SAFEGUARDING FOOD SECURITY IN VOLATILE GLOBAL MARKETS

EDITED BY

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FIAT PANIS

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Contents

Chapter 11

International commodity agreements and their current relevance for grains price stabilization[1]

Christopher L. Gilbert[2]

This chapter examines the various international commodity agreements (ICAs) with economic provisions (price bands and stockholding or supply control obligations) that were established in the post Second World War period with the declared objective of stabilizing international commodity prices. The report asks what, if anything, can be learnt with the ICAs in the current context of high and volatile food prices.

A contributory factor that has been identified as possibly driving high grain prices since 2007 is the apparently low level of global grains stocks. The next section outlines the theory of the role of stocks in price determination for storable commodities, discusses the downward trend in global public and commercial inventories and food stocks over the most recent decades and attempts to relate stock levels to prices. After which, a discussion on the history and motivation of the ICAs with economic provisions for the different products is presented, including the instruments they employed, the reasons for their lapse or collapse and their successes and failures. The lessons of the ICAs for concerns relating to the current elevated levels of grains price volatility are then drawn, including stockholding measures that are currently receiving attention. Finally, the chapter concludes with implications to policy.

Commodity stocks

Commodity prices are variable because short-term production and consumption elasticities are low. Production responsiveness is low in agriculture because input decisions are made before new crop prices are known. These decisions depend on expected prices and not price realizations. Price outcomes are seldom so disastrous as to result in the crop being abandoned on the trees or in the ground. Short-term demand elasticities are low because the actual commodity price may not be large component of overall value of the final product (cocoa in chocolate, coffee beans in soluble coffee powder); and, for subsistence commodities, because there may be few alternative affordable products (potatoes in nineteenth-century Ireland).

1 This is the abbreviated and revised version of a report prepared under contract to the OECD. It has benefited from comments from representatives of OECD member countries. I am also grateful to Garry Smith for comments on the initial draft. All errors are my responsibility and not those of OECD.

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Changes in commodity prices originate in shocks to demand and supply. It has generally been supposed that price volatility for food crops owes more to supply shocks while volatility for industrially consumed commodities is driven primarily by demand shocks. This judgement reflects low income elasticities of demand for food, implying that food consumption is less variable than the business cycle, and high usage intensity for industrial commodities in construction and investment, resulting in their consumption being more variable than the business cycle. However, because harvest outcomes are not strongly correlated across either continents or commodities, supply shocks are more important in explaining movements in the prices of individual food commodities than in aggregate food price indices where a degree of offsetting takes place through averaging (Gilbert, 2010).

The relationship between price and stocks

Low elasticities imply that small shocks to production can have a large price impact. However, the impact of shocks on commodity prices is moderated by stockholding. Low prices, caused either by positive supply shocks, negative demand shocks, or both of these, imply probable positive returns to stockholding. Consumption demand is therefore augmented by stock demand until such point as the expected return from holding stocks is equal to rate of interest on comparably risky investments. The fall in prices is moderated to the extent that excess supply is absorbed in stocks.

The same mechanism works for excess demand resulting from negative supply shocks or positive demand shocks. These result in destocking thereby augmenting supply. The catch is that destocking requires an inventory. Once stockout occurs, price is determined simply by equality of consumption demand and production. The non-negativity constraint on stocks implies that stockholding behaviour will be more effective in moderating downward than upward price movements. This leads to the observation that commodity price cycles will typically exhibit long flat bottoms punctuated by occasional sharp peaks.

There have been significant advances in understanding inventory-moderated commodity price cycles. Building on a paper by Williams (1936), Samuelson (1957) illustrated the effects of storage on grain prices. In a pioneering paper, Gustafson (1958), writing in the context of grains, characterized the amount of storage which will take place in a competitive world in which there is no government intervention. The Gustafson storage rule applies in a simple non-dynamic model of agricultural supply and demand with a single state variable - availability, defined as production plus lagged carryover. Deaton & Laroque (1992) obtained essentially the same result as a so-called rational expectations equilibrium. Williams & Wright (1991) used numerical methods to approximate this equilibrium in more complicated dynamic models.

It is a feature of these models that commodity stocks and the commodity price are jointly determined. It is neither the case that the price is determined by the current carryover nor the reverse. Instead, there is an equilibrium relationship between the price in the current crop year and the planned carryover to the following year. This relationship is inverse - if availability is low, there will be no carryover and the market clearing price will be high while if availability is high, stocks will be carried forward to the next year and the price will be low.

Empirically, commodity researchers focus on the relationship between the current price and the lagged carryover, that is the carryover (if any) from the previous to the present crop year. This relationship is also inverse, but, unlike that between the price and the current year's carryover, is also causal (the current priced cannot affect last year's storage decisions). However, the relationship need not be constant as the price depends on availability which

is the sum of the lagged carryover plus the current (actual or expected) harvest. For these reasons, one should not necessarily expect to find a constant relationship between price and stock levels. This possible non-constancy applies also in more complicated models, such as those in which production depends on expected prices, where the lagged carryover and the current harvest may affect prices with different weights.

This is also true for other reasons. Markets are forward-looking and analysts focus considerable attention on forecasts, in particular those produced by the USDA, of end-crop-year carryover. Prices can therefore rise or fall through one crop year in anticipation of a respectively low or high end-year carryover. Furthermore, higher production levels would also reduce volatility both directly, by increasing food availability, and indirectly, by resulting in higher stock over the future.

The foregoing discussion has related entirely to so-called speculative stocks. Inventory may also be held as working stocks. The analogy is with the transactions and precautionary demands for money. Such stocks yield their owners, typically processing companies or merchants, a "convenience yield" which is measured by the amount they will pay to have immediate access to the commodity (Brennan & Schwartz, 1985). It seems likely that changes in industrial structure and practice, in particular the emergence of just-in-time delivery systems, may have reduced convenience yields and hence diminished this component of stock demand. If this is the case, the same commodity price will be consistent with a lower level of stocks today than was the case, say, a decade ago. In practice, therefore, it makes sense to relate price to stocks relative to a current estimate of "normal stocks".

Grains stocks are also held by governments for food security reasons. Globalization resulted in increased reliance on trade rather than national stockpiles. Movements in these governmental stocks can be large and have the potential to obscure the stock-price relationship.

Price volatility will also be related to lagged stock levels, but subject to the same qualifications. In the context of a high carryover from previous years, a negative supply shock (a poor harvest) will be met largely by destocking. The price impact will therefore be limited. In the case of a zero or low carryover, the same supply shock would require consumers to reduce consumption. Because demand elasticities are low, the price will need to rise by much more to clear the market. Volatility will therefore be negatively related to stocks (Gilbert & Morgan, 2010). But because volatility is directionless, both upward (poor harvest) and downward (abnormally good harvest) price movements will be larger when stocks are low than when they are high.

Storage Adequacy

Policies which result in higher levels of storage than would otherwise have been the case may be expected to reduce volatility. This raises the question of the adequacy of storage in the absence of public intervention. This question may be posed either at a global or a national level. In this section, I address the adequacy of global stocks from an economic theory perspective. The adequacy or otherwise of national grains stocks depends on the trade environment and on the objectives of national policy – I discuss this question in Chapter 18 of this volume.

Economists discuss the adequacy of global grain stocks in terms of whether private stockholding decisions will result in "optimal" outcomes. Optimality can fail to obtain if price volatility results in negative externalities or if those impacted by volatility are unable to offset the resulting uncertainty either through insurance, through hedging on futures or

options markets or through other state-contingent contracts. The view that volatility gives rise to externalities (Gardner, 1979) is difficult to make rigorous – the dangers arising from food riots might be one possible route. Price risk is generally not insurable, since it is common across the entire range of producers, consumers and intermediaries, but it may be possible to offset these risks, either directly or indirectly, through hedging on organized exchanges where these exist. Supply chain intermediaries in developed economies, including those involved in physical storage, will routinely access these markets. Producers may benefit indirectly if these benefits are intermediated to them by, for example, purchase contracts which provide pricing fixing options. Governments might in principle operate in the same manner for consumers.

The extent to which global stocks are adequate can therefore not be separated from the question of the adequacy of risk-sharing arrangements. These arrangements will be least effective for those products where the markets themselves work least well. In the grains complex, this is most evidently the case with rice. For other grains, there is a choice between taking the state of risk sharing arrangements as given and focussing policy on augmenting storage, or, alternatively, of taking storage levels as adequate and focussing policy on improving the access to and the effectiveness of risk management.

If global grains storage is regarded as inadequate, governments might either attempt to augment private stocks by public food security storage programmes might provide incentives to the private sector to carry additional stocks. The public storage approach has the major disadvantage that it will discourage, and possibly eliminate, private storage – see below. Subsidization of private storage is therefore likely to be more attractive and financially less onerous. Williams & Wright (1991) found that subsidization of private storage was superior to public storage schemes.

Public and private stocks

Theories relating commodity prices to private stockholding behaviour have important implications for commodity policy. Miranda & Helmberger (1988) have shown how public stockholding, for instance by a buffer stock agency, changes the incentives for the private sector to hold stocks. In particular, the agency's commitment to purchase at the agreed floor price will pre-empt those private sector purchases which would have taken place in the event that the non-intervention price was below the floor price. At the same time, if the stabilization band (the gap between the ceiling and floor prices) is narrow, intervention will limit potential capital gains to private stockholding. If market conditions are sufficiently weak, the public sector may end up holding the entire market deficit. This was the situation under the sixth International Tin Agreement which collapsed in 1985 - see Anderson & Gilbert (1988). Clearly, floor provisions of this type make buffer stock stabilization extremely expensive.

The stabilization ceiling price can be vulnerable to speculative attack (Salant, 1983). If speculators perceive the stocks held by the stabilization agency as possibly insufficient to maintain the ceiling price in the future, they will compete to buy the entirety of the agency's remaining stock in order to take advantage of likely capital gains. Recognizing this, Williams & Wright (1991) suggested that, while a stabilization agency might choose to defend a price floor, price band schemes offer few, if any additional advantages. In particular, the apparent symmetry of the price band is only superficial since once the stock is exhausted, there is no means of defending the ceiling.

Speculators may also in principle attack a floor price by selling the commodity short. There is, however, an important asymmetry between a floor (short) and a ceiling (long)

attack. Speculators will typically operate on the futures and not the cash market, at least in the first instance, as futures transactions only require the deposit of margin, typically 10 percent of contract value, while cash transactions require full payment. Futures therefore permit leverage. Futures purchases at or near the stabilization ceiling will pull cash prices up in line with the rising futures price as the contango (the difference between the futures and the cash price, if positive) must be equal to the carrying charge (interest plus warehousing and depreciation costs) - see Hull (2006). Upward pressure on futures price therefore translates dollar for dollar into the cash price which the authority is required to defend. This does not apply to speculative futures sales at the floor as the backwardation (the difference between the cash and the futures price, if positive) can be indefinitely large. Provided market participants believe that the authority has sufficient finance to defend the floor, it can allow the futures price to fall beneath this level. Furthermore, the authority is in a position to perform a "short squeeze" on the speculators by forcing them either to deliver the commodity at contract expiry or close out at a loss. For these reasons, short speculative attacks rarely occur whereas long attacks are more likely.

The risk of speculative attack arises out of the commitment to sell at a pre-announced price. It is irrelevant whether this ceiling price is a parameter of the intervention scheme of whether instead it is defined as a moving average of past prices. These considerations suggest that, if public storage is envisaged, the intervention agency should, following the implication of Williams & Wright (1991), refrain from committing to a ceiling price but should instead sell on an opportunistic basis if a shortage emerges. The absence of a ceiling commitment should not affect the extent of volatility reduction that is achieved since this will be determined by the quantity of stock available to be sold, not the price at which it is sold.

Trends in international grain stocks

In this section, I consider the evolution of stocks of wheat, maize (corn) and rice at the world level. It is necessary to exercise caution in the interpretation of these numbers as much of the stock data are inferred from data on production and consumption. I use data from the United States Department of Agriculture (USDA), in preference to data from the Food and Agriculture Organization of the United Nations (FAO) as the USDA data are available over a longer time period. The FAO data tend to imply higher stocks-consumption ratios but the general trends are the same in the two datasets.

Dawe (2009) argues for exclusion of Mainland China stocks on the basis that the country is largely self-sufficient in all three major grains and that Mainland China's production and consumption are not impacted by world prices. Furthermore, much of the variability in world grain stocks is the result of accumulation and disaccumulation on the part of China (Mainland). I therefore look at stock-consumption ratios both including and excluding China (Mainland).

Figure 11.1 shows the world wheat stock-consumption ratio from 1960/61 to 2009/10.[3] The figures move closely together except in the late 1990s when Mainland China accumulated large levels of stocks - 49 percent of the world total at the end of the 1998-99 crop year. Stock-consumption ratios have declined over the fifty year period considered from around 35 percent to around 25 percent. In real terms, the world wheat price has declined in real terms from around USD 250 per tonne to around USD 175 per tonne (in 2005 values)[4]

[3] Ratio of closing stocks to consumption on a crop year basis. Source: USDA.

[4] I deflate by the United States Producer Price Index, PPI (all items). The figure therefore measures the wheat price relative to the wholesale prices of all goods using United States weights. Although the precise numbers change, the general pattern shown in this and the following figures is unaffected by the choice of deflator. Data source for prices and PPI: IMF, International Financial Statistics.

Figure 11.1: Wheat stock-consumption ratio

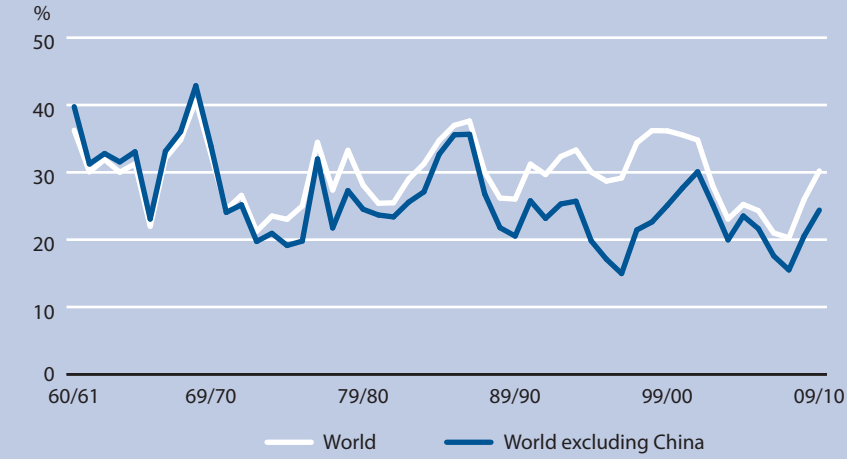
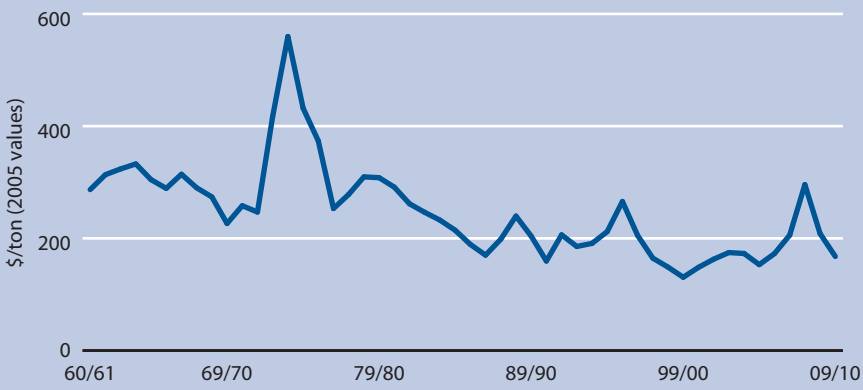


Figure 11.2: Wheat reference price deflated by United States PPI



- see Figure 11.2. The result is that the simple relationship between wheat stocks and prices has been obscured by increases in agricultural productivity, resulting in lower prices, and improvements in stock and production management resulting in lower inventory requirements.

Figures 11.3 and 11.4 provide the same information for maize. Stock-consumption ratios have declined even more dramatically in maize than in wheat - from a similar initial value in the early 1960s of around 35 percent to a current value of near 15 percent. While this decline was steady for wheat, in the case of maize there was a sharp jump back to the earlier levels in the late 1980s. Again as in wheat, Mainland China's stocks were very high in the late 1990s, accounting for 64 percent of world stocks from 1997/98 to 1999/2000. Over the same

Figure 11.3: Maize stock-consumption ratio

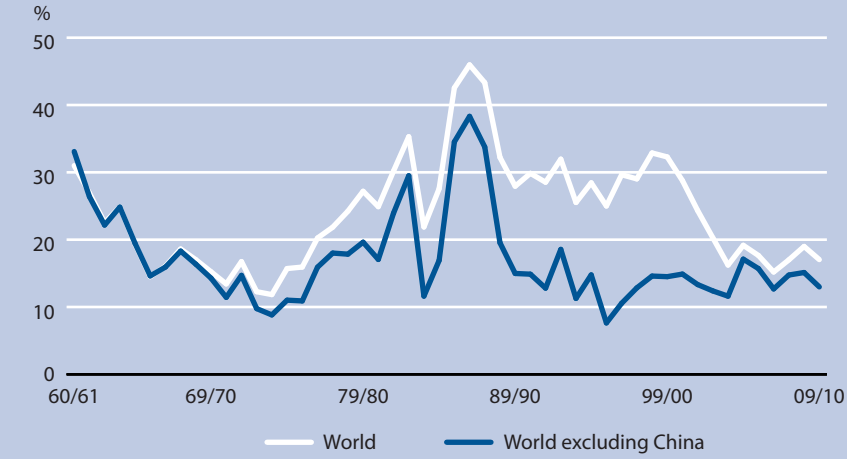
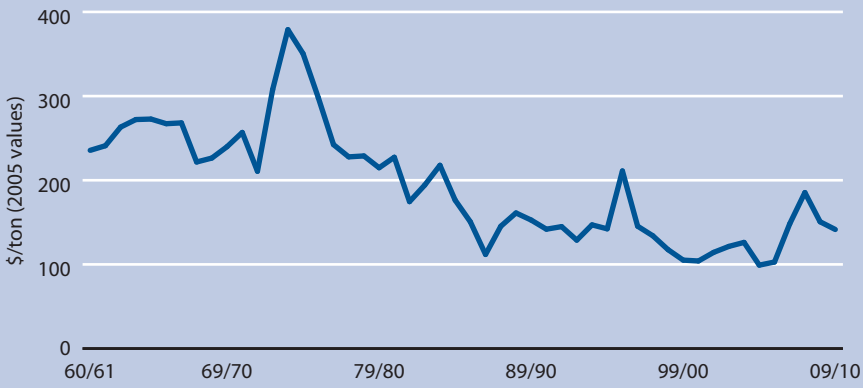


Figure 11.4: Maize reference price deflated by United States PPI



period, the real maize price has approximately halved from around USD 200 per tonne in 2005 values) in the early 1960s to around USD 125 per tonne through the 1990s. Even at its recent 2007/08 peak, real maize prices were substantially lower than in the 1970s and eighties.

Rice shows a starkly contrasting picture - see Figures 11.5 and 11.6. Here, stock-consumption ratios have tended to increase over time, from around 7 percent in the early 1960s to around 20 percent now. China (Mainland) accumulated enormous stocks in the late 1980s and early 1990s holding almost 75 percent of world stocks in 1990/91 and 1991/92. Aggregate non-China (Mainland) stocks have shown much lower variability. The Bangkok spot price is generally taken as an indicator or the world rice price. This halved in real terms from around USD 600 per tonne (at 2005 values) in the early 1960s to around USD 300 per

Figure 11.5: Rice stock-consumption ratio

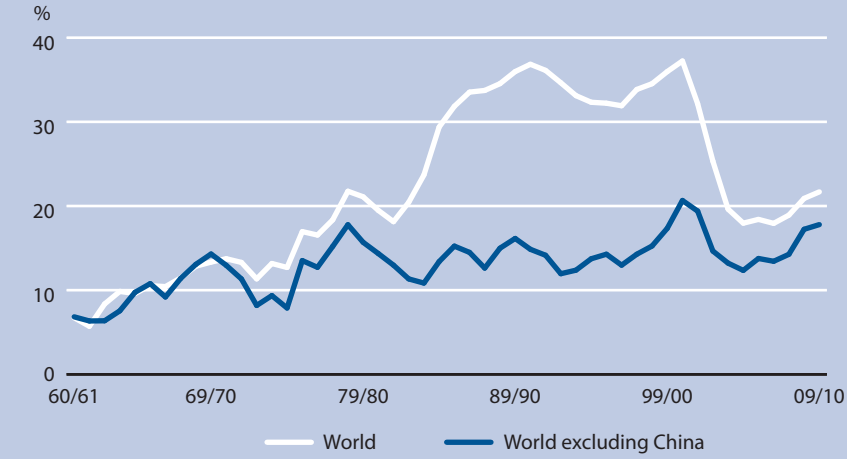
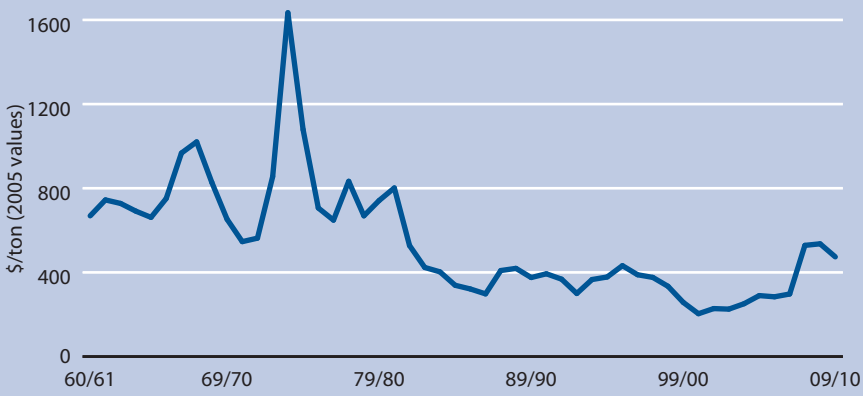


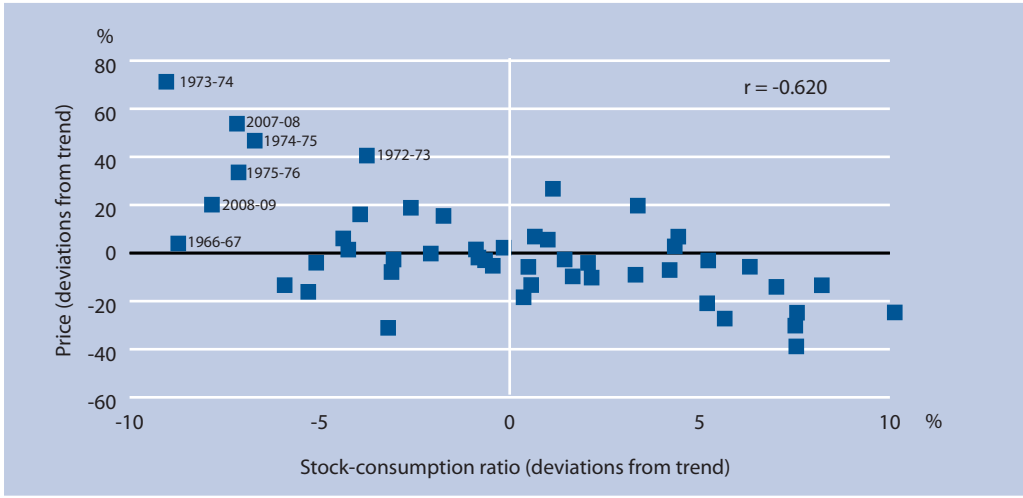
Figure 11.6: Rice reference price deflated by United States PPI



tonne prior to the 2006-08 spike. Even at its 2008 peak, the rice price was much lower than it had been in the 1970s. (It is important to note, however, that the free market in rice is residual and that actual transactions prices may differ markedly from the Bangkok quotations).

The general picture is one of trend declines in wheat and maize stock-consumption ratios taking place simultaneously with declines in real grains prices, although rice has seen rising stock-consumption ratios. Some part of the trend decline in these rations is attributable to change in developed country agricultural policies (Mitchell & Le Vallee, 2005). Overlaying this, there was a very substantial accumulation of grain reserves on the part of China (Mainland), starting with rice in the late 1980s and following through into wheat and maize in the 1990s followed by disaccumulation in the first five years of the new century.

Figure 11.7: Deflated wheat prices and stock-consumption ratio: 1961/62–2009/10



Taking a long-period view, the lower stock-consumption ratios in wheat and maize probably result from greater production and organizational efficiency in the food processing industry. The more general decline in stocks in all three grains over the most recent decade, by contrast, is the result of China (Mainland) destocking - see Dawe (2009).[5] Part of the argument as to whether world wheat and maize stocks are now too low therefore revolves round the issue as to whether Mainland China's stocks would, in the past, have been available to the world economy to provide a cushion in the event of a negative shock. A negative answer to this question would suggest that the decline in Mainland China's stocks may not be important in understanding recent and current high grains prices.

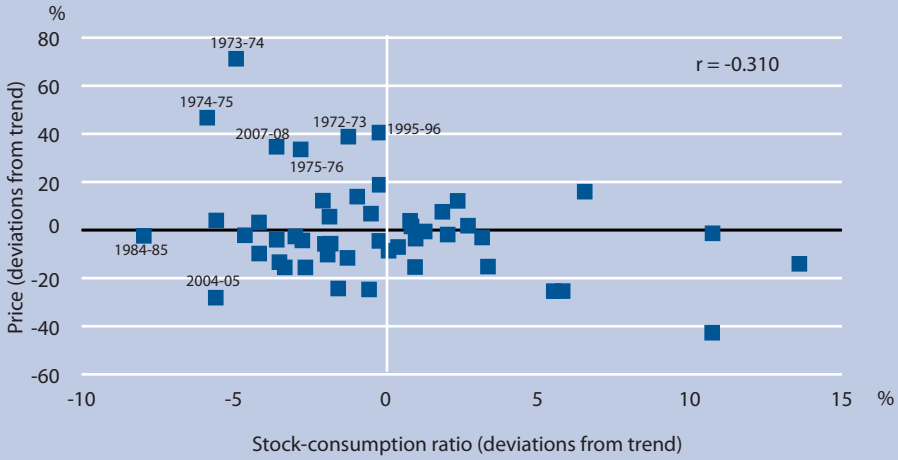
Grains stocks and grains prices

In order to see whether, and by how much, grains stocks have impacted grains prices it is necessary to disentangle the long-term trend movements in prices and stocks from the shorter term variations about trend. Econometric modelling offers one approach to this problem. An alternative is to use more straightforward statistical trend extraction methods. This is the approach I adopt here. It is important to emphasize that the results I report may be sensitive to the trend model adopted and the sample over which the trend is identified. Use of a long sample reduces problems associated with start and end points but makes the assumption of a constant linear trend less plausible. I therefore adopt the approach of fitting smooth trends but which nevertheless permit continuous variation in the slope of the trend - see Koopman et al. (2009).

Figure 11.7 illustrates the resulting relationship for wheat. The horizontal axis measures deviations of the world stock-consumption ratio (i.e. with Mainland China included) from its estimated trend, lagged one year. The vertical axis measures the deviation of the wheat

[5] FAO (2004) concluded that "Much of the drawdown in world stocks has been due to a drawdown in Mainland China's cereal inventories". However, they also caution that it is difficult or even impossible to estimate the "true" level of cereal stocks in Mainland China in the past, and that apparent changes may have resulted from different estimation procedures or from statistical revisions.

Figure 11.8: Deflated maize prices and stock-consumption ratio: 1961/62–2009/10



price, deflated by the United States PPI, from its estimated trend. The correlation, negative as expected, is 0.620. If China (Mainland) is excluded from the stock-consumption ratio, the correlation falls to 0.500 indicating that the fall in Mainland China's stocks may have been a factor in rising wheat prices. The negative relationship is clear, but is dominated by the four observations from the 1970s price spike (1972/73, 1973/74, 1974/75 and 1975/76). The 2007/08 observation falls in the middle of this group. Nevertheless, the relationship is only modestly strong - stock differences explain less than 40 percent of price differences. Approximately the same stock deviation as 2006-08 was observed in four other years (1966/67, 1974/75, 1975/76 and 2008/09) but was associated with much lower price deviations from trend. Low stocks appear to provide only a partial explanation of high wheat prices.

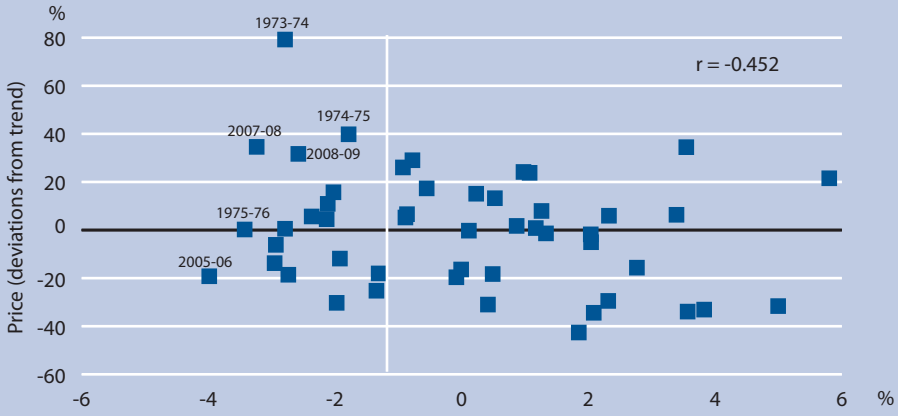
Figure 11.8 shows the corresponding relationship for maize. Here the correlation is lower at 0.310.[6] The 2007/08 observation gains falls within the range defined by the 1970s price spike. Although high price periods years are associated with low stocks, there are many years with similarly low starting stocks for which the price is close to (e.g. 1984/85) or below (e.g. 2004/05) its estimated trend. Low stocks therefore again appear necessary but not sufficient for high prices.

For rice, a superior correlation is obtained by excluding China (Mainland) from the stock-consumption ratio (0.452 against 0.223) supporting Dawe's (2009) argument. Figure 11.9 therefore shows the former relationship. The observations for 2007/08 and 2008/09 are comparable to those for 1974/75 but as in the case of maize, low stocks appear to be necessary but not sufficient for high prices.

Summarizing, by considering deviations of both the deflated price and the stock-consumption ratios from their respective trends, it is possible to discern the expected negative relationship between grains stocks and grains prices. Furthermore, the combination of the price and the stock-consumption level in 2007/08 was comparable for each of the three grains to those observed in the 1970s food price spike. Galtier (2009) implies that even if high food prices were not due, in the first instance, to falls in stocks, the low level of stocks will have

6 Excluding China (Mainland), the correlation is almost unchanged at 0.304.

Figure 11.9: Deflated rice prices and stock-consumption ratio: 1961/62–2009/10



amplified the magnitude of the price rises. Comparison of Figures 11.1 and 11.2 (wheat), 11.3 and 11.4 (maize) and 11.5 and 11.6 (rice) indicates that price spikes only occurred when the stock level was exceptionally low. However, low stocks did not necessarily lead to price surges. Low stocks appear therefore to have been necessary but not sufficient for high prices historically. This suggests both that changes in stock levels provide a partial explanation for the level of grains price and that the overall level of stocks is an important determinant of price volatility. Low stocks appear therefore to have been necessary but not sufficient for high prices historically. This suggests both that changes in stock levels provide only a partial explanation for the level of grains price but that the overall level of stocks is an important determinant of price volatility.

Dawe (2009) is therefore incorrect in arguing that "stocks did not have an important effect on the evolution of the world food crisis". However, the relevance of variations in estimates of Mainland China's grain stocks remains unclear. Other commentators have emphasized diversion of food commodities into use as biofuel feedstocks (Mitchell, 2008), exchange rate changes (Abbott et al., 2009) and futures market activity (Gilbert, 2010). Any evaluation of a stock-based policy to counter possible volatility should take these and other additional factors into account.

International commodity agreements[7]

The term "international commodity agreement" (henceforth ICA) refers to a treaty-agreement between governments of both producing and consuming countries to regulate the terms of international trade in a specified commodity. There have been six ICAs which have had "economic" (i.e. interventionist) clauses: the International Cocoa Agreements (ICCAs), the International Coffee Agreements (ICOAs), the International Natural Rubber Agreements (INRAs), the International Sugar Agreements (ISAs), the International Tin Agreements (ITAs) and the International Wheat Agreements (IWAs).

7 This section is partially based on Gilbert (2007).

There is also a large number of "study group" style agreements whose functions are information collection and dissemination, market promotion and, in certain cases, the fostering of research and development. With the ending of international commodity control, where they have survived, the previously active agreements have taken on this form. This function remains important and is not questioned by any comments on the "economic" clauses that follow.

Genesis and motivation

Primary commodity markets have been subjected to governmental intervention at least as far back as the 1930s. The first IWA was concluded in 1933 as a response to low wheat prices during the Great Depression. At the end of the Second World War, there was a widespread expectation across the range of primary markets that excess production and low prices and might return. The immediate post-war discussion of commodity matters aimed at avoidance of these outcomes. The unratified 1948 Havana Charter, which would have set up the International Trade Organization as the third pillar of Bretton Woods, included measures aimed at the alleviation of situations of "burdensome surplus" (Rowe, 1965). For the most part, it was envisaged that this would be accomplished primarily through supply regulation - typically export controls. In the absence of the institutional structures which the Havana Charter aimed to create, interested governments negotiated free-standing agreements of which the 1949 IWA and the 1954 ISA and ITA were the first. Both the ISA and the ITA focused primarily on supply management - the ISA entirely so, while the ITA also utilized a buffer stock, the initial purpose of which was seen as supporting the price over the period in which export restrictions took effect - see Fox (1974). These two agreements continued an interventionist tradition inherited from interwar colonial administrations. The 1949 IWA followed a different approach based on the concept of a multilateral contract (International Wheat Council, 1993).

Wheat and sugar are both produced in developed as well as developing economies. In the immediate postwar period, the major wheat exporters were Argentina, Australia, Canada and the United States of America. The ICAs subsequently negotiated from the 1960s related to tropical export commodities with the result that the exporters were developing countries and consumers were developed economies. This division coloured future developments.

At the time of the negotiation of the first ICOA in 1962, coffee was predominantly a Latin American commodity (Brazil and Colombia were the largest exporters), although production was already expanding in Africa. The Instituto Brasileiro do Cafe (IBC) was responsible for Brazil's coffee policy and had favoured supply management for many decades, but the Colombians had resisted this, preferring to expand production under unfettered conditions. However, as coffee consolidated in Colombia, the coffee-growing regions came to look for higher prices rather than increased output (Bates, 1997) . The ICOA was modelled on the ISA as a pure export control agreement. The United States of America was, and remains, the single largest coffee consuming nation. The crucial element which allowed the ICOA to come into existence was the willingness of the Government of the United States of America to agree to export controls. This was the period immediately following the socialist revolution in Cuba, and it is often supposed that the United States of America saw the advantage of higher coffee prices for Latin American exporters as outweighing the disadvantages arising from a controlled market. Bates (1997) argues that the highly concentrated United States of America coffee roasting industry was more concerned with reliability and security of supply than with price and may have seen acceptance of supply controls as a tolerable price for supply security.

Cocoa has largely been a West African crop throughout the post-Second World War period, although there is significant production for export in Southeast Asia. Latin America, which was important historically in cocoa, now produces largely for domestic consumption. Many of the West African cocoa producers are also coffee producers, and West African cocoa had inherited a tradition of state-controlled marketing from the British and French colonial administrations. In this context, it was natural that the cocoa producers would seek an agreement similar to that negotiated in coffee. However, the Government of the United States of America declined to join the 1972 ICCA, perhaps seeing West Africa as less important for United States of America interests than Latin America. The ICCA differed from the ICOA in that its primary instrument was the buffer stock, with export controls playing a supplementary role.

With the 1964 foundation of the United Nations Conference on Trade and Development (UNCTAD), ICAs moved into a more highly politicized environment. Existing ICAs came under the auspices of UNCTAD, which also sought, from 1976, to stimulate the negotiation of new agreements as part of the Integrated Programme for Commodities (IPC) in connection with the so-called New International Economic Order (NIEO). The NIEO was intended to set up what its proponents viewed as a more equitable system of trading relations between the developed and the developing world. The IPC was endorsed by the United Nations General Assembly in 1974. Its most explicit statement is in UNCTAD Resolution 93(IV) which sought the stabilization of commodity prices around levels which would be "remunerative and just to producers and equitable to consumers" (UNCTAD, 1976). UNCTAD produced a list of ten "core" commodities in which it hoped to see ICAs[8] but developed country governments argued for a commodity-by-commodity approach to negotiations. These negotiations took place in Geneva over the following years.

Brown (1980) gives an account of the UNCTAD negotiations. Although the rhetoric of the negotiations related to the variability of commodity prices, with buffer stock intervention now the favoured instrument, developed countries remained suspicious that the main intention of the producer country governments related to raising the level rather than reducing the variability of prices. The INRA was the only new agreement to emerge from this long process.

To summarize, the tropical export crop ICAs had emerged against a background in which colonial governments had historically regulated commerce and the subsequent UNCTAD push for more widespread agreements took place in a context in which many developing country governments hoped to re-establish political regulation of international markets. In sugar and wheat, the ICSAs were negotiated against a background in which international commerce had been largely on an intergovernmental basis. The initial motivation was the avoidance of excess supply and low prices and, in the case of wheat, food security. Subsequently, developing country governments pushed for "remunerative and just prices", a phrase widely interpreted by consumer country governments as suggesting above-market levels. Volatility reduction featured more prominently in the rhetoric of negotiation than in actual practice.

Export controls

The principal instruments used by ICAs have been supply management through export controls and buffer stock intervention. The ICOA and ISA both relied entirely on supply management while the INRA only used a buffer stock. The ICCA and ITA employed both

[8] Cocoa, coffee, copper, cotton, jute, rubber, sisal (later extended to all hard fibres), sugar, tea and tin. Note the absence of grains.

instruments. In the first ITAs, the buffer stock was seen as a supplement to export controls but in later ITAs it assumed the major role. In the ICCA, the buffer stock was always more important than the export controls. The initial (1933) IWA was based on export controls but these were ineffective and absent from subsequent IWAs. Gilbert (1989) discusses the detailed intervention procedures.

Supply management presupposes the ability of government to control either production or exports. In agriculture, production is typically undertaken by a large number of relatively small producers, and the same was also true of most tin production. Governments can attempt to control production through quotas (livestock and dairy products), acreage controls (crops) or dredger capacity (alluvial metals) although yield variability can translate into substantial output variability for crop commodities. For export crops, governments have therefore found it more effective to control exports than production. In the cocoa, coffee and sugar agreements, these controls were often implemented through monopsony-monopoly marketing boards (a feature of many ex-British colonies) or caisses de stabilization (standard in many ex-French colonies). With exports constrained and little domestic consumption, export controls forced producing countries to accumulate excess production. When ICOA export controls were finally lifted in 1989, producer country inventories were released onto the world market resulting in depressed prices over the following five years (Gilbert, 1996).

To that extent, the difference between stabilization via export controls and via a buffer stock lies in who holds the stocks and at whose cost. In export control agreements, the incidence of the costs of stabilization is on producers and producer governments which have the incentive to reduce future production. Instead, with buffer stock stabilization, producer and producer governments have little incentive to reduce production. This is a major reason why the ICCA and ITA combined export controls with buffer stock intervention.

Export controls are better seen as an instrument for raising prices from unsustainably low levels than for stabilizing prices. This is because effective controls can compel reductions in available supply in the face of low prices, but can seldom compel producers to increase supply in the face of high prices. In a surplus situation, producers are collectively better off by collectively reducing exports from the levels which maximize profits on an individualistic basis, even if they would be worse off if they were to do this unilaterally.

Regulation through export controls faced three major problems:

1. Export controls rely on a comprehensive compliance both by actual and potential producers.
2. They may introduce distortions.
3. The potential benefits may be appropriated by or dissipated in rent-seeking activities.

With rigid historically-based quota allocations, these negative side-effects tended to increase over time.

Compliance is always a problem in any cartel-like arrangement. Each producer benefits from the price rise in resulting from other producers' supply restrictions, but would benefit himself by maintaining or even increasing his own production level (as price is now above marginal cost). Every producer therefore has an incentive to renege but is aware that obvious violations of the agreement will encourage others to follow. Because these agreements did not include any mechanism for redistributing profits between members, low cost producers, who might be inclined to expand even at low price levels, were often the least committed to controls. Because agreements only included countries who were significant producers at the time the agreements were negotiated, potential producers and producers who were too small to be included in the scheme, were unrestricted. Supply restrictions therefore

tend to encourage both production by non-members and non-compliance by members. This was a serious problem in tin where Brazil, a non-member of the ITA, found it profitable to substantially expand production under the umbrella of ITC export controls. By contrast, high cost African coffee producers expanded market share at Brazil's expense under the umbrella of the ICOA. With the ending of ICOA controls, the Brazilian market share in coffee has returned to its pre-ICOA level.

The allocation of export quotas has the potential to distort both the production structure of the industry, as low cost member producers are unable to expand at the expense of high cost producers, and also the consumption structure, if more than one grade of the commodity is produced. Grade distortion was a major problem in the ICOAs, where consumer preferences moved during the eighties towards high quality mild arabica coffees at the expense of robustas and unwashed arabicas. The ICOA's historic quota allocations generated a significant premium for mild arabicas, while at the same time the agreement allowed production in excess of quota of these premium coffees to be sold at substantial discounts in non-member consuming countries, largely in eastern Europe and Southeast Asia - see Bohman & Jarvis (1990). This caused resentment in importing member countries.

As primary prices generally declined in real terms during the 1980s, the price raising features of the export control agreements became more apparent than previously, but at the same time, growing evidence that, at least in the case of coffee, quota allocations in many instances generated rent-seeking, cast doubt on whether the coffee growers themselves were always beneficiaries of these prices. The extent and effects of rent seeking behaviour of this form in the Indonesian coffee sector has been well documented by Bohman et al. (1996). It is difficult to gauge the extent to which the benefits from higher prices fed through to farmers were appropriated by supply chain intermediaries and others or were simply dissipated in wasteful activities. The net result of these activities was that the coffee producers came to see little direct benefit to themselves from the control agreement. This was a major cause of the 1989 lapse of coffee market intervention (Gilbert, 1996).

Rent seeking and market distortion are problems of market efficiency. The extent of inefficiency introduced by resort to export controls increases the longer they are in effect. Increasingly, therefore, the international community came to see attempts to formalize export control arrangements into long-term agreements as misguided.

Buffer stock stabilization

Buffer stock stabilization rests on an implicit premise that private sector storage is inadequate. This may be a valid assumption in the absence of efficient futures markets as individual risk aversion will in general result in investments (here investment in storage) requiring inappropriately large risk premia (Arrow & Lind, 1970). However, where they exist, futures markets allow separation of the speculative and storage decisions with the result that hedged stockholding becomes near riskless and so should be unaffected by individual risk aversion. In that case, it is invalid to claim that high volatility justifies public sector storage.[9] All three commodities for which buffer stock intervention was envisaged (cocoa, natural rubber and tin) were traded on futures markets. Among the grains, maize and wheat are actively

[9] It remains the case that if futures markets are biased predictors of future cash prices, commodity storage may reflect incorrect incentives but at least in the case of agricultural crops, risk should be idiosyncratic and hence diversifiable which should result in unbiased futures prices. The empirical evidence is consistent with futures prices being near unbiased.

traded on futures exchanges but rice is not.[10] This suggests that while it is possible to make a theoretical case for public sector storage on the basis of inadequate private storage for rice, this is more difficult for other grains.

The foregoing considerations apply to international stockpiling. Additional factors may be relevant to national food security stocks, in particular in developing countries. High food prices are likely to impact particularly on the urban poor and on landless rural households. These groups will typically have few assets on which to fall back and will be vulnerable in that adverse shocks may have negative impacts with much longer duration than the shocks themselves. Co-insurance at the family or village level is ineffective for common shocks which impact the insurer as well as the insured. The private sector will not be motivated to purchase for the needs, as distinct from the likely purchases, of these vulnerable groups. Developed economies use targeted social and family support policies to protect vulnerable groups of this sort. Targeting is less important in developing economies where larger and often more homogeneous groups are vulnerable. In these cases, there may be arguments for either public food security stocks or variable tariffs (or export controls for an export crop) to ensure that domestic grains prices do not rise too far or too fast.

Staple foods form a large part of the budgets of poor households in most developing countries. This makes food prices and availability acutely political. Governments are therefore unable to credibly and effectively commit not to intervene in the event that a shortage arises. However, this fact makes it unattractive for private merchants to store grains until government has announced its decisions. In turn, governments justify intervention by reference to the unpreparedness of the private sector. These problems are largely absent in middle income and developed economies in which governments typically follow policies based on pre-announced intervention rules.

Finally, one might argue that volatility resulting from low stock levels will impose negative externalities (Galtier, 2009). The major impact of these externalities will typically be on supply chain intermediaries, in developing countries particularly acutely on locally-based intermediaries with limited access to credit and futures markets. The consequence is that such intermediaries will often operate at inefficiently small scale and will be at a competitive disadvantage relative to multinational competitors (Dana & Gilbert, 2008; Galtier, 2009). These concerns are legitimate but it is arguable that they may be better addressed by encouraging the growth or creation of local futures markets, where this is feasible (UNCTAD, 2009), or by provision of direct assistance to the intermediaries concerned.

At the practical level, international buffer stock stabilization faced three major problems:

1. The long-run price level about which stabilization should take place may change over time, requiring updating of the stabilization range.
2. Even if the stabilization range is appropriately defined, the intervention authority may lack the resources to keep the price within the range.
3. Once the buffer stock is exhausted, the intervention authority lacks instruments for dealing with any further price rise.

The long-run sustainable price may change over time because of changes in production costs, or of consumer tastes. Problems associated with updating of price support ranges became central in the three buffer stock ICAs. In the two decades to 1973, buoyant real prices in conjunction with low inflation in the developed countries implied that periodic

[10] Rice is traded on both the Bangkok and Chicago markets but volumes are thin and prices are not always representative of those relating to more important off-exchange transactions.

upward revision of ranges was required. This seldom proved controversial because, with actual prices generally above the stabilization range, consumer country governments did not see range revisions as likely to raise realized prices. By contrast, over the two decades from 1975, falling real prices and (after 1981) low inflation, prices tended to be at the bottom of the price range in buffer stock agreements. The ITA contained no mechanism for revision of the price support range, and this range also suffered from an implicit dollar link. The lack of updating procedures was an important factor in the collapse of the ITA (Anderson & Gilbert, 1988).

If, on the other hand, the stabilization range adjusts so rapidly that it simply tracks the market price, the agreement will not stabilize prices to any useful extent. Specifically, if an agreement stabilization range is revised down to a sufficiently large extent in relation to weak market conditions, producing countries will cease to perceive any interest in the so-called stabilization exercise. The INRA included provisions for periodic revision of the support range in relation to a moving average of past price. These revisions proved unpopular with producing governments since with weak prices, downward revision implied a fall in actual prices. Disputes over downward revision of the price support ranges were important in the eventual abandonment of intervention in the second INRA (Gilbert, 2007).

The second problem is that buffer stock stabilization can be expensive. This is obvious if "stabilization" is around a price in excess of the long-run market clearing level, but would also be true in a "neutral" scheme in which the correct long-run price level had been identified, supposing this to be possible. Theoretical models suggest that commodity price cycles should exhibit long flat bottoms punctuated by occasional sharp peaks. Buffer stock stabilization will consequently be an expensive instrument for dealing with low prices since stocks will need to be held over a long-period. These difficulties are exacerbated by the fact that public sector storage displaces private stocks. Townsend (1977) has shown that any neutral price-fixing scheme will eventually exhaust available resources. It is clear that the less finance an intervention authority has available, the earlier this likely exhaustion date. Lack of finance severely handicapped the ICCA and was a major cause of the collapse of the ITA.

Buffer stock stabilization was also ineffective at the peaks, which arise from stockouts - the third problem indicated above. Once the stock was exhausted, the authority was powerless to do anything except campaign for an upward revision of the support range.

In practice, the updating and finance difficulties tended to become entangled. Because of long investment lead times, metals and tree crop commodities can experience acute excess or (as presently) under-capacity for sufficiently long-periods of time as to make buffer stock stabilization about the supposed long-run price infeasible. This factor was important for both the ICCA, as the result of severe excess capacity during the 1980s, and in the ITA, where exhaustion of Malaysian alluvial deposits had resulted in a sustained period of under-capacity in the seventies. The ITA broke down because the agreement was inadequately financed, was attempting to stabilize at too high a level and was carrying the entire world surplus. The ICCAs were both poorly financed and committed to stabilizing the price at too high a level.

Multilateral contracting

The 1949 IWA was based on multilateral contracting. IWA exporting members guaranteed assured supplies of wheat subject to a maximum price while importing countries guaranteed purchases subject to a minimum price. These provisions were maintained in the 1953, 1956, 1959 and 1962 IWAs. These arrangements worked well so long as prices did not fall

significantly beneath the IWA floor or exceed the ceiling but were difficult to sustain in more turbulent times. Contractual floor and ceiling prices were absent from IWAs after 1971 (International Wheat Council, 1993).

The IWA multilateral contracts were contracts between governments. This was natural at a time in which international trade in wheat was dominated by intergovernmental transactions and in which the prices paid to farmers in wheat exporting countries were set or heavily influenced by national farm support policies. Except in rice, grains commerce is now largely in the hands of private companies which contract on the basis of market prices. Governments would therefore currently need to enforce commitments of this sort through a regime of taxes and subsidies. However, WTO regulations require countries to reduce export subsidies thereby making it difficult for governments to guarantee agreed maximum prices. Even if it were judged desirable, the original IWA concept of multilateral contracting would therefore no longer be feasible.

Multilateral contracts are a form of forward contracting. The IWAs extended for three years, so the IWA multilateral contracts may be regarded as a set of one, two and three year forward contracts, for quantities which were not specified but implicitly related to past transactions, capped at predetermined floor and ceiling prices. These prices are negotiated to be fair to exporting and importing countries at the start of the agreement so at that time they have zero value to either side, i.e. neither exporters nor importers are financially better off as the result of the contracts (Hull, 2006). However, as market conditions change during the course of the agreement, the contracts have positive equity for one side and negative for the other - if prices rise, importers gain from the price ceiling at the expense of exporters while if they fall, exporters gain from the floor at the expense of importers. Once the losses from adherence to the negotiated ceiling prices become substantial, there is pressure from farmers to renegotiate or renege, as in the Commonwealth Sugar Agreement (also based on multilateral contracting) in 1973. If the losses from sticking to the negotiated floor prices become substantial, consumers and importing governments seek renegotiation, as the 1967 IWA a year after its negotiation.

Multilateral contracting can work well so long as price volatility remains low but lacks enforcement mechanisms and hence credibility when volatility becomes high. It is ill-adapted to a world in which commerce takes place between private companies.

Decline of the ICA movement

The commodities debate becoming increasingly politicized through the latter half of the 1970s and into the eighties. Many developed country governments viewed price stabilization as a costly diversion of funds from more pressing development objectives. Some suspected that a number of commodity exporting countries wished to substitute an inefficient socialist-style "planned" commodity economy which would result in an unfavourable shift in the terms-of-trade against the developed countries. Industry groups saw the continuing UNCTAD negotiations as driven by political rather than commercial concerns. Consequently, the ICA movement went into reverse.

- The ISAs had never managed to overcome the problems caused by the USA's 1962 decision to deny access to Cuba, then the largest sugar-exporting country, to the United States of America market, and by the substantial growth in sugar production in the European Union. The fourth ISA terminated in 1984 and was replaced by an agreement which did not contain market intervention clauses (Gilbert, 1987).

- The IWAs failed to achieve mechanisms for updating contractual price floors and ceilings in the face of market turbulence which commenced in 1968 and became acute in the 1970s. Implicit in this was the absence of incentives in the agreements to ensure continued adherence to the agreements in altered market circumstances.
- The ICCA allowed the possibility of market intervention through unspecified production management measures, but no longer through the buffer stock. However, the ICCAs never had either the finance or the country coverage to be able to have more than a small effect on the cocoa market (Gilbert, 1987, 1996).
- The ITA broke down spectacularly on United Nations Day (24 October) 1985 as the result of attempting to defend an unrealistic floor price with insufficient finance the - see Anderson & Gilbert (1988).
- The ICOA effectively abandoned supply management ambitions on (United States) Independence Day (4 July) 1989. In the post-Cold War period, the USA no longer saw a need to provide surreptitious financial support for its Latin American coffee-producing allies, and Brazil, now the second largest coffee consumer as well as the largest producer, had mixed motives.
- This INRA staggered on until 1999, a year prior to the formal ending of the third INRA, when first Malaysia and then Sri Lanka and Thailand gave notice of withdrawal from the agreement. These actions were in part motivated by the perception that, because of adjustment of the price bands, the INRA offered too little stabilization. This effectively terminated the agreement and hence also the ICA movement.

There is no single reason for the breakdown or lapse of the commodity agreements. The cocoa and sugar agreements lapsed because they were ineffective. The tin agreement collapsed because it was attempting to hold the price at too high a level with too little finance to do so. This was the single case which corresponds to the widespread view that ICAs attempt to stand "Canute-like" against the incoming market tide, but it is important also to recall that the ITA was effective for the first twenty-five years of its existence. More interesting are the cases of coffee and natural rubber where the agreements lapsed rather than collapsed. In the case of coffee, this was because the agreement lost support from consumers and to some extent also from producers (Gilbert, 1996). The case of rubber is more complicated and is relevant to some current policy discussions. The INRA provisions required that the stabilization band would be automatically updated in relation to a moving average of past prices. Nevertheless, updating remained controversial when this implied downward revision of the floor price (Gilbert, 1996). In the end, stabilization lapsed as producing country governments saw little benefit from continued price smoothing.

These changes in support took place in the context in which the markets for tropical export commodities were being liberalized and in which domestic stabilization agencies - marketing boards and caisses de stabilization – were being dismantled or forced to accept reduced powers - see Akiyama et al. (2001). The private sector was becoming more important and government involvement in agriculture was diminishing. Governments had both less power than previously to control supplies, and also a diminished willingness to attempt control. The ICAs appeared anachronistic and international meetings, in which diplomats deployed non-commercial arguments about price and export levels, seemed irrelevant in the face of the imperatives of competing in largely liberalized markets.

ICA effectiveness

The extent to which ICAs have (a) raised and (b) stabilized prices remains controversial. Evaluations have typically relied on counterfactual simulation of econometric models, for example Smith & Schink (1976) on tin and Palm & Vogelvang (1981) on coffee. Exercises of

Table 11.1: Post-ICA price changes

Year	Cocoa	Coffee	Natural rubber	Sugar	Tin	Average
- 1	100.0	100.0	100.0	100.0	100.0	100.0
0	65.8	63.5	102.8	59.0	55.5	69.4
1	55.7	67.3	92.6	55.3	50.5	64.3
2	62.0	61.8	110.9	80.6	44.9	72.0
3	63.4	55.3	150.0	80.2	57.7	81.2
4	60.7	77.9	167.5	101.6	44.5	89.4
Average 5-9	67.3	115.3	189.6	122.9	41.0	107.2

this sort are subject to qualification with regard to the extent that the models employed in the simulations adequately reflect market behaviour. These worries are underlined by the fact that production, stockholding and export decisions will adapt to the policies followed by the stabilization authority (Miranda & Helmberger, 1988). This adaptation is difficult to model.

Table 11.1 reports the results of a cruder evaluation procedure for the five ICA commodities for which developing countries are the most important exporters.[11] The table gives the annual price averages for cocoa, coffee, natural rubber, sugar and tin over the nine years following cessation of intervention. In each case, prices are measured relative to the IMF Commodity Price Index (non-fuel commodities), with the ratio normalized to 100 in the twelve month period prior intervention ceased or was abandoned. The indices in Table 11.1 should therefore be seen as indices relative to the general level of non-energy commodity prices. Except in the case of natural rubber, the ending of intervention was associated over the following two years with prices around 30 to 40 percent lower than in the final year of control. Despite subsequent recovery in coffee and sugar, on average prices remained 30 percent lower over the next three years, and much of this difference persisted over the following five years.

Post-ICA price changes

Taken at face value, the values in Table 11.1 suggest that ICAs raised commodity prices by a substantial amount. However, prices may have fallen for three other reasons:

1. Release of stocks either held by the buffer stock (tin) or by producers subject to export controls (coffee) will have depressed prices relative to their ICA levels.
2. ICAs may have lapsed or failed in the face of likely increases in supply. In coffee, the advent of Viet Nam as a major exporter in the early 1990s depressed prices after the ending of ICOA controls. It seems very unlikely that the rigid ICOA quota system would have been able to cope with the arrival of a major new exporter. Exporting members may have been aware of this possibility.
3. Other market developments may have resulted in prices being higher or lower than under ICA interventions.

Nevertheless, averaging over all five ICA commodities, it is evident that post-intervention prices were around 30 percent lower than might otherwise have been expected for two years

[11] Table 11.1 updates Table 2 of Gilbert (2007). Except for natural rubber, where an extended window is now available, differences relate to revisions in the IMF non-fuel commodity price index used as deflator. Data sources: IMF, International Financial Statistics except coffee, International Coffee Organization.

and around 10 percent lower for a further two years. This provides some evidence that the ICAs did raise prices.

Did the ICAs also stabilize prices? The answer to this question is complicated by the fact that commodity prices should be less variable when supply is plentiful - see Williams & Wright (1991), Deaton & Laroque (1992) and Brunetti & Gilbert (1995) - and the ending of controls tended increased availability through release of the buffer stock, or, in the case of export control agreements, by allowing exporting countries to sell accumulated inventory. Looking at the three year period immediately following the lapse or collapse of controls in relation to the three year period immediately preceding this, the coefficient of variation of monthly coffee prices fell from 23.6 percent to 10.7 percent, while the coefficients of variation for cocoa and tin rose from 6.9 percent to 14.3 percent and from 8.3 percent to 14.3 percent respectively. There is thus little clear evidence that the ending of ICA controls resulted in higher price variability. Coffee moved from a regime of high but volatile prices to one of stable depressed prices while the rise in the coefficients of variation for cocoa and tin is attributable to lower average prices - the price standard deviations are almost identical before and after the end of stabilization. Rubber price volatility reflected changes in market tightness - prices became less volatile in the weak market conditions at the time of the ending of the agreement but volatility has subsequently increased dramatically as the markets for all industrially-consumed raw materials have become very tight.

It is true of both export control and buffer stock agreements that they were more effective in defending floor than ceiling prices. In an export control agreement, it was always economically possible to limit exports although, as in OPEC, disagreement on the allocation of quotas may make this politically difficult. Quota allocation in the ICOA was very rigid and enforcement was undertaken by importing member countries who only accepted coffee certificated by the International Coffee Organization (ICO). When markets became tight, however, the ICO could do little more than exhort members to expand exports implicitly beyond commercially attractive levels. Similarly, in a buffer stock agreement, the buffer stock authority can buy the commodity so long as its funds are sufficient to do so,[12] while it can only sell what it has previously bought. Both types of intervention are therefore effective in preventing price falls than rises. But this is exactly the same as the situation of private stockholding in the absence of intervention.

Even if ICAs did generate benefits to exporting countries we should ask, "Who were the beneficiaries within the countries?" There is some evidence, particularly from the coffee agreements, that benefits were diverted to elites (Bohman et al., 1996). Export controls always create rents, partly because export quotas can be allocated to friends or political allies, and also because the administration of controls generates employment and therefore a vested interest in the continuation of controls. One reason Brazil lost interest in coffee market control was the perception that the major beneficiary was the controlling IBC bureaucracy (Gilbert, 1996).

Evaluation of the overall "success" of the ICAs is problematic on account of the confusion over their objectives. The rhetoric of the agreements, at least over the final decades of the century, stressed reduction in price variability, but here the effects appear to have been at best marginal. By contrast, producer governments have always seen ICAs as a means of raising prices, or at least of avoiding low prices, and on this criterion, the agreements - in particular the ICOA and the ITA - do appear to have enjoyed some success.

[12] Perhaps longer than this - the eventual bankruptcy of the International Tin Organization arose because, essentially by means of the creative use of what would now be called off-balance sheet accounting, its market exposure greatly exceeded the resources it owned to purchase tin (see Anderson & Gilbert, 1988).

Summary

The motivation of the early post-War commodity agreements was the avoidance of excess supply and the associated low prices. Food security was an additional concern in the IWA. These agreements operated largely through supply management, principally export controls, although the IWA was built around multilateral contracting. The second round of agreements, which related to tropical export crop commodities, was justified in terms of price stabilization but was largely motivated by the wish on the part of the exporters to obtain higher prices. There was a significant shift of emphasis in these agreements towards buffer stock stabilization which had been seen in the earlier ITA as an adjunct to supply management.

Both export controls and multilateral contracting presuppose a substantial intergovernmental role in international commodity commerce. This was true of wheat in the initial postwar decades and was true of developing commodity exporters prior to the substantial market liberalization which took place on the 1980s. Both developed and developing country governments have now retreated from this level of involvement in commodity commerce and neither type of arrangement would now be practical. Furthermore, they are doubtfully WTO-compatible. Export controls had other negative impacts - they protected high cost producers from competition from lower cost competitors, they introduced distortions in the qualities (grades) available to the market and they induced significant rent-seeking behaviour. These negative impacts tended to accumulate with the duration of intervention.

Both export control and buffer stock agreements faced acute problems in updating their stabilization ranges over time. In the 1960s and seventies, inflation required that floor and ceiling prices be periodically raised. In the 1980s, altered market circumstances put downward pressure on the entire primary sector requiring stabilization objectives to be lowered. These changes were politically difficult and were a major factor behind the ending of intervention.

Buffer stock intervention was expensive, both because public storage crowds out private storage and because stabilization reduces the incentives for producers to expand or contract production. The costs of buffer stock stabilization could be reduced by periodic and formulaic revision of the stabilization range, on the basis for example of a moving average of past prices. This was the practice in the INRA. Nevertheless, it failed to diminish the extent of political controversy and limited the perceived usefulness of the agreement.

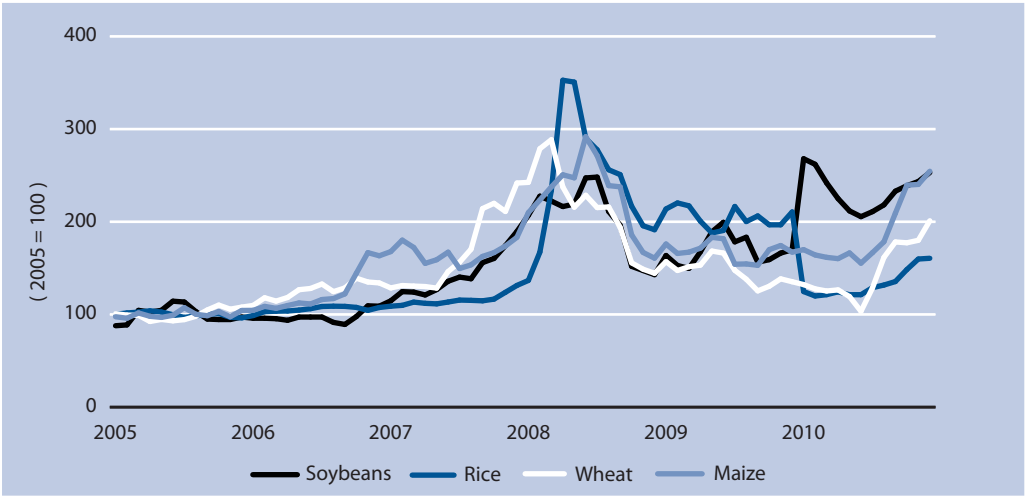
A review of the historical experience suggests that international commodity agreements were successful in raising prices but had little success in reducing priced variability. Part of the reason for this lack of success is that they lacked effective instruments for dealing with price spikes - countries cannot be forced to export beyond what is profitable and a buffer stock can only sell what it has previously bought.

The ITA was the only commodity agreement to collapse. In the other active agreements, intervention lapsed. It is incorrect, both as a matter of logic and history, to argue that commodity price stabilization is infeasible and is bound to break down. Instead, governments either lacked the will to continue to stabilize, or concluded that the benefits were too small or that the costs were too large to justify intervention.

Policy

The prices of grains and other food commodities increased dramatically in 2006-08. Subsequently, in 2009, prices fell back although, except for wheat, not to their pre-spike

Figure 11.10: International grains prices: 2005-10



levels - see Figure 11.10 which charts the world prices of the four principal grains, maize (corn), wheat, rice and soybeans.[13] The summer of 2010 witnessed catastrophic weather conditions in much of the northern hemisphere resulting in renewed upward pressure on the wheat and maize prices.

These developments have resulted in a widespread view that the combination of rapid economic growth in much of Asia with more variable weather conditions, perhaps in part caused by global warming, will result in higher and more variable food prices over at least the next decade. They have also provoked renewed interest in the possibility of international intervention to reduce or offset this anticipated volatility.

Lessons from the commodity agreements

The International Commodity Agreement (ICA) experience over the second half of the twentieth century is generally perceived as having been negative. The account given earlier this chapter indicates that this judgement is too simple. Except in a single case (tin), intervention lapsed rather than collapsed. Furthermore, it is necessary to ask what were the actual objectives of each agreement and whether they enjoyed the support and resources to achieve these objectives. Developing country exporters came to look at the ICAs as instruments for raising more than for stabilizing prices. The evidence suggests that the agreements may have been successful in this regard. By contrast, importing country governments laid emphasis on the potential volatility reductions that the ICAs were expected to deliver. These expectations were largely disappointed. The success or failure of the ICAs therefore depends to a large extent on the perceived intervention objectives.

The principal current concern in relation to the grains markets is volatility reduction and, in particular, the avoidance of further grains price spikes. Wheat remains the most important traded grain. Many wheat exporting countries are rich and few are very poor. By contrast, many of the poorest countries are grains importers. There is thus no suggestion that

13 Source: IMF, International Financial Statistics.

intervention should aim to raise wheat prices and there may be some hope that intervention might reduce the average level of prices over time. Food security issues have resurfaced.

Given these concerns, much of the post-1945 commodity agreement history is irrelevant. Limitation of exports will tend to raise rather than lower prices and does nothing to reduce either the incidence or magnitude of price spikes or to enhance food security. This leaves only the buffer stock features of the three agreements which used this instrument (cocoa, natural rubber and tin) as potentially informative for the current debate.

The discussions earlier highlighted four problems with buffer stock agreements;

1. They are potentially very costly, in part because public storage crowds out private storage.
2. There is a need to update the stabilization range in relation to changed market circumstances. This can result in controversy. Formulaic updating, on the basis for example of a moving average of past prices, reduces the potential for stabilization and hence the value of the intervention, but does offset the costs of intervention.
3. Given sufficient finance, a buffer stock authority can maintain a price above the agreed floor. However, the buffer stock can only sell what it has previously bought so once its stock is exhausted the authority has no further means of defending the ceiling. The consequence is that buffer stock agreements tend to more effective in limiting price falls than in curtailing the incidence and magnitude of spikes.
4. This feature is exacerbated by the possibility of speculative attack. Although attacks can take place either on a floor or a ceiling price, the problem is more serious at the ceiling.

In practice, it seems that there is little evidence that buffer stock stabilization did result in any significant reduction in price volatility. A possible objection is that the commodity agreements had mixed objectives and were thus not seriously committed to the reduction of price variability. This might be taken as implying that a new generation of price smoothing arrangements might be expected to enjoy greater success is reducing volatility. Nevertheless, the intervention authorities active in the commodity agreement movement would probably resent the suggestion that they were not fully committed to price stabilization and would be more inclined to blame the secular decline in real prices over the nineteen eighties and nineties for any lack of success. It is also debatable, and also untestable, whether more could have been achieved if the objectives of the agreements had been differently defined. In particular, the argument that price smoothing schemes based on moving averages of past price might be more effective than traditional schemes faces the problem that the natural rubber agreement, which had this structure, had little effect on volatility and lapsed because producing member countries failed to see value in the smoothing arrangements.

The substantive lessons from the ICA experience, where relevant to current circumstances, are therefore predominantly negative and are informative about what should be avoided and not what should be done. However, this does not imply that valid policy options are unavailable.

An international grains stockpile?

A number of commentators have proposed creation of an international grains stockpile. Most recently, Fan (2010) has argued that, as part of the five prong IFPRI programme, "the establishment of a global, coordinated physical grain reserve, which could be managed by the WFP".

There are two sets of arguments against this proposal - the first theoretical and the second practical. At a theoretical level, the proposal presupposes that private storage is inadequate. I discussed that argument earlier arguing that there is no generally valid theoretical argument

to expect that, at the world level, private storage will be inadequate. Occasional price spikes would not themselves constitute such an argument since it may simply be too costly to eliminate them. Furthermore, even if it were thought that world grains stocks are too low there are strong arguments for preferring policies would stimulate additional private storage against those which emphasize public storage and which are likely to discourage private storage.

In the previous section it was argued that although it is possible to discern the expected stock-price relationship, this relationship is weak for grains. Low stocks appear to be necessary but not sufficient for price spikes. This is consistent with claims that many other factors have driven recent grains price movements. The possible counterfactual price effects of increased storage will depend on how higher storage interacts with these other factors. It may therefore be wise to discount the more optimistic claims made for an international grain stockpile which presuppose a much tighter stock-price relationship than that which is actually observed. At the very least, further work is required to quantify this nexus more precisely. These conclusions are in line with the theoretical discussion of the last section and are similar to those reached by Wright (2009).[14]

At a practical level, the commodity agreement experience makes it doubtful that intervention along these lines would reduce the incidence or magnitude of price spikes. Low stocks appear to be a necessary but not sufficient condition for high prices. It is arguable that a higher level of inventory would reduce market anxieties that supplies may prove insufficient, but it is also likely that the process of establishing an inventory in a period in which supplies are already tight will have an offsetting effect in increasing market concerns.

Buffer stock stabilization was costly and did not notably reduce price volatility for those commodities where it was employed. Much of the cost arises from the fact that public storage tends to displace private storage. In terms of the effectiveness of storage in reducing volatility, once the buffer stock is exhausted, it can do nothing to prevent further price rises. This, and the asymmetric risk of speculative attack at the price support ceiling, suggests that any intervention should forbear from committing to a pre-defined price ceiling, whether parametric or as a moving average of past prices. Instead, the intervention authority should follow the practice of many central banks which, when they intervene on foreign exchange markets, do so without prior announcement and without making their objectives explicit. This could substantially reduce the level of intervention costs by finessing both the updating and speculative attack problems.

Von Braun & Torero (2009) have advocated a virtual food reserve which would complement a smaller physical reserve. The virtual reserve, which would be backed up by a financial fund, would be used to "calm" markets under speculative situations, i.e. it would be used to countervail speculative pressure. The proposal supposes both that the fund managers know better than the market and that they can prevail against it. A precondition for any stabilization, whether physical or virtual, is greater transparency and certainty on grain production and inventories.

A useful analogy is with central banks which intervene in currency markets. The 1985 Plaza Agreement, which reversed the rise of the United States Dollar, shows that in certain circumstances well-planned interventions can be successful. Despite this, the profitability of many hedge funds comes from betting against central bank foreign exchange market interventions. The same would likely be true if a virtual grains reserve were to be established.

[14] Wright does suggest a small emergency reserve to respond quickly to national or regional emergencies which could help speed up responses of international organizations in relief situations (see Chapter 25).

Agenda for future research

The focus for future research should be on public grain stocks. The following issues appear salient:

1. It is widely held that grain stock levels have fallen sharply over the past decade. It was noted that this fall is largely owing to an apparent fall in Mainland China's stocks but that caution is required in interpretation of those figures. It would be very helpful if agencies could work with the Government of China to increase transparency on grains stock levels and to establish, with greater certainty and on a consistent basis, what stock levels were over the past decade.
2. Both economic theory and historical experience suggest that public stockholding crowds out private stockholding. This issue has received relatively little attention empirically. Is this effect large or small and does it vary according to the purpose and location of the stocks? It seems possible, for example, that emergency relief stocks may have little or no price impact while intervention stocks may have a large impact since the former will never be available to regular market participants. It is possible that the same is also true, perhaps to a lesser extent, of stocks held in developing countries and away from major international markets.
3. Additional research would be valuable on the potential cost and uptake of market instruments for hedging risks. Will these be feasible for all major grains or just for wheat and maize? In southern and eastern Africa, white maize is the principal staple. Can this be hedged on the regional South African (SAFEX) market, or should the Chicago yellow market be used, and, in that case, do white and yellow maize prices move sufficiently closely to make the instruments cost-effective? North African and Near Eastern countries are wheat importers. Do their prices move sufficiently closely with North American prices to make protection via Chicago calls effective, or should they hedge on the Paris market which although historically less liquid than Chicago, has becoming increasingly important as the European Union has moved away from direct support of prices?

It is the contention of this report that answers to these questions would lead to a more informed debate on international grains policy and that this is a prerequisite for improvements in policy.

Conclusions

The conclusions of this chapter are largely, but not completely, negative. International commodity agreements had multiple objectives. While it would be incorrect to claim that international commodity agreements failed, in general terms, they did not have significant success in reducing the volatility of the prices they set out to stabilize. By restricting exports, they probably did succeed in raising prices but this is not helpful in the current context in which the international community wishes to limit grains price variability, or at least limit its effects.

The focus of much recent discussion has been on the need for higher levels of grains stocks. Historically, low stocks appear therefore to have been necessary but not sufficient for price spikes. Stocks have fallen over time but this may simply reflect lower commercial inventory requirements. In any case, much of the fall in stocks over the past decade is the result of an apparent decline in poorly documented Mainland China's stocks from what were previously very high levels. The expected negative stock-price relationship is apparent in the data but stocks leave much of the variation in prices unexplained. It seems likely therefore that low stocks were only one of several factors which were responsible for the 2006-08 price spike.

Many commentators have reverted to public sector storage as a possible response to apparently inadequate private storage. Public storage crowds out private storage so the

mere introduction of a public storage programme increases the problem that it was designed to solve. Public storage is therefore costly, and possibly very costly. Finally, it is unlikely to be very effective in countering price spikes since the storage authority can only sell what it has previously bought. The knowledge that it cannot counter price spikes will leave it vulnerable to speculative attack. The history of buffer stock storage in the international commodity movements bears out these views. If storage is seen as inadequate at the global level, it may be preferable to concentrate on measures which enhance rather than discourage private storage.

Finally, the chapter suggests an agenda for future research. This should focus on increasing the transparency of information on grains stocks, investigation of the extent to which different types of public storage impact private storage and examination of the costs and benefits from the use of market-based instruments.

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