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The "not-so-modern" consumer – considerations on food prices, food security, new technologies and market distortions

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Abstract. *Although food quality and food safety issues seem to dominate discussion and research in Europe, price inflation and economic recession may pose questions over food abundance over the coming years. For the first time since the early seventies, market stability for a number of commodities is seriously questioned.*
The paper tackles the fluctuation of food prices in the last decade and the reasons behind recent record prices in a series of commodities, trying to investigate whether food shortages may create new problems, even for relatively economically stable nations. Lowering stock levels that induce price volatility, production shortfalls due to adverse conditions that are often correlated to climate change, oil prices, changing diet patterns in regions that have become more affluent in recent decades, trade policies that often contradict one another, financial speculation in food markets all play a distinct role forming today’s reality. The effect of rising food prices is crucially important, at the microeconomic level, for poorer households.
The paper tries to investigate whether food security problems -in the sense that all people, at all times, have economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life- may become increasingly important in Europe in the future, as well as the necessary policies to protect those most vulnerable.

Keywords*: food insecurity, biofuels, food prices, market distortion, financial speculation*

Introduction

Recent record prices in a variety of food products have drawn considerable attention to the less privileged people around the world. Individuals facing chronic poverty and food insecurity were among the worst hit by recent price fluctuations. It is a fact that there is no single remedy for the problem as it does not stem from a single source. Facing an emergent food crisis, different sets of policies have been adopted both at national and international level without leaving, however, much space for optimism.
Market instability in major agricultural commodities coupled with general economic recession may provide an explosive mix even in economic regions that are considered affluent, like the EU, at least for those at the bottom of the income scale. High unemployment rates, rising prices and increasing inequality by definition mean, that more and more people will be left behind, unless necessary policies provide an effective social safety net.

Agricultural commodities and the 2008 price peaks

The undeniable decline in food prices during 2009 may not modify the importance of sharp increases during the two previous years. The index of nominal food prices, provided by FAO, has doubled between 2002 and 2008, while the real food price index started rising in 2002, following thirty years of stable prices and mainly declining trends. Price increases became dramatic during 2006 and 2007, leading to record highs for a number of crops. By mid-2008, real food prices were 64% higher than their 2002 levels (FAO, 2008a)[1].

At their peaks, during 2008, world prices of wheat and maize were three times higher than those in 2003, while price of rice was five times higher. Other food products were also influenced; Dairy products, meat, palm oil and cassava also experienced sharp price hikes during the same 5-year time period. The prices of butter and milk tripled and those of beef and poultry doubled.
Figure 1 illustrates the food price index for the past decade, with the 2008 peak being apparent, while Figure 2 shows that not all products had proportionate price fluctuations; the cereals price index has a much steeper peak than the meat price index for the same time period.

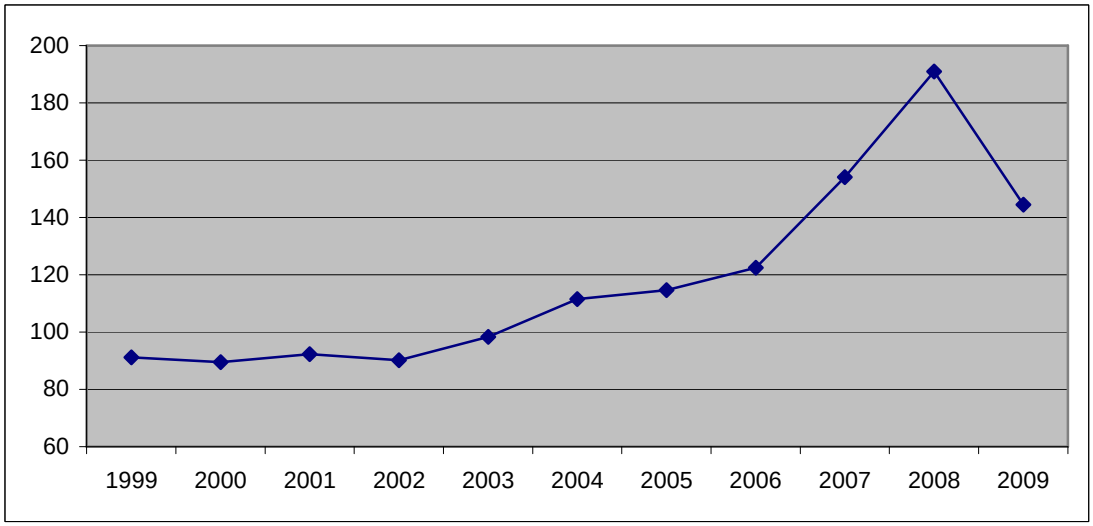

Figure 1: Food Price Index from 1999 to 2009,
data from FAO, (2002-04=100)

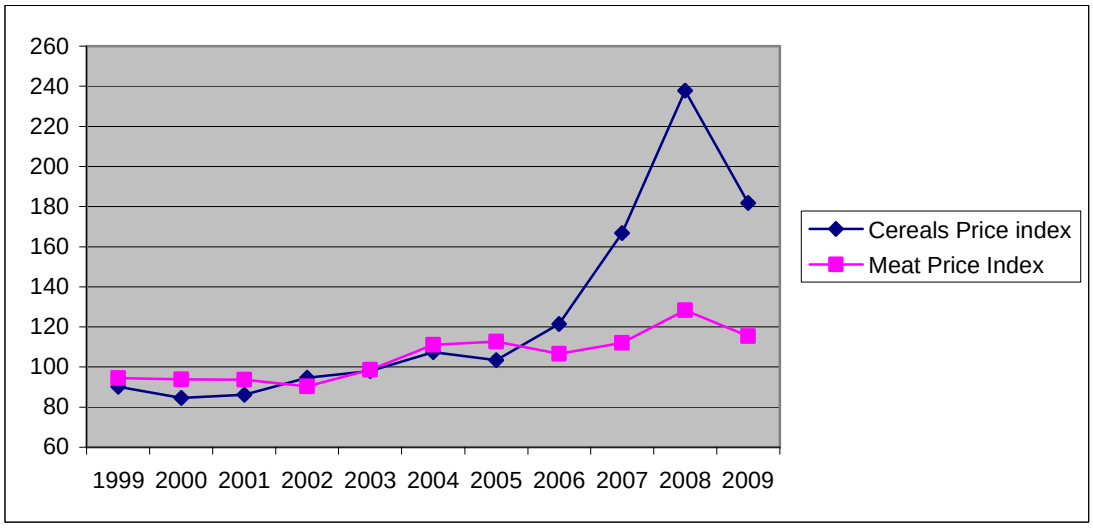

Figure 2: Cereals and meat price indices from 1999 to 2009,
data from FAO, (2002-04=100)

It is not an easy task to address the reasons behind the 2007-08 food price increase. It is certain that not a single factor but a variety of reasons have formed today's reality. Production shortfalls due to adverse conditions that are often correlated to climate change do not explain observed price changes but surely affect them. The demand side is influenced by changing diet patterns in regions that have become more affluent in recent decades, especially in Asia, where consumption of wheat and wheat-based products,

temperate-zone vegetables and dairy products in Asia has increased (Pingali 2006)[2]. This shift is expected to be reinforced in the future. With an income growth of 5.5 percent per year in South Asia, annual per capita consumption of rice in the region is projected to decline from its 2000 level by 4 percent by 2025. At the same time, consumption of milk and vegetables is projected to increase by 70 percent and consumption of meat, eggs, and fish is projected to increase by 100 percent (Kumar et al. 2007)[3]

In addition, trade policies that often contradict one another create insecurity; lowering stock levels induce price volatility, while oil price increases put further pressure. Further analysing these trends is out of the scope of this paper. However, two distinct and rather unique characteristics require further consideration. The first one concerns financial speculation in food markets, the intensity of which constitutes a rather new phenomenon. Addressing this food-financial crisis nexus, Sodano (2009)[4] identifies speculation in commodity futures, following the collapse of the financial derivatives markets, as one of the reasons behind recent price surges. The second one that has drawn already considerable attention investigates the role of the rapid increase in biofuel production and the consequent food-fuel competition.

Financial speculation in food markets

Financial speculation involves the buying, holding, selling, and short-selling of stocks, bonds, commodities, or any valuable financial instrument to profit from fluctuations in its price as opposed to buying it for use or for dividend or interest income (Robles et al., 2009)[5]. Speculation is widely understood as the purchase of a good for later resale rather than for use, or the temporary sale of a good with the intention of later repurchase in the hope of profiting from an intervening price change.

It has been suggested that following the downward spiral in financial markets, speculation in food products has been increased. If that were true, it could explain drastic peaks in prices that may not be addressed via the supply and demand functions. As Robles et al. (2009) point out *the flow of speculative capital from financial investors into agricultural commodity markets has been drastic, and the number of future traded contracts is increasing over time.* They have used four indicators in total, in order to investigate changes in speculative capital on agricultural commodities; *volume of futures contracts*, (which shows the total number of trades in commodity futures contracts in the Chicago Board of Trade –CBOT- on a monthly basis), *open interest in future contracts* (which captures the total number of future contracts for a given commodity that have not yet been offset by an opposite position or fulfilled by delivery of the commodity), *the ratio of volume to open interest in future contracts* as well as *the positions in future contracts by non-commercial traders.*

Among their findings is that traded volumes of agricultural commodity futures have increased significantly in recent years. *From 2005 to 2006, the average monthly volume of futures for wheat and maize grew by more than 60 percent and those for rice by 40 percent. In 2007, traded volumes again rose significantly for all four commodities, especially soybeans, whose monthly average was 40 percent larger than in 2006. During the first five months of 2008, only the volumes for maize seem to have stabilized, whereas the volumes for rice and soybeans were still growing at very high rates—47 percent and 40 percent, respectively* (Robles et al, 2009). The average monthly open interest in future contracts provides a similar story, leaving thus space for scepticism both on the role of short-term speculators, who open and close positions in a relatively short period of time and on the entry of medium and long term speculators into commodity future markets. In the same context, Plastina (2008)[6] concluded that between January 2006 and February 2008, investment fund activity might have pushed cotton prices 14 percent higher than they would have been otherwise. Sodano (2009) points out that *the amount of speculative money in commodity futures ballooned from US$5 billion in 2000 to US$175 billion in 2007*, in what was called in Wall Street the "commodities super-cycle"

Fiscal profit arising from speculation represents in essence the reward of the risk accepted by the speculator as opposed to a risk-adverse individual. However, excessive, unregulated speculation may have negative effects, especially in the case of food markets. Increased price volatility and high peaks reduce confidence in global food markets and may pose significant stability problems in the long run.

While regulating similar transactions is not an easy task and requires considerable resources, the steak is very high indeed as those worse affected by price fluctuations are the poor and the effects are often irreversible.

The food-fuel competition

Feedstock represents the principal share of total biofuel production costs. For ethanol and biodiesel, feedstock accounts for 50–70% and 70–80% of overall costs, respectively (IEA 2004)[7]. Thus, prices of agricultural commodities used in biofuel production are increasingly connected to energy prices, leading to even more fluctuations. Noting that the following paragraphs mainly refer to first generation biofuels, which have been the major application so far, it is not difficult to observe that, as increasingly more land is devoted to biofuel production, competition between food and fuel becomes transparent. Future competitiveness of the biofuel sector will determine the extent to which land, water and capital will be diverted away from food production. Figure 3 indicates the rapid expansion in the production of biofuels presenting US production of ethanol in millions gallons. As shown in Figure 4, US accounts for more than half of the worldwide ethanol production, being one of the two main producers (the other one is Brazil).

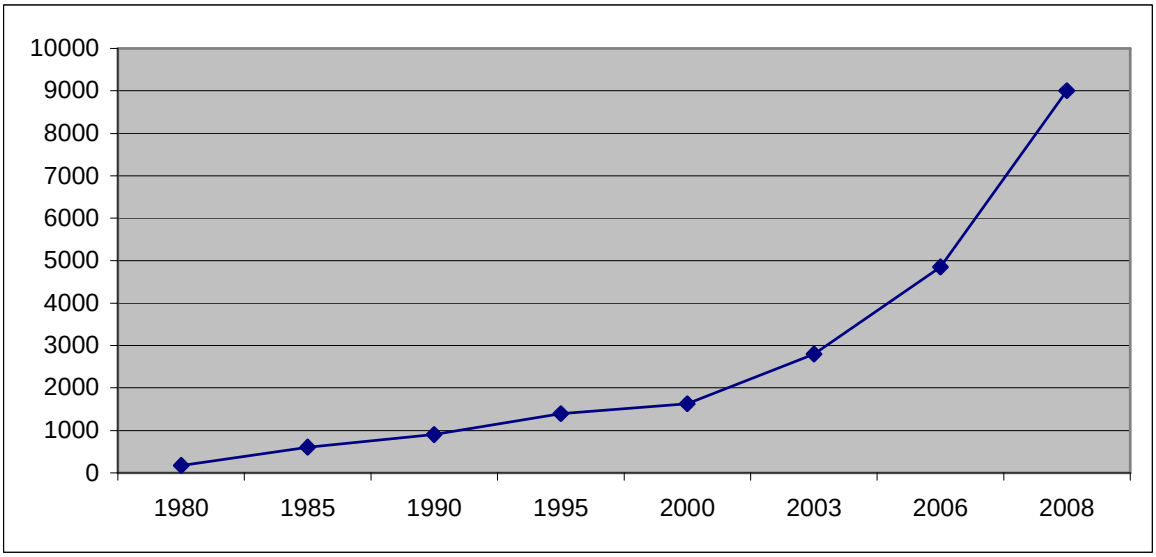

Figure 3: US historic ethanol production (in millions gallons), data from RFA

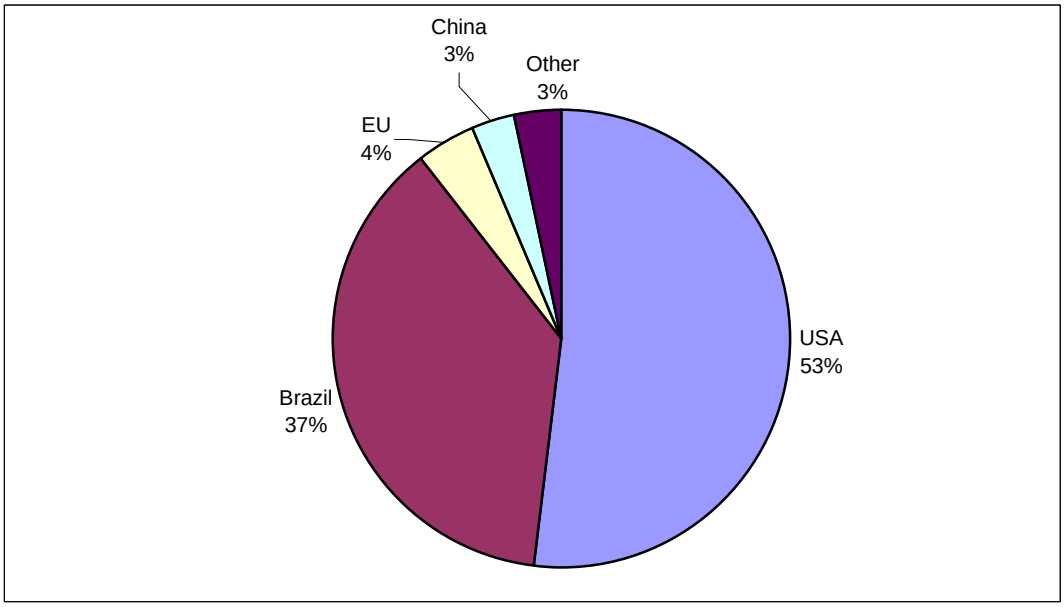

Figure 4: World ethanol production in 2008 by country, data from RFA

Forecasts related to biofuel production is not an easy task; IFPRI has developed IMPACT, which stands for International Model for Policy Analysis of Agricultural Commodities and Trade and has generated two future scenarios, one based on the current rate of biofuel increase, the other assuming a drastic raise. Under the planned biofuel expansion scenario, international prices increase by 26% for maize and by 18% for oilseeds. Under the more drastic biofuel expansion scenario, maize prices rise by 72% and oilseeds by 44%. Under both scenarios, the increase in crop prices resulting from expanded biofuel production is also accompanied by a net decrease in the availability of and access to food, with calorie consumption estimated to decrease across all regions compared to baseline levels (von Braun, 2007)[8].

Competition between food and fuel is heavily influenced by protectionist policies regarding biofuels. Protectionism is not a new initiative in the sector as it can be traced back in previous decades. The general idea was that biofuels were offering an alternative market for agricultural commodities, stimulating thus demand and pushing prices upwards. Facing huge budgetary considerations stemming by farm subsidies, the suggestion seemed economically viable. The willingness to end dependence on traditional oil-producing nations in unstable regions and environmental concerns constitute additional drivers that form today's reality.

However, the market environment in the biofuel sector became highly artificial as the agricultural commodities used for biofuel production already enjoyed some degree of protectionism via agricultural policies. Off-farm subsidies for biofuel production and consumption were added, resulting in an unsustainable background, heavily dependent on public intervention. Taken into consideration all protectionist measures, including import tarrifs, the safety net enabled domestic producers to thrive.

In general, subsidies for biofuels that use agricultural production resources are extremely anti-poor because they implicitly act as a tax on basic food, which represents a large share of poor people's consumption expenditures and becomes even more costly as prices increase (von Braun 2007). The International Food Policy Research Institute - IFPRI (Rosegrant et al, 2008)[9] attempted to quantify what part of the cereals price rise over the period 2000-07 was caused by biofuels demand. They conclude that the *increased* biofuels demand accounted for 30% of the average price rise of cereals and for 39% of that of maize (Alexandratos, 2008)[10].

Analysing in depth externalities present in the sector, may render a certain degree of protectionism on biofuels social benefits. However, the intensity of the subsidies is not compatible with the stated goals. *The bewildering array of incentives that have been created for biofuels in response to multiple (and sometimes contradictory) policy objectives bear all the hallmarks of a popular bandwagon aided and abetted by sectional vested interests. Understanding the consequences of these changes before any further damage is inflicted is the only responsible way forward* (IISD, 2007)[11].

Protectionism revisited

Back in 1973, Richard Nixon imposed a ban on US soybeans exports to ensure local supply, a decision that caused immediate outcry from other countries. The US was the major supplier and the measure was perceived as threatening livestock production. The Japanese were particularly unhappy as soybeans are a vital ingredient in their nourishment and 98% of their supplies were coming from the US. Although the ban did not last but one week and was subsequently replaced by other protective measures, such a reality would be considered distant past some years ago.

However, protectionist measures seem to become once more up to date, as national governments often find refuge in order to help domestic consumers and control food price inflation in the short run. While in some countries, such reaction may be addressed as beneficial at the national level and thus desirable by local governments, it is not rarely the result of social pressure.

Demonstrations, protests and riots over the price of food products has been the expectable result of the recent crisis that had serious social repercussions, although those are often less visible in affluent societies. Mexico, Yemen, Pakistan, Mauritania, Senegal, Cameroon, Argentina, India, Burkina Faso constitute just a small part of a long list of countries that have also witnessed protests over the last two years alone. Suddenly the bread intifadas in Egypt and Morocco in 1977 and 1984 respectively seem closer.

Risking popularity and electoral results, protectionist measures are a drastic option. Jordan, Bangladesh and Morocco, are increasing subsidies and reconsidering their tariff regimes, India and Egypt are restricting exports, China centrally controls domestic food prices, while Russia has implemented price controls on basic foodstuff. Export tariffs on wheat and other basic food products become once more popular; countries import more than they actually need in order to build their stocks.

While protective measures may provide a relief for domestic consumers in the short run, integral problems associated with market distortions do not cease to exist as they are economically unsustainable and fail to prioritise the greater, long term good. Price controls and export tariffs render production less profitable, damaging further the supply side. Subsidised consumer prices delay social unrest but simultaneously create an artificial economic environment, stimulating demand and creating even more problems in the long run. In February 2008, Kazakhstan's government announced its plan to restrict wheat exports in order to ensure domestic supply. As a result, global wheat prices augmented by 25% in a single day.

The effect on the poor

It is self evident that at the microeconomic level, the outcome of higher prices depends on whether the household is a net buyer or a net seller of food. FAO empirical analysis from developing countries indicates that about 75% of rural households and 97 % of urban households are net food buyers (FAO, 2008a). The budget share allocated to food and the income elasticity of food increase as income decreases and this conclusion, stemming both from simple economic logic and actual evidence (Regmi et al., 2001[12], Theil et al, 1989[13]), stands at the micro as well as the microeconomic level. Individuals with limited financial means will allocate more resources proportionately in order to cover basic needs, such as eating than rich people that will allot a significant proportion of their income on other needs, such as recreation. In addition, poor people will choose low value, inexpensive food products that may bear however low nutritional value and they will be much more responsive in price fluctuation.
Regmi *et al*. calculated that for every 1% increase in the price of food, food consumption expenditure in developing countries decreases by 0.75%, an estimate that may be further aggravated by recent price pressures. They also compared consumption spending response to price changes among developed and developing countries and their findings show that food consumption spending is much more elastic in low-income countries (Regmi *et al*., 2001). Poor people, once more, bear the burden.
Ahmed *et al*. (2007)[14] calculate the number of people living in ultra poverty –less than US 0.5$ a day- at 160 millions. Even worse, in certain regions including Sub-Saharan Africa as well as Latin America, the absolute number of ultra poor people is still increasing. While this is without doubt reason for great concern, persistent inequality may pose new questions for those less privileged, even in the developed world.

The other side of economic prosperity

It is not difficult to explain why the bulk of research, analysis and policy measures concerning poor people focus on the developing world. Crossing the psychological limit of one billion food insecure individuals and the increasing number of ultra-poor (those living on less than $ 0.5 per day) in many regions of the planet, demonstrate in tragic fashion the urgency of the problems. However, it is simultaneously noticeable that, even in affluent societies, some are left behind.
Poverty as a notion poses difficulties both in terms of definition and comparison. This is apparent to the Dublin European Council definition that considers as poor *those persons, families and groups of persons whose resources (material, cultural and social) are so limited as to exclude them from the minimum acceptable way of life in the Member State to which they belong.*
The European Council's definition constitutes interesting reading. Approaching poverty as *exclusion from the minimum acceptable way of life* reveals a relative definition, instead of absolute measures, which are mainly used in developing economies. Internationally, thresholds of one or half a US dollar per day –in purchasing power parity terms- are used for the identification of poor and ultra poor people respectively. One of the UN Millennium Goals portrays this tendency as it is aiming to lower by 50% the population earning less than one US dollar per day, in a period of 25 years until 2015. At EU level, individuals are considered to be under the risk of poverty when they posses disposable income of below 60% of the national median. This has become the standard risk of poverty threshold in Europe, although Eurostat calculates and publishes rates according to various thresholds.
It is not very hard to spot that the utilisation of relative measures may camouflage the bigger picture. Thus, on one hand, in case of rapid economic growth, disposable income of below 60% of the national median may denote acceptable living standard which means a decrease in absolute poverty, although the relative measures may show no significant change. On the other hand, during economic recession, relative poverty may fail to portray the magnitude of absolute poverty that people live in.

Since relative poverty measures seem to dominate the analysis, income distribution and inequality become of primary importance. Figure 5 shows income inequality in selected European countries as derived dividing the total income of the richest fifth by the total income of the poorest fifth. The EU average is slightly less than 5, with Greece and Portugal presenting the highest inequality rates and Sweden the lowest.

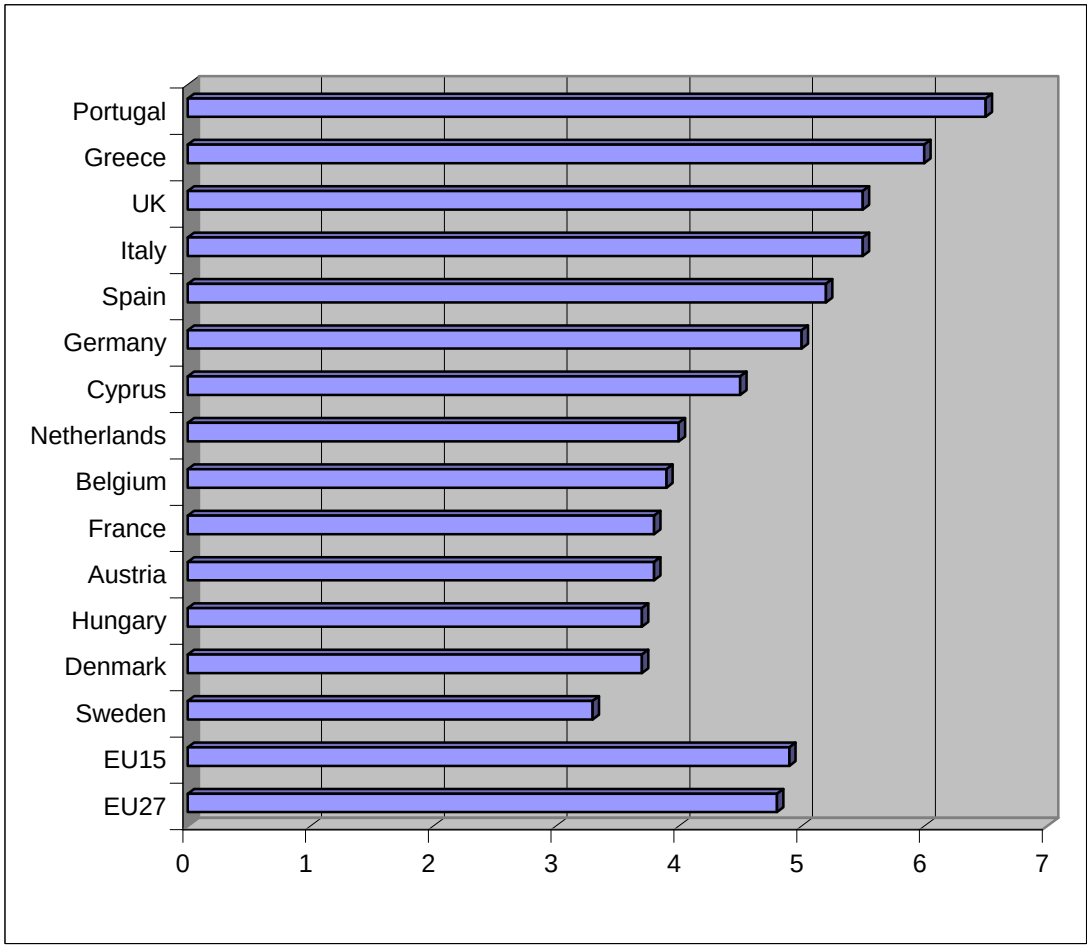

Figure 5: Income inequality in selected European countries
(total income of the richest fifth / total income of the poorest fifth),
data from EU Community Statistics on Income and Living Conditions, 2009

As calculated by Lelkes et al. (2009)[15], based on 2006 EU-SILC data, the rate of relative poverty varies between 10% and 23% in EU countries, with the proportion of the population with income below the poverty threshold lowest in the Czech Republic and the Netherlands and highest in Latvia. They also estimate that two-thirds of the total population at risk of poverty in the EU live in the six largest countries: Germany, France, the UK, Italy, Poland and Spain. However, this fact conceals regional disparities as Germany and Italy have the same absolute number of people at risk of poverty, while the latter is significantly smaller in terms of total population. Thus, Germany may have an important negative contribution to the total amount of people at risk of poverty but still presents risk of poverty rates below average.

Lelkes et al., in the same study try to address low income categories in absolute terms as well. In order to do this, they calculate an income of 40% of the EU median as representing an average of just under 15 Euros per day, expressed in purchasing power terms than actual Euros. Estimating the income equivalent of this level of purchasing power in Poland at 8 Euros per day, they come up with a rather arbitrary threshold of around 5 Euros per day (60% of the Polish median), which can be useful for illustration purposes.

Figure 6 illustrates the actual number of people with equivilised disposable income of under 5 Euros per day, measured in terms of purchasing power standards for selected European countries. Using 2005-06 data, in Europe there were more than 14 million people in total in this category, which represent 3% of the total population. Almost half of them live in Poland, followed by Lithuania, Italy and Germany.
Figure 7 shows the percentage of people with equivilised disposable income of under 5 Euros per day out of the total population in each country. Almost one out of three Latvians and Lithuanians, one out of five Polish belong in this category.

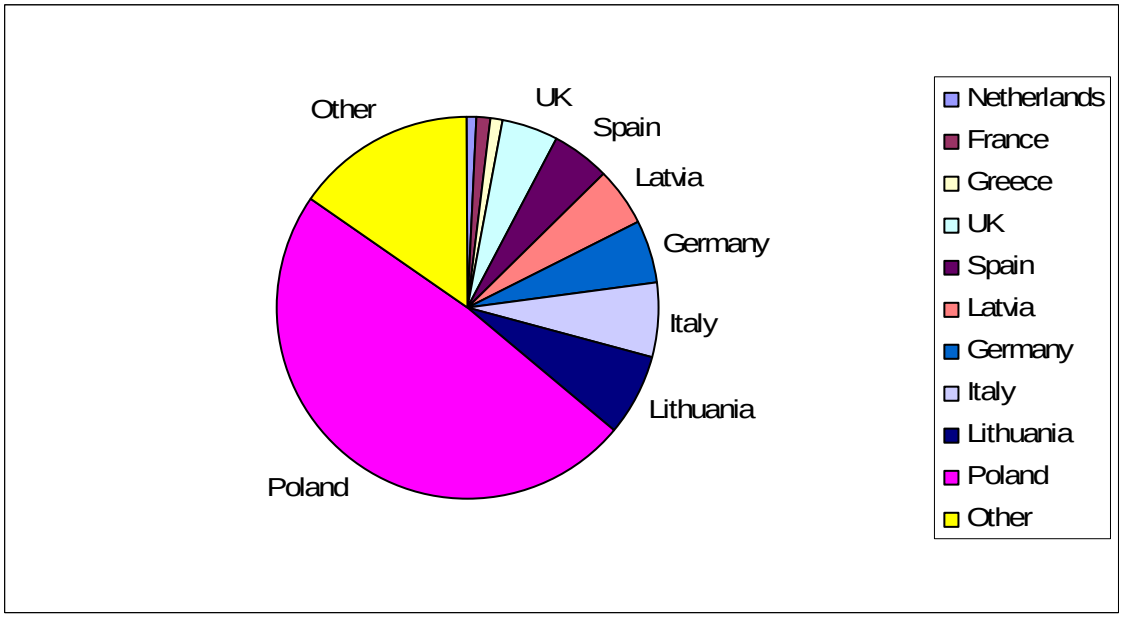

Figure 6: People with equivilised disposable income of under 5 Euros per day by country, adapted from Lelkes et al. (2009), data are from EU-SILC (2006)

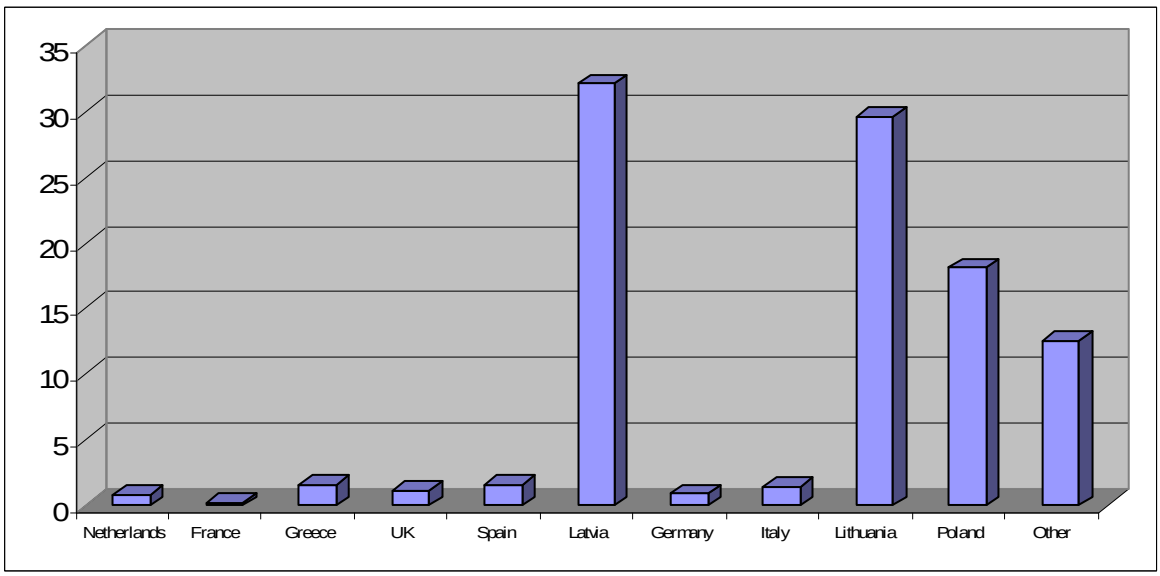

Figure 7: % of people with income under 5 Euros per day out of total national population by country, adapted from Lelkes et al. (2009), data are from EU-SILC (2006)

Policy responses and conclusive remarks

While a variety of driving forces have contributed in the price increases that have seriously affected agricultural markets, quite a few of them are not surprising, as they have emerged in the past. Population growth, income growth, production shortfalls and increasing demand, oil prices and subsequent production costs, trade policies presenting lack of clarity concerning ultimate goals have all been present and, at some extent dealt with, in the past. *Such surges were resolved through a combination of policy responses and spontaneous market adjustments. If these were the only factors at play currently, we could look forward with some confidence to the prospect that the present price surges would subside over the short to medium term* (Alexandratos, 2008). While panic over price increases loses steam, protectionist measures will be relaxed and coupled with supply recovery, food prices may return closer to their historical averages in the short run. However, in order to shape polices necessary to address future problems, an insight in the integral mechanisms of price formation in the long run, is essential.

An analysed in previous paragraphs, recent food price increases are also due to new, non-traditional factors that may prove to be more than mere disturbances on the path of world agriculture (Alexandratos, 2008). Biofuel production and the subsequent food-fuel competition may be addressed in more than one ways in this context. While protectionist policies that create an artificial environment, which favours biofuel expansion seem to dominate the discussion nowadays, increasing prices of energy may start to pose new questions in the not so distant future. As long as oil prices continue to increase, biofuels will become increasingly competitive and even the removal of their safety net may not affect future production, putting thus more pressure in agricultural resources. Unregulated financial speculation may aggravate the situation and lead to even more price fluctuations.

International organisations, including the United Nations and the Food and Agriculture Organisation have called for the necessary policy responses in recent declarations (High Level Conference on World Food Security, FAO, 2008b[16] and High Level Force on the Global Food Crisis, UN, 2008[17]). These would include emergency measures to combat food insecurity as well as structural adjustments, including stock replenishment and long term agricultural investment to increase productivity.

While, future predictions regarding the state of world agriculture should be tentative, in the sense that they are affected by factors that are surrounded by a certain degree of uncertainty, recent tendencies may require policy responses that may alleviate some of the burden for those less privileged. Although this fact has long been acknowledged as far as the developing world is concerned, persistent inequality coupled with general economic recession may require policy adjustments concerning income lagging individuals in affluent societies as well.

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