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Commodity market instability and asymmetries in developing countries: Development impacts and policies

Les asymétries et l'instabilité du marché des matières premières dans les pays en développement : politiques et impacts sur le développement

Commodity market instability and development: Issues and policies

By

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Abstract

The paper review various aspects of commodity market instability and development, with the purpose to identify whether research has dealt with some of the pressing issues relating to the topic during the past years, and to identify promising areas for further research. Particular emphasis is given to the areas of distortions, asymmetries, and irreversibilities, and it is revealed that while these topics are very relevant, not enough research has addressed them. The paper concludes by discussing the various policies that can be implemented at the international levewl to alleviate problems of food commodity market instability.

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1. Introduction

Commodity and general market instability have been at the center of development policy debate in the recent past, starting with the food commodity prices spikes on 2007-8, then continuing with the 2009-10 financial crisis, the ongoing energy market volatility, and the continuing commodity market instability of the last few years. Natural but also economic disasters have left large economic losses. The International Fund for Agricultural Development (IFAD) Rural Poverty Report of 2011 emphasized the importance of addressing risk for rural development, and the latest World Bank World Development Report of 2014 (WDR 2014) highlighted that there is substantial evidence that recognizing and preparing for risk can pay off in terms of development and growth. The main message of the WDR of 2014 was that individuals and institutions in developing countries as well as donors should move from being "crisis fighters" to becoming "proactive and systematic risk managers", and this because protecting hard-won development gains by building resilience to risk is essential to achieving prosperity.

Risk, defined as exposure to uncertain future events, is part of everyday life, and people and countries have learned to deal with it over centuries. However, there is a growing realization that uncertainty and risk maybe crucial to a country's growth and development as well as its welfare. Sudden and unanticipated shocks, whether caused by natural events, or economic developments affect developing countries, as well as poor people in unequal ways. Commodity market risks in particular are well known to affect development and welfare in a variety of ways and it is important to understand these so as to prioritize policy actions, and to design strategies to avoid the undesirable parts of the consequences. In particular commodity market shocks may have both asymmetric patterns and asymmetric impacts, namely differing in booms and busts, or create irreversibilities that may hamper subsequent development. While considerable research has taken place in the past to understand the influences of commodity market shocks, asymmetries and irreversibilities have not been studied much.

The purpose of this paper is to review the various aspects of commodity market instability and development, with the purpose to identify whether research has dealt with some of the pressing issues relating to the topic during the past years, and to identify promising areas for further research. Particular emphasis will be given to the areas of distortions, asymmetries, and irreversibilities, as these are topics which have not been adequately researched before.

Section 2 below reviews the concept and measurement of commodity market instability or volatility and evidence on the consequences at macro level. Section 3 examines the volatility risks faced in particular by developing country food importers. In section 4 the impacts of food market instability on food security are examined. Section 5 discusses the imnpact of market distortions on commodity instability, while section 6 explores the poverty trap inducing aspects of market instability. Section 7 considers policies to deal with food commodity piice shocks, and section 8 concludes

2. Nature of commodity market instability and why it matters

Market instability or volatility normally refers to variations of market prices from period to period. As such it is an ex-post concept, in the sense that everyone can observe the market variations. However, what matters for both market participants as well as policy makers are not the market price variations per se, but their

unpredictability, and the risks they create. Uncertainty of the variable x, when looked at from some period before its realization, is basically a summary measure of the unpredictable elements in the process determining x, that are likely to occur between the time of the prediction and the time of realization of the variable x. For instance if a producer is contemplating producing a crop, he/she may know the basic process (the model) that determines the yield and the price of the commodity, but he also knows that there are elements of this process, such as rainfall and future price, that cannot possibly be predicted say one year ahead. These unpredictable elements are what create the uncertainty about the outcome of his action to produce the crop. Uncertainty then depends on how far into the future one is interested in the variable of interest. In the sequel uncertainty and upredictability are used interchangeably as they refer to the same concept.

Risk, in turn is generated by uncertainty. In other words risk is generated by actions whose outcomes are subject to unpredictability. In the case of the producer, he knows that production of a crop is uncertain. As long as he does not produce the crop he is not at risk. If, however, he decides to produce it, he places himself at risk, as the outcome of the crop affects his income and welfare. Thus it is unpredictability that defines uncertainty, and it is the actions that have uncertain outcomes that create the attendant risks. In the face of uncertain outcomes and prices, agricultural producers, for instance, tend to reduce the risks facing them, by diversification, namely by producing a less uncertain mixture of products. In the case of countries, whose foreign exchange earnings depend on commodity exports (and there are several such developing countries as indicated below), commodity price instability and unpredictability make economic planning quite difficult, thus potentially affecting growth.

Prices normally fluctuate in commodity markets in response to new and continuously changing information about the state of the markets. Similarly the underlying uncertainty about future events gives rise to expectations about future market outcomes, such as prices, and difference degrees of confidence about these expectations. Hence at any point in time one can talk about the underlying uncertainty of the market about a future outcome. The level of information and the actions of the various market participants based on this information determine the probability distribution of expectations as well as actual market outcomes. It is normal in commodity markets that actual prices vary from period to period, and also that expectations of market outcomes, such as prices, also vary.

Volatility is normally associated with two concepts. The first is variability of the observed prices, and as such it is a concept that can be readily quantified ex-post through some a measure based on observable market prices. The second concept is that of unpredictability, and this, at any one time, refers to the conditional probability distribution of some subsequent market outcome, given current information. Such a concept cannot be readily and objectively quantified, as there is no corresponding market variable. It can only be inferred from observed market variables through some appropriate model.

The principal concern of market participants and policy makers alike is not large ex-post variations in observed prices per se, but large shifts in the degree of unpredictability or uncertainty of subsequent prices. Such large shifts normally also cause large changes in observed market prices and are associated with what has been termed “excess volatility” (Shiller, 1981, Prakash, 2011), a rather elusive concept

referring to variations of prices outside what maybe inferred or predicted on the basis of expectations of rational efficient markets.

A very popular measure of ex-post or realized or historical market volatility, used extensively in finance, is the annualized historic volatility, computed as the standard deviation of the logarithmic returns of prices over a given period of time multiplied by the square root of the frequency of observations.

$v = \sigma\sqrt{T}$, where

$$\sigma = \sqrt{\sum_{i=1}^{n}(r_i - \mu)^2/(n-1)} \quad , \text{ and } \quad r_i = \ln(P_t) - \ln(P_{t-1}) \qquad (1)$$

In the above r_t is the logarithmic return of price, P is the (detrended) price of the commodity, n is the number of observations, μ is the average of the logarithmic returns, and T is the frequency of the observations on a yearly basis (252 if daily[2], 12 if monthly, etc.).

Unpredictability in turn is not easily measured as indicated above. One relatively objective measure of unpredictability is "implied volatility", which is a measure of the market estimate of the ex-ante or conditional variance of subsequent price, based on current observations of values of options on futures prices in organized exchanges, and using the Black-Scholes model for the computations. Estimates based on the two concepts may point in different directions, depending on data. For instance illustrations in Prakash (2011) indicate estimates of realized volatilities of cereals, based on observed spot prices in major international markets, such as Gulf (as compiled by FAO), which exhibit mild upward trends, while estimates of implied volatilities of the same cereal prices, as inferred from option prices in the major exchange trading these derivative instruments, namely Chicago Mercantile Exchange (CME), exhibit strongly upward trends. This suggests that there maybe different determinants of the ex-post and the ex-ante volatilities of food commodities depending on the market where prices are measured.

Unfortunately there are not many organized commodity options markets, and hence implied volatilities cannot be estimated from readily observed option prices for most commodities. However, there are other ways to measure unpredictability. A popular measure is an estimate of the conditional variance of future price, based on a time series model of the price. Models of prices that allow direct estimation of such conditional variances are the class of Generalized Autoregressive Conditional Heteroscedastic time series models (GARCH), introduced by Bollerslev (1986).

The detrimental effects of uncertainty or unpredictability on both private agents, as well as governments are not hard to understand, and have been the object of both discussion as well as research for a long time. For instance, Keynes (1942) argued that commodity price fluctuations led to unnecessary waste of resources, and, by creating fluctuations in export earnings, had a detrimental effect on investment in new productive capacity, and tended to perpetuate a cycle of dependence on commodities, what we may call in modern growth terminology a "commodity development trap".

[2] 252 refers to the number of trading days within a year

The above discussion implies that mere ex-post variability of outcomes does not constitute uncertainty, which is inherently an ex-ante concept. This issue of uncertainty versus mere ex-post variability is important, as compensatory schemes like STABEX, as well as the IMF's Commodity Compensatory Financing Facility (CFF) have adopted a notion of uncertainty that is related to the mere ex-post variability or fluctuations of outcomes such as export earnings or import costs, rather than to their predictability. More recently, there have been efforts to construct indices that correspond more closely to the theoretical notion of uncertainty, namely the notion of unpredictability. Dehn (2000b), constructed an index of price instability that distinguishes between negative and positive shocks, and finds, as expected theoretically, that negative commodity price shocks have a significant negative effect on overall economic growth. This was the first study to establish a strong negative empirical link between negative unanticipated shocks and overall economic growth. Recently Cavalcanti et. al. (2011) also estimated that negative terms of trade shocks (which include high food import costs) have stronger negative growth impacts than positive terms of trade shocks for developing countries.

Commodity market instability is of considerable concern for Commodity Dependent Developing Countries (CCDCs). According to UNCTAD (2014), a commodity dependent country is one where commodity exports account for 60 percent or more of merchandise export value. In 2012-13 there were 94 developing countries which were CDDCs, up from 88 in 2009-10. Of these 45 were in Africa, 20 in Latin America and the Caribbean, 19 in Asia, and 10 in Oceania. These countries represented 71 percent of all developing countries in 2012-13. Sixty three developing countries were classified in 2012-13 as being extremely commodity dependent, defined as those where commodity exports accounted for more than 80 percent of total merchandise export value. Of all Least Developed Countries 39 countries (or 85 percent of the group) were CDDCs in 2012-13, and increase from 37 in 2009-10. UNCTAD cautions that the recent increase in commodity dependence maybe the result of rising commodity prices. Between 2009-10 and 2012-13, the UNCTAD non-oil commodity price index rose by 14 percent, while crude oil prices rose by 48 percent. Most of these CDDCs also had very high degree of commodity export concentration, namely dependence on only a few commodities for total exports.

That unpredictability rather than instability is the main problem in agricultural production is one of the oldest, but apparently forgotten or not appreciated, issues in agricultural economics. In fact one of the earliest classic works in agricultural economics considered exactly the issue of agricultural price unpredictability and the benefits of establishing forward prices for producers (Johnson, 1947). By establishing forward prices for agricultural producers, one basically eliminates one of the most troublesome and potentially damaging sources of income unpredictability, and makes producers able to plan better their activities.

Establishing predictability in agriculture has been one of the earliest institutional developments of the modern era in developed countries. In fact the modern US agricultural marketing system realised very early the benefits of a market based system of forward prices, and through the simple system of warehouse receipts, emerged one of the most sophisticated and useful marketing institutions in modern agriculture, namely the institution of futures markets. It is not perhaps coincidental that futures markets developed independently in several countries and long time ago. In more recent years, the development and globalisation of financial markets has led to the proliferation of many other risk management commodity related instruments,

notably options, and weather related insurance contracts. While in some developed countries the marketing system response to unpredictability has been the establishment of sophisticated forward markets, in most other countries, both developed and developing, the response of producers, and through their pressure of governments, has been the institution of fixed or minimum price marketing arrangements. The major problem, however, of most such schemes is not that they are in principle wrong, but that they have most often been transformed to price support or taxation instruments that have veered off their purpose of providing forward signals and minimum prices based on proper predictions.

It, therefore, appears that a major issue in post adjustment agriculture in most developing countries, with respect to market volatility, is how to establish some forward pricing or insurance system for agricultural producers and governments without distorting the markets. Once such forward mechanisms can be established then one can talk about systems of insurance or systems of compensation.

Considerable literature has been devoted to understanding the costs of market volatility. Prakash (2011) offers a thorough survey. While some literature (e.g. Lucas, 2003) suggested that the cost of market volatility is quite small in developed countries with efficient capital markets, other literature, that took into account credit constraints and imperfect transmission from international to domestic markets, showed that the cost of market volatility can be substantial for low income developing countries exposed to commodity shocks (Guillaumont, et. al., 1999, Prasad and Crucini, 2000, Subervie, 2008, Rapsomanikis and Sarris, 2008, Bellemare, et. al. 2010).

3. Volatility risks faced by food importers

While general commodity market instability and upredictability is crucial for commodity exporting countries, and this is where the commodity dependence literature has focused for most of the past 40 years, food commodity dependence, expecially by LDCs, LIFDCs, and NFIDCs[3] came to the fore with the first world food crisis of 1973-74, and recently with the food crisis of 2007-8. Food market instability and especially unpredictability matters a lot for food security for countries and households that are net staple food buyers. Policies for the effective management of price booms or general market volatility depend on the proper identification and assessment of the risks facing each country. These differ by country, and involve the identification of the parts of a country's economy and inhabitants that are vulnerable to food commodity market shocks, as well as the types of market uncertainties which affect these agents. In other words one must outline a "risk profile" of the country to food commodity shocks. In the sequel risks that depend on upheavals in international food markets are discussed.

Proper response to a food commodity shock differ depending on whether the shock affecting the country is transitory or permanent. Factors to consider are the following: (i) Does the price shock have its origins in factors external to the country, such as world markets, or in domestic production supply imbalances in the markets concerned? (ii) How transitory are the factors that have led to the price shock? (iii)

[3] LIFDCs (Low Ijncome Food Deficit Countries) are a FAO classification. The latest list of May 2012 includes 62 countries. The list of LDCs(Least Developed Countries) is one used by the United Nations (UN) and as of 2012 includes 49 countries. Almost all LDCs are also included in the LIFDC list. The list of NFIDCs (Net Food Importing Developing Countries) is a World Trade Organization (WTO) group, which as of 2012 includes all 49 LDCs and another 31 higher income developing countries, for a total of 80 countries.

What is the level of uncertainty concerning the factors that may influence the future course of prices? The answers to these questions are not easy, and there may be legitimate differences of opinion among analysts concerning such assessments.

The second issue concerns the possible impacts of the price shock on the country's economy and its citizens. The impact of increasing prices on the wider economy is determined by a number of structural characteristics, such as the structure of production and food consumption, and the types and income-consumption profiles of households. Any adopted policy measure should not try to protect or benefit one vulnerable group by damaging the benefits to another poor constituency. In this context, it is important to ascertain the extent to which price signals are transmitted to the domestic markets, the identification of vulnerable population groups that can be targeted for support, as well as the agricultural sector's ability to respond to increasing prices.

The third issue that is imperative before a country adopts specific policy measures is to ascertain and be clear about the objective of the policy. Too often policy measures are adopted with a very narrow objective, and may end up affecting negatively other areas of equally important domestic concern. Also if the objective is known and generally agreed upon, then any policy measure can be judged against others that may offer similar benefits, but with smaller side effects or negative secondary consequences. Finally, if there are more than one policy objectives, it may well be that a combination of measures is necessary to simultaneously achieve all of them.

The reactions to the recent price boom, suggest that policy reactions to the food price surge have been prompt, with governments in many developing countries initiating a number of short-run measures, such as reductions in import tariffs and export restrictions, in order to harness the increase in food prices and to protect consumers and vulnerable population groups. Other countries have resorted to food inventory management in order to stabilize domestic prices. A range of interventions have also been implemented to mitigate the adverse impacts on vulnerable households, such as targeted subsidized food sales (Rapsomanikis, 2009).

Demeke, et. al. (2009) made a review of policies adopted in response to the recent food price spike and they indicated that the responses of developing countries to the food security crisis appear to have been in contrast to the policy orientation most of them had pursued over the last decades as a result of the implementation of the Washington consensus supported by the Bretton Woods Institutions. This period had been characterized by an increased reliance on the market – both domestic and international – on the ground that this reliance would increase efficiency of resources allocation, and by taking world prices as a reference for measuring economic efficiency. The availability of cheap food on the international market was one of the factors that contributed to reduced investment and support to agriculture by developing countries (and their development partners), which is generally put forward as one of the reasons for the recent crisis. This increased reliance on markets was also concomitant to a progressive withdrawal of the state from the food and agriculture sector, on the ground that the private sector was more efficient from an economic point of view.

The crisis has shown some drawbacks of this approach. Countries depending on the world market have seen their food import bills surge, while their purchasing capacity decreased, particularly in the case of those countries that also had to face higher energy import prices. This situation was further aggravated when some important

export countries, under intense domestic political pressure, applied export taxes or bans in order to protect their consumers and isolate their prices from world prices.

As a result, several countries changed their approach through measures ranging from policies to isolate domestic prices from world prices; moving from food security based strategies to food self sufficiency based strategies; by trying to acquire land abroad for securing food and fodder procurement; by trying to engage in regional trade agreements or; by interfering with the private markets through price controls, anti-hoarding laws, government intervention in output and input markets, etc.

The major problem of NFIDCs is not only price or quantity variations *per se*, but rather major unforeseen and undesirable departures from expectations, that can come about because of unanticipated food import needs due to unforeseen adverse domestic production developments, as well as adverse global price moves. In other words, unpredictability is the major issue. This is also the gist of the argument of Dehn (2000a) and Cavalcanti, et. al. (2011) who argued that the negative impacts on growth of commodity dependent economies come from unanticipated or unpredictable shocks, rather than from ex-post commodity instability per se.

Apart from the problem of unpredictability of food import bills for NFIDCs, another problem that surfaced during the recent food price spike was the one of reliability of import supplies. Several NFIDCs that could afford the cost of higher food import bills, such as some of the middle income oil exporting countries and small island states, during the 2007-8 period faced problems of not only unreliable import supplies but also the likelihood of unavailability of sufficient food import quantities to cover their domestic food consumption needs. This raises a different problem for these countries, namely the one of assurance of import supplies. Several of these countries, e.g. those surrounding the Arab Peninsula and the Persian Gulf, have unfavorable domestic production conditions and rely on imports for a substantial share of their domestic consumption. Unavailability of supplies creates large food security concerns for these countries.

A third problem that also became prominent during the recent food crisis, was the one of trade finance. Trading agents in exporting countries who plan to export food commodities to any country need to obtain finance for the exports. Such finance is normally provided by specialized export financing banks, which in turn have limits on how much total finance they provide, or exposure they incur, to any one country. When international prices rise, the amount that needs to be financed for a consignment of fixed volume naturally increases. The increase, however, maybe such, depending on the amount of price rises, that the export bank reaches the limit of its exposure to the particular country, and will not lend more. Hence imports maybe limited by the rise in international price irrespective of whether the importing country agent has adequate resources to pay for the imports.

Prices normally fluctuate in commodity markets in response to new and continuously changing information about the state of the markets. Similarly the underlying uncertainty about future events gives rise to expectations about future market outcomes, such as prices, and difference degrees of confidence about these expectations. Hence at any point in time one can talk about the underlying uncertainty of the market about a future outcome. The level of information and the actions of the various market participants based on this information determine the probability distribution of expectations as well as actual market outcomes. It is normal in commodity markets that actual prices vary from period to period, in response to new

information, and also that expectations of market outcomes, such as prices, also vary. Thus actual and observed price variations are due to two sets of fundamental variables, namely the underlying uncertain shocks that change the conditions in the markets (such as production shocks), and the behavior of the market participants, both private as well as public, in response to these shocks (Fackler and Tian, 1999). It is important to ascertain the degree to which price uncertainty is due to unpredictable exogenous shocks, or due to market actor responses to such shocks, as the appropriate policies to deal with market uncertainty will be different.

4. Impacts of food market instability and unpredictability on food security

The major issue relevant to the impact of high international food prices, and/or unpredictable food price spikes on food security, is the impact on poor rural and urban net staple food buying households. This impact in turn depends on two factors. First, it depends on the share of staple foods in total consumption expenditures. Secondly, it depends on the degree to which international food prices are "transmitted" to the local markets.

On the first issue table 1, borrowed from Anderson, Ivanic, and Martin (2014), indicates that for most low-income countries, people living on less than $1.25 per day are net buyers of staple foods, and the share of these foods in total expenditures is very high, about 62 percent. It also shows that rice, wheat, oilseeds, and maize account for about 39 percent of total food expenditures of the poor. It is thus likely that the prices of these four commodities have large implications for food security of these poor households.

On the second issue, price transmission of international prices to domestic prices relevant for the poor can be conceived as the net effect of several stages. These stages start with the conversion of the international prices to domestic currency prices, then there is a variety of border and domestic policies that alter the local price of the commodity via tariffs, subsidies, export bans, food reserve systems, price controls, etc. The net result of all these can be expressed as a "price transmission coefficient", which, if there were no policies and no barriers, would be equal to 1. It turns out that in practice these coefficients are considerably smaller than 1. For instance in a study of seven Asian economies, Dawe (2008) found that transmission rates of rice and wheat prices were generally low in Asia. In India, Philippines, and Vietnam the pass-through was just 6–11 percent, but in the remaining countries it was 41–65 percent. Rapsomanikis (2009) in a study of several Eastern and Southern Africa countries found that transmission of international to domestic maize prices is generally strong, but it takes several months for full transmission (4-8 in most cases).

The transmission, however, is not only from international to domestic prices. A variety of trade distortions aimed at insulating domestic markets from world price shocks, end up in aggregate to destabilize the world prices themselves. Anderson, Ivanic and Martin (2014) found that the aggregate effect of all countries' price-insulating behavior during 2006–08 was to raise the price in the international marketplace by 52 percent for rice, by 18 percent for both wheat and maize, and by 31 percent for edible oils. These are clearly non-negligible effects, which show that self-serving nationalistic policies, when generalized across countries, tend to be partially self-defeating. This is a case of the well-known fallacy of composition.

Given specific rises in food staple prices, the issue arises as to the impact on poor people's welfare and food security. Three papers have examined in a comprehensive

manner such impacts. Ivanic and Martin's (2008) study of 9 countries across several continents; the study by Wodon et al. (2008) of 12 West African countries; and the study by Dessus, Herrera, and Hoyos (2008) of the urban sector of 73 developing countries. The basic approach in these papers follows Deaton (1989) in estimating the change in food welfare as the product of the food net-benefit ratio and the change in food prices. All three studies assume domestic food price changes for lack of actual data. Thus the results of these studies should be treated as experimental answers to the research question "What would happen to poverty rates if prices increased by x percent?"

In one simulation by Ivanic and Martin (2008), the authors do use real international prices, but they assume a common 60 percent transmission rate to domestic prices. In general, however, the three studies simulate real price changes ranging from 10 to 30 percent. Whether these guesses are too high or too low is not clear. So far we have very limited data on how much overall food prices have changed as a response to higher international prices. Also, what data we do have tend to be urban prices (often wholesale prices). Food prices in rural areas will often be very different, and price rises will probably be smaller in rural areas because of higher transaction costs. Recent studies show that African markets in the same country may not be equally well integrated with international markets (Cudjoe, Breisinger, and Diao 2008; Ulimwengu, Workne, and Paulos 2009), which has strong implications for the spatial impacts of international food price rises.

Many of the countries in the study samples of Ivanic and Martin (2008) and Wodon et al. (2008) are estimated to experience significant increases in poverty. Similar methods applied to individual country studies find equally strong results, including poverty increases in Ghana (Cudjoe, Breisinger, and Diao 2008), Mexico (Valero-Gil and Valero 2008), and Pakistan (Ul Haq, Nazli, and Meilke 2008). Even a net rice exporter like Thailand appears to experience an increase in national poverty because of higher food prices (Warr 2008). Moreover, changes in rural poverty are sometimes larger than those in urban poverty, especially in Africa. In Zambia, for example, Ivanic and Martin (2008) estimate that the incidence of rural poverty increases three times as much as urban poverty, which is surprising.

Is it possible that these surveys overestimate the number of net food consumers? Aksoy and Isik-Dikmelik (2008) also analyze household surveys (including some of the surveys analyzed by Ivanic and Martin [2008]) and conclude that (i) although most poor households are net food buyers, almost 50 percent are marginal net buyers and (ii) net buyers typically have higher average incomes than net food sellers in eight of the nine countries surveyed, so that a rise in food prices would generally have progressive effects on income distribution. Another explanation for the high impacts on rural poverty, found in Ivanic and Martin (2008). may be related to measurement error. Household surveys may generally underestimate the degree to which rural households are net sellers of food, because the consumption side of household accounts is generally better measured than the production side (Cudjoe, Breisinger, and Diao 2008). For similar reasons, household income in rural regions may not be as well measured as it is in urban regions. Hence, the Ivanic and Martin (2008) and Wodon et al. (2008) studies may overestimate the impact of price rises on rural poverty.

The conclusion one can draw from these studies is that high food prices possibly lead to large increases in hunger, but the studies do not provide reliable evidence on the

actual effects of rising food prices on the food insecure and vulnerable households.

5. Do market distortions and structural features affect market instability?

It is well known that market distortions, such as the presence of monopoly and oligopoly, can affect the levels of commodity prices. It is not clear, however, and it has not been much investigated, whether such structural features affect market instability. We shall distinguish between market distortions arising our of structural features, such as monopoly and oligopoly, and distortions caused by policy interventions.

Concerning policy distortions, it has been known for a long time (eg. Tyers and Anderson, 1992, Anderson and Tyers, 1986) that agricultural, and especially trade policies in developed and other trading countries, while stabilizing domestic markets, tend to increase international price instability. Tyers and Anderson (1992) found that government market insulating trade policies resulted in international food commodity prices being three time more unstable than what they would have been under free trade. More recently Anderson and Nelgen (2010) examined market insulating behavior during the recent food crisis, and found that the average short-term price transmission elasticities for the 11 most traded agricultural commodities, was 0.5 in developing countries and 0.54 in high income countries in the period 1986-2004, hence not much different. These figures represented an increase in short-term price transmission in developing countries from the earlier 1965-84 period, but a decrease among high income countries. Clearly the literature concludes that individual country market stabilizing policies tend to destabilize international markets. If one country institutes such policies, then in defense other countries may institute their own market stabilizing policies, thus further destabilizing world price in the remaining global market.

In terms of asymmetric price behavior and imperfect markets, Morriset (1997) showed that spreads between domestic consumer prices and respective international commodity prices, as well as spreads between domestic wholesale prices and international prices increased dramatically in the 25 year period before 1997, because of the asymmetric response of domestic consumer prices to movements in world prices. In all major consumer markets, decreases in world commodity prices have been systematically much less transmitted than increases to domestic consumer prices. This asymmetric response, which has been attributed to trade restrictions and processing costs, appears rather to be largely caused by the behavior of international trading companies. The role of these companies merits greater attention. While more evidence is still needed, Morriset, nevertheless, showed that many of these companies are large enough to have a dominant position on most commodity markets. Whatever the reason for the increasing spreads, their impact has been great: they may have cost commodity exporting countries over US$100 billion a year because they have limited the expansion of the final demand for these products in the major consumer markets.

That asymmetric price transmission (APT) is a widespread phenomenon has been well documented and the review of Meyer and von Cramon Taubadel (2004) mentions a variety of studies which have estimated such APT, for several commodities. On the explanations for this phenomenon, however, the views seem to be diverging, with the majority of analysts referring to various forms of market power as a key determinant of APT. Other explanations include asymmetric information by market actors, asymmetric adjustment costs, price support, and skewness of demand and supply shocks. What is clear, however, from this survey is that there are not

adequate theoretical models on which to base empirical estimations, and hence this topic is an area of considerable research interest and potential.

6. Market instability and poverty traps

A well known possible consequence of large real income shocks for individual households is the fall into poverty traps. A series of papers in the last ten years has explored both the theory of these micropoverty traps (e.g. Lybbert et. al. 2004, Carter and Barrett, 2006, McKay, 2009), as well as the empirical aspects of them (Carter et. al., 2006). The idea is that a short term shock may induce a household to lose a substantial amount of its productive assets, thus, in the presence of credit constraints, not allowing it to produce adequate income in subsequent periods, and hence falling in a state of chronic poverty.

There are several ways in which a household can experience a short-term real income shock. These include asset losses, through for instance, health related shocks, even deaths, that could induce loss of productive labor, or natural disaster, which could destroy assets, or current agricultural production. Market related shocks are related to adverse price developments, which could affect negatively both sales of cash crops, declines in labor opportunities or declines on wages, or increases in prices of commodity consumed.

Increases in market prices of basic purchased commodities, such as wheat, maize, or rice, would have to be substantial to induce a large income shock. For instance if a household spends 30 percent of its budget on maize, or rice, then a 50 percent increase in the price of the commodity would imply a 15 percent real income shock (0.5*0.3). To accommodate this the household could employ a variety of "consumption smoothing" strategies, or reduce the amount of consumption of the staple. However, as the amount of consumption decline would have to be very large to maintain the level of real income (in this example it would take a 50 percent decrease in maize consumption to nullify the rise in price), households normally do apply a range of such methods to maintain or not reduce much their real consumption. Nevertheless as reducing or selling assets is one such strategy, and a shock may induce the sale of productive, rather than unproductive assets, the possibility is very real that a commodity price shock can induce poverty traps. No evidence, however, of any such occurrence has as yet been provided in the literature in light of the recent or earlier food crises.

7. Policies to deal with food market volatility

How can individual countries and the international community manage excessive market volatility? There are basically two ways in which individual countries can manage their domestic food markets in the face of excessive international market volatility. One involves trade actions, and the other involves public stockholding. If countries or other agents can be assured their commodity supplies through trade, then they would need to carry lower levels of security stocks. Hence trade can be an important substitute for carrying costly physical inventories. Trade, however, can be impeded by a variety of problems. Policies aimed at facilitating commodity trade, may therefore obviate the need for policies to carry costly security or emergency physical stocks, both nationally and internationally. In the recent as well as previous food crises, there were three major trade facilitation related problems that caused governments to examine carrying larger security stocks. The first concerned unexpected and uncoordinated export bans by key exporters, which tend to increase

international prices. The second was the unavailability of import financing for several lower income food importing countries, and the third was the uncertainty about international contract enforcement in a time of rising prices. The sequel discusses proposals to deal with these problems.

7.1 Can export bans be prevented?

Export bans are very disruptive to international markets, as they disturb established trade flows and cause significant losses to traditional trading partners of the countries that import from those imposing export bans. As export bans are a trade measure, the appropriate international forum to discus this is the World Trade Organization (WTO). Currently export bans are not forbidden by the WTO agreement, as the concern of WTO members in the past was with low prices and hence import restriction measures, rather than high prices, which are reinforced by export bans. It would cost little to implement such an agreement among WTO members, once they agreed to it, and it would involve a small change in existing WTO rules. This, however, is not assured, as some members may not want to abandon the flexibility to control their domestic commodity markets via such an instrument. Clearly the developed countries would have a large role to play in revising the WTO rules in this direction.

7.2 A fund for the establishment of an internationally coordinated "Global Financial Food Reserve" (or GFFR) of basic food commodities

The only sure way to avoid excessive market upheavals is to have some amounts of previously accumulated stocks, but every proposal along these lines runs up against coordination and financing problems. The idea of the proposal here is to combine the best parts of the two proposals on reserves that have been discussed considerably, namely the establishment of a coordinated global physical reserve and a virtual reserve aimed at calming futures market speculation. The idea is to have a market based global safety net which would create physical or financial resources in times of price spikes.

The major problem with all proposals that have been proposed and deal with market volatility is that they purport to try to prevent the occurrence of a price spike. This, however, is very difficult to accomplish within a globalized market system, and may need very large and uncertain amounts of financial resources, that rightly makes donors uneasy and unwilling to consider. However, if the major objective of a system to deal with market volatility is to prevent the weakest members of the international community from paying the price for an upheaval, which for the most part is not their fault, then one could consider a limited and much cheaper safety net system to ensure support only for those countries.

The proposal made here would be an agreement by a group of a few important world grain market participants that would include members of the G8+5 as well as major grain exporters and other donors, to commit funds that could be utilized to hold specified amounts of publicly owned long positions in organized exchanges. In other words the proposal calls for the establishment of an international publicly held "global commodity fund" specifically targeted to basic foods. Given low margin requirements, this fund could assure, with relatively modest financial resources, control over a considerable amount of physical reserves. The idea is that a certain amount of financial resources would be used to initially buy an amount of long

futures contracts in one or more basic grains. These contracts would be held and rolled over, when the time of expiration comes, and in addition there would be some additional funds to cover potential margin calls in the course of holding the long positions. This could then constitute a "virtual commodity reserve", but in its concept it is very different from what has been proposed before by von Braun and Torrero (2009), and von Braun et. al. (2009), as the fund would consist of committed long positions, and would basically act a dormant physical reserve. The fund's positions would be rolled over from period to period, much like the commercial commodity funds do.

The fund's positions would be dormant and passive when markets are operating in normal conditions. Hence its resources would not be used for any "stabilization operations", albeit, they maybe used to cover margin calls in periods when prices fall below the acquisition price. However, when markets go into an unusual spike, which could be signaled by either the breeching of some prespecified price upper ceiling, the fund would have the option to either take physical delivery, so as to utilize the physical stocks for prespecified purposes, or to sell off the long positions. In either case the fund would command at a time of a price spike either physical stocks or financial profits from its long positions, if liquidated under market spike conditions. These physical stocks or profits could be utilized to promote a global safety net to assist most affected poor countries in obtaining food commodity imports at lower than spiking market prices. In other words the fund and the stocks it could support would not be utilized for market or price stabilization but rather for supporting assistance to needy countries in times of global price spikes.

Given that the fund's purpose would not be to stabilize markets, but rather to assure market weak participants that their excess food import costs would be covered, the GFFR could be restricted in size to what is estimated as needed for additional or extraordinary assistance to needy food importing countries in times of a food crisis.

The cost of such a reserve would be modest. For instance between 2006 and 2008 the total cereal import bill of LDCs increased by roughly 20 percent or about 4 billion US$. If 10 percent of that could have been considered as extraordinary cost of vulnerable poor countries that would be compensated by developed countries as extraordinary aid under some global safety net, then this would amount to 400 million US$. This is much smaller than the funds that were committed by developed countries in support of developing countries in the context of the global food crisis. If the fund before the crisis was of a size of 100 million US$, and it was all invested in cereal stocks via long future positions, then at 5 percent margin it would have commanded physical amounts, worth about 2 billion US$. The profits from a 20 percent increase in prices during the spike (and the actual increase during a spike would have been much larger than this) would then have been around 400 million US$, which would have allowed the fund to compensate some low income developing countries for the extraordinary costs of the import bills. Needless to say that these calculations are very quick and simple but are intended to give an order of magnitude to the amounts involved.

The GFFR would act as a global market based safety net. As its major market operation would be to roll over positions in each period if needed, it would not interfere in the normal functioning of the commodity markets. The allocation of the proceeds or the profits of the GFFR from any price spike to needy developing countries could be a separate process, that would entail allocation according to some

prespecified development criteria.

7.3 Food import financing and a dedicated food import financing facility (FIFF)

A major problem facing least developed countries (LDCs) and some net food importing developing countries (NFIDCs) is financing for both private and parastatal entities of food imports, especially during periods of excess commercial imports. The financing constraint arises from the imposition, by both international private financial institutions and domestic banks that finance international food trade transactions, of credit (or exposure) limits for specific countries or clients within countries. These limits can easily be reached during periods of needs for excess imports, or periods of high prices, thus constraining the capacity to procure finance for food imports and as a result, food import capacity. To this end a FIFF was proposed in 2005 to the WTO by FAO and UNCTAD and elaborated further by Sarris (2009), to overcome this problem.

The purpose of a food import financing facility (FIFF) would be to provide financing to importing agents/traders of LDCs and NFIDCs to meet the cost of excess food import bills. The FIFF is not intended to replace existing financing means and structures; rather it is meant to complement established financing sources of food imports when needed. The financing will be provided to food importing agents. It will follow the already established financing systems through central and commercial banks, which usually finance commercial food imports using such instruments as letters of credit (LCs). The extra contribution of the FIFF would be to provide guarantees to these financial institutions so that they can increase their exposure to the importing countries. It will do so by inducing the exporters' banks to accept the LCs of importing countries in hard currency amounts larger than their credit ceilings for these countries. A key aspect of the FIFF is that it will not finance the whole food import bill of a country, but only the excess part induced by a food crisis. In this way "co-responsibility" will be established, so that only real and likely unforeseen needs will be financed, and the cost of excess financing will be kept at a low level.

The basic feature of the proposed FIFF is to provide the required finance at a very short notice, and exactly when needed, once the rules of operation are agreed upon in advance. Thus, the delays common to past ex-post insurance or compensation schemes that rely on ex-post evaluation of "damages" can be avoided. The proposed FIFF will operate in real time. Its financial strength would be based on guarantees provided to the FIFF by a number of countries or international financial institutions.

The costs of a FIFF would be minimal through risk pooling for a large number of countries and food products, and low operational costs owing to its risk management activities. The principal risk for the FIFF is that the guarantees that it provides will be called to finance non-repayments. This risk could be managed actively. As the facility would not set out to disturb the normal functioning of international food trade, there is a "non-zero" risk that the local or central banks cannot be reimbursed by their local food importing clients. This would primarily be the concern of the domestic and central banks of each country, and not the FIFF. Nevertheless, lack of reimbursement by the ultimate beneficiaries of the finance may lead commercial banks to default on their obligations (or delay repayment) to the FIFF.

The FIFF would benefit from guarantees from a number of countries. Ideally, this would include a number of OECD countries, which would enable the FIFF to borrow

at AAA terms, when needed. But any group of countries could provide guarantees; the risk rating of the FIFF is then likely to be that of the best-rated among these countries.

A food import financing facility has existed in the IMF since 1981 under the Compensatory Financing Facility (the IMF CFF). The objective of that was not food import financing, but rather compensatory financing to countries facing balance of payments problems, and hence could not import food. Despite its availability it has been utilized very little, largely owning to the conditionalities imposed on borrowers by the IMF. The proposed FIFF would be different from the CFF in the sense that it would provide guarantees for normal food import finance, and would act in a much more timely fashion, namely before the undesirable event, rather than after.

While the FIFF envisioned in the current proposals is an international initiative, it could operate also as a policy of major food exporters, such as the EU, Canada and others. The US already operates a system very similar to this under its GSM-102 program of the Commodity Credit Corporation. The EU does not have a system of this type, despite the fact that many major agricultural commodity exporting firms and financial institutions operate in the EU.

A drawback of the FIFF, as mentioned by Gilbert and Tabova (2011), would be the fact that potential donors would have to count the guarantees provided to the FIFF as part of their public debt, even though the guarantees may not be exercised, something that may not be easy for some donors. To this end it is helpful to make rough estimates of the types of amounts of guarantees needed. Sarris (2009) made some empirical estimates for the yearly guarantee needs that LDCs and LIFDCs would require under such a system and given the data for years up until 2007. The computations suggest that average yearly FIFF guarantee financing for LDCs would be in the vicinity of 200-430 million US$, while the financing needs in an exceptional year may reach as much as 2,400 million US$. To put these figures in perspective the average yearly LDC commercial food import bill for all foods between 2000 and 2007 was 10.7 billion US$. Hence the FIFF average annual financing and hence guarantee needs would constitute about 2-4 percent of yearly LDC combined commercial food imports. In a year of exceptional needs, the value of FIFF guarantee financing needed could rise to as much as 23 percent of the total LDC food import bill.

If all LIFDCs were to be covered by the FIFF, then the annual guarantee financing needed would be in the range of 960-1937 million US$, and this constitutes around 1.8-3.7 percent of the average LIFDC food import bill for the period 2000-2007. In an exceptional year the maximum financing needed could rise to as much as 10 billion US$, which would be about 19 percent of the total LIFDC average food import bill of the same period. The above amounts are very small compared to the debt levels of the major donors, which, for instance for the US currently stands at around 14 trillion US$, for France to 2 trillion US$, for Germany to near 2 trillion US$, etc. The G7 group of most developed countries currently has a level of public debt in the neighborhood of 20 trillion US$.

7.4 A system to guarantee food import contracts

A problem that is acute during food crises is counterparty performance risk, namely the risk of reneging on a delivery contract, faced by many food importers. In other words, the problem in this case is not so much unpredictability of food import costs, or high food import prices, or financing, but rather assurance that supplies will be

delivered. This does not only pertain to short term contracts but also longer term contracts. The basic reason for non-performance of international staple food import contracts is adverse price movements or adverse financial events that prevent a food exporter or trader to fulfill an import contract. There seems to be no contract enforcement mechanism in international staple food grain transactions.

Contracts in organized commodity exchanges are enforced because there is a clearing house which is responsible for making sure that all transactions are executed. Similarly contracts within one national legal jurisdiction can be enforced as there is a legal system to ensure contract enforcement, albeit a court based legal enforcement system is quite slow. Most international contracts are very similar to Over the Counter (OTC) contracts in the sense that is it only the financial and reputation status of the two parties that instills confidence in contract enforcement. There is no mechanism for international contract enforcement, and whatever juridical procedures exist are slow, uncertain, and costly, and cannot deal with the immediate risk of contract cancellation.

The basic missing institution is an international contract together with an international clearing house type of arrangement similar to the clearing houses that are integral parts of the organized commodity exchanges, which ensure that all contracts are executed. The key question is whether an international contract along with a clearing type of mechanism can be envisioned to ensure the performance of staple food type of import contracts. A proposal for an international grain contract has been made by Berg (2011), while Sarris (2009) proposed the institution of an International Grain Clearing Arrangement (IGCA). These are complementary proposals, as they aim at the same objective namely global contract enforcement. The objective of an IGCA would be to guarantee or insure performance of grain import trade contracts (short, medium and long term) between countries or private entities based in different countries.

A major function of a commodity exchange clearing house, apart from the settlement of the financial contracts, which amount to the bulk of settlements, is to ensure that physical delivery can take place, if needed. This is for instance one of the functions of the Chicago Mercantile Exchange (formerly the Chicago Board of Trade), and to ensure this a variety of rules and regulations with respect to delivery obligations are adopted by the exchange and the clearing house. In most organized exchanges physical delivery is a very small portion of all transactions, but if a trader insists on delivery then this must be arranged by the exchange. Many exchanges have arrangements with warehouses so that physical deliveries can be made against a futures contract, and there are severe penalties for anyone with an open contract who either does not fulfill the financial terms or does not deliver a physical commodity on it. It is these properties that would need to be emulated by an envisioned international contract and a IGCA, in order to it to be viable as a guarantee institution in international staple food transactions.

A global contract, according to Berg, (2011) rather than tracking prices in one geographical region, would track “cheapest to deliver” commodities, by designating delivery points in several places in the world. The traders who could deliver on such a contract would be those with relatively low prices.

There are precedents to this type of global contract, namely the global sugar futures contracts of the Intercontinental Exchange and the Euronext Liffe. In these cases the ports able to provide the cheapest sugar are the first to deliver against the contract.

This provides a global signaling system of both price and regional availabilities of sugar ready to export. Given that the contracts are provided through organized international exchanges, the delivery on a given contract is guaranteed through the clearing houses of the relevant exchange. The only potential drawback is the logistical difficulty of having the supplies delivered in some part of the world, which maybe unknown at the time of contracting, and different from the location of the desired place of delivery. However, it would not be difficult to envision that transport services would be readily available in all major delivery points.

If a global contract is not instituted by an international exchange then the next best way to implement something on an international scale resembling the functions of an international contract and the clearing house of existing organized exchanges would be to link existing or envisioned commodity exchanges, with their respective clearing houses, or to have international exchanges list contracts with several international points of delivery. In other words, it maybe appropriate to think of how parts of contracts bought in on one exchange could be guaranteed not only by the clearing house of the exchange in question but by clearing houses of other linked exchanges.

The problem is that delivery at a recognized warehouse, e.g. near Chicago where the CME delivery locations are, may not be what the importer wants, and may need to incur considerable cost to transport those amounts to his desired import location. Hence what would be desirable is to have the possibility of taking delivery of the same amount of grain but at a location much closer to the importer's desired destination. One way to do this would be to establish links between various commodity exchanges around the world, so that the price difference between grain stocks in different locations would be equal to the relevant cost of transport and other transactions charges.

The IGCA could be envisioned as a branch of the linked commodity exchanges which would in essence consist of some parts of the underlying clearing houses of the exchanges. The IGCA would try to guarantee that physical supplies around the world at various exchanges are available to execute the international contracts in its member exchanges. This could be done, for instance, if part of the financial reserves of the clearing houses that are members of the IGCA could be transformed into a physical reserve, via for instance holding warehouse receipts in various reliable locations around the world. The advantage of transforming part of the financial reserves into physical reserves would be two fold. First, the value of the underlying reserves would fluctuate with the price of the underlying commodity. This is like marking the underlying assets to market. This would obviate the need by contracting parties to post additional margins in case the price of the commodity increases suddenly.

Second, and this is perhaps a major positive aspect, if some of the financial reserves of the IGCA were to be transformed into warehouse receipts, the physical execution of the underlying contracts, and not only their financial settlement, could be guaranteed. The commitments in futures or warehouse receipts of the IGCA could be liquidated once the actual deliveries on the relevant contract were executed. The liquidation of the physical positions or futures holdings of the IGCA would provide the funds to return to the contracting parties their posted insurance margins. In fact, since the liquidation of the IGCA margins would result in a variable amount as prices fluctuate on the underlying warehouse receipts or futures contracts, the restitution to the contracting parties of their initial margins would be variable and close to a fixed share (minus some transactions cost) of the underlying transaction value. Hence the

true cost to the two parties to an international contract would be the interest foregone or paid for the posted good faith margin. Given all the other transactions costs in an international staple food import contract this may not be too high.

The IGCA would guarantee the execution of contracts by pooling the resources of several exchange related clearing houses. This would ensure that there would be liquidity in terms of physical reserves to honor individual contracts in case of non-performance by a participant. In fact, the major underlying benefit of the IGCA would be that by investing a small part of its reserves into physical warehouse receipts or deliverable futures contracts, it would create a global physical commodity reserve stock that could be utilized to execute international staple food contracts in case of non-performance of the exporting party to a transaction. The major difference, however, of such a stock and stocks envisioned in previous discussions on global price stabilization would be that this reserve stock would be used only to make the market work, namely ensure physical delivery and not to change the fundamentals of the market, as most of the other stock holding ideas envision. In the words, the stocks held in the form of warehouse receipts or other physically executable contracts, would perform the function normally done by so-called pipeline stocks, which are held by various market participants to ensure that there is uninterrupted performance of the normal market functions of the agent. Their function would not be to stabilize or speculate, but simply to ensure liquidity in the market, much as the financial reserves of the commodity clearing houses ensure liquidity to execute all underlying financial contracts. The necessity for an international arrangement to have such stocks is that there is no such physical liquidity mechanism internationally. In other words one of the main functions of the IGCA would be to ensure global physical grain liquidity. The IGCA could spread the risk of non-performance or country problems by holding its commodity reserves in several geographic locations, as well as several organized exchanges.

A major risk of such a IGCA would be that a sovereign country in whose territory, the warehouses of the underlying stocks in which the IGCA has invested are physically located, could impose export restrictions or bans that may make the physical release of stocks impossible. Here, however, is where appropriate export related disciplines could be formulated in the context of the World Trade Organization (WTO), or another regional arrangement, to prevent exactly this type of phenomenon, as discussed above. Also if major IFIs, such as the World Bank, the IMF, and other IFIs are financiers of such a IGCA, then the type of sovereign type of default could be guaranteed by these IFIs, perhaps in the same manner they provide sovereign guarantees and insurance for other investment projects. In other words, default on any of the contracts insured with the IGCA would entail default with the IFIs behind it, and this may make it harder to default. On the downside, the relevant IFIs may be required to devote part of their sovereign guarantee capacity to this.

Another major risk of the IGCA maybe the possibility of default by a party. This does not have to be only a supplier (in case for instance of increased prices), but could also be the buyer (in case of suddenly decreased prices), who may not be interested in a contract at some prices that may now be considered too high. In such a case the seller would be losing a portion of the value of the contract due to the decrease in price. Given that the IGCA would be an extended arrangement among viable commodity clearing houses, it could compensate the seller by the difference in the original and current value of the contract insured through the relevant exchange or clearing house.

An essential element then of the proposed IGCA is the internationalization and linkage of commodity exchanges. This implies that the additional performance guarantees that are envisioned here can be obtained if two conditions exist. First appropriate exchanges must exist in different geographic locations around the world. Such locations should most likely be near the major production areas for the commodity in question. Second most importers of the food commodity would hedge their subsequent purchases in such exchanges. This can become part of most food importers trading practices, and it probably is already a practice by many importers. The existence of more exchanges would probably reduce the basis risks and hence make trade more efficient.

Clearly this idea needs more thinking and analysis as there are many details that need to be elaborated. This could be done by a group of knowledgeable market analysts, but if implemented it could go some way to instill more confidence in global food commodity markets.

7.5 Compensatory finance systems

These systems arose in the 1970s and 1980s from the need to assist developing commodity exporting countries to deal with sudden drops in export commodity prices. The main ones that have been instituted are the IMF Compensatory Financing Facility (CFF), and the European Union's STABEX, which was replaced by the FLEX.

The IMF's CFF (for more extensive recent discussions see Gilbert and Tabova, 2011, and Konandreas, 2011) was created in 1963 and the cereal import element was added in 1981, following the food crisis of 1973-75. Its primary purpose was to help IMF members cope with temporary export shortfalls and high cereal import costs which create balance of payments problems. IMF arrangements and conditionalities applied to such borrowing. The main benefit to the countries that used it was an additional IMF window. However, while the trigger for disbursements was tied to commodity prices, the schedule for repayments was not tied to export recovery or import cost declines. This tended to undermine its unique function. Strict eligibility requirements and costly financial terms led to it not being used very much by countries, and it was officially abolished in 2009. A smaller IMF scheme named the "Exogenous Shock Facility" (ESF) was established in 2006 to provide quick and easy access to concessional financing for low income countries facing exogenous shocks such as food commodity price spikes, natural disasters, or other exogenous crises. Conditionalities under this scheme are restricted to measures needed to adjust to the shock. The system is currently active.

The EU's STABEX was active between 1975 and 2000 as part of the Conventions signed between the EU and its former colonies in the Asian Caribbean and Pacific (the ACP countries), many of which were dependent of commodities for the bulk of their external income. The idea was to compensate the governments of the ACP countries, on a grant basis, for export income shortfalls due to variations in export prices or export quantities. The funds were given, ex-post to the governments, which used them during early periods in a flexible way as balance of payments support, while later they were targeted mostly to the sector affected by the shock. The compensation was given for earnings shortfalls in individual commodities rather than a group of commodities. There were several shortcomings of the STABEX, such as delays in fund disbursements that tended to making them procyclical rather than countercyclical, its tendency to not stabilize export earnings, and others, that led the

EU to replace the scheme in 2000 by the Fluctuations of Exports (FLEX) scheme. The FLEX had many of the principles of the STABEX, but was designed for faster disbursement, and triggers based on overall export income losses rather that on commodity specific losses.

The basic problem of all compensatory finance schemes is that they are of necessity backward looking, and hence slowly disbursing. This does not help with smoothing of the export income fluctuations. Food import bill variations have not been part of the STABEX or FLEX schemes, albeit the balance of payments and other impacts maybe similar. If, however, they were to be made part of the existing compensatory finance schemes they would be plagued by similar problems as the existing instruments. They have been viewed by most analysts as additional development assistance tools, rather than commodity risk management schemes.

7.6 Safety nets

The idea of a food related safety net is to have a system whereby sudden erosion of the capacity of food insecure households or countries to maintain food consumption, can be dealt with by rapid access to financial resources and food commodities targeted to those most vulnerable to food price spikes. Several developing countries have such quick reaction programs, and international assistance could help the affected countries keep the cost of such programs reasonably low in times of crisis. An example of such a global safety net program is the World Bank's Global Food Crisis Response Program (GFCRP) that became operational in 2008. The program aims to reduce the negative impact of high food prices on the poor, help countries in the design of policies to mitigate the adverse impacts of volatile food prices, and support food producers to enhance productivity and reduce vulnerability to future crises.

The GFCRP envisages safety nets in the form of funds to provide cheap food to targeted poor, and financing and technical assistance to increase agricultural supply. Its major advantage is that it is quick disbursing. As of mid-March 2013 , the GFCRP had financed operations amounting to 1.56 billion US$ in projects that reached 66 million vulnerable people in 49 countries, mostly in Africa. As of July 2012, World Bank emergency response is channeled through the International Development Association (IDA) Crisis Response Window, and the recently approved Immediate Response Mechanism. The facility depends considerably on donor support, which has been substantial. The main issue with such programs is their sustainability in the future. The GFFR proposed above could be a way to enhance sustainability in a cost effective way.

7.8 Market based approaches to managing market volatility

The idea of this approach is to utilize existing market instruments to anticipate food price spikes and insure against their adverse consequences. The major way to do this is via futures and options contracts or similar "over the counter" (OTC) instruments. The problem to dealt with is whether the use of organized or OTC futures and options markets can reduce the unpredictability of the food import bill, and at what cost.

Consider an agent who needs to plan imports of some basic food and desires to protect himself against a price spike. By buying a futures contract or a call option contract (namely the right to purchase at a future date an amount of the commodity at a prespecified strike price), the agent hedges the risk of a price spike, by locking in a maximum price for the subsequent transaction. When the subsequent transaction in

the cash market is executed, the agent can lift the hedge by executing and opposite transaction in the futures or option market (namely sell the futures contract or exercise the option contract if prices have moved above the strike price), so as to counteract any price variation that was not anticipated at the time of planning[4]. While, on average this type of hedge will not make or lose money, there will be a significant reduction in the conditional volatility of both price and subsequent purchases. The major advantage to the hedger is that the subsequent price for the transaction is known much better than if the agent waited until the time the supplies need to be ordered. In other words predictability is enhanced.

Sarris, Conforti and Prakash (2011) as well as Dana, Gilbert and Shim (2006) have examined in detail cases of food importers using futures and options in organized markets and have shown that indeed there are substantial reductions in upredictability.

A drawback of using these types of instruments in a developing country context is that credit requirements arising from the need to manage on a daily basis the exchange margin calls (in the case of futures), may run up against credit constraints. Another drawback is that if the futures market moves in an opposite direction from the one that the hedge anticipated, the agent (which could be a government agency) may have to lose money, which may be unacceptable to the financing authorities. Call options lessen these problems as they basically act as price insurance, by allowing an agent to lock a maximum price for subsequent imports. The cost is that on average the reduction in unpredictability is smaller than when futures are utilized (Sarris, et. al. 2011). On the other hand options are more flexible and with known ex-ante costs. They are also less costly than physical stocks.

8 Conclusions and outlook

The problem of general commodity as well as food commodity market volatility and intermittent crises and price spikes, does not seem likely to go away in the future, and in fact appears likely to become more acute. The most vulnerable countries are those who normally have little part in creating the food crisis. If growth opportunities of these countries are not to be stalled by occasional food crises, the international community must provide appropriate systems to prevent or manage the spikes. The paper has reviewed several facets of the global commodity market instability problem, and the proposals that have been made to deal with it, and has made proposals for what maybe deemed as most cost effective and appropriate policy measures.

The first major conclusion is that unpredictable food price spikes can create considerable increases in hunger and loss of welfare by the most food insecure. It was seen that food price spikes are possible to define and monitor. Hence, it seems that there can be an empirical base on the basis of which the international community can base action.

It appears that there are several ways to manage (rather than prevent) market volatility and spikes for the benefit of low-income food importing countries, and there have been several proposals along these lines. The paper has reviewed all these proposals and made some new ones. The ones that seem most cost effective and least distorting of international markets are those that are market based. Among those, utilizing

[4] The hedge will be affected by "basis risk", namely the imperfect correlation between the border price of the country where the agent operates, and the price at the exchange where the hedge is placed.

existing systems of commodity risk management, such as futures and options is the easiest, and could be enhanced by the support of new exchanges in developing countries as well as technical assistance on how to exploit the various instruments available.

A new proposal for a new system of a Global Financial Food Reserve (GFFR) was made, in the form of a fund to finance long positions or food commodities in organized exchanges. Such a fund could constitute a dormant virtual physical reserve that could generate physical and financial resources in times of a spike, so as to benefit highly negatively affected developing countries. In other words the GFFR would be a market based global safety net. Apart from the GFFR, the proposal for a Food Import Financing Facility (FIFF) was also deemed cost effective and an appropriate mechanism to ensure the continuous flow of food imports in times of a spike.

It was seen that there are ways to guarantee the performance of international food import contracts, through the promotion of standardized international food contracts in existing international commodity exchanges or the linking of existing exchanges and their clearing houses, through an International Grain Clearing Arrangement (IGCA). These could be explored further with the collaboration of existing exchanges.

The final set of measures that could be taken involve global safety nets. The GFFR proposed in the paper is one form of such a global safety net, and a physical emergency reserve to smooth out flows of food aid is another. However, others in the form of permanent funds or technical assistance to help needy countries maintain their local food safety nets can also be envisioned.

In summary it appears that there are quite a few cost effective and non-distorting measures and options to lower the probability of food price spikes, and help food importing low-income developing countries to manage the attendant risks. Given that food security is of paramount concern to all counties, especially those that are at low levels of food intake, it appears that the international community has a major role to play in ensuring global food security in a world of growing uncertainty.

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Table 1. Food expenditures of people living on less than $1.25 per day, 30 developing countries, 2001-2010

				Average net share in expenditure of the poor, % of total							
	All countries gross share of food	All countries gross share of total consumption	All countries net share of total consumption	India	China	Bangladesh	Pakistan	Vietnam	Uganda	Tanzania	Indonesia
Total	100.0	60.8	37.0	59.7	26.2	26.1	37.8	-15.6	15.2	33.4	32.7
Rice (+ processed)	22.4	13.9	8.2	14.7	5.6	5.0	1.7	-9.3	0.1	2.8	2.6
Other food	15.6	9.7	7.6	9.9	7.5	7.7	4.4	3.5	1.6	7.9	18.9
Vegetables	15.3	9.3	4.5	11.0	0.5	4.6	6.2	-3.2	4.5	5.7	1.7
Meats	9.1	5.4	2.4	1.8	9.6	-0.3	1.3	-1.7	2.1	0.3	-0.6
Wheat (+ processed)	8.4	5.0	3.5	4.6	3.4	0.6	10.4	1.3	0.2	1.8	0.0
Oilseeds and edible oils	6.5	3.9	3.4	5.2	0.2	2.6	4.5	1.0	1.4	2.7	3.9
Fish and fish products	6.3	3.8	2.5	1.6	3.6	5.0	0.3	-1.7	2.1	3.3	2.7
Milk and dairy products	5.6	3.3	2.9	6.1	0.0	-0.3	3.4	0.7	0.3	-0.1	0.5
Maize and other grains	4.1	2.6	-0.5	1.5	-5.5	-0.1	0.2	-4.1	1.2	6.3	0.0
Fruits	3.9	2.3	1.1	0.9	1.4	1.0	1.0	-1.2	-0.5	-0.3	-0.6
Sugar	2.7	1.7	1.5	2.3	0.0	0.2	4.5	-0.9	2.3	3.1	3.5

Source. Anderson, Ivanic, Martin (2014)