



# FOOD AID AS SURPLUS DISPOSAL? THE WTO, EXPORT COMPETITION DISCIPLINES AND THE DISPOSITION OF FOOD AID

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## **1.0 INTRODUCTION**

There is a long history of crossover between international trade rules and guidelines on international food aid shipments. This crossover has been a frequent point of contention and remains unresolved in World Trade Organisation (WTO) negotiations. Recent Doha Development Agenda (DDA) negotiations have included lengthy discussions on food aid, and despite the uncertainty of the DDA, there is momentum towards developing new international disciplines and guidelines for food aid shipments.

On one level, there is an inherent conflict between guidelines that ensure the viability of food aid and trade rules that discipline shipments. Development advocates seek food aid guidelines that ensure delivery of adequate and beneficial deliveries, while policy makers from competing agricultural exporting countries seek to discipline the use of food aid as a vent for surplus disposal to ensure that it does not become a means of circumventing export competition disciplines. Despite the progress that was made over the past few years in these areas, it appears as though the DDA negotiations will not accomplish either goal.

Food aid disciplines that emerge from a trade agreement may not tell the whole story of how food aid shipments may be affected, however. Rules that govern export subsidies and credits may play important roles in the size and disposition of food aid shipments. Export subsidy and credit arrangements have been the primary vents for agricultural surpluses for several years, and WTO member countries were poised to phase out the use of agricultural export subsidies and to curtail the use of export credit arrangements in the DDA. The possibility of tighter disciplines on export subsidies and credits would apply increased pressure on food aid as a means of surplus disposal. If subsidy and credit allowances were to be curtailed to a greater degree than domestic support programmes that create agricultural surpluses, then there may be an increase in the use of food aid shipments as a tool of surplus disposal. This could happen despite the inclusion of explicit food aid rules in a trade agreement.

This paper presents the institutional background for food aid procurement and delivery, with particular emphasis on the United States (US). The US is by far the largest donor of international food aid, and it has been accused of being the worst offender of using food aid as a tool of surplus disposal (Barrett and Maxwell). The historical background of food aid as a tool of surplus disposal is presented, along with some empirical observations. A conceptual model is then developed that provides the framework for an empirical investigation into how changes in the use of one surplus disposal vent has affected changes in other vents. The empirical model is discussed in the context of the DDA draft modalities, with respect to how changes in export subsidy and credit allowances may affect food aid shipments.

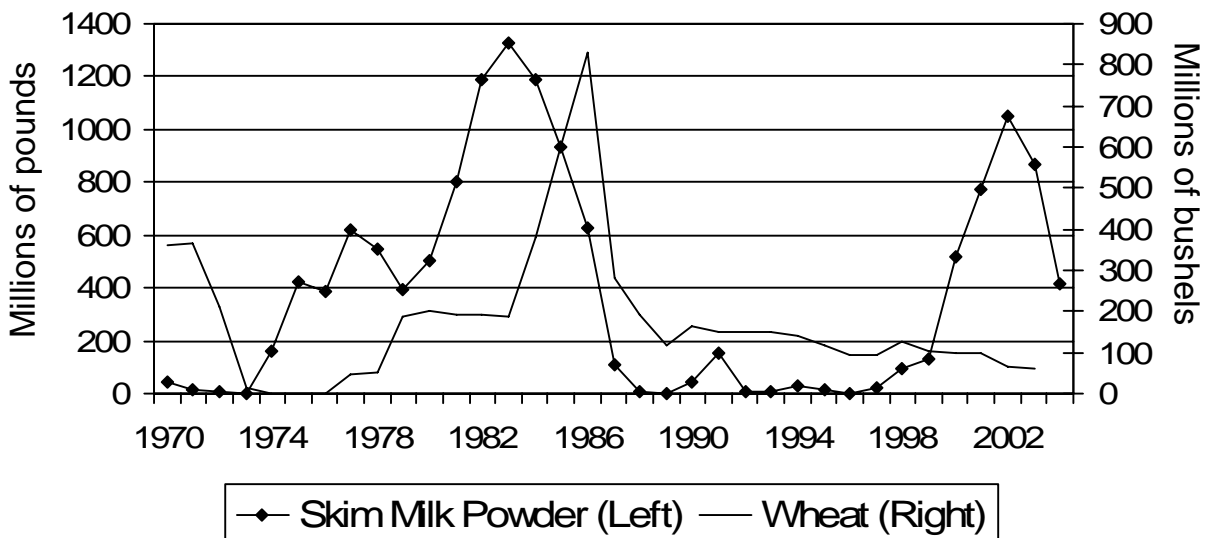
## **2.0 AGRICULTURAL SURPLUSES AND SURPLUS DISPOSAL**

The public acquisition of agricultural stocks has a long history in the US. The Commodity Credit Corporation (CCC) was incorporated in 1933 and it is charged with the role of administering loans, purchase programmes and other operations “required in

the production and marketing of agricultural commodities” (USDA, 1999). The CCC Board of Directors consists of United States Department of Agriculture (USDA) officers who oversee the CCC’s support, inventory, disposal and export programmes. Traditionally, the primary avenue through which the CCC acquires commodity stocks is nonrecourse support loans to primary producers. Nonrecourse loans are provided to producers, who are then afforded the option of either repaying the principal and interest or of forfeiting the commodity that served as collateral. In cases where the commodity’s market price is below the current US loan rate, producers generally forfeit the collateral, thus adding to the CCC’s stocks. However, the USDA’s loan deficiency payment program has tempered the CCC’s acquisition of stocks. Producers can now choose to receive a deficiency payment that covers the difference between the loan rate and the market rate, in lieu of forfeiting their crops.

Support for dairy producers comes through an intervention programme in which the CCC purchases butter, cheese and skim milk powder (SMP) from processors and handlers. Figure 1 illustrates the variation in CCC wheat and SMP stocks over the past thirty years.

**Figure 1. Commodity Credit Corporation Ending Stocks**



Source: USDA

Once the CCC has acquired stocks, it is faced with either storing or disposing of its surplus. Because of the high direct and opportunity costs of holding stocks, it is in the interest of the CCC to dispose of its agricultural surpluses. However the manner in which the CCC disposes of its surplus has the potential to undo the effects of the programmes that created the surplus by flooding the domestic market with commodities, thus pushing down prices. It is in the interest, then, of both the CCC and domestic US producers to dispose of public stocks in a manner that does not negatively affect domestic commodity prices.

To do so, the CCC makes an effort to dispose of its surplus agricultural commodities as additional consumption; i.e. consumption that would not have occurred in the absence of the CCC programme. The disposal takes two primary forms, export programmes and food aid.<sup>1</sup> Each is discussed below.

The CCC's export programmes are comprised of export credit programmes and export subsidies. Both are administered by the Foreign Agricultural Service of the USDA. Export credit programmes include Export Credit Guarantees (GSM 102 and 103<sup>2</sup>), the Supplier Credit Guarantee Program and the Facility Guarantee Program. All of these programmes provide credit guarantees to US banks or exporters in the event of default on the part of the importer. Consumption that arises from export credit programmes may be "additional" in the sense that export guarantees might relax liquidity constraints in importing countries that would not otherwise be able to secure the requisite credit to import US commodities (Rude and Gervais).

The CCC operates two export subsidy programmes, the Export Enhancement Program (EEP) and the Dairy Export Incentive Program (DEIP). The USDA pays cash bonuses directly to exporters in an effort to allow sale of US commodities in markets where international prices are below what the exporter pays to acquire the products. The EEP, though still on the books, has not been used for more than ten years; US agricultural export subsidies are currently applied only to dairy. Export subsidies are provided under the rationale that US producers could not compete with foreign-subsidised products in some markets without subsidies.

The US administers a myriad of food aid programmes that are aimed at addressing a range of domestic and foreign policy goals. The first US food aid programme was administered in 1954 under Public Law 480 (PL 480). PL 480 aid is comprised of three categories, or titles: Title I consists of bilateral government-to-government aid and is primarily a tool of surplus disposal and market development, Title II aid is primarily emergency food aid which is either transferred government-to-government or channelled through aid agencies, and Title III aid is monetised for balance-of-payments relief.<sup>3</sup> Other US aid programmes include Food for Progress (food aid to countries that

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<sup>1</sup> The CCC also operates domestic assistance programmes that provide commodities to the Bureau of Indian Affairs, the armed forces, correctional facilities and a range of charities.

<sup>2</sup> GSM 103 is to be discontinued as a result of the Brazilian cotton case.

<sup>3</sup> Monetised food aid is donated to a recipient-country government, which then sells the food on the local market. Proceeds from the sale provide the recipient government with balance-of-payments relief or may be used to fund long-run projects.

undertake market-based and democratic reforms) and Section 416(b) aid, which donates CCC surplus stocks in grant form. The USDA's Farm Services Administration (FSA) procures all commodities for US food aid programmes and the USDA's Foreign Agricultural Services office and US Agency for International Development are responsible for dispensing commodities to recipient countries and non-governmental organisations.

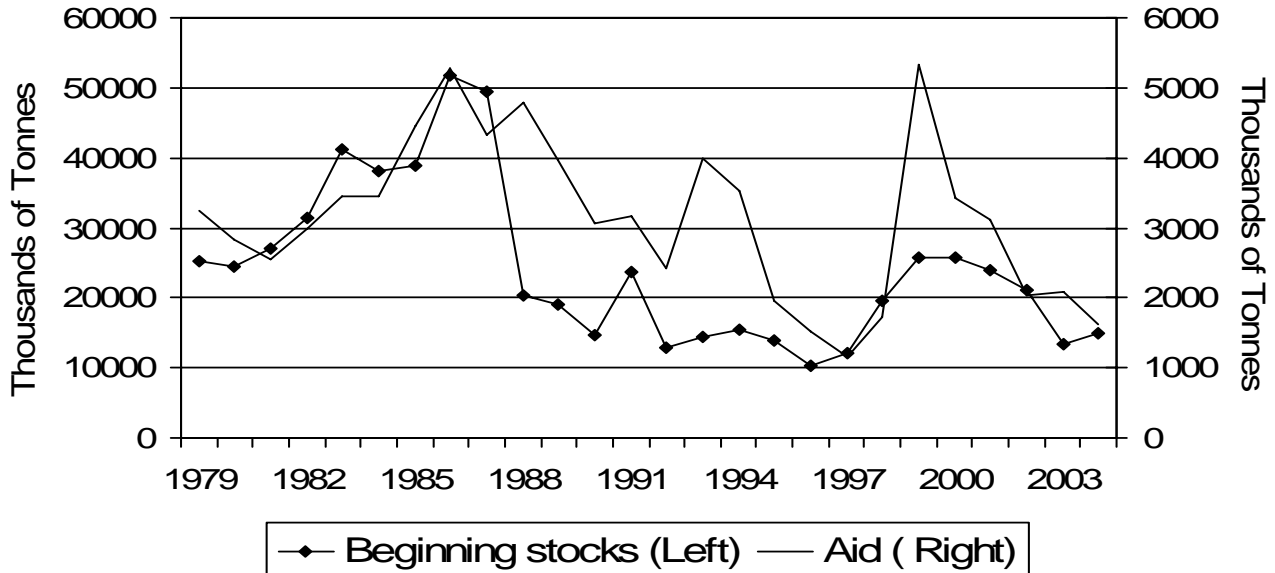
The use of food aid as a vent for surplus disposal was first analysed by Nobel laureate Theodore Schultz in 1960. Schultz conducted an analysis of the benefits to US agricultural industries of disposing of surplus commodities by means of PL 480 programmes during the 1950s. The most famous and long-lasting result from Schultz's seminal paper is the possibility that food aid may be detrimental to the recipient country by depressing local food prices and creating production disincentive effects ("Schultzian" effects). However, the primary objective of the paper was to evaluate the cost and the effectiveness of food aid as a tool of surplus disposal. The early policy environment surrounding PL 480 aid is exemplified in a quote from Harold D. Cooly, chairman of the Committee on Agriculture of the US House of Representatives, who stated "We are primarily interested in getting rid of these surpluses and we don't care how you do it and under what authority. We have told you we want the commodities sold for dollars first and then for foreign currencies or then donate them." (US House of Representatives)

US food aid policy has evolved beyond surplus disposal over the past 40 years to include project aid and greater involvement of multilateral donor organisations. However US food aid policy is still viewed as being driven largely by domestic policy motivations. A study by Diven analyses the relationship between donor-country agricultural policy interests and food aid shipments. US aid shipments are modelled as a function of donor stocks, donor exports, lagged aid shipments and recipient country grain production. There are three key results in Diven's analysis. The first is that aid shipments are strongly positively correlated with donor stocks. That is, US aid shipments rise in years of high carryover stocks. Second, US aid shipments are incremental; a given period's aid delivery is highly dependent on the previous period's shipments. Finally, aid shipments are shown to be *positively* related to grain production in the recipient country. Such a finding runs contrary to philanthropic motives. Diven concludes that "US food aid flows have consistently served the interests of [domestic] commodity producers." Barrett and Maxwell confirm the link between US surplus disposal and food aid policy by noting that food aid shipments are more closely correlated to domestic stocks now than at any time in the past because Congress has begun to issue "emergency" appropriations for the CCC to purchase commodities and ship them as aid in response to weak domestic commercial markets. Figure 2 illustrates the close correlation between US food aid flows and domestic stocks.

### **3.0 FOOD AID AND THE WORLD TRADE ORGANISATION**

Disquiet over the use of food aid as a tool of surplus disposal predates its formal inclusion in trade negotiations. The United Nation's (UN) Food and Agricultural Organisation (FAO) convened the Consultative Subcommittee on Surplus Disposal

**Figure 2. Aid and Stocks, Wheat**



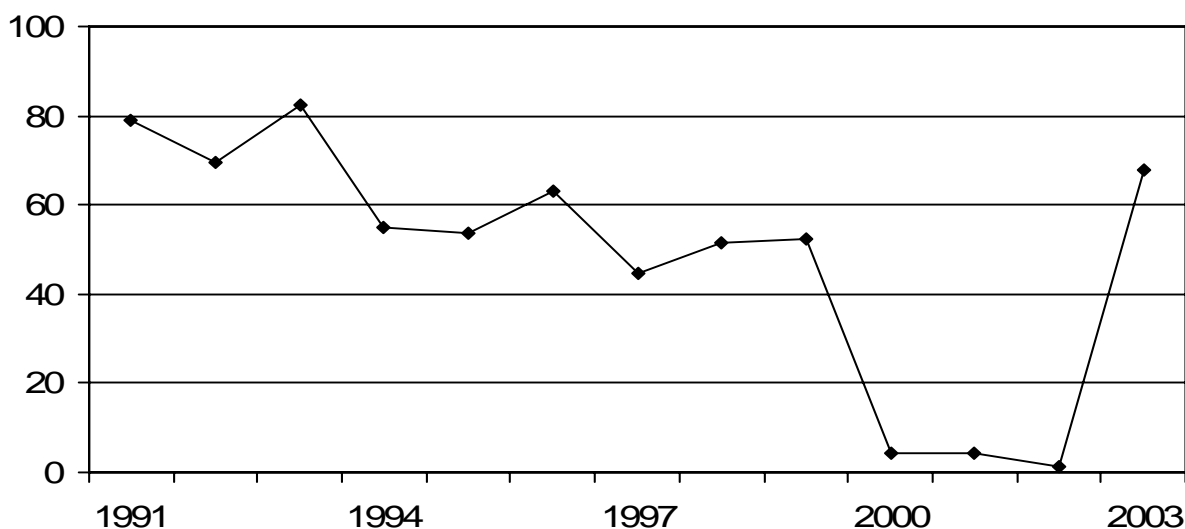
Source: USDA

(CSSD) in 1954 in an effort to monitor member countries' food aid practices. There are two key principles that govern the CSSD. The first is the maintenance of Usual Marketing Requirements in aid-recipient countries. Usual Marketing Requirements are an attempt to ensure that food aid provides wholly additional consumption; that is, food aid should not displace commercial imports. Usual Marketing Requirements are generally operationalised by comparing current-year commercial food imports (during which food aid is received) to a five-year historical average. If current-year imports fall below the average, then food aid is presumed to have displaced commercial trade and Usual Marketing Requirements are not satisfied. The second core principle of the CSSD is that donor countries notify the CSSD of all food aid shipments. This second principle has gone largely unfulfilled, as the share of aid reported to the CSSD has been dropping since its inception (figure 3).<sup>4</sup> Two important points are worth making about the CSSD. First, the CSSD does not have a development agenda; it is intended as an oversight tool for the disposition of surplus as food aid. Second, its principles are non binding and are unenforceable.

Food aid made its first appearance as part of an international trade agreement during the Kennedy Round trade negotiations in 1967. The International Wheat Agreement was negotiated under the auspices of the Kennedy Round as an attempt to stabilise international trade in grains, and included a parallel Food Aid Convention. The Food Aid Convention was a non-enforceable agreement between signatory countries for

<sup>4</sup> The jump in 2003 is the result of the US reporting four years of aid in one year.

**Figure 3. Food Aid Notified to the Consultative Committee on Surplus Disposal (%)**



Source: FAO

minimum annual food aid donations, and has been renewed several times over the past 40 years. The current convention has been extended to July 2007 in the hope that the DDA negotiations will be completed before a new convention has to be convened.

The Uruguay Round Agreement on Agriculture (URAA) is the first such agreement to address agricultural trade, and contains specific reference to food aid. Article 10 of the Agreement on Agriculture provides guidelines that signatories are to follow to prevent the circumvention of export subsidy commitments. The first of these guidelines calls for food aid to be untied; that is, aid should not be dependent on procurement from a specific country (usually the donor) or group of countries. This guideline has been widely flouted by donor countries. A mere 12-15 percent of food aid is untied, using the Organisation for Economic Cooperation and Development (OECD) definition of “tied aid”. Approximately 67 percent of non-food aid is untied (Clay). Canada has recently changed its procurement policy to allow 50 percent of its food aid budget to be spent on purchases from a list of eligible developing countries. While still officially “tied” (because there is a list of eligible source countries), this policy change represents a movement towards the spirit of the Uruguay Round food aid principles.

The second guideline to emerge from the URAA defers to the FAO’s “Principles of Surplus Disposal and Consultative Obligations” as outlined by the CSSD. This guideline calls for the maintenance of Usual Marketing Requirements and the reporting of aid shipments. This last guideline has generally been ignored by signatories, as discussed above. The third guideline calls for food aid to be provided in grant form, as opposed to sold under credit or subsidy arrangements. Most donors comply with this

guideline with the notable exception of the US which provides up to 20 percent of its food aid as concessional sales (Young).

Despite the growing emphasis on food aid in trade negotiations, it is WTO rules on export competition that might have the most significant effects on food aid shipments. Export subsidies and credits have historically been used to dispose of domestic agricultural surpluses. Stricter trade rules that reduce allowable levels of export credits and eliminate export subsidies might increase the pressure for disposal of domestic surpluses through other channels. There are two primary vents for domestic agricultural surpluses besides export subsidies and credits; food aid and storage. Food aid is preferred by donors for several reasons. First, the donor nation receives political capital in return for donating food aid. This capital can come in the form of a public perception that the donor government is providing necessary humanitarian assistance, or in the form of political and/or social concessions from the recipient country. Food aid has been shown to be a function of donor country political motives, driven by closeness of economic and military ties between donor and recipient (Zahariadis, Travis and Ward). Second, politicians who set food aid policy and budgets are subject to a strong maritime transportation lobby who are in positions to win contracts to ship food aid to overseas destinations (Barrett and Maxwell). Storage of commodities provides no political or social benefits to the donor and entails substantial storage costs. Storage is a last resort for the CCC and the minimisation of storage costs is a frequent motivation for USDA policies.

The URAA negotiations produced disciplines on agricultural export subsidies in an effort to curtail the use of this primary surplus vent. Article 9 of the URAA committed member countries to bound levels of export subsidies, measured in both quantity and value, and instituted schedules of reduction over a six-year implementation period. The base period at which subsidies were bound was 1986 to 1990, which was a period of high export subsidies. The bound levels of subsidies were so high that the constraint was not typically binding and there was substantial "water" (unused allowable subsidies) in the disciplines. The use of export subsidies has declined significantly (except for dairy trade), but it is unclear if URAA export subsidy disciplines had the effect of increasing pressure on an alternative vent (i.e., food aid) because of the water in subsidy disciplines. This point is addressed further in a later section of the paper.

The URAA does not contain disciplines on export credits. As such, there remains relatively undisciplined access to three primary vents for domestic agricultural surplus (export credits, food aid and storage) under the current agreement. We now turn to what future trade negotiations may hold for food aid.

The status of the DDA trade negotiations is murky, at best. The collapse of talks in July 2006 makes it very unlikely that an agreement can be reached before George Bush's Trade Promotion Authority expires in July 2007. While one cannot be certain of the final form that export competition and food aid rules might take in the DDA (or, in the event of its total collapse, the DDA's successor), ministerial declarations and draft modalities produced by the WTO over the past few years provide some insight into the future relationship between food aid and the WTO. The most contentious issues in the DDA negotiations on agriculture are market access and domestic support, not export



competition (specifically, not food aid). Even if the DDA collapses entirely, it is likely that any food aid and export competition disciplines in a future agreement will resemble the proposed modalities that have been generated as part of the DDA. It is therefore worthwhile to examine the proposed disciplines.

The most recent draft modalities from the DDA negotiations indicate that export subsidies were likely to be eliminated entirely. Subsidy volumes and values were to be bound and reduced according to a schedule, and eliminated by 2013. Export credits were likely to be disciplined as well in an effort to bring their use more in line with commercial transactions. The common themes that emerged during the DDA were: 1) imposition of a maximum repayment period (36 months), 2) a minimum interest rate (perhaps the London Interbank Offered Rate - as a reference) and 3) a requirement that credit programmes be self financing and not reliant on government support. Export credit arrangements that do not meet these requirements would be considered export subsidies and be prohibited. (WTO, 2005)

The draft modalities do not set out implementation schedules for export credit disciplines, and the uncertainty surrounding the DDA makes timing even more ambiguous. The modalities do, however, make clear that the availability of export subsidies and credits as vents for domestic agricultural surplus will decrease with a new WTO agreement. If food aid is an alternative vent for this surplus, then increased pressure may emerge on that vent, *ceteris paribus*. Any new WTO Agreement on Agriculture is likely to affect domestic production and therefore surpluses, however, leaving pressure for surplus disposal not-so-*paribus*. As domestic support is one of the most contentious issues in current DDA negotiations, the degree to which domestic overproduction will be affected is uncertain. The URAA called for scheduled reductions in domestic support over the 1995 to 2000 implementation period, and a new agreement is likely to require further cuts in domestic Aggregate Measurement of Support (AMS) over an implementation period (Brink). Whether the required cuts in domestic AMS will be large enough to reduce domestic surpluses by an amount commensurate with required reductions in export competition measures remains to be seen, and will ultimately be an empirical question.

The DDA draft modalities also contain provisions that outline the direction that food aid disciplines are likely to take. But it is important to note that the inclusion of food aid rules in an Agreement on Agriculture is the result of competing interests. On one hand, the DDA is referred to as the "Doha Development Round", implying that one of the primary motivations of member nations is to improve the lot of developing countries. As such, any rules on food aid are likely to tread carefully so as to not jeopardise legitimately-needed food aid. Also, signatories are likely to be wary of limiting food aid shipments for fear of further tarnishing the WTO's public image.

On the other hand, the notion that food aid is used as a tool of surplus disposal has become generally accepted. Competing agricultural exporters seem determined to curtail the use of food aid as a means of skirting export subsidy and credit disciplines. A set of draft guidelines has emerged from DDA negotiations which walk the fine line between restricting the use of aid as a tool of surplus disposal and ensuring that legitimate aid is not impeded.

The proposal that permeates the draft modalities and Chair's Reference Papers is the creation of a "safe box" for emergency food aid. The safe box is a classification for food aid that would not be subject to WTO disciplines, akin to "green box" for domestic support programmes. The stumbling block for this proposal, however, is determining under what circumstances food aid would qualify for the safe box. It appears as though an appeal from either the recipient country, the International Committee for the Red Cross or a UN Consolidated Appeal would be the "bedrock standards" for conformity with the safe box (Chair's reference paper, April 11, 2006). There remains some debate about whether appeals from non-governmental agencies such as Medicines Sans Frontiers or OXFAM would warrant classification as "safe box" aid.

The draft modalities also contain reference to non-emergency (i.e. programme and project) food aid, though most of these proposals are enclosed in the ubiquitous square brackets, which convey that anything contained therein is preliminary and likely to change. Proposals include: allowing programme food aid only when based on an assessment of need by a third-party, improved targeting of recipients, and phasing out programme aid by 2013. This last proposal is particularly ambitious, and would spell the end of the majority of US PL 480 shipments. The modalities also pay lip service to notification requirements. The low level of compliance with the CSSD indicates that such a requirement may go unfulfilled, however. Another proposal calls for an end to monetised aid.

What would the draft modalities mean for the future of food aid shipments? The most specific proposals are for emergency food aid, which has historically been less controversial from a surplus-disposal perspective than programme aid. The proposed modalities for programme food aid do have the potential to markedly reduce programme aid shipments, however the vagaries in the draft documents are so substantial that programme food aid may remain unaffected. It seems unlikely that the US would accept terms that would limit its authority to disperse programme food aid without a third party assessment. The effects of a DDA agreement on export subsidies and credits are clearer. The proposed disciplines would have ultimately reduced shipments under such arrangements. The effects of reduced subsidy and credit shipments on food aid are the focus of the next chapter.

#### **4.0 MODEL**

We now turn to the formulation of a conceptual model to explain how changes in the use of one surplus disposal vent (i.e. export credits and subsidies) could affect commodity volumes that flow through an alternative vent (i.e. food aid). An empirical application of the conceptual model follows.

The Uruguay Round implementation phase of 1995-2000 provides a unique snapshot of a period in which allowable export subsidies were decreased according to The Agreement's disciplines. At first blush, it would seem reasonable to investigate a causal relationship between reductions in allowable export subsidies and changes in food aid shipments over that period. The nature of the URAA scheduled reductions make the

investigation of such a relationship impossible, however. Export subsidies were bound at levels high enough so that not all member countries were utilising all of their allowable allotments. Reductions in allowable subsidies did not, therefore, necessarily translate into reductions in actual subsidies. This is the “water” that was discussed earlier in the paper.

An alternative method of modelling the effects of changes in one surplus vent on other vents is to investigate the time-series relationships that exist between the data. Before proceeding to the empirical model, however, it is worth providing a conceptual framework that links WTO agreements to food aid shipments. The conceptual model is based on the institutional structure of the US and the empirical application utilises US data. Figure 4 illustrates the important causal links that connect WTO rules to food aid shipments. A new Agreement on Agriculture would include rules on domestic support, export competition and market access. Disciplines on domestic support will affect domestic AMS, which is one of the determinants (dashed line indicates that there are also other determining factors) of domestic commodity production. Domestic production is sold commercially as either domestic consumption or exports, and the remainder is domestic surplus. As discussed above, the CCC has three primary outlets for its share of surplus commodities; sell under export subsidy or credit arrangements, ship as food aid or store as carry-over stocks. Agreement on Agriculture rules on export competition will be a partial determinant (dashed line) of how the CCC’s surplus is apportioned between these three vents. Specifically, if a new Agreement on Agriculture includes disciplines on export subsidies and credits or on food aid, then such rules will affect member countries’ export competition and food aid policies.

An Agreement on Agriculture that includes tighter disciplines on, say, export subsidies would increase pressure on other vents, *ceteris paribus*. As a result, there is an endogenous relationship between the vents contained in the circle. Changes in the volume of commodities pushed through one vent are presumed to trigger changes in the volume that is pushed through the other two vents.<sup>5</sup>

There is also the prospect for the distribution of surplus disposal between these vents to be affected by exogenous factors. The situation in which there is an unusually large call from the international community for emergency food aid is likely the most important of these factors. Such a call could lead to a large change in food aid shipments; a change that is not due to the endogenous relationships between the surplus vents. The conceptual diagram in figure 4 includes the US foreign aid budget to control for such circumstances.

The objective of the empirical portion of this study is to quantify the endogenous relationships between the surplus disposal vents to determine if changes in the use of one vent have affected the use of other vents. Such information can provide insight into whether US food aid has been used as an alternative vent to export credits or subsidies, and whether new disciplines on subsidies and credits from a trade agreement are likely to affect US food aid shipments. The most informative method of modelling

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<sup>5</sup> The directions and meanings of the endogenous arrows in figure 4 are explained more thoroughly within the description of the empirical model.

endogenous relationships is to test for statistical relationships between the relevant variables with a vector autoregression (VAR). A VAR explains movements in a group of endogenous variables through changes in lags of the endogenous variables and by current-period exogenous variables. The VAR provides econometric estimates of the size of the effects of changes in one endogenous variable on changes in the other endogenous variables. However, since a shock to one variable in a VAR is transmitted to all endogenous variables, estimated coefficients do not convey the complete picture. Impulse response (IR) functions are derived that trace out the effects of a one-time shock to one of the errors.

A few important points are worth noting. First, the objective of this empirical application is to flesh out the effects of one endogenous variable on the other endogenous variables, not to explain the size of US commodity production or the size of the domestic commodity surplus. The policy decision analysed in this study is the selection of outlet. Second, the variables that make up the commodity surplus (discussed below in the data section) do not comprise a singular system. The use of the VAR methodology allows an examination of the relationships between endogenous variables without having to explain the disposition of the entire surplus. This means that if a decrease in export subsidy shipments of 100 tonnes is imposed on the VAR, then the other vents (food aid and carry-over stocks) do not necessarily have to increase by 100 tonnes in the same period. The VAR simply conveys historical estimates of how the group of endogenous variables move together. This point is particularly important because, while surplus CCC stocks have been an important source for PL 480 Title II, Section 416(b) and Food for Progress aid, a portion of US food aid shipments are procured from private stocks.<sup>6</sup> The VAR methodology is also appealing because one need not develop a behavioural model for every endogenous variable independently to estimate how changes in one variable affects the system's other endogenous variables.

The structural-form VAR for a specific commodity is represented as

$$(1) \quad Bx_t = \Gamma_0 + \sum_{i=1}^n \Gamma_i x_{t-i} + \Pi z_t + \varepsilon_t .$$

$x_t$  is a three by one vector of endogenous variables that includes the volume of exports that were shipped under subsidy or credit arrangements, food aid shipments and carry-over stocks.  $x_{t-i}$  is a matrix of lagged endogenous variables, and  $z_t$  is contemporaneous development assistance spending (the exogenous factor discussed above).  $B, \Gamma_0, \Gamma_i$  and  $\Pi$  are parameter matrices to be estimated. This structural form model represents the relationships between the endogenous variables and between the exogenous variable and the endogenous system.

The structural form of equation (1) cannot be estimated in its current form because endogenous variable appear on both sides of the equation. The structural form can be

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<sup>6</sup> The Kansas City Commodity Office of the USDA estimates that an average of just under 30% of food aid shipments between 1992 and 2004 were procured from USDA inventories.

reduced to standard form by inverting the  $B$  parameter matrix and reorganising terms to generate

$$(2) \quad x_t = A + \sum_{i=1}^n C_i x_{t-i} + Dz_t + e_t$$

where  $A = B^{-1}\Gamma_0$ ,  $C_i = B^{-1}\Gamma_i$ ,  $D = B^{-1}\Pi$  and  $e_t = B^{-1}\varepsilon_t$ . Equation (2) is estimated as a VAR using ordinary least squares.

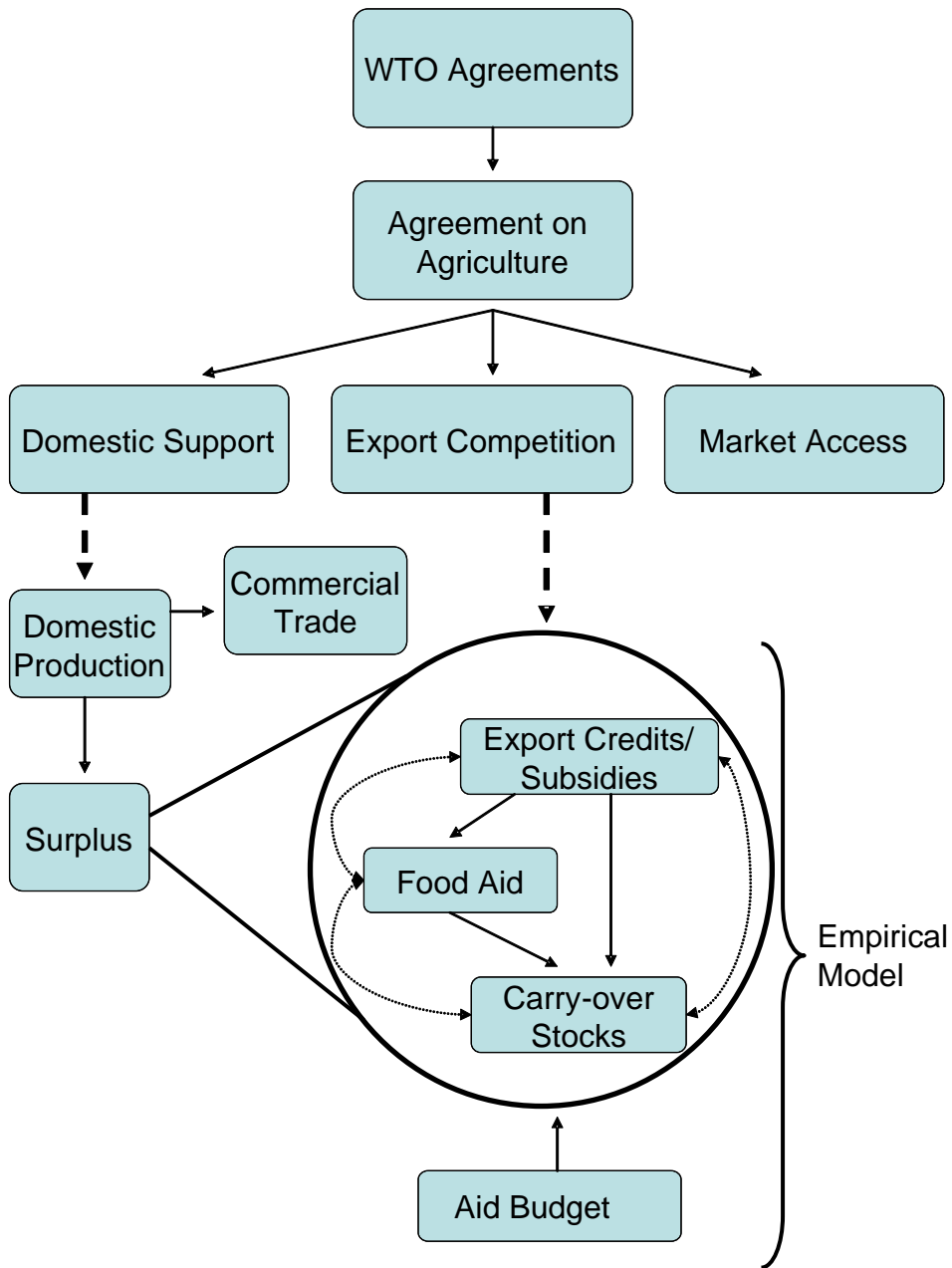
The standard form of equation (2) is under identified; the contemporaneous effects of parameter matrix  $B$  cannot be discerned without parameter restrictions. Theory provides a structural decomposition on the system to ensure identification, however. Within the system of endogenous variables, there is a hierarchy by which each vent is utilised. The CCC seeks first to sell its surplus under either export subsidy or credit arrangements. This is the first portion of surplus that is disposed, and has direct contemporaneous effects (the solid lines in figure 4) on food aid shipments and carry-over stocks. The remainder of the surplus commodity is either shipped as food aid or held as carry-over stocks, with food aid being determined first. Carry-over stocks do not have contemporaneous effects on the other vents. This structural decomposition is operationalised by imposing the following constraint when recovering the structural form parameters from standard form parameter estimates:

$$(3) \quad B = \begin{bmatrix} 1 & 0 & 0 \\ \beta_{21} & 1 & 0 \\ \beta_{31} & \beta_{32} & 1 \end{bmatrix}.$$

Food aid has been shown to be persistent (Barrett, Mohapatra and Snyder, Diven), so that aid in one period begets aid in the subsequent period. The parameter matrix  $\Gamma_i$  is left unrestricted to account for potential lagged effects in the endogenous system. These are the dotted lines within the circle of endogenous variables in figure 4.

It is worth making an important point about using VAR analysis for the current research. The objective of the current paper is to test for and estimate dynamic endogenous relationships between a group of proposed vents for surplus disposal. Once these relationships are determined, one can infer how changes in the use of one vent (as a result of a trade agreement) may affect the use of others. A new WTO agreement would presumably establish new trade rules, thereby introducing the Lucas critique (Lucas) to the analysis. The importance of the Lucas critique in VAR analysis is a subject of debate (Stock and Watson, Rudebusch), but it is important to note that the current analysis does not attempt to forecast how commodity shipments under subsidy and credit arrangements would change after a DDA agreement. The goal is to understand if export subsidies, credits and food aid have been used as alternative vents in the past, and to provide empirical estimates of the effects. Such knowledge is valuable in forming policies and rules whose purpose is to avoid circumvention of export competition disciplines.

Figure 4. Conceptual Model



## 5.0 EMPIRICAL RESULTS

The empirical VAR is estimated for US wheat, which is the most important food aid commodity. The data are annual observations and are from a variety of USDA sources. Export credit data comprise CCC export credit programmes, which are taken from

*Wheat: Background for 1995 US Farm Legislation* (USDA, 1995) and from the annual *Wheat Yearbook*. Export subsidy data are taken from the *Wheat Yearbook* and include EEP shipments from 1986 to 1996.<sup>7</sup> CCC ending stock data are from USDA's *Wheat Situation and Outlook Yearbook*, 2006. Food aid data are from the USDA's *Wheat Yearbook*, and include all concessional and grant food aid programmes. PL 480 shipments that were sold on concessional terms are included as food aid.<sup>8</sup> The exogenous control variable for unusually high (or low) levels of food aid is gross overseas development assistance (ODA), as reported by the OECD. The sample period is 1960 to 2004. Skim milk powder (SMP) has attracted attention of late as an example of food aid shipments responding to export subsidy constraints (Margulis), however it was not possible to obtain enough time-series data for VAR analysis of SMP.

The 3 x 3 VAR is estimated in Eviews. Wheat shipments under subsidy and credit arrangements, food aid and year-end CCC stocks are the system's endogenous variables. A constant and US gross ODA are exogenous variables. The lag length of the VAR is selected so as ensure maximum available degrees of freedom without misspecifying the model. Both the Schwarz Information Criterion and the sequential likelihood ratio test (Enders) indicate the inclusion of one lag of each endogenous variable. The standard-form VAR of equation (2) is estimated and produces parameter estimates for matrices  $A$ ,  $C$  and  $D$  as well as the composite error vector  $e$ . Standard-form parameter estimates are presented in table 1. These parameters, in combination with the parameter restrictions of equation (3) and the estimated residual covariances, are used to recover the structural-form parameters of matrices  $B, \Gamma_0, \Gamma_i$  and  $\Pi$  by solving a set of simultaneous equations in MatLab.

The contemporaneous coefficient estimates of interest, matrix  $B$ , are reported in table 2 and are intuitively appealing at first blush. Note that equation (1) is structured such that all endogenous variables appear on the left-hand side, so that positive  $\beta_{ij}$  estimates imply inverse relationships between the endogenous variables. The point estimates for matrix  $B$  tell us that a decrease in wheat shipments under subsidy and credit arrangements results in a contemporaneous increase in food aid shipments. Likewise, a decrease in subsidy and credit shipments pushes up carry-over stocks. However, the effect on carry-over stocks is partially mitigated by the contemporaneous impact of a change in aid shipments on carry-over stocks (i.e. the  $\beta_{32}$  coefficient).

The primary focus is if export credits/subsidies and food aid are alternative outlets for surplus agricultural commodities. VAR analysis is well suited for this task because it provides estimates of dynamic interactions between endogenous variables. Specifically, we generate IRs to observe the dynamic effects of changes in one endogenous variable on the system's other endogenous variables; point estimates from

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<sup>7</sup> Quantities shipped under export subsidies and credits are aggregated into one variable for the empirical application. While it is possible that not all of the shipments sold under credit arrangements contained a subsidy element, the series are aggregated to sort out the effects of an overall decline in subsidy and credit shipments.

<sup>8</sup> Food aid that is sold concessionally is not categorized as credit or subsidy shipments because the US currently reports such shipments as food aid, not as credit or subsidy shipments. It is possible that a new WTO agreement would require that all concessional sales be reported as such, and not as food aid.

table 2 tell only a part of the story. Figure 5 illustrates the effects on food aid shipments and carry-over stocks of a negative shock to subsidy and credit shipments. A reduction (instead of a positive shock, as is usually analysed in VARs) in shipments is simulated

Table 1 - Standard-Form Coefficients

<u>Regressors</u>	<u>Dependent Variables</u>		
	Credit/Subsidy	Food Aid	Carry-Over Stocks
Constant	-2336.4540 (-3348.27)	2121.2470 (-1098.28)	3565.1920 (-2509.19)
Lagged Credit/Subsidy	0.8077 (-0.09)	-0.0357 (-0.03)	-0.0776 (-0.06)
Lagged Food Aid	-0.0914 (-0.37)	0.5418 (-0.12)	-0.4764 (-0.27)
Lagged Carry-Over Stocks	0.1525 (-0.10)	0.1086 (-0.03)	0.9419 (-0.07)
Overseas Development Assistance	0.3858 (-0.26)	-0.0569 (-0.09)	-0.0667 (-0.20)

\* standard errors in parentheses

to provide a parallel with a WTO agreement that would result in a reduction in the quantity of wheat shipped under such arrangements. The IRs in figure 5 are consistent with expectations. A negative shock to export subsidy/credit shipments of approximately 4.8 million tonnes causes a contemporaneous increase of 49 000 tonnes in food aid shipments. The negative shock also has a contemporaneous effect on carry-over stocks of approximately 614 000 tonnes.<sup>9</sup> The VAR system clearly illustrates the offsetting relationships between three primary vents for surplus disposal. A decrease in subsidy and credit shipments leads to an immediate increase in food aid shipments and larger carry-over stocks.

Figure 5 also illustrates the dynamic effects of a negative shock to subsidy and credit shipments. The lagged structure of the empirical VAR allows delayed effects of the shock to show up in future aid shipments and carry-over stocks. Food aid and carry-over stocks both follow inverted J-curve patterns. Aid shipments jump higher in period one (following the initial, one-time shock in period zero) and then follow a J-curve pattern until approaching zero. The lagged-response increase in food aid shipments could be due to a combination of the persistence of food aid and to the previous period's increase in carry-over stocks (which leaves more surplus for disposal in the subsequent period). Carry-over stocks also follow an inverted J-curve pattern and ultimately decay towards zero. The initial shock to subsidy and credit shipments decays in parallel with the responding variables, and the VAR system is stable.

Once the magnitudes of the effects are determined, it is important to evaluate the statistical and economic significance of the IRs; this is done by decomposing the IR variances. Table 3 provides the percentage contribution of each endogenous variable to the variation in the responding variable. The share of variation in the food aid

<sup>9</sup> Recall that this is not a singular VAR; a decrease in subsidy and credit shipments need not be fully offset by commensurate increases in food aid shipments and carry-over stocks.



response that is due to the subsidy/credit shock is approximately two percent after the first period. As the effects of the shock accumulate, the share of food aid variation attributed to changes in subsidy and credit shipments approaches 17 percent. An interesting result is that the lagged effect of carry-over stocks on aid shipments is larger

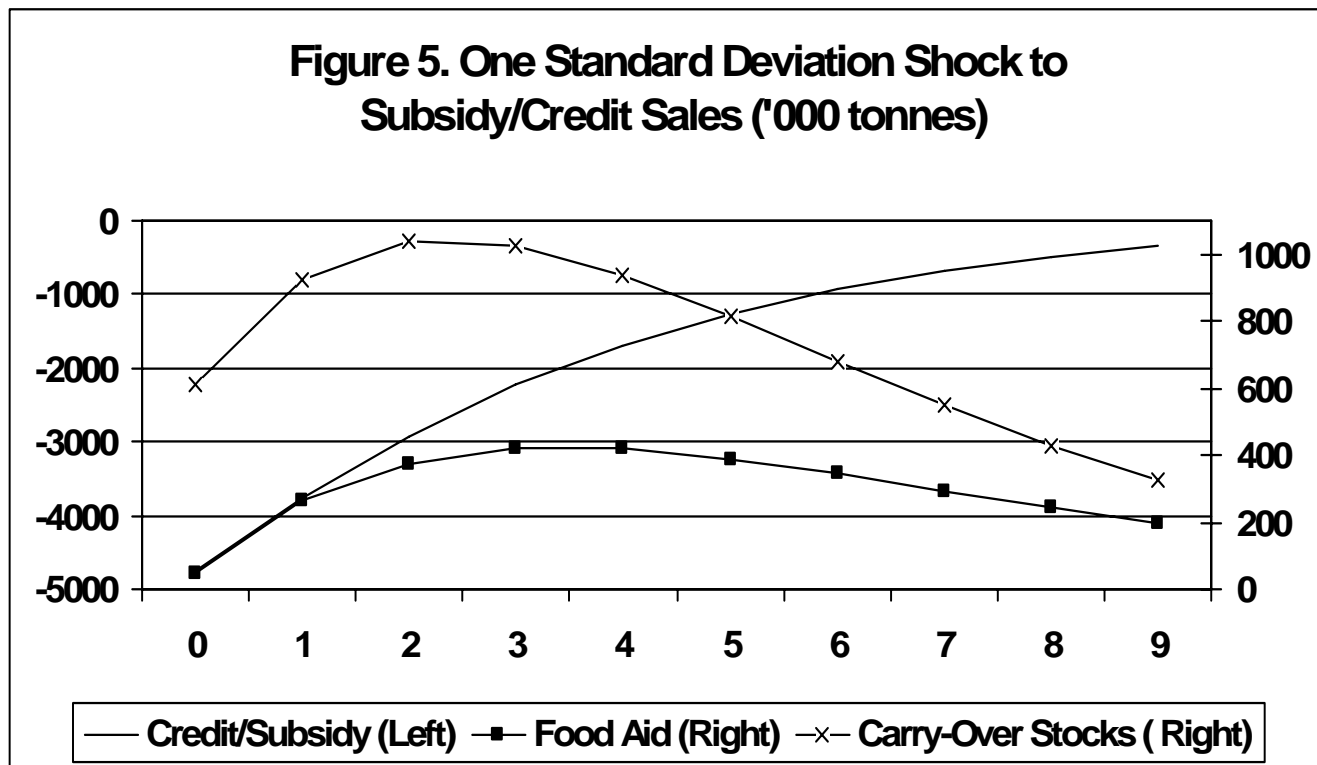


Table 2 - Contemporaneous Coefficients

Regressors	Dependent Variables		
	Credit/Subsidy	Food Aid	Carry-Over Stocks
Credit/Subsidy	1	0.0103	0.1313
Food Aid	0	1	0.2536
Carry-Over Stocks	0	0	1
Overseas Development Assistance	0.3858	0.1125	0.0096

than the effect of subsidy/credit shipments. The percentage of food aid's variation that is due to carry-over stocks in the initial shock period is zero (because the model restricts the direction of causality, as in figure 4), but thereafter exceeds the effect of the subsidy/credit shock. The accumulation of carry-over stocks in response to the fall in subsidy/credit shipments generates pressure for surplus disposal one period hence; pressure that is relieved through increased aid shipments. This could be attributed to an institutional inability to dispose of the entire increased surplus as aid in a single

period. A very small portion of the carry-over stock response is attributed to the subsidy/credit shock. This corresponds to the relatively small magnitude of the IR.

The economic significance of the IRs are not entirely clear. Consider a trade deal that results in credit or subsidy shipments falling one third below their most recent five-year average; from approximately 4 million tonnes to 2.6 million tonnes. The immediate effect is an estimated increase in food aid shipments of approximately 13 000 tonnes, with further increases as the response follows the J-curve pattern described above. An increase of 13 000 tonnes on the world wheat market is certain to have a negligible effect on world prices. There is the possibility for such an increase to be important beyond its effect on world prices, however. Aid shipments of 13 000 tonnes arriving in a single location could certainly be enough to trigger Schultzian disincentive effects. Such a shipment could also, if not additional consumption, displace commercial imports and trigger a trade grievance from a competing exporter.

## **6.0 CONCLUSION**

The future of the DDA is shaky, at best. It is unlikely that an agreement will be ready for ratification before the US President's Trade Promotion Authority expires in July of 2007, even if negotiations are restarted immediately. This means that there will be no WTO-sanctioned disciplines on food aid, and no new disciplines on agricultural export credits or subsidies for at least several years, despite these subjects being relatively uncontroversial within the Agreement on Agriculture negotiations. What does this mean for food aid in the near term?

The implementation period for Uruguay Round disciplines on export subsidies is past and there will be no new constraints imposed on their use without a DDA agreement. Donor countries will retain export subsidies as an option for surplus disposal subject to Uruguay Round limits. Export credits will remain a second option for disposing of surplus commodities. The upshot is that increased pressure that the DDA might have placed on food aid as a vent for surplus disposal is not likely to materialise. Food aid will remain an avenue for surplus disposal, but trade rules will not push more commodities through that vent.

There will also be no binding rules on food aid if the DDA negotiations do not reconvene. The proposed safe box for emergency will not emerge and donor countries will not be subject to any new disciplines on their donations. Programme aid will remain an option and monetisation of food aid is likely to continue. The upshot is that food aid will remain an undisciplined vent for surplus agricultural products in its current form.

With the WTO unlikely to develop formal food aid rules in the near term, what are the prospects of an alternative venue developing new food aid guidelines? There may be room for another multilateral organisation to put forward some new rules on food aid. The current Food Aid Convention expires in July of 2007, and is an obvious venue. However the effectiveness of the Food Aid Convention is constrained by its nature as a voluntary non-binding agreement. Non-binding agreements on food aid have a chequered past; for example low rates of reportage to the CSSD and the failure of

countries to meet their Food Aid Convention minimum donation requirements. This was part of the incentive to bring rules on food aid into the WTO - to coerce member nations to change their behaviour by threat of cross retaliation from other WTO agreements.

Another important factor is that nations may be less willing to make concessions on their food aid positions outside of the reciprocal deal-making environment of the WTO. The US currently favours the status quo food aid environment (keeping food aid outside export competition disciplines) (Clay), and even though food aid rules are not the most controversial aspects of the Agreement on Agriculture negotiations, the US may be unwilling to compromise without gaining concessions from other member countries in other areas (ex: market access).

The empirical investigation suggests that there exists an endogenous relationship between subsidy/credit shipments and food aid for wheat in the US. The empirical VAR demonstrates a contemporaneous increase in food aid shipments as alternative vents constrict. This result suggests that a trade agreement that disciplines export subsidies and credits may put upward pressure on food aid shipments as agricultural exporters vent the pressure of their domestic surpluses. The empirical results suggest that in the US wheat market the effects are not large. The same phenomenon has been noted in the case of skim milk powder by Margulis; skim milk powder would provide another interesting empirical case, were the data available.

A future trade agreement, Doha or its successor, that attempts to limit the use of agricultural export subsidies and credits may also need to include rules on food aid to prevent its abuse as a vent for surplus disposal.

Table 3 - Variance Decomposition (%)

<u>Aid</u>			<u>Carry-Over Stocks</u>		
<u>Lead (years)</u>	<u>Credit/Subsidy</u>	<u>Carry-Over Stocks</u>	<u>Lead (years)</u>	<u>Credit/Subsidy</u>	<u>Aid</u>
1	2.1	4.2	1	5.0	1.2
5	13.2	23.1	5	9.6	6.6
9	16.9	24.9	9	10.8	8.2

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