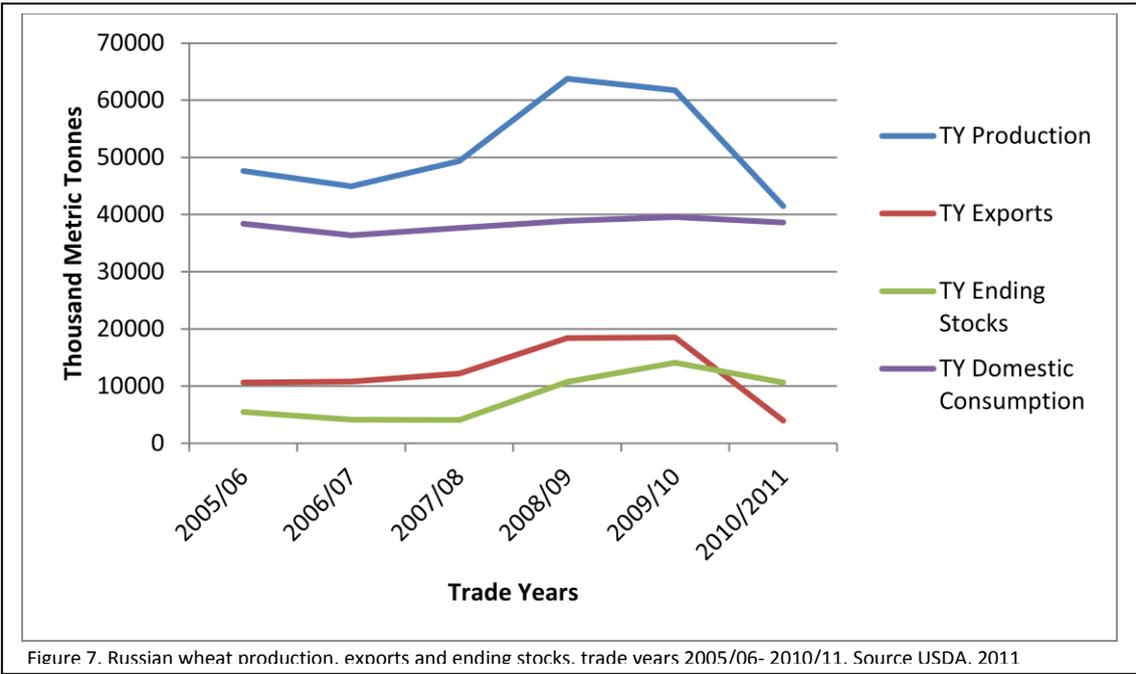


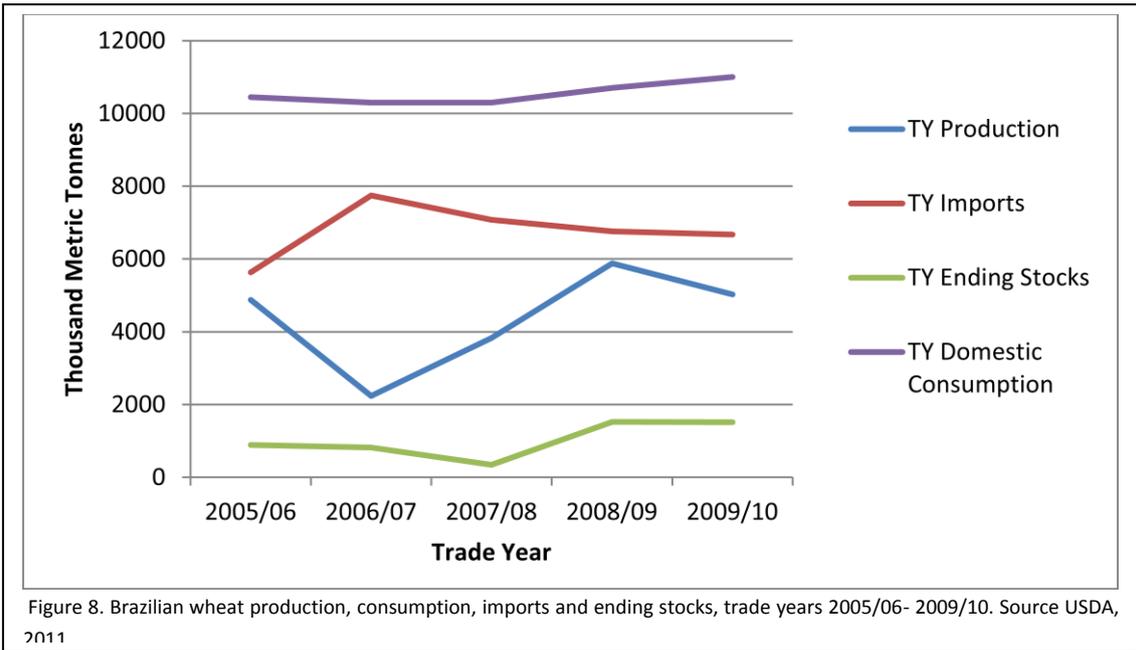
Figure 6. Canadian wheat production, exports and ending stocks, trade years 2005/06- 2009/10. Source: USDA, 2011

Russia is a special case within this thesis because the problems with Russian wheat exports to the world market started after TY 2009/2010. This specific case is added to the thesis, because it gives a nice example how governments can react in case of weather induced exogenous supply shock. TY 2010/11 was a disastrous year for Russian wheat production. Due to wildfires and a severe drought wheat production declined with 33 per cent from 61770 TMT in TY 2009/10 to a level of 41508 TMT in TY 2010/11. Figure seven shows a corresponding decrease of Russian wheat exports of 78 per cent, in TY 2009/10 a total of 18556 TMT was exported to the world market. Whilst in TY 2010/11 an estimated 4000 TMT found its way to the world market. The decline in stocks reached around 25 per cent, TY 2009/10 saw a level of 14121 TMT ending stocks and in TY 2010/11 total ending stocks where 10629 TMT.

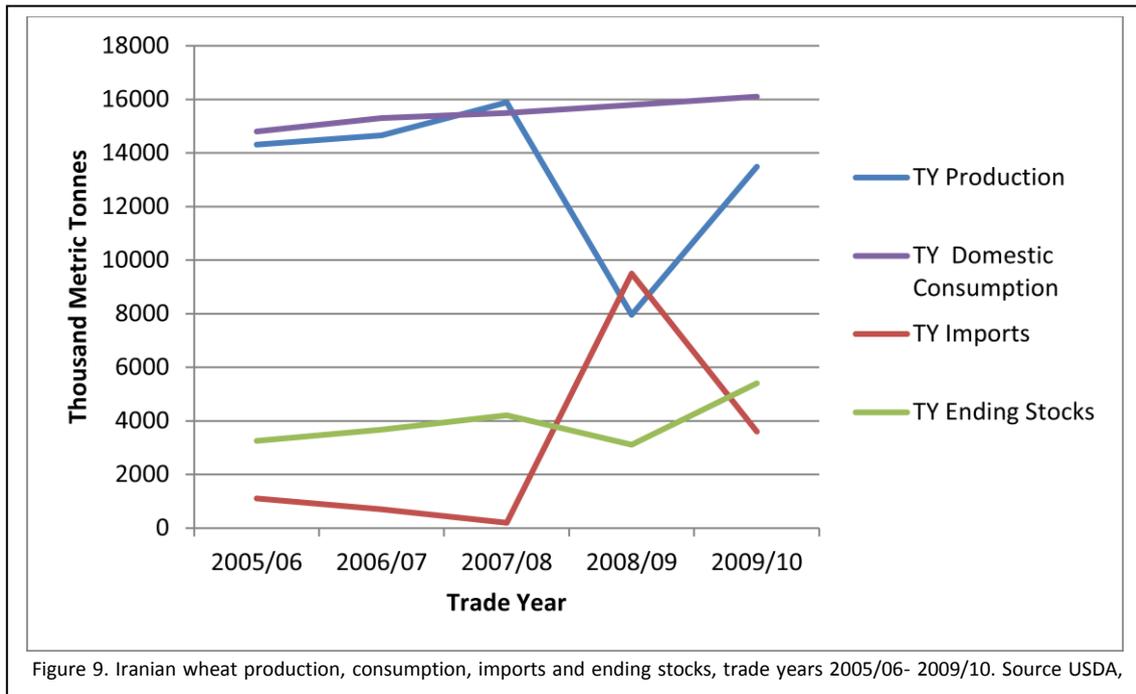


**2.4.2 Wheat importing countries**

On the importing side of the world wheat market an exogenous supply shock causes domestic production to decrease and wheat imports to increase. Therefore countries with a reasonable domestic production of wheat were studied. Because when production in these countries is below average, this causes an additional demand on the world market. During the period 2005/2010 two large importing countries namely Brazil and Iran encountered weather conditions severe enough to decrease domestic wheat production and increase their wheat imports (USDA, 2007, 2009). Brazil was hit by a drought in TY 2006/2007, which caused domestic production to decrease from 4873 TMT in TY 2005/06 to a level of 2234 TMT in 2006/07. Figure 8 shows a decrease of production by 54 per cent in one year, subsequently causing imports to increase from 5631 TMT in TY 2005/06 to 7743 TMT in TY 2007/08.



Another case where severe weather conditions caused domestic production to decrease and imports to increase is Iran. Since TY 2003/04 Iran didn't import more than 1200 TMT of wheat annually due to increased domestic production, Iran became almost self-sufficient and decreased its wheat imports. Until TY 2008/09 when Iran was struck by drought and wheat production decreased by 50 per cent from 15887 TMT in TY 2007/08 to 7957 TMT in TY 2008/09. Because of this decrease in domestic production due to drought, wheat imports increased by 4650 per cent from an import level of 200 TMT in TY 2007/08 to 9500 TMT in TY 2008/2009. In TY 2009/2010 domestic production recovered and imports fell to a level of 3600 TMT.



### **3. Policy instruments**

#### **3.1 Why do governments use policy instruments?**

Policy is used by governments in order to influence decisions made by consumers and producers. Policy changes the economic and social environment in which these decisions are made. Agricultural policy is also part of the toolbox used by governments in order to influence their domestic consumers and producers. Agricultural policy is used by virtually every government in the world, both from rich and poor countries. Agricultural commodities are primary commodities, which require specific policy treatment by governments due to their unique properties in production, retailing and processing. Many governments try to govern beneficial trade policies for producers and/or consumers, monitor food safety, animal welfare and formulate environmental policies.

That agricultural commodities play a very important role has been proven during the food crisis in 07/08 when there were severe food riots in various countries around the world. Because of this political sensitivity almost every government in the world intervenes in agricultural markets. According to Ritson et al. (1997: page 01-02) a few reasons are important for governments to intervene in agricultural markets:

- To protect producers and consumers from price volatility of basic agricultural commodities.
- To sell agricultural commodities at reasonable prices for consumers.
- Reduce income inequality between urban and rural populations.
- To provide sufficient supply of agricultural products.

In order to reach these goals governments use agricultural policies. Agricultural policy can be divided into two categories; market and price policy aimed at influencing the prices of agricultural commodities and structural policy. Structural policy is policy directed towards the increase of agricultural productivity. In this thesis the emphasis will be on market and price policy, because this kind of policy is most often used in the case of exogenous supply shocks.

#### **3.2 Overview of different types of policy instruments**

Market and price policy is the preferred agricultural policy when governments are faced with exogenous supply shocks in global wheat markets. Market and price interventions within wheat markets are aimed at influencing domestic demand and supply. The basic idea is that in case of a domestic supply shock that leads to a reduction in the domestic wheat supply importing countries try to increase their imports by reducing import tariffs and thus lowering domestic prices towards the world market price. Exporting countries try to decrease exports by restricting their exports. To achieve these goals governments can use the following policy instruments:

- Import and export tariffs
- Non-tariff trade barriers
  - \* Import and export quotas
  - \* Hoarding

### 3.3 Import and export tariffs

A tariff is the tax that a government charges on products or commodities when they cross the national border. The main goal of border tariffs is insulating the domestic market (Koo et al., 2005).

There are three ways by which the import tariff (also called import tax) of a wheat importing country can be determined: ad valorem tariff, fixed tariff and a variable tariff. With an ad valorem tariff the domestic wheat price equals the world market price plus a certain percentage of the world market price. In case of a fixed tariff the domestic wheat price is determined by the world market price increased with a fixed amount of money per unit of weight or volume. With a variable tariff the world market price is increased depending on the height of the world market price. Ad valorem tariffs are most often used by wheat importing countries. Figure 10 gives a basic graphical representation of an import tariff used by a wheat importing country.

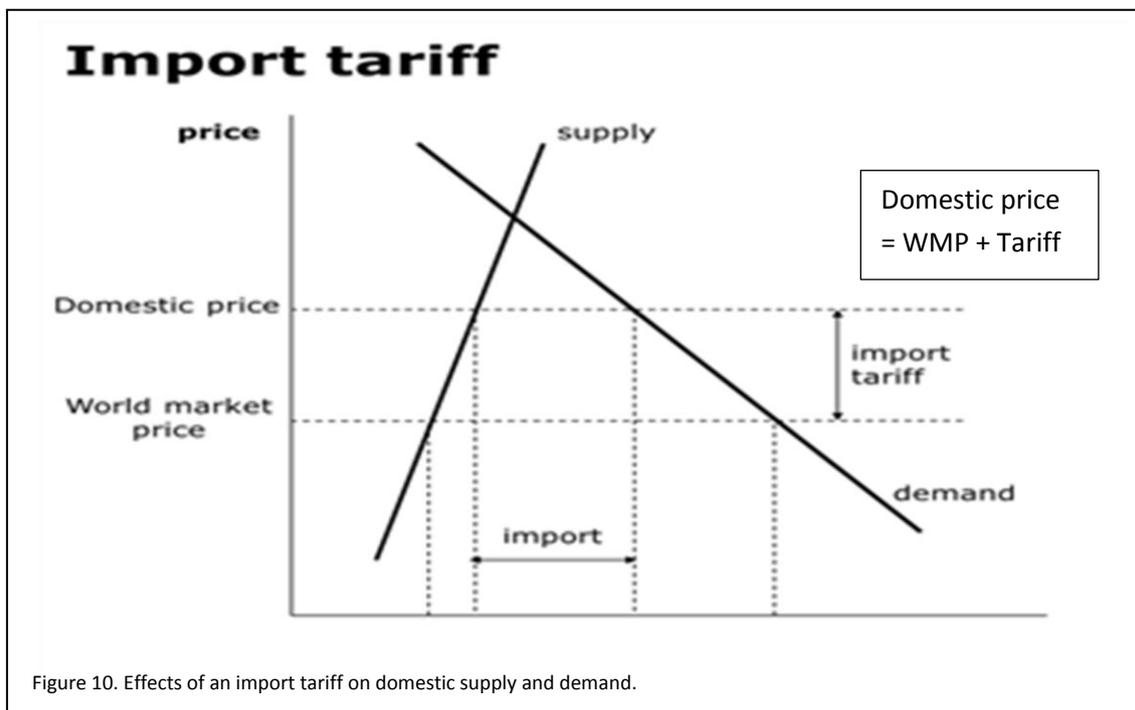
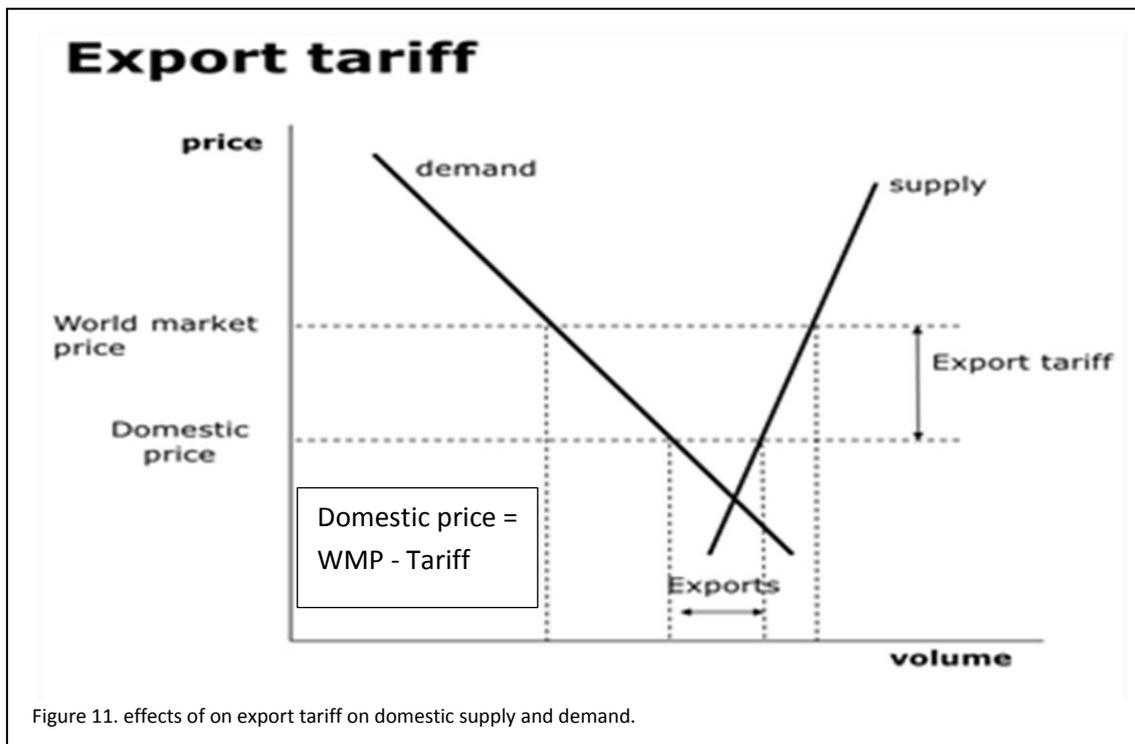


Figure 10. Effects of an import tariff on domestic supply and demand.

The use of an export tariff (also called export tax) can take the same form as import tariffs: ad valorem tariff, fixed tariff and a variable tariff. Export tariffs are used to limit wheat exports by domestic producers and increase supply of wheat for domestic consumers. This is done by decreasing the prices wheat producers receive, because they have to pay a tax on each volume of wheat that is exported. The decrease in price also triggers a decrease in supply, and an increase in domestic demand thus decreasing global wheat supply. Figure 11 shows graphically the reduction in exports an export tax may cause.



Although import and export tariffs cause global trade distortions in wheat markets it is commonly used by governments as instrument to protect domestic wheat markets. But under pressure of the World Trade Organisation (WTO) Agricultural Agreement steps are taken to reduce trade distorting tariffs.

### 3.4 Nontariff Trade Barriers

Nontariff trade barriers (NTBs) refer to policy instruments used by governments to influence trade via another way than border tariffs. The use of NTBs became increasingly popular after the General Agreement on Tariffs and Trade (GATT) and its successor the World Trade Organisation (WTO) issued the reduction of border tariffs during the last decade (Beghin, 2006). NTBs can be divided into many categories, but the most commonly used in agriculture are: physical restrictions on production (e.g. quotas), government policies that restrict trade (e.g. hoarding, set-aside policy), technical barriers (e.g. quality standards, safety regulations) (Koo et al., 2005). Although there are many different types of NTBs for wheat market the focus will be on quota and hoarding as used types of NTB.

### **3.4.1 Import and export quotas**

Import and export quotas are policy instruments aimed at reducing the quantity of wheat being imported or exported across a nation's border. Instead of influencing demand and supply by changing the prices of wheat, import and export quotas physically reduce the amount of wheat being traded. Quotas are very effective in isolating domestic wheat markets from the world wheat market. Due to large trade distortions that quotas create the use of import and export quotas have been banned by the GATT and WTO.

The use of import quotas as a policy instrument is primarily aimed at protecting domestic wheat producers. For an import quota to reach its goals, the import quota is set at a level below the normal import quantities that would be reached without quantitative trade restrictions in order to increase domestic production. Export quotas work the other way around, export quotas reduce the amount of wheat being exported from a country. Therefore it is aimed at protecting consumers from an outflow of essential commodities. In the case of an exogenous supply shock export quotas (export bans) are used to prevent the outflow of wheat from the domestic market to the world market to prevent domestic wheat shortages.

Two major types of quotas are used in the world: unilateral quotas and bilateral quotas. Unilateral quotas are quantitative import/export restrictions imposed by countries without negotiation or in consultation with other countries or trading partners. These quotas often cause complaints or even trade wars between trading partners. Bilateral or multilateral quotas try to avoid these problems by negotiation between trading partners.

It is important to notice that with the use of import or export quotas as well with import or exports tariffs a small or large country assumption can apply. This assumption applies whether or not the country is large enough to substantially influence the amount of commodity traded on the global market. The small country assumption assumes that an exporting or importing country cannot influence the amount of commodity traded on the world market in order to influence world market prices. In that case an importing country faces perfectly elastic export supply (constant world market price), so an import tariff or an import quota will raise domestic wheat prices. An exporting country faces perfectly elastic import demand (constant world market price), which results in a decrease in prices received by producers when an export quota or tariff is introduced.

The large country assumption assumes that an importing or exporting country can influence the amount and price of a commodity traded on the world market. In other words these countries are price setters instead of price takers in case of the small country assumption. Wheat importing countries that reduce their import quota or import tariff will cause an increase in domestic demand for wheat which translates in a higher global demand for wheat. Because import supply is not perfectly elastic this increase in demand will cause an increase in global wheat prices. The same story holds for wheat exporting countries when these countries introduce an export quota or export tariff. This will cause a decrease in domestic supply. When an export tariff on wheat is introduced the domestic prices producers receive will decrease and therefore they will produce less. An export quota reduces export supply by physically

reducing production of wheat. In both cases reduced domestic supply translates in a reduced supply of wheat on the world market, this reduction will cause wheat prices to rise.

### **3.4.2. Hoarding**

Hoarding by governments can be seen as an increase in domestic demand. This increase in domestic demand by governments is used to increase buffer stocks and to dampen future prices spikes. Governments buy wheat on world and domestic markets because they expect a steep increase in prices in the near future. The effect of hoarding on markets is that they inflate prices and bring price increases forward to current markets. When hoarding occurs by a net importer of wheat this will cause an increase in demand and under the large country assumption this will lead to an increase in global wheat demand. Whilst hoarding by a net exporter of grain will cause a decrease in supply and a subsequent decrease of supply under the large country assumption.

## **4. Governmental policy reactions period 2005/2010**

### **4.1 Overview policy reactions**

This chapter gives an overview of three countries on how governments may adapt their policies in case of a weather induced exogenous supply shock in wheat markets. The case of one wheat importing country (Brazil) and two wheat exporting countries (Russia and Argentina) in this chapter shows how various policies were implemented. Exporting countries Australia and Canada also encountered supply shocks, but did not change their policies. These countries have a relative small domestic consumption and even under adverse circumstances still a production surplus, which is exported to the world market. Iran is a special case in this thesis, although they had to buy large amounts of wheat on the world market, specific information on this topic is difficult to find and therefore not discussed in this thesis.

### **4.2 Russia**

In recent years Russia has experienced consecutive series of good wheat harvests. The wheat harvest yielded 49368 TMT in TY 2007/2008, 63765 TMT in TY 2008/2009 and 61770 TMT in TY 2009/2010. During this period the domestic consumption of wheat for food and feed was stable around 38000 TMT (USDA, 2011). Result of this increase in production is that Russia has a significant share in global wheat exports. Based on this optimism on growing yields and export volumes the forecast for the TY 2010/2011 wheat harvest was also positive. Not only the forecast for TY 2010/2011 had a positive outlook the Russian government had significant wheat reserves from purchases in previous years (Wergen, 2011).

Everything was normal until June 2010 when warm temperatures emerged in western Russia. These high temperatures are normal for the time of the year in Russia, so no one had any idea what the future would bring. But the high temperatures that emerged in June 2010 were persistent and followed by a drought that continued until mid-August 2010, causing extremely dry conditions throughout the country, which contributed to more than 500 wildfires and around \$15 billion in damages. When the first signs became apparent that the wheat harvest of TY 2010/2011 would be significantly lower than the previous year, the market reaction was one of immediate panic. This panic resulted in a sharp spike in wheat prices; widespread speculation, hoarding and panic buying (Wergen, 2011).

The first response of the Russian government was assuring the population that there was no reason for panic and that shortages of wheat would not occur. When it became clear that this was not enough effort to calm down domestic markets, more severe measures were taken in attempt to ease pressure. At the end of July 2010, 3000 TMT of grain from Russia's reserves were released to enhance domestic supply. This also wasn't enough to relieve pressure on domestic markets. On 15 August Prime Minister Putin announced a temporary export ban until 31 December 2010 on grains, including wheat. Due to dry conditions in the fall of 2010 and uncertainty on the size of spring harvest the export ban was extended to July 2011 (Wergen, 2011).

	Subject:	Consumer Prices - food					
	Measure:	Percentage change on the same period of previous year					
		Q1 2010	Q2 2010	Q3 2010	Q4 2010	Q1 2011	Q2 2011
Russia		5,7	4,6	6,4	11,4	14,1	13,3

Source: OECD, 2011

The desired effect of an export ban is to protect domestic consumers from world market price increases. In case of Russia's wheat export ban the direct effect is hard to measure, but given the increases in food price inflation shown in table 1, the export ban seems to be ineffective as policy measure. Since Q3 2010 the change in consumer prices has accelerated from a low 4.6 per cent quarterly change in Q2 2010, to a high 13.3 per cent quarterly change in Q2 2011. The export ban also had an impact on wheat prices elsewhere in the world, figure 12 shows the nominal prices of US No2, Hard Red Winter wheat. These wheat prices show an increase in prices before and after the export ban was introduced and remained high during the ban followed by a decrease in prices when the ban was lifted.

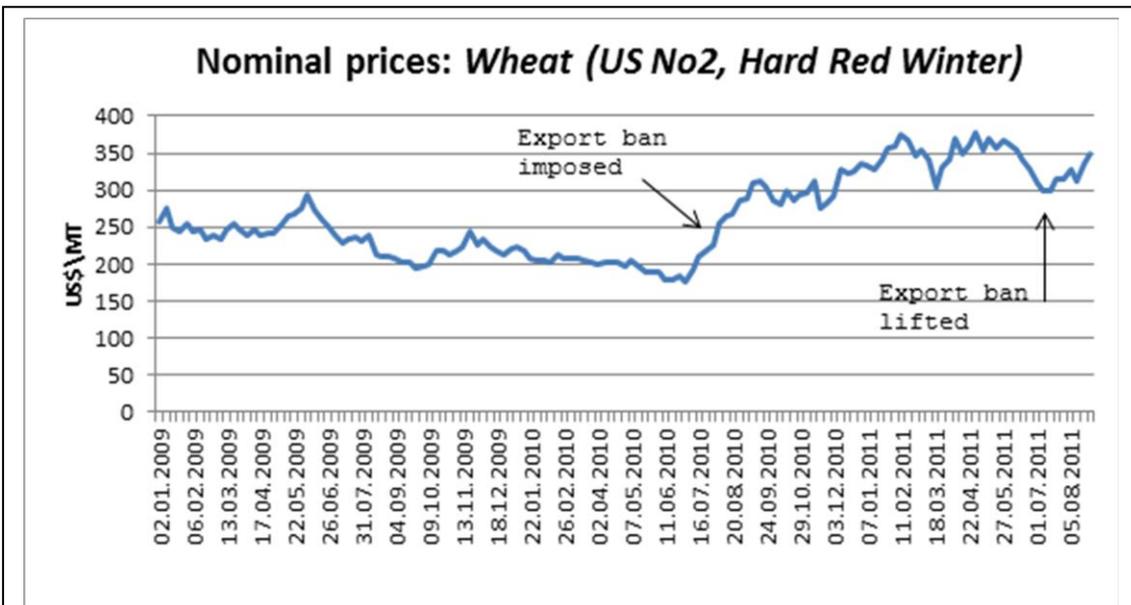


Figure 12. Nominal wheat prices during the period 2009-2011. Source: FAO, 2011

### 4.3 Argentina

Argentina encountered a severe drought during the period March 2008 until February 2009. As one of the largest exporters of wheat in the world, Argentina is a special case on how governments react in case of an exogenous supply shock. The Government of Argentina (GoA) follows an agricultural policy based on intervention, it tries to provide domestic consumers with cheap foodstuffs. In case of wheat production and processing these policies include: subsidies, export taxes and export licenses. The latter is a form of quantitative restriction on wheat exports (USDA, 2010).

The export tax and license system were introduced in 2002 after more than a decade of virtually no trade barriers under the free-market policies of President Carlos Menem. Introduction of new trade barriers came after a period of deep social unrest following the economic meltdown in the early 2000s. The reasons to reintroduce export taxes were clear, to generate resources in order to relief increased poverty among the population, which was a result of the economic meltdown. Export taxes were introduced on a wide array of agro-industrial products including wheat. In case of wheat an ad-valorem export tax and export license system were used to guarantee domestic supply at reasonable prices. The rate of this tariff reached a level of 32,5 per cent during the middle of 2007 (IPC, 2008). These export taxes create a wig between domestic and international wheat prices as shown in figure 13.

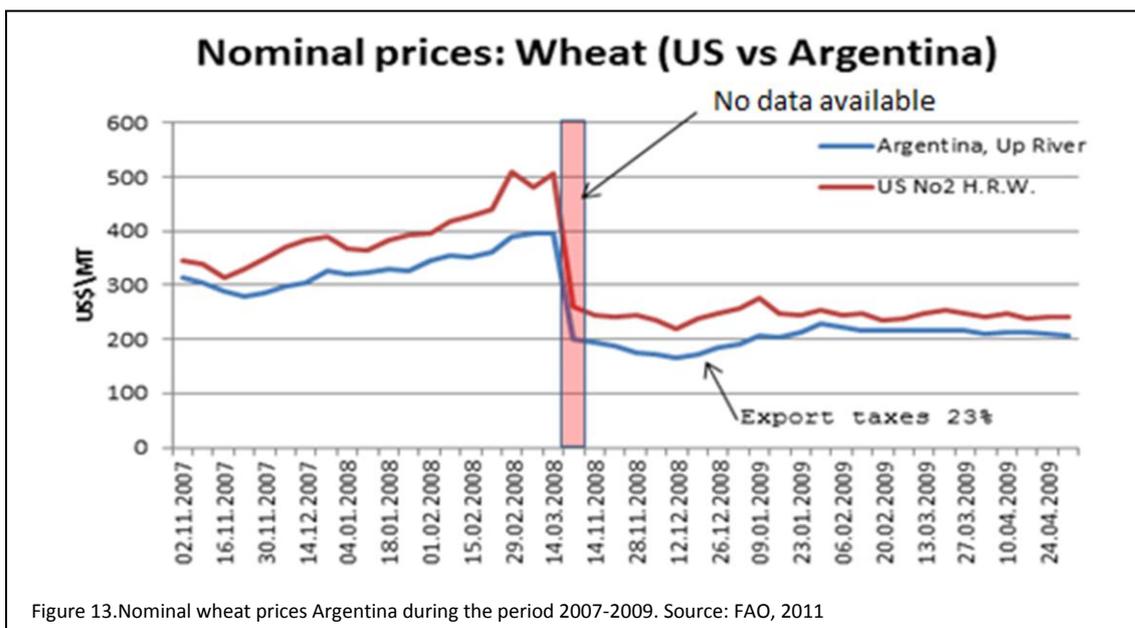


Figure 13. Nominal wheat prices Argentina during the period 2007-2009. Source: FAO, 2011

Quantitative export restrictions were applied during the period of drought, farmers must register their wheat exports with the government. The government then decides whether or not there is enough domestic supply before granting an export license. Wheat exports were suspended from February 2008 until May 2008 in order to provide sufficient domestic supply of wheat. This export ban including a farmer's strike that lasted from March until June seriously disrupted Argentinian wheat exports. The country most affected by these disruptions was Brazil, which imports a large share of Argentine wheat exports.

Besides providing cheap domestic foodstuffs, export taxes are also used by the GoA to finance government expenditure. The fact that the GoA is dependent on the revenue of export taxes to finance expenditure made it possible that during a severe drought a proposal was implemented to increase export taxes on agricultural commodities. This policy reform implemented on 11 March 2008, which included new and higher export taxes on agricultural commodities including wheat. After the announcement that a new tax regime would be implemented, farmers staged a 20 day strike against the new taxes (USDA, 2008). The farm strike ended after the GoA agreed to negotiate with the four main farmer groups in Argentina. These talks resulted in a plan to reduce export taxes on wheat by 5 percentage points to a level of 23%. This reduction of export taxes was published in Joint Resolution 26/2008 and 28/2008 on 22 December 2008 (USDA, 2009).

The Argentinian example shows clearly that GoA followed a policy of intervention in order to protect domestic consumers by creating a price wig between global wheat prices and domestic wheat prices. The increase of export taxes during weather induced exogenous supply shocks was unfortunate but understandable from a government's point of view. They tried to protect their domestic consumers and securing government revenues. The end result was the exact opposite; eventually the GoA was forced to reduce the export taxes on wheat under pressure by farm organisations. They were fed up with paying government expenditures and not receiving the prices they wanted for their products. Not only domestic producers were harmed by these agricultural policies also importers of Argentinian wheat were harmed. They had to look elsewhere for wheat imports during the export ban and had to import more expensive wheat from the world market.

### **4.3 Brazil**

Brazil is one of the largest exporters of agricultural commodities in the world. Agricultural exports account for 40% of the Brazilian trade surplus and the production of agricultural commodities provides almost 6% of the national GDP (Martinelli, et al. 2010). But the tropical climate in Brazil is not suitable for the production of wheat, therefore wheat is only produced in the country's two coldest states, Paraná and Rio Grande do Sul. The domestic production of wheat in these two states is not sufficient to cover its annual domestic consumption of 10000 TMT of wheat. Under normal conditions Brazil has to import around 6700 TMT of wheat every year in order to meet domestic consumption (USDA, various years). This makes Brazil one of the largest importers of wheat in the world.

The largest share of Brazilian wheat imports come from countries within the Mercosur trade bloc, especially Argentina provides most of the Brazilian wheat imports. Wheat imports done inside the Mercosur do not face any trade duties, whilst all wheat imported from outside the Mercosur faces a 10% duty (Common External Tariff) and a 25% Merchant Marine Tax on freight. Result of the Common External Tariff and Merchant Marine Tax is that non-Mercosur wheat cost around 30% more than Argentine wheat (USDA, 2007).

When Brazilian wheat production was down during TY 2006/2007 after adverse weather conditions (drought and frost) resulting in a low domestic supply of wheat, the Brazilian wheat industry first looked at Argentina to provide the additional wheat imports needed to meet domestic demand. However half of the Argentinian wheat exports were already committed to other countries via the export license system. So the wheat industry had to look at imports from outside the Mercosur trading bloc, which were more expensive due to the import levies. Although foreign wheat imports were found the import tariff was not reduced after this supply shock. But continuing uncertainty about Argentina's wheat exports and the global food crisis in TY 2007/2008 caused domestic prices to rise.

In response to this fear of inflation and more than a year of intensive lobbying by the wheat industry the Brazilian government announced on 6 February 2008 that it would temporarily reduce the Common External Tariff from 10% to 0% for up to 1000 TMT until 30 June 2008, but keeping the Merchant Marine Tax of 25% on Non-Mercosur wheat imports. This reduction of the import tariff for Non-Mercosur members was primarily aimed to increase Canadian and United States wheat imports. Since wheat from North America is not available until June this reduction of the import tariff did not have a large effect in providing extra wheat imports.

The Brazilian government realised this and in May 2008 it increased the quota up to 2000 TMT and extended the deadline until 31 August 2008. Besides increasing the quota and extending the deadline the government temporarily abolished the Merchant Marine Tax of 25% until 31 December 2008. This reduction in import tariffs caused protest by the Argentinian government, which accused the Brazilian government that a reduction in tariffs was an attempt to lower domestic wheat prices in Argentina (USDA, various years).

## 5. Conclusion

During the period 2005-2010 six countries were hit by weather induced supply shocks that affected their wheat production. On the exporting side of the wheat market important exporters like Australia, Argentina, Canada, and Russia had to deal with severe droughts during the period 2005-2010. On the importing side of the market large importers like Brazil and Iran faced this problem. But not all these countries changed their policies after the supply shock. Only Argentina and Russia tried to protect their domestic consumers with trade restricting policies, whilst Brazil tried to help domestic consumers by reducing trade restricting policies.

The policies used by the different governments are mainly market and price policies, which are aimed at influencing the prices and quantities traded of wheat. This can be done via import and export tariffs that create a barrier around the domestic market insulating domestic prices from world market prices. In case of an import tariff, the domestic price paid for wheat is higher than the world market price and in case of an export tariff the domestic price paid for wheat is lower than the world market price. Governments can also use nontariff trade barriers (NTBs) to influence prices and quantities of wheat traded. Although NTBs can be divided into many categories, the main idea of this policy is influencing wheat markets other than direct price intervention.

Considering the policy instruments used by exporting governments, they use roughly the same policies. Both Russia and Argentina applied export restrictions (export ban, export taxes) in order to protect their domestic consumers. This protection of domestic consumers had an effect on importing countries as the example of Brazil shows. Due to the protection of domestic consumers in Argentina, the wheat industry in Brazil had to look for other more expensive wheat imports. But also the export ban on Russian wheat caused a steep increase in wheat prices on the world market. On the importing side Brazil reacted mainly on the uncertainty of Argentinian wheat supplies. The country was forced to reduce its import tariffs on non-Mercosur wheat imports in order to provide enough wheat for its domestic consumers.

Comparing the policies used by exporting and importing countries there are similarities, both exporting and importing countries try to provide their domestic consumers with sufficient supplies of wheat. But there is a difference in how exporting and importing countries try to reach this goal. Countries that export a large part of their domestic wheat production close their borders trying to prevent an outflow of wheat, lowering the amount of wheat available on the world market. On the other hand importing countries of wheat try to increase their wheat imports in order to fill the gap between consumption and production caused by lower domestic wheat production. Thus increasing demand for wheat on the world market. The direct effects of policy interventions on the global wheat market are hard to measure but in the case of Russia's export ban, there was an increase in wheat prices on the world market after the export ban was enacted and a subsequently decrease in prices when the ban was lifted in July 2011. Argentina is an example that shows the effect of lowering domestic prices by insulating the domestic market from the world market. The prices paid for wheat in

Argentina are lower than paid for United States wheat, due to the export taxes levied by the Government of Argentina.

A more common result of policy interventions by governments is a negative effect on neighbouring importing countries. The interlinked case of Argentina and Brazil underscores this problem. After an exogenous supply shock that affected domestic wheat production, Argentina chooses to protect their domestic market by closing export registries during the first half of 2008, trying to grant domestic consumers with an adequate supply of wheat. By choosing this policy of isolation the country adversely affected the largest importer of Argentinian wheat, namely Brazil. Brazil, which relies mainly on wheat from Argentina to provide in its domestic demand of wheat, had to look outside its trade union (Mercosur) to find sufficient supplies of wheat. Because Brazil had to look outside its trade union it had to pay higher prices for wheat, thus negatively affecting welfare.

To measure the direct effects of policy intervention in case of a short term supply shock on global wheat markets can be a difficult task. This is the case because there are many more factors influencing global wheat markets than just government policy. A shortage of wheat caused by a short term supply shock in an importing should not always lead to an increase in world market prices as long as exporting countries can fulfil the extra global demand. On the other hand the fear of future wheat shortages can cause prices to increase even when there still is a sufficient supply of wheat in a country. But by comparing the different policy interventions taken by governments named in this thesis an insight can be given into the influence that governments still have on agriculture. Therefore it might be an interesting study to use government policy reactions as variable in a larger econometric study with other possible explanations for price increases or decreases in global wheat markets, and try to find out whether this is the case.

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