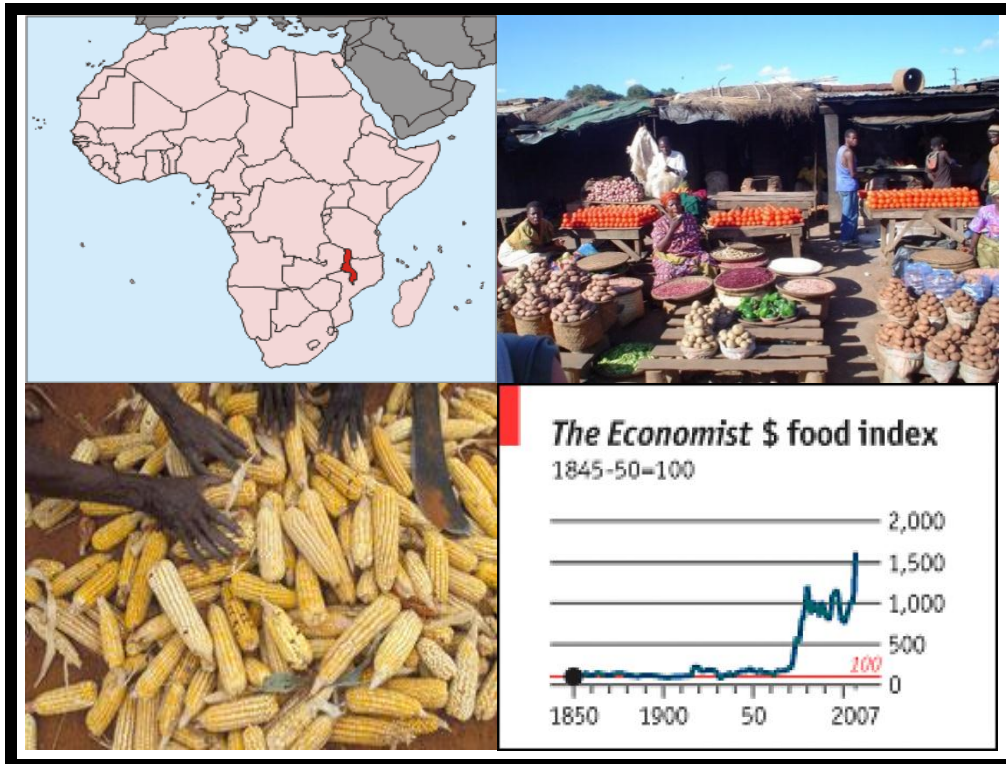


The Impact of High World Food Prices on Household Welfare in Malawi



**BSc Thesis Project
DEC- 80818**

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Abstract

This thesis takes a local perspective on the global food price crisis of 2005- 08 by analysing the price transmission between world food prices and domestic prices in Malawi. It also assesses the impacts of food price increases on household welfare. It is shown that markets in Malawi are well integrated with international markets and that price transmission is high. The welfare analysis for consumers shows that the effect of world food prices appears to be big due to non- diverse consumption patterns. It is found that the hardest hit by the high food prices are the already food insecure and an extra 13 percent of the population will become food insecure.

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1. Introduction

Cheap food has been taken for granted for almost 30 years. From their peak in the 1970s crisis, real food prices steadily declined in the 1980's and 1990's and eventually reached an all-time low in the early 2000 (Headey and Fan 2010). But in 2007 the Global Food Crisis rose, characterized by a sharp spike in the prices of most commodities, including staple grains (Minot 2011). In many cases the price doubled in the space of a few years, and in some cases – such as rice – in the space of just a few months. The World Bank expects volatile, higher than average grain prices until at least 2015. The fast raise of food prices has caused panic and protest in developing countries, as most of its population is a net-buyer of food and spends a large proportion of their household budgets on food. Sharply rising prices offer few means of substitution and adjustment, especially for the urban poor, so there are concerns that millions of people may suffer further through increased hunger and malnutrition (Headey and Fan 2010). The food crisis received a great deal of attention from policymakers, the media and the academic community. Active and heated debates have arisen regarding what has caused this crisis, what the impact will be on the poor and what should be done to resolve it. Most analysts agree that a mix of rising oil prices, US dollar depreciation, biofuel policies, market speculation, and temporarily imposed trade restrictions all contributed to the rapid surge in food prices (Cudjoe, Breisinger, Diao 2010).

The impact of the global food crisis may have been particularly severe in Sub-Saharan Africa for four reasons (Minot 2011). First, the region is a net importer of food and agricultural commodities, so higher food prices lead to trade imbalances. Second, studies have shown that even in rural areas a large percentage of households are net buyers of staple food crops, so they are hurt by higher food prices. Third, as a consequence of the low incomes, food accounts for a large share of household budgets (50%-70%). Finally, 34 of the 48 countries in the region are classified as 'low income' by the World Bank, which limits their capacity to respond to the crisis (Minot 2011).

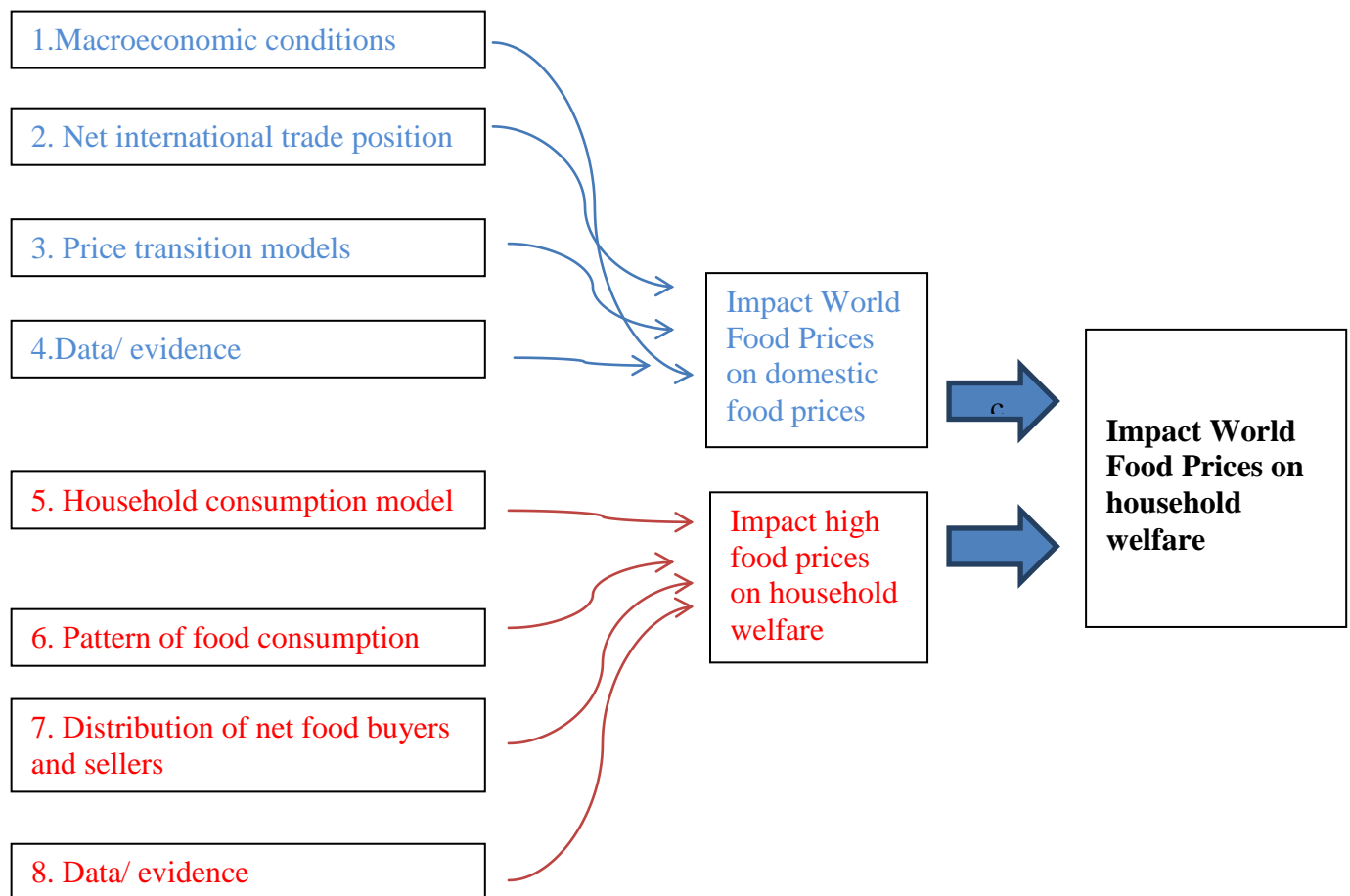
Price transmission between food markets is central in assessing the impact on producers and consumers and understanding how do they adjust to price shocks. In general, the absence of market integration or of complete pass-through of price changes from one market to another has important implications for economic welfare. Most developing countries are subject to incomplete price transmission either due to trade and other policies, or due to high transaction costs arising from poor transport and communication infrastructure. Poor transmission results in a reduction in the price information available to economic agents and leads to decisions which contribute to less elastic demand and supply responses (Rapsomanikis 2009). The impact of surging food prices are often country specific. (Cudjoe, Breisinger, Diao 2010). It must be taken into account that each country has a different macroeconomic condition, different international trade positions,

different consumption & production patterns ect. Therefore the degree of price transmission differs between countries. In this thesis I will focus on only one country, Malawi. Malawi is a special country in that sense that its population consumes and produces mainly maize and is very dependent on this crop. It is interesting to see what happens to household welfare if the world price of maize (and other crops of Malawi) increase in a very short time.

1.1. Research goal

The goal of this research is to (a) see in to what extent the local food prices in Malawi are sensible to changes in world food prices and (b) see what the impact of such shocks are on household and individual welfare in this country. This objective is achieved, based on a literature review, through (c) a critical look at contemporary theory and statistical databases on commodity price formation; and (d) through literature on Malawian household welfare. Schematically it will look like this:

Figure 1. Research model



Source: constructed by author

Looking at the research model it is clear that the main question is ‘What is the impact of high food prices on household welfare in Malawi?’. To answer this question eight ‘ingredients’ are needed. The first four (in blue) explain how world food prices influence the domestic Malawian food prices, so we look at the macroeconomic side of the problem. It is important to know in to what extent the domestic and the international markets are integrated. Here some characteristics of Malawi play a role. The next question is: ‘What is the impact of high domestic food prices on household welfare?’ Here we look at the micro- economic side of the problem and investigate what the consumption patterns are of different types of households.

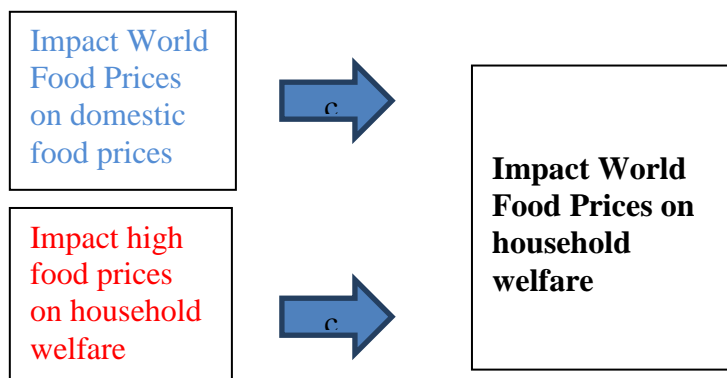
1.2. Structure and outline

This paper is divided in three parts. Chapter one provides the methodological part of the research. Here I will explain how price transmission works (1.1) and how the impact of poverty at household level is measured (1.2). In the next chapter the background information about the crisis (2.1) and characteristics of Malawi (2.2) are given; this will give insight in to the problem. In the last chapter part one and part two come together, here we look at price transmission and its impact for the specific case of Malawi, this will be supplemented by empirical evidence of previous research. At the end the conclusion and discussion are provided.

2. Methodology

This section provides the mechanisms behind the theories of a) price transmission and b) impact assessment. If we take a look at the research model (figure 2), it is clear that we need to give insight into these mechanisms to be able to address the main implications of higher food prices on poverty. The first part will describe how prices are transmitted and I explain the differences between the different models. In the second part the methodology behind poverty impact assessment is discussed.

Figure 2. Methodology



Source: constructed by author

2.1. How are price signals transmitted?

Fluctuations in world food prices will affect people in developing countries only if the price changes are transmitted to domestic markets in those countries. It has been generally argued that high food prices at the international level partly explain the behavior of domestic food prices. However, the extent to which high international food prices can affect domestic prices depends on the integration of markets through the price transmission mechanism (Chirwa 2009).

Price transmission refers to the effect of prices in one market on prices in another market. It is generally measured in terms of the transmission elasticity, defined as the percentage change in the price in one market given a one percent change in the price in another market (Minot 2010). Studies on transmission of price signals are based on the concept of competitive pricing (Rapsomanikis 2009). In the simple case of perfectly competitive markets the assumptions are made that the product is homogeneous, traders are numerous, traders have perfect information, trading occurs instantly, there are no trade taxes/barriers and no transportation costs (Minot 2010). This ensures that the price of a commodity is the same in all markets. If the price in market A (P_a) exceeds the price in market B (P_b), it would

be profitable to ship the product from market B to market A until the prices are equal again. Price transmission would be 'perfect' if any price change in one market would be quickly reflected in an equivalent change in the other market. The transmission elasticity would be 1.0 (Minot 2010).

The classical paradigm of the 'Law of one price' suggests the same as above, but takes transport costs into account. "Changes in supply and demand in one country will affect prices which in turn will instigate trade with other countries. As arbitrage and trade restores the market equilibrium, prices in the domestic market tend to equalize with those in foreign markets except for transport- costs" (Rapsomanikis 2009). *Transportation costs* are a major factor in trade, particularly for staple foodcrops. A low value-to- bulk ratio implies that transportation costs are large relative to the cost of the product. In a simple two- region, one-commodity model, trade is profitable if the difference in autarky (without trade) price in market A (P_a) and in market B (P_b) is greater than the full cost of transportation (c) between the two markets (Minot 2010):

$$P_b - P_a > c,$$

till the equilibrium is reached:

$$P_b - P_a = c$$

In this situation, any small change in the price in one market would be reflected in an equivalent change in the price in the other market, prices move together. On the other hand, if the difference between the autarky price in market A and in market B is less than the full cost of transportation (c), then it is not profitable to trade. In this simple model as long as there is no trade, there will be no price transmission. If the cost of transportation (c) is large, this will create a large band within which each price can fluctuate without inducing trade and reconnecting the two prices (Minot 2010). The full cost of transportation will be greater if a) the distance between the two markets is great, b) transportation infrastructure is poor, c) tariffs and other trade taxes are high, and d) trading is risky. We have assumed that market A and market B are symmetric, in that each market influences prices in the other market. However, in the relationship between world market prices and domestic prices in Sub- Saharan Africa, there is a large difference in scale. Here, we could apply the 'small country assumption' (Minot 2010), which describes that domestic prices will not have a noticeable effect on world commodity prices, but world prices can influence domestic prices. There are also other factor affecting price transmission:

Market power: If a small number of traders dominates the market, they may be able to exert market power. For example, if the import market is dominated by a few large traders, they may be quick to transmit price increases in world markets but slow to pass on price reductions (Minot 2010).

Product homogeneity and differentiation: The degree of substitutability in consumption between similar goods produced in different countries may affect market integration and price transmission (Conforti 2004). If there are quality differences between commodities produced in different locations, the local and imported goods may be imperfect substitutes and the prices will differ between them. Price transmission will not be perfect (Minot 2010).

Border and domestic policy: Restrictions on international trade are common in Sub-Saharan Africa (Minot 2010). In general, the implementation of ad valorem tariffs, or export taxes allow international price changes to be fully transmitted to domestic markets. Nevertheless, high tariffs or taxes eliminate opportunities for arbitrage and result in domestic and international prices moving independently of each other, as if an import or export ban were implemented (Rapsomanikis 2009). A number of countries implement price stabilization policies, in Malawi the Agricultural Development and Marketing Corporation (ADMARC) maintains a strong presence. Such policies impede price transmission. “Depending on domestic market fundamentals, trade takes place and the international and domestic prices may not be completely interrelated, with the intervention policy resulting only in weak international price pass-through” (Rapsomanikis 2009).

Rapsomanikis (2009) also says that *consumer preferences* can play a role. Domestically produced food often has different attributes than those characterizing internationally traded food commodities. In Southern Africa, consumers generally prefer white maize rather than the internationally traded yellow maize. As consumers are unwilling to substitute one type of maize for another, domestic maize prices may depend mainly on regional supply and demand for white maize, rather than the global market conditions.

2.2. Modeling spatial price transmission

The analysis of price transmission has developed during the past decades. Abdulai (2007) distinguishes three different episodes: 1) Initial Approaches including *correlation coefficients* and *first differences specifications*, 2) Modern time series including *causality*, *cointegration* and *error correction models*, and 3) Transaction costs based approaches including *threshold autoregression models* and *parity bound models*.

Early studies on price transmission used simple correlation coefficients of contemporaneous prices. A high correlation coefficient was evidence of co-movement and was often interpreted as a sign of an efficient market. Another early approach was to use regression analysis on contemporaneous prices, with the regression coefficient being a measure of the co-movement of prices. But this

approach got criticized for assuming instantaneous response in each market to changes in other markets. Ravallion (1986) mentioned that this problem could be faced by including lagged world prices as explanatory variables in the regression analysis. In the 1980's, researches became aware of the problem of nonstationarity of the price series, which leads to inferential problems in empirical tests (Goodwin and Piggott 2001). Numerous authors have therefore used cointegration and error correction models to address this problem in their studies of short- and long- run integration of agricultural commodity markets (Abdulai 2000). Regression and cointegration-based tests have been criticized recently for their ignorance of transactions costs (Goodwin and Piggott 2001). Recognition of the important but often neglected role of transactions costs has led to the application of new empirical approaches which explicitly recognize the influences of transactions costs on spatial market linkages. Some scholars used threshold autoregression models to examine market integration. In one version of these models, two variables have no relationship with each other when the difference between them is below a certain threshold, but they become linked when the difference exceeds that threshold (Minot 2010).

2.3. Poverty impact assessment

There is big concern about the impacts of high food prices on poor people, but little information appears to be available on actual impacts on poor people. The overall impact on poverty rates in poor countries depends on whether the gains to poor net producers outweigh the adverse impacts on poor consumers. Whether higher food prices improve or worsen the situation of particular households depends importantly on the products involved; the patterns of household incomes and expenditures; and the policy responses of governments (World Bank 2008). On average, the net position of households in the market, that is whether households are net sellers or net buyers of food, will determine the impact of price changes on income, food security and poverty (Rapsomanikis 2009).

According to Wodon (2010) there are different methodological approaches to estimating the impact of sudden shocks on household welfare. One approach is simulation, using the latest available nationally representative household surveys. A second approach involves the use of information gathered in the midst of the shock, which may often rely on non- representative samples. A third approach is ex post analysis using representative household data linking the shock to outcome variables. The analysis of the distributional impact of price rises follows a simple methodology based on Deaton (1989), it estimates change in food welfare (ΔW_{food}) as the product of the food net- benefit ratio (NBR_{food}) and the change in food prices (ΔP_{food}):

$$\Delta W_{food} = \Delta P_{food} * NBR_{food} = \Delta P_{food} * (Y_{food} / Y_{total} - C_{food} / C_{total}),$$

Where Y_{food}/Y_{total} is the ratio of food sales and own- production to total household monetary income, and C_{food}/C_{total} is the ratio of food expenditure and own- consumption to total household expenditure (Headey and Fan 2010). The interpretation of the above equation is straightforward. If a household is a net seller of food Y_{food}/Y_{total} will be larger than C_{food}/C_{total} and the household will benefit from the price increase. Hence the main issues with microeconomic assessments of the poverty impacts concern the products involved, the numbers of net buyers and sellers and the policy responses.

3. Context/ Background

The two sections in this chapter will give us some background information to have a better understanding of the problem. In the first section we will see how the crisis started, what caused it and what the implications are for developing countries and Malawi. To understand how world food prices are transmitted in Malawi, we need an understanding of the country's specific characteristics. Especially important are the food markets and the trade position. These two explain why the prices are transmitted the way they are, and why the price transmission in this country is different from others.

3.1. The World Food Crisis

In the period since 2005, the international prices of food rose increasingly to a peak in mid- 2008, then the prices fell, but still being relatively high. Historically, food prices have had a downward trend relative to the prices of manufactured goods, but this trend has been interrupted by a number of episodes driven by booms and slumps, such as that of 1973-1974, 2007-2008 and now again in 2010-2011 (Rapsomanikis, 2009). Estimates of those who fall into, and move out of, poverty as a result of high food prices since June 2010 show there is a net increase in extreme poverty of about 44 million people in low- and middle income countries (World Bank, 2011).

Figure 3. FAO Food Price Index



SOURCE: FAO, APRIL 2011

The 2007-08 commodity price swing shares a number of similarities with the 1970s price episode. Both were characterized by fast economic growth, inflation, low real interest rates and excess international liquidity. Nevertheless, the two price episodes differ in that sense that in the 1970's the food prices led the commodity boom, while in 2007-2008 the commodity boom was preceded by high metal and fuel prices. In the 1970's the supply side sector (food prices rose in

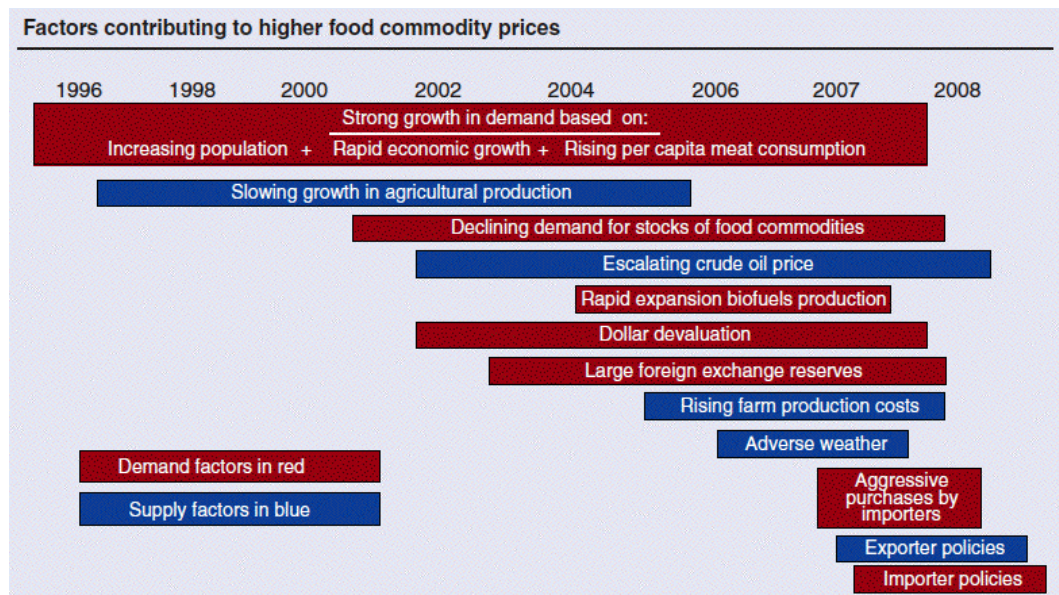
response to bad harvests) played a bigger role than in 2007-08. In the recent crisis the supply side also plays a role, in the sense that decades of underinvestment in less developed countries lead to a limited capacity to respond, but it is more contextual and not defining for this crisis.

In the following section the reasons behind the recent (2005- 08) price surge and slump are discussed.

3.1.1. Causes

A lot of economists agree that some factors have caused the crisis of 2005- 08. Trostle (2008) provides a very useful timeline of events, in this timeline all the important factors that are hypothesized are present.

Figure 4. Trostle's time line



Source: Trostle (2008)

In this section I will provide an analysis of the factors influencing the crisis, and use the critics/papers of Mitchell (2008), Headey (2010) and Abbott, Hurt, and Tyner. (2008). Hereby I will show what the weights of the different factor are and in what way they are significant.

a) *Strong growth in demand, especially from China and India*

Many parts of the developing world continue to face high population growth, and an increasing number of countries have experienced high economic growth in recent years, especially Asia (mainly China and India). In the period of 2005-2007 Asia's GDP grew by more than 9 % and Sub-Saharan Africa by more than 6% (Von Braun 2008). With higher incomes and shifting rural- urban populations, domestic consumer demand for food has increased. At the same time, the growing world population is

demanding more and different kinds of food. Food patterns are shifting from grains and other staple crops to vegetables, fruits, meat and dairy causing cuts into land and water use for grains (Von Braun 2008).

This sounds plausible. And many studies, policy briefs and media publications have attributed rising food prices to strong economic growth in especially China and India. But Headey and Fan (2008) argue that this factor is over valued. They state that both China and India have long been self- sufficient in food, including the staple commodities for which international prices have been rising. In fact, China imported less wheat in 2000-2007 (33.8 million metric tons) than it did in the previous years (40.3 million metric tons), and its rice imports also declined slightly from already low levels. Indian imports of wheat and maize have also been negligible, and India is generally a net exporter of rice. The only agricultural commodity group for which China and India have sizable increased their demand is oilseeds, but this demand began mid 90's rather than recently. India did increase its soybean imports from 20.4 to 33.5 million tons from the mid 90's to the present and therefore contributed to U.S. farmers increasing soybean production; but Headey and Fan (2008) estimate that grain production in the U.S. would only have been 3% higher if this hadn't happened. It seems unlikely that rising soybean demand from the mid 90's is likely to explain a sudden and largely unforeseen price shock 10 years later. Concluding, this is a less convincing factor.

b) Slowing growth in agricultural production

'On the supply side, the global production response to rising demand has been slow. Production has grown only slowly in some traditionally grain-surplus and grain- exporting countries. Output declined in Australia and stagnated in China, Europe, India and the U.S. Overall productivity growth in agriculture along past trends is simply too slow to cope with the increase in demand (Von Braun 2008)'. This is a belief that is shared by many others, several articles and policy briefs (also see Abbott, Hurt and Tyner 2008) believe that the declining productivity growth and declining stocks are the principal cause of the supply- demand imbalance. In many of these documents, slowing productivity growth is attributed to lower rates of investment in agricultural research, land and water constraints and deficient agricultural banking. Headey and Fan (2010) on the other hand, believe there is no substantial evidence that links a productivity decline to increased pressure in international cereal markets, except perhaps in Sub-Saharan Africa. They argue that it is true, overall productivity growth has slowed down. Three quarters of the decline in global food production is explained by poor performance of Europe (and especially the former USSR). But, as international prices are primarily determined by trade, for the decline in cereal production in this region to result in a rise in

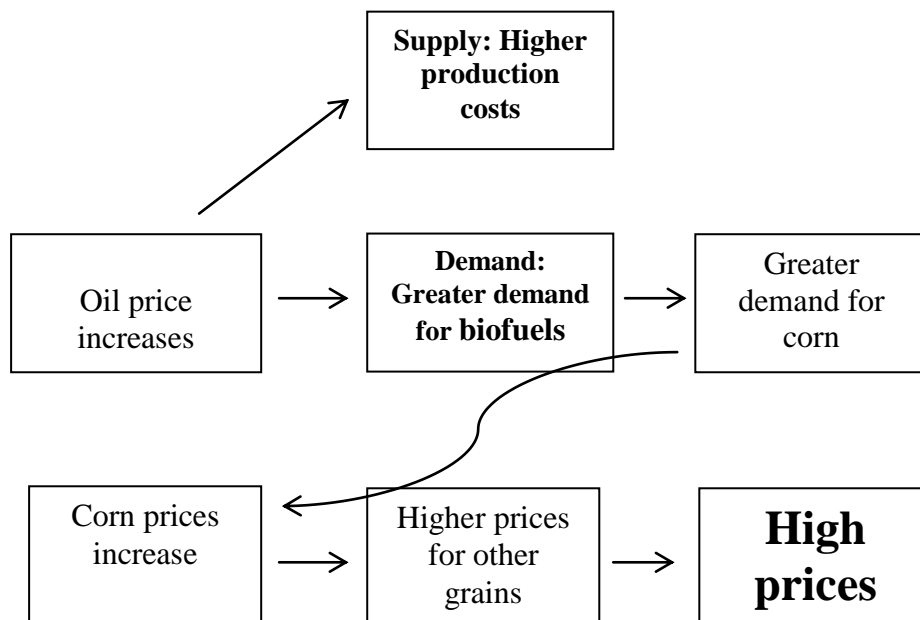
international prices, we need net exports from these countries to also have declined. And that didn't happen, USDA trade estimates suggest that net exports from this region actually increased.

c) *Rising oil prices*

Crude oil price increases have been very important (Abbott, Hurt and Tyner, 2008). Energy and agricultural prices have become increasingly intertwined (Von Braun, 2008). Oil can affect food prices through both supply and demand. At the supply side that will be through costs of agricultural production and at the demand side it is through the production of biofuels (discussed at point d).

There is a debate about into what state the supply side has played a big role. Abbott, Hurt and Tyner (2008) say, higher crude oil prices have increased production costs of all goods and services, including food and that the supply side is not that important. Contrarily, Mitchell (2008) states that high energy prices have contributed for 20% to higher U.S. food commodities production and transport costs. Headey and Fan (2010) think these estimates are even too low. Higher energy prices should be taken seriously.

Figure 5. Price increase: demand vs supply



Source: constructed by author

d) Rapid expansion of biofuels production

As seen in figure 5, an increase in the oil price has effects on the supply side and the demand side. Mitchell (2008) thinks that the factor that has caused the biggest increase in internationally traded food prices is the production of biofuels from grains and oilseeds from the U.S. and Europe. 'With the oil prices being so high and with the U.S. government and the E.U. subsidizing agricultural-based energy, farmers have massively shifted their cultivation toward crops for biofuel' (Von Braun 2008). Increased production of biofuels have influenced the high food prices because biofuels (ethanol and biodiesel) are made of agricultural products. Most of the increase in corn demand has been driven by the higher oil price and the fall in the U.S. \$. Corn has gone from \$2 to \$6 as oil has gone from \$40 to \$120. About \$3 is due to the higher oil price and \$1 to the ethanol subsidy (Abbott, Hurt and Tyler 2008).

e) Declining stocks and reserves

Scholars do not often mention that declining stocks and reserves can be a cause of high food prices. But Headey and Fan (2010) and Trostle (2008) do talk about it. That is because it seems that stocks are relevant for the current crisis. Agricultural scientists emphasize that when stocks are high, prices are generally low. And historically that can be proven, during stable prices periods, the stocks were doing fine, but not during the food crisis in the 70's or now. It could be an explanation that when the stocks decrease the prices increase. But Headey and Fan (2010) believe this is a superficial explanation for the price surge and that the other factors determine what is behind the decline in stocks. First, declining stocks might simply reflect increased demand or reduced production levels. Second, stock levels could have declined because of exogenous policy decisions. And third, prices could affect stock decisions, so that very low food prices up until 2003 may have decreased the apparent need to hold stock.

f) Dollar devaluation

Not many scholars have taken this factor very seriously, but Abbott, Hurt and Tyner (2008), think that it has been underestimated. In their analysis it clearly shows that there is a link between the exchange rate and commodity prices. Oil, agricultural commodities and most other commodities are priced in US\$, but are purchased in the domestic currency. A comparison of the real trade weighted exchange rate and the index of food prices shows a general connection between dollar depreciation and food price increase (Mitchell 2008). When the dollar depreciates, agricultural exports increase and the value of agricultural export increase (Headey and Fan 2010). Moreover Mitchell (2008) has calculated that a depreciation of the U.S.\$ increases dollar commodity prices by 20% with an elasticity of 0.75.

g) *Speculation in financial markets*

A factor that is not included in the timeline of Trostle is 'speculation'. But this factor is mentioned a couple of times in different publications and policy briefs. So, it is important to take this factor into account as well. Von Braun (2008) distinguishes three kinds of speculators; a) governments, farmers, households and others whose speculation does not have much influence, but if it adds all up can have large effects in a price crisis; b) commercial traders; c) non-commercial traders who are seeking profits through speculation. The amount of pension, hedge and index funds in the commodity markets have grown intensely; and that is why some people have blamed the 'speculators' for a big part of the price increases (Abbott, Hurt and Tyner 2008). But many scholars reject this hypothesis, because it is impossible to say, based on existing research, that the overall price levels have been influenced by speculation.

h) *Trade shocks: adverse weather, exporter- and importer policies*

Many countries took steps, such as export restrictions and price controls to try to minimize the effects of higher prices on their populations. These steps can be seen as policy failures. Von Braun (2008) explains that policy responses such as export bans or high export tariffs may reduce risks of food shortages in the short term for the relevant country, but they are likely to backfire by making the international market smaller and more volatile. Export restrictions have harmful effects on import-dependent trading partners.

Another trade shock was the adverse weather condition in 2006-2007, it made an already difficult situation worse. But, this only holds for wheat. Australian wheat production in 2006 was 50- 60% below the growth rates two years before. In the U.S. it was 14% lower than previous year, and there were also some declines in Russian and Ukrainian production (Headey and Fan 2008). Mitchell (2008) confirms this, but observes that the grain production in 2007 increased again by 4.7%, thus the production shortfall in grains, would not, by itself, have been a major contributor to the increase in prices. But when combined with large increases in biofuels production, land use changes and stock declines it certainly contributed to higher prices. Furthermore, Headey and Fan (2008) also argue that annual production shortfalls are a normal occurrence in agricultural production and in wheat production in particular.

Concluding, the factors that have most influenced the high food prices are the rising oil prices, the growing production of biofuels, the dollar devaluation and some trade shocks. Especially increases in production of biofuels are blamed by scholars. Without these increases, global wheat and maize stocks would not have

declined that much, and price increases due to other factors would have been moderate (Mitchell 2008). According to Abbott, Hurt and Tyner (2008) the price increase from 2007-08, has happened before. Business cycles, inflation, and macroeconomic policy will play important roles in determining how long the cycle of high prices continue. A strengthening of the dollar, and lower oil prices, would bring pressure for other commodity prices to fall.

3.1.2. Implications

In the previous section we got an idea of the factors that might play a role in the food crisis. But why is there so much attention on this? What is the problem?

Higher food prices have different effects across countries and population groups. At the country level, countries that are net food exporters can benefit, as increased food prices will raise the income of net producers, inducing increases in their consumption which may also benefit other sectors of the economy; the size of these benefits will depend on the extent to which supply can respond to increasing prices (Rapsomanikis 2009). Von Braun (2008) argues that these countries also benefit because the terms of trade improve, although some of them are missing out on this opportunity by banning exports to protect consumers. Net food importers on the other hand, struggle to meet domestic food demand. High food prices can result in inflation and increased food import bills that lead to the deterioration of the balance of payments and the current account (Rapsomanikis 2009). Africa is the hardest hit by volatile and increased food prices, because most African countries are net importers of food. At the household level, the poorest are hit the hardest (Von Braun 2008). These poor households spend roughly three-quarters of their incomes on staple foods (Ivanic and Martin 2008). Von Braun (2008) argues that there are three important irreversible consequences on high food prices; a) deterioration of the nutritional status of pregnant and lactating women and of preschool children; b) the withdrawal of children, especially girls, from school; and c) the distress sale of productive assets. Because of these effects, it will be difficult for individuals and households to escape poverty. Poor households are more sensitive to changes in food prices than the wealthy, but there are variations across countries in the magnitude of this sensitivity (Von Braun 2008).

The impact of high food prices on poverty is far from uniform across developing countries, depending for example upon which commodity prices change (Ivanic and Martin 2008), the structure of the economy (Rapsomanikis 2009), price transmission, the distribution of net buyers and net sellers of food and policy responses (Headey and Fan 2010). Empirical evidence is provided in chapter 4.2. In the coming sections these factors are analysed. But first of all, the next item provides background information about Malawi, this gives insight into the specific problems that Malawi is confronting.

3.2. Characteristics of Malawi

Malawi is a small, landlocked, densely populated country in southern Africa. The majority of its population of 12.3 million live below the poverty line. It is currently ranked 164 out of 177 on the Human Development Index. About 83 percent of the people live in rural areas with low access to basic health and education services. Agricultural production is the mainstay of Malawi's economy and small-holder farmers dominate the sector. Landholdings are small particularly in the densely populated south (FAO 2011).



Figure 6. Map of Malawi

3.2.1. Economic growth

Growth in Malawi is strong and its history has been volatile and can be characterized by four distinct phases: a) 1960-79 estate-based growth; b) 1979-89 decline; c) 1989-03 stagnation due to shocks and transition to smallholder led growth; and d) 2004- 10 recovery. During the first phase the government supported large-scale agriculture through access to land, investment and credit. Estates grew at an average annual rate of 17 percent. Estate-led growth was made possible by relatively high product prices, the efficient value chain of estate marketing, good transport infrastructure and cheap credit (World Bank). In the end of the 70's incomes strongly declined following the oil price shock accompanied by severe deterioration in the terms-of-trade. In the 90's (third phase) agriculture becomes smallholder-led, from nearly nothing in 1990, smallholders came to produce around 70 percent of the tobacco crop. Unfortunately, high fiscal deficits combined with exchangerate liberalization rapidly transmitted price instability to the rest of the economy, and inflation reached a high of 83 percent in 1995. Luckily there was a rapid turnaround in government finances with the arrival of a new government (2004). The improved fiscal position led to an increase in donor inflows, reducing domestically borrowing and allowing more resources to become available for private sector investment.

3.2.2. Agriculture and trade

This section describes the production and trade patterns of the main staple foods in Malawi: maize, cassava and sweet potatoes. Production and trade patterns determine whether prices are determined by international prices or local supply and demand. For widely traded commodities, the price is largely determined by international prices, trade policy, and transportation costs. On the other hand, for commodities that are not widely traded, prices will depend largely on local supply and demand. Since demand is relatively stable over time, fluctuations in the price of non- tradables is largely determined by weather- related fluctuations in production (Minot 2010b). The economy (and growth) of Malawi is dominated by agriculture and it is the major source of livelihoods for more than 85 percent of the population, which is mostly rural. Agriculture, which has benefited from fertilizer subsidies since 2006, accounts for about one third of gross domestic product and 90 percent of export revenues, a higher percentage than in most of the other countries in eastern and southern Africa. Maize is the most important food crop, Malawi produces about 2.4 million metric tons of maize per year (Minot 2010) and over 60 percent of national calorie consumption derives from maize; 97 percent of famers grow maize and over half of households grow no other crop (World Bank). As seen in the table below, in the time of the crisis (2005-07), exports and imports have been quite small relative to production. Imports averaged 3 percent of apparent consumption, while exports were less than 6 percent of production. It is clear that in general, maize is a non- tradable crop in Malawi so prices are determined largely by domestic supply and demand (Minot 2010).

Figure 7. Production and trade of important food staples

Commodity	Production (1000 tonnes)	Import (1000 tonnes)	Export (1000 tonnes)
Maize	2,354	63	131
Cassava	2,756	0	0
Sweet potatoes	2,218	0	0

Source: FAO (the data used are average of 2005, 2006 and 2007)

Other important crops are cassava and sweet potatoes. According to the FAO statistics, cassava production has grown dramatically, rising from about 300 thousand tons in the 90s to over 3.3 million tons in 2007; produced by 6 percent of the small- farm area. Farmers tend to grow the cassava for home consumption (Kambewaa and Nyembe 2008). Malawi has no trade in cassava with its neighbours. Sweet potatoes occupy about 5 percent of the area cultivated by small- scale farmers.

The dominant export crop is tobacco, grown both by small- scale farmers and on large estates. Important cash crops are sugarcane, tea, cotton, and coffee, produced

mainly by estates (World Bank). National surveys estimate that agriculture is the most important occupation for 71% of the rural population.

3.2.3. Consumption

Malawi produces a number of food commodities including maize, rice, miller, sorghum, beans, cassava, potatoes and groundnuts, but maize remains the dominant staple food (Chirwa 2009). Figure 8 shows the importance of maize in the typical diet of a rural household in Malawi in 2002. The data used in the study of Chirwa and Zakeyo (2003) reveals that 94.8 percent of the sample households take maize as their main staple food, against 4.8 percent for cassava.

Figure 8. typical diet of a rural household in 2002

Main Food Item	Lunch (%)	Supper (%)
<i>Main Meal</i>		
<i>Nsima (maize)</i>	77.97	82.37
<i>Nsima (cassava)</i>	1.94	1.69
Rice	1.40	2.66
Other	8.86	8.62
No Meal	9.93	4.66
<i>No. of Households</i>	826	826

Source: Chirwa 2009

The dominance of maize in the diet of most households implies that maize price swings are likely to have major implications on livelihoods of poor households.

3.2.4. Distribution of net buyers and net sellers

The impact of the food price rise on households is diverse, generating benefits for net food producers, while significantly worsening the welfare of net food consuming households. In general, urban households that are net staple food buyers will lose, as they have to pay more to maintain good diets. On the other hand, rural households, especially those that are involved in the production and sale of staple foods, may benefit to a certain extent. Chirwa (2009) describes in his study that 56 percent of smallholder households are net- buyers of maize and are, in general, the poorest. He also shows that 10.2 percent of households are net-sellers, while 29 percent neither bought nor sold maize during the 2006/07 harvest season. The high proportion of maize buyers implies that price rises affect significantly many smallholder farmers in Malawi.

3.2.5. Policy responses

Given the importance of maize in Malawi, it is not surprisingly that food policy focuses largely on this commodity. Food security is largely defined as access to maize, and maize self sufficiency is seen as the best strategy for improving access.

Some of the main elements of this policy are intervention in food markets by the ADMARC, restrictions on maize trade, and a large fertilizer subsidy program (Minot 2010b). During the 2005-08 crisis, the government has intervened in the food market, in an attempt to ensure that food is available at prices affordable by the majority of the population. It is quite possible that without the interventions, households could have experienced much higher prices and larger swings (Chirwa 2009).

4. Empirical Evidence

Many papers have been written on price transmission and poverty impact in general. In this section I will show some empirical evidence and the most influential outcomes for Malawi. After this section I can make conclusions about the overall impact on poverty in Malawi because of the higher food prices.

4.1. Price transmission in Malawi

There is mixed evidence that markets in Malawi are integrated with international markets. The first studies find little integration and the most recent studies find that Malawi has the best integrated markets in the region. Here follow influential outcomes in chronological order. Goletti and Babu (1994) examine the behavior of maize prices in Malawi before and after market liberalizations of the 90s using cointegration analysis. Before the liberalization 18 of the 48 market pairs were cointegrated, after 34 pairs were cointegrated. They find that transmission is only partial and can be slow. Chirwa (2000) uses cointegration methods to examine maize and rice prices in Malawi. He finds that several of the main markets are cointegrated. Chirwa and Zakeyo (2006) also analyze market integration before and after liberalization in the mid- 1990s. They find that integration has improved after liberalization, but that the overall price transmission is weak. They also find that the markets for fully liberalized commodities (bean, rice, and groundnuts) are more integrated than the markets for maize.

In 2008 Myers (cited in Minot 2010) did an analysis on spatial market integration using weekly maize prices from ten markets over the period 2001-2008. The study finds strong evidence of a long- run relationship in six of the nine market pairs tested. In his study the markets are more efficient than they are in the studies of Chirwa (2000) and Goletti and Babu (1994).

Rapsomanikis (2009) shows in his study that there is strong evidence that maize markets in Malawi are integrated with both the international and the South African maize markets. In the table below is shown how world prices affect eight markets in Malawi and how much months each market needs to adjust to the international price. Prices in the country co- move with both the US yellow maize and the SAFEX (South African Future Exchange) white maize prices in the long run. In

the short run, effects between the domestic and the international and the SAFEX prices are found to be insignificant. This suggests that domestic market conditions, and probably open operations by the Malawian Agricultural Development and Marketing Corporation (ADMARC) determine short run price movements.

Figure 9. Price transmission in Malawi (Rapsomanikis)

	CHIPITA	KARONGA	RUMPHI	BANGULA
Co-movement with				
> International price (yellow)	Strong	Strong	Moderate	Strong
> South African price (white)	Strong	Strong	Strong	Strong
Causality	World → domestic	World → domestic	World → domestic	World → domestic
Months to full adjustment to International (South African) price	6.6 (5.0)	4.7 (4.8)	(8.3)	3.8 (4.7)
	SALIMA	MITUNDU	LIWONDE	MZUZU
Co-movement with				
> International price (yellow)	Weak	Strong	Strong	Strong
> South African price (white)	Strong	Strong	Strong	Strong
Causality	World → domestic	World → domestic	World → domestic	World → domestic
Months to full adjustment to International (South African) price	-(5.3)	5.8 (5.0)	7.7 (6.4)	5.5 (6.1)

Source: Rapsomanikis (2009)

Minot (2010) did an analysis based on the simple ratio of local to international price increases over June 2007 to June 2008. He also carried out an econometric analysis of the degree to which local prices track world prices using a vector error correction model. The data consisted of 62 domestic price series for maize, rice, and wheat in nine Sub-Saharan African countries. Looking at descriptive statistics the highest domestic food prices were in Malawi: six of the nine prices examined in the country increased by more than 150 percent. Since the price increases in this country actually exceeded the price increases in the world markets for the same commodities, this suggests that the world price was not the only factor contributing to the price increases. As seen in figure 9 only three of the eight maize markets (Chitipa, Lilongwe and Nkhata Bay) in Malawi showed a long-run relationship with the world maize price. The other five markets score negatively on the Johansen tests.

Figure 10. Price transmission in Malawi (Minot)

Country	Location	Commodity	Unit root in domestic price?		Long-run relationship?	Error correction model (if long run-relationship confirmed)		
			A DF test	Phillips-Perron test	Johansen test	Speed of Adjustment	Short-run Adjustment	Long-run Adjustment
Malawi	Chitipa	Maize	Yes	No	Yes	0.14 *	0.09	0.70
Malawi	Karonga	Maize	No	No	No			
Malawi	Lilongwe	Maize	No	No	Yes	0.20 *	0.44	-0.07
Malawi	Lunzu	Maize	No	No	No			
Malawi	Mitundu	Maize	No	No	No			
Malawi	Mzuzu	Maize	No	No	No			
Malawi	Nkhata Bay	Maize	No	No	Yes	0.20 *	0.44	0.07
Malawi	Rumphi	Maize	Yes	Yes	No			

Source: Minot 2010a

As seen in the figure 10, Malawi, Mozambique and Ethiopia have the highest proportion (38%, 36% and 33% respectively) of domestic markets that are linked to world markets, these countries have the best integrated markets. But the integration is limited to a maximum of 38 percent from Malawi.

Figure 11. Comparing price transmission with other countries

	Prices with relationship	Total nbr. of prices	Percentage
Ethiopia	1	3	33%
Ghana	1	7	14%
Kenya	0	2	0%
Malawi	3	8	38%
Mozambique	4	11	36%
South Africa	0	4	0%
Tanzania	4	16	25%
Uganda	0	2	0%
Zambia	0	9	0%
Total	13	62	21%

Source: Minot 2010a

Price transmission is crucial when analyzing the impact of international food price swings on developing countries. Malawi, where maize is the staple food, experienced dramatic increases in the price of maize in 2007-08, in line with the international market. Empirical evidence, above all the latest studies, suggests that in the long run, changes in the prices of international prices are transmitted to domestic prices. However, price transmission is characterized by a slow adjustment to international price changes. This slow adjustment means incomplete price transmission. Short run fluctuations are shaped by domestic factors, which indicate that the Malawian market will continue to be characterized by volatile prices in the short run. But, as prices co- move in the long run with those of the world market, international price booms and slumps are transmitted to Malawi.

This is maybe a strange statement, as I said in the section Agriculture and Trade that “Malawi in the time of the crisis (2005-07), exports and imports have been quite small relative to production. Imports averaged 3 percent of apparent consumption, while exports were less than 6 percent of production. *It is clear that in general, maize is a non- tradable crop in Malawi so prices are determined largely by domestic supply and demand*”. Thus even if maize is a non- tradable crop, the domestic maize prices are influenced by the world food prices and Malawi is the country with the highest price transmission (as seen in figure 7).

4.2. Impact on household welfare

A number of researchers have attempted to measure the implications of the food price upswing for poverty in Malawi (Ivanic and Martin, 2008; Chirwa, 2009; Wodon and Zaman, 2008; and Rapsomanikis, 2009). These analyses utilize several different methodologies and apply them to household survey data. In general, the results suggest that on average food price increases will result in increased poverty.

Ivanic and Martin (2008) did a study of 9 countries across several continents on the impacts of rising prices on household poverty, utilizing a Computable General Equilibrium (CGE) model and a measure of poverty defined by the standard 2007 World Bank Development Indicators ‘dollar-a- day’ expenditure. For Malawi they found that an increase in the price of maize raises poverty both in rural and urban areas. Increasing the price of maize by 10 percent would raise poverty by 0.5 percent in rural areas and 0.3 percent in urban areas; and 0.5 percent nationally. When the prices of all staples increase by 10 percent, poverty rises by 0.6 percent in rural areas and 0.4 percent in urban areas.

Rapsomanikis (2009) examined the impact of an increase in food prices on consumption, household food expenditure and food security in Malawi, Zambia and Uganda. The analysis was based on a simulation of food demand system models that were estimated utilizing household survey data sets and gives importance to staple food diversification. The results provide some indication of the extent of the impact of food price increases on households’ food security. For Malawi, the simulation of 50 percent increase in the price of maize suggests that, on average, consumers reduce the maize consumption by 8.5 percent. As seen in figure 11, on average, poor and food insecure households reduce the consumption of maize to a lesser extent (4.4 percent) as compared with non poor and food secure consumers (11.8 percent). Food secure consumers consume less maize with higher prices, that could mean that the impact on them is greater, but it is more plausible that the difference is reflecting limited possibilities of substitution for the food insecure. The households reduce the consumption, but the expenditures increase by 10 percent.

Figure 12. Impact of food price increases on consumption (Rapsomanikis)

MALAWI				
	Food insecure		Food secure	
	Baseline consumption kg per capita	Impact of shock on consumption, %	Baseline consumption kg per capita	Impact of shock on consumption, %
Maize	135.2	-4.4	189.3	-11.8
Other cereals	4.4	-17.2	17.2	-21.0
Cassava	68.3	-5.3	100.7	0.3
Other roots and tubers	46.4	0.1	102.5	5.1
Meat	13.5	-2.0	39.1	0.6
Fruit and vegetable	67.8	7.3	108.9	3.9
Pulses	21.5	9.2	42.7	6.7
Other foods	19.6	-4.9	55.0	-3.2

Source: Rapsomanikis 2009

High food prices and the corresponding increases in food expenditure result in increases in the rate of food insecurity. For Malawi this means that with higher (50 percent) food prices, an extra 13 percent of the population will be food insecure. This analysis shows that many non poor households will face higher expenditures, but that the food price swing has a significant negative impact on households that are already poor and food insecure. Also important to notice is that diversification of the staple diet is important. Malawi is pretty hard hit by the high food prices because its population is very dependent on maize. Comparing Malawi with Uganda it becomes clear. If the maize prices in Uganda increase by 50 percent, 30 percent less maize is consumed, the population substitutes maize for other staple foods, leading to less than one percent increase in the number of food insecure households, as compared to an increase of 13 percent in Malawi.

Conclusion

Cheap food has been taken for granted for almost 30 years. From their peak in the 70's crisis, real food prices steadily declined in the 80's and 90's and eventually reached an all-time low in the early 2000. But in 2007 the Global Food Crisis rose, characterized by a sharp spike in the prices of most commodities, including staple grains. The reasons behind the sharp spike are strong demand, slowing growth in agricultural production, rising oil prices, rapid expansion of biofuels production, declining stocks and reserves, dollar devaluation and trade shocks. Especially increases in production of biofuels are blamed by scholars. Actually, not one specific factor can be pointed out; this crisis is due to a combination of events.

The impact of the high food prices on Malawi depends on the degree of price transmission and poverty impact. Malawi is one of the countries in Sub-Saharan Africa where the markets are pretty well integrated with the international markets in the long run. Maize is the most important crop in Malawi and in general, it is a non-tradable crop, so prices are determined largely by domestic supply and demand, but because of the good market integration, the domestic prices are influenced by the world food prices and Malawi is the country with the highest price transmission. Whether higher food prices improve or worsen the situation of particular households depends importantly on the products involved, the patterns of household incomes and expenditures and the policy responses of governments. The empirical evidence shows that most households reduce the consumption of maize and increase their expenditure of maize, this results in increases in the rate of food insecurity. For Malawi this means that with food price increases of 50 percent, and extra 13 percent of the population will be food insecure. Malawi is hard hit by the food crisis because its population is very dependent on maize. A critical note on most recent studies on poverty impact assessment is that most studies have focused on simulating the impact of the price upswing by means of quantitative models based on past household survey data sets, rather than actual data. So the measured impacts are not real, they are simulated.

Finally, I want to highlight a contrast in this report. On one hand it is clear that in general, maize is a non-tradable crop in Malawi (imports are 3 percent of consumption, while exports are less than 6 percent of production), so prices are determined largely by domestic supply and demand (Minot 2010). On the other hand, Malawi is a country where its markets are very good integrated with international markets and therefore the transmission of international prices to domestic prices is high. If a country is in autarky all the prices are determined domestically, but even with a little bit of trade, the markets will be cointegrated. The Malawian markets are especially integrated in the long run, short-run fluctuations are mostly determined by domestic shocks.

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