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Michael V. Martin

The purpose of this study is to investigate the role of the source of the external trade statistics in measuring the price responsiveness of foreign demands and relative price competitiveness of the major exporting countries in trade of agricultural commodities in international markets. In particular, the papers included in this study examine the apparent misspecification of commodity models due to the use of trade data based on exporting countries reports, rather than the reports of importing countries. The results indicate that the use of export data instead of import data more likely produces biased price parameter estimates. The research is conducted in three distinct and yet related papers, resulting in the presentation of three separate manuscripts.

The first paper presents a critical review of two different commodity trade modeling approaches frequently employed for estimation of price responsiveness of trade flows and market shares

in trade literature.

The second paper discusses the nature of agricultural commodity trade statistics. It reviews factors causing discrepancies in external trade statistics and compares advantages and disadvantageous associated with the use of export and import data in estimating the trade flow and market share price responsiveness. Import reports are found to provide more reliable foreign demand and market share price responsiveness since they exclude speculative market activities from demand and market share equations for estimation.

The third paper examines major factors affecting U.S. competitiveness in the exports of agricultural commodities in general, wheat in particular. Utilizing importers' data, the empirical econometric results suggest that the continuation of U.S. export promotional expenditures in developed countries (DCs) causes U.S. market share to decline relative to the share of its competitors in these markets although such expenditures are found to contribute to U.S. expansion into less developed countries (LDCs) markets. Relative prices, export reliability ratio (ratio of exports to a given destination to total production), production and population in importing countries are found to be the important factors that affect the market shares of major exporting countries in import markets.

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DEDICATION

This thesis is dedicated to the memory of my father, Darwish Emami (1923-1981), whose moral example and constant encouragement in achieving higher education have helped me immeasurably.

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CHAPTER 1

INTRODUCTION

The purpose of this dissertation is to provide information on the price responsiveness of foreign demand facing major exporters of wheat in international markets. The specific objectives of this study are as follows:

(1). To explore how important the source of external trade statistics are in measuring the price responsiveness of foreign demand and in determining relative price competitiveness of the major exporting countries in trade of agricultural commodities.

(2). To empirically estimate the relative price elasticities of the market share of major wheat exporting countries (U.S., Canada, Australia, France, and Argentina) in individual regional import markets for the period of 1962-1982. The regional import markets include 7 regions of developed countries (DCs), and the 17 regions of less developed countries (LDCs) listed in appendix A.

(3). To analyze the policy implications of findings.

There are few economists who would deny the importance of knowing the price responsiveness of agricultural sales in foreign markets. Knowledge of the foreign market's response to price changes is important for designing appropriate foreign agricultural trade policies. It is usually assumed that the volume of trade responds to price changes and this price responsiveness may be represented either by the price elasticity of export (import) demand, or by the price elasticity of an exporter's market share in foreign markets. Such information is particularly useful when the objective of agricultural policy is to improve the foreign exchange earning position of their nation through the adoption of commodity and export promotion programs.

A low (less than 1.00 in absolute value) foreign demand price elasticity implies that the farmers would benefit from programs that increase rather than decrease the price of the traded commodity. That is, the gross revenue to the farmers after an increase in the price will be higher than the gross revenue to them if the price had decreased by the same amount. A high price elasticity (greater than 1.00 in absolute value) would imply that farmers would benefit from commodity programs that lower the price of the commodity traded. In the former case a commodity program may call for the curtailment of exports by reducing production through a system of marketing quotas or by payments to farmers to hold land out of production (land diversion or set-aside programs). The latter case may require policies aimed at export expansion to reduce the price of particular commodity in world markets. Programs such as deficiency payments, price supports or non-recourse loans, export subsidies, and "bonus a bushel" programs would be examples of such commodity programs. In the long run, programs that increase agricultural productivity (decrease cost of production), such as federally funded research, also tend to lower price.[1]

THE PRICE ELASTICITY OF FOREIGN DEMAND FOR U.S. WHEAT EXPORTS: CURRENT CONTROVERSIES

Currently there is a debate regarding the relative magnitude of the price elasticity of foreign demand for U.S. agricultural exports in general, and wheat specifically. For example, Schuh [1984], Schuh and Everett [1984], contend that the price elasticity of demand for exports of wheat from the United States is greater than 1.00. In support of their view, they argue that the price elasticity of import demand for any given import market is determined by the price elasticities of domestic demand and supply, the share of wheat imports from total domestic consumption, and the highly elastic supplies of U.S. competitors in that import market. Accordingly, if the importer of U.S. wheat is a marginal importer, that is, the importer country imports only a small portion of its total domestic consumption, then the import demand elasticity can be quite large, and the higher prices induced by U.S. commodity programs provide incentive for producers in import markets to either substitute domestic production for U.S. supplies or to increase imports from U.S. competitors. Thus, wheat growers would benefit from lower rather than higher prices. They strongly argue that the current U.S. commodity programs, coupled with the strong dollar, (caused by, among other things, the federal budget deficit), have priced U.S. agricultural commodities out of the international markets.

In contrast to this view, Schmitz, McCalla, Mitchell and Carter (SMMC) [1981], argue that the foreign import demand for grains is price inelastic. "If there is any agreement in the recent literature, it is that protective food and agricultural policies tend to make import demand insensitive to price." [Schmitz et al., P. 151]

In support of this contention, they first review two groups of related studies: those which estimate the domestic or import demand price elasticities for importing countries and regions, and those which estimate price elasticity for imports of a particular agricultural commodity from a specific exporter country [Schmitz et al., tables 6-2 and 6-3, PP. 149-151]. Second, they analyze the demand characteristics and the nature of domestic supply response in various import markets classified as developed, developing, and centrally planned economies. Similar to Schuh, they recognize that the elasticity of foreign import demand depends on both domestic demand and supply in the importing countries/regions. But SMMC argue that the protected nature of the import markets in developed (DCs) and centrally planned countries (CP,s), isolates domestic prices in these regions from world prices. In other words, protection does not allow the transmission of international prices to domestic consumers and producers in those markets. Referring to Abel [1966], Josling [1977], McCalla [1967], Zwart and Meilke [1979], Abbott [1979], and Hurttado [1976], SMMC argue that as long as the world price remains below the protected resale price in those markets, price isolation makes the import demand for wheat perfectly unresponsive to world prices. That is, when the transmission elasticity (the elasticity of domestic price with respect to the changes in world price) is zero, the domestic supply elasticity becomes irrelevant in determination of the net import demand for DCs and CP,s. Thus, they hypothesized that the DC and CP regions have very low or zero elasticities of import demand.

With regard to the less developed countries (LDCs), however, they allow for the transmission of the world prices to the domestic environment of these markets. As a result, the higher world prices provide an incentive for domestic producers in LDCs to increase their production. But for political reasons they argue, the domestic policies in LDCs are designed to maintain low urban food prices. In general, the existence of such policies, coupled with the lack of income (foreign exchange availability), tends to offset any incentive on the behalf of domestic suppliers to react to world prices. Thus, in the low income LDCs the demand for imports depends completely on domestic demand variables such as income, population and foreign exchange availability, and for all practical purposes it is unresponsive to world prices [Schmitz et al., 1981, pp. 151-156].

The inelastic foreign import demand then, provides a basis for the existence of monopoly rents which may be exploited by a grain export cartel in a way which will bring the prices for grain in parity with the prices of oil and other major raw materials.

According to this view, an increase in the price of grains, given price inelastic foreign import demand, will increase the net revenue to the members of the grain export cartel.

CURRENT CONTENTIONS, POLICY IMPLICATIONS AND AMBIGUOUS EMPIRICAL ESTIMATES ON FOREIGN DEMAND PRICE ELASTICITIES FOR U.S. WHEAT EXPORTS

To sum up, Schuh's contention, calls for export expansionism (for example due to technological advances, or eliminating the land set-aside programs -- where government may in fact be paying farmers to set aside their least efficient land), and implies that U.S. farmers would benefit from trade liberalization. Contrary to this contention, Schmitz et al., contention advocates trade protectionism in terms of controlling wheat exports, preferably through an Organization of Grain Exporting Countries (O.G.E.C.), basically to control export prices, or as a retaliatory way to stop rent seeking behavior of importing countries who are believed to have already benefited from their unfair trade practices. However these contentions can not be pursued by agricultural policy makers unless there is a general consensus on the magnitude of foreign demand price elasticities.

Despite the numerous attempts to estimate the foreign demand price responsiveness for U.S. agricultural exports, little consensus has been reached on the magnitude of the price responsiveness of U.S. sales of agricultural products in foreign markets. Thompson [1981] in a comprehensive survey of international agricultural trade models, gives an extensive review of studies concerned with the price responsiveness of U.S. agricultural sales in international markets. The empirical results are not consistent and price responsiveness for U.S. exports ranges anywhere from zero to -16.00. In this regard, Thompson concluded that:

> "The quality of the empirical parameter estimates in many studies surveyed was subject to question. Inadequate data (no single organization collects and banks all the data needed by trade researchers) and insufficient resources to collect better data lie at the root of many problems with existing trade models. Furthermore, specification errors and use of inappropriate estimators often biased the estimates of parameters in the models. The generally weak empirical content was the principal deficiency of all the trade models reviewed." [Thompson, 1981, p. iv]

In particular, many studies that have attempted to estimate foreign demand price elasticities for U.S. wheat exports have produced very diverse empirical results that are summarized in Gardiner and Dixit [pp. 14-15, Table 2., May 1986]. Such a diverse empirical results does not answer the question of whether or not the international price mechanism could be relied on for achieving the objectives of domestic and foreign agricultural policy programs. Consequently, we can not formulate effective foreign agricultural and food policy programs for such issues as the U.S. agricultural foreign exchange earning position (balance of payment adjustment purposes), or for U.S. counteraction to unfair trade practices by its trade partners and competitors in international wheat markets. More important, the adoption of policies based on such uncertain information may well produce counterproductive results. That is, if the U.S. export demand is price elastic, then instead of current price support policies aimed at output reduction, the appropriate policy would be to expand output and thus increase U.S. wheat grower's gross revenue.

PREVIOUS STUDIES: A COMMON PROBLEM

The diversity of price elasticity estimates reported for U.S. wheat exports in the literature may be attributed to differences in methodology, assumptions, sample of the trading partner countries/regions, the data source, and the time period chosen for the analysis. Agricultural economists have employed a number of different theoretical and empirical methods to estimate the degree to which foreign demands respond to the changes in the export/import prices of a given commodity traded in international markets. Ryan [1979], Sarris [1981], Schmitz et al., [1981, Chapter 6], Thompson [1981], Thompson and Abbott [1982], Gardiner and Dixit [1986], and Blandford [1986], have surveyed different commodity trade models that are in general concerned with the analyses of the changes in the patterns of trade flows, forecasting and estimating export/import demands, and explaining the nature of price or non-price competition for a single (or a group of) agricultural commodity(ies) traded between two or several trading regions. Models specifically concerned with the estimation of foreign demand price responsiveness in international markets may be cataloged as follows:

(1). The Net National Excess Demand (NNED) Models ;

(2). The Direct Excess Demand (DED) Models ;

(3). The Elasticity of Substitution (EOS) Models ;

(4). The Market Share (MS) Models :

(a) Constant Market Share (CMS) Models

(b) Probabilistic Models

(c) Armington Models

(d) Markov Models

(e) Logit (Limited Dependent variable) Models;

(5). The Structural Models:

(a) Spatial Price Equilibrium (SPE) Models

(b) Nonspatial Price Equilibrium (NSPE) Models .

(c) Linnemann-Tinbergen Model

(6). Game Theoretic (GT) models.

(7). Disequilibrium Demand (DD) Models

The common characteristic of such studies is that they all utilize: (a)- external trade statistics, and (b)- a price linkage equation (an equation linking the domestic price in import market to world market price) in their quantitative analyses of import/export quantities and import/export prices.

Trade statistics are available from two reporting sources: exporting and importing countries. It is possible that the current ambiguity on the magnitude of foreign demand parameter estimates may be dictated by the source of the data employed by the researchers in their quantitative analyses of foreign demand. In practice, for various reasons that will be explained later, the quantity data reported by counterpart trading countries differ substantially from one another. This raises the questions of which data source is appropriate and whether the data source affects the magnitude of foreign demand parameter estimates.

With regard to the price linkage equation, the domestic prices in importing countries are linked to the world or export prices in different ways depending on the researchers' assumptions underlying their models. Such equation may or may not incorporate the role of the exchange rate, transportation cost, insurance cost, and trade impediments in the linkage of export/import prices. Thus, it is possible that the ambiguity on foreign demand parameter estimates may be dictated by the choice of linkage equation employed by researchers. Although, several price linkage equations will be reviewed later, this study is mainly concerned with the effects of data sources on foreign demand parameter estimates discussed above.

PRESENT STUDY

The following papers intend to examine the possible effects of the source of trade statistics on the magnitude of the import (export) demand parameters estimated by the first two commodity trade models mentioned above. More precisely the presentation of these papers together addresses the following questions:

(1). Is the source of trade data (import quantities based on the reports of importing countries vis-a-vis import quantities based on the export reports of exporting countries) a neutral factor in determining the magnitude of the import (export) demand parameter estimates?

(2). If not neutral, how then does one evaluates the import (export) demand parameter estimates?

(3). Is there an alternative theory for correct specification of an import (export) demand function?

(4). Applying the alternative theory in international wheat markets, what would be the magnitude of the relative price responsiveness of the market shares of individual major exporting countries?

THESIS OUTLINE

The remainder of this thesis is organized as follows. Chapter 2 reviews concept of foreign demands (export/import demands), and theoretical and empirical methods for measuring the impact of international prices on the level of exports/imports (or relative market shares of exporting countries) of a given commodity (homogeneous or heterogeneous) traded in international markets. The objective here is to trace different methods for measuring the price elasticity of foreign demands facing exporter countries. Special emphasis is given to:

(a). Approaches taken for linking the domestic markets of importing countries to international markets through a domestic/international market price linkage equation.

(b). Approaches employed for incorporating the effects of trade impediments in both exporting and importing countries on the magnitude of parameter estimates of foreign demand price elasticities.

(c). Possible approaches for estimating the elasticity of price transmission to be incorporated in the estimation of price elasticity of foreign demands.

Chapter 3 reviews factors causing discrepancies in external trade statistics of counterpart trading countries. Also, it compares the advantageous and disadvantageous of relying on the reports of exporting countries vis-a-vis the reports of importing countries, and examines the use of trade matrices in the quantitative analysis of export/import quantities and prices. Finally, this chapter draws on commodity models reviewed in Chapter 2 in order to examine the ability of those models in achieving their objective (estimation of foreign demand price elasticity), when they are estimated based on the trade matrices reported by exporting countries vis-a-vis trade matrices reported by importing countries. This chapter shows that when the discrepancies between export-import reports are due to an arbitrage (speculative) market (besides the import market for domestic consumption and import market for inventories) on the side of importing countries, then the exporting countries are not only faced with import demands for consumption and inventories, but they are also facing an import demand which is totally uncertain to the exporters, i.e. import demand for speculation. It also shows that the current specification of the structure of the commodity models that only recognizes a maximum of two demands (for consumption and inventories), produces biased excess demand price parameter estimates when they utilize trade data based on the reports of exporting countries which includes quantity exported/imported for speculation purposes.

Chapter 4 discusses the U.S. competitiveness in the international wheat market. It draws on the theoretical and analytical issues discussed in the literature regarding the meaning of the concept, and factors affecting competition and performance of major exporting countries in international wheat markets. It specifies an econometric model capable of measuring the impacts of relative price, relative promotional expenditure, and export capacity utilization of major exporting countries on their market shares in DCs and LDCs import markets for the time period of 1962-1982.

Chapter 5 summarizes the findings and draws conclusions regarding the measurement of the price responsiveness of foreign demands and the export market shares of major exporting countries in international wheat markets. It discusses policy implications and suggests additional feasible research activities that might be productively pursued.

ENDNOTES

1. For detailed information on U.S. export expansion programs see Chapter 4 of this study. In general the U.S. government agricultural commodity programs that are designed to promote U.S. agricultural exports may be classified into two broad program groups of: (a)- the non-price commodity export expansion programs, and (b)- the price-induced commodity export expansion programs.

CHAPTER 2

THE PRICE ELASTICITY OF EXPORT-IMPORT DEMAND: THEORY AND PRACTICE

This chapter is divided into two parts. The purpose of the first part is to review the theoretical concepts of export demand, import demand, and their corresponding price elasticities. This includes definitions, graphical illustration, and mathematical presentation of these concepts. The second part discuses different methodologies employed by agricultural economists for estimating the price elasticity of export demand for a specific product traded between two or several regions. Special emphasis is given to different types of linkage procedures employed by different models for linking domestic and international markets, specifically when policy interventions in agricultural commodity markets are common practice.

EXPORT AND IMPORT DEMANDS

The theoretical concepts of an export demand and an import demand are relatively simple. An exporting country may face one or several importing countries demanding its product of export. The foreign demand(s) for a product exported by a country is called the export demand for that product. The export demand may refer to the demand of an individual importing nation, or it may describe the aggregated demands of a group of importing nations constituting an export market for an exporting country. Following conventional economic logic, such demand summarizes the response of importing (demanding) nations to every possible (hypothetical) export price of the product. Thus, demand can tell exporting countries what can be expected to happen to the volume demanded or the export receipts from exports of a given product if the export price changes (say due to a currency devaluation or revaluation, change in technology, or any policy and trade impediments that could change the export price).[1]

In the traditional economic theory of consumer demand, the response of an individual consumer to alternative prices of a product is usually analyzed in two ways. One is to analyze the response of the quantity demanded to possible alternative prices while assuming that all other variables affecting demand (consumer's income and taste, price of other products, etc.) are held constant, i.e., partial equilibrium analysis of a demand *curve*. The other approach for analyzing the response of the quantity demanded to alternative prices is to allow the other variables affecting the demand to change along with the changes in the price of the demanded product, i.e., the general equilibrium analysis of a demand *function*. In this regard Baumol [1977] distinguishes between concepts of "*demand curve*" and "*demand function*" in terms of "*isotemporal*" characteristic of the consumer demand as follows:

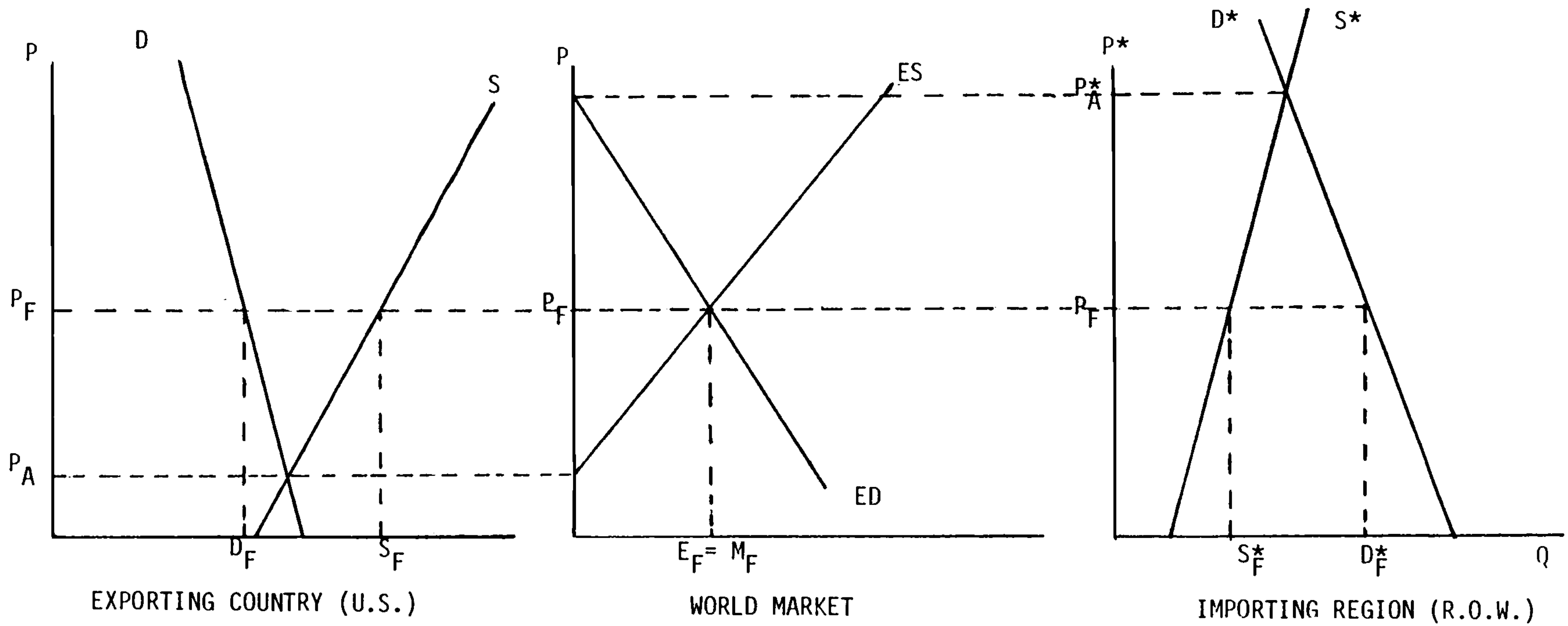
> "To summarize, demand is a function of many variables such as price, advertising, and decisions relating to competing and complementary products. The relationship

> which describes this entire many-variable interconnection is called the *demand function*. By contrast, the demand curve deals only with two of these variables, price and quantity demanded, and ignores the others, or, rather, assumes that their values are held constant. Indeed, the distinction between a movement along and a shift in a demand curve may be described in terms of the variables involved. Any changes in quantity demanded which results only from a variation in price is a movement along the curve, whereas changes in the value of any other variable in the demand *function* is likely to shift the demand *curve*. [Baumol 1977, pp.181-182.]

Following Baumol, the export demand *curve* and export demand *function* may be defined in partial and general equilibrium frameworks as follows:

The partial equilibrium concept of an export demand *curve* for a single commodity (wheat), traded between two regions is illustrated in Figure 2-1.[2] The world is divided into two countries (regions): One exporting country (i.e., U.S.), and one importing country (i.e., the rest of the world, ROW). The domestic demand and supply for the U.S. are labeled D and S, respectively. The combined domestic demand for imports and domestic production in the ROW is labeled D*. The supply of domestic import-competing production in the ROW is labeled S*.[3] The supply curves S, and S* are assumed to trace the marginal cost of domestic production in exporting and importing regions respectively. The assumptions are made that the domestic product is a perfect substitute for the imports, and at a given range of prices (determined by S*), the consumers in importing region first take up all domestic production and they demand imports only when their

FIGURE 2.1. FREE TRADE MODEL FOR A SINGLE HOMOGENEOUS COMMODITY



demand exceeds domestic production at that price. Thus the *domestic demand curve for imports* in the ROW implicitly is incorporated in the domestic demand D*. Assuming that the trade between these two regions is conducted in a perfectly competitive market, with no transportation cost, and one to one correspondence between currencies of two regions (i.e. exchange rate between the two currencies is equal to one, such that price in the exporting country, P, equals the import price P^*), then such implicit import demand can be converted into the *excess (import) demand curve* of the ROW, or *export demand curve* facing U.S, labeled ED in the middle panel of Figure 2-1. This curve (ED) is obtained by subtracting at each possible price (P) the domestic supply S* from the domestic demand D*. Thus ED specifies the relationship between the quantity of the imports demanded by ROW from U.S. at every possible price (P) over a given range of product prices at the world market. Here the assumption is made that as we measure the excess quantity (D* - S*) at various prices, the values of other variables affecting these curves (D*, and S*) are not affected by choosing different levels of product prices in the ROW[4]. With regard to the assumptions underlying the partial equilibrium analysis of domestic supply and demand in the importing region, Gorden [1979, p. 6] argues that:

> "The precise assumptions underlying the partial equilibrium supply and demand curve ... need not be set out because a variety of assumptions are compatible with such curves. All sorts of reactions affecting prices of other goods or of factors, or indeed government policies, can be supposed to

> be associated with movements along these curves. The essence of the partial equilibrium method is that we blinker ourselves to look only at the product or industry concerned and ignore any reactions outside the immediate field of vision. It is normal, but not essential, to assume that money income stays constant. We must assume only that movements along one of the curves do not shift the position of the other curve; there must be no relationship between them other than those indicated in the diagram".

The excess (export) of domestic supply over domestic demand at any possible prices P in U.S. is represented by excess supply curve ES. Similar to ED curve, the ES curve (export supply curve) is obtained under the assumption that other variables affecting D and S are held constant for varying levels of the product price P in the United States (the exporting region).

In the absence of trade (autarky), two regions are considered as closed economies. The nontrade equilibrium in each region is where domestic demand equals domestic supply, $D = S$, and $D^* = S^*$ for U.S. and ROW respectively. In figure 2-1, the autarkic equilibrium price for U.S. and ROW are given by P_A, and P_A^* respectively. If two regions are allowed to trade free of any kind of trade impediments, then producers in the United States want to sell to the ROW at higher prices (a north east movement along the ES curve). The consumers in the ROW want to buy the product available for trade from the U.S. at a lower price than at home (a movement down the ED curve). The movements along these two curves continue (trade expansion) until the free trade product price (P_F) prevails every where. At this price, U.S. produces S_F, consumes D_F, and exports $E_F = S_F - D_F$. At the same time, the ROW demands D^*_F, produces S^*_F, and imports $M_F = (D^*_F - S^*_F) = E_F = (S_F - D_F)$.

THE PRICE ELASTICITY OF EXPORT DEMAND *CURVE*

The price elasticity of export demand *curve* e_{ED} by definition measures the response in quantity demanded from the U.S. by the ROW (M_{ROW}) to a given change in the export price (P) of the traded commodity at any point on that

curve, i.e.,

$$e_{ED} = \left(\frac{\partial M_{ROW}}{\partial P}\right) \left(\frac{P}{M_{ROW}}\right) \qquad (1)$$

the absolute value of the elasticity coefficient, $|e_{ED}|$ is usually used to determine how export demand responds to a change in the price of the traded product:

(1). If and only if, the absolute value of elasticity is equal to one (unitary price elastic), then as a result of an increase (decrease) in price the quantity demanded decreases (increases) such that the percentage rise (fall) in price is exactly equal to percentage fall (rise) in quantity demanded, and export revenue and import expenditure before and after change in the product price remain the same.

(2). If and only if, the absolute value of elasticity is less than one (price inelastic), then as a result of an increase (decrease) in price the quantity demanded decreases (increases) less than proportional change in price such that the export revenue and import outlay increases (decreases).

(3). If and only if, the absolute value of elasticity is grater than one (price elastic), then as a result of an increase (decrease) in price the quantity demanded decreases (increases) by more than proportion change in price such that the export revenue and import outlay decreases (increases).

The relationship between the magnitude of the price elasticity and total receipts are summarized in Table 2.1 bellow.

TABLE 2.1. THE RELATIONSHIP BETWEEN THE PRICE ELASTICITY OF DEMAND, THE DIRECTION OF CHANGES IN PRICE, TOTAL RECEITPS AND THE RELATIVE CHANGES IN QUANTITY DEMANDED.

	$e_{ED} < 1$	$e_{ED} = 1$	$e_{ED} > 1$
Price increase	Receipts rise $dQ/Q < dP/P$	Receipts unchanged $dQ/Q = dP/P$	Receipts fall $dQ/Q > dP/P$
Price fall	Receipts fall $dQ/Q > dP/P$	Receipts unchanged $dQ/Q = dP/P$	Receipts rise $dQ/Q < dP/P$

* Note: d indicates partial differentiation.

THE PRICE ELASTICITY OF EXPORT DEMAND UNDER DIFFERENT LINKAGE SCHEMES

The empirical estimates of the price elasticity of export demand depends on how the trade between countries are modeled, specifically how the domestic markets of the importing nations (ROW) and the domestic markets of exporting nations (U.S.) are linked to each other in an international environment. This section considers the NNED and DED models used by agricultural economists with special emphasis given to:

(a). Approaches taken for linking the domestic markets of importing countries to international markets through domestic/international market price linkage equation.

(b). Approaches employed for incorporating the effects of trade impediments in both exporting and importing countries on the magnitude of parameter estimates of foreign demand price elasticities.

(c). Possible approaches for estimating the elasticity of price transmission to be incorporated in the estimation of price elasticity of foreign demands.

NET NATIONAL EXCESS DEMAND (NNED) MODELS: TWO-REGION NONSPATIAL PRICE EQUILIBRIUM MODEL

One way to estimate the price elasticity of demand facing a given exporting country is to employ the identity for the net foreign demand facing that exporting country in a two region model framework.[5] In such models the market for an internationally traded commodity is divided into two countries (regions). One is the exporting country of interest (i.e., U.S.), and the other region consists of an aggregate of all other countries in the rest of the world (ROW). Assuming that perfect competition prevails on both side of the market and that imports and domestically produced commodity are perfect substitutes, then Equation (2) represents the identity for the net excess (import) demand of importing country/region (net of its domestic supply including supplies of other competing countries) for U.S. exports.

$$M_{ROW} = D^*(P^*) - S^*(P^*) = f(P^*) , \qquad \frac{\partial f}{\partial P^*} < 0 \qquad (2)$$

where M_{ROW} indicates the quantity of the commodity imported from the U.S., $D^* = f(P^*)$, and $S^* = g(P^*)$ are respectively the domestic demand and supply in the ROW as a function of landed cif (cost, insurance and freight) import price (P^*) expressed in terms of the currency of ROW.

Equation (3) represents the supply of commodity available for export (export supply or excess supply) at the borders of the exporting country. $E_{U.S.}$ indicates the quantity of the commodity that the exporter can export at different fob (free on board) prices at its borders.

$D = h(P)$, and $S = k(P)$ are respectively the domestic demand and supply in the exporting country as a function of fob export price (P) expressed in terms of the currency of exporting country.

$$E_{U.S.} = D(P) - S(P) = j(P)\ ,\ \frac{\partial j}{\partial P} > 0 \qquad (3)$$

Equations (4) to (8) represent alternative formulations for international linkage between the import price P* and the export price P. The prevailing exchange rate (number of units of importing country's currency per unit of the currency of the exporting country) is represented by r, P is in terms of the currency of exporter, C is the per unit cost of transportation and insurance which is assumed to be independent of the volume of trade and is measured in terms of the currency of the importing country, T is the specific tariff (a fixed *sum* per unit of the imported commodity) or subsidy levied by importing country in terms of its own currency, t is an ad valorem tariff (a constant percentage of value) or a percentage subsidy, VL is a variable levy which is equal to the difference between targeted import price ($P*_t$) and export price (P) in the currency of the importing country ($VL = P*_t - rP$).

$$P* = P \qquad (4)$$

$$P* = rP \qquad (5)$$

$$P* = rP+C+T \qquad (6)$$

$$P* = r(1+t)P+C, \qquad -1 < t < +\infty \qquad (7)$$

$$P* = rP+C+VL = rP+C+(P*_t-rP) = P*_t+C \qquad (8)$$

PROPERTIES OF ALTERNATIVE PRICE LINKAGE EQUATIONS

Equation (4): No currency differential, no transportation and insurance costs ($C = 0$), and no tariff or subsidies ($T = 0$). The elasticity of P* with respect to P ($e_{P*/P}$) which is also known as the elasticity of price transmission is unity, i.e.:

$$e_{P*/P} = \left(\frac{\partial P^*}{\partial P}\right) \left(\frac{P}{P^*}\right) = 1 \qquad (9)$$

Equation (5): The prevailing exchange rate between currencies of two trading regions is represented by r. The assumptions of zero C and T are still maintained. Again, the magnitude of $e_{P*/P}$ remains unity, i.e.:

$$e_{P*/P} = \left(\frac{\partial P^*}{\partial P}\right) \left(\frac{P}{P^*}\right) = r \left(\frac{P}{P^*}\right) = r \left(\frac{P}{rP}\right) = 1 \qquad (10)$$

Equation (6): Specific tariff (T), and per unit transportation and insurance costs (C) are added to Equation (5). In this case $e_{P*/P}$ is greater, equal, or less than unity if the sum of (T+C) is respectively less than, equal, or greater than zero:

$$e_{P*/P} = \left(\frac{\partial P^*}{\partial P}\right) \left(\frac{P}{P^*}\right) = r \left(\frac{P}{P^*}\right) = \left(\frac{rP}{P^*}\right) = \frac{rP}{(rP + C + T)} \qquad (11)$$

$e_{P*/P} < 1$, for $T \geq 0$ and $C > 0$, or $T > 0$ and $C \geq 0$

$e_{P*/P} > 1$, for $(T + C) < 0$

The latter is a subsidy case where subsidy (T) exceeds per unit transportation and insurance cost (C).

Equation (7): Includes ad valorem tariff (t).

$$e_{P*/P} = \left(\frac{\partial P^*}{\partial P}\right)\left(\frac{P}{P^*}\right) = \left[\frac{r(1+t)P}{r(1+t)P+C}\right] \tag{12}$$

$e_{P*/P} = 1$, for $C = 0$ and $-1 < t < \infty$

$e_{P*/P} < 1$, for $C > 0$

Equation (8):

$$e_{P*/P} = \left(\frac{\partial P^*}{\partial P}\right)\left(\frac{P}{P^*}\right) = 0 \tag{13}$$

When the international price linkage Equation (4) is assumed to hold between two trading regions, then from the ROW's point of view the price elasticity of the ROW,s excess (import) demand for U.S. export with respect to the domestic landed price (P*) in the ROW ($e_{ED/P*}$) would be:

$$e_{ED/P*} = \left(\frac{\partial M_{ROW}}{\partial P^*}\right)\left(\frac{P^*}{M_{ROW}}\right) = \left(\frac{\partial D^*}{\partial P^*}\right)\left(\frac{P^*}{M_{ROW}}\right) - \left(\frac{\partial S^*}{\partial P^*}\right)\left(\frac{P^*}{M_{ROW}}\right)$$

$$e_{ED/P*} = \left(\frac{\partial D^*}{\partial P^*}\right)\left(\frac{P^*}{D^*}\right)\left(\frac{D^*}{M_{ROW}}\right) - \left(\frac{\partial S^*}{\partial P^*}\right)\left(\frac{P^*}{S^*}\right)\left(\frac{S^*}{M_{ROW}}\right)$$

$$\boxed{e_{ED/P*} = e_{D^*/P^*}\left(\frac{D^*}{M_{ROW}}\right) - e_{S^*/P^*}\left(\frac{S^*}{M_{ROW}}\right)} \tag{14-1}$$

where, $e_{D*/P*}$ is the price elasticity of domestic demand in the ROW with respect to domestic price (P^*) in the ROW, $(D*)/(M_{ROW})$ is the share of domestic consumption out of imports in the ROW, $e_{S*/P*}$ is the price elasticity of domestic supply (includes supplies of other exporting countries to ROW) in ROW with respect to domestic prices (P^*) in ROW, and $(S*)/(M_{ROW})$ is the share of domestic supply (includes supplies of other exporting countries to ROW) out of total imports.

By the same token, when P* = P, the price elasticity of ED with respect to P (export price) is the same as $e_{ED/P*}$ indicated in Equation (14-1), i.e.,:

$$\boxed{e_{ED/P} = e_{D^*/P}\left(\frac{D^*}{M_{ROW}}\right) - e_{S^*/P}\left(\frac{S^*}{M_{ROW}}\right)} \qquad (14\text{-}2)$$

Thus when P* = P (i.e., there is no currency differential and no tariff and transportation cost between countries), then from the point of view of the importing country/region, the price elasticity of excess (import) demand for a commodity imported from a given exporting country depends on the portion of its consumption out of its imports ($D*/M_{ROW}$), the share of its domestic as well as other exporters' supply out of its imports from given exporter ($S*/(M_{ROW})$, and the price elasticities of its domestic demand and supply, $e_{D*/P}$ and $e_{S*/P}$ respectively.

Yntema [1932, pp.43-44], derived $e_{ED/P}$ equivalent to Equation (14-2) as follows:[6]

$$\boxed{e_{ED/P} = \left(\frac{e_{S^*/P}\ S^* - e_{D^*/P}\ D^*}{S^* - D^*} \right)} \qquad (14\text{-}3)$$

Orcutt [1950, p. 127], utilized Yntema's formula in order to illustrate the relationship between export demand price elasticity and domestic demand and supply price elasticities. In order to make the $e_{ED/P}$ more realistic, Horner [1952], discussed the same formula but introduced "market frictions" within the export market in his analyses. According to Horner, two kinds of market friction are present in trading markets:

First, the products of the same kind exported to an export market are not perfect substitutes. Rather, the consumers in importing countries differentiate among such products by their export origins. Ignoring such friction eliminates the impact of elasticities of substitutions (among the products of different competing sources of exports) in the calculation of Yntema's type elasticity formula. Thus the estimates of the export demand price elasticities based on Yntema's type price elasticity formula which does not account for such substitution elasticities produces upper bound elasticities. In this regard he argues that:

> "One of the most important frictions lies in the fact that products of different origins are by no means the same in the eyes of the consumer, not even staple farm products. ..., Further research into elasticities of substitutions may enable the necessary adjustments eventually to be made. In the meantime, since this type of friction can only reduce the elasticity of export demand for any country's product, estimates made under the present scheme must be taken as upper limits." [Horner, 1952. pp. 328-329]

Second, he argues that the existence of market frictions such as specific tariff and transport costs operate to make export demand less elastic than otherwise. In other words, Horner tried to modify the elasticity term $e_{D*/P}$ on the right hand side of Equation (14-2) in terms of the landed prices (P*) in the importing country. In regard to Equation (14-2) above, he stated that:

> "An important market friction which can be allowed for here, however is the influence of transport costs and tariffs. ..., if [P] is taken now to be the export price in the given exporting country, the elasticity of demand [$e_{D*/P}$] in the consuming countries of the export market will have been expressed in terms of a different price, viz., a price inclusive of tariff duties and transport costs. As this price is a function of export price [P], it can be seen that the elasticity [$e_{D*/P}$] can be modified to express export market demand with respect to [P] instead of landed price if it is simply multiplied by the elasticity of landed price with respect to [P].[7]" [Horner, 1952. p. 329.][8]

Thus, when P* is not the same as P, rather P* = h(P) such that dP*/dP is different from 1, then Equation for $e_{ED/P}$ can be rewritten as follows:

$$M_{ROW} = D^*[P^*(P)] - S^*[P^*(P)]$$

$$\left(\frac{\partial M_{ROW}}{\partial P}\right) = \left(\frac{\partial D^*}{\partial P^*}\right)\left(\frac{\partial P^*}{\partial P}\right) - \left(\frac{\partial S^*}{\partial P^*}\right)\left(\frac{\partial P^*}{\partial P}\right)$$

multiplying both sides of this Equation by (P/M_{ROW}), and the first and the second terms on the right hand side by (P*/P*)(D*/D*), and (P*/P*)(S*/S*) respectively, it follows that:

$$e_{ED/P} = \left(\frac{\partial M_{ROW}}{\partial P}\right)\left(\frac{P}{M_{ROW}}\right)$$

$$e_{ED/P} = \left(\frac{\partial D^*}{\partial P^*}\right) \left(\frac{\partial P^*}{\partial P}\right) \left(\frac{P}{M_{ROW}}\right) \left(\frac{P^*}{P^*}\right) \left(\frac{D^*}{D^*}\right) - \left(\frac{\partial S^*}{\partial P^*}\right) \left(\frac{\partial P^*}{\partial P}\right) \left(\frac{P}{M_{ROW}}\right) \left(\frac{P^*}{P^*}\right) \left(\frac{S^*}{S^*}\right)$$

$$e_{ED/P} = e_{P^*/P} \left[e_{D^*/P^*} \left(\frac{D^*}{M_{ROW}}\right) - e_{S^*/P^*} \left(\frac{S^*}{M_{ROW}}\right) \right] \qquad (15)$$

where:

$$e_{P^*/P} = \left(\frac{\partial P^*}{\partial P}\right) \left(\frac{P}{P^*}\right)$$

represents the response of the landed (consumer) price in the importing country (P*) to a percentage change in the export price (P) in the exporting country. $e_{P*/P}$ is also known as "the elasticity of price transmission" (Bredahl, Meyers, and Collins [1979], p. 58.)

$$e_{D^*/P^*} = \left(\frac{\partial D^*}{\partial P^*}\right) \cdot \left(\frac{P^*}{D^*}\right)$$

is the own-price elasticity of demand in the importing country/region.

$$e_{S^*/P^*} = \left(\frac{\partial S^*}{\partial P^*}\right) \cdot \left(\frac{P^*}{S^*}\right)$$

is the own price elasticity of supply in competing countries (including the importer country/region).

Substituting the values of $e_{P*/P}$'s from Equations (9) to (13) into Equation (15) yields different values for export demand price elasticity under alternative price linkage schemes in trade between the two country/regions (Table 2.2).

TABLE 2.2. THE EXPORT DEMAND PRICE ELASTICITIES UNDER DIFFERENT PRICE LINKAGE SCHEMES IN TRADE BETWEEN TWO REGIONS.

Price Linkage	$e_{ED/P}$
$P^* = P$	$e_{D^*/P^*}\left(\frac{D^*}{M_{ROW}}\right) - e_{S^*/P^*}\left(\frac{S^*}{M_{ROW}}\right)$
$P^* = rP$	$e_{D^*/P^*}\left(\frac{D^*}{M_{ROW}}\right) - e_{S^*/P^*}\left(\frac{S^*}{M_{ROW}}\right)$
$P^* = rP+C+T$	$\left(\frac{rP}{rP+C+T}\right)\left[e_{D^*/P^*}\left(\frac{D^*}{M_{ROW}}\right) - e_{S^*/P^*}\left(\frac{S^*}{M_{ROW}}\right)\right]$
$P^* = r(1+t)P+C$	$\frac{r\left(1+t\right)P}{\left[r\left(1+t\right)P + C\right]\left[e_{D^*/P^*}\left(\frac{D^*}{M_{ROW}}\right) - e_{S^*/P^*}\left(\frac{S^*}{M_{ROW}}\right)\right]}$
$P^* = P^*_t + C$	Zero

Powell [1959], employed a different version of Horner's formula to estimate the effect of a 10% increase in Australian wool supply on its gross wool revenue. Following Powell, the formula for the price elasticity of export demand for a particular commodity exported by a single exporting country is:

$$e_{ED/P} = \left(\frac{1}{f}\right)\left(e_{D^*/P} - e_{S^*/P}\right) + e_{S^*/P} \tag{16}$$

which is obtained by substituting (D* - M) for S* in Equation (15) while assuming $P^* = P$ (i.e., perfect price transmission), and $f = M/D^*$ is the exporting country's share of the import market.

Floyd [1965], relaxed the assumption of product homogeneity for imports and domestic production in the importing country. He assumed that consumers in the importing country differentiate between product imported and the same kind of product produced domestically, i.e., imports and domestic production are not perfect substitutes. He divided (D^*), the consumers' total demand for consumption in the import market into two components: its consumption from imports (D^*_M), and its consumption from domestic production (D^*_d).[9] The excess demand becomes:

$$M_{ROW} = D^*_M - D^*_d - S^*$$

In this case the excess demand price elasticity of the ROW for the imports of a particular product may be defined as follows:[10]

$$e_{ED/P} = e_{P^*/P}\left[e_{D^*_M/P^*}\left(\frac{D^*_M}{M_{ROW}}\right) + e_{D^*_d/P^*}\left(\frac{D^*_d}{M_{ROW}}\right) - e_{S^*/P^*}\left(\frac{S^*}{M_{ROW}}\right)\right] \quad (17)$$

Tweeten [1967] provided a general expression for the price elasticity of export demand facing the i^{th} exporting country in its trade with n importing countries ($j = 1, 2, 3, \ldots, n$) as follows:

$$e_{ED/P} = \sum_{j=1}^{n}\left[e_{P^*_j/P} \cdot e_{D^*_j/P^*}\left(\frac{D^*_j}{M_i}\right) - e_{P^*_j/P} \cdot e_{S^*_j/P^*}\left(\frac{S^*_j}{M_i}\right)\right] \quad (18)$$

Tweeten employed such relation to estimate the long run price elasticity of foreign demand for U.S. farm output. Under the assumption that the elasticity of price transmission is equal to one in the long run, i.e.,

$(e_{P_j^*/P} = 1)$

he concluded that:

> "Estimates of the price elasticity of demand for U.S. food and feed exports ranged up to -16. Adjustment downward of this estimate for institutional impediments and market imperfection led to an estimate of -6.4." [Tweeten 1967, p. 366.]

Johnson [1977] criticized the approach used by Tweeten to calculate the price elasticity of excess demand on technical grounds that aggregation across many commodities and countries are the sources of errors in Tweeten's procedure. Johnson argued that:

> "The source of error is clear. The elasticity for a market with many participants is equal to the quantity weighted average of the various participants and not the sum. This piece of price theory is available in Stigler among other places [Stigler, 1966, p. 340-341]." [Johnson 1977, p. 735]

Johnson refers to Floyd [1965], and his own work [1970] for a correct procedure for calculation of foreign demand price elasticity. Under the assumptions of perfect price transmission ($e_{P*j/P} = 1$), domestic demand and supply elasticities of -0.2 and +0.2 for wheat everywhere, and applying his calculated "commodity weights" (i.e., 0.18 as the weight of wheat in the 1970 U.S. export market basket) his estimates on the "Implied Elasticity" for wheat and feed grains respectively are -6.72, and -10.14 which are close to Tweeten's estimates.

However, Johnson's weighted wheat implied elasticity is -1.20 (-6.72 x .018).

Webb and Blakley [1982], criticized the use of high supply and demand elasticities for countries in Johnson's study. They used their own calculated elasticities (with the values of three to 10 times less than Johnson's elasticities) in Johnson's formula and obtained the value of -1.03 for the elasticity of excess demand for U.S. wheat export. This value is equal to -1.05 based on their own econometric model.

Taplin [1971] and Cronin [1979], assumed that exports of a particular commodity from different exporting countries are not perfect substitutes for one another, or for the domestically produced commodity in the import market. Taplin purposed further decomposition in Powell's formula (Equation 16 above) to account for the cross price elasticities of the exports of different sources of export in the calculation of the price elasticity of export demand facing an individual exporting country. In this regard he stated that:

> "The elasticity of demand for the product of one exporting country is a "total" elasticity which embraces the relevant direct and cross price elasticity. The latter are related in a straight-forward way to the elasticity of demand for the commodity as a whole which is assumed to be the only known elasticity." [Taplin 1971, p. 104.]

Following Powell, in the case of one exporting country and one importing country and zero elasticity of supply by competing exporters ($e_{S*/P} = 0$), the export demand price elasticity (Equation 16) facing the only exporting country reduces to:

$$e_{ED/P} = \left(\frac{e_{D^*/P}}{f}\right) = e_{D^*/P}\left(\frac{D^*}{M}\right) \tag{19}$$

In Taplin's terminology, $e_{ED/P}$ is the "total elasticity" of export demand facing an exporter country and $e_{D*/p}$ is the "aggregate elasticity" which refers to the demand for the commodity as a whole ($D* = X1 + X2$). Following Taplin, in the case of two exporting countries 1 and 2 with the exports of X1 and X2 and export prices of P1 and P2 respectively, and one importing country, the export (or total) elasticity for exporting country 1 is expressed as follow:

$$e_{ED/P} = e_{D^*/P} - e_{X1/P2} + (1-f)e - \frac{\left(e_{X1/P2}\right)^2}{\left[\frac{1}{(f-1)} \quad e_{D^*/P} - e_{X1/P2} - (1-f)e\right]} \tag{20}$$

where,

e is the "elasticity residual", i.e.:

$e = (e_{X1/P1} + e_{X1/P2}) - (e_{X2/P1} + e_{X2/P2})$

and $e_{X1/P2}$ is the elasticity of demand for X1 with respect to P2.

Taplin [1971, p. 106.][11] compares the value of $e_{ED/P}$ derived by Equation (19), i.e., "simple formula", with $e_{ED/P}$ estimated by Equation (20) as follow:

(a) "As $[e_{X1/P2}]$ becomes large export elasticity approaches $[e_{D*/P}]/f$. A large value of $[e_{X1/P2}]$, i.e., a large cross price elasticity, means that the two sub-classes are close to being the one undifferentiated commodity and the simple formula for the elasticity of demand for one country's exports is applicable."

(b) "As the value of e approaches the value of $[e_{D*/P}]/f$, export elasticity also approaches $[e_{D*/P}]/f$, regardless of the magnitude of $[e_{X1/P2}]$. The practical importance of this property is that at small values of $[e_{D*/P}]/f$, say between 0 and -1, export elasticity calculated by the formula derived in this paper [Equation (20)]does not differ substantially from the elasticity calculated by the simple formula. Conversely, large negative values calculated by the latter formula are heavily discounted when they are re-calculated by the formula of this paper."

Product heterogeneity has been also considered by Cronin [1979]. Cronin distinguished between consumption price (P^{*C}) and the producer price (P^{*S}) in the importing country/region. That is, when $D^* = f[P^{*C}(P)]$, and$S^* = g[P^{*S}(P)]$ then Equation for $e_{ED/P}$ becomes:

$$e_{ED/P} = \left(\frac{\partial D^*}{\partial P^{*C}}\right)\left(\frac{\partial P^{*C}}{\partial P}\right)\left(\frac{P}{M_{ROW}}\right)\left(\frac{P^{*C}}{P^{*C}}\right)\left(\frac{D^*}{D^*}\right) - \left(\frac{\partial S^*}{\partial P^{*S}}\right)\left(\frac{\partial P^{*S}}{\partial P}\right)\left(\frac{P}{M_{ROW}}\right)\left(\frac{P^{*S}}{P^{*S}}\right)\left(\frac{S^*}{S^*}\right)$$

$$e_{ED/P} = e_{P^{*C}/P} \cdot e_{D^*/P^{*C}}\left(\frac{D^*}{M_{ROW}}\right) - e_{P^{*S}/P} \cdot e_{S^*/P^{*S}}\left(\frac{S^*}{M_{ROW}}\right) \qquad (21)$$

where, $e_{P*C/P}$ is the elasticity of consumption price P^{*C} with respect to export price P, and $e_{P*S/P}$ is the elasticity of producer price in the importing or competing country P^{*S} with respect to export price P.

Bredahal, Meyers and Collins [1979] argued that governments' price insulation policies such as variable import/export taxes and subsidies (for protecting their domestic consumers and producers from "external price fluctuations") insulates prices in counterpart trading countries.[12] Therefore, the assumption of perfect price transmission (unit value for the elasticity of price transmission, $e_{P*/P}$) inherent in Tweeten [1967, p., 362], Johnson [1977, p. 735], and all other studies based on the classical free-trade framework) produces upper bound biased estimates for the elasticity of export demand. They review the trade policies of major exporting and importing countries in trade of cereals, soybeans, and cotton, in search for "implied $e_{P*/P}$" values to be incorporated in their calculation of the U.S. export demand price elasticities. When they incorporated trade and domestic price policies in their analysis, they obtained inelastic empirical estimates more in line with previous empirical estimates.[13] Their estimate on export demand elasticity for U.S. wheat is -5.50 for free trade market case with no policy interventions (i.e., $e_{P*/P} = 1$). When they considered the price insulating policies, the value of their estimate for U.S. wheat export demand elasticity ranges from 0 to -1.67.

Dunmore and Longmire [1984], followed Bredahal, Meyers and Collins [1979], Sharples [1982], and Jabara [1981] by incorporating the "elasticities of nominal price transmission" (1.0 ,0.8, 0.95, 0.10,, 0.30, 1.00, and 0.20. for wheat respectively in U.S., Canada/Australia/S. Africa,Argentina/Brazil, European Community, Japan, Centrally Planned, and Rest-of-world markets) in their expanded version of export elasticity formula which also includes changes in stock variable SK (Equation 22):

$$e_{ED/P} = e_{P^*/P} \left[e_{D^*/P^*} \left(\frac{D^*}{M} \right) - e_{S^*/P^*} \left(\frac{S^*}{M} \right) - e_{SK/P^*} \left(\frac{SK}{M} \right) \right] \qquad (22)$$

where, $e_{SK/P*}$ is the elasticity of stocks demand.
They estimated the demand elasticity of -0.837 for U.S. wheat exports of which +.0409 belongs to U.S. competitors' supply elasticities.[14] When Dunmore [1984], assumed unit price transmission elasticity in every market (i.e., free trade), his elasticity estimate for U.S. wheat exports increased from -0.837 to -2.64.

Gallagher, Lancaster, Bredahl, and Ryan [1981] weighted the directly estimated individual import market demand elasticities in Western Europe, LDC,s, and Japan with the U.S. market shares in those markets. Their regional OLS estimates for the export demand price elasticity of U.S. wheat in LDC, Japan, and Western Europe are -0.71, -0.97, and -3.396 respectively (based on 1960-1974 data. They weighted these regional elasticities by U.S. market shares (based on 1974 data) in those regions. Thus their estimate for elasticity of total U.S. wheat export demand is the sum of weighted regional export demand elasticities which is equal to -0.413.

Paarlberg [1983], in a three importer and three exporter model treated the public policy as endogenous to the system. His estimate of the elasticity of U.S. wheat export demand is -1.82.

DIRECT EXPORT DEMAND (DED) MODELS

The DED models have been frequently employed in providing estimates on the price elasticity of export demand for a given commodity. These models simply follow the logic of the consumer demand derived under the maximization of an individual consumer's (country's) well-behaved utility function subject to a budget constraint. According to Klein [p. 23-24, 1973],

> "Theory tells us that the demand for a good is a function of relative prices of all commodities in a consumer's budget and of real income. In econometric practice this formulation is condensed into a more manageable equation relating demand to price of the good being studied, the general price level, prices of one, two, or three closely related goods (substitutes or complements), and income."

Thus the functional form of DED followed the traditional functional form of an individual consumer's demand function:

$$ED^{K}_{ijt} = f\left(\frac{P_{kt}}{P_t} , \frac{P_{St}}{P_t} , \frac{Y_{jt}}{P_t} \right) \tag{23}$$

where, ED_{ijt} represents the demand for the export of commodity k from the i^{th} exporting country by the j^{th} importing country at time t, P_{kt} is the price of the commodity k at time t, P_{St} is the price of substitutes for commodity k, Y_{jt} is the income of importing country at time t, P_t is a weighted average of all prices of consumer goods, and Y_{jt}/P_t is the real income of consumer. For empirical purposes, the linear form of ED is usually specified as follow:

$$ED^{K}_{ijt} = \beta_o + \beta_1\left(\frac{P_{kt}}{P_t}\right) + \beta_2\left(\frac{P_{St}}{P_t}\right) + \beta_3\left(\frac{Y_{jt}}{P_t}\right) + U_{jt} \qquad (24)$$

where , β_1 is the slope of the export demand curve in its own price dimension, and U_{jt} is a stochastic disturbance term. ED may be estimated for the exports of a group of commodities or across a group of importers or both.[15] Equation (24) appears in different forms in the literature. However, this equation is most often estimated in logarithmic form.

Mathematically the own price elasticity of ED ($e_{ED/Pij}$) at any point on that curve is equal to:

$$e_{ED/P_{ij}} = \left(\frac{\partial ED}{\partial P_{ij}} \quad \frac{P_{ij}}{ED}\right) \qquad (25)$$

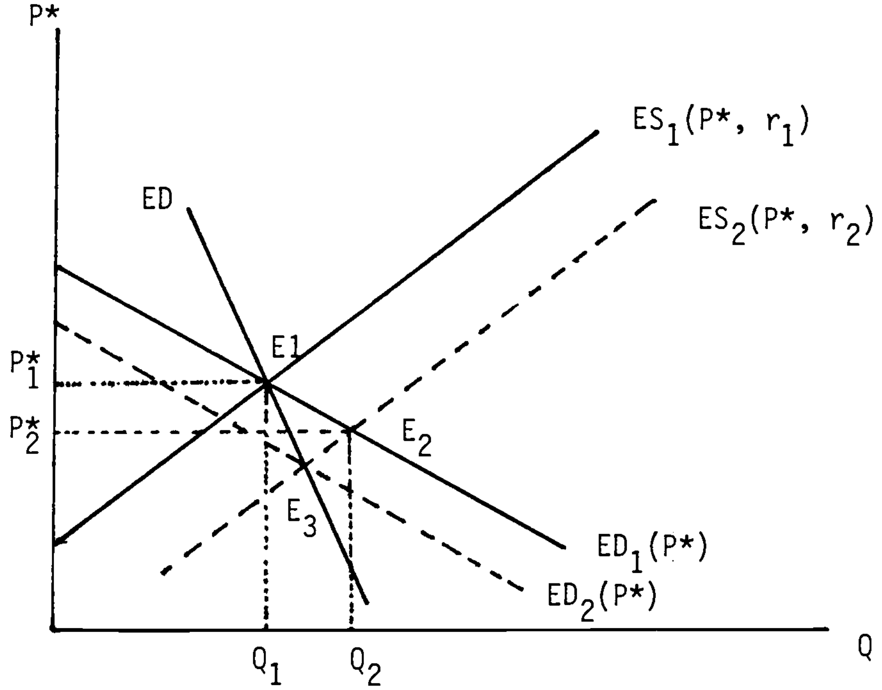
Thus, when the estimated value of β_1 (own price slope) is multiplied by the ratio of the averaged observed equilibrium trade values such as $(P_F)_{ijt}$ and $(E_F)_{ijt}$ (in Figure 2-1) for a given i and all possible j,s, it provides an empirical estimate for the price elasticity of export demand ED for a given time at a given point on that curve.

For empirical purposes a number of assumptions are required to specify a direct demand model as presented in Equation (24). These include the assumptions that: the importing country is small and the supply elasticity of imports is infinite; also the import demand is not affected by the variables which are excluded from model.

In 1950, Orcutt initiated a debate regarding the downward biasedness of the estimates on β_1 in the cases where researchers employed historical price and quantity data in the estimation of such coefficient by fitting an ordinary least square (OLS) regression line to historical data. Orcutt advanced five reasons for his belief:

First, due to the identification problem associated with regression analysis, the regression analysis will measure the demand curve which has the low elasticity of demand even if the true demand is elastic, i.e. single equation regression techniques fail to identify the true demand curve. This point is explained by Figure 2-2. This Figure shows the effect of a depreciation (devaluation) of the U.S. dollar on the U.S. exports in a given export market when the foreign excess demand curve (ED_1) and the U.S. excess supply curve of exports (ES_1) are expressed in terms of the foreign currency. Points E_1 and E_2 are respectively, the equilibrium points observed before and after U.S. devaluates its currency. Due to the depreciation of U.S. currency, ES_1 shifts downward to ES_2 while the foreign excess demand remains unchanged at ED_1. If the excess demand curve ED_1 did not change, then regression analysis on observed prices and quantities associated with E_1 and E_2 provides the estimation of correct excess demand curve ED_1. However, if ED_1 is also shifted to ED_2, say due to the reduced foreign tastes for U.S. exports, then regression analysis on observed points bounded by two excess supplies and two excess demands will estimate the inelastic foreign demand E_1E_3 for U.S. exports rather than ED_2 which also passes through

FIGURE 2.2. REGRESSION ANALYSIS AND IDENTIFICATION PROBLEM



equilibrium point E_3 (because it minimizes the horizontal deviations from ED). Thus, although the equilibrium point E_1 and E_3 are consistent with elastic excess demands ED_1 and ED_2, the regression technique always estimates the low elasticity ED curve even if the true excess demand is elastic and given by ED_1 and ED_2. Hence, the regression procedure fail to identify true excess demand curves ED_1 and ED_2, and since excess demand curves shift frequently due to changes in taste or other factors, then estimated elasticities by regression technique are likely to underestimate true elasticities.

Second, Orcutt pointed out the reduction in the accuracy of estimated import/export demand relationships due to the errors of observation in price , income and quantity variables. According to him:

> "... these errors of observation are likely to result in a substantial underestimation of the price elasticities. ,...., To be completely certain about the direction of the resulting bias it would be necessary to know the precise way in which errors of observation in the observed quantities, incomes, and prices are correlated with each other and with the true values of the quantity, income, and price series. It has not been possible to construct a reasonable case supporting either negative or positive correlation between the errors or between the errors and the true values of the variables. In view of this, it has seemed reasonable to assume that the errors of observation in the quantity, price, and income series are essentially uncorrelated with each other and with the true values of these series. [Orcutt op. cit., pp. 124.]

Thus, when there were no errors in the price variable (independent variable on the vertical axis) but only in the quantity (dependent variable on the horizontal axis), then the true price observations will be on the true demand while the observations on the quantity will be scattered horizontally on both sides of true demand. In this case fitting an OLS line on a linear relation between quantity (dependent variable) and price (independent variable) minimizes the sums of the squares of the deviations of the errors (SSE) from the demand line and hence provides unbiased estimate of the true demand line (vertical measurement of SSE in Q-P quadrant is identical to the horizontal measurement of SSE in P-Q quadrant). However, when the quantity data are free of errors of observation and only the price variable is observed with errors, then the errors of observations are scattered in north and south of true demand and parallel to the vertical price (independent variable) axis, i.e., the errors of observations (the distance between the observed price with error and the true value of price on the true demand line) are scattered horizontal with respect to dependent variable quantity on the horizontal axis. The application of OLS on quantity (dependent variable)-price (independent variable) relation provides unbiased estimate of true demand line by minimizing the sum of squared errors (SSE) when such errors (price errors) are measured from the true demand line vertically with respect to quantity (dependent variable) not horizontally. In this case OLS minimizes the horizontal distances of the errors from true line rather than the vertical distances from that line, hence the application of OLS estimates more steeper demand than true demand depending on the magnitude of errors of observation on P relative to variation in relative prices. Orcutt also discussed the case that the errors of observation were only in income variable. In this case he shows (Orcutt op. cit., Appendix 2.) that both income and price elasticities would be biased toward zero.

Third, Orcutt indicated that the large variations in historical prices are mostly associated with goods with low price elasticities of demand (i.e., raw material). In this case the price indices of aggregate heterogeneous imports/exports may be heavily weighted by large price fluctuations of low price elasticity goods. Thus utilizing such historical price indexes in the estimation of the total demand for large aggregate heterogeneous imports/exports may understate the true price elasticity of demand due to the excessive weight given to the goods with low price elasticity of demand or supplies.

Fourth, Orcutt distinguishes that short-run export/import price elasticities are smaller than the long-run price elasticities. He argues that most of the previous studies have estimated the short-run elasticities rather than long-run elasticities. He indicated that the quantity adjustments to price variations are not instantaneous, rather requires several years for such adjustments. Thus ignoring such long-run quantity-price adjustment will reduce the effects of price changes on quantity demanded.

Orcutt's final point was that the price elasticity of demand for imports/exports is smaller for small price changes than for large price changes. His main reason was that the consumers do not change their habit for small price changes (specially the temporary price changes) due to the cost of switching from one source of supply to another.

Leamer and Stern [P. 29, 1970] summarized Orcutt's five reasons for the biasedness of the price coefficient β_1 due to the methods and data employed in studies prior to Orcutt's study as follows:

(1) Lack of independence between relative prices and the random deviation in the import-demand function.
(2) The data may reflect errors of observation.
(3) The use of data aggregates may give undue weight to goods with relatively low elasticities.
(4) Short-run elasticities were measured and these are typically lower than long-run elasticities.
(5) Devaluation elasticities were larger than the estimated short-period elasticities, which reflect adjustment to small price changes.

Magee [P. 204, 1975], also summarized the Orcutt's five reasons for the downward bias estimates of the price elasticities of demand for internationally traded commodities. Magee's summary corresponding to five points mentioned above are as follow:

(1) Simultaneity.
(2) Random observation errors in the price indices.
(3) Aggregation.
(4) Timing (short-run elasticities are smaller than long-run elasticities).
(5) Quantum effects (elasticities are larger for large price changes than for small price changes).

Harberger [1953], also criticized the use of OLS for estimating the price elasticity of import demand on the grounds that OLS procedure provides the lower limit price elasticities. Orcutt's and Harberger's critique on the uselessness of OLS procedures for time series analysis of demand led Neisser [1958] to conclude the death of the time series multiple regression analysis. Leamer and Stern, [op. cit., P. 34.] with regard to Neisser's conclusion argued that:

> "This conclusion was overly pessimistic, however, since Orcutt's reservations about least squares procedure are not quite as devastating as they may appear. That is, there may be many cases in which this procedure is reasonably applicable. This will be true when countries are relatively small and also when demand is relatively stable. It is also possible to use data specifications that will avoid lumping together commodities with widely varying elasticities. Explicit allowance can be made, moreover, for lags in the adjustment process. Finally, it may well be that the interwar period had special characteristics that made for unreliable statistical results."

Contrary to Orcutt's concern on the downward biased price elasticities, Magee [PP. 214-218, 1975], presented eight reasons (partially based on studies by MacDougall [1952], and White [1970]) for which the price elasticities could be biased upwards. Sarris [P. 91, 1981], stated that: "Of these reasons, the effects of nonprice rationing and the effects of cross-price substitution influences are of special relevance to individual commodities."[16]

Despite the problems associated with the use of OLS in estimating export/import demands, there have been numerous empirical studies (beside those already mentioned in the previous section under ED models) estimating export/import demand equation by applying the

OLS method on a single or a simultaneous system of equations. Such studies for export/import demands of different countries for wheat or other commodities include: Morgan and Corlett [1951] on import demand of U.S., U.K., Australia, Sweden, Canada, and India for some 25 commodities, Adler and Schlesinger, and Westerborg [1952], Horner [1952] on export demand for Australian wheat, wool and butter, Malach [1957], Capel and Rigaux [1974] on export demand for Canadian wheat, Meinken [1955], Reekie [1967], and Konandreas, Bushnell and Green [1978] on estimating the import demands of several regions for U.S. wheat exports.

EMPIRICAL SPECIFICATION OF EXCESS DEMAND

The specifications of the econometric models employed by studies on U.S., and Canadian wheat export demands are summarized as follows:

Konandreas, Bushnell and Green [p. 41., 1978] on estimating the commercial export demand for U.S. wheat exports argue that:

> "Total commercial export demand for U.S. wheat is the aggregate of individual countries' import demands. Thus as a first step in the specification of a U.S. export demand function, the variables that enter the import demand function of individual importing countries must be analyzed."

They aggregated the importing countries in five regions: developed countries, Latin America, Asia, Africa, and the U.S.S.R. and Eastern Europe. They estimated the export demand functions for each region by applying OLS as well as Theil-Goldberger's mixed estimation (OLS and use of *extraneous* information, i.e., income elasticities with uncertainty) method, and conditional least square (mixed estimation with complete certainty) on a single equation postulated as: the U.S. commercial wheat exports to each region as the dependent variable, per capita wheat production in the region, U.S. concessional wheat exports to the region, effective U.S. export price of wheat in region, and effective per capita real income of importing region as explanatory variables.[17] Based on their price coefficients obtained from mixed estimation, they provided the regional import price elasticities for U.S. exports as: -1.47 for

DC's, -0.37 for Latin America, +3.46 for Asia, -3.35 for Africa, and -34.01 for U.S.S.R. and Eastern Europe.

Capel and Rigaux [1974], estimated the regional import demand function for Canadian wheat exports utilizing a linear and loglinear single equation with the quantity imported by the region as the dependent variable, the region's average import price from all exporters, the lagged value of wheat production in import region, and a time trend as explanatory variables. The price elasticities of regional import demands based on their logarithmic specification range from +3.19 for China to -13.19 for U.S.S.R. Based on linear specification of import demands, the price elasticities range from +3.67 for China to -5.93 for Taiwan.

Researchers have attempted to overcome the econometric problems associated with the estimation of DED models mentioned above in different ways. These efforts mainly centered around two major econometric problems of *simultaneous equation bias* and *specification error* in export/import demand equations.

Specification error in an export demand equation includes omitting relevant regressors, adding irrelevant regressors, incorrect specification of disturbance term, and using an incorrect functional form.[18] Omission of relevant regressors will likely bias the remaining estimates although their variances will be lower. Including an irrelevant regressor produces higher variances for the remaining estimated coefficients. The incorrect specifications that error term has a zero expected value (mean) and constant error variance, *homosk(c)edasticity*, are common practice in export/import demand studies, although in a regression model with quantity as the dependent variable and price as explanatory variable there are no prior reasons to believe that error variances associated with high prices would be equal to the error variances associated with low prices. The incorrect specification of the disturbance term may also occur in situations where the stochastic disturbance is included into the regression equation with a wrong functional relationship with other variables, i.e., additive rather than multiplicative. In this case it is shown that the slope parameter is biased and inconsistent. Theoretical considerations of a demand function usually dictate the functional form of the equation to be estimated. Incorrect specification of the functional form of the export demand equation arises in situations where, for example, the correct functional form of the export/import demand equation is *nonlinear* but a linear regression equation is estimated to approximate the nonlinear relationship. In this case (misspecification of nonlinearity), the estimated parameters are subject to the same problems associated with the case of omitting relevant variables.

The problem of simultaneous equations bias is the first factor listed in Orcutt's list. The OLS approach gives unbiased and consistent parameter estimates for the coefficients of single equation (or a group of structural simultaneous equations) provided that none of the predetermined (independent) variables are correlated with the unexplained residual. The problem of simultaneous equations bias is present if the single equation (or an equation within a system of equations) contains more than one endogeneous variable and OLS procedure is applied to estimate the coefficients of such equation(s). In the case of specifying a single equation (could be an equation representing the reduced form of a system of equations), this problem arises when one specifies a single equation describing a structural behavior system and then applies directly the least square method to estimate the coefficients of that equation. The assumption underlying a single equation export demand function implies that the volume of exports (quantity), and price are determined simultaneously. The consequence of such an assumption is that the price argument and error terms in the single export equation are determined jointly. Hence, the direct application of least square method (DLS) on a single export demand equation such as Equation (25) produces biased estimates of the export demand price coefficient. In general, the application of DLS in the case of correlation between an independent variable and the error term leads to inconsistent OLS parameter estimates, (see Pindyck and Rubinfeld [1976]).

To remedy the single equation export demand function estimated by OLS method from its biased parameters, econometricians suggested the use of simultaneous equation system in a national commodity model framework. This was mainly an effort towards correcting the econometric method of estimating import/export demands for the problems mentioned by Orcutt and others. Partially, these efforts led to the utilization of different models of internationally traded commodities known as *national commodity models* with underlying domestic structures given in Labys [1975], Adams and Behrman [1976], Adams [1978], Sarris [1981], Thomson and Abbott [1982], and Labys and Pollak [1984].

The structure of commodity models is primarily based on the microeconomic analysis of domestic market equilibrium between demand and supply functions. In domestic models the interaction of the demand and supply behavior of all consumers, producers, and stock holders (inventories) in domestic market determines the equilibrium price at which the domestic market clears. For a given country and commodity the structure of a commodity model is usually specified in a system of four equations as follows:[19]

$$Q_t^D = f\left(Q_{t-1}^D,\ P_t,\ P_t^S,\ A_t\right) \tag{26}$$

$$Q_t^S = g\left(Q_{t-1}^S,\ P_{t-1},\ Z_t\right) \tag{27}$$

$$P_t = h\left(P_{t-1},\ I_t,\ I_{t-1},\ S_t\right) \tag{28}$$

$$I_t = I_{t-1} + Q_t^S - Q_t^D \tag{29}$$

Where

Q_t^D = Domestic commodity demand for consumption.

Q_t^S = Domestic commodity supply.

P_t = Domestic price of the commodity.

P_t^S = Price of the substitute commodities.

A_t = Income or activity level.

Z_t = Variables influencing supply, i.e., policy and technology variables.

S_t = Variables influencing demand for inventory

I_t = Commodity inventory (supply of inventory).

The subscripts t denotes time.

The change in inventories (inventory demand) is presented by ΔI_t.

Such national commodity model is converted to an international structural commodity trade model by incorporating the country's total exports (E_t) and total imports (M_t) of the given commodity in the right hand side of Equation (29).[20] Adding E_t and M_t in Equation (29) and rearranging the terms then the structural form of the international commodity trade model can be summarized in the following four equations:[21]

$$Q_t^D = f\left(Q_{t-1}^D,\ P_t,\ P_t^S,\ A_t\right) \tag{30}$$

$$Q_t^S = g\left(Q_{t-1}^S,\ P_{t-1},\ Z_t\right) \tag{31}$$

$$\Delta I_t = K(P_t,\ P_{t-1},\ S_t) \tag{32}$$

$$E_t - M_t = Q_t^S - Q_t^D - \Delta I_t \tag{33}$$

By substituting Equations (30) to (32)) into (33), the reduced form of net exports $NE_t = (E_t - M_t)$ can be expressed as follow:

$$NE = F\left(Q^D_{t-1},\ Q^S_{t-1},\ P^S_t,\ P_t,\ P_{t-1},\ A_t,\ Z_t,\ S_t\right) \tag{34}$$

Under the assumption that the trading countries are price takers, the world price P^W is determined by equating the sum of all excess supplies to excess demands. If there are m exporting countries and n importing countries involved in the trade of the given commodity, then the world price P^W is determined as a solution to:

$$\sum_{i=1}^{n} NE_i = \sum_{j=1}^{m} NE_j \tag{35}$$

In the absence of trade impediments (i.e., transportation cost, tariff or nontariff barriers, and other intervention variables) the linkage between the world market price and domestic prices in countries i and j are established through their exchange rates R_i, and R_j respectively.

$$P_{it} = P^W_t \cdot R_{it} \tag{36}$$

$$P_{jt} = P^W_t \cdot R_{jt} \tag{37}$$

Where R_{it} and R_{jt} are measured respectively in units of the domestic currencies of countries i and j per unit of a key currency. Substituting (36) and (37) one at a time in Equation (34) yields NE_{it} - the net export supply (excess supply) function of the exporting country i -, and NM_{jt} - the net import demand (excess demand) function of the importing country j[22] - in terms of world price P^W, i.e.,

$$\boxed{NE_{it} = F\left(P_t^W,\ R_{it},\ P_{t-1}^W,\ R_{i(t-1)},\ P_{it}^S,\ I_{i(t-1)},\ A_{it},\ Z_{it},\ S_{it}\right)} \tag{38}$$

$$\boxed{NM_{jt} = G\left(P_t^W,\ R_{jt},\ P_{t-1}^W,\ R_{j(t-1)},\ P_{jt}^S,\ I_{j(t-1)},\ A_{jt},\ Z_{jt},\ S_{jt}\right)} \tag{39}$$

Modified versions of the reduced form net excess demand equations (38) and (39) have been used by researchers in estimating export/import demand equations. Among others, Konandreas and Schmitz [1978], utilized an OLS mixed estimation procedure (included extraneous information on income elasticities) estimating foreign (the rest of the world) demand for U.S. exports of wheat, oats, barley, and sorghum in a reduced form foreign demand equation two-region commodity trade modeling framework. Their export demand equation (Equation 19, p. 77.) specified the total quantity exported by the U.S. at time t as the dependent variable, and explanatory variables include: lagged dependent variable, the rest of the world (ROW) per capita production, per capita stock level held by U.S. competitors at the beginning of year t, effective U.S. export price (ratio of U.S. export price to domestic price in import regions corrected for exchange rate, weighted by three years average import share of importing regions), effective per capita real income of each importing country within each region, and a random disturbance. The price elasticity of the ROW's demand for U.S. wheat exports was -3.13. When they excluded the lagged dependent variable the elasticity reduced to -2.95. The trade interventions such as U.S. government price support programs through Commodity Credit Corporation (CCC) programs, are introduced into their model through an stock (inventory) level equation.

However, it has been shown that when an structural equation within a system of equations contains more than one single endogeneous variable then the use of OLS again produces biased estimates of the structural coefficients. One way to purge the correlated exogeneous variable of its correlation with error terms and thus to *reduce* the bias is to use a limited or full information estimator like two-or three stage least squares (2SLS or 3SLS) procedure.[23] The advantage of 2SLS compared with OLS is its lower amount of bias, and as the sample size becomes large, the bias of 2SLS estimator disappears entirely, whereas the bias of OLS estimator remains.[24] However, 2SLS has a distinct disadvantage: it cannot always be applied to every simultaneous equation system, specifically when the system is not identifiable.[25] A more efficient estimating technique than OLS for situations that there is no simultaneity, but the error terms are correlated across equations, is Zellner's seemingly unrelated regression (SUR) estimating technique also known as Aitken's two- stage generalized least square (GLS) estimator.[26]

Thus when 2SLS does not attempt to account for the possible correlation among the error terms of equations in the simultaneous system of equations, the 3SLS associated with Zellner and Theil [1962] which basically utilizes 2SLS as its first two stages and Zellner's SUR as the other stage, is used to achieve greater asymptotic efficiency than 2SLS.[27]

Taylor and Talpaz [1979] estimated a log-linear export demand equations for U.S. wheat exports using SUR procedure. The explanatory variables included the average price received by U.S. farmers, total wheat production excluding U.S. production, a time trend variable, and a dummy variable representing shifts in export demand. Their estimate for the price elasticity of U.S. wheat export demand over 1960-1974 time period is -0.15 with a t value of 3.13.

Baumes and Meyers [1980] estimated the value of -0.35 for the price elasticity of export demand for U.S. wheat exports. They specified the per capita (deflated by world population net of sum of the U.S. and the centrally economies population) U.S. wheat exports net of P.L. 480 shipments, and sales to centrally planned economies as the dependent variable. The explanatory variables included the average wheat price received by U.S. farmers net of the U.S. per unit payments on wheat, the ratio of the weighted average of the U.S. feed grain price to the wheat price, the U.S. export price of rice net of per unit government payments, U.S. P.L. 480 shipments of wheat and wheat flour, and wheat production and stocks in Canada, Australia, Europe, and less developed countries.

Chambers and Just [1981], in an analysis of the dynamic effects of exchange rate on U.S. wheat, corn, and soybeans markets, constructed an econometric model consisting of 15 equations explaining domestic disappearances, inventories, production, and exports.[28] They formulated their model in a SUR recursive form with separate blocks for each commodity and used 3SLS technique on the whole system to estimate structural and reduce form equations for disappearance, inventory, export, and production equations associated with each commodity using quarterly data for the period of 1969(I)-77(II). With regard to the U.S. export equation for wheat, they estimated per capita wheat exports as a linear function of own-deflated wheat price (U.S. wholesale price of wheat divided by wholesale price index), the exchange rate measured in terms of Special Drawing Right (SDR) per U.S. dollar, the European Community's (EC) threshold price for wheat imports to reflect tariff barriers in the EC, the stocks of wheat in other major exporting countries, P.L. 480 shipments of wheat, and lagged dependent variable. They estimated the value of -0.17 for short-run price elasticity of U.S. wheat exports. The major problem with such elasticity is that it is estimated with the variables (population and export price) associated with the exporting country (U.S.) rather than the demand variables associated with the countries demanding

U.S. wheat exports.

Recently researchers have started work on other problems such as constancy of price coefficient (ultimately price elasticity) of export demand vis-a-vis its variability. Conway [1985] employed the stochastic coëfficient approach developed by Swamy and Tinsley [1980] which allows for time-wise changes in the foreign demand parameters to be estimated. Conway utilized this approach with Chambers and Just's model mentioned above to estimate the "export equation price elasticities" for U.S. wheat, corn, and soybeans. He estimated the short-run export equation price elasticity of -0.26 for wheat (with very insignificant t statistic of -0.0003) which is larger than Chambers and Just's estimate of -0.17. He also calculated the long-run price elasticity of -0.429 for wheat exports from the mean values of the stochastic coefficients model.

SUMMARY

In this chapters we reviewed controversies on the magnitude of the price responsiveness of trade flows in international markets, and examined critically two major methodologies currently employed for estimation of foreign demand price responsiveness. The NNED (net national excess demand) models has used the concept of excess demand and domestic demand and supply elasticities to calculate price elasticities of export/import demand (excess demand). The origin of this class of models is mostly associated with the name of Yntema [1932]. The structure of commodity market everywhere is based on the Walrasian classical perfect competitive free-trade model. Taplin [1971], and Cronin [1979], attempted to relax the assumption of homogeneous commodity (perfect substitutability among the export of one country with the exports of its competitors including domestically produced commodity in import market(s)).[28] They allowed for the traded commodity to be differentiated in the eyes of importing nation(s), Indeed, this allowed to capture the effects of cross price elasticities in their calculations of the export demand price elasticities.

Some studies attempted to incorporate the effects of governments interventions (in terms of policies) on the magnitudes of export demand elasticity by assuming some exogenous predetermined values for elasticities of price transmission as proxies for such interventions

(Breadhal, et al., [1979], Dunmore, et al., [1984]). The general consensus is that: the elasticity of domestic supplies and demands in importing countries, the elasticity of stock demand in importing countries, the share of total consumption (from both imports and domestic production) out of total imports, and the elasticity of price transmission are the major factors determining the magnitude of the elasticity of import demand of foreign countries with respect to a single price determined in a Walrasian stable market equilibrium framework. The major problem with NNED models is that they employ elasticities such $e_{P*/P}$, $e_{D*/P*}$, $e_{S*/P*}$, and $e_{SK/P*}$ that are usually estimated directly by OLS method which is subject to critiques that were discussed under the DED (direct excess demand) models.

According to DED models, the export/import demand for a given product facing an exporter/importer country is equivalent to the demand of an individual consumer for that product as it was derived based on the static concepts of consumer demand theory. Thus originally the functional form of an export/import demand was identified in a single equation of quantity demanded as a function of relative prices and the real income of the importing country(ies)). The use of OLS to estimate such demand function are known to produce biased coefficients, hence biased price elasticity estimates. To remedy the OLS estimated single equation export demand from its biased parameters, simultaneous structural equation systems of a national commodity model associated with Labys [1975] and Adams and

Behrman 1976] were utilized. The reduced form equation for such system of equations provided a net excess supply (export supply) or a net excess demand function which have been estimated again by OLS, 2SLS, 3SLS, or Theil-Zelner SUR estimation techniques.

In summary, most of researchers strove for alternative assumptions, models, and methodologies for estimating the price responsiveness of foreign demand and market shares of exporters in international markets. Although these efforts are important for improving the quality of information for policy makers, their estimation requires the use of external trade statistics which are subject to enormous problems that ultimately affects the empirical outcomes of these models.

The existing body of the literature reviewed in this chapter does not consider the potential bias in their parameter estimates due to the problems inherent in trade statistics. Almost all of models reviewed here used trade data reported by exporting countries which consistently over report import volume as reported by importer countries. In the next chapter, I will examine the problems associated with trade data in detail and investigate the extent of the potential bias that may be introduced in demand parameters due to the source of trade data.

ENDNOTES

1. It is important to recognize that demand for farm products are derived demands since they are generally purchased from the farm by food manufacturers who process the raw farm product before selling that to final consumer. For example, wheat is milled into wheat flour and baked into bread. However, lack of data on value added by processors make it difficult to estimate the derived demand instead of actual demand.

2. In a general equilibrium trade model, the "reciprocal demand curves" (offer curves) associated with Marshal [1879, 1923], Edgeworth [1881], Leontief [1933], and Lerner [1934], (as indicated by Chipman [1965]), replaces the partial equilibrium concepts of export and import demands for a particular commodity. The offer curve of a nation represents simultaneously that how much the nation is willing to import its import commodity and export its commodity of export at various import/export price ratios. See Kemp [pp. 103-108, 1964] for a mathematical derivation of import price elasticities in a general equilibrium framework.

3. Henceforth, variables for foreign country are presented with a superscript (*).

4. The variables affecting D* and S* (beside the product price) include: income, tastes, population, foreign exchange, foreign aid and credit as demand shifters; technology, and weather, as supply shifters; prices of other products and government policies as the shifter of both demand and supply curves. The price of imports at the importing country's frontiers includes the cost of transport, insurance and freight, i.e., it is cif (cost , insurance, freight) price. However, if the assumption of zero transportation cost between regions is maintained, then the import price excludes costs of insurance and freight and it would be represented by fob (free on board) price.

5. Gardiner and Dixit [1986, p. 5.], refer to this group of models as "the calculation method".

6. The notations used by Yntema are different than notations used here.

7. Horner notes: "Cf. R. G. D. Allen, *Mathematical Analysis for Economists* (London, 1938), p. 253, where it is shown that elasticities obey the same function-of-a-function rule as

derivatives." For example, when $D* = f[P*(P)]$, then $e_{D*/P} = (e_{D*/P*}) \cdot (e_{P*/P})$.

8. Symbols and comments in the brackets are mine.

9. Floyd's notations are different from notations given here.
10. Floyd did not derive equation (17), rather he substituted $(M + S*)$ for $D*$ in the right hand side of equation (15) and assumed $(D*/M) = K$, such that $(S*/M) = K-1$. Thus he derived another version of $e_{ED/P}$ as follow [Floyd's equation (15), p. 103]:

$$e_{ED/P} = e_{P^*/P}\, e_{D^*/P^*} + (K-1)e_{P^*/P}\, e_{D^*/P^*} - (K-1)e_{P^*/P}\, e_{S^*/P^*} \qquad (16)'$$

11. Symbols in the brackets are ours.

12. The price insulation policies are also discussed by Abel [1966], McCalla [1967], Josling [September, 1977], Johnson, Grennes, and Thursby [1977], Grennes, Johnson, and Thursby [1978b].

13. Their list includes: Houck, Ryan, and Subotnik [1972], Ryan and Houck [1976], Gallagher and Bredahl [1977], Bredahl, Womack, and Matthews [1978], and Bredahl, Meyers, and Hacklander [1978].

14. See Dunmore, et al., p. 54. The U.S. competitors' supply elasticities is basically the sum of the $[(e_{S*j/P}) \cdot S*_j/M]$.

15. The reduced form of DED is usually presented as:
$ED_{ijt} = f(P_{ijt}, Y_{jt}, A)$
Where, A_t represents other explanatory variables representing the shifters of demands and supplies in trading countries. Thus it includes: income, tastes, population, foreign exchange, and credit as demand shifters; technology, and weather, as supply shifters; prices of other products and government policies as the shifter of both demand and supply curves. Aggregation of demand across commodities or countries requires major assumptions of weak and strong separability. For detailed theoretical and empirical implication of such assumptions see Deaton and Muellbauer [1980, Chapter 5, and 6, pp. 119- 166].

16. Magee listed the following eight cases, under which the empirically estimated price elasticities could be bias upward: *Nonprice rationing*, *Cross-price effects*, *Structural effects*, *Understated lags*, *Inversely correlated measurement errors*, *Aggregate prices in sub-markets*, *Positive component elasticities*, and the psychological (subjective) effect of *Orcuttization*. With regard to *Nonprice rationing* factors, theoretically price

rations the quantity demanded. However, if changes in delivery date, and queues (nonprice rationing factors) rations the quantity demanded in the same direction as the price rations it, then the failure to include such factors in the empirical estimates of export/import demand function causes the changes in the quantity demanded due to the changes in both price and such factors misleadingly to be attributed to price variable alone. Hence the exclusion of nonprice rationing factors from an empirically estimated export/import demand function will result in estimating an inflated price coefficient ($ß_1$) which then leads us to calculate an upward bias import/export demand price elasticity. The *Cross-price effects* is more relevant in the context of Elasticity of Substitution (EOS) Models rather than DED models discussed here.

17. See Theil, H. and Goldberger [1961].

18. For detail information on specification errors in econometric estimation see Theil [1957], Rao and Miller [1971], and Kmenta [pp. 391-405, 1971].

19. For a detailed description of these models see Labys [pp. 9-11, 1975], Labys and Pollak [pp. 48-58, 1984].

20. See Sarris [pp. 88-95, 1981], Thompson and Abbott [pp. 350-356, 1982].

21. The price Equation (28) is inverted to represent an inventory demand

22. Sometimes the import demand M_{jt} is described as an export demand facing exporters.

23. For detailed discussion see Jonston [pp. 483-492, 1984], Kmenta [pp. 559-589, 1971], Pindyck and Rubinfeld [pp. 298-307, 1976].

24. In fact it is not correct to speak of the 2SLS estimator even of being *asymptotically* unbiased. Actually, 2SLS has only the property of *consistency*.

25. Identification is a prerequisite for the application of 2SLS or any other simultaneous equations estimating techniques.

26. For more information on SUR estimation technique see Zellner [1962a], [1962b], and [1963]. For more information on GLS (Aitken) estimator see Aitken [1934].

27. The 3SLS's gain in efficiency over 2SLS may be obtained only under certain circumstances. For more information see Johnston [1984], pp. 489-490.

28. Around this time period, Armington's [1969] theory of product heterogeneity based on the consumer's differentiation among products of close substitute by the origin of production was another attempt to incorporate product heterogeneity in consumer demand.

CHAPTER 3

TRADE IN FARM PRODUCTS

THE UNITED NATIONS AGRICULTURAL COMMODITY TRADE STATISTICS 1962-1982

INTRODUCTION

Current United Nations (UN) Agricultural Commodity Trade data sets for the period of 1962-1982 have several deficiencies which limit their usefulness to researchers. The major deficiencies include missing trade data for several countries and noncomparability of external trade statistics for a given commodity reported by counterpart trading countries.

With regard to the problem of missing data, a trade data availability survey conducted for 221 countries included in this study indicates that the UN trade data is available only for 24 countries for the whole period of 1962-1982. The trade data is not available for 76 countries for the whole period of 1962-1982. The 121 remaining countries together potentially have 1124 years of missing data over the same time period.[1]

The second problem is the noncomparability (mismatches) of bilateral trade statistics of counterpart trading countries for a given commodity. This is a very old problem inherent in most of the trade data banks. This problem had long been recognized by various consumers of foreign trade statistics. Studies such as Allen and Ely [1953], League of Nations [1935-1938], Ely [1961], Morgenstern [1963], U.S. Bureau of Census [1970], UN [1974], Parniczky [1980], FAO [1984], Hiemstra [1985], and Hiemstra and Mackie [1986] have all given testimony to the existence of such a problem.

The existence of the problems mentioned above have resulted in a major problem facing international trade analysts. That is, on whose trade statistics should they rely? In other words, should the international economic analysts employ the trade flow matrix based on the exporters' reports for their economic analysis or should they rely on the trade flow matrix based on the importers' reports?

Unfortunately, in the field of trade statistics the choice between export and import reports is hardly investigated. Most studies relied solely on the trade statistics reported by the exporting countries without giving any strong justification for their reliance of the supply-side reports. Relying exclusively on the export-side reports and occasionally filling the gaps with the import-side reports has been the common approach towards adjusting a trade data set for the existing discrepancies.[2] The logic behind such an approach mainly lies in the fact that most of the exporting countries are very advanced and highly developed countries and, therefore, are more likely to have better access to computers and, hence, more reliable data compilation procedures.[3]

Nevertheless, the fallacy of this logic has been proven by two studies which attempted to reconcile discrepancies inherent in counterpart trade statistics of the United States and Canada (U.S. Bureau of Census, [1970]; UN, [1974]). These studies revealed that there are enormous discrepancies in counterpart trade statistics of Canada and the United States, both highly developed countries.

In contrast to the export-side approach, Parniczky [1980] advocated the reliance on importers'reports instead of export reports.[4] Parniczky compares the advantages and disadvantages associated with each approach and draws the conclusion that the trade matrices constructed based on import reports are as good as the export ones, if not better (Parniczky [1980], p. 48). The validity of this approach becomes more obvious when we review the sources causing noncomparability of external trade statistics and examine the impact of such causal factors on export reports as well as import reports. Specifically, as it will be shown in this chapter, when the objective of the researchers is to conduct quantitative analyses on export/import demand price elasticities, the use of import quantities reported by the importing countries (vis-a-vis the import quantities reported by exporting countries) produces less biased relevant export/import demand coefficients and elasticities than otherwise.

The main objective of this chapter is to review the quality of the United Nations (UN) trade data set for two major deficiencies which limit their usefulness to researchers. The major deficiencies include differences between export and import data of counterpart trading countries as well as missing trade data for several countries over the period of 1962-1982.

The selected farm products for this review are the following 10 nonmanufactured farm products encompassing the 3-4 digit Standard International Trade Classification (SITC) code Revision 1.[6]

SITC CODE	Product Description
041.0	Wheat (including spelt) and meslin, unmilled
042.0	Rice
043.0	Barley, unmilled
044.0	Maize (corn), unmilled
045.1	Rye, unmilled
045.2	Oats, unmilled
061.1	Raw sugar, beet and cane (not including syrups)
121.0	Tobacco, unmanufactured (including scrap tobacco and tobacco stems)
221.4	Soya beans (excluding flour and meal)
263.1	Raw cotton, other than linters

The reminder of this chapter is organized as follows. First, it reviews two major problems associated with the UN data and identifies factors causing such deficiencies, explains several factors causing discrepancies in external trade statistics and presents recent justifications given for the advantages of reliance on the importers' reports vis-a-vis the exporters' reports. Then, it focuses on the trade matrices reported by exporting and importing countries and the advantages associated with the use of components of import trade matrix in quantitative analyses of the price responsiveness of export/import quantities and market shares. Appendix A1 lists the country composition of the regions as well as the information regarding the type of the trade system employed by each country, their valuation procedures, and definitions of their counterpart trading countries. Appendix A2 provides explanatory notes on Appendix A1. Appendix A3 provides special country notes. Appendix A4 presents the trade data availability table which is a review summary of UN/USDA trade data tapes. This table provides information regarding the availability of trade data on UN/USDA DATA tape for each country over the period of 1962-1982.

FACTORS CAUSING DISCREPANCIES IN EXTERNAL TRADE STATISTICS

The external trade statistics for a given commodity is essentially compiled and reported to UN statistical offices by the government agencies of different nations. To improve the comparability of the international trade statistics, the UN statistical office advises these government agencies on how to compile and report their trade statistics.[7] However, when two sets of export and import data on a given commodity of trading partners are brought together, their usefulness is often seriously handicapped by their noncomparability. The noncomparability of the international trade data arises for a variety of reasons:

1. National Security. Trade statistics reported to the UN are basically government statistics. Such statistics may reveal information regarding: a) the political relationships among trading countries; and/or b) the economic status of reporting countries, such as their financial strength in the international markets. Since such information is often regarded as crucial to the national security of any nation, there is a tendency for government agencies not to report the actual trade statistics. In this regard, Allen and Ely argue that:

> "It is only realistic to recognize that trade statistics are primarily government statistics. Because they are compiled as a by-product of other government operations and reveal information about each national political, economic, and administration needs and policies. The form and content of the statistics may therefore be affected by a nation's

> belief as to how the information may be used to its own advantage or disadvantage - its attitude toward the use of its statistics as commercial intelligence by other countries, its belief as to whether its trade figures will support its credit standing, its need to obtain other trade statistics on a reciprocal basis, its desire to conceal information for military, political, or economic reasons [Allen and Ely, 1953, p. 3].

2. Commodity Arbitrage. The possibility of the commodity arbitrage in international markets tends to generate discrepancies between export and import data. Commodity arbitrage or speculation involves the purchase for immediate or later sale of a given commodity by a middleman to take advantage of a difference in price in two locations. Parniczky argues that:

> "The principal source of inconsistency appears to be the role of entrepot trade (middleman trade) in commercial transactions. The operations of large enterprises in 'free zones,' customs bonded store-houses and bonded processing establishments may confuse the mutual identification of partner countries. Frequently the exporter is not aware of the final destination of the merchandise and the importer has a multiple choice in identifying the country of provenance, depending on the precise definition [Parniczky, 1980, p. 45].

3. Time Lag. That is, the time lag between the declaration date of an export and the date that the trading partner registers the corresponding import. Consequently, for a specific time horizon the export data (volume and value) may not match the import data.

4. Differences in Trade Systems and Definitions of Partner Countries.

   a. Trade Systems. In general, the reporting countries record their external trade statistics based on two different recording systems; namely, General (G) and Special (S) Trade systems.[8] Under the General Trade system all commodities that entered the country are recorded as imports, whether these commodities are being used for domestic consumption or not. However, under this system if the imported goods leave the country in the same condition as the time of entry (i.e., no improvements), then this system registers the exit of such commodities as re-exports. In terms of recording the exports, the General Trade system records all of the following categories of goods as total exports:

i. National goods which include goods produced domestically and foreign goods which have been transformed.

ii. Nationalized goods which include the foreign goods imported but not transformed.

The Special Trade system records as imports those goods which are directly imported or withdrawn from customs storage for domestic consumption, improvements or repair, as well as those which have been entered for transformation under customs control. Special exports include the exports of national products as well as the export of improved imports.

b. Definitions of Partner Countries. The partner country is defined as the country to which an importing/exporting country credits its imports/exports. The UN [1974], identifies three partner definitions for imports and three partner definitions for exports as follows:

For imports:

i. "country of first consignment or provenance" is defined as the country from which the goods were originally dispatched to the reporting country, with or without breaking bulk in the course of transport, but without any commercial transaction intervening between that country and the country of import.

ii. "country of origin or production" means the country where the products were grown, raised or mined.

iii. "country of purchase" means the country in which the seller of the goods carries on his business, or if the goods are bought through an agent, commissioner, etc., who is not buying on his own account, the country where the actual seller lives.

For exports:

i. "country of last consignment or destination" is defined as the country to which the goods are actually dispatched, with or without breaking bulk in the course of transport, but without any commercial transaction intervening between that country and the country of export.

ii. "country of consumption" is defined as the country is which the goods will be put to the use for which they were produced, or in which they will undergo a process of transformation.

iii. "country of sale" means the country in which purchaser of the goods carries on his business, or if the goods are sold through an agent, commissioner, etc., who is not buying on his own account, the country where the business of the actual buyer is located. UN [1977, pp.194-95].

Currently 71 countries out of 153 reporting countries (46.4%) use the General Trade system and 82 countries (53.6%) employ the Special Trade system. In terms of partner definition, for imports, 98 countries out of 153 countries (64.1%) credit their imports to the country of production, 21 countries (14.3%) credit their imports to the country of purchase, 29 countries (18.4%) credit their imports to the country of first consignment and 5 countries (3.2%) to the country of last consignment. In terms of exports, 97 countries (63.4%) credit their exports to the country of last consignment, 31 countries (20.2%) credit to the country of consumption, 2 countries (1.3%) credit to the country of destination, 20 countries (13%) credit to the country of sale and 3 countries (1.9%) credit their exports to the country of first consignment.Obviously these diversities in the methods of recording trade data and various definitions of the trade partners have resulted in the noncomparability of external trade data.

5. Differences in Customs Administrations. The differences in customs administrations among the trading countries is another factor causing noncomparability of international trade data. The customs procedures include classification and valuation of goods as well as the principles governing the concepts and definitions of the entry of goods for home use, warehousing of goods, free zones and inward processing - concepts which affect the recording of trade statistics.

6. Other Factors. There are other factors, such as smuggling and lack of reporting data, which influence trade data and cause discrepancies in trade statistics.

7. Valuation Problem Specific to Value Data.[9] The causal factors mentioned above are the sources of discrepancies in both quantity

and value data. However, there are valuation problems which are specific to value data causing noncomparability of the value data reported by counterpart trading countries. The valuation problems arise due to several factors including: a) diversity in value definitions used by countries in valuation of their exports and imports, and b) government activities which affect trade statistics.

a. Diversity in Value Definitions. An important source of discrepancies in value data is due to the existence of different value definitions used by countries in the valuation of their exports and imports. The diversity in value definitions arises from the fact that the value is a phenomenon of the market, and the recorded value of merchandise will differ according to the market environment in which that value is recorded. Currently there are at least eight value bases which are frequently used by trading countries in the valuation of their external trade statistics. Four of these values, 1) Free On Board Carrier Transaction (FOBT) value, 2) FOB Domestic (FOBD) value, 3) Free On Rail Resale (FOR) value, and 4) Free Alongside The Carrier (FAS) value correspond to the trade valuation procedures based upon the export market price criteria. The other four values, 5) Transaction Cost, Insurance and Freight (CIFT) value, 6) Transaction Cost, Insurance, Freight and Landing Expenses (CIFL) value, 7) CIF

Domestic (CIFD) value, and 8) CIF customs (CIFC) value in importing country correspond to the trade valuation methods based on the import market price conditions.[10] Obviously, the trade value statistics cannot be comparable when the trading partners employ such diverse value definitions.

b. <u>The Effects of Government Activities on Trade Statistics</u>.

Government interventions in international trade markets are known as the prime obstacle in obtaining reliable trade statistics. The collection of customs duties, export/import subsidizations, foreign exchange controls, and government special trade transactions are examples of government activities which affect the exports/imports value data. Among these activities the imposition of customs duties is the major factor which causes discrepancy in trade data. Customs duties provide revenues for governments of exporting/importing countries. While the governments want to maximize these revenues, the exporters/importers wish to maintain their duty payments at the minimum. Thus, when customs duties are imposed based on ad valorem rates (percentage of the total value) then there may be a tendency among the traders to under report the fob value of their imports. To prevent this kind of undervaluation, governments may collect customs duties based on the official valuation procedure. This valuation procedure assigns predetermined price lists to the commodities imported.

This valuation method ignores the fob value of imports and generates the total value of the merchandise imported based upon the previous wholesale domestic cash prices less the customs duty payments. Hence, due to the imposition of customs duties there will be two effects on the trade value figures reported by counterpart trading countries: 1) the import value figures will be greater than the export values by more than the amount of transportation and insurance costs, simply due to the possible undervaluation of exports originally caused by the imposition of the export duties; and 2) the reported value figures by importer may, in fact, change not due to the changes in the international market environment and prices, rather due to the changes in the rate of duty and domestic market prices determined by the domestic policies of the importer countries.

TRADE MATRICES: WHICH ONE TO CHOOSE?

The existence of the causal factors mentioned so far resulted in two major deficiencies in any given trade data set. The UN/USDA agricultural trade data set is no exception to these deficiencies. These deficiencies are: 1) discrepancies between the quantity of the reported exports and reported imports of farm products; and 2) missing data on the exports/imports of some countries. These deficiencies handicap the usefulness of the UN agricultural trade data to international agricultural economic analysts. Thus, the immediate problems facing the trade statisticians are: 1) which matrix, export or import, should be chosen; and 2) how to fill the gaps in that trade matrix? Parniczky [1980] in his paper, "On the Inconsistency of World Trade Statistics," suggests that the choice between export matrix (X) or import matrix (M) should be make, as much as possible, in accordance with the trade theories explaining the international flows of merchandise among trading countries:

> "Filling the gaps' in a given trade matrix by using counterpart data is an obvious reaction of the trade statistician to such problems. The real question, however, is this: which matrix should by recommended to the econometrician, provided both X and M are available and they are equally complete (or incomplete)? In other words, which concept is closer to the theoretical trade flow between i and j, defined for the purpose of model building." (Op. Cit., p. 47).

From this perspective, he argues that:

> The trade preference for the export matrix is subject to discussion and data producers should offer at least an

equally balanced choice between X and M. The rationale of this proposition can be put in the form of arguments for and against both alternatives.

a. Arguments in favor of X (against M):

   i. Valuation Convention: export data are free of transportation and insurance charges (FOB), thus comparable across flows.

   ii. Disappearance of ships in the import matrix (they are present, although falsely allocated in the export matrix).[11]

b. Arguments in favor of M (against X):

   i. Under recording of exports by the customs authorities.

   ii. Better commodity identification of imports due to closer inspection.

   iii. Uncertain destination of exports under the condition created by entrepot trade. The origin of imports is far more reliable information than the destination of exports, inter alia simply because it is easier to establish what happened in the past than to forecast what would happen in the future.

   iv. Moreover, the "country of production" concept used by the majority of countries, to compile import statistics, is closer to the meaning of trade flow, as defined by the econometrician, than the vague concept of "last known destination" applied for exports [Parniczky, 1980, pp. 47-48].

Where the support for import matrix M outweighs the choice for export matrix X, Parniczky concluded that another choice is to rely on the import-side and fill the gaps in the data using the counterpart data from the export matrix.

Theoretically, the export matrix (E)[12] identifies the major exporters of a commodity and provides information on where they send their exports. However, the export destinations given by matrix (E) are not necessarily the ultimate import markets for the traded commodities. In fact only 31 countries out of 153 reporting countries (20.2%) credited their exports to the country of consumption. Except for U.S. and Turkey, the remaining 29 countries out of this 31 countries are importers of agricultural products. Conversely, import matrix (M) identifies the major importers and provides much accurate information on the country of production of the imported commodity. Currently, 98 countries out of 153 countries (64.%) credit their imports to the country of production. In fact, most of these countries are the major importers of agricultural products. This "country of production" concept alone provides strong support for relying on the import data in constructing import matrix (M), since it reduces the possibility of double counting and inflating trade data resulting from commodity arbitrage activities.

To sum up, Parniczky's argument opens up a new path for data processing within analytical economics that will help researchers employ another version of the trade flow matrix (i.e. import matrix) in building their agricultural commodity trade models.

TRADE MATRICES AND QUANTITATIVE ANALYSIS OF EXPORT/IMPORT QUANTITIES AND PRICES

Currently most of the international trade models utilize import-export trade matrices in their quantitative analysis of export and import quantities and prices, trade flows, and import/export market shares. Such models have been used based on the assumption that the elements of their underlying trade matrix are the same whether they are reported by exporting or importing countries. While the components of the export matrix are often used in the quantitative analyses of export/import quantity and prices, the component of the import trade matrix have been rarely employed for such economic analyses. This part specifically focuses on the relationship between quantity exported/imported and corresponding prices from the point of view of importing countries/regions. For a given importing country/region j, such relationship may be studied using the quantity imported based on the export statistics of exporting countries (M_j^E), or the quantity imported based on the import statistics of importing countries themselves (M_j).

The following section illustrates and evaluates the components of two groups of trade matrices. One group is based on the export statistic reports of exporting countries, and the other one is based on the import statistic reports of importing countries. The comparison of these two sets of trade matrices reveals a *Trade*

Discrepancy Matrix which its ignorance by researcher may affect the empirical contents of studies concerned with measuring the price responsiveness of foreign demands and the export market shares of exporting countries.

COMMODITY TRADE MATRICES

To evaluate the extent to which the use of inappropriate trade statistic reports could affect the results obtained by the researchers, let present the world trade network for a given commodity in terms of the following ten trade matrices:

1. An export flow matrix $E = [E_{ij}]$, Table 3-1.
2. An import flow matrix $M = [M_{ij}]$, Table 3-2.
3. An export price matrix $EP = [EP_{ij}]$, Table 3-3.
4. An import price matrix $MP = [MP_{ij}]$, Table 3-4.
5. An import-export price difference matrix $T = MP - EP$, Table 3-5.
6. An import share matrix based on the reports of the importing countries, $MS^M = [MS_{ij}{}^M]$, Table 3-6.
7. An import share matrix based on the reports of exporting countries, $MS^E = [MS_{ij}{}^E]$, Table 3-7.
8. An export share matrix based on the reports of the importing countries, $ES^M = [ES_{ij}{}^M]$, Table 3-8.
9. An export share matrix based on the reports of exporting countries, $ES^E = [ES_{ij}{}^E]$, Table 3-9
10. An arbitrage trade matrix $A = [a_{ij}]$ in Table 3-10, where

$a_{ij} = E_{ij} - M_{ij}$.

Each of these trade matrices has certain properties that are discussed in the subsequent sections as follows.

EXPORT FLOW MATRIX E

The export flow matrix E in Table 3-1 shows m exporting countries and n importing countries engaged in the trade of a single commodity X. This commodity may be homogeneous or it may be heterogeneous. In this study a commodity X is defined as any set of products (X_1, X_2, X_3, ..., X_i, ..., X_m) for which the marginal rate of substitution in consumption is constant between each and every pair of products comprising the set. This commodity is called a homogeneous commodity if and only if the constant marginal rate of substitution in consumption (i.e., slopes of the indifference curves) between each pair of products comprising the commodity equals -1.0. If the constant marginal rate of substitution between products are not all equal to -1.0, then the commodity is heterogeneous. For now, it is assumed that the commodity X in all Tables is homogeneous and is comprised of m perfectly substitutable products of m exporting countries. The trade in heterogeneous commodity will be discussed later in this part.

In export flow matrix E the elements E_{ij} are based on the reports of exporting countries and represent the annual flow of the commodity X from exporting country i to importing country j, (i = 1,

TABLE 3.1. EXPORT FLOW MATRIX BASED ON EXPORT DATA

EXPORTING REGIONS	IMPORTING REGIONS 1	2	3	...	j	...	n	TOTAL EXPORTS
1	E_{11}	E_{12}	E_{13}	...	E_{1j}	...	E_{1n}	E_1
2	E_{21}	E_{22}	E_{23}	...	E_{2j}	...	E_{2n}	E_2
3	E_{31}	E_{32}	E_{33}	...	E_{3j}	...	E_{3n}	E_3
...	...	...	...	...	...	...	...	...
i	E_{i1}	E_{i2}	E_{i3}	...	E_{ij}	...	E_{in}	E_i
...	...	...	...	...	...	...	...	...
m	E_{m1}	E_{m2}	E_{m3}	...	E_{mj}	...	E_{mn}	E_m
TOTAL IMPORTS	M_1^E	M_2^E	M_3^E	...	M_j^E	...	M_n^E	W^E

TABLE 3.2. IMPORT FLOW MATRIX BASED ON IMPORT DATA

EXPORTING REGIONS	IMPORTING REGIONS 1	2	3	...	j	...	n	TOTAL EXPORTS
1	M_{11}	M_{12}	M_{13}	...	M_{1j}	...	M_{1n}	E_1^M
2	M_{21}	M_{22}	M_{23}	...	M_{2j}	...	M_{2n}	E_2^M
3	M_{31}	M_{32}	M_{33}	...	M_{3j}	...	M_{3n}	E_3^M
...	...	...	...	...	...	...	...	...
i	M_{i1}	M_{i2}	M_{i3}	...	M_{ij}	...	M_{in}	E_i^M
...	...	...	...	...	...	...	...	...
m	M_{m1}	M_{m2}	M_{m3}	...	M_{mj}	...	M_{mn}	E_m^M
TOTAL IMPORTS	M_1	M_2	M_3	...	M_j	...	M_n	W^M

2, 3, ..., m; j = 1, 2, 3, ..., n). The dimensions of this matrix primarily depend upon the reports of the exporting countries on the numbers of the trading countries/regions engaged in the trade of the given commodity. In this case matrix E potentially may represent a maximum of mn elements of trade outflows. In practice the number of the elements of this matrix may be less than mn, because: 1) the importing countries do not import the same product from all exporting countries; and 2) the trade data may be missing for some countries. Matrix E can be used to present trade in either physical quantities or values (fob value). Let E_{ij} represents exports in terms of volume, then the sum of entries in a given row gives the total quantity of exports supplied from the exporting country associated with that row, i.e.,

$$E_i = \sum_{j=1}^{n} E_{ij} \qquad j=1, \ldots, n. \tag{1}$$

M_j^E is the total quantity of imports of the j^{th} importing country or region based on the exporters' reports, that is:

$$M_j^E = \sum_{i=1}^{m} E_{ij} \qquad i=1, \ldots, m. \tag{2}$$

Total world exports in terms of volume, and based on the reports of exporting countries (W^E) equals total world imports (M_j^E) reported by the same exporting countries, i.e.,

$$W^E = \sum_{i=1}^{m} E_i = \sum_{j=1}^{n} M_j^E \tag{3}$$

IMPORT FLOW MATRIX M

In import flow matrix M (Table 3-2), the elements M_{ij} are based on the reports of importing countries and represent the annual inflow of the commodity X from exporting country i into importing country j, (i = 1, 2, 3, ..., r; j = 1, 2, 3, ..., k). The dimensions of this matrix primarily depend upon the reports of importing countries on the numbers of the trading countries/regions engaged in the trade of the given commodity. In this case matrix M potentially may represent a maximum of rk elements of trade inflows. In practice the dimensions of this matrix differ from the dimensions of export matrix E due to the differences between m-r, and n-k. Assuming that m=r, n=k, and identity of exporting and importing countries are the same in both matrices E and M, then the only difference between these two matrices reduces to the differences between the amounts of their trade flow elements E_{ij} and M_{ij} respectively.

Matrix M can be used to present trade in either physical quantities or values (cif value). Let M_{ij} represents imports in terms of volume, then the sum of entries in a given row (E_i^M), gives the total imports of all importing countries from the exporting country i. In a sense E_i^M may be regarded as the importers view of the "export supply function" for the i^{th} exporting country.

$$E_i^M = \sum_{j=1}^{n} M_{ij} \qquad j=1, \ldots, n \tag{4}$$

M_j is the total quantity of imports of the j^{th} importing country based on its own reports, that is:

$$M_j = \sum_{i=1}^{m} M_{ij} \qquad i=1, \ldots, m \tag{5}$$

Total world imports in terms of volume, and based on the reports of importing countries (W^M) equals total world exports (E_i^M) reported by the same importing countries, i.e.,

$$W^M = \sum_{j=1}^{n} M_j = \sum_{i=1}^{m} E_i^M \tag{6}$$

INTERNATIONAL UNIT VALUE TRADE MATRICES

Export price matrix EP (corresponding to matrix E), and import price matrix MP (corresponding to matrix M) along with the trade marketing margins unit value matrix T are illustrated respectively in Tables 3-3, 3-4, and 3-5. The exporting countries receive per unit export price of EP_{ij} (fob) in terms of a denominated dominant currency for their shipments of each E_{ij} at their port(s) of export, while the importing countries pay per unit import price of MP_{ij} (cif) in terms of the same currency at their port(s) of imports. The difference between these two prices equals the per unit costs of transportation, insurance, and middleman trade involved in the exchange of the traded commodity between markets i and j. In this study the cif-fob price differences are referred to as the trade

TABLE 3.3. EXPORT PRICE MATRIX BASED ON EXPORT DATA

EXPORTING REGIONS	IMPORTING REGIONS 1	2	3	...	j	...	n	WORLD EXPORT PRICES
1	EP_{11}	EP_{12}	EP_{13}	...	EP_{1j}	...	EP_{1n}	EP_1
2	EP_{21}	EP_{22}	EP_{23}	...	EP_{2j}	...	EP_{2n}	EP_2
3	EP_{31}	EP_{32}	EP_{33}	...	EP_{3j}	...	EP_{3n}	EP_3
...	...	...	...	...	...	...	...	...
i	EP_{i1}	EP_{i2}	EP_{i3}	...	EP_{ij}	...	EP_{in}	EP_i
...	...	...	...	...	...	...	...	...
m	EP_{m1}	EP_{m2}	EP_{m3}	...	EP_{mj}	...	EP_{mn}	EP_m

TABLE 3.4. IMPORT PRICE MATRIX BASED ON IMPORT DATA

EXPORTING REGIONS	IMPORTING REGIONS 1	2	3	...	j	...	n
1	MP_{11}	MP_{12}	MP_{13}	...	MP_{1j}	...	MP_{1n}
2	MP_{21}	MP_{22}	MP_{23}	...	MP_{2j}	...	MP_{2n}
3	MP_{31}	MP_{32}	MP_{33}	...	MP_{3j}	...	MP_{3n}
...	...	...	...	...	...	...	...
i	MP_{i1}	MP_{i2}	MP_{i3}	...	MP_{ij}	...	MP_{in}
...	...	...	...	...	...	...	...
m	MP_{m1}	MP_{m2}	MP_{m3}	...	MP_{mj}	...	MP_{mn}
WORLD IMPORT PRICES	MP_1	MP_2	MP_3	...	MP_j	...	MP_n

marketing margins unit values (T_{ij}'s) which are presented in matrix T. i.e.,

$$MP_{ij} - EP_{ij} = T_{ij} \qquad (7)$$

Assuming that each importing country pays the same import price (MP_j) to every exporting country from which it imports, and each exporting country receives the same export price (EP_i) from every importer to whom it exports, then

$$\begin{aligned} MP_{ij} &= MP_j & \forall\ i \\ EP_{ij} &= EP_i & \forall\ j \\ T_{ij} &= MP_{ij} - EP_{ij} & \\ &= MP_j - EP_i & \\ &= T_j & \forall\ i \text{ and } j \qquad (8) \end{aligned}$$

IMPORT MARKET SHARE MATRICES

Trade flow matrices M and E can be converted respectively into an import share matrix based on the reports of importing countries, $MS^M = [MS_{ij}^M]$, in Table 3-6, and an import share matrix based on the reports of the exporting countries $MS^E = [MS_{ij}^E]$, in Table 3-7. In import share matrix MS^M each element MS_{ij}^M represents the share of the i^{th} exporting country in the total imports of country/region j, based on the reports of that importing country. In terms of the

TABLE 3.5. TRADE MARKETING MARGINS FOR A GIVEN COMMODITY

EXPORTING REGIONS	IMPORTING REGIONS 1	2	3	...	j	...	n	
1	T_{11}	T_{12}	T_{13}	...	T_{1j}	...	T_{1n}	
2	T_{21}	T_{22}	T_{23}	...	T_{2j}	...	T_{2n}	
3	T_{31}	T_{32}	T_{33}	...	T_{3j}	...	T_{3n}	
...	...	...	...	...	...	...	...	...
i	T_{i1}	T_{i2}	T_{i3}	...	T_{ij}	...	T_{in}	
...	...	...	...	...	...	...	...	...
m	T_{m1}	T_{m2}	T_{m3}	...	T_{mj}	...	T_{mn}	
AVERAGE MARKETING MARGINS	T_1	T_2	T_3	...	T_j	...	T_n	

TABLE 3.6. IMPORT SHARE MATRIX BASED ON IMPORT REPORTS
(Shares as a Percentage of Total Imports)

EXPORTING REGIONS	IMPORTING REGIONS 1	2	3	...	j	...	n	WORLD EXPORT SHARES
1	MS_{11}^M	MS_{12}^M	MS_{13}^M	...	MS_{1j}^M	...	MS_{1n}^M	WES_1^M
2	MS_{21}^M	MS_{22}^M	MS_{23}^M	...	MS_{2j}^M	...	MS_{2n}^M	WES_2^M
3	MS_{31}^M	MS_{32}^M	MS_{33}^M	...	MS_{3j}^M	...	MS_{3n}^M	WES_3^M
...	...	...	...	...	...	...	...	...
i	MS_{i1}^M	MS_{i2}^M	MS_{i3}^M	...	MS_{ij}^M	...	MS_{in}^M	WES_i^M
...	...	...	...	...	...	...	...	...
m	MS_{m1}^M	MS_{m2}^M	MS_{m3}^M	...	MS_{mj}^M	...	MS_{mn}^M	WES_m^M
TOTAL SHARES	1.00	1.00	1.00	...	1.00	...	1.00	1.00

trade flow matrix M, each MS_{ij}^{M} element of matrix MS^{M} in Table 3-6., is expressed as (M_{ij}/M_{j}). Elements in the last column, (WES_{i}^{M},s) represent world export shares of the i^{th} exporter based on the reports of all importing countries, i.e.,

$$WES_i^M = \frac{E_i^M}{W^M} \qquad \forall\ i \qquad (9)$$

Similarly, in import share matrix MS^{E} each element MS_{ij}^{E} represents the share of the i^{th} exporting country in the total imports of country/region j, based on the reports of the exporting country associated with that element. In terms of the trade flow matrix E, each MS_{ij}^{E} element of matrix MS^{E} in Table 3-7., is expressed as (E_{ij}/M_{j}^{E}). Elements in the last column, (WES_{i}^{E},s), represent export shares of the i^{th} exporter in the world market based on its own reports, i.e.,

$$WES_i^E = \frac{E_i}{W^E} \qquad i = 1, \ldots, m. \qquad (10)$$

EXPORT MARKET SHARE MATRICES

Trade flow matrices M and E can also be converted respectively into an export share matrix based on the reports of importing countries, $ES^{M} = [ES_{ij}^{M}]$, in Table 3-8, and an export share matrix based on the reports of exporting countries $ES^{E} = [ES_{ij}^{E}]$, in Table 3-9. Each element in export share matrices $[ES^{M}]$, and $[ES^{E}]$ presents the portion of the total exports of the i^{th} exporting country which go to the importing country j based on the reports of importing and exporting countries respectively. In terms of matrix M, each (ES_{ij}^{M}) element of matrix ES^{M}, is expressed as (M_{ij}/E_{i}^{M}) for all i and j. Elements in the last row, (WMS_{j}^{M},s) represent world import market share of the j^{th} importing country/region based on the reports of that importing country, i.e.,

$$WMS_j^M = \frac{M_j}{W^M} \qquad j = 1, \ldots, n. \qquad (11)$$

Similarly, in export share matrix ES^{E} each element ES_{ij}^{E} represents the portion of the total exports of the i^{th} exporting country which go to the importing country j based on the reports of that exporting country. In terms of matrix E, each (ES_{ij}^{E}) element of matrix ES^{E}, is expressed as (E_{ij}/E_{i}) for all i and j. Elements in the last row, (WMS_{j}^{E},s) represent world import market share of the j^{th} importing country/region based on the reports of exporting countries, i.e.,

$$WMS_j^E = \frac{M_j^E}{W^E} \qquad j = 1, \ldots, n. \qquad (12)$$

TABLE 3.7. IMPORT SHARE MATRIX BASED ON EXPORT REPORTS
(Shares As A Percentage Of Total Imports)

EXPORTING REGIONS	IMPORTING REGIONS 1	2	3	...	j	...	n	WORLD EXPORT SHARES
1	MS_{11}^E	MS_{12}^E	MS_{13}^E	...	MS_{1j}^E	...	MS_{1n}^E	WES_1^E
2	MS_{21}^E	MS_{22}^E	MS_{23}^E	...	MS_{2j}^E	...	MS_{2n}^E	WES_2^E
3	MS_{31}^E	MS_{32}^E	MS_{33}^E	...	MS_{3j}^E	...	MS_{3n}^E	WES_3^E
...	...	...	...	...	...	...	...	...
i	MS_{i1}^E	MS_{i2}^E	MS_{i3}^E	...	MS_{ij}^E	...	MS_{in}^E	WES_i^E
...	...	...	...	...	...	...	...	...
m	MS_{m1}^E	MS_{m2}^E	MS_{m3}^E	...	MS_{mj}^E	...	MS_{mn}^E	WES_m^E
TOTAL SHARES	1.00	1.00	1.00	...	1.00	...	1.00	1.00

TABLE 3.8. EXPORT SHARE MATRIX BASED ON IMPORT REPORTS
(Shares As A Percentage Of Total Imports)

EXPORTING REGIONS	IMPORTING REGIONS 1	2	3	...	j	...	n	TOTAL
1	ES_{11}^M	ES_{12}^M	ES_{13}^M	...	ES_{1j}^M	...	ES_{1n}^M	1.00
2	ES_{21}^M	ES_{22}^M	ES_{23}^M	...	ES_{2j}^M	...	ES_{2n}^M	1.00
3	ES_{31}^M	ES_{32}^M	ES_{33}^M	...	ES_{3j}^M	...	ES_{3n}^M	1.00
...	...	...	...	...	...	...	...	...
i	ES_{i1}^M	ES_{i2}^M	ES_{i3}^M	...	ES_{ij}^M	...	ES_{in}^M	1.00
...	...	...	...	...	...	...	...	...
m	ES_{m1}^M	ES_{m2}^M	ES_{m3}^M	...	ES_{mj}^M	...	ES_{mn}^M	1.00
WORLD IMPORT SHARE	WMS_1^M	WMS_2^M	WMS_3^M	...	WMS_j^M	...	WMS_n^M	1.00

THE TRADE DISCREPANCY MATRIX: THE POSSIBILITY OF ARBITRAGE IN INTERNATIONAL COMMODITY MARKETS

In international trade modeling literature, it is hard to find much distinction between export matrix E and import matrix M, illustrated in Tables 3-1, and 3-2 respectively. In fact the trade flow matrix $E = [E_{ij}]$ in Table 3-1, is <u>the</u> trade flow matrix which has been utilized in theoretical construction of international trade models. In contrast to the trade matrix M mentioned above, trade matrix E is mostly used to demonstrate trade in terms of values (fob-cif) for large commodity aggregates. Each flow element E_{ij} is assumed to represent the flow of commodities from country i to country j, under the assumption that the export reports of exporting countries in terms of volume or in terms of converted fob-cif values are the same as the reports of their counterpart importing countries. This assumption -

i.e., $a_{ij} = E_{ij} = M_{ij}$ - implies that:

$$M_j = M_j^E \tag{13}$$

$$E_i = E_i^M \tag{14}$$

$$\sum_{j=1}^{n} M_j = \sum_{j=1}^{n} M_j^E = \sum_{i=1}^{m} E_i = \sum_{i=1}^{m} E_i^M \tag{15}$$

$$[E] = [M] \tag{16}$$

$$[ES^E] = [ES^M] \tag{17}$$

$$[MS^E] = [MS^M] \tag{18}$$

TABLE 3.9. EXPORT SHARE MATRIX BASED ON EXPORT REPORTS
(Shares As A Percentage Of Total Imports)

EXPORTING REGIONS	IMPORTING REGIONS 1	2	3	...	j	...	n	TOTAL
1	ES_{11}^E	ES_{12}^E	ES_{13}^E	...	ES_{1j}^E	...	ES_{1n}^E	1.00
2	ES_{21}^E	ES_{22}^E	ES_{23}^E	...	ES_{2j}^E	...	ES_{2n}^E	1.00
3	ES_{31}^E	ES_{32}^E	ES_{33}^E	...	ES_{3j}^E	...	ES_{3n}^E	1.00
...	...	...	...	...	...	...	...	...
i	ES_{i1}^E	ES_{i2}^E	ES_{i3}^E	...	ES_{ij}^E	...	ES_{in}^E	1.00
...	...	...	...	...	...	...	...	...
m	ES_{m1}^E	ES_{m2}^E	ES_{m3}^E	...	ES_{mj}^E	...	ES_{mn}^E	1.00
WORLD IMPORT SHARE	WMS_1^E	WMS_2^E	WMS_3^E	...	WMS_j^E	...	WMS_n^E	1.00

TABLE 3.10. THE TRADE FLOW DISCREPANCY (ARBITRAGE) MATRIX

EXPORTING REGIONS	IMPORTING REGIONS 1	2	3	...	j	...	n	TOTAL EXPORTS
1	a_{11}	a_{12}	a_{13}	...	a_{1j}	...	a_{1n}	E_1^A
2	a_{21}	a_{22}	a_{23}	...	a_{2j}	...	a_{2n}	E_2^A
3	a_{31}	a_{32}	a_{33}	...	a_{3j}	...	a_{3n}	E_3^A
...	...	...	...	...	...	...	...	...
i	a_{i1}	a_{i2}	a_{i3}	...	a_{ij}	...	a_{in}	E_i^A
...	...	...	...	...	...	...	...	...
m	a_{m1}	a_{m2}	a_{m3}	...	a_{mj}	...	a_{mn}	E_m^A
TOTAL IMPORTS	M_1^A	M_2^A	M_3^A	...	M_j^A	...	M_n^A	W^A

In practice such idealistic assumption is unrealistic and each element of matrix E differs from each element of matrix M by the amount of a_{ij}, i.e., $E_{ij} - M_{ij} = a_{ij}$. The values of a_{ij},s in trade discrepancy matrix A (Table 3-10), may differ from each other in terms of sign (positive or negative) and also in terms of magnitude. In extreme cases a_{ij} may take any of the following values:

$$a_{ij} = E_{ij} \text{ when } M_{ij} \text{ is missing or it is reported as zero.} \quad (19)$$

$$a_{ij} = -M_{ij} \text{ when } E_{ij} \text{ is missing or it is reported as zero.} \quad (20)$$

In general,

$$a_{ij} > 0 \text{ when } E_{ij} > M_{ij} \quad (21)$$

$$a_{ij} < 0 \text{ when } E_{ij} < M_{ij} \quad (22)$$

Thus the value of a_{ij} is bounded between two values of E_{ij} and M_{ij}. By the same token the value of each M_j^A (column sums in Table 3-10), lies between M_j^E and ($- M_j$). However, for a given j it is possible that the different positive and negative magnitude of a_{ij},s associated with different i,s cancel out each other such that the value of

$$M_j^A = M_j^E - M_j = \sum_{i=1}^{n} a_{ij}$$

becomes zero or different from individual corresponding a_{ij},s in terms of both sign and magnitude. In the case that $M_j^A = 0$,--Although there may be discrepancy at the level of bilateral trade reports-- the values of M_j^E and M_j misleadingly will be equal. The value of E_i^A (row sums in Table 3-10), lies between E_i and $(-E_i^M)$. Again, there is the possibility that a_{ij},s across a given row cancel out each other such that E_i and E_i^M misleadingly become equal and,

$$E_i^A = E_i - E_i^M = \sum_{j=1}^{m} a_{ij}$$

show zero values. Similarly, $W^A = (W^E - W^M)$ may take any value between W^E and $(-W^M)$. The positive magnitude for W^A indicates that $W^E > W^M$, where the negative magnitude for W^A indicates that $W^E < W^M$.

In general it may be argued that the discrepancies between export and import reports are due to the existence of possible arbitrage activities in international markets. The arbitrage activities may occur on any segment of the market. Depending on the system of compilation of the external trade statistics employed by the country involved in the arbitrage activities, the quantity of the commodity arbitrated will affect the amount of export or import reports of that country in different ways.

According to UN [1979], generally, countries record and report their external trade statistics based on two different recording systems: namely, *General* (G) and *Special* (S) trade systems. Under *General Trade System* all goods that enter the country of import are recorded as imports, regardless if those goods are being used for domestic consumption or otherwise. However, under this system if the imported goods leave the country at the same condition as the time of entry (i.e. no improvements), then the country registers the exit of such goods as <u>reexports.</u> On the other hand, the *Special* trade system distinguishes between goods entered for domestic consumption and goods for other purposes. As indicated by UN, the detailed coverage of these two systems are as follows:

> "*General imports:* The general trade system records in a single category of imports the goods which fall into the administrative categories shown:
>
> 1.1 Entered directly (i.e., cleared through customs on first arrival).
>
> a. For domestic consumption (including transformation) or re-export.
>
> b. For improvements or repair.
>
> 1.2 Entered into customs storage.
>
> 1.3 Entered for transformation under customs control.
>
> *General exports:* The general system records as exports or re-exports all of the goods, other than those in direct transit, which leave the customs area. These goods may

conveniently be considered as made up of the following administrative categories:

1.4 Goods withdrawn from customs storage for re-export.

1.5 National goods.

a. Domestic produce (including articles resulting from the transformation, improvement, or repair, outside of customs control, of imported goods).

b. Foreign goods exported after admission for transformation under customs control.

1.6 Nationalized goods (foreign goods imported under 1.1a re-exported without transformation).

Re-exports: The general system usually distinguishes a separate category of re-exports which comprises the goods in administrative categories 1.4 and 1.6 above.

Special imports: The special trade system records in a single category of imports the value of the following administrative categories of goods:

2.1 Entered directly.

a. For domestic consumption (including transformation).

b. For improvements or repair.

2.2 Withdrawn from customs storage.

a. For domestic consumption (including transformation).

b. For improvements or repair.

2.3 Entered for transformation under customs control.

Special exports: The special trade system records in a single category of exports the following administrative categories of goods:

2.4 National goods (as in 1.5 above).

2.5 National goods (foreign goods imported under 2.1a or 2.2a and re-exported without transformation)". [UN, 1979, P., 194]

Thus, it seems reasonable to argue that the import statistics based on *Special imports* provide import data which approximates imports for domestic consumption more accurately than any of the following data sets:

a. Import data (M_j^E), provided from *General exports*, (category 1.4 above) which includes data on re-exports.

b. Import data (M_j^E), provided from *Special exports* (category 2.5 above), which includes re-exports.

c. Import data (M_j), provided from *General imports*, (category 1.1a above), which includes re-exports.

Therefore, the import data provided from *Special imports* is more likely to be free of re-exports, and much better approximate the imports for domestic consumption of importing countries than other three alternative data sets mentioned above. In addition to such advantage and in terms of partner definition, the import data (either special or general imports) credits imports to the country of production more than does the export data. The identification of the origin of the imports by the place of production is another advantage associated with import reports (vs. the export reports) which eliminates the arbitrage trade which is likely to happen anywhere between the original place of production and final place of consumption.

Currently most of the reporting countries (82 out of 153), use the special trade system and 71 countries employ the general trade system. In terms of partner definition, for imports, 98 countries out of 153 countries (64.1%) credit their imports to the country of production, where in terms of exports, 31 countries credit their exports to the country of consumption (Appendix A1).

In practice W^E may be greater or smaller than W^M depending on the commodity under consideration, time, and the source of trade data. For ten agricultural commodities reviewed in this study, Appendices B-1 through B-4 (Appendix B) compares the total exports to the world based on the exporters' reports (W^E), with the total imports from the world based on the importers' reports (W^M). The data for such comparison is obtained from different sources. The data sources include the Commodity Trade Statistics of the United Nations (Series D),[13] and the Trade Yearbook of the Food and Agriculture Organization of the United Nations (FAO).[14]

The comparison of the unadjusted (original) UN total world export and import data (Appendix B-1) indicates that $W^E > W^M$ for most of the commodities. The major factor causing W^E to exceed W^M is attributed to the missing reports of many importing countries who not report their external trade statistics to UN. When the partner export reports are replaced for missing import reports (Appendix B-2), the direction of inequality is reversed for almost all commodities in different years, i.e., $W^E < W^M$. Allowing $(W^E - W^M) = W^A$, then the coefficient of variation (CV) for W^A, (STD DEV/MEAN), ranges from -3.04 for cotton to 4.37 for soybean for data corresponding to Appendix B-1, (Table 3-11). The CV,s for W^A,s corresponding to Appendix B-2 (unadjusted NU export data vs. adjusted UN import data), for most of commodities are negative and ranges from -2.31 for soybean to 9.06 for wheat, (Table 3-11).

In contrast to the comparison of unadjusted UN export data with adjusted UN import data mentioned above, when the FAO export data (which is actually the adjusted UN export data) are compared with the UN adjusted import data (Appendix B-3), the values for W^A are found to be mostly positive. In this case the CV,s of W^A are positive and less than unity for all commodities except soybean (1.48), oats (4.51), and rye (1.58). Finally, the comparison of FAO export and import data (Appendix B-4) indicates both positive and negative values for W^A. The CV values in this case are also both positive and negative ranging from -7.47 for tobacco to 6.04 for rye.

The differences between export and import reports mentioned above exist not only at the world level, but also on the country basis. When on the country basis the M_j^E is compared with M_j the direction of inequality is in the both directions, i.e., $M_j^E - M_j > 0$ for some countries and $M_j^E - M_j < 0$ for some other countries. In the instances that $M_j^E - M_j > 0$, the large bulk of the difference is due to the missing reports of the importing countries who do not report their external trade statistic to UN, i.e. socialist countries. However, when these missing reports (M_j^D) are derived from export side and added to M_j to calculate the corrected imports (M_j^*), i.e., ($M_j^* = M_j + M_j^D$), the difference between M_j^E and M_j^* mostly remains positive.[15]

TABLE 3.11. THE COEFFICIENT OF VARIATION FOR DESCRIPENCIES OBSERVED IN INTERNATIONAL TRADE STATISTICS

EXPORT REPORT IMPORT REPORT COMMODITY	UN UN CV11	UN A.UN CV12	F.A.O. A.UN CV13	F.A.O. F.A.O. CV14
WHEAT	0.44	9.06	0.56	2.35
RICE	1.63	(1.32)	0.27	(6.18)
BARLEY	1.08	7.93	0.74	4.60
CORN	1.21	(1.26)	0.85	2.76
RYE	2.13	(1.63)	1.54	6.04
OATS	2.21	(1.23)	4.51	4.29
SUGAR	(0.83)	(0.54)	0.46	1.01
TOBACCO	(0.93)	(0.58)	0.69	(7.47)
SOYBEAN	4.37	(2.31)	1.48	3.19
COTTON	(3.04)	(0.75)	0.48	(1.89)

*: 1. CV11 IS THE COEFFICIENT OF VARIATION WHICH IS USED TO DESCRIBE THE AMOUNT OF VARIATION IN (W^A) CORESPONDING TO APPENDIX B-1. CV = (STD DEV)/MEAN.
2. CV12 IS THE COEFFICIENT OF VARIATION WHICH IS USED TO DESCRIBE THE AMOUNT OF VARIATION IN (W^A) CORESPONDING TO APPENDIX B-2.
3. CV13 IS THE COEFFICIENT OF VARIATION WHICH IS USED TO DESCRIBE THE AMOUNT OF VARIATION IN (W^A) CORESPONDING TO APPENDIX B-3.
4. CV14 IS THE COEFFICIENT OF VARIATION WHICH IS USED TO DESCRIBE THE AMOUNT OF VARIATION IN (W^A) CORESPONDING TO APPENDIX B-4
5. A.UN = ADJUSTED UN DATA.
6. NUMBERS IN PARENTHESES INDICATE NEGATIVE VALUES.

ESTIMATION BIAS IN FOREIGN DEMAND AND EXPORT MARKET SHARE PRICE ELASTICITIES RESULTING FROM TRADE DATA DISCREPANCIES

Agricultural economists interested in international trade and trade policy are trapped in an interesting and important controversy regarding the price responsiveness of foreign demand or market shares of exporters for major agricultural commodities in world markets. The ultimate outcome of this controversy has implications beyond strictly academic discourse. It has very important implications with respect to policy formation, and reform. It also will act as an important guiding mechanism in setting more competitive strategic marketing plans for major exports from U.S. agriculture.

A great deal of the attention being focused on this issue revolves around a debate over alternative assumptions, models, and methodologies for estimating demand or measuring the degree of competitiveness for commodities at international markets. These are clearly important topics. But it is the contention of this study that the debate cannot stop here. Specifically, this study argues that the choice of model and choice of methodology cannot be make independent of considerations of the source of data.

The next section will present a discussion of systematic bias which may be introduced into estimates of price elasticity of demand if the modeling process does not appreciate differences in data as reported by exporter country versus importer country. A close examination of data on bilateral and multilateral agricultural trade flows as discussed in the previous sections, reveals that trade volumes reported by exporter countries consistently over report import volume as reported by importer countries. Among other reasons, it was suggested that one possible explanation for this occurrence may be that major trade oriented developed economies import not only for their own use and reserves but for resale to other countries in close marketing proximity. It is well known, for example, that Japan is a major reseller of many agricultural commodities in southeast Asia. Thus, when the U.S. reports exports for Japan, these statistics include reexport sales, as well as commodities purchased for domestic consumption and reserves in Japan. If the modeler then uses export data and fits a traditional demand model to the Japanese market, the results will reflect not only the true demand for commodities assignable to Japanese consumers, but commodities assignable to consumption in other economic environments. It is possible and even likely that the results of such an analysis will be biased in terms of the computation of demand elasticities.

IMPORT DEMAND FOR ARBITRAGE

Let's assume three purposes for importing a given commodity: import for domestic consumption (M_{ijt}^{C}), import for inventory (M_{ijt}^{I}), and import for arbitrage or speculative (M_{ijt}^{A}) purposes.

The M_{ijt}^{C} includes the domestic use of the commodity for final consumption as well as uses as an input in further processing, and seed uses. The M_{ijt}^{I}, includes demand for commodity stockholdings which may or may not be released for immediate consumption. When M_{ijt}^{I} is kept in the customs storages and is released for domestic consumption over the same time period that M_{ijt}^{C} is consumed, - for price stabilization purposes, - then it is reasonable to think of M_{ijt}^{I} as a part of import demand which belongs to M_{ijt}^{C} and therefore no need for a separate identification of such import demand. In this case, the category 1.2 and 2.2 respectively under *General imports* and *Special imports* mentioned above, reinforces the possibility that such import reports to represent both M_{ijt}^{I} and M_{ijt}^{C} in one figure. The M_{ijt}^{A} may be considered as the importer's import demand for arbitrage (speculative) purposes. The importing countries with large storage capacity and port facilities in their disposal, could make profit from importing large quantities of goods at low prices and selling them at higher prices to the neighboring countries with no port facilities or being landlocked.

The difference between M_{ijt}^{A} and M_{ijt}^{I} simply lies in the fact that the import demand for inventories is almost a *Certain demand*, where the M_{ijt}^{A} is an import demand for *Hedging* the commodity solely for the purposes of the speculative arbitrage activities. In other words, the M_{ijt}^{I} exists mainly to avoid the political consequences of not feeding properly the nations in the event of possible shortfalls in the production, or being confronted to an unexpected embargo.

Thus we expect that the importing countries always carry a certain amount of inventories which finally they will be consumed inside those countries.

In contrast, the M_{ijt}^{A} may be considered as an import demand solely for hedging the commodity to be sold (re-exported) at prices higher than the imported prices. Thus such import demand is solely a function of the expected prices which may prevail in future. In a sense the exporting countries (firms) are confronted with 3 kind of import demands, one (M_{ijt}^{A}) of which is uncertain. This is the similar situation as when a "producing firm" is facing an uncertain demand for its produced, i.e., theories of the firm facing the uncertain demand as have been described by Baron [1971], Leland [1972], Sandmo [1971], and Lim [1980].

To the best of my knowledge no trade model yet has been developed which incorporates the import demand for arbitrage (M_{ijt}^{A}) in the economic analyses of import demands for traded agricultural commodities in international markets. The major effect of the exclusion of M_{ijt}^{A} from such studies is that the estimated parameters for import demand equation of importing countries will be biased. As it will be shown below, the direction of the biasedness of the parameters heavily depends on the source of the external trade statistics employed by the researchers, (exporters' reports vs. importers' reports).

BIASED IMPORT/EXPORT DEMAND PRICE ELASTICITY DUE TO THE SOURCE OF EXTERNAL TRADE STATISTICS

To show the bias in parameter estimates of the import demand of the j^{th} importing country for a given commodity due to the use of inappropriate trade data, identify the following three import demand equations for M_{ijt}^{C}, M_{ijt}^{I}, and M_{ijt}^{A}.

$$M_{ijt}^{C} = a + b(MP)_t + e_t; \qquad \frac{\partial M_{ijt}^{C}}{\partial (MP)_t} = b < 0 \tag{23}$$

$$M_{ijt}^{I} = c + d(MP)_t + g(MP)^*_{t+1,t} + u_t$$

$$\frac{\partial M_{ijt}^{I}}{\partial (MP)_t} = d < 0; \quad \frac{\partial M_{ijt}^{I}}{\partial (MP)^*_{t+1,t}} = g > 0 \tag{24}$$

$$M_{ijt}^{A} = j + k(MP)_t + q(EP)^*_{t+1,t} + w_t$$

$$\frac{\partial M_{ijt}^{A}}{\partial (MP)_t} = k < 0; \quad \frac{\partial M_{ijt}^{A}}{\partial (EP)^*_{t+1,t}} = q > 0 \tag{25}$$

where,

t = Time period.

MP_t = The import price at time t.

EP_t = The reexport price at time t.

$MP^*_{t+1,t}$ = The expected import price in period t+1 as viewed from period t. This also, operates as a factor shifting the demand for inventory up and down.

$EP^{*}_{t+1,t}$ = The expected re-export price in period t+1 as viewed from period t. Also, operates as a factor shifting the demand for speculative trade up and down.

e_t, u_t and w_t are random variables independently distributed over time with the properties:

$$E(e_t) = 0, \qquad E(e_t^2) = \sigma_e^2 \tag{26}$$

$$E(u_t) = 0, \qquad E(u_t^2) = \sigma_u^2 \tag{27}$$

$$E(w_t) = 0, \qquad E(w_t^2) = \sigma_w^2 \tag{28}$$

Now, let the researcher choose M_{ijt}^{E} instead of M_{ijt}^{C} as his dependent variable to be explained by $(MP)_t$ for estimating the j^{th} country's import demand for consumption mentioned in equation (23) above. As it was argued earlier, the export reports (both *General* and *Special* exports) do not distinguish among the possible three different uses of imports. Thus the total export reports of the exporting countries to the j^{th} import market which mistakenly are viewed as the total imports of the j^{th} importing country for consumption is nothing but the sum of all three kinds of imports explained in equations (23 to 25), i.e.,

$$M^E_{ijt} = M^C_{ijt} + M^I_{ijt} + M^A_{ijt} \tag{29}$$

Measuring the dependent variable with error (i.e., $M_{ijt}{}^E$ instead of $M_{ijt}{}^C$ is the familiar econometric problem of "measurement error in dependent variable".[16] That is, the observations on dependent variable contain errors, such that instead of the true value of $M_{ijt}{}^C$ we observe $M_{ijt}{}^E$ which differs from the former by v_t,

$$M^E_{ijt} = M^C_{ijt} + v_t \tag{30}$$

This problem is approached in econometric texts mostly for the special case in which the error in measuring the t^{th} value of $M_{ijt}{}^C$ is assumed to be random with specific probability characteristics and independent from e_t and $(MP)_t$ in the true equation (23), i.e.,

$$E(v_t,\ MP_t) = 0 \tag{31}$$

$$E(v_t,\ e_t) = 0 \tag{32}$$

$$E(v_t) = 0 \tag{33}$$

$$E(v_t^2) = \sigma_v^2 \tag{34}$$

As long as these assumptions hold, the OLS estimators of the regression coefficients remain unbiased. That is, let the regression for import demand for consumption ($M_{ijt}{}^C$) be estimated with $M_{ijt}{}^E$ as the dependent variable, with no account made for the fact that M_{ijt}^{E} is not an accurate measure of M_{ijt}^{C}. Substituting equation (23) into equation (30), we see that this is equivalent to running the following regression,

$$M_{ijt}^{E} = a + b(MP)_t + \phi_t \qquad (35)$$

where,

$$\phi_t = e_t + v_t$$

$$\phi_t \sim N(0,\sigma_\phi^2)$$

$$\sigma_\phi^2 = \sigma_e^2 + \sigma_v^2$$

Given the assumptions in equations (31 to 34), the estimated intercept and slope parameters will be unbiased. The only difference between (23) and (35) is that the error variance in (35) is increased by d^2_v.

In contrast to the neutral measurement error in dependent variable mentioned above, when equations (29) and (30) are compared, the error in the dependent variable is exactly equal to (M_{ijt}^{I} + M_{ijt}^{A}). Substituting equations (24) and (25) for v_t in equation (30) then we have,

$$M_{ijt}^{E} = [a+b(MP)_t+e_t] + [c+d(MP)_t+g(MP)^*_{t+1,t}+u_t] + [j+k(MP)_t+q(EP)^*_{t+1,t}+w_t]$$

Arranging the terms, we get,

$$M^E_{ijt} = (a+c+j)+(b+d+k)(MP)_t+g(MP)^*_{t+1,t}+q(EP)^*_{t+1,t}+(e_t+u_t+w_t) \quad (36)$$

assume that:

$$(MP)^*_{t+1,t} = \beta_1(MP)_t + \gamma_1 \quad (37)$$

$$(EP)^*_{t+1,t} = \beta_2(EP)_t + \gamma_2 \quad (38)$$

$$(EP)_t = (MP)_t + T \quad (39)$$

β_1, β_2 are multiplicative shift parameters, and

γ_1, γ_2 are the additive ones .

T is per unit markup price when commodity is reexported. Substituting (37), (38), and (39) into (36) then the regression becomes,

$$M^E_{ijt} = (a+c+j+g\gamma_1+q\beta_2T+q\gamma_2)+(b+d+k+g\beta_1+q\beta_2)(MP)_t+(e_t+u_t+w_t) \quad (40)$$

Comparing the true regression equation (23) with the regression equation with a deterministic error in the dependent variable (40), we observe the following differences in the coefficients of these two regressions:

1. The intercepts differ by the amount of:

   $c + j + g\gamma_1 + q\beta_2T + q\gamma_2$

2. The slope coefficients differ by the amount of:

$d + k + g\beta_1 + q\beta_2$

The immediate consequence of the differences between slope parameters is that the price elasticity of import demand estimated from the exporters report (Equation 40) will be biased. That is, the price elasticity of true import demand for consumption obtained from Equation (23) is,

$$\eta^C = b \left(\frac{\bar{M}P}{\bar{M}_j^C} \right) \tag{41}$$

where the price elasticity of import demand with error obtained from Equation (40) is,

$$\eta^E = (b+d+k+g\beta_1+q\beta_2) \left(\frac{\bar{M}P}{\bar{M}_j^E} \right) \tag{42}$$

Since $\bar{M}_j^C < \bar{M}_j^E$ then,

$$\left(\frac{\bar{M}P}{\bar{M}_j^C} \right) > \left(\frac{\bar{M}P}{\bar{M}_j^E} \right)$$

the comparison of Equations (41) and (42) indicates that:

$$\boxed{\eta^E = \left[1 + \frac{(+d+k+g\beta_1+q\beta_2)}{b} \right] (1-S^A_{ijt})\ \eta^C \qquad (43)}$$

where S_{ijt}^{AE} is the share of arbitrage out of total imports reported by exporting country, i.e.,

$$S_{ijt}^{A\ E} = \frac{M_{ijt}^{A}}{M_{ijt}^{E}}$$

the conditions stated in (43) indicates that the directions of the bias depends on: (a)-how the shifts in the demands for inventory and arbitrage due to the expectation of future import and reexport prices could be offset by the changes in those demands due to the change in the current import prices, and (b)- on the value of S_{ijt}^{A}. Under certain conditions for (a) and (b), the relationship between

η^E and η^C may be summarized as follows:

$$\eta^E = \eta^C \text{ if } M_{ijt}^{A} = 0 \Rightarrow (d+k+g\beta_1+q\beta_2) = 0, \text{ and } S_{ijt}^{A} = 0 \qquad (44)$$

$$\eta^E > \eta^C \text{ if } (1-S_{ijt}^{A})\ (d+k+g\beta_1+q\beta_2) > 1 \qquad (45)$$

$$\eta^E < \eta^C \text{ if } (1-S_{ijt}^{A})\ (d+k+g\beta_1+q\beta_2) < 1 \qquad (46)$$

According to (44), no bias in the price elasticity exists when those forces offset each other completely. The condition (45) implies an upward bias in the price elasticity obtained from Equation (40), where the condition (46) implies a downward bias in the price elasticity obtained from Equation (40).

The inconsistencies in trade data not only produces bias parameter estimates on foreign demand elasticities as it was shown above, but also produces bias estimate on the export market share's relative price elasticity. The following section will show the nature of such bias.

BIASED EXPORT MARKET SHARE'S RELATIVE PRICE ELASTICITY DUE TO THE SOURCE OF EXTERNAL TRADE STATISTICS

To show the bias in the relative price elasticity of market share due to the use of export data we may define the market share equations based on the import reports (S_{ijt}^{C}), and based on the export reports (S_{ijt}^{E}) as follows:

$$S^{C}_{ijt} = A + B \,.\, (RP) + e_t;\; B < 0 \tag{47}$$

$$S^{E}_{ijt} = C + D \,.\, (RP) + u_t;\; D < 0 \tag{48}$$

where,

RP is a relative import price index.

$S^{C}_{ijt} = \dfrac{M^{C}_{ijt}}{\sum_{i}^{m} M^{C}_{ijt}}$ is the market share of the i^{th} exporter in j^{th} import market calculated from import data reported by j.

$S^{E}_{ijt} = \dfrac{M^{E}_{ijt}}{\sum_{i}^{m} M^{E}_{ijt}}$ is the market share of the i^{th} exporter in j^{th} import market calculated from export data reported by i.

The relative price elasticities obtained from (47) and (48) are as follows:

$$\eta^{C} = B \left(\frac{\bar{RP}}{\bar{S}^{C}_{ijt}}\right) \tag{49}$$

$$\eta^{E} = D \left(\frac{\bar{RP}}{\bar{S}^{E}_{ijt}}\right) \tag{50}$$

The comparison of (49) and (50) reveals that:

$$\eta^{E} = \frac{D}{B}\left(\frac{\bar{S}^{C}_{ijt}}{\bar{S}^{E}_{ijt}}\right)\eta^{C}$$

or,

$$\eta^{E} = \frac{D}{B}\,\frac{\left(\dfrac{M^{C}_{ijt}}{\sum\limits_{i}^{m} M^{C}_{ijt}}\right)}{\left(\dfrac{M^{E}_{ijt}}{\sum\limits_{i}^{m} M^{E}_{ijt}}\right)}\,\eta^{C}$$

$$\eta^{E} = \frac{D}{B}\left(\frac{\sum\limits_{i}^{m} M^{E}_{ijt}}{\sum\limits_{i}^{m} M^{C}_{ijt}}\right)\left(\frac{M^{C}_{ijt}}{M^{E}_{ijt}}\right)\eta^{C}$$

$$\eta^{E} = \frac{D}{B}\left(\frac{M^{C}_{jt} + M^{A}_{jt}}{M^{C}_{jt}}\right)\left(\frac{M^{C}_{ijt} \cdot M^{A}_{ijt}}{M^{E}_{ijt}}\right)\eta^{C}$$

$$\eta^{E} = \frac{D}{B}\left(1 + S^{AC}_{jt}\right)\left(1 - S^{AE}_{ijt}\right)\eta^{C} \qquad (52)$$

where,

S^{AC}_{jt} represents the share of arbitrage commodity (imported from all exporters) out of total imports for domestic consumption (imported from all exporters), i.e.,

$$S^{AC}_{jt} = \frac{M^{A}_{jt}}{M^{C}_{jt}}$$

S^{AE}_{ijt}, as it was explained earlier in (43), represents the share of arbitrage commodity (imported from the i^{th} exporter) out of total imports for domestic consumption and arbitrage purposes (imported from all exporters), i.e.,

$$S^{AE}_{ijt} = \frac{M^{A}_{ijt}}{M^{E}_{jt}}$$

In (52) S_{ijt}^{AE} is always less than S_{jt}^{AC}. Assuming that D = B, then we can say for the values of S_{jt}^{AE} close to one there is a tendency for estimating smaller price elasticity based on export data than import data.

While the use of import data based on the exporters' reports makes the estimated price elasticities of import demand for consumption (M_j^C) as well as the relative price elasticity of market shares biased, the import data based on the importers' reports (matrix M), may be used as an alternative to reexamine the possible empirical outcomes for international trade models that as their objective have attempted to forecast or analyze the foreign demand functions and market shares. Currently despite the numerous attempts to estimate the foreign demand price responsiveness for U.S. agricultural exports, little consensus has been reached on the magnitude of the price responsiveness of U.S. sales of agricultural products in foreign markets.

Thompson [1981] in a comprehensive survey of international agricultural models, gives an extensive review of studies concerned with the price responsiveness of U.S. agricultural sales in international markets. The empirical results are not consistent and price responsiveness for U.S. exports ranges anywhere from zero to -16.00. In this regard, Thompson concluded that:

> "The quality of the empirical parameter estimates in many studies surveyed was subject to question. Inadequate data (no single organization collects and banks all the data

needed by trade researchers) and insufficient resources to collect better data lie at the root of many problems with existing trade models. Furthermore, specification errors and use of inappropriate estimators often biased the estimates of parameters in the models. The generally weak empirical content was the principal deficiency of all the trade models reviewed." [Thompson, 1981, p., iv]

To improve the quality of the empirical parameter estimates for foreign demand functions and market share equations, this study relies on the argument presented above in the favor of using the import quantity reported by importing countries. Specifically, when the objective of the researcher is to estimate the price responsiveness of foreign demand, or the relative price responsiveness of market shares of a commodity traded for domestic consumption purposes in importing markets ($M_{ijt}^{C} + M_{ijt}^{I}$, or MS_{ijt}^{C}), the import data reported by importing countries provide a dependent variable free of measurement error (M_{ijt}^{A}). On the other hand, the export reports do not distinguishes among the possible uses of exports and thus the export reports may be used only when the objective is to estimate either total export supply or import demand function ($M_{ijt}^{C} + M_{ijt}^{I} + M_{ijt}^{A}$).

In sum, accurate estimates on price responsiveness of foreign demands or market shares for an internationally traded commodity is important to policy makers and strategic planners alike. Decisions with respect to underline assumptions, model specifications and methodology should not be made without careful consideration of the source and potential biases in trade statistics and data. This chapter presented a generalized analysis of bias in elasticity estimates which may be introduced if a model based on standard demand or market share parameters is applied to data provided by exporter countries. In general, if a standard demand or market share equation model is to be fit using econometric techniques, data from importer country sources is preferable. However, further analysis should be undertaken to fully identify the reasons for the consistent differences in volumes of trade reported by exporters and importers.

ENDNOTES

1. See Appendix A4: Trade Data Availability Table

2. For example see Hickman, B.G., Yoshimi Kuroda, and L.J. Lau [1977], p. 15.

3. Leonard, W.R., [1953].

4. Also, see Hiemstra [1985] and Hiemstra and Mackie [1986].

5. For a complete review of these models, see Taplin's review [1967], Ball [1973], Magee [1975], Ryan [1979], Thompson [1981], Sarris [1981], Thompson and Abbott [1982], and Labys and Pollak [1984].

6. United Nations. Department of Economic and Social Affairs. Statistical Office. *Standard International Trade Classifications Revised.* Statistical Papers, Series M, No. 34, New York. 1961.

7. UN [1980].

8. For more details see UN [pp. 143-4, 1979].

9. For detailed information on the problems associated with trade value data see: (1) Ely, j. Edward and Nicholas M. Petruzzeli [1953]; (2) Hicks, Earl [1953]. This section heavily benefited from these two studies.

10. Complete value definitions are given in Appendix A2.

11. Parniczky (p. 44) refers to the case of under-recording of the imports of ships and boats (SITC 735), "...if the last known destination of exports is a flag of convenience, which is quite common, imports are not recorded at all. In 1974 the value of vessels exported was $12,312 million, whereas only $5,254 million were reported."

12. Henceforth, the export matrix is identified by matrix E, and not X.

13. United Nations, Commodity Trade Statistics. ST/STAT/SER.D/51-91. Years 1962-1982.

14. FAO Trade Yearbook, Various volumes, Rom, Italy.

15. See FAO [1984].

16. See Theil [1971, pp., 607-614.], Kmenta [1971, pp., 307-316.], Pindayck and Rubinfeld (1976, pp., 128-129.) Johnston [1984, p., 428].

CHAPTER 4

U.S. EXPORT COMPETITIVENESS IN INTERNATIONAL WHEAT MARKETS

INTRODUCTION

In recent years it has become increasingly evident that U.S. is losing market share in the world export market for wheat. U.S. exports of wheat declined from 48.8 million metric tones (MMT) in 1981 to approximately 38 MMT in 1984; a time period during which the worldwide demand for wheat exports continued to rise. The result was a decline in the share of U.S. wheat exports from 48% of world exports in 1981 to only about 36% in 1984.

A variety of explanations have been advanced to explain the apparent U.S. losses in the international wheat market including the following:

1. Other countries have become more productive leading to more self sufficiency and creating competitors for the U.S. in international wheat markets.
2. The U.S. dollar has been overvalued, causing all U.S. exports to decline.
3. Wheat importing countries, especially oil exporting countries, have restricted their imports of all commodities in an attempt to save foreign exchange.
4. U.S. wheat is of an inferior quality compared to the wheat

exported by other countries.

5. U.S. wheat export policies are not strong enough to maintain competitiveness in the international wheat market.

First, increased production by EEC countries in the post-World War II (WWII) period has resulted in the EEC being a net exporter of wheat rather than a net importer. It has been further argued that the U.S. has lost its competitive edge as other wheat producers, most notably the EEC and Australia, have become more productive (Stanton [1986]). There appears to be some controversy on this subject as it is very difficult to formulate comparable statistics on productivity between countries. Policy solutions here include incentives for farmers to be more productive rather than subsidizing production under existing technologies.

Also, related to the productivity issue, some "special interest" groups such as U.S. farmers and agricultural organizations believe that the U.S. farm export markets have contracted due to the diffusion of U.S. agricultural technology and agricultural education. According to this view the transfer of U.S. agricultural technology and agricultural education, either "gone with the wind" or through U.S. technical agricultural assistance programs, makes the recipient countries of such transfers (U.S. competitors as well as the countries importing from U.S.) more productive and hence reducing U.S. farm exports. Houck [1986], through two recursive cross sectional econometric models applied to the World Banks' sample of "low income economies" and "lower middle-income economies" for years 1983 and 1984, has demonstrated that such assertions do not hold, at least for low-income nations. His chain of reasoning and his empirical results indicate that in those countries the agricultural productivity per worker increases their per capita income which in turn increases their per capita imports of cereals specifically, and all food in general. In this regard he concluded that:

> "... lessons are clear, at least for the low-income nations on this planet. In particular, a strong case can be made for the idea that advances in agricultural productivity are associated with <u>increases</u> in imports of cereals and other agricultural products. The connection comes via the positive income effect of general economic development. For these countries, investment in agricultural development through successful technical assistance and education are not detrimental to U.S. farm export interests. They are generally beneficial.
>
> For middle-income nations, the case is not so clear and probably more controversial. What can be said is that nothing in the aggregate data leads one to conclude that improvements in farm productivity among middle-income nations is generally or systematically threatening to U.S. farm exports across a broad international spectrum."(Houck [1986], pp. 10-11.)

The appropriate policy in this case should include increasing technical assistance to low-income nations.

In regard to the second argument, that the U.S. has lost wheat exports due to an overvalued dollar in recent years, Meyers, Helmar, Devadoss, Blandford, and Young II [1986] argue that the macro economic environment in 1970's has been reversed in 1980's with negative impacts on agricultural sector. That is, the anti-inflationary macroeconomic policies of the U.S. government in the 1980's reduced economic growth in U.S. as well as in many foreign countries. The more rapid decline of the inflation rate than of the interest rate, accompanied with the U.S., government's higher demand for money due to the 1981 tax cut, caused real interest rates to rise. The rise in real interest rates made the U.S. dollar an attractive investment for foreign investors. The demand for the dollar increased, the dollar appreciated, and U.S. exports in general, and agricultural exports in particular, declined. "Exchange rate changes and export declines were casualties rather than causes of this turnaround." According to Meyers et al., the changes in the macroeconomic environment, on the one hand, increased the current account deficit (the value of U.S. imports more than its exports) causing reduction in the U.S.'s ability to lend funds to developing countries for repayments of their debts to U.S. banks and government, and, on the other hand, confronted developed and developing countries with higher real interest rates and a stronger dollar, which ultimately reduced the growth in their demand for U.S. agricultural products. For U.S. exports of corn, wheat and soybeans, Meyers et al., (p., 24-13) concluded that:

> the change in the macroeconomic environment that did take place in the 1980's significantly depressed the U.S. agricultural sector. Slower income growth in developed and developing countries stunted growth in demand for the three products, and the stronger U.S. dollar made U.S. products less competitive with other exporters."

In contrast to this argument, that the U.S. has lost wheat exports due to an overvalued dollar in recent years, Jabara and Schwartz [1986], argues that this argument does not lend itself to policy directed specifically at the agricultural sector. Indeed, an overvalued dollar should be dealt with at the macroeconomic level with monetary policy aimed at the entire export sector, not just agriculture.

If the loss in wheat markets is due to less developed countries trying desperately to repay foreign debt by curtailing imports and stimulating their own exports to gain foreign exchange, then again U.S. policies aimed at stimulating wheat exports will not likely be successful.

Hill [1986] has asserted that the quality of U.S. grain is usually lower and less consistent than the quality of grain from other exporters. The argument that U.S. wheat quality is inferior and unreliable, however, has been around since colonial times and is thus probably not an important factor in the U.S. decline in world markets in the past eight years.

The question which is of primary concern here is whether U.S. government wheat export programs are effective in maintaining the U.S. competitiveness in world export markets. An important factor to consider here is whether U.S. credit programs have been attractive enough vis-a-vis the programs of our major competitors in world wheat markets. It is also possible that the U.S. loan rate itself, which has been a major determinant of the international price of wheat, has been a factor in the U.S. market share decline.

Wilson [1986] argues that the loss in U.S. market share is due to its position as the dominant party in an industry characterized by price leadership. According to this model it is expected that the dominant firm will lose market share unless aggressive pricing policies are pursued when other competitors begin to expand their market share. In this model, it is U.S. pricing policy, governed by the administered loan rate, which sets the international wheat price and is the policy tool of controversy. Aggressive credit programs are one way in which the U.S. can try to regain market share.

In the analysis that follows the primary focus is on the effectiveness of U.S. credit programs in maintaining U.S. wheat sales and market share in several important wheat export markets. First, wheat market from 1962 to 1982 is reviewed in terms of production, regional export/import market shares, and relative landed prices in import markets. Second, factors influencing competitiveness in international markets are examined. Third, the theoretical implications of the oligopoly model will be discussed. Fourth, the influence of U.S. credit promotional expenditures on U.S. market shares in different import markets is examined empirically. This is followed by a discussion of major conclusions and recommendations for future research.

AN OVERVIEW OF WHEAT PRODUCTION, TRADE, AND IMPORT PRICES 1962-1982

WHEAT PRODUCTION

The wheat production in major exporting and importing countries/regions for the period of 1962-1982 is presented in Table 4-1. The major exporting countries include U.S., Canada, Australia, France, Argentina, and a residual group of exporting countries labeled as Others. For the purpose of this study, the importing countries are grouped into two main economic regions of developed countries (DCs), and less developed countries (LDCs). The centrally planned countries (CPs) are excluded from this analysis due to the fact that for political reasons there is a tendency for governments of these countries to over report their production and under report their trade statistics [Emami, et al., 1986, p., 7]. Based on geographic, and regional economic communities, the DC and LDC regions are further decomposed into 7 and 17 sub-regions, respectively. Appendix A1 lists the country composition of these regions and sub-regions, as well as information regarding the type of the trade system employed by each country, their valuation procedures, and definitions of their counterpart trading countries.

The wheat production over the study period in the combined DCs and LDCs regions increased by +93.56 percent, from 151,190,000 metric tons (MT) in 1962 to 292,640,000 metric tons in 1982 (Table 4-2).

During the same period, the DCs increased their production by +79.78 percent, while the LDCs increased their production by +123.20 percent. However, the DCs per capita production grew by +51.82 percent from 0.16 MT in 1962 to 0.24 MT in 1982, but the LDCs per capita production grew by +38.13 percent from 0.03 MT in 1962 to 0.05 MT in 1982.

During the 1962 to 1982 period, the production of all regions increased except for Japan and E. Asia. The wheat production in Japan declined by -54.53 percent, and in S. Asia by -75.37 percent. The production in major wheat exporting countries increased significantly, +154.39 percent in Argentina, +153.21 percent in the U.S., +80.50 in France, +73.68 percent in Canada, and +6.26 percent in Australia. The year to year changes in the wheat production of the combined DCs and LDCs producing regions were positive except for the periods 1964-65, 1968-69, 1969-70, and 1976-77 (Table 4-3).

The DCs share of the combined DCs and LDCs production declined by -4.86 percentage points (-7.12 percent) from 68.28 in 1962 to 63.42 in 1982, but the LDCs share increased by +4.86 percentage points (+15.32 percent) from 31.72 in 1962 to 36.58 percent in 1982 (Table 4-4, and 4-5). The production market shares increased for the U.S. by +6.06 percentage points (+30.82 percent), decreased for Canada by -1.05 percentage points (-10.27 percent), decreased for France by -0.63 percentage points (-6.74 percent), decreased for Australia by -2.49 percentage points (-45.10 percent), and increased for Argentina by +1.18 percentage points (31.43 percent).

TABLE 4.1. WHEAT PRODUCTION BY REGIONS, 1962-1984 (1000 METRIC TONS).

REGION NAME	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
N. AMERICA	45111	50902	51277	53479	58215	57569	60584	58363	46314	59032	56551	62957	63028	74963	82067	75277	69458	75276	83910	100972	101985	92445	91836
U. S. A.	29718	31211	34929	35805	35699	41432	42898	39740	37291	44620	42047	46408	48807	57665	58480	55419	48322	58080	64618	76169	75250	65857	70637
CANADA	15393	19691	16349	17674	22516	16137	17686	18623	9023	14412	14514	16459	14221	17078	23587	19658	21136	17196	19292	24803	26735	26588	21199
ISRAEL	52	55	127	150	101	222	175	156	125	195	301	242	252	243	206	230	169	133	253	215	135	335	120
EEC	36412	29840	36054	37530	32602	37922	38324	37403	36721	42021	43143	43132	47243	40180	41466	40081	50271	48726	55117	54541	59852	58862	76241
FRANCE	14054	10249	13838	14760	11297	14288	14985	14459	12921	15360	18046	17792	18906	15013	16125	17350	20936	19544	23683	22892	25368	24828	33125
E. F. T. A.	3117	2692	3159	3176	2505	3762	3814	3192	3081	3683	3501	3700	4588	4029	4764	3496	3444	2811	3618	3084	4072	4471	4915
O. W. EUROPE	8337	9011	7687	7929	9486	10480	9679	9510	7858	10993	9408	8719	10729	8708	10418	9662	10164	8597	11133	7681	9631	9857	11653
OCEANIA DC	8666	9173	10314	7317	12991	7922	15246	11003	8275	8704	6823	12492	11448	12185	12227	9740	18447	16515	11162	16696	9168	22227	18831
AUSTRALIA	8353	8924	10040	7067	12699	7574	14804	10546	7988	8380	6434	12094	11200	11982	11800	9370	18090	16188	10856	16360	8876	21903	18523
JAPAN	1632	716	1244	1287	1024	997	1012	758	474	440	284	202	232	241	222	236	367	541	583	587	742	695	741
S. AFRICA LDC	758	950	1128	722	628	1142	1333	1390	1459	1643	1770	1931	1658	1840	2310	1918	1751	2123	1501	2360	2437	1828	2251
N. AFRICA LDC	3549	3649	3426	3485	3090	3079	4827	3408	3905	4772	4694	4516	4552	4883	5416	3953	4971	4620	4850	4099	5439	4898	4827
E. C. O. W. A. S.	21	21	20	20	18	14	15	14	12	12	11	9	11	21	23	24	25	24	30	29	34	39	49
E. AFRICA LDC	771	811	829	902	904	947	1037	1084	1110	1156	1154	1088	956	934	819	689	701	826	922	1013	1255	1242	887
O. S. AFRICA	29	38	27	36	44	54	55	45	62	110	107	107	110	102	116	105	227	178	184	216	240	147	124
O. AFRICA LDC	4	6	6	7	8	12	9	11	10	8	10	6	7	4	4	5	10	11	12	10	10	16	16
L. A. F. T. A.	9713	12769	15575	10440	10524	11705	10428	12766	11040	11852	12277	12058	12950	15047	19279	11724	14464	15076	14708	15036	21729	19152	20616
ARGENTINA	5700	8940	11260	6079	6247	7320	5740	7020	4920	5680	7900	6560	5900	8570	11000	5700	8100	8100	7780	8300	14500	12300	12700
C. A. C. M.	33	37	37	28	31	33	34	34	32	34	39	38	37	41	50	60	56	41	43	42	42	54	46
CARIBBEAN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
O. AMERICA LDC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S. ASIA LDC	16319	15175	14235	17080	14569	15991	23253	25635	27803	30560	33671	32532	30097	32233	38199	38802	40933	45474	43971	49376	50259	56973	57912
S. E. ASIA LDC	21	32	54	72	97	67	51	26	33	44	27	36	38	56	75	77	94	42	91	117	124	129	188
E. ASIA	268	229	309	300	315	310	345	366	357	322	241	162	150	97	82	45	36	42	92	57	66	112	17
M. E. OIL	3970	3091	3555	4801	5350	5628	5528	5533	5548	4584	7275	5707	5614	6541	7020	5849	6339	6187	5855	6578	6878	6753	6052
M. E. NON-OIL	12507	13495	12212	12402	12557	13825	12793	14352	12959	16497	16943	13582	16168	16054	17350	17571	17939	17148	18253	18484	18542	18124	17492
OCEANIA LDC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL DC &LDC	151190	152671	161275	161163	165065	171681	188542	185049	167278	196762	198240	203146	210277	218457	242713	219544	239916	245391	256295	281183	292640	298359	314814
TOTAL EXCLUDING U. S. A.	121472	121460	126347	125358	129366	130249	145644	145309	129987	152142	156193	156738	161470	160572	184233	164125	191594	187311	191677	205014	217390	232501	244177
TOTAL EXCLUDING CANADA	135797	132980	144926	143489	142549	155544	170856	166426	158255	182350	183726	186687	196056	201379	219126	199686	218780	229195	237003	256380	265905	271770	293615
TOTAL EXCLUDING AUSTRALIA	142837	143747	151235	154096	152366	164107	173738	174503	159290	188382	191806	191052	199077	206475	230913	210174	221826	229203	245439	264823	283764	276455	296291
TOTAL EXCLUDING ARGENTINA	145490	143731	150015	155064	158818	164361	182802	178029	162358	191082	190340	196586	204677	209887	231713	213844	231816	237291	248515	272883	278140	286059	302114
TOTAL EXCLUDING FRANCE	137136	142422	147437	146403	153768	157393	173557	170590	154357	181402	180194	185354	191371	203444	226588	202194	218980	225847	232612	258301	267272	273530	281689
TOTAL DC	103227	102389	109862	110868	116924	118874	128834	120385	102848	125068	120021	131354	137529	140549	151370	138722	152320	152599	165776	183765	185585	188892	204337
TOTAL LDC	47963	50282	51413	50295	48141	52807	59708	64664	64430	71694	78219	71792	72748	77908	91343	80822	87596	92792	90519	97417	107055	109466	110477
DC PRODUCTION EXCLUDING U. S. A.	73509	71178	74934	75063	81225	77442	85936	80645	65557	80448	77974	84946	88722	82664	92890	83303	103998	94519	101158	107597	110335	123035	133700
DC PRODUCTION EXCLUDING CANADA	87834	82698	93513	93194	94408	102737	111148	101762	93825	110656	105507	114895	123308	123471	127783	118864	131184	135403	146484	158963	158850	162304	183138
DC PRODUCTION EXCLUDING AUSTRALIA	94874	93465	99822	103801	104225	111300	114030	109839	94860	116688	113587	119260	126329	128567	139570	129352	134230	136411	154920	167406	176709	166989	185814
DC PRODUCTION EXCLUDING FRANCE	89173	92140	96024	96108	105627	104586	113849	105926	89927	109708	101975	113562	118623	125536	135245	121372	131384	133055	142093	160884	160217	164064	171212
LDC PRODUCTION EXCLUDING ARGENTINA	42253	41342	40153	44216	41894	45487	53968	57644	59510	66014	70319	65232	67148	69338	80343	75122	79496	84692	82739	89117	92555	97165	97777

SOURCE: FAO PRODUCTION YEARBOOKS.

TABLE 4.2. CHANGES IN WHEAT PRODUCTION, 1962-1982.

REGION NAME	1962	1982	62-82
	1000 METRIC TONS		PERCENTAGE
N. AMERICA	45111	101985	126.08
U.S.A.	29718	75250	153.21
CANADA	15393	26735	73.68
ISRAEL	52	135	159.62
EEC	36412	59852	64.37
FRANCE	14054	25368	80.50
E.F.T.A.	3117	4072	30.64
O. W. EUROPE	8337	9631	15.52
OCEANIA DC	8566	9168	7.03
AUSTRALIA	8353	8876	6.26
JAPAN	1632	742	-54.53
S. AFRICA LDC	758	2437	221.50
N. AFRICA LDC	3549	5439	53.25
E.C.O.W.A.S.	21	34	61.90
E. AFRICA LDC	771	1255	62.78
O. S. AFRICA	29	240	727.59
O. AFRICA LDC	4	10	150.00
L.A.F.T.A.	9713	21729	123.71
ARGENTINA	5700	14500	154.39
C.A.C.M.	33	42	27.27
CARIBBEAN	0	0	0.00
O. AMERICA LDC	0	0	0.00
S. ASIA LDC	16319	50259	207.98
S. E. ASIA LDC	21	124	490.48
E. ASIA	268	66	-75.37
M. E. OIL	3970	6878	73.25
M. E. NON-OIL	12507	18542	48.25
OCEANIA LDC	0	0	0.00
TOTAL	151190	292640	93.56
TOTAL EXCLUDING U.S.A.	121472	217390	78.96
TOTAL EXCLUDING CANADA	135797	265905	95.81
TOTAL EXCLUDING AUSTRALIA	142837	283764	98.66
TOTAL EXCLUDING ARGENTINA	145490	278140	91.17
TOTAL EXCLUDING FRANCE	137136	267272	94.90
TOTAL DC	103227	185585	79.78
TOTAL LDC	47963	107055	123.20
DC PRODUCTION EXCLUDING U.S.A.	73509	110335	50.10
DC PRODUCTION EXCLUDING CANADA	87834	158850	80.85
DC PRODUCTION EXCLUDING AUSTRALIA	94874	176709	86.26
DC PRODUCTION EXCLUDING FRANCE	89173	160217	79.67
LDC PRODUCTION EXCLUDING ARGENTINA	42263	92555	119.00

SOURCE: TABLE 4-1.

TABLE 4.3. ANNUAL PERCENTAGE CHANGE IN WHEAT PRODUCTION BY COUNTRIES/REGIONS.

REGION NAME	62-63	63-64	64-65	65-66	66-67	67-68	68-69	69-70	70-71	71-72	72-73
N AMERICA	12.84	0.74	4.29	8.85	-1.11	5.24	-3.67	-20.64	27.46	-4.19	11.15
U.S.A.	5.02	11.91	2.51	-0.30	16.06	3.54	-7.36	-6.16	19.65	-5.77	10.37
CANADA	27.92	-16.97	8.10	27.40	-28.33	9.60	5.30	-51.55	59.73	0.71	13.40
ISRAEL	5.77	130.91	18.11	-32.67	119.80	-21.17	-10.86	-19.87	56.00	54.36	-19.60
EEC	-18.05	20.82	4.09	-13.13	16.32	1.06	-2.40	-1.82	14.43	2.67	-0.03
FRANCE	-27.07	35.02	6.66	-23.46	26.48	4.88	-3.51	-10.64	18.88	17.49	-1.41
E.F.T.A.	-13.63	17.35	0.54	-21.13	50.18	1.38	-16.31	-3.48	19.54	-4.94	5.68
O W. EUROPE	8.08	-14.69	3.15	19.64	10.48	-7.64	-1.75	-17.37	39.90	-14.42	-7.32
OCEANIA DC	7.09	12.44	-29.06	77.55	-39.02	92.45	-27.83	-24.79	5.18	-21.61	83.09
AUSTRALIA	6.84	12.51	-29.61	79.69	-40.36	95.46	-29.76	-24.26	4.91	-23.22	87.97
JAPAN	-56.13	73.74	3.46	-20.44	-2.64	1.50	-25.10	-37.47	-7.17	-35.45	-28.87
S AFRICA LDC	22.69	21.29	-35.99	-13.02	81.85	16.73	4.28	4.96	12.61	7.73	9.10
N AFRICA LDC	2.82	-5.11	1.72	-11.33	-0.35	56.77	-29.40	14.58	22.20	-1.63	-3.79
E C.O.W.A.S.	0.00	-4.76	0.00	-10.00	-22.22	7.14	-6.67	-14.29	0.00	-8.33	-18.18
E AFRICA LDC	5.19	2.22	8.81	0.22	4.76	9.50	4.53	2.40	4.14	-0.17	-5.72
O S. AFRICA	31.03	-28.95	33.33	22.22	22.73	1.85	-18.18	37.78	77.42	-2.73	0.00
O AFRICA LDC	50.00	0.00	16.67	14.29	50.00	-25.00	22.22	-9.09	-20.00	25.00	-40.00
L A.F.T.A.	31.46	21.99	-32.97	0.80	11.22	-10.91	22.42	-13.52	7.36	3.59	-1.78
ARGENTINA	56.64	25.96	-45.01	2.76	17.18	-21.53	22.30	-29.91	15.45	39.08	-16.96
C.A.C.M.	12.12	0.00	-24.32	10.71	6.45	3.03	0.00	-5.89	6.25	14.71	-2.56
CARIBBEAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
O AMERICA LDC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S ASIA LDC	-7.01	-6.19	19.99	-14.70	9.76	45.41	10.24	8.46	10.28	9.82	-3.32
S E. ASIA LDC	52.38	68.75	33.33	34.72	-30.93	-23.88	-49.02	26.92	33.33	-38.64	33.33
E ASIA	-14.93	35.53	-2.91	5.00	-1.59	11.29	6.09	-2.46	-9.80	-25.16	-32.78
M E. OIL	-22.14	15.01	35.05	11.56	5.08	-1.78	0.09	2.08	-18.84	58.70	-21.55
M E. NON-OIL	7.90	-9.51	1.56	1.25	10.10	-7.46	12.19	-9.71	27.30	2.70	-19.84
OCEANIA LDC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	0.98	5.64	-0.07	2.42	4.01	9.82	-1.85	-9.60	17.63	0.75	2.47
TOTAL EXCLUDING U.S.A.	-0.01	4.02	-0.78	3.20	0.68	11.82	-0.23	-10.54	17.04	2.66	0.35
TOTAL EXCLUDING CANADA	-2.07	8.98	-0.99	-0.66	9.12	9.84	-2.59	-4.91	15.23	0.75	1.61
TOTAL EXCLUDING AUSTRALIA	0.64	5.21	1.89	-1.12	7.71	5.87	0.44	-8.72	18.26	1.82	-0.39
TOTAL EXCLUDING ARGENTINA	-1.21	4.37	3.38	2.41	3.49	11.22	-2.61	-8.60	17.69	-0.39	3.29
TOTAL EXCLUDING FRANCE	3.85	3.52	-0.70	5.03	2.36	10.27	-1.71	-9.52	17.52	-0.67	2.86
TOTAL DC	-0.91	7.30	0.92	5.46	1.67	8.38	-6.56	-14.57	21.60	-4.04	9.44
TOTAL LDC	4.83	2.25	-2.17	-4.29	9.69	13.07	8.30	-0.36	11.27	9.10	-8.22
DC PRODUCTION EXCLUDING U.S.A.	-3.17	5.28	0.17	8.21	-4.66	10.97	-6.16	-18.71	22.71	-3.08	8.94
DC PRODUCTION EXCLUDING CANADA	-5.85	13.08	-0.34	1.30	8.82	8.19	-8.44	-7.80	17.94	-4.65	8.90
DC PRODUCTION EXCLUDING AUSTRALIA	-1.49	6.80	3.99	0.41	6.79	2.45	-3.68	-13.64	23.01	-2.66	4.99
DC PRODUCTION EXCLUDING FRANCE	3.33	4.22	0.09	9.90	-0.99	8.66	-6.96	-15.10	22.00	-7.05	11.36
LDC PRODUCTION EXCLUDING ARGENTINA	-2.18	-2.88	10.12	-5.25	8.58	18.64	6.81	3.24	10.93	6.52	-7.23

REGION NAME	73-74	74-75	75-76	76-77	77-78	78-79	79-80	80-81	81-82	82-83	83-84
N AMERICA	0.26	18.94	9.48	-8.27	-7.73	8.38	11.47	20.33	1.00	-9.35	-0.66
U.S.A.	5.17	18.60	1.03	-5.23	-12.81	20.19	11.26	17.80	-1.21	-12.48	7.26
CANADA	-13.60	20.09	38.11	-15.81	5.44	-18.64	12.19	28.57	7.79	-0.55	-20.27
ISRAEL	8.26	-7.25	-15.23	11.65	-26.52	-21.30	90.23	-15.02	-37.21	148.15	-64.18
EEC	9.53	-14.95	3.20	-3.34	25.42	-3.07	13.12	-1.05	9.74	-1.65	29.52
FRANCE	6.26	-20.59	7.41	7.60	20.67	-6.65	21.18	-3.38	10.66	-2.13	33.42
E.F.T.A.	24.00	-12.18	18.24	-26.62	-1.49	-18.38	28.71	-14.76	32.04	9.80	9.93
O W. EUROPE	23.04	-18.83	19.64	-7.26	5.20	-15.42	29.50	-31.01	25.39	2.35	18.22
OCEANIA DC	-8.36	6.44	0.34	-20.34	89.39	-10.47	-32.41	49.49	-45.06	142.44	-15.28
AUSTRALIA	-7.39	6.98	-1.52	-20.59	93.06	-10.51	-32.94	50.70	-45.75	146.77	-15.43
JAPAN	14.85	3.88	-7.88	6.31	55.51	47.41	7.76	0.69	25.41	-5.33	6.62
S AFRICA LDC	-14.14	10.98	25.54	-16.97	-8.71	21.25	-29.30	57.28	3.25	-24.99	23.14
N AFRICA LDC	9.65	-1.29	10.80	-27.01	25.78	-7.06	4.98	-15.45	[illegible]	-9.95	-1.45
E C.O.W.A.S.	22.22	90.91	9.52	4.35	4.17	-4.00	25.00	-3.35	[illegible]	14.71	25.64
E AFRICA LDC	-12.13	-2.30	-12.31	-15.87	1.74	17.83	11.62	9.87	[illegible]	-1.04	[illegible]
O S. AFRICA	2.80	-7.27	13.73	-9.48	116.19	-21.59	3.37	17.39	11.11	-38.75	[illegible]
O AFRICA LDC	16.67	-42.86	0.00	25.00	100.00	10.00	9.09	-16.67	0.00	60.00	0.00
L A.F.T.A.	7.40	16.19	28.13	-39.19	23.37	4.23	-2.44	2.23	44.51	-11.66	7.64
ARGENTINA	-14.63	53.04	29.35	-48.18	42.11	0.00	-3.95	6.68	74.70	-15.17	3.25
C.A.C.M.	-2.63	10.81	21.95	20.00	-5.67	-25.79	4.88	-2.33	0.00	23.57	-14.81
CARIBBEAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
O AMERICA LDC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S ASIA LDC	-7.54	7.26	18.33	1.58	5.49	13.54	-5.39	12.29	1.79	13.36	1.68
S E. ASIA LDC	5.56	47.37	33.93	2.57	22.08	-55.32	116.67	29.57	5.99	3.23	46.88
E ASIA	-7.41	-35.33	-15.46	-45.12	-20.00	16.67	119.05	-38.04	15.79	69.70	-84.82
M E. OIL	-1.63	16.51	7.32	-16.68	9.23	-3.16	-5.35	12.33	[illegible]	-1.82	-10.38
M E. NON-OIL	19.04	-0.71	11.81	-2.11	2.09	-4.41	6.48	1.23	0.31	-2.25	-3.49
OCEANIA LDC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	3.51	3.89	11.10	-9.55	9.29	2.29	4.44	9.71	4.07	1.95	5.52
TOTAL EXCLUDING U.S.A.	3.02	-0.56	14.74	-10.91	16.74	-2.24	2.33	6.96	6.04	6.95	5.02
TOTAL EXCLUDING CANADA	5.02	2.72	8.81	-8.87	9.56	4.30	3.65	8.19	3.72	2.21	8.04
TOTAL EXCLUDING AUSTRALIA	4.20	3.72	11.84	-8.98	5.54	3.33	7.06	7.90	7.15	-2.59	7.18
TOTAL EXCLUDING ARGENTINA	4.12	2.55	10.40	-7.71	8.40	2.36	4.73	9.81	1.93	2.86	5.61
TOTAL EXCLUDING FRANCE	3.25	6.31	11.38	-10.77	8.30	3.14	3.00	11.04	3.47	2.34	2.98
TOTAL DC	4.70	2.20	7.70	-8.36	9.80	0.18	8.64	10.85	0.99	1.78	8.18
TOTAL LDC	1.33	7.09	17.24	-11.52	8.38	5.93	-2.45	7.62	9.89	2.25	0.92
DC PRODUCTION EXCLUDING U.S.A.	4.45	-5.83	12.37	-10.32	24.84	-9.11	7.02	6.37	2.54	11.51	8.67
DC PRODUCTION EXCLUDING CANADA	7.32	0.13	3.49	-6.98	10.36	3.22	8.18	8.52	-0.07	2.17	12.84
DC PRODUCTION EXCLUDING AUSTRALIA	5.93	1.77	8.55	-7.32	3.77	1.62	13.57	8.06	5.56	-5.50	11.27
DC PRODUCTION EXCLUDING FRANCE	4.46	5.83	7.73	-10.26	8.25	1.27	6.79	13.22	-0.41	2.40	4.36
LDC PRODUCTION EXCLUDING ARGENTINA	2.94	3.26	15.87	-6.50	5.82	6.54	-2.31	7.71	3.86	4.98	0.63

SOURCE: TABLE 4-1.

TABLE 4.4. WHEAT PRODUCTION MARKET SHARES BY REGION, 1962-1984.

REGION NAME	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973
N AMERICA	29.84	33.34	31.79	33.18	35.27	33.53	32.13	31.54	27.69	30.00	28.53	30.95
U.S.A.	19.66	20.44	21.66	22.22	21.63	24.13	22.75	21.48	22.29	22.68	21.21	22.84
CANADA	10.18	12.90	10.14	10.97	13.64	9.40	9.38	10.06	5.39	7.32	7.32	8.10
ISRAEL	0.03	0.04	0.08	0.09	0.06	0.13	0.09	0.08	0.07	0.10	0.15	0.12
EEC	24.08	19.55	22.36	23.29	19.75	22.09	20.33	20.21	21.95	21.36	21.76	21.23
FRANCE	9.30	6.71	8.58	9.16	6.84	8.32	7.95	7.81	7.72	7.81	9.10	8.76
E F.T.A.	2.06	1.76	1.96	1.97	1.52	2.19	2.02	1.72	1.84	1.87	1.77	1.82
O W. EUROPE	5.51	5.90	4.77	4.92	5.75	5.10	5.13	5.14	4.70	5.59	4.75	4.29
OCEANIA DC	5.67	6.01	6.40	4.54	7.87	4.61	8.09	5.95	4.95	4.42	3.44	6.15
AUSTRALIA	5.52	5.85	6.23	4.39	7.69	4.41	7.85	5.70	4.78	4.26	3.25	5.95
JAPAN	1.08	0.47	0.77	0.80	0.62	0.58	0.54	0.41	0.28	0.22	0.14	0.10
S AFRICA LDC	0.50	0.61	0.70	0.45	0.38	0.67	0.71	0.75	0.87	0.84	0.89	0.95
N AFRICA LDC	2.35	2.39	2.12	2.16	1.87	1.79	2.56	1.84	2.33	2.43	2.37	2.22
E C.O.W.A.S.	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00
E AFRICA LDC	0.51	0.53	0.51	0.56	0.55	0.55	0.55	0.59	0.66	0.59	0.58	0.54
O S. AFRICA	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.02	0.04	0.06	0.05	0.05
O AFRICA LDC	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.01	0.00	0.01	0.00
L A.F.T.A.	6.42	8.36	9.66	6.48	6.38	6.82	5.53	6.50	6.60	6.02	6.19	5.94
ARGENTINA	3.77	5.86	6.98	3.77	3.78	4.26	3.04	3.79	2.94	2.89	3.99	3.23
C A.C.M.	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
CARIBBEAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
O AMERICA LDC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S ASIA LDC	10.79	9.94	8.83	10.60	8.83	9.31	12.33	13.85	15.62	15.58	16.98	16.02
S E. ASIA LDC	0.01	0.02	0.03	0.04	0.06	0.04	0.03	0.01	0.02	0.02	0.01	0.02
E ASIA	0.18	0.15	0.19	0.19	0.19	0.18	0.18	0.20	0.21	0.16	0.12	0.08
M E. OIL	2.63	2.02	2.20	2.98	3.24	3.28	2.93	2.99	3.39	2.33	3.67	2.81
M E. NON-OIL	8.27	8.84	7.57	7.70	7.61	8.05	6.79	7.76	7.75	8.33	8.55	6.69
OCEANIA LDC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
TOTAL EXCLUDING U.S.A.	80.343	79.556	78.342	77.783	78.372	75.866	77.247	78.524	77.707	77.322	78.789	77.155
TOTAL EXCLUDING CANADA	89.818	87.102	89.862	89.033	86.359	90.600	90.619	89.936	94.605	92.675	92.678	91.897
TOTAL EXCLUDING AUSTRALIA	94.475	94.154	93.774	95.614	92.306	95.588	92.148	94.300	95.224	95.741	96.754	94.046
TOTAL EXCLUDING ARGENTINA	96.229	94.144	93.018	96.228	96.215	95.736	96.955	96.206	97.058	97.113	96.014	96.770
TOTAL EXCLUDING FRANCE	90.704	93.286	91.419	90.841	93.156	91.677	92.052	92.186	92.275	92.193	90.896	91.241
TOTAL DC	68.276	67.065	68.120	68.792	70.835	69.241	68.331	65.055	61.483	63.563	60.543	64.659
TOTAL LDC	31.723	32.934	31.879	31.207	29.164	30.758	31.668	34.944	38.516	36.436	39.456	35.340
DC PRODUCTION EXCLUDING U.S.A.	48.620	46.621	46.463	46.575	49.207	45.108	45.579	43.580	39.190	40.885	39.333	41.815
DC PRODUCTION EXCLUDING CANADA	58.095	54.167	57.983	57.825	57.194	59.841	58.951	54.991	56.089	56.238	53.221	56.557
DC PRODUCTION EXCLUDING AUSTRALIA	62.751	61.219	61.895	64.407	63.141	64.829	60.479	59.356	56.707	59.304	57.297	58.706
DC PRODUCTION EXCLUDING FRANCE	58.980	60.351	59.540	59.634	63.991	60.918	60.383	57.242	53.759	55.756	51.440	55.901
LDC PRODUCTION EXCLUDING ARGENTINA	27.953	27.079	24.897	27.435	25.380	26.495	28.623	31.150	35.575	33.550	35.471	32.110

REGION NAME	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
N AMERICA	29.97	34.31	33.81	34.29	28.95	30.68	32.74	35.91	34.85	30.98	29.17
U.S.A.	23.21	26.50	24.09	25.24	20.14	23.67	25.21	27.09	25.71	22.07	22.44
CANADA	6.76	7.82	9.72	9.05	8.81	7.01	7.53	8.82	9.14	8.91	6.73
ISRAEL	0.12	0.11	0.08	0.10	0.07	0.05	0.10	0.08	0.05	0.11	0.04
EEC	22.47	18.39	17.08	18.26	20.95	19.86	21.51	19.40	20.45	19.73	24.22
FRANCE	8.99	6.87	6.64	7.90	8.73	7.96	9.24	8.14	8.67	8.32	10.52
E F.T.A.	2.18	1.84	1.96	1.59	1.44	1.15	1.41	1.10	1.39	1.50	1.56
O W. EUROPE	5.10	3.99	4.29	4.40	4.24	3.50	4.34	2.73	3.29	3.30	3.70
OCEANIA DC	5.44	5.58	5.04	4.44	7.69	6.73	4.36	5.93	3.13	7.45	5.98
AUSTRALIA	5.33	5.48	4.86	4.27	7.54	6.60	4.24	5.82	3.03	7.34	5.88
JAPAN	0.11	0.11	0.09	0.11	0.15	0.22	0.23	0.21	0.25	0.23	0.24
S AFRICA LDC	0.79	0.84	0.95	0.87	0.73	0.87	0.59	0.84	0.83	0.61	0.72
N AFRICA LDC	2.35	2.24	2.23	1.80	2.07	1.88	1.89	1.46	1.86	1.64	1.53
E C.O.W.A.S.	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02
E AFRICA LDC	0.45	0.43	0.34	0.31	0.29	0.34	0.36	0.36	0.43	0.42	0.28
O S. AFRICA	0.05	0.05	0.05	0.05	0.09	0.07	0.07	0.08	0.08	0.05	0.04
O AFRICA LDC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01
L A.F.T.A.	6.15	6.89	7.94	5.34	6.03	6.14	5.74	5.35	7.43	6.42	6.55
ARGENTINA	2.66	3.92	4.53	2.60	3.38	3.30	3.04	2.95	4.95	4.12	4.03
C A.C.M.	0.02	0.02	0.02	0.03	0.02	0.02	0.02	0.01	0.01	0.02	0.01
CARIBBEAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
O AMERICA LDC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S ASIA LDC	14.31	14.78	15.74	17.67	17.06	18.94	17.16	17.56	17.17	19.10	18.40
S E. ASIA LDC	0.02	0.03	0.03	0.04	0.04	0.02	0.04	0.04	0.04	0.04	0.06
E ASIA	0.07	0.04	0.03	0.02	0.02	0.02	0.04	0.02	0.02	0.04	0.01
M E. OIL	2.67	2.99	2.89	2.66	2.66	2.52	2.28	2.34	2.35	2.26	1.92
M E. NON-OIL	7.69	7.35	7.40	8.00	7.48	6.99	7.12	6.57	6.34	6.07	5.56
OCEANIA LDC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
TOTAL EXCLUDING U.S.A.	76.789	73.502	75.905	74.757	79.858	76.331	74.787	72.911	74.285	77.926	77.562
TOTAL EXCLUDING CANADA	93.237	92.182	90.281	90.954	91.190	92.992	92.472	91.179	90.864	91.088	93.266
TOTAL EXCLUDING AUSTRALIA	94.673	94.515	95.138	95.732	92.459	93.403	95.764	94.181	96.966	92.658	94.116
TOTAL EXCLUDING ARGENTINA	97.336	96.077	95.467	97.403	96.623	95.699	96.964	97.048	95.045	95.877	95.965
TOTAL EXCLUDING FRANCE	91.009	93.127	93.355	92.097	91.273	92.035	90.759	91.862	91.331	91.678	89.477
TOTAL DC	65.403	64.337	62.365	63.186	63.489	62.186	64.681	65.354	63.417	63.310	64.907
TOTAL LDC	34.596	35.662	37.634	36.813	36.511	37.813	35.318	34.645	36.582	36.689	35.092
DC PRODUCTION EXCLUDING U.S.A.	42.192	37.839	38.271	37.943	43.347	38.517	39.469	38.265	37.703	41.237	42.469
DC PRODUCTION EXCLUDING CANADA	58.640	56.519	52.647	54.141	54.679	55.178	57.154	56.533	54.281	54.399	58.173
DC PRODUCTION EXCLUDING AUSTRALIA	60.077	58.852	57.504	58.918	55.948	55.589	60.445	59.536	60.384	55.969	59.023
DC PRODUCTION EXCLUDING FRANCE	56.412	57.464	55.722	55.283	54.762	54.221	55.441	57.216	54.748	54.988	54.385
LDC PRODUCTION EXCLUDING ARGENTINA	31.933	31.739	33.102	34.217	33.134	34.513	32.282	31.693	31.627	32.565	31.058

SOURCE: TABLE 4-1.

TABLE 4.5. CHANGE IN WHEAT PRODUCTION MARKET SHARES BY REGIONS 1962 AND 1982.

REGION NAME	1962	1982	62-68	62-68
	PERCENTAGE		%POINTS	PERCENTAGE
N. AMERICA	29.84	34.85	5.01	16.80
U.S.A.	19.66	25.71	6.06	30.82
CANADA	10.18	9.14	-1.05	-10.27
ISRAEL	0.03	0.05	0.01	34.13
EEC	24.08	20.45	-3.63	-15.08
FRANCE	9.30	8.67	-0.63	-6.74
E.F.T.A.	2.06	1.39	-0.67	-32.51
O. W. EUROPE	5.51	3.29	-2.22	-40.32
OCEANIA DC	5.67	3.13	-2.53	-44.70
AUSTRALIA	5.52	3.03	-2.49	-45.10
JAPAN	1.08	0.25	-0.83	-76.51
S. AFRICA LDC	0.50	0.83	0.33	66.10
N. AFRICA LDC	2.35	1.86	-0.49	-20.82
E.C.O.W.A.S.	0.01	0.01	0.00	0.00
E. AFRICA LDC	0.51	0.43	-0.08	-15.90
O. S. AFRICA	0.02	0.08	0.06	327.57
O. AFRICA LDC	0.00	0.00	0.00	0.00
L.A.F.T.A.	6.42	7.43	1.00	15.58
ARGENTINA	3.77	4.95	1.18	31.43
C.A.C.M.	0.02	0.01	-0.01	-34.25
CARIBBEAN	0.00	0.00	0.00	0.00
O. AMERICA LDC	0.00	0.00	0.00	0.00
S. ASIA LDC	10.79	17.17	6.38	59.11
S. E. ASIA LDC	0.01	0.04	0.03	205.06
E. ASIA	0.18	0.02	-0.15	-87.28
M. E. OIL	2.63	2.35	-0.28	-10.49
M. E. NON-OIL	8.27	6.34	-1.94	-23.41
OCEANIA LDC	0.00	0.00	0.00	0.00
TOTAL	100.00	100.00	0.00	0.00
TOTAL EXCLUDING U.S.A.	80.343	74.285	-6.06	-7.54
TOTAL EXCLUDING CANADA	89.818	90.864	1.05	1.16
TOTAL EXCLUDING AUSTRALIA	94.475	96.966	2.49	2.64
TOTAL EXCLUDING ARGENTINA	96.229	95.045	-1.18	-1.23
TOTAL EXCLUDING FRANCE	90.704	91.331	0.63	0.69
TOTAL DC	68.276	63.417	-4.86	-7.12
TOTAL LDC	31.723	36.582	4.86	15.32
DC PRODUCTION EXCLUDING U.S.A.	48.620	37.703	-10.92	-22.45
DC PRODUCTION EXCLUDING CANADA	58.095	54.281	-3.81	-6.56
DC PRODUCTION EXCLUDING AUSTRALIA	62.751	60.384	-2.37	-3.77
DC PRODUCTION EXCLUDING FRANCE	58.980	54.748	-4.23	-7.18
LDC PRODUCTION EXCLUDING ARGENTINA	27.953	31.627	3.67	13.14

SOURCE: TABLE 4-1.

EXPORT PERFORMANCE IN INTERNATIONAL WHEAT MARKETS, 1962-1982

This section examines the performance of the major wheat exporting countries (U.S., Canada, Australia, Argentina, France, Others) in the export of wheat (SITC 041.0) in the developed and less developed countries (DCs and LDCs respectively) during 1962-1982 by a disaggregated analysis of changes in U.S. export performance relative to that of its major competitors.

According to Miksell and Farah [1980], performance of any country in the export of any commodity is affected both by the developments within particular markets and by changes in the exporting country's competitive strength relative to that of competing countries. Developments within a particular import market includes shifts or rotations in consumer demand and producers supply, and changes in government import policies. The changes in the exporting country's competitive strength relative to that of competing exporting countries involves market penetration or deterioration based on: (a)- their overall relative price and cost competitiveness (on their borders) affected dynamically by the changes in the comparative advantage structure of their exports, and (b)- their overall relative marketing margins competitiveness (on the borders of importing countries) affected dynamically by the changes in transportation, insurance, and middlemen costs. In the analysis that follows the primary measure of any exporting country's export performance in wheat vis-a-vis other exporting countries is its export share (in terms of quantity) in DCs and LDCs import regions.

AN OVERVIEW OF U.S. EXPORT PERFORMANCE 1962-1982

The U.S. export market share in the combined regions of DCs and LDCs remained at almost the same level of 52.23 percent and 52.40 percent in 1962 and 1982, respectively (Table 4-6). However, its export market share in DCs increased by +9.67 percentage points from 29.88 percent in 1962 to 39.55 percent in 1982; mainly due to +4.57 percentage points increase in its market share in EC-10, +28.66 percentage points in E.F.T.A., and +25.06 percentage points in Japan. During the same time period it lost -24.02 percentage points in O.W. Europe.

The U.S. export share in the LDCs declined -21.60 percentage points from 78.92 percent to 57.32 percent over the same time period; mainly due to the losses of -41.57 percentage points in N. Africa, -56.63 percentage points in E. Africa, -68.65 percentage points in O.S. Africa, -19.04 percentage points in O. Africa, -21.97 percentage points in O. America, -31.55 percentage points in S. Asia, -72.15 percentage points in M.E. Oil producing countries, -47.38 percentage points in M.E. Non-oil producing countries, and -6.21 percentage points in Unidentified regions. In contrast to these losses in the LDCs, the U.S. gained market shares by +80.68 percentage points in

S. Africa region, +49.64 percentage points in E.C.O.W.S., +15.23 percentage points in L.A.F.T.A., +3.88 percentage points in C.A.C.M., +14.80 percentage points in Caribbean, +12.60 percentage points in S.E. Asia, and +19.71 percentage points in E. Asia.

TABLE 4.6. IMPORTS FROM U.S. AS A PERCENTAGE OF TOTAL IMPORTS OF IMPORTING REGION/SUBREGION (WHEAT, SITC 041.0, YEARS 1962-1982).*

IMPORTING REGIONS	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972
	PERCENT OF TOTAL IMPORTS										
DEVELOPED REGIONS	29.88	33.40	32.32	32.90	41.74	34.29	30.55	22.52	34.20	33.72	32.74
N. AMERICA	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	1.39
ISRAEL	100.00	80.28	86.95	91.33	100.00	94.31	99.92	77.08	93.79	97.63	99.93
EC-10	16.55	17.12	18.58	16.05	26.96	23.31	19.93	12.69	23.82	20.38	21.29
E.F.T.A	37.35	25.87	39.98	20.27	34.33	19.79	15.08	11.60	34.68	31.87	34.98
O.W.EUROPE	75.61	83.73	93.91	90.45	95.34	91.18	45.95	0.00	0.00	89.94	90.78
OCEANIA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
JAPAN	34.75	46.29	46.79	54.08	55.09	52.94	50.88	45.95	55.20	52.61	49.43
DEVELOPING REGIONS	78.92	79.94	76.95	70.65	72.78	60.62	62.69	56.10	58.60	51.30	58.05
S.AFRICA	0.00	27.85	35.35	0.00	62.10	16.50	0.00	0.00	7.06	7.47	0.00
N.AFRICA	88.88	86.93	90.81	63.03	75.75	51.40	38.18	35.22	37.09	29.18	33.63
C.E.U.C.A	0.00	0.00	0.15	0.00	0.00	0.37	0.00	0.00	0.07	0.29	0.12
E.C.O.W.A.S	25.62	38.21	15.89	34.40	40.85	46.95	38.12	54.18	58.98	70.94	54.71
E.AFRICA	75.90	100.00	100.00	52.13	90.83	4.42	0.00	48.67	0.00	0.72	0.25
O.S.AFRICA	75.14	77.67	69.34	27.41	21.10	8.34	4.99	0.00	17.44	9.76	5.04
O.AFRICA	87.60	98.22	100.00	0.00	100.00	66.47	0.00	50.00	7.75	2.94	0.00
L.A.F.T.A	62.11	62.12	60.38	35.12	59.83	54.45	53.50	47.06	47.67	61.36	60.03
C.A.C.M	86.39	79.22	75.46	66.15	86.89	85.38	98.61	94.43	97.02	98.59	95.59
CARIBBEAN	64.88	68.15	76.92	85.65	99.68	99.68	88.11	79.46	67.69	55.99	54.21
O.AMERICA	100.00	100.00	92.14	100.00	99.93	99.91	100.00	98.96	99.54	99.98	99.86
S.ASIA	86.63	95.84	96.56	95.62	83.35	72.86	84.99	71.91	74.93	70.69	68.98
S.E.ASIA	51.40	41.27	35.18	42.32	46.97	45.79	39.59	40.23	44.25	40.18	51.17
E.ASIA	78.61	85.02	59.80	84.60	84.75	86.68	86.71	92.02	92.08	74.58	91.67
MIDDLE E.OIL	85.20	25.07	66.07	29.28	30.90	23.49	47.85	1.81	6.10	27.71	64.75
MIDDLE E.NONOIL	99.98	99.77	96.20	84.38	77.71	33.14	24.38	39.81	63.26	34.69	37.95
OCEANIA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UNIDENTIFIED REGIONS	98.40	95.03	97.03	90.33	78.30	93.64	68.71	68.19	80.41	68.61	67.45
AREAS N.E.S. AND NOT SPECIFIC	98.40	95.03	97.03	90.33	78.30	93.64	68.71	68.19	80.41	68.61	67.45
TOTAL SHARE	52.23	55.65	53.81	51.65	59.05	50.17	48.68	38.42	46.84	42.90	45.65

*NOTES: 1. SOURCE: Emami and Martin 1986

2. NA=MARKET SHARE NOT AVAILABLE DUE TO THE MISSING REPORTS ON IMPORT QUANTITY DATA.

TABLE 4.6. (CONTINUED)

IMPORTING REGIONS	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
	PERCENT OF TOTAL IMPORTS									
DEVELOPED REGIONS	39.53	31.20	37.66	32.53	30.51	37.41	40.01	43.45	40.98	39.55
N. AMERICA	1.01	0.08	0.92	3.09	2.92	21.62	1.43	NA	NA	NA
ISRAEL	87.64	89.37	99.80	100.00	100.00	100.00	100.00	100.00	97.30	100.00
EC-10	25.01	14.64	26.65	16.41	10.72	20.75	24.23	23.13	23.04	21.12
E.F.T.A	51.33	31.02	45.83	37.69	49.89	54.35	45.23	62.69	62.43	66.01
O.W. EUROPE	68.40	79.12	63.82	27.07	18.77	70.39	82.94	95.68	55.82	51.49
OCEANIA	0.00	10.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
JAPAN	67.14	56.26	53.12	57.00	59.10	58.86	56.50	59.00	60.26	59.81
DEVELOPING REGIONS	61.66	60.87	59.71	63.51	49.39	63.44	53.47	52.57	63.39	57.32
S. AFRICA	0.00	40.89	0.00	0.00	0.00	0.00	100.00	68.91	98.97	80.68
N. AFRICA	41.11	42.23	42.03	53.42	40.33	47.87	44.59	38.80	41.92	47.31
C.E.U.C.A	0.16	0.69	0.64	0.18	0.00	0.34	0.95	0.59	0.00	0.00
E.C.O.W.A.S	77.99	67.71	62.92	71.29	65.00	64.30	68.76	74.15	70.60	75.26
E. AFRICA	91.16	0.12	24.11	43.48	21.43	33.20	28.64	14.41	19.96	19.27
O.S. AFRICA	7.73	0.00	10.55	27.21	20.07	26.63	8.62	26.85	21.04	6.49
O. AFRICA	59.72	61.21	56.97	87.02	77.07	70.89	74.07	74.69	68.39	68.56
L.A.F.T.A	64.11	61.67	83.50	60.82	50.44	77.06	59.90	61.15	84.68	77.34
C.A.C.M	99.99	97.28	99.99	98.91	99.99	85.11	98.77	96.43	71.95	90.27
CARIBBEAN	65.66	74.81	81.01	72.82	51.02	49.39	53.11	71.31	80.67	79.68
O. AMERICA	99.94	99.92	94.71	100.00	99.99	97.94	97.42	98.44	99.98	78.03
S. ASIA	53.10	65.14	58.97	70.42	43.90	63.84	48.95	70.96	69.36	55.08
S.E. ASIA	54.67	45.30	31.89	50.57	31.38	47.35	52.51	54.33	61.09	64.00
E. ASIA	96.97	96.78	98.30	98.78	94.95	97.96	98.26	97.90	99.48	98.32
MIDDLE E. OIL	82.74	83.26	57.58	39.17	50.47	63.41	32.38	10.10	38.13	13.05
MIDDLE E. NONOIL	63.12	56.76	52.51	53.38	23.52	37.25	28.25	27.62	41.38	62.60
OCEANIA	1.18	0.56	0.40	0.28	0.00	0.00	0.31	0.22	0.71	0.22
UNIDENTIFIED REGIONS	100.00	100.00	0.00	74.14	75.15	90.62	80.86	89.78	88.65	92.19
AREAS N.E.S. AND NOT SPECIFIC	100.00	100.00	0.00	74.14	75.15	90.62	80.86	89.78	88.65	92.19
TOTAL SHARE	54.34	49.90	52.89	51.52	42.46	54.69	49.36	50.65	56.54	52.40

*NOTES: 1. SOURCE: Emami and Martin 1986

2. NA=MARKET SHARE NOT AVAILABLE DUE TO THE MISSING REPORTS ON IMPORT QUANTITY DATA.

AN OVERVIEW OF CANADA'S EXPORT PERFORMANCE

1962-1982

The export market share of Canada in the combined regions of DCs and LDCs declined by -8.58 percentage points from 22.31 percent to 13.73 percent during 1962-1982, (Table 4-7). The overall decline in Canada's market share was mainly due to the loss of -16.43 percentage points in DCs. This was mainly due to the loss of -18.57 percentage points in EC-10, -21.22 percentage points in E.F.T.A., and -24.72 percentage points in Japan.

However, Canada's export market share in the LDCs increased by +5.94 percentage points from 4.63 percent in 1962 to 10.57 percent in 1982. This was mainly due to the increase in its market share in N. Africa by +13.46 percentage points, in E. Africa by +15.35 percentage points, in L.A.F.T.A. by +11.06 percentage points, in S. Asia by +8.37 percentage points, in M.E. Non-oil producing countries by +8.58 percentage points, and in Unidentified regions by +3.64 percentage points. Although, Canada gained higher market shares in several LDC markets, its market share declined in S. Africa by -99.36 percentage points, in E.C.O.W.A.S. -3.37 percentage points, in O.S. Africa -17.84 percentage points, in C.A.C.M. -10.44 percentage points, in Caribbean -23.68 percentage points, and in S.E. Asia -39.57 percentage points.

TABLE 4.7. IMPORTS FROM CANADA AS A PERCENTAGE OF TOTAL IMPORTS OF IMPORTING REGION/SUBREGION (WHEAT, SITC 041.0, YEARS 1962-1982).*

IMPORTING REGIONS	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972
					PERCENT OF TOTAL IMPORTS						
DEVELOPED REGIONS	36.79	41.53	36.94	31.60	29.79	33.34	29.05	22.58	25.72	26.19	21.45
N. AMERICA	99.86	100.00	100.00	99.95	99.63	97.91	78.89	86.94	99.95	99.38	97.22
ISRAEL	0.00	19.72	13.05	0.00	0.00	0.00	0.00	3.88	0.00	2.43	0.00
EC-10	41.52	48.48	41.79	37.40	34.90	36.62	30.27	22.29	26.66	28.32	21.99
E.F.T.A	30.81	32.51	24.36	21.41	19.00	19.54	23.21	25.29	23.86	28.14	16.01
O.W.EUROPE	1.77	14.04	4.69	1.70	1.28	4.86	10.34	39.92	47.35	3.46	2.03
OCEANIA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
JAPAN	47.63	41.54	38.98	34.27	35.42	34.78	30.46	23.50	25.51	25.57	24.02
DEVELOPING REGIONS	4.63	6.28	6.75	4.75	7.61	8.21	5:96	6.72	12.22	17.29	9.97
S. AFRICA	100.00	72.25	64.65	0.00	14.69	45.94	0.00	0.00	76.77	41.07	100.00
N. AFRICA	0.53	0.66	0.00	0.00	0.16	0.71	5.54	0.75	13.25	25.20	13.65
C.E.U.C.A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
E.C.O.W.A.S	6.24	3.24	5.52	6.86	7.34	4.52	7.10	13.19	5.06	2.12	13.44
E. AFRICA	0.00	0.00	0.00	7.56	0.00	87.20	93.38	33.30	4.03	0.32	0.00
O. S. AFRICA	24.82	18.24	4.35	1.15	0.00	0.00	0.00	2.34	0.20	0.00	1.02
O. AFRICA	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	47.99	0.00	0.00
L.A.F.T.A	5.93	6.40	6.99	8.09	4.09	3.33	2.38	1.68	12.93	15.98	9.04
C.A.C.M	12.61	20.62	24.54	33.59	13.00	11.10	1.16	0.18	0.00	1.18	4.08
CARIBBEAN	35.11	31.64	23.08	10.55	0.24	0.18	11.89	20.53	32.25	43.95	42.90
O. AMERICA	0.00	0.00	7.82	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.03
S. ASIA	1.21	0.64	1.84	1.72	11.90	12.25	10.35	16.25	14.82	18.93	10.09
S.E. ASIA	40.57	43.19	40.64	26.83	11.05	2.02	2.78	2.03	2.17	14.72	10.24
E. ASIA	3.28	1.66	13.01	5.61	5.16	3.17	2.45	2.53	2.43	3.12	1.82
MIDDLE E. OIL	14.80	19.54	7.39	7.17	2.46	2.21	1.21	3.73	7.29	18.10	1.38
MIDDLE E. NONOIL	0.00	0.00	0.00	0.00	0.00	0.63	12.68	0.00	17.91	37.97	30.32
OCEANIA	97.64	100.00	100.00	100.00	37.17	0.00	0.00	0.00	0.00	0.00	0.00
UNIDENTIFIED REGIONS	0.72	1.93	2.97	1.59	0.35	1.43	3.82	1.85	0.00	6.37	5.97
AREAS N.E.S. AND NOT SPECIFIC	0.72	1.93	2.97	1.59	0.35	1.43	3.82	1.85	0.00	6.37	5.97
TOTAL SHARE	22.31	24.32	22.52	18.18	17.39	18.61	16.07	14.66	18.72	21.61	16.60

*NOTES. 1. SOURCE. Emami and Martin 1986

2. NA=MARKET SHARE NOT AVAILABLE DUE TO THE MISSING REPORTS ON IMPORT QUANTITY DATA.

TABLE 4.7. (CONTINUED)

IMPORTING REGIONS	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
					PERCENT OF TOTAL IMPORTS					
DEVELOPED REGIONS	20.61	24.15	22.89	21.07	23.27	21.26	20.73	19.86	20.46	20.36
N. AMERICA	49.37	95.61	6.82	95.89	97.02	78.38	98.57	69.89	91.01	99.93
ISRAEL	12.36	0.00	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EC-10	18.73	22.87	23.23	19.61	23.86	21.95	21.24	22.04	23.32	22.95
E. F. T. A	11.71	27.95	16.15	20.01	20.94	22.13	18.56	12.17	4.78	9.59
O. W. EUROPE	17.54	13.75	17.13	0.00	46.02	11.02	11.39	3.70	9.04	2.03
OCEANIA	0.00	0.00	0.00	0.00	0.00	NA	0.00	0.07	0.00	0.00
JAPAN	26.92	27.68	26.10	26.05	22.08	22.12	23.32	23.58	23.99	22.91
DEVELOPING REGIONS	9.79	13.31	8.56	8.52	16.88	12.19	8.30	13.22	7.82	10.57
S. AFRICA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.64
N. AFRICA	7.63	12.03	6.68	5.14	25.00	11.82	12.87	11.42	12.87	13.99
C. E. U. C. A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
E. C. O. W. A. S	3.43	12.25	6.72	5.02	10.97	9.16	7.89	3.36	4.92	2.87
E. AFRICA	0.17	0.27	28.65	2.00	16.88	31.75	25.33	7.73	11.97	15.36
O. S. AFRICA	8.54	19.56	29.19	12.83	0.00	6.16	3.87	7.70	0.00	6.98
O. AFRICA	0.00	0.00	0.00	0.00	0.00	0.99	0.31	2.18	0.00	0.00
L. A. F. T. A	9.24	22.74	9.70	17.54	18.43	17.48	5.91	22.59	9.84	16.99
C. A. C. M	0.01	2.41	0.00	0.00	0.01	0.00	0.00	0.02	7.08	2.17
CARIBBEAN	22.51	11.82	5.94	17.60	38.68	41.21	38.30	20.66	10.98	11.43
O. AMERICA	0.04	0.08	0.07	NA	0.01	0.00	0.00	0.02	0.00	0.00
S. ASIA	17.71	13.08	8.49	7.19	11.38	16.86	8.99	10.29	6.55	9.68
S. E. ASIA	10.87	9.96	13.64	6.61	13.24	1.85	0.62	1.11	0.32	1.00
E. ASIA	0.83	1.89	0.54	0.86	3.04	1.96	1.74	1.88	0.38	0.63
MIDDLE E. OIL	2.44	0.69	9.18	8.17	11.08	0.13	10.38	16.79	5.97	10.73
MIDDLE E. NONOIL	13.42	18.01	13.43	6.77	46.54	28.82	15.77	15.73	11.78	8.68
OCEANIA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UNIDENTIFIED REGIONS	0.00	0.00	0.00	0.00	0.94	6.26	1.12	0.00	0.00	4.36
AREAS N. E. S. AND NOT SPECIFIC	0.00	0.00	0.00	0.00	0.94	6.26	1.12	0.00	0.00	4.36
TOTAL SHARE	13.82	17.33	13.57	13.27	19.03	15.37	12.81	15.16	11.92	13.73

*NOTES: 1. SOURCE: Emami and Martin 1986.

2. NA=MARKET SHARE NOT AVAILABLE DUE TO THE MISSING REPORTS ON IMPORT QUANTITY DATA.

AN OVERVIEW OF AUSTRALIA'S EXPORT PERFORMANCE
1962-1982

The export market share of Australia in the combined regions of DCs and LDCs increased by +2.98 percentage points from 9.46 percent to 12.44 percent during 1962-1982, (Table 4-8). Its market share increased by +11.75 percentage points in the LDCs, but declined by -7.60 percentage points in the DCs. Australia lost market shares in all DC regions (except Oceania), but it gained market shares in all LDC regions (except E. Asia).

Its losses in the DCs include -11.70 percentage points in EC-10, -6.72 percentage points in E.F.T.A., -20.40 percentage points in O.W. Europe, and -0.34 percentage points in Japan. Its losses in two regions in the LDCs were -16.05 and -8.88 percentage points in E. Asia and Areas N.E.S., respectively. Its market share gains in the LDCs include, +10.43 percentage points in S. Africa, +9.28 percentage points in N. Africa, +15.09 percentage points in E. Africa, +21.19 percentage points in O.S. Africa, +12.13 in S. Asia, +28.33 percentage points in S.E. Asia, +57.93 percentage points in M.E. Oil producing countries, +19.36 in M.E. Non-Oil producing countries, and +97.42 percentage points in Oceania.

TABLE 4.8. IMPORTS FROM AUSTRALIA AS A PERCENTAGE OF TOTAL IMPORTS OF IMPORTING REGION/SUBREGION (WHEAT, SITC 041.0, YEARS 1962-1982).*

IMPORTING REGIONS	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972
					PERCENT OF TOTAL IMPORTS						
DEVELOPED REGIONS	13.04	8.49	10.64	8.38	7.28	9.30	9.82	15.09	13.51	17.00	14.86
N. AMERICA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA
ISRAEL	0.00	0.00	0.00	0.00	0.00	5.69	0.00	0.00	0.00	0.00	0.00
EC-10	11.70	8.85	8.88	7.34	7.06	7.11	6.13	10.62	11.76	15.63	10.24
E. F. T. A	6.75	8.44	9.61	5.76	2.48	10.93	6.54	9.90	6.90	17.46	13.45
O. W. EUROPE	20.40	2.04	0.00	0.00	1.93	2.47	37.78	47.80	40.44	2.34	5.19
OCEANIA	0.00	0.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
JAPAN	17.62	12.17	13.46	11.58	9.49	12.28	18.37	28.81	19.28	21.82	26.56
DEVELOPING REGIONS	5.24	3.28	2.49	4.28	6.90	17.02	9.33	10.43	11.36	24.47	17.53
S. AFRICA	0.00	0.00	0.00	0.00	19.59	37.56	0.00	0.00	16.17	51.46	0.00
N. AFRICA	0.00	NA	0.00	2.29	0.57	2.64	1.14	0.00	7.40	37.13	37.09
C. E. U. C. A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
E. C. O. W. A. S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA	0.00	0.00
E. AFRICA	6.84	NA	NA	NA	2.63	8.39	3.31	17.48	86.53	75.95	97.14
O. S. AFRICA	0.00	NA	0.00	NA	77.09	73.07	61.23	46.18	77.14	82.09	68.42
O. AFRICA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	34.97	27.87	97.06	0.00
L. A. F. T. A	0.00	0.30	0.00	0.00	0.25	7.50	4.47	9.38	1.93	9.36	8.42
C. A. C. M	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CARIBBEAN	0.01	0.01	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00
O. AMERICA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S. ASIA	12.15	3.52	1.60	2.67	4.41	14.36	3.94	5.36	6.36	8.53	6.75
S. E. ASIA	6.04	15.17	23.42	29.32	41.35	51.20	54.53	41.10	50.57	44.35	38.42
E. ASIA	18.10	11.30	26.92	9.13	9.88	9.52	9.86	4.10	3.97	22.05	6.33
MIDDLE E. OIL	0.00	41.03	21.88	36.06	64.63	65.14	33.62	92.10	79.43	53.49	20.56
MIDDLE E. NONOIL	0.00	NA	0.00	NA	11.17	60.19	20.08	24.00	8.46	18.94	20.16
OCEANIA	2.36	NA	0.00	NA	62.83	100.00	100.00	100.00	100.00	97.98	100.00
UNIDENTIFIED REGIONS	0.88	3.04	NA	5.60	11.76	4.93	6.47	5.16	15.02	25.02	24.02
AREAS N. E. S. AND NOT SPECIFIC	0.88	3.04	NA	5.60	11.76	4.93	6.47	5.16	15.02	25.02	24.02
TOTAL SHARE	9.46	6.62	6.75	6.45	7.10	13.58	9.49	12.80	12.49	20.80	16.32

*NOTES: 1. SOURCE: Emami and Martin 1986.

2. NA=MARKET SHARE NOT AVAILABLE DUE TO THE MISSING REPORTS ON IMPORT QUANTITY DATA.

TABLE 4.8. CONTINUED

IMPORTING REGIONS	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
				PERCENT OF TOTAL IMPORTS						
DEVELOPED REGIONS	2.75	5.35	7.33	6.37	6.31	5.59	6.55	5.34	4.96	5.44
N. AMERICA	27.46	0.00	0.00	0.00	NA	0.00	0.00	0.00	0.00	0.04
ISRAEL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EC-10	2.62	0.00	0.37	1.45	0.64	0.03	0.00	0.03	0.11	0.10
E.F.T.A	0.13	0.09	0.01	0.03	0.99	0.04	0.02	0.02	0.01	0.03
O.W. EUROPE	0.00	0.00	0.00	0.00	0.00	0.00	NA	0.00	0.00	0.00
OCEANIA	100.00	89.42	100.00	100.00	0.00	100.00	100.00	99.93	100.00	100.00
JAPAN	3.39	15.45	20.77	16.95	18.83	19.02	20.18	17.43	15.66	17.28
DEVELOPING REGIONS	7.78	11.83	14.29	13.78	13.48	10.18	15.74	13.86	12.08	16.99
S. AFRICA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.43
N. AFRICA	15.08	14.41	14.64	13.68	8.77	6.13	4.08	3.81	10.56	9.28
C.E.U.C.A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
E.C.O.W.A.S	0.00	0.00	0.00	0.00	0.00	1.04	0.39	0.00	0.00	0.00
E. AFRICA	2.81	60.79	19.58	26.64	30.92	2.90	5.13	29.62	16.30	21.93
O.S. AFRICA	28.48	21.86	27.88	31.49	25.92	33.53	31.83	13.06	21.43	21.19
O. AFRICA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
L.A.F.T.A	4.76	5.43	3.12	0.00	0.54	0.57	0.12	0.00	0.00	0.00
C.A.C.M	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CARIBBEAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
O. AMERICA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S. ASIA	2.09	13.47	12.41	15.63	18.31	9.17	32.50	8.16	10.97	24.28
S.E. ASIA	30.77	39.49	52.19	40.91	60.91	48.53	45.65	44.34	37.98	34.37
E. ASIA	2.07	1.33	1.16	0.25	1.84	0.00	0.00	0.00	NA	1.05
MIDDLE E. OIL	13.39	12.86	27.42	49.71	29.14	25.76	50.53	56.18	36.05	67.93
MIDDLE E. NONOIL	2.89	5.22	21.13	29.26	21.52	22.88	32.66	30.44	20.21	19.36
OCEANIA	98.82	99.44	99.60	99.72	99.85	100.00	99.68	99.76	99.29	99.78
UNIDENTIFIED REGIONS	0.00	0.00	0.00	22.38	19.86	3.12	6.99	10.22	1.86	0.00
AREAS N.E.S. AND NOT SPECIFIC	0.00	0.00	0.00	22.38	19.85	3.12	6.99	10.22	1.86	0.00
TOTAL SHARE	5.28	9.02	11.26	11.05	10.75	8.17	11.85	10.55	9.24	12.44

NOTES: 1. SOURCE: Emami and Martin 1986.

2. NA=MARKET SHARE NOT AVAILABLE DUE TO THE MISSING REPORTS ON IMPORT QUANTITY DATA.

AN OVERVIEW OF ARGENTINA'S EXPORT PERFORMANCE

1962-1982

The export market shares of Argentina in the combined regions of DCs and LDCs declined by -8.12 percentage points from 9.74 percent in 1962 to 1.62 percent in 1982, (Table 4-9). Its market shares declined by -10.31 percentage points in the DCs, and by -6.69 percentage points in the LDCs.

Its losses in the DCs include -16.34, -6.01, and -.24 percentage points in EC-10, E.F.T.A., and O.W. Europe regions, respectively. Its losses in the LDCs include -1.04, -17.17, -27.05 percentage points in N. Africa, E. Africa, and L.A.F.T.A, respectively. Argentina's market shares increased only by +0.48 and +8.54 percentage points in E.C.O.W.A.S., and M.E. Oil regions, respectively.

TABLE 4.9. IMPORTS FROM ARGENTINA AS A PERCENTAGE OF TOTAL IMPORTS OF IMPORTING REGION/SUBREGION (WHEAT, SITC 041.0, YEARS 1962-1982).*

IMPORTING REGIONS	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972
					PERCENT OF TOTAL IMPORTS						
DEVELOPED REGIONS	10.52	5.43	6.14	12.58	5.60	5.88	4.23	4.34	3.34	2.47	1.62
N.AMERICA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ISRAEL	0.00	0.00	0.00	5.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EC-10	16.70	8.84	10.42	18.41	9.18	9.26	6.55	6.17	5.06	3.96	2.52
E.F.T.A	6.04	7.46	2.33	13.67	5.13	6.66	2.22	3.59	1.88	0.07	1.01
O.W.EUROPE	0.56	0.00	0.00	7.64	0.96	0.00	0.00	0.00	0.00	1.97	0.00
OCEANIA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
JAPAN	0.00	0.00	0.00	0.07	0.00	0.00	0.09	0.33	0.00	0.00	0.00
DEVELOPING REGIONS	9.17	8.09	11.32	13.02	7.32	6.53	9.67	12.39	8.36	2.64	6.31
S.AFRICA	0.00	0.00	0.00	0.00	3.63	0.00	0.00	0.00	0.00	0.00	0.00
N.AFRICA	2.37	3.72	0.00	0.00	0.00	1.53	0.58	3.00	0.69	1.05	1.18
C.E.U.C.A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
E.C.O.W.A.S	0.00	0.00	0.00	2.49	0.00	0.00	0.00	0.00	0.00	0.95	0.00
E.AFRICA	17.17	0.00	0.00	21.57	6.45	0.00	0.00	0.00	0.00	0.00	0.00
O.S.AFRICA	0.00	0.00	26.31	61.16	1.43	13.21	4.97	0.00	0.00	0.00	0.00
O.AFRICA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
L.A.F.T.A	31.90	29.76	32.58	53.75	32.89	28.56	32.57	35.90	35.16	9.36	22.13
C.A.C.M	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.58	0.00	0.00	0.00
CARIBBEAN	0.00	0.00	0.00	3.80	0.04	0.00	0.00	0.00	0.00	0.00	0.00
O.AMERICA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.65	0.00	0.00	0.00
S.ASIA	0.00	0.00	0.00	0.00	0.00	0.06	0.67	2.56	1.64	0.00	0.27
S.E.ASIA	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00
E.ASIA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MIDDLE E.OIL	0.00	0.00	0.00	1.21	0.00	0.00	5.90	0.00	0.00	0.00	0.00
MIDDLE E.NONOIL	0.00	0.00	0.00	5.26	1.51	0.00	2.87	0.00	1.72	5.17	1.73
OCEANIA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UNIDENTIFIED REGIONS	0.00	0.00	0.00	1.45	7.67	0.00	0.00	0.00	1.67	0.00	0.00
AREAS N.E.S. AND NOT SPECIFIC	0.00	0.00	0.00	1.45	7.67	0.00	0.00	0.00	1.67	0.00	0.00
TOTAL SHARE	9.74	6.55	8.36	12.53	6.56	6.15	7.09	7.78	5.76	2.52	3.86

*NOTES: 1. SOURCE: Emami and Martin 1986.

2. NA=MARKET SHARE NOT AVAILABLE DUE TO THE MISSING REPORTS ON IMPORT QUANTITY DATA.

TABLE 4.9. (CONTINUED)

IMPORTING REGIONS	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
					PERCENT OF TOTAL IMPORTS					
DEVELOPED REGIONS	2.68	1.92	1.24	1.62	4.03	1.29	1.89	0.38	0.47	0.21
N. AMERICA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ISRAEL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EC-10	3.06	2.98	2.04	2.35	4.75	1.99	2.29	0.70	0.87	0.36
E.F.T.A	0.31	0.05	0.24	2.40	7.85	0.52	6.27	0.02	0.00	0.03
O.W. EUROPE	0.00	0.00	0.00	0.00	32.14	5.41	2.77	0.00	0.00	0.32
OCEANIA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
JAPAN	2.10	0.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DEVELOPING REGIONS	8.74	3.29	2.45	5.33	10.56	1.62	9.05	5.09	1.52	2.48
S. AFRICA	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
N. AFRICA	0.76	2.11	5.14	4.78	16.79	1.36	1.69	0.00	0.19	1.33
C.E.U.C.A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
E.C.O.W.A.S	0.00	0.00	0.00	0.00	0.37	0.00	0.00	0.56	0.00	0.48
E. AFRICA	0.00	27.10	15.81	0.00	0.00	0.00	0.00	0.00	0.00	0.00
O.S. AFRICA	0.00	0.00	8.81	0.00	6.28	0.00	19.94	0.00	0.00	0.00
O. AFRICA	0.00	14.09	24.17	3.91	16.65	0.00	7.49	3.15	0.00	0.00
L.A.F.T.A	20.94	8.50	2.09	20.17	25.80	4.59	30.05	15.81	3.84	4.85
C.A.C.M	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.76	3.47	0.00
CARIBBEAN	0.00	0.00	0.00	0.00	0.00	0.81	0.00	1.26	0.00	0.00
O. AMERICA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.54	0.00	0.00
S. ASIA	13.32	3.22	2.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S.E. ASIA	0.00	0.00	0.00	0.00	2.54	0.00	0.00	0.00	0.00	0.00
E. ASIA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MIDDLE E. OIL	0.00	0.00	0.00	0.00	3.28	0.00	0.10	2.42	3.77	8.54
MIDDLE E. NONOIL	4.29	0.00	4.54	3.36	4.95	0.00	4.80	0.64	0.00	0.00
OCEANIA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UNIDENTIFIED REGIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AREAS N.E.S. AND NOT SPECIFIC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL SHARE	5.72	2.68	1.92	3.73	7.62	1.43	5.93	3.14	1.10	1.62

*NOTES: 1. SOURCE: Emami and Martin 1986.

2. NA=MARKET SHARE NOT AVAILABLE DUE TO THE MISSING REPORTS ON IMPORT QUANTITY DATA.

AN OVERVIEW OF FRANCE'S EXPORT PERFORMANCE 1962-1982

The export market shares of France in the combined regions of DCs and LDCs increased by +8.64 percentage points from 3.42 percent in 1962 to 12.06 percent in 1982, (Table 4-10). Its market shares increased by +16.02 percentage points in the DCs, and by +6.01 percentage points in the LDCs.

France is the only exporting country that lost only in two markets; E.F.T.A. in the DCs and E.C.O.W.A.S. in the LDCs, by -7.95 and -49.78 percentage points, respectively. Its export market shares in terms of percentage points increased by +30.22 in EC-10, +10.83 in O.W. Europe, +4.95 in S. Africa, +11.80 in N. Africa, +14.15 in E. Africa, +60.70 in O.S. Africa, +26.18 in O. Africa, +0.81 in L.A.F.T.A., +4.47 in C.A.C.M., +8.09 in Caribbean, +19.56 in O. America, +5.58 in S. Asia, +0.14 in S.E. Asia, +0.75 in M.E. Oil, +8.73 in M.E. Non-Oil, and +2.41 in Areas N.E.S.

TABLE 4.10. IMPORTS FROM FRANCE AS A PERCENTAGE OF TOTAL IMPORTS OF IMPORTING REGION/SUBREGION (WHEAT, SITC 041.0, YEARS 1962-1982).*

IMPORTING REGIONS	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972
				PERCENT OF TOTAL IMPORTS							
DEVELOPED REGIONS	4.85	5.64	9.06	9.32	6.91	7.05	13.41	23.85	14.65	15.50	23.39
N. AMERICA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ISRAEL	0.00	0.00	0.00	3.17	0.00	0.00	0.08	1.12	0.00	0.00	0.00
EC-10	6.34	7.66	13.52	12.07	9.24	10.31	18.84	34.04	21.42	24.30	35.68
E.F.T.A	13.52	18.78	14.32	27.52	19.94	13.41	27.16	19.83	14.91	13.17	20.75
O.W. EUROPE	0.11	0.08	0.24	0.31	0.45	0.86	4.05	9.26	4.28	0.24	1.84
OCEANIA	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
JAPAN	0.00	0.00	0.76	0.00	0.00	0.00	0.20	1.36	0.00	0.00	0.00
DEVELOPING REGIONS	1.72	1.51	2.47	5.26	2.78	3.94	9.64	8.37	4.37	1.65	3.06
S. AFRICA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
N. AFRICA	6.92	7.37	8.81	25.35	12.28	28.45	46.04	45.03	20.26	1.19	6.22
C.E.U.C.A	0.00	100.00	99.77	100.00	99.94	99.63	100.00	95.87	97.01	99.71	99.88
E.C.O.W.A.S	68.00	57.21	78.22	56.20	50.93	48.53	51.49	31.10	35.05	25.64	30.55
E. AFRICA	0.00	0.00	0.00	11.18	0.00	0.00	0.00	0.00	0.00	19.03	0.00
O.S. AFRICA	0.04	4.09	0.00	10.28	0.01	5.38	28.59	28.87	5.22	8.13	25.40
O. AFRICA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	46.88
L.A.F.T.A	0.00	0.00	0.00	0.32	0.00	0.00	3.33	0.00	0.00	0.00	0.00
C.A.C.M	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CARIBBEAN	0.00	0.21	0.00	0.00	0.00	0.14	0.00	0.00	0.06	NA	2.77
O. AMERICA	0.00	0.00	0.00	0.00	0.07	0.09	0.00	0.39	0.03	0.01	0.08
S. ASIA	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.00	0.30	0.54	0.00
S.E. ASIA	0.00	0.00	0.00	0.04	0.11	0.00	0.33	11.06	2.72	0.02	0.00
E. ASIA	0.00	0.00	0.00	0.00	0.00	0.00	0.64	1.03	1.14	0.00	0.00
MIDDLE E. OIL	0.00	0.00	0.57	21.09	0.00	0.00	7.92	0.01	0.00	0.00	0.01
MIDDLE E. NONOIL	0.01	0.06	3.80	10.37	3.00	1.71	36.09	2.91	0.81	0.00	1.10
OCEANIA	0.00	0.00	0.00	0.00	0.00	NA	0.00	0.00	NA	2.02	0.00
UNIDENTIFIED REGIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.06	15.30	0.00	0.00	0.00
AREAS N.E.S. AND NOT SPECIFIC	0.00	0.00	0.00	0.00	0.00	0.00	0.06	15.30	0.00	0.00	0.00
TOTAL SHARE	3.42	3.61	5.90	7.18	4.59	5.17	11.11	16.83	9.41	8.44	13.11

*NOTES. 1. SOURCE. Emami and Martin 1986.

2. NA=MARKET SHARE NOT AVAILABLE DUE TO THE MISSING REPORTS ON IMPORT QUANTITY DATA.

TABLE 4.10. (CONTINUED)

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IMPORTING REGIONS	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
	PERCENT OF TOTAL IMPORTS									
DEVELOPED REGIONS	27.00	28.35	17.16	25.88	26.19	25.20	23.15	20.31	24.08	20.87
N. AMERICA	0.00	0.00	0.00	NA	0.00	0.00	0.00	0.00	0.00	0.00
ISRAEL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.70	0.00
EC-10	40.70	46.26	26.57	41.75	45.22	41.76	40.28	35.86	39.05	36.56
E.F.T.A	17.63	21.63	21.07	16.16	1.88	8.32	16.76	14.34	21.23	6.57
O.W. EUROPE	2.11	6.57	13.41	15.14	0.57	1.86	1.06	0.11	21.41	10.94
OCEANIA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
JAPAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DEVELOPING REGIONS	5.07	7.84	8.97	5.91	3.69	4.50	8.47	10.37	12.04	7.73
S. AFRICA	0.00	59.11	100.00	0.00	0.00	100.00	0.00	0.00	1.03	4.95
N. AFRICA	16.18	25.08	23.65	14.76	0.90	7.31	22.62	33.79	31.89	18.72
C.E.U.C.A	99.16	99.31	99.36	99.82	99.79	99.66	99.05	99.39	100.00	100.00
E.C.O.W.A.S	17.32	18.65	29.92	22.71	22.27	21.39	21.09	20.17	21.20	18.22
E. AFRICA	1.45	5.71	0.00	0.00	5.12	22.90	7.91	5.87	41.13	14.15
O.S. AFRICA	38.19	25.42	18.54	18.23	24.12	27.10	28.23	36.14	48.36	60.74
O. AFRICA	16.35	8.93	17.80	9.07	4.08	25.63	17.87	13.25	28.10	26.18
L.A.F.T.A	0.00	0.16	0.10	0.99	0.04	0.30	3.78	0.00	1.67	0.81
C.A.C.M	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.19	1.05	4.47
CARIBBEAN	11.83	13.37	13.05	9.58	10.20	8.38	8.56	6.75	8.35	8.09
O. AMERICA	0.02	0.00	0.00	0.00	0.00	NA	NA	0.00	NA	19.56
S. ASIA	1.56	1.95	8.51	4.29	12.26	5.55	6.00	5.95	10.65	6.58
S.E. ASIA	0.73	1.30	0.55	0.90	0.00	0.34	0.30	0.21	0.59	0.14
E. ASIA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MIDDLE E. OIL	0.00	0.00	0.00	0.00	0.00	0.00	0.04	5.83	6.52	0.75
MIDDLE E. NONOIL	6.83	18.67	1.24	1.33	0.00	3.93	4.22	9.68	7.98	8.74
OCEANIA	0.00	0.00	NA	0.00	0.00	0.00	0.00	0.00	NA	0.00
UNIDENTIFIED REGIONS	0.00	0.00	0.00	3.25	0.00	0.00	0.00	0.00	8.89	2.41
AREAS N.E.S. AND NOT SPECIFIC	0.00	0.00	0.00	3.25	0.00	0.00	0.00	0.00	8.89	2.41
TOTAL SHARE	13.98	15.81	11.70	13.68	12.70	12.13	13.80	13.65	16.10	12.06

*NOTES: 1. SOURCE: Emami and Martin 1986.

2. NA=MARKET SHARE NOT AVAILABLE DUE TO THE MISSING REPORTS ON IMPORT QUANTITY DATA.

AN OVERVIEW OF OTHERS' EXPORT PERFORMANCE

1962-1982

The export market shares of Others in the combined regions of the DCs and LDCs increased by +4.91 percentage points from 2.85 percent in 1962 to 7.76 percent in 1982, (Table 4-11). Its market shares increased by +8.65 percentage points in the DCs, and by +4.60 percentage points in the LDCs.

Others gained market shares in all but three regional markets (O. Africa, L.A.F.T.A., and S.E. Asia). Its export market shares, in terms of percentage points, increased by +11.81 in EC-10, +13.24 in E.F.T.A., +33.57 in O.W. Europe, +3.30 in S. Africa, +8.07 in N. Africa, +3.03 in E.C.O.W.A.S., +29.22 in E. Africa, +4.59 in O.S. Africa, +2.09 in C.A.C.M., +0.80 in Caribbean, +2.41 in O. America, +5.48 in S. Asia, +9.01 in M.E. Oil, +10.82 in M.E. Non-Oil, and +1.04 in Areas N.E.S. It lost -7.14, -0.04, and -1.50 percentage points in O. Africa, L.A.F.T.A., and S.E. Asia, respectively.

TABLE 4.11. IMPORTS FROM "OTHER EXPORTERS" AS A PERCENTAGE OF TOTAL IMPORTS OF IMPORTING REGION/SUBREGION (WHEAT, SITC 041.0, YEARS 1962-1982).*

IMPORTING REGIONS	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972
				PERCENT OF TOTAL IMPORTS							
DEVELOPED REGIONS	4.92	5.51	4.89	6.02	8.69	10.13	12.94	11.62	8.58	5.12	5.95
N. AMERICA	0.00	0.00	0.00	0.05	0.37	2.09	21.11	14.06	0.06	0.52	1.39
ISRAEL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	17.92	6.21	0.03	0.07
EC-10	7.19	9.06	7.01	8.74	12.67	13.39	18.29	14.18	11.28	7.41	8.28
E. F. T. A	5.53	6.93	9.40	11.37	19.13	29.67	25.79	29.80	17.77	9.28	13.81
O. W. EUROPE	1.65	0.01	1.16	0.01	0.04	0.63	1.88	3.02	7.93	2.03	0.16
OCEANIA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA
JAPAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	NA	0.00	0.00
DEVELOPING REGIONS	0.31	0.91	0.20	2.03	2.62	3.69	2.70	6.99	5.09	2.65	5.07
S. AFRICA	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00
N. AFRICA	1.30	1.31	0.37	9.32	11.27	15.28	8.51	16.00	21.30	6.25	8.24
C. E. U. C. A	0.00	0.00	0.08	0.00	0.06	0.00	0.00	4.13	2.92	0.00	NA
E. C. O. W. A. S	0.14	1.33	0.38	0.05	0.87	NA	3.29	1.53	0.91	0.36	1.30
E. AFRICA	0.09	0.00	0.00	7.58	0.09	0.00	3.31	0.55	9.44	3.98	2.61
O. S. AFRICA	0.00	0.00	0.00	NA	0.37	0.00	0.22	22.61	NA	0.02	0.12
O. AFRICA	12.40	1.78	0.00	100.00	0.00	33.53	0.00	15.03	16.39	NA	53.13
L. A. F. T. A	0.05	1.42	0.05	2.71	2.93	6.16	3.76	5.98	2.32	3.95	0.38
C. A. C. M	1.00	0.16	NA	0.25	0.10	3.52	0.23	3.81	2.98	0.23	0.33
CARIBBEAN	0.00	0.00	NA	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.13
O. AMERICA	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.43	0.00	0.03
S. ASIA	0.00	0.00	0.00	0.00	0.34	0.37	0.05	3.92	3.05	1.31	13.91
S. E. ASIA	1.99	0.37	0.77	1.41	0.52	0.98	2.77	5.58	0.29	0.78	0.17
E. ASIA	0.00	2.02	0.27	0.77	0.21	0.63	0.34	0.32	0.38	0.25	0.18
MIDDLE E. OIL	0.00	14.35	4.09	5.19	2.01	9.16	3.49	2.36	7.19	0.70	13.30
MIDDLE E. NONOIL	0.00	0.17	NA	0.00	6.62	4.33	3.90	33.28	7.83	3.22	8.74
OCEANIA	0.00	0.00	NA	0.00	0.00	0.00	0.00	NA	0.00	0.00	0.00
UNIDENTIFIED REGIONS	0.00	0.00	0.00	1.02	1.93	0.00	20.94	9.49	2.90	0.00	2.56
AREAS N. E. S. AND NOT SPECIFIC	0.00	0.00	0.00	1.02	1.93	0.00	20.94	9.49	2.90	0.00	2.56
TOTAL SHARE	2.85	3.26	2.67	4.01	5.31	6.32	7.57	9.53	6.79	3.83	5.46

*NOTES: 1. SOURCE: Emami and Martin 1986.

2. NA=MARKET SHARE NOT AVAILABLE DUE TO THE MISSING REPORTS ON IMPORT QUANTITY DATA.

TABLE 4.11. (CONTINUED)

IMPORTING REGIONS	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
					PERCENT OF TOTAL IMPORTS					
DEVELOPED REGIONS	7.54	9.03	13.72	12.81	9.68	9.27	7.67	10.66	9.06	13.57
N. AMERICA	22.17	4.30	92.26	1.03	0.06	NA	NA	30.11	8.99	0.04
ISRAEL	0.00	10.63	0.00	0.00	0.00	0.00	0.00	NA	0.00	0.00
EC-10	9.89	13.26	21.14	18.34	14.82	13.52	11.95	18.25	13.60	19.00
E.F.T.A	18.88	19.26	16.70	23.72	18.45	14.64	13.16	10.77	11.54	18.77
O.W. EUROPE	11.95	0.56	5.64	57.79	2.49	11.32	1.85	0.51	13.73	35.22
OCEANIA	0.00	0.00	0.00	0.00	0.00	0.00	NA	0.00	0.00	NA
JAPAN	0.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00
DEVELOPING REGIONS	6.95	2.87	6.01	2.94	6.00	8.08	4.97	4.89	3.15	4.91
S. AFRICA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	31.09	0.00	3.30
N. AFRICA	19.34	4.14	7.86	8.23	8.22	25.51	14.15	12.18	2.57	9.37
C.E.U.C.A	0.68	0.00	0.00	0.00	0.21	0.00	0.00	0.02	0.00	0.00
E.C.O.W.A.S	1.26	1.49	0.44	0.98	1.57	4.11	1.86	1.77	3.28	3.17
E. AFRICA	4.40	6.01	11.95	27.89	25.65	9.26	32.99	42.36	10.64	29.31
O.S. AFRICA	17.05	33.17	5.04	10.23	24.61	7.58	7.51	16.25	9.17	4.59
O. AFRICA	23.93	15.77	1.07	0.00	2.20	2.49	0.26	6.72	3.51	5.26
L.A.F.T.A	0.94	1.49	1.47	0.48	4.74	0.00	0.24	0.09	0.07	0.01
C.A.C.M	0.00	0.31	0.01	1.09	0.01	14.89	1.23	1.60	16.46	3.09
CARIBBEAN	0.00	0.00	NA	NA	0.11	0.22	0.03	0.02	0.00	0.80
O. AMERICA	0.00	0.00	5.22	NA	NA	2.06	2.58	0.00	0.02	2.41
S. ASIA	12.21	3.13	9.52	2.46	14.15	4.58	3.57	4.64	2.48	5.48
S.E. ASIA	2.95	3.95	1.74	1.11	1.93	1.93	1.02	0.00	0.02	0.49
E. ASIA	0.12	0.00	0.01	0.10	0.17	0.09	0.00	0.23	0.14	0.00
MIDDLE E. OIL	1.42	3.18	5.82	2.94	6.03	10.70	6.57	8.68	9.55	9.01
MIDDLE E. NONOIL	9.44	1.34	7.15	5.90	3.46	7.13	14.30	15.88	18.65	10.82
OCEANIA	0.00	NA	0.00	0.00	0.15	NA	0.01	0.01	NA	NA
UNIDENTIFIED REGIONS	0.00	0.00	0.00	0.22	4.06	0.00	11.02	0.00	0.60	1.04
AREAS N.E.S. AND NOT SPECIFIC	0.00	0.00	0.00	0.22	4.06	0.00	11.02	0.00	0.60	1.04
TOTAL SHARE	6.85	5.25	8.66	6.75	7.44	8.20	6.25	6.84	5.11	7.76

*NOTES: 1. SOURCE: Emami and Martin 1986.

2. NA=MARKET SHARE NOT AVAILABLE DUE TO THE MISSING REPORTS ON IMPORT QUANTITY DATA.

REGIONAL DISTRIBUTION OF EXPORTS OF WHEAT TO DC and LDC 1962-1982

During the 1962-1982 period there were substantial shifts in the regional distribution of wheat exports by the six major exporting countries to the DCs and LDCs (Tables 4-12 and 4-13). The percentage of total wheat exports to the DCs declined by -20.82 percentage points from 55.20 percent in 1962 to 34.38 percent in 1982. During the same time period the percentage of total wheat exports to LDCs increased by +19.36 percentage points from 42.85 percent in 1962 to 62.21 percent in 1982. The Areas N.E.S. imported +1.46 percentage points more from exporting countries in 1982 than 1962.

The percentage of total wheat exports to each individual DC region declined significantly during 1962 and 1982. The major declines in terms of percentage points were for EC-10 by -14.32 (-43.37 percent), followed by O.W. Europe by -4.96 (-76.66 percent), E.F.T.A. by -1.19 (-27.80 percent), and Israel by -0.29 (-25.22 percent). Japan's import share of total imports of combined the DCs and LDCs increased by only +0.21 percentage points (+2.15 percent) from 9.78 percent in 1962 to 9.99 percent in 1982.

In contrast to import regions of DCs, most regions in the LDCs increased their shares of total imports of the combined DCs and LDCs, during the same time period. The major increases in terms of percentage points were for M.E. Oil by +6.81 (+896.05 percent), followed by N. Africa by +5.90 (+79.09 percent), S.E. Asia by +4.36 (+343.31 percent), L.A.F.T.A. by +2.90 (+24.94 percent), E.C.O.W.A.S. by +2.59 (+784 percent), E. Asia by +1.47 (+77.78 percent), Caribbean by +0.54 (138.46 percent), O.S. Africa by +0.45 (+225.00 percent), C.A.C.M. by +0.38 (+95.00 percent), E. Africa by +0.36 (+133.33 percent), O. Africa by +0.34, O. America by +0.20, C.E.U.C.A. by +0.18, S. Africa, and Oceania by +0.14. The total wheat exports to S. Asia, and M.E. Non-Oil declined in terms of percentage points by -6.81 (-45.43 percent), and -0.65 (-19.94 percent), respectively.

TABLE 4.12. IMPORT MARKET SHARES AS PERCENTAGE OF TOTAL IMPORTS OF ALL IMPORTING REGIONS (WHEAT, SITC 041.0, YEARS 1962-1982).*

IMPORTING REGIONS	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972
DEVELOPED REGIONS	56.20	51.83	52.76	50.34	44.36	41.84	43.97	53.53	49.70	49.23	49.74
N. AMERICA	0.51	0.49	0.29	0.07	0.10	0.03	0.04	0.12	0.12	0.03	0.01
ISRAEL	1.15	1.04	0.83	0.67	0.83	0.33	1.07	1.17	1.05	0.81	0.64
EC-10	33.02	28.55	30.06	29.43	24.43	24.15	27.31	34.85	31.45	29.76	30.84
E. F. T. A	4.28	3.88	4.68	4.02	3.95	3.36	2.65	3.50	3.62	3.01	2.92
O. W. EUROPE	6.47	6.17	2.72	4.26	4.05	1.21	0.25	0.13	0.11	1.73	1.20
OCEANIA	0.00	0.00	0.68	0.51	0.32	0.22	0.06	0.00	0.18	0.15	0.03
JAPAN	9.78	11.70	13.50	11.38	10.68	12.53	12.69	13.77	13.16	13.74	14.10
DEVELOPING REGIONS	42.85	46.76	45.19	47.40	54.86	56.45	54.04	44.03	48.61	49.31	48.33
S. AFRICA	0.07	1.11	0.63	0.00	1.76	1.77	0.05	0.00	0.36	0.13	0.04
N. AFRICA	7.46	5.96	5.94	5.61	7.44	5.94	6.76	5.57	5.94	9.40	8.47
C. E. U. C. A	0.00	0.00	0.05	0.05	0.05	0.08	0.17	0.17	0.13	0.14	0.18
E. C. O. W. A. S	0.33	0.44	0.65	0.70	1.00	0.78	1.03	1.22	1.53	1.64	1.69
E. AFRICA	0.27	0.02	0.00	0.08	0.15	0.01	0.02	0.03	0.10	0.19	0.25
O. S. AFRICA	0.20	0.23	0.29	0.34	0.43	0.56	0.72	0.60	0.98	0.82	0.79
O. AFRICA	0.00	0.01	0.01	0.01	0.01	0.02	0.00	0.01	0.02	0.00	0.03
L. A. F. T. A	11.63	11.96	15.47	10.78	11.87	12.28	14.92	13.94	10.60	11.35	13.10
C. A. C. M	0.40	0.46	0.54	0.58	0.42	0.66	0.85	0.81	0.82	0.81	0.79
CARIBBEAN	0.39	0.42	0.38	0.35	0.37	0.57	0.61	0.74	0.70	0.54	0.64
O. AMERICA	0.00	0.06	0.10	0.09	0.11	0.11	0.12	0.25	0.26	0.29	0.27
S. ASIA	14.88	16.69	16.63	21.63	24.53	24.98	18.84	10.44	14.39	7.70	7.84
S. E. ASIA	1.27	1.67	1.66	1.83	2.41	2.94	3.33	3.30	3.25	3.02	4.20
E. ASIA	1.89	3.71	0.91	1.83	1.53	2.41	3.11	4.81	3.77	6.22	6.32
MIDDLE E. OIL	0.76	0.58	1.04	1.73	0.91	2.24	2.11	0.53	1.29	5.63	2.91
MIDDLE E. NONOIL	3.26	3.40	0.86	1.80	1.88	1.11	1.38	1.62	4.49	2.44	1.79
OCEANIA	0.06	0.04	0.03	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.00
UNIDENTIFIED REGIONS	1.95	1.41	2.04	2.26	0.78	1.71	1.99	2.44	1.69	1.46	1.94
AREAS N. E. S. AND NOT SPECIFIC	1.95	1.41	2.04	2.26	0.78	1.71	1.99	2.44	1.69	1.46	1.94
TOTAL	100.00	100.00	99.99	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.01

*NOTES. 1. SOURCE. Emami and Martin 1986.

2. DUE TO THE ROUNDINGS IN THE PREVIOUS TABLES TOTALS IN LAST ROW MAY NOT ADD TO 100.

TABLE 4.12. (CONTINUED)

IMPORTING REGIONS	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
DEVELOPED REGIONS	41.80	39.66	36.90	39.20	40.49	37.75	38.59	37.10	34.66	34.38
N. AMERICA	0.01	0.19	0.03	0.05	0.08	0.00	0.01	0.01	0.00	0.09
ISRAEL	0.54	0.65	1.01	0.91	0.99	1.03	1.05	0.71	0.68	0.86
EC-10	26.72	23.06	22.22	23.37	23.34	22.16	20.68	19.82	18.60	18.70
E.F.T.A	2.32	2.29	1.96	2.01	2.36	3.01	3.54	2.99	3.98	3.09
O.W.EUROPE	0.14	1.15	0.13	0.41	1.06	0.56	1.18	2.75	1.03	1.51
OCEANIA	0.03	0.30	0.28	0.06	0.00	0.01	0.10	0.11	0.08	0.14
JAPAN	12.04	12.02	11.26	12.40	12.66	10.99	12.04	10.72	10.30	9.99
DEVELOPING REGIONS	53.18	58.29	59.84	58.74	56.74	58.26	57.44	58.97	61.71	62.21
S. AFRICA	0.03	0.02	0.00	0.00	0.00	0.00	0.02	0.02	0.53	0.21
N. AFRICA	8.18	11.17	11.34	11.16	12.89	12.60	11.82	12.40	13.44	13.36
C.E.U.C.A	0.17	0.13	0.19	0.16	0.28	0.16	0.17	0.22	0.21	0.18
E.C.O.W.A.S	3.37	2.44	1.44	2.41	2.99	2.76	2.83	2.83	3.16	2.92
E. AFRICA	0.21	0.22	0.39	0.21	0.50	0.75	0.24	0.36	0.65	0.63
O.S.AFRICA	0.42	0.49	0.57	0.61	0.68	0.42	0.57	0.52	0.65	0.65
O. AFRICA	0.07	0.21	0.11	0.31	0.35	0.28	0.39	0.37	0.36	0.34
L.A.F.T.A	13.58	14.18	9.52	12.69	12.68	16.71	15.85	17.50	16.58	14.53
C.A.C.M	0.67	0.60	0.66	0.68	0.82	0.80	0.74	0.86	0.78	0.78
CARIBBEAN	0.78	0.75	0.78	1.00	0.97	0.98	0.99	1.21	1.09	0.93
O. AMERICA	0.25	0.19	0.25	0.28	0.30	0.24	0.24	0.22	0.23	0.20
S. ASIA	12.23	12.08	20.96	16.52	5.88	6.96	6.69	4.06	5.33	8.12
S.E.ASIA	4.48	4.34	3.90	5.02	4.97	4.65	5.00	6.19	5.81	5.63
E. ASIA	4.29	3.23	3.23	4.08	4.77	3.48	3.72	3.75	3.78	3.36
MIDDLE E.OIL	2.51	4.93	4.06	2.69	6.25	5.83	6.23	6.87	6.52	7.57
MIDDLE E.NONOIL	1.92	3.24	2.36	0.82	2.31	1.51	1.78	1.47	2.44	2.61
OCEANIA	0.02	0.08	0.07	0.10	0.10	0.13	0.16	0.14	0.16	0.20
UNIDENTIFIED REGIONS	5.03	2.06	3.26	2.06	2.77	3.99	3.97	3.93	3.63	3.41
AREAS N.E.S. AND NOT SPECIFIC	5.03	2.06	3.26	2.06	2.77	3.99	3.97	3.93	3.63	3.41
TOTALS	100.01	100.01	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

*NOTES: 1. SOURCE: Emami and Martin 1986.

2. DUE TO THE ROUNDINGS IN THE PREVIOUS TABLES TOTALS IN LAST ROW MAY NOT ADD TO 100.

TABLE 4-13: CHANGES IN IMPORT MARKET SHARES OF IMPORTING REGIONS AS PERCENTAGE OF TOTAL IMPORTS OF DCs AND LDCs, 1962-1982*

IMPORTING REGIONS	1962	1982	62-82	62-82
	PERCENTAGE		%POINTS	PERCENTAGE
DEVELOPED REGIONS	55.20	34.38	(20.82)	(37.72)
N.AMERICA	0.51	0.09	(0.42)	(82.35)
ISRAEL	1.15	0.86	(0.29)	(25.22)
EC-10	33.02	18.70	(14.32)	(43.37)
E.F.T.A	4.28	3.09	(1.19)	(27.80)
O.W.EUROPE	6.47	1.51	(4.96)	(76.66)
OCEANIA	0.00	0.14	0.14	-----
JAPAN	9.78	9.99	0.21	2.15
DEVELOPING REGIONS	42.85	62.21	19.36	45.18
S.AFRICA	0.07	0.21	0.14	200.00
N.AFRICA	7.46	13.36	5.90	79.09
C.E.U.C.A	0.00	0.18	0.18	----
E.C.O.W.A.S	0.33	2.92	2.59	784.85
E.AFRICA	0.27	0.63	0.36	133.33
O.S.AFRICA	0.20	0.65	0.45	225.00
O.AFRICA	0.00	0.34	0.34	----
L.A.F.T.A	11.63	14.53	2.90	24.94
C.A.C.M	0.40	0.78	0.38	95.00
CARIBBEAN	0.39	0.93	0.54	138.46
O.AMERICA	0.00	0.20	0.20	----
S.ASIA	14.88	8.12	(6.76)	(45.43)
S.E.ASIA	1.27	5.63	4.36	343.31
E.ASIA	1.89	3.36	1.47	77.78
MIDDLE E.OIL	0.76	7.57	6.81	896.05
MIDDLE E.NONOIL	3.26	2.61	(0.65)	(19.94)
OCEANIA	0.06	0.20	0.14	233.33
UNIDENTIFIED REGIONS	1.95	3.41	1.46	74.87
AREAS N.E.S. AND NOT SPECIFIC	1.95	3.41	1.46	74.87
TOTAL DC&LDC SHARES	100.00	100.00	0.00	0.00

*SOURCE: TABLES 4-12.

SUMMARY OF EXPORT PERFORMANCE OF MAJOR EXPORTING COUNTRIES 1962-1982

During the 1962-1982 period, the import share of importing regions in the DCs (mainly Israel, EC-10, E.F.T.A., O.W. Europe, New Zealand, and Japan) declined by -20.82 percentage points (37.72 percent). Also, their share of production, out of the combined DC and LDC production, reduced both collectively and individually (except for Israel), (Table 4-5). The three exporting countries of Canada, Australia, and Argentina collectively lost -34.34 percentage points of their market shares in the DCs to France (16.02), the U.S. (9.67), and Others (8.65), (Table 4-14). Interestingly, these three exporting countries gained market shares while they exported smaller percentages of their total exports to the DCs in 1982 than in 1962 (Table 4-15).

During the same period, the import share of the LDC and Areas N.E.S. importers increased by +19.36 and +1.46 percentage points, respectively. The volume of production in the LDCs increased by 123.20 percent while their production market shares increased by only 4.86 percentage points (15.32 percent), (Table 4-2 and 4-5). The four exporting countries of Australia, France, Canada, and Others increased their market shares in the LDCs by +11.75, +6.01, +5.94, and 4.60 percentage points, respectively. The U.S. market shares declined by -21.60 percentage points, and Argentina's market share declined by -6.69 percentage points (Table 4-14). All exporting countries exported a higher percentage of their exports to the LDCs in 1982 than in 1962 (Table 4-15).

In summary, during the 1962-1982 time period, the U.S. remained the major wheat exporting country in both the DCs and the LDCs regions (See Figures 1 to 3). However, while it became more dependent on the LDCs import market, it lost significant market shares to Canada, Australia, France, and Others in the LDCs. Canada's market shares declined in the combined DCs and LDCs regions due to the major losses in the DCs regions. However, Canada increased the percentage of its exports going to the LDCs as well as its market share in that region. The market shares of France increased in both the DCs and LDCs. France increased the percentage of its exports going to the LDCs by the same amount that it was decreased in the DCs. Australia increased its market shares in the combined DCs and LDCs; Although it lost market shares in the DCs, it increased market shares in the LDCs more than offset its losses in the DCs. Argentina lost market shares almost everywhere except in M.E. Oil region. The group Others, increased its market share almost everywhere except in O. Africa, L.A.F.T.A., and S.E. Asia. The higher percentage of Others exports went to the LDCs rather than the DCs.

TABLE 4.14. CHANGES IN EXPORT MARKET SHARES OF MAJOR WHEAT EXPORTING COUNTRIES IN DCs AND LDCs REGIONS/SUBREGIONS, 1962-1982.*

IMPORTING REGIONS	U.S.A. 62-82	CANADA 62-82	AUSTRALIA 62-82	ARGENTINA 62-82	FRANCE 62-82	OTHERS 62-82
	PERCENT POINTS					
DEVELOPED REGIONS	9.67	(16.43)	(7.60)	(10.31)	16.02	8.65
N. AMERICA	NA	0.08	0.04	0.00	0.00	0.04
ISRAEL	O.E.	0.00	0.00	0.00	0.00	0.00
EC-10	4.57	(18.57)	(11.70)	(16.34)	30.22	11.81
E.F.T.A	28.66	(21.22)	(6.72)	(6.01)	(7.95)	13.24
O.W. EUROPE	(24.02)	0.26	(20.40)	(0.24)	10.83	33.57
OCEANIA	0.00	0.00	O.E.	0.00	0.00	NA
JAPAN	26.06	(24.72)	(0.34)	0.00	0.00	0.00
DEVELOPING REGIONS	(21.60)	5.94	11.75	(6.69)	6.01	4.60
S. AFRICA	80.68	(99.36)	10.43	0.00	4.96	3.30
N. AFRICA	(41.57)	13.46	9.28	(1.04)	11.80	8.07
C.E.U.C.A	0.00	0.00	0.00	0.00	O.E.	0.00
E.C.O.W.A.S	49.64	(3.37)	0.00	0.48	(49.78)	3.03
E. AFRICA	(56.63)	15.35	15.09	(17.17)	14.16	29.22
O.S. AFRICA	(68.65)	(17.84)	21.19	0.00	60.70	4.59
O. AFRICA	(19.04)	0.00	0.00	0.00	26.18	(7.14)
L.A.F.T.A	16.23	11.06	0.00	(27.05)	0.81	(0.04)
C.A.C.M	3.88	(10.44)	0.00	0.00	4.47	2.09
CARIBBEAN	14.80	(23.68)	(0.01)	0.00	8.09	0.80
O. AMERICA	(21.97)	0.00	0.00	0.00	19.56	2.41
S. ASIA	(31.55)	8.37	12.13	0.00	5.58	5.48
S.E. ASIA	12.60	(39.57)	28.33	0.00	0.14	(1.50)
E. ASIA	19.71	(2.65)	(16.05)	0.00	0.00	0.00
MIDDLE E. OIL	(72.15)	(4.07)	57.93	8.54	0.75	9.01
MIDDLE E. NONOIL	(47.38)	8.58	19.36	0.00	8.73	10.82
OCEANIA	0.22	(97.64)	97.42	0.00	0.00	NA
UNIDENTIFIED REGIONS	(6.21)	3.64	(0.88)	0.00	2.41	1.04
AREAS N.E.S. AND NOT SPECIFIC	(6.21)	3.64	(0.88)	0.00	2.41	1.04
TOTAL DC&LDC SHARES	0.17	(8.58)	2.98	(8.12)	8.64	4.91

*NOTES:
1. SOURCE: TABLES 4-6 to 4-11.
2. NA = NOT AVAILABLE.
3. NEGATIVE NUMBERS IN PARENTHESES.
4. THE EXPORTS OF FRANCE TO OCEANIA DC IN 1962 ARE IGNORED SINCE IT WAS THE ONLY YEAR THAT FRANCE EXPORTED TO THAT REGION.
5. O.E. = THE ONLY EXPORTER TO THAT REGION.

TABLE 4.15. CHANGES IN THE DISTRIBUTION OF TOTAL EXPORTS OF EXPORTING COUNTRIES IN IMPORT REGIONS, 1962-82.*

IMPORTING REGIONS	MAJOR EXPORTER COUNTRIES: U.S.	CANADA	AUSTRALIA	ARGENTINA	FRANCE	OTHER EXPORTERS	CHANGE IN TOTAL IMPORT SHARES
	PERCENTAGE POINTS						
DEVELOPED REGIONS	(5.63)	(40.04)	(61.04)	(55.09)	(18.94)	(35.18)	(20.82)
N. AMERICA	NA	(1.59)	0.00	0.00	0.00	0.00	(0.41)
ISRAEL	(0.56)	0.00	0.00	0.00	0.00	0.00	(0.29)
EC-10	(2.92)	(30.20)	NA	(52.42)	(4.58)	(37.47)	(14.32)
E.F.T.A	0.83	(3.76)	(3.05)	(2.60)	(15.51)	(0.83)	(1.19)
O.W. EUROPE	(7.87)	(0.29)	(13.95)	(0.08)	1.15	3.11	(4.96)
OCEANIA	0.00	0.00	1.14	0.00	0.00	0.00	0.14
JAPAN	4.89	(4.21)	(4.34)	0.00	0.00	0.00	0.21
DEVELOPING REGIONS	3.30	39.02	61.22	55.09	18.25	34.73	19.36
S. AFRICA	0.33	(0.31)	0.18	0.00	0.09	0.09	0.14
N. AFRICA	(0.63)	13.43	9.97	9.16	5.64	12.76	5.90
C.E.U.C.A	0.00	0.00	0.00	0.00	1.51	0.00	0.18
E.C.O.W.A.S	4.03	0.52	0.00	0.86	(2.08)	1.18	2.59
E. AFRICA	(0.15)	0.70	0.91	(0.47)	0.74	2.36	0.36
O.S. AFRICA	(0.21)	0.11	1.10	0.00	3.26	0.38	0.45
O. AFRICA	0.43	0.00	0.00	0.00	0.73	0.21	0.33
L.A.F.T.A	7.62	14.89	0.00	6.56	0.98	(0.20)	2.91
C.A.C.M	0.68	(0.10)	0.00	0.00	0.29	0.17	0.38
CARIBBEAN	0.93	0.16	0.00	0.00	0.62	0.10	0.54
O. AMERICA	0.30	0.00	0.00	0.00	0.32	0.06	0.20
S. ASIA	(16.14)	4.86	(3.26)	0.00	3.75	5.73	(6.76)
S.E. ASIA	5.63	(1.89)	14.75	0.00	0.07	(0.53)	4.36
E. ASIA	3.46	(0.12)	(3.34)	0.00	0.00	0.00	1.47
MIDDLE E. OIL	0.65	5.41	35.28	39.98	0.47	8.79	6.81
MIDDLE E. NONOIL	(3.62)	1.63	4.06	0.00	1.88	3.63	(0.66)
OCEANIA	0.00	(0.26)	1.57	0.00	0.00	NA	0.14
UNIDENTIFIED REGIONS	2.33	1.02	(0.18)	0.00	0.68	0.46	1.46
AREAS N.E.S. AND NOT SPECIFIC	2.33	1.02	(0.18)	0.00	0.68	0.46	1.46

*NOTES: 1. NA = NOT AVAILABLE.

2. SOURCE: EMAMI AND MARTIN [1986].

3. EACH ELEMENT OF THIS TABLE IS THE DIFFERENCE BETWEEN THE SHARES OF EXPORTS OF EACH EXPORTING COUNTRY GOING TO A GIVEN IMPORT REGION IN YEARS 1962 AND 1982.

FIGURE 4.1. MARKET SHARES IN COMBINED DCs AND LDCs.

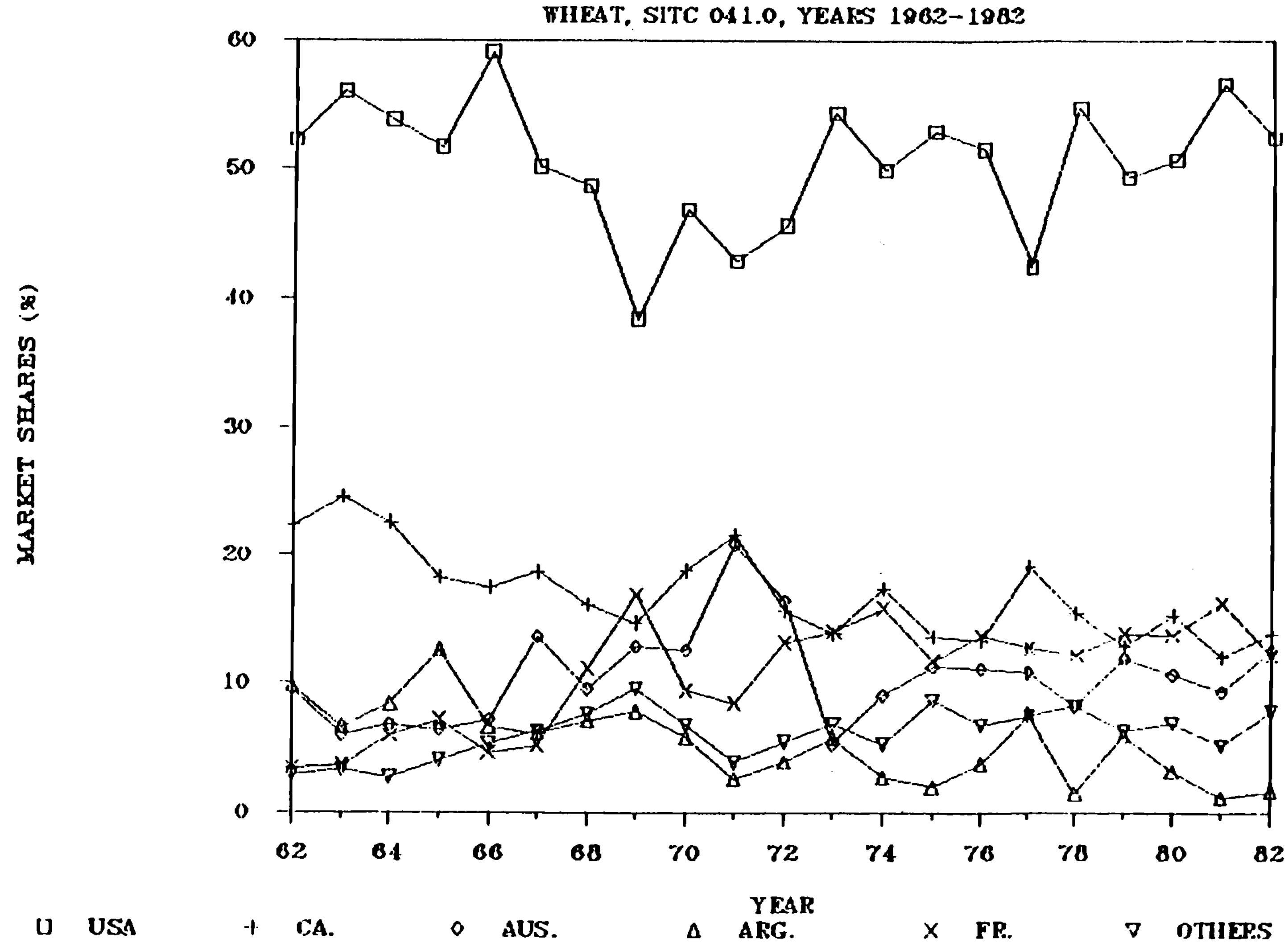


FIGURE 4.2. MARKET SHARES IN DEVELOPED REGIONS.

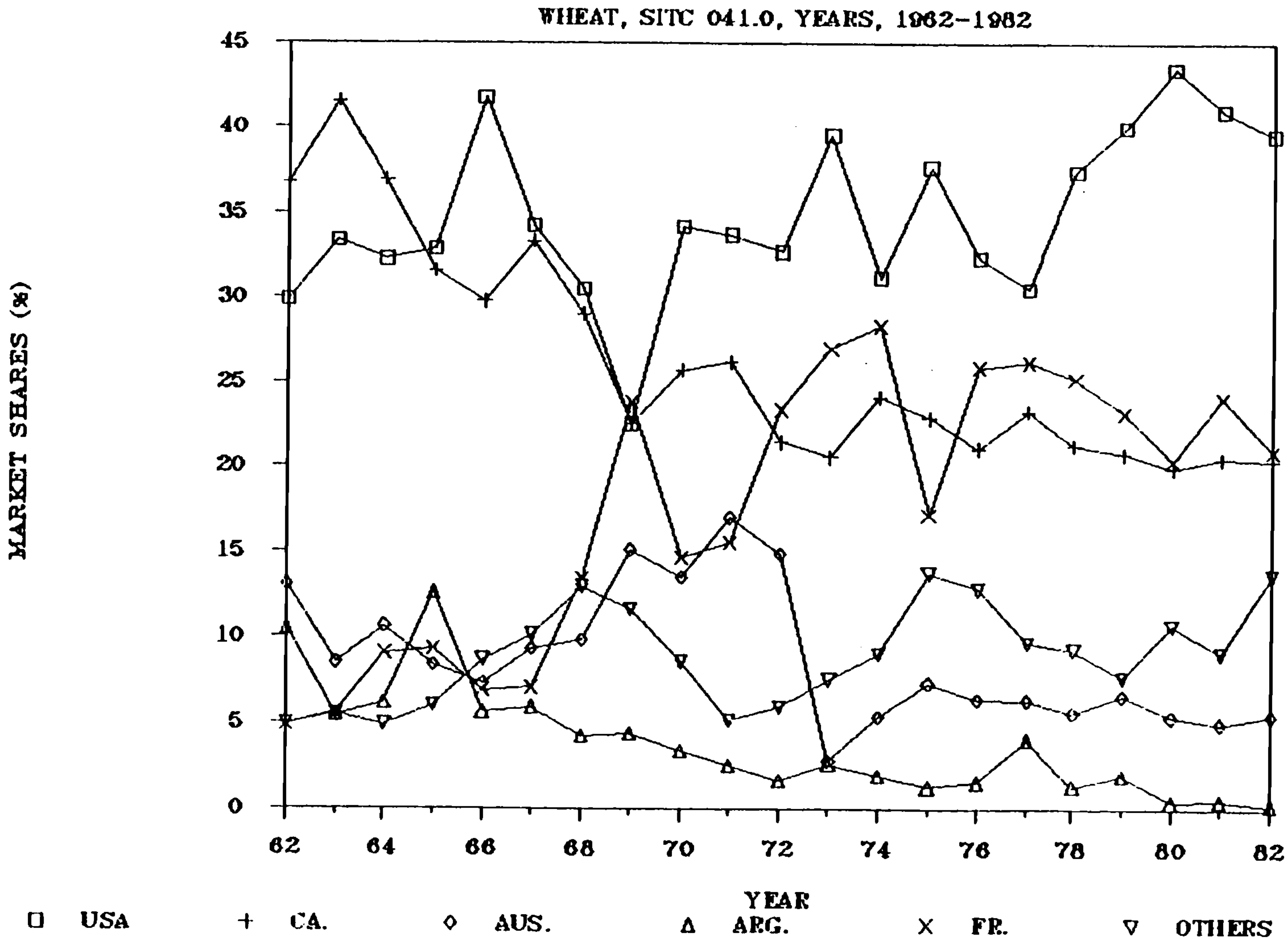
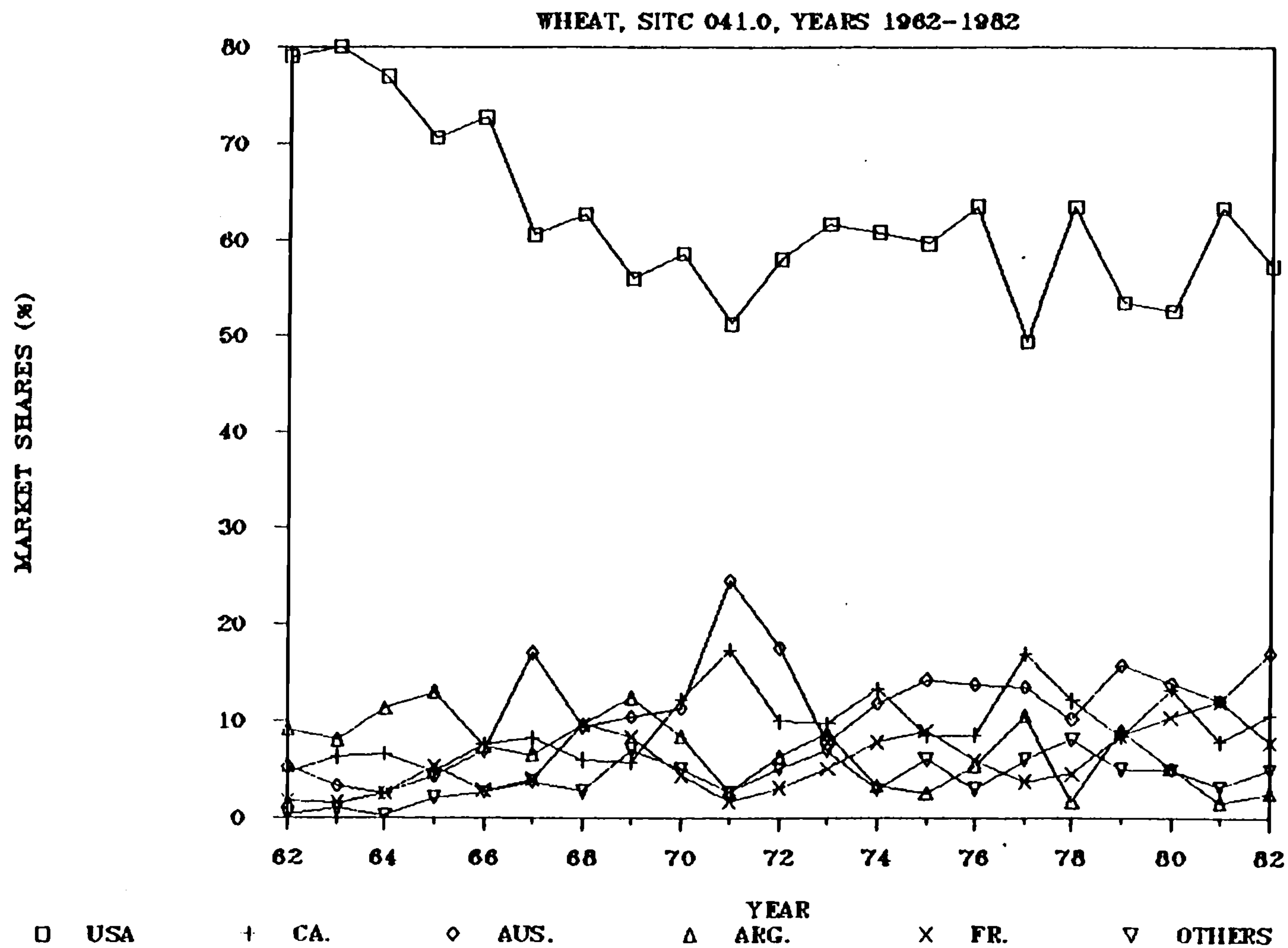


FIGURE 4.3. MARKET SHARES IN DEVELOPING REGIONS.



EVIDENCE ON RELATIVE LANDED PRICES OF WHEAT IN IMPORT MARKETS

Theoretically, if both the export and import sides of the international market for a given traded commodity operate under the assumptions of perfect competition, then the law of one price prevails. In this case, the relative landed (cif) prices of any two exporters in any import market becomes unity. Any exporter who offers higher landed prices than its competitors to the importer countries would be excluded from those import markets. In other words, the assumption of the homogeneity of the traded good, guarantees the perfect substitution of exports of one exporter for the exports of another exporter when the price of the latter exporter increases relative to its competitor. Thus, the relative landed price is the variable which determines the volume and share of exports a particular country holds in a specific import market. In this case, the elasticity of substitution between the exports of any pairs of exporters would be infinite. An importer confronted with the same landed prices may choose to import from one or several exporting countries.

Tables 4-16 to 4-18 present the relative landed prices of wheat for individual major exporting countries in the combined and individual DCs and LDCs regions, respectively. In the combined DCs and LDCs, the relative landed prices of the U.S., Australia, and

Argentina remained mostly below the perfect competition unitary relative landed price line during 1962-1982. The relative cif prices of the U.S. rose above unity by 4 percent in 1973, by 3 percent in 1975, and by 1 percent in 1976. Australia's relative landed prices rose above the unit line by 8, 19, 5, and 16 percent in 1963, 1964, and 1974, respectively. Argentina's relative price was more than unity by 6 percent in 1962 and 1975, and by 2 to 3 percent in 1974, 1981, and 1982, respectively. The relative landed prices for Canada, France, and Others were above the unit line for most of the years during the 1962-1982 period. (See Table 4-16, and Figure 4.)

The U.S.'s relative landed prices in the DCs (Table 4-17, Figure 5) rose above the unit relative price line only in 1974 to 1976 by 11, 6, and 2 percent, respectively. Australia's relative landed prices rose above unity only in 1963 and 1974 by 5 and 11 percent, respectively. Argentina's prices were more than unity in 1962, 1964, 1973, 1974, and 1980 to 1982 by 7, 1, 10, 30, 17, 9, and 6 percent, respectively. The relative prices for Canada, France, and Others in the DCs were more than unity in most years. Canada's relative prices were less than unity only in 1971, 1972, and 1977 to 1979 by 2, 5, 6, 9, and 3 percent, respectively. France had less than unit relative prices in 1962 by 12 percent, in 1974 by 32 percent, in 1975 by 19 percent, in 1976 by 4 percent, and in 1981 by 7 percent.

The relative landed prices in the LDCs for the U.S. and Canada were generally more than unity during 1962-1982. The U.S. prices were less than unity only during 1962-1965, and in 1974, and 1980. Canada's prices were less than one in 1964, during 1971-1973, and 1977-1978. Relative prices for Australia were mostly less than one, but they exceeded one in 1963 by 61 percent, in 1964 by 124 percent, in 1965 by 34 percent, in 1974 by 18 percent. France's relative prices were less than one during 1964-1965, 1967-1970, 1975-1976, 1979-1982. The Others' relative prices were less than one during 1966-1971, 1974-1977, 1979, and 1981-1982. (See Table 4-18, and Figure 6.)

TABLE 4.16. RELATIVE CIF EXPORT PRICES OF EXPORTING COUNTRIES IN ALL IMPORT REGIONS WHEAT, SITC 041.0, YEARS 1962-1982.*

YEARS	MAJOR EXPORTER COUNTRIES					
	U.S.	CANADA	AUSTRALIA	ARGENTINA	FRANCE	OTHER EXPORTERS
1962	0.9521	1.0842	0.8798	1.0652	0.9440	1.1633
1963	0.9439	1.0422	1.0806	1.0099	1.0234	1.0074
1964	1.0063	0.9688	1.1952	0.9930	0.9442	0.8253
1965	0.9494	1.0694	1.0567	0.9581	1.0932	0.9438
1966	0.9880	1.0587	0.9633	0.9339	1.1026	0.9325
1967	0.9878	1.0604	0.9510	0.9668	1.0897	0.9556
1968	0.9764	1.0826	0.9493	0.9923	1.0339	0.9504
1969	1.0118	1.0483	0.9010	0.9964	1.1061	0.8637
1970	0.9589	1.0342	0.9085	0.9444	1.2135	1.0089
1971	0.9608	0.9901	0.9104	0.9728	1.3525	1.0185
1972	0.8892	0.9728	0.8767	0.9882	1.3497	1.2371
1973	1.0496	0.9602	0.7850	0.8944	1.0687	1.0189
1974	1.0046	1.1074	1.1604	1.0265	0.7991	0.9538
1975	1.0360	1.1424	0.9189	1.0658	0.8626	0.9518
1976	1.0156	1.0926	0.9457	0.9694	0.9640	0.9423
1977	0.9369	0.9755	0.8647	0.8319	1.3746	1.0754
1978	0.8779	0.9719	0.8617	0.9112	1.3853	1.1151
1979	1.0127	1.0380	0.8033	0.8580	1.1541	1.0635
1980	0.9509	1.0937	0.8688	0.9820	1.0829	1.0653
1981	0.9960	1.1681	0.9452	1.0324	0.9098	1.0064
1982	0.9785	1.1072	0.9389	1.0222	0.9810	1.0181
62-82 AVERAGE	0.9764	1.0509	0.9412	0.9721	1.0874	1.0056

*NOTE: 1. SOURCE: Emami, Hueth, and Martin, 1986.

FIGURE 4.4. RELATIVE CIF EXPORT PRICES IN ALL IMPORT REGIONS.

WHEAT, SITC 041.0, YEARS 1962-1982

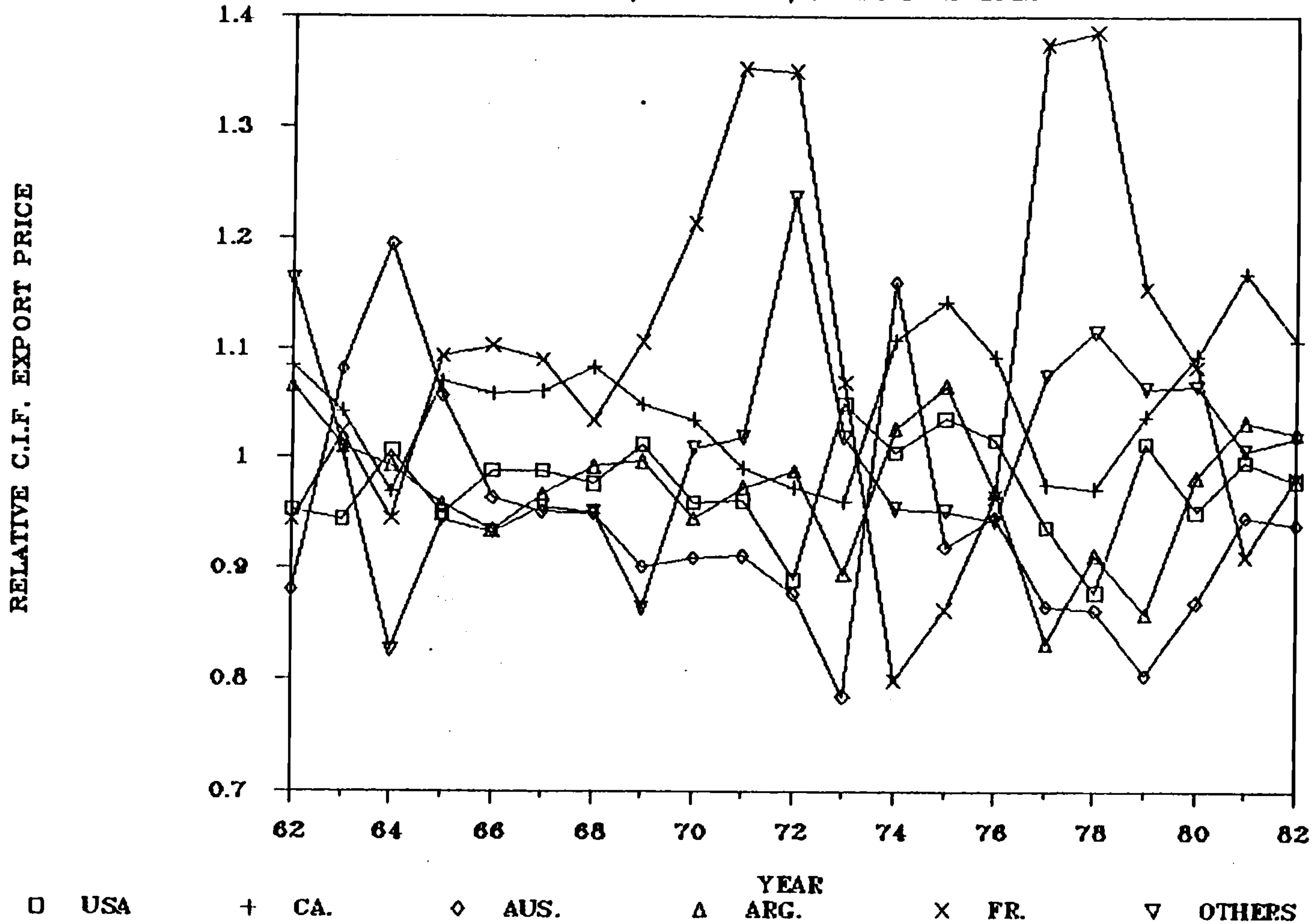


TABLE 4.17. RELATIVE CIF EXPORT PRICES OF EXPORTING COUNTRIES IN DEVELOPED REGIONS (WHEAT, SITC 041.0, YEARS 1962-1982).*

YEARS	MAJOR EXPORTER COUNTRIES					
	U.S.	CANADA	AUSTRALIA	ARGENTINA	FRANCE	OTHER EXPORTERS
1962	0.9339	1.0751	0.9130	1.0710	0.8813	1.1286
1963	0.9396	1.0430	1.0590	0.9909	1.0057	0.9817
1964	0.9499	1.0752	0.9715	1.0169	1.0288	0.8608
1965	0.9199	1.0918	0.9276	0.9445	1.1714	0.9332
1966	0.9250	1.0909	0.9475	0.9591	1.1691	0.9408
1967	0.9300	1.0765	0.9080	0.9716	1.2054	0.9531
1968	0.9315	1.0495	0.9095	0.9993	1.1853	0.9288
1969	0.9316	1.0221	0.8954	0.9791	1.2098	0.8702
1970	0.9119	1.0052	0.8525	0.9829	1.2975	1.0246
1971	0.8872	0.9818	0.8663	0.9397	1.3817	1.0685
1972	0.8444	0.9503	0.8175	0.8893	1.3986	1.0845
1973	0.9517	1.0079	0.7695	1.1041	1.0893	0.9555
1974	1.1165	1.2071	1.1130	1.3099	0.6886	0.9710
1975	1.0642	1.1376	0.9371	0.9635	0.8174	0.9437
1976	1.0243	1.0942	0.9429	0.9200	0.9611	0.9246
1977	0.8241	0.9444	0.7881	0.8081	1.3310	1.1246
1978	0.7981	0.9154	0.8151	0.8832	1.3623	1.1730
1979	0.8697	0.9767	0.8390	0.7828	1.2452	1.1365
1980	0.9062	1.0352	0.8823	1.1703	1.1140	1.0610
1981	0.9629	1.1565	0.9817	1.0905	0.9342	0.9649
1982	0.9478	1.0761	0.9396	1.0669	1.0257	0.9945
62-82 AVERAGE	0.9319	1.0482	0.9084	0.9926	1.1192	1.0011

*NOTE: 1. SOURCE: Emami and Martin 1986.

FIGURE 4.5. RELATIVE CIF EXPORT PRICES IN DEVELOPED IMPORT REGIONS.

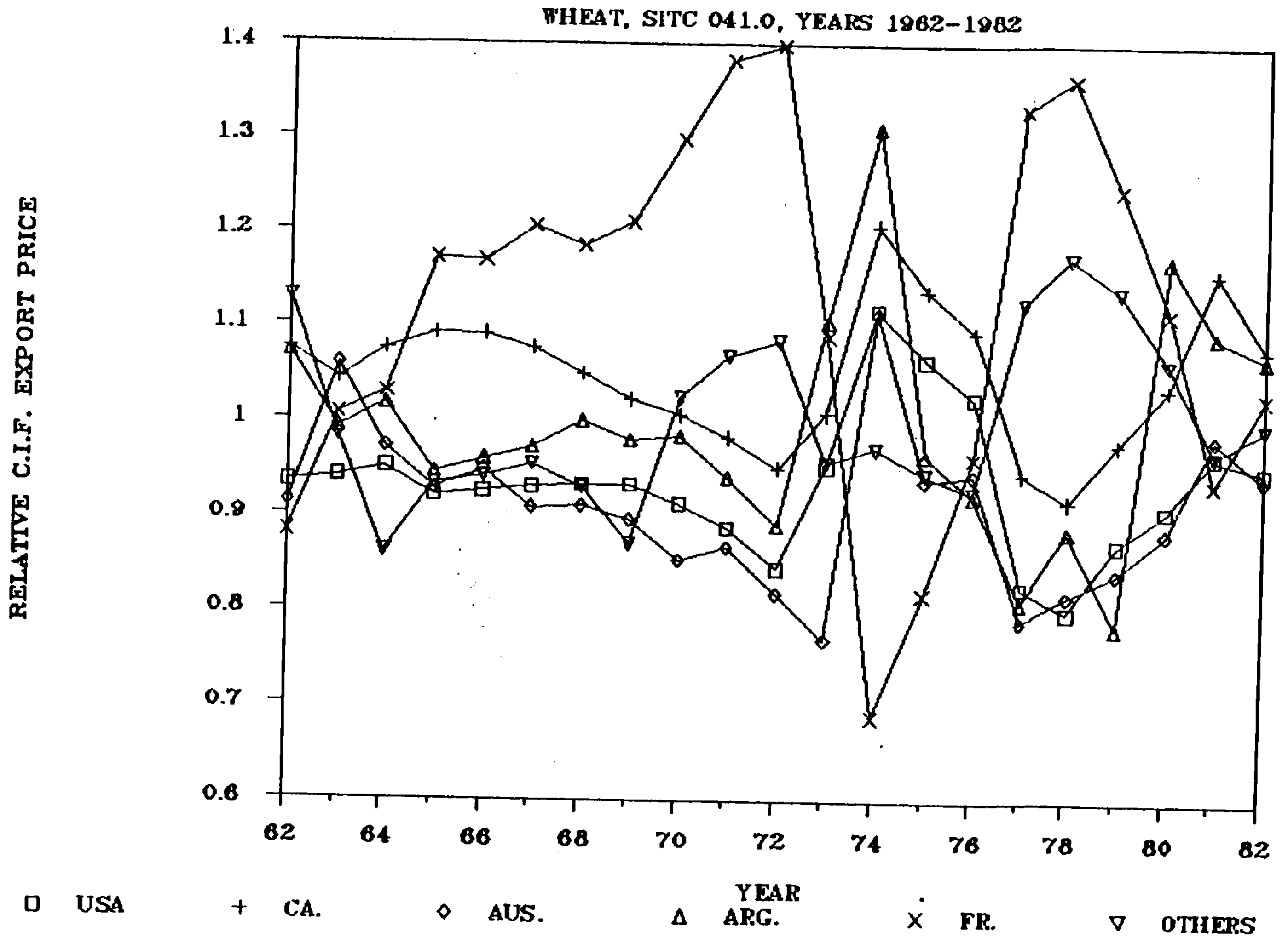
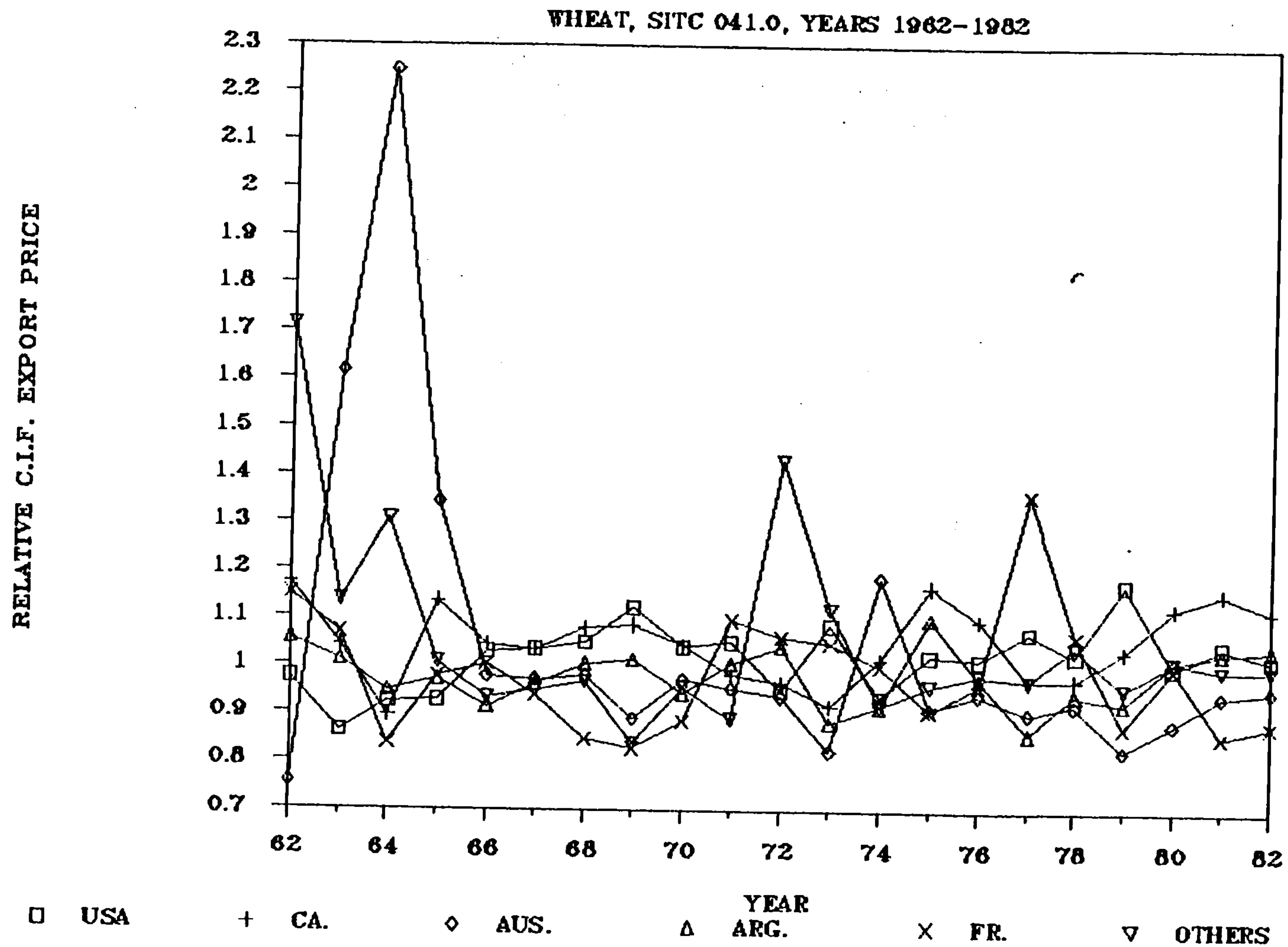


TABLE 4.18. RELATIVE CIF EXPORT PRICES OF EXPORTING COUNTRIES IN DEVELOPING REGIONS.
WHEAT, SITC 041.0, YEARS 1962-1982 *

YEARS	MAJOR EXPORTER COUNTRIES					
	U.S.	CANADA	AUSTRALIA	ARGENTINA	FRANCE	OTHER EXPORTERS
1962	0.9733	1.1726	0.7547	1.0555	1.1487	1.7140
1963	0.8628	1.0429	1.6172	1.0110	1.0672	1.1345
1964	0.9251	0.8948	2.2463	0.9464	0.8362	1.3064
1965	0.9284	1.1338	1.3430	0.9712	0.9780	1.0068
1966	1.0296	1.0436	0.9785	0.9151	1.0027	0.9341
1967	1.0344	1.0331	0.9707	0.9629	0.9389	0.9495
1968	1.0491	1.0806	0.9806	1.0041	0.8474	0.9672
1969	1.1225	1.0852	0.8904	1.0134	0.8287	0.8392
1970	1.0403	1.0437	0.9719	0.9432	0.8851	0.9550
1971	1.0503	0.9823	0.9540	1.0052	1.0964	0.8916
1972	0.9503	0.9661	0.9382	1.0414	1.0609	1.4315
1973	1.0865	0.9186	0.8243	0.8825	1.0487	1.1207
1974	0.9356	1.0159	1.1854	0.9172	1.0012	0.9197
1975	1.0225	1.1672	0.9125	1.0999	0.9086	0.9606
1976	1.0143	1.0976	0.9414	0.9750	0.9637	0.9815
1977	1.0718	0.9726	0.9042	0.8619	1.3617	0.9718
1978	1.0233	0.9733	0.9203	0.9429	1.0651	1.0406
1979	1.1726	1.0328	0.8265	0.9237	0.8761	0.9552
1980	0.9971	1.1233	0.8827	1.0131	0.9978	1.0128
1981	1.0455	1.1548	0.9417	1.0304	0.8571	0.9958
1982	1.0153	1.1185	0.9519	1.0400	0.8797	0.9947
62-82 AVERAGE	1.0167	1.0502	1.0446	0.9789	0.9833	1.0516

*NOTE: 1. SOURCE: Emami and Martin 1986.

FIGURE 4.6. RELATIVE CIF EXPORT PRICES IN DEVELOPING IMPORT REGIONS.



AN OVERVIEW OF UNIT MARKETING MARGINS BY EXPORTING COUNTRIES/IMPORTING REGIONS

The trade unit marketing margins (TUMM) for an individual agricultural commodity is defined as the difference between the per unit landed price at the border of importing countries (UNIT CIF PRICE) and the per unit export price at the borders of exporting countries (UNIT FOB PRICE), i.e.,

TUMM = [(UNIT CIF PRICE) - (UNIT FOB PRICE)].

Assuming no commodity transformation or improvements, and exclusion of export/import taxes and subsidies, then the TUMM includes cost of transportation, insurance, and middleman markup.

Tables 4-19 to 4-21 (with corresponding Figures 7 to 9) summarize the TUMM for wheat between individual major exporting countries and the DCs, LDCs, and the combined DCs-LDCs regions, respectively. For the DCs region, France had the lowest TUMM, while Argentina had the highest TUMM, and the U.S., Canada, and Australia had the middle range TUMM during 1962-1982. For the LDCs region, France had the lowest TUMM during most of the 1960's and 1980's, while the U.S., Canada, Australia, and Argentina alternated their position in having lower TUMM during 1962-1982. In the combined DCs and LDCs regions, France had the lowest TUMM during most of the 1962-1982 time period, followed by close TUMM competition between the U.S., and Canada on the one hand, and Australia and Argentina on the other.

The comparison of TUMM for each exporting country in DC and LDC markets indicates that in general TUMM is higher in LDCs than in DCs over 1962-1982 time period.

TABLE 4.19. THE UNIT MARKETING MARGINS BETWEEN EXPORTING COUNTRIES AND DC,s IMPORT REGION, FOR WHEAT SITC 041.0, 1962-1982

YEAR	U.S.A.	CANADA	AUSTRALIA	FRANCE	ARGENTINA
		$ U.S./METRIC TON			
1962	6.06	8.40	ERM	2.57	16.28
1963	6.34	6.71	ERM	4.40	8.91
1964	7.64	8.32	ERM	5.29	14.85
1965	9.56	10.22	ERM	4.12	14.28
1966	9.36	9.23	10.92	2.40	15.52
1967	8.80	25.86	8.25	2.72	16.97
1968	8.69	8.72	8.88	1.54	13.99
1969	10.29	11.03	8.29	1.91	11.72
1970	11.40	11.98	12.33	5.50	14.42
1971	9.81	11.46	13.19	3.97	14.09
1972	8.19	6.20	8.21	4.32	7.65
1973	11.06	-2.70	2.48	2.85	45.70
1974	30.45	14.79	33.57	7.02	53.27
1975	28.12	17.81	22.31	6.15	45.65
1976	22.91	15.19	19.85	4.80	26.19
1977	17.85	21.04	15.37	4.98	28.17
1978	13.53	28.88	16.38	2.00	28.35
1979	15.10	31.50	24.64	2.70	17.93
1980	29.70	38.12	32.16	4.98	62.95
1981	22.23	32.51	31.64	-0.79	7.53
1982	14.44	25.76	28.38	6.64	32.37

* ERM indicates that export value reports were missing.
Source: Emami, Hueth, and Martin [1986].

FIGURE 4.7. THE UNIT MARKETING MARGINS FOR DCs IMPORT REGION.

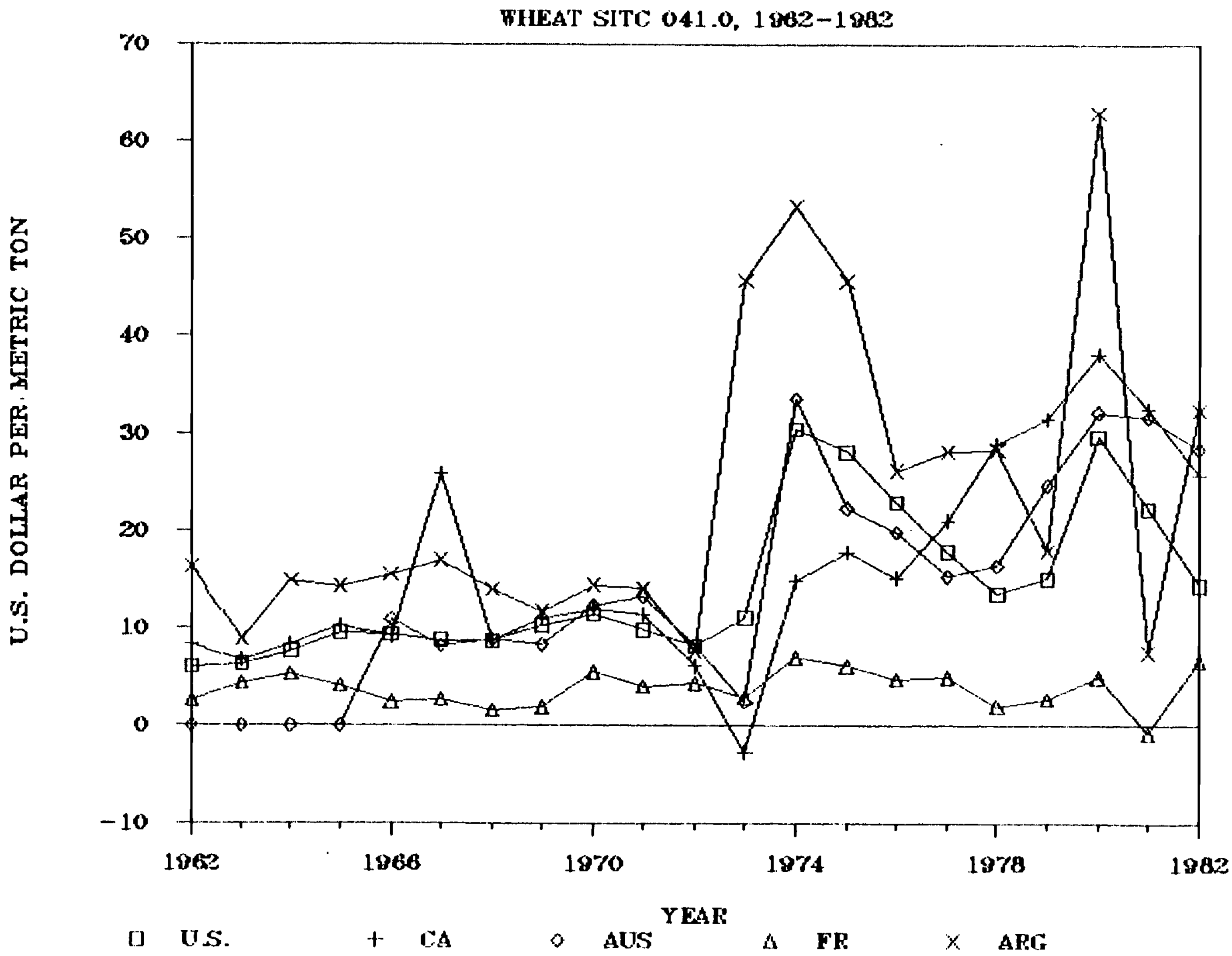


TABLE 4.20. THE UNIT MARKETING MARGINS BETWEEN EXPORTING COUNTRIES AND LDCs IMPORT REGION FOR WHEAT SITC 041.0, 1962-1982

YEAR	U.S.A.	CANADA	AUSTRALIA	FRANCE	ARGENTINA
			$ U.S./METRIC TON		
1962	6.61	16.43	ERM	-3.51	14.80
1963	9.50	7.65	ERM	10.21	12.53
1964	22.11	3.38	ERM	7.98	16.50
1965	12.84	24.14	ERM	8.55	15.74
1966	15.72	11.80	16.68	13.01	14.98
1967	13.87	25.81	11.84	11.47	14.19
1968	12.16	12.87	11.66	7.64	15.03
1969	14.75	14.09	12.27	8.74	15.69
1970	13.17	12.07	14.18	2.88	13.47
1971	12.69	8.79	14.01	17.38	12.99
1972	7.50	1.87	11.42	12.13	10.69
1973	-3.89	0.80	20.51	-10.96	15.21
1974	15.44	-8.40	59.25	53.65	10.46
1975	33.73	45.49	6.42	39.77	19.81
1976	32.00	31.93	22.11	32.01	40.03
1977	35.84	10.29	15.74	11.92	21.74
1978	0.02	27.24	-10.38	-12.36	33.05
1979	13.97	11.25	9.07	-10.15	18.16
1980	21.99	32.20	9.70	15.49	24.28
1981	28.71	50.86	13.38	19.41	-2.65
1982	21.28	47.69	24.45	13.06	28.91

*: ERM indicates that export value reports were missing.
Source: Emami, Hueth, and Martin [1986].

FIGURE 4.8. THE UNIT MARKETING MARGINS FOR LDCs IMPORT REGION.

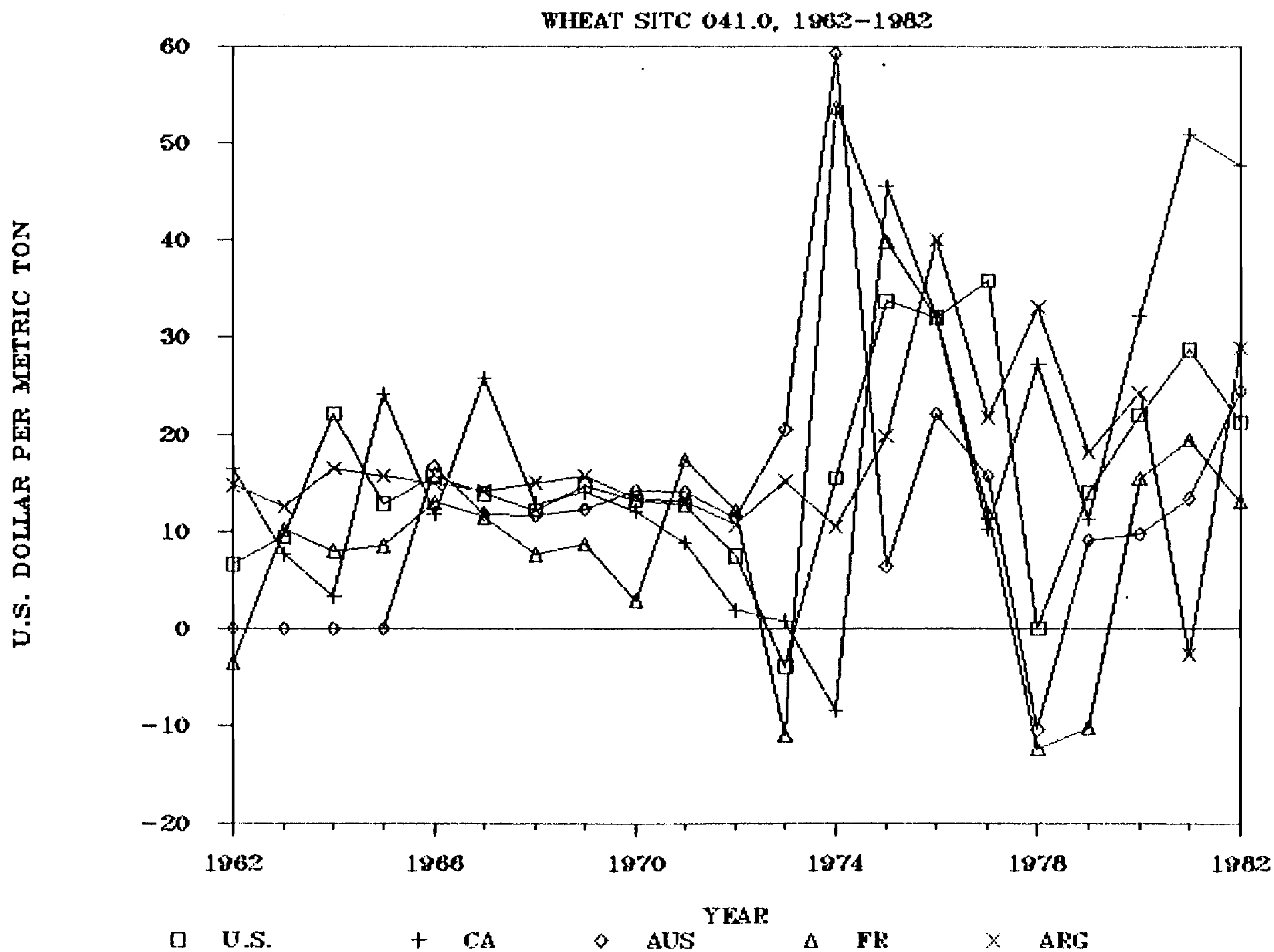
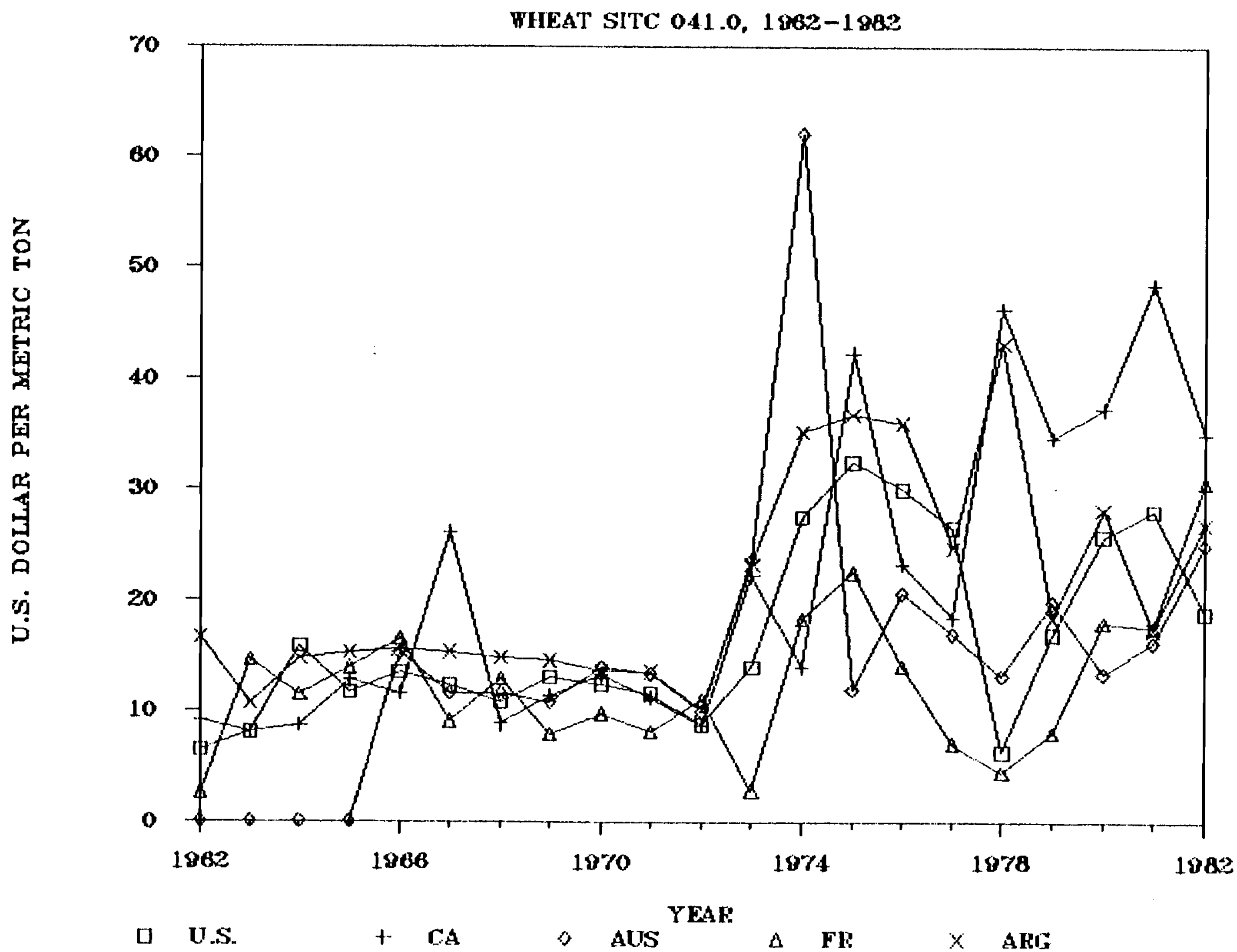


TABLE 4.21. THE UNIT MARKETING MARGINS BETWEEN EXPORTING COUNTRIES AND COMBINED DCs and LDCs IMPORT REGIONS FOR WHEAT SITC 041.0, 1962-1982

YEAR	U.S.A.	CANADA	AUSTRALIA	FRANCE	ARGENTINA
		$ U.S./METRIC TON			
1962	6.46	9.16	ERM	2.55	16.59
1963	8.06	8.08	ERM	14.59	10.71
1964	15.82	8.70	ERM	11.48	14.71
1965	11.68	12.80	ERM	13.87	15.27
1966	13.50	11.56	15.22	16.46	15.56
1967	12.29	26.10	11.58	9.09	15.30
1968	10.79	8.84	11.56	12.91	14.84
1969	13.02	11.38	10.76	7.92	14.57
1970	12.37	13.31	13.93	9.71	13.55
1971	11.52	11.16	13.33	8.12	13.54
1972	8.75	8.66	9.96	10.99	10.11
1973	13.93	22.27	23.57	2.79	23.21
1974	27.43	13.95	62.07	18.30	35.21
1975	32.43	42.26	11.91	22.48	36.73
1976	30.02	23.26	20.62	14.05	35.98
1977	26.51	18.39	16.92	7.03	24.67
1978	6.29	46.25	13.15	4.45	43.12
1979	16.88	34.63	19.79	8.02	18.36
1980	25.73	37.29	13.35	17.98	28.14
1981	28.03	48.48	16.12	17.49	17.33
1982	18.78	34.91	24.94	30.61	26.79

*: ERM indicates that export value reports were missing.
Source: Emami, Hueth, and Martin [1986].

FIGURE 4.9. THE UNIT MARKETING MARGINS FOR TOTAL DCs AND LDCs IMPORT REGION.



FACTORS AFFECTING COMPETITIVENESS IN INTERNATIONAL WHEAT MARKETS

The competitiveness of an exporting country in international markets involves complex conceptual and analytical issues related to: (a)-the meaning of the concept itself, (b)-the organization of the world market (basic conditions, structure, conduct, and performance) within which the world landed prices are determined, and (c)-the quantitative measurement of this concept.

In trade literature, the concept of competitiveness almost always refers to the ability to obtain market shares. An exporting country is considered to be more competitive than other competitors if it obtains higher market shares. When the concept is used in this context, then "export performance" (measured by market shares) and "competitiveness" become synonymous, and different types of measurement ratios constructed based on the market shares of major exporting countries serve as indices for measuring the degree of competition among major exporting countries.[1]

With regard to the definition of "competitiveness", Langley [1987, p. 1.] defined competitiveness as follow:

> "Competitiveness is generally defined as a nation's ability to produce and market products in international trade while earning a level of returns to the resources (both human and physical) used to produce those products. This level must be at least comparable to what those resources could earn in alternative activities. Maintaining competitiveness involves a nation's ability to adjust the mix of resource use, the price paid for those resources, and the mix of

> products produced to changing market conditions. The ability to adjust to changes in market conditions implies a need to focus on the longer term dynamic aspects of market performance."

To explain multiple measures of performance in order to define different components of competitiveness, Perkins [1987, p. 17.], adopted the Harvard Business School's definitions of competitiveness:

> "National competitiveness refers to a country's ability to create, produce, distribute and/or service products in international trade while earning returns on its resources."

In regard to the factors affecting competitiveness, Shane [1987, p. 15.] indicates that:

> "The world market is dynamic and competitive. The volume and value of both exports and imports reflect the interaction of fundamental factors affecting country-level supply and demand as well as policies affecting both domestic and international markets. Thus, trade involves numerous interactions: resource endowments, technology, and quality of factor inputs on the supply side; income population, tastes, substitutes, and marketing infrastructure on the demand side; and domestic commodity and general macroeconomic policies affecting world trade. Therefore, realized exports and imports reflect both the fundamental factors underlying comparative advantage and the policy and macro factors which modify the comparative advantage of a country to reflect relative competitiveness."

Sharples [1987, p. 12.] divided the factors affecting competitiveness into short-run and long-run factors. The short-run factors which shift wheat demand and supply functions in the 3-5 year time period include: dynamic factors related to business cycles (changes in exchange rates, interest rate, foreign exchange reserves and employment), stochastic production, and government interventions. The long-run factors include: natural endowments (quality of land, availability of water, climate, navigable river systems, deep harbors), public and private investment in the production and marketing infrastructure, opportunity cost of inputs, technology, demand factors (per-capita income growth and population growth), and public policy which influences all of the above mentioned factors.

McLennan [1987, p. 41.] argues that fluctuation in freight rates influences export competitiveness of major wheat exporting countries. In this regard, he stated that:

> "The cost of international shipping services is an important factor in determining the landed price of products in world markets and in influencing the profits received by exporters. Because freight rates fluctuate sharply, export competitiveness is influenced not only by the level of rates but also by the ability to manage freight rate volatility."

Lin and McElroy [1987, p. 59.] argue that U.S. competitiveness in the world wheat market depends on the U.S. delivery (landed) price in import markets. The lower the U.S. delivery price relative to its competitors in import markets, the more competitive the U.S. will be in those markets. In this regard he stated that:

> "The U.S. competitive positions in the world market will depend on its ability to deliver wheat at lower prices than its competitors. Delivery price in turn is closely linked to: (1) public policies dealing with production control, grain marketing, and grain trade; (2) exchange rate of the dollar relative to the value of foreign currencies and

> other macroeconomic policies; and (3) costs of producing and marketing wheat for export as affected by technology adoption and investment in marketing infrastructure."

In fact, if the landed prices are the ultimate determinant of competitiveness, then "market organization" within which relative landed prices are determined becomes the major force behind the price formation and hence the price competition in a given import market. Following theories of industrial organization, a traditional market organization includes the four components of basic conditions, structure, conduct, and performance. Structure and conduct determine *how* the market functions within the limits of its basic conditions, whereas performance determines *how well* the market functions.

COMPETITIVENESS AND ORGANIZATION OF THE INTERNATIONAL WHEAT MARKET

With regard to the influence of the organization of the market on market performance or competitiveness of an exporting country, Mikesell [1980, pp. 1-2], recognized three alternative market export price formation structures: perfect competiton ("Price taker" exporter and importer), "seller's market" ("price maker" --oligopoly--exporter, price taker importer), and "buyer's market" (price maker --oligopsony--importer, price taker exporter). According to him, if the market structure is such that it does not allow for the existence of market power on the behalf of either exporter or importer countries, then exporter and importer countries can be viewed as "price takers" in the international market environment. They must sell and buy at the world market price which brings total world demand and supply into equality. In this case, if the relative cost of production for export increases, then the exporting country may choose to sell less in foreign markets and more at home, or may reduce the output or shift the production to another product.

Alternatively, in the case of a seller's market, exporters act as "price makers." They can export at their own domestic price or at a price which maximizes their oligopolistic rents. If they export at the same price as their domestic price, then the export price is determined by the same factors that govern domestic market behavior. In an international oligopolistic market, export prices may be determined wholly on the basis of marketing strategies in a particular export market, i.e., domestic and export prices for the same product will be different. In an oligopolistic market, if the production cost for an exporter country increases, that country may not be able to adjust its export prices in response to the changes in cost.

In the case of a buyer's market, importers exercise market power by acting as oligopsonists. The oligopsonistic price can be set by using trade barriers to extract rent from the international market. Then, the export price formation is affected by the same factors that determine optimal tariff oriented domestic trade policies of importing countries.

The empirical evidence on the structure of the world wheat market is highly contradictory and controversial. Takayama and Judge [1964a, 1964b, 1964c; 1971], Schmitz and Bawden [1973], and Rojko, Fuchs, O'Brien, and Regier [1978] assumed that no country exercises market power in the world wheat trade market. In contrast to these studies, several writers have argued that the market power lay with the exporting countries. Originally, McCalla [1966], and later Taplin [1969], depicted the international wheat market as a duopoly with Canada as the price leader and the U.S. as a major follower. Alouze, Watson, and Sturgess [1978] argued that the market had developed into a triopoly with the U.S., Canada, and Australia. Carter and Schmitz [1979], and Schmitz, McCalla, Mitchell and Carter [1981] have argued that market power lay with the importer countries. Olson [1979], MacCalla [1980], Paarlberg [1980], MacGregor and Kulshreshtha [1980], Hillman [1981], Bredahl and Green [1983], and Wilson [1986] also see the market as an oligopoly with the U.S. in the role of a dominant price leader (due to the influence of the U.S. loan rate on the international price of wheat) constantly under the pressure of an aggressive competitive fringe.

Bredahl and Green [1983], tested the hypothesis that the price formation in international wheat market is determined by a price leadership market structure with the U.S. being a policy-induced non-intentional price leader, and, at the same time, a residual supplier in the world grain market. Bredahl and Green (BG), suggested the use of statistical causality tests associated with Granger [1969] and Sims [1972] to test their residual supplier hypothesis. According to BG, for the U.S. to be a residual supplier in the world coarse grain trade market requires that:

1. Exports and area harvested of countries competing with the U.S. have not responded to world prices;
2. World prices and exports of competing exporters have not been simultaneously determined;
3. The U.S. exports and area harvested have responded to world prices; and
4. The U.S. exports and world prices have been simultaneously determined.

Specifically, BG investigated the direction of causality between world prices and coarse grain and corn exports of major exporting countries as well as between world prices and the coarse grain and corn acreage harvested by those countries. "If causality can be rejected, exports are said to respond to world prices." For coarse grain exports and world prices, they found that only the exports of the U.S. and France have responded to world prices. For corn exports and world prices, only the exports of the U.S. have responded to world prices. For response of world price to exports, they found that world prices have been influenced only by the U.S. coarse grain and corn exports, while the exports of competing countries have not individually influenced world prices. For the relationship between areas harvested and world prices, they found that except for U.S. corn, all competing exporters have not responded to world prices. Recently, Fryar [1986] criticized the methodology employed by BG on the grounds that the results obtained based on the Granger-Sims-Chow type of causality are all subject to Type II Error.

OLIGOPOLY MARKETS AND IMPLICATIONS FOR PROMOTIONAL PROGRAMS

It is true that international wheat markets appear to be getting more competitive. Australia, France, and the residual group of exporting countries, Others, have become major exporters in recent years, creating effective competition for the U.S. and Canada who long enjoyed a dominant position in a price leadership oligopoly with a competitive fringe.

In an oligopolistic situation, firms often attempt to gain market share through use of various types of promotional programs. In the general literature this is referred to as advertising, and there exists an extensive literature on the impact of advertising on sales, market shares, and profit. In the circumstance of international wheat markets, the various credit and export subsidy programs explained below are the effective means by which the competitors "advertise" and attempt to gain market share.

If, however, the promotional programs enacted by one competitor are quickly responded to by retaliatory "advertising," then total wheat sales may increase, but the market share of the individual competitors may remain constant. How much the quantity of wheat demanded varies depends, on the goal and conditions of individual exporters' promotional programs and the elasticities of import (export) demand (supply) for wheat in international market.

U.S. WHEAT EXPORT PROMOTIONAL PROGRAMS

Following the reviews on U.S. agricultural policies by Bowers, Rasmussen, and Baker [1984], Rasmussen [1985], and Grigsby and Dixit [1986], in general, the U.S. government agricultural commodity programs that have been designed to promote U.S. agricultural exports may be classified into two broad program groups: (1)- the nonprice commodity export expansion programs, and (2)-the export price-inducing commodity programs. The former includes programs that directly or indirectly increase the import demand by affecting consumer preferences, or by increasing their purchasing power (income effect). The latter includes programs that increase import demand by reducing the world import price.

NONPRICE COMMODITY EXPORT EXPANSION PROGRAMS

These programs are designed to expand the foreign demand for U.S. agricultural exports through generating long-run changes in the behavior of the consumers and producers in importing countries. Examples of nonprice export expansion strategies include: (1)- <u>export market development programs</u>, (2)- <u>export credit sales programs</u>, and (3)- <u>investment credit programs</u>.

The <u>export market development programs</u> are aimed at altering the importing countries preference structure such that they increase their import demand for U.S. exports (i.e., such programs shift the excess demand to the right). The _export credit sales programs_ are aimed at helping the importing countries overcome their short-run (3 to 36 months) credit constraints (i.e., having soft currency, or foreign currency reserve shortages) in order to provide them the necessary purchasing power to maintain or increase their imports from the U.S. In contrast to the short-run credits provided by the _export credit sales programs_, the _investment credit programs_ provide intermediate term (3 to 10 years) loans for market development projects in import markets.

The _export market development programs_ are undertaken in importing countries with the objective of changing the importers preference structure toward U.S. exports (i.e., increasing domestic demand in importing countries). These programs include demand promotion programs, technical assistance and trade servicing activities. Depending on the nature of the commodity targeted for export promotion, the demand promotion programs may be classified into direct and indirect demand promotion programs. The direct demand promotion programs such as brand or generic advertising are usually conducted for increasing the demand for the exports of final products, while indirect demand promotion programs focus on promoting the exports of intermediate products such as wheat. Technical assistance such as technical training, consulting, and the transfer of techniques are usually given to those industries in importing markets which utilize U.S. exports as inputs in their production.

The transfer of technical knowledge on the baking industry, for example, will increase the production of bread and, hence, increases the demand for U.S. exports of wheat that is used as an input in the bakery industry. The trade servicing programs provides market and technical information and delivery and product quality information for importers. It also links exporters and importers through exhibitions and trade meetings.

The _export credit sales programs_ are also designed for U.S. export enhancement purposes. The _export credit sales programs_ include 4 major programs: 1) _the direct export credit program_, 2) _the credit guarantee program_, 3) _the blended credit program_, and 4) Title I of the Agricultural Trade Development and Assistance Act of July 10, 1954 (P.L. 480). The first three programs have been used primarily to help importing countries overcome their short-run (3 to 36 months) credit constraints (i.e., having soft currency, or foreign currency reserve shortages) in order to provide them the necessary purchasing power to maintain or increase their imports from U.S. The latter program (P.L. 480) provides authority for selling surplus agricultural commodities to importing countries at interest rates lower than market rates with a 20 to 40 year repayment period.

The direct export credit program include credit sales given to importing countries which are financed through Commodity Credit Corporation (CCC) for period of 6 to 36 months at commercial interest rates. Historically, South Korea, Poland, Soviet Union, Turkey, and

Bangladesh were recipients of such credits.

Credit guarantee programs include credits issued to importing countries through commercial banks for period of 6 to 36 months at commercial interest rates. If an importing country defaults, the CCC will pay 96 percent of the principal and 6 percents of the interest of the default payments.

The blended credit program consisted of a credit package which include extended guaranteed loans and some interest free credit loans which made the interest rate on the whole credit package lower than market interest rates. The blended credit program was recognized to be subject to cargo preference requirements and, hence, was suspended in 1985.

The credits under P.L. 480 were made to importing countries at lower than commercial interest rates, and for a long-run period of 20 to 40 years. The repayments were usually made in the domestic currencies of importing countries, deposited in special U.S. accounts in those countries used for different purposes including market development activities and investment programs that would help enhancement of U.S. export demand in the long run.

<u>The investment credit programs</u> have been established to provide funds for market development projects aimed at expanding import demand for U.S. exports in the long run. The main source of funds for such programs has been provided through P.L. 480 Title I nonconvertible currency loan repayments that are deposited in a

U.S. owned account in the importing countries. Part of these loan repayments (in domestic currency of importing countries) are being re-loaned at a fix, predetermined market interest rate for a 3 to 10 year time period (intermediate-term credit). These intermediate-term credits are usually agreed to be spent on market development, educational improvements, and construction of grain handling and shipping facilities.

EXPORT PRICE-INDUCING COMMODITY PROGRAMS

The Export Price-Inducing Commodity Programs refers to policies that increase imports from U.S. through changes in export prices induced by such policies. Two broad groups of programs that allow export expansion through changes in export prices are (a)- export subsidy (payment) programs and (b)- producer subsidy (payment) programs.

EXPORT SUBSIDY PROGRAMS

Export subsidy (payment) programs increase exports through lowering export prices. Generally, high domestic commodity support prices in the U.S. increases domestic production, reduces domestic consumption, reduces exports, and consequently provides potential stocks in excess of world demand for imports. For the U.S. to dispose of its stocks in international markets, a per-unit export subsidy, equal to the difference between the U.S. support price and the new world price, would be required. Thus, as a result of the U.S. export subsidy and support price, imports from the U.S. will increase.

The export subsidies (payments) are provided to grain exporting firms through: (1)- Section 32 of Public Law 320, passed in 1935, (2)- the International Wheat Agreement (IWA), passed in 1949, and International Grain Agreement, passed in 1968, (3)- CCC direct payments prior to 1956, and CCC Payment-In-Kind (PIK) export program since 1956, and (4)- subsidized exports under Agricultural Trade Development and Assistance Act of 1954--Public Law 480.

Public Law 320: An important provision of the Amendment of August 24, 1935 to the Agricultural Adjustment Act was section 32 of P.L. 320. Section 32 provided the United States Department of Agriculture (USDA) with 30 percent of the customs receipts collected on imported commodities in order to promote U.S. exports; specifically to dispose of surplus production generated by domestic price supports. Under this authority, the private exporters could buy grains (among other things) at internal market prices, and sell it at the lower world price and receive cash from section 32 funds. This program ended in 1974.

International Wheat/Grain Agreement: On June 13, 1949, the International Wheat Agreement (IWA) between the governments of the major wheat exporting countries (U.S., Canada, Australia, and France) and 37 importing countries established an annual trade volume of 456 million bushels wheat and a fixed range of price for a 4 year period beginning August 1, 1949.[2] At the same period, the Agricultural Act of October 31, 1949 provided higher fixed support prices. Under IWA, and the Act of 1949, U.S. exporting firms received export subsidies from the CCC program when they bought at domestic prices and sold at the lower world price. If the domestic price was lower than the world price, then exporting firms purchased marketing certificates.[3] This export payment program ended in 1967. In 1968, the International Grain Agreement (IGA) replaced IWA with similar support prices for wheat. This agreement ended in 1969.

<u>CCC Programs</u>: Prior to 1956, the CCC continued the sale of surplus production in agricultural commodities from its stocks to U.S. private exporters at competitive bid or announced export prices that were usually lower than domestic price. By the mid-1950s, the surplus production had risen to such a level that additional programs aimed at larger acreage reductions were required. On June 1, 1953, Secretary Benson declared marketing quotas for the 1954 wheat production. On January 11, 1954, President Eisenhower urged that the export programs be strengthened to reduce surpluses and to isolate the Government-owned surpluses from the market in order to prevent downward pressure on export prices. In an effort to reduce the surplus production, the Agricultural Act of 1956 established the Soil Bank program which included acreage reserve and conservation reserve programs for the removal of land from production. The reserves were

to be disposed of by exports, donations, disaster relief, and other means. This program ended in 1958 due to its high cost and its ineffectiveness in production reduction. The conservation program continued along with PIK payments from CCC stocks, in terms of wheat certificates. The exporters were given certificates with a dollar value equal to the difference between the domestic purchase price and the export price times the amount exported. The exhaustion of CCC stocks through the PIK program reduced the available supply from this program, and thus, the PIK export program discontinued in 1966.

Public Law 480: The Public Law 480 programs approved July 10, 1954 proved to be of major importance for disposing of surplus farm products abroad. The P.L. 480 programs authorized the government to make agreements for the sale of farm products for foreign currency, emergency relief shipments, barter exchanges, and other aid purposes. The government sales to foreign countries were made from CCC inventories at export prices lower than domestic prices. This price differential reflected per unit export subsidies under the P.L. 480, Title I program.

PRODUCER SUBSIDY PROGRAMS

A variety of U.S. domestic farm policies, while originally designed for domestic market purposes, resulted in altering world prices such that they implicitly either imposed a tax or provided a subsidy to the importers of U.S. farm products. The former includes programs that limit farm output (i.e., input restriction programs, such as land diversion or set-aside programs). The latter includes programs that increase farm output (i.e., target prices and corresponding deficiency payment programs, loan rates, or a combination of both). The effects of these programs on the level of exports and market shares of major exporting countries are analyzed by Martin [1979] under different foreign demand price elasticity scenarios for the international wheat market, characterized by perfect competition as well as oligopoly. The impacts of other promotional programs, mentioned above, on the export levels and market shares of exporting countries are examined in Grigsby et al.

THE DYNAMIC RELATIONS BETWEEN MARKET STRUCTURE AND BEHAVIOR IN THE INTERNATIONAL WHEAT MARKET, 1962-1982: METHODOLOGY

Wilson [1986, p. 29], argues that during the 1950s and 1960s the international trade in wheat was characterized by an oligopolistic market dominated by Canada as the price leader, and the U.S., Australia, Argentina, France, and other exporters constituting the competitive fringe suppliers. According to Wilson, the market organization has evolved from the Canadian lead oligopoly to a competitive market organization in the 1970s and to a price leadership market with the U.S. as the leader in the1980s. He indicated that the interaction between future markets and the U.S. farm programs--the loan rate in particular--is the major force underlying price formation in the wheat market. The major factor behind the U.S. export expansion has been the use of the credit programs, while Other exporters expanded their exports through "long-term bilateral trade agreements (LTAs)" with importing nations.

With regard to the implications of a "dominant-country price leadership market structure," he concluded that:

(1). The U.S. market share will decline if it does not account for shifts in aggregate demand and the expansion of the supply from the competitive fringe due to the rigid price levels set by its loan rates.

(2). Due to the potential inflexibility of the effective export price which results from U.S. loan rates, the U.S. will continue to observe shocks from changes in the aggregate demand and supply of competitive fringe.

(3). Since the expansion of the competitive fringe is irreversible, a long-run adjustment period for reductions in the U.S. export prices is required.

Wilson's assertions, regarding the changes in the international wheat market's leadership and the relations among market shares, prices, credit programs, LTAs, and competition in international market, may be summarized in a hypothesis regarding the dynamic relations between market structure and behavior. The "dominant price umbrella" (DPU) hypothesis associated with Jones [1921, pp. 186-230], Burns [1936, pp. 77-93], Stigler [1940, 1950, 1965], and Worcester [1957] explains the decline in the market share of the dominant firm by arguing that the dominant firm sets its price high enough such that it induces the fringe suppliers to expand their capacities and outputs. The dynamic limit pricing (DLP) model developed by Gaskins [1971] and applied by Yamawaki [1985] to the U.S. iron and steel industry provides a general theoretical framework for DPU hypothesis.

The DLP model simply assumes that the dominant firm chooses its optimal price as a solution to the maximization of its long-run profits constrained by the rate at which fringe suppliers expand their outputs or new fringes enter the market. The expansion rate of the fringe exporters is assumed to be a function of the price set by the dominant exporting country. Thus, market structure (i.e., price leadership) dynamically affects the behavior of fringe exporters, and the behavior of fringe exporters (their expansion) has a long-run feedback effect on the market structure.

To explain the decline in the market share of a dominant wheat exporting country, the DLP model may be used to examine the dynamic relations between market structure and behavior in the international wheat market over the 1962-1982 time period. The hypothesis to be tested and the questions to be answered are as follows:

HYPOTHESIS:

The price set by the dominant wheat exporting country (Canada for 1962-1972, and the U.S. for 1973-1982) was continuously influenced by the fringe market share, while this share was originally determined by the leader's price. The leader's price gave the competitive fringe the incentive to expand production capacity and stock-holding capacity. Investment behavior of the fringe exporters then changed the international wheat market's structure.

QUESTIONS

(1). Did the export market share of the fringe exporters affect the dominant exporter's pricing policy?

(2). Were the output and stock-capacity expansion of the fringe exporters sensitive to the price level set by the dominant exporting country?

(3). Was the export market share of the dominant exporter country more sensitive to the relative export price, the own export capacity, the importers trade dependency, or the relative export promotional activities?

To answer these questions, the following model seeks to explain the changes over time of the dominant exporting country's market share by means of a modified time series model originally developed by Yamawaki [1985]. This model consists of seven structural equations; each explicitly analyzes (a)- the price formation and determination of the dominant wheat exporting country, (b)- the output capacity expansion of both the dominant and the fringe exporters, and (c)- the long-run feedback effect of capacity expansion (of both exporting and importing countries) on the market structure.

PRICE DETERMINATION MODEL

ASSUMPTIONS

1. The individual exporting countries within the fringe behaved competitively and independently. Each individual exporting country within the fringe is assumed to be so small that its output decisions do not affect the equilibrium market price.

2. Product differentiation is absent. Wheat is considered to be a homogeneous commodity. This assumption is required because the equilibrium price setting by the dominant exporter occurs with

respect to the residual demand, which is constructed by subtracting the fringe's wheat supply from the total excess demand of importing countries. Therefore, the construction of such a curve involves the implicit assumption that wheat is a homogeneous commodity (see Alaouze, et al., [1978, p. 174].

3. The promotional payments and other advertising activities of the exporting countries are assumed to influence the consumers' preferences by creating *"product awareness and goodwill"* but not establishing product differentiation.

4. The dominant exporter sets its price given that the exports supplied by the competitive fringe depend on the dominant exporter's price.

5. The dominant exporter has a Cobb-Douglas export production function.

The combination of assumptions (2) and (3), assures that the international market equilibrium is determined by decisions based on price, output capacity expansion, stock capacity, and promotional programs.

Let the markets total demand for imports be $M_T = f(P)$, where M_T is the total import quantity demanded and P is the wheat price in the international market. The supply function of fringe exporters is a function of market price P, $M_F = g(P)$, where M_F is the sum of the export production of the fringe exporters. The dominant exporter faces the residual import demand $M_R = M_T - M_F$.

The first order condition for the maximization of the dominant exporter's profits, subject to the residual demand M_R and its production costs is:

$$P = \left[\frac{e_T - \left(\frac{M_F}{M_T}\right) \cdot e_F}{(e_T+1) - \left(\frac{M_F}{M_T}\right)(e_F+1)} \right] \cdot MC_D \qquad (1)$$

where e_T is the elasticity of total market demand; e_F is the supply elasticity of the competitive fringe; (M_F/M_T) is the market share of the fringe (MS_F); and MC_D is the marginal cost of the dominant exporting country.[4] Equation (1) shows that the markup factor A (the term in the brackets), for the dominant exporting country, depends on the market demand elasticity, the supply elasticity of the fringe, and the market share of the fringe (or the dominant exporter's market share). Equation (2) shows that an increase in the market share of the fringe exporting countries reduces the price level set by the dominant exporter. Equation (3) shows that the more elastic the fringe supply, the lower the price set by the dominant exporter country. Equation (4) shows that the short-run price elasticity of the fringe exporters will increase when the dominant price or total market demand changes such that the fringe exporters are left with excess capacity, since the fringe will expand output up to full capacity by undercutting the price charged by the dominant exporter country. Thus the dominant's markup factor is negatively related to any index of the excess capacity in the fringe exporting countries.

$$\frac{\partial P}{\partial \left[\frac{M_F}{M_T} \right]} < 0 \tag{2}$$

and,

$$\frac{\partial P}{\partial e_F} < 0 \tag{3}$$

$$\frac{\partial e_F}{\partial P} < 0 \tag{4}$$

Let's specify a multiplicative functional form for the markup factor of the dominant exporter country as:

$$A = a_o (MS_F)^{a_1} (CUI)^{a_2} \tag{5}$$

where A is the markup factor of the dominant exporter; MS_F is the market share of the fringe suppliers; and CUI is an index of the capacity utilization of the market (to capture the impacts of the fringe capacity expansion through changes in its short-run supply elasticity). Rewriting Equation (2) as P = A . MC_D, substituting Equation (5) for A, and substituting a short-run marginal cost associated with the dominant country's Cobb-Douglas export production function as a function of unit input costs for MC, gives

$$MC = (ULC)_D^{a_3} (UMC)_D^{a_4}$$

which provides the following Equation for estimation:

$$\boxed{\log P_t = \log a_o + a_1 \log(MS)_{F,t} + a_2 \log(CUI)_t + a_3 \log(ULC)_{D,t} + a_4 \log(UMC)_{D,t} + u_t} \tag{6}$$

where $(ULC)_D$ and $(UMC)_D$ are the dominant exporter's unit labor cost and unit material cost, respectively, and u is an error term.

CAPACITY EXPANSION MODEL

The decline in the market share of the dominant exporter country may be attributed to the capacity expansion of the existing fringe exporting countries and/or due to the "entry" of new exporters. The dominant exporter umbrella model implies that capacity expansion of the fringe exporters is positively related to the price charged by the dominant exporting country, since by assumption the fringe behave as price takers and maximize their profits given the price level set by the dominant exporter. The dominant exporter maximizes its profit subject to the fringe (follower) reaction function ($M_F = g(P) = h(M_D)$), such that its capacity expansion depends on the fringe's choice of capacity, which in turn depends on the price set by the dominant exporter.

Given that the dominant exporter has a Cobb-Douglas production function, Equation (7) shows the optimal capital stock (K^*_D) for the dominant exporting country. This equation is obtained from the first order condition for the long-run profit maximization of the dominant exporting country subject to the fringe's reaction function, (the marginal revenue times the value of the marginal product of each input, equal to its price).[5]

$$K^*_D = \frac{Z \,.\, P \,.\, M_D \left[(e_T+1) - MS_F(e_F+1) \right]}{r(e_T - MS_F \,.\, e_F)} \tag{7}$$

$$\frac{\partial K^*_D}{\partial MS_F} > 0 \qquad (8)$$

where, MS_F is the market share of the fringe (M_F/M_T), Z is the production function's parameter, and r is the cost of capital. Equation (8) shows that the dominant exporter's investment policy is positively related to the fringe's market share. That is, the dominant exporter expands its production capacity when it faces a large degree of competition from the fringe, and it reduces production capacity when it faces a lesser degree of fringe competition. Equations (9) and (10) shows the desired level of capital stock for the dominant exporter (K^*_D) and the competitive fringe (K^*_F) respectively.

$$K^*_D = b_o(P^*)^{b_1}(M^*_T)^{b_2}(CS^*_F)^{b_4}(r)^{b_3} \qquad (9)$$

$$K^*_F = c_o(P^*)^{c_1}(M^*_T)^{c_2}(CS^*_F)^{c_3}(r)^{c_4} \qquad (10)$$

where P^* is the expected product price in real terms; M^*_T is the expected industry export production; and CS^*_F is the fringe capacity share.

Since the MS_F is affected by the short-run fluctuation in the fringe output behavior, the CS_F (preferably with one year lag) is used instead of MS_F as an appropriate variable in the dominant investment Equation (9) to capture the long-run fringe penetration and hence the effect of fringe competition.

The change in the capacity of the exporting countries involves some adjustment cost for new investment. To avoid the high costs of adjusting capacity rapidly, individual exporters adjust their capacity smoothly. Thus, it is more appropriate to expect that each individual exporting country's investment will follow the gradual long-term growth path of the market. Therefore, to capture the effect of adjustment costs, the expected total export production, (M^*_T), is included in Equations (9) and (10) instead of the individual exporter's export production to allow for the long-term effect of adjustment costs. However, the effect of market growth on the capacity expansion of each exporting country may differ, mainly due to the different initial capacity (plant size), upon which they have established their export operation. For a large exporting country, further capacity expansion may be required only if its production capacity was found binding in previous years, and not primarily due to the expected market growth. While on the contrary, the fringe exporters may respond more strongly to the expected growth of the market. To capture these effects, the dominant exporter's capacity utilization lagged one period ($CU_{D(-1)}$) and the fringe's capacity utilization lagged one period ($CU_{F(-1)}$) may be added respectively to Equations (9) and (10).

Utilizing a partial adjustment process of the capital stock with the adjustment rate of (d), as described by Hickman [1965], results in Equation (11):

$$\left[\frac{K_t}{K_{t-1}} \right] = \left[\frac{K^*_t}{K_{t-1}} \right]^d ; \qquad 0 < d \leqq 1. \tag{11}$$

and assuming rational expectation on price and adding $(CU_{D(-1)})$ and $(CU_{F(-1)})$, respectively, to Equations (9) and (10) and taking the logarithm of those equations we obtain the following equations for estimation.[6]

$$\boxed{\begin{aligned} \log(K^*_D)_t = {} & d_D\log(b_o) + d_D b_1\log(P^*)_t + d_D b_2\log(M^*_T)_t + d_D b_3\log(CS_F)_{t-1} \\ & + d_D b_4\log(r)_t + d_D b_5\log(CU_D)_{t-1} + d_D\log(K^*_D)_{t-1} + v_{D,t} \end{aligned}} \tag{12}$$

$$\boxed{\begin{aligned} \log(K^*_F)_{(t)} = {} & d_F\log(c_o) + d_F c_1\log(P^*)_t + d_F c_2\log(M^*_T)_t + d_F c_3\log(CS^*_F)_{t-1} \\ & + d_F c_4\log(r)_t + d_F c_5\log(CU_F)_{t-1} + d_F\log(K^*_F)_{t-1} + v_{F,t} \end{aligned}} \tag{13}$$

where d_D and d_F are the adjustment coefficients, and $v_{D,t}$ and $v_{F,t}$ are error terms for the dominant and the fringe equations, respectively.

FRINGE SUPPLY AND MARKET SHARE

The profit maximization of the competitive fringe yields a short-run supply function as $M_F^S = g(P, IP, K)$ where M_F^S is the fringe's supply of output; IP is a vector of input prices; and K is production capacity, and:

$$\frac{\partial (M^S{}_F)}{\partial P} > 0 , \qquad \frac{\partial (M^S{}_F)}{\partial (IP)} < 0 , \qquad \frac{\partial (M^S{}_F)}{\partial K} > 0$$

Thus, for estimation purposes, the fringe's supply function and its market share equations are specified in Equations (14) and (15), respectively.

$$\boxed{\log(M_F)_t = f_o + f_1\log P_t + f_2\log(AIP)_t + f_3\log(FTC)_{t-1} + f_4\log(ULC)_{F,t} + 1_t} \tag{14}$$

$$\boxed{\log(MS_F)_t = g_o + g_1\log P_t + g_2\log(AIP)_t + g_3\log(CS_F)_{t-1} + g_4\log(ULC)_{F,t}} \tag{15}$$

where P is the dominant price; AIP is the average input price (other than labor cost); FTC is the fringe's total production capacity lagged one period; $(ULC)_F$ is the fringe's unit labor cost; and 1_t is an error term.

THE DOMINANT'S UNIT LABOR COST

The unit labor cost (ULC) is a major component of the cost of production. Thus, the dominant's markup over its marginal cost, and hence the height of its price and magnitude of its profit, depends on ULC. The production worker's hourly wage (HW) and the marginal productivity of labor (MP_L) are the two components of ULC.

The excess of price over cost of all factors of production determines the excess profits of the firm. The excess profits increase not only with product price but also with the reduction of the cost of production induced by costs of factors as well as improvements in technology. Assuming that higher excess profit is only due to price increase, and HW increases as a result of higher prices, then we expect a positive relation between the wage and the product price. The MP_L component of unit labor cost is controlled by the long-run productivity trend which in turn reflects changes in technology and the utilization of labor force in production. Thus, we specify the dominant's unit labor cost, $(ULC)_D$, as:

$$\boxed{\log(ULC)_{D,t} = j_o + j_1 \log P + j_2 \log(CPI)_{D,t-1} + j_3 \log(CU)_{D,t} + j_4 \log(PGI)_{D,t} + s_t} \quad (16)$$

where $(CPI)_{D,t-1}$ is consumer price index to capture the effects of the previous year's cost of living on wages; $(CU)_{D,t}$ is capacity utilization which is assumed to be correlated with the utilization of the fixed portion of the labor force, $(PGI)_{D,t}$ is the dominant's productivity growth index; and s_t is an error term.

We close the model by adding Equation (17) for the fringe's total production capacity FTC and Equation (18) for the dominant's total production capacity DTC.

$$\boxed{\log(FTC)_t = m_o + m_1 \log(K^*_F)_t + m_2 \log(K^*_F)_{t-1} + q_t} \quad (17)$$

$$\boxed{\log(DTC)_t = n_o + n_1\log(K^*{}_D)_t + n_2\log(K^*{}_D)_{t-1} + z_t} \tag{18}$$

MODEL SUMMARY

The model explained above consists of 7 structural equations (Equations 6, 12, 13, 14, 16, 17, and 18) and 7 identities; 14 endogenous variables and 6 exogenous variables (M^*_T, IP, CPI, r, PGI, ULC_F). The variable definitions, simultaneous equation system, estimation procedure, and expected signs are summarized below.

VARIABLE DEFINITIONS

Variable	Expected Sign	Definition
AIP	(-)	Average input price for fringe.
CPI	(+)	The consumer price index.
CS_F	(+)	Fringe capacity share, CS_F= (FTC/TCAP).
CU_D	(+)	Capacity utilization of dominant, CU_D = (M_D/DTC).
CU_F	(-)	The capacity utilization of fringe, CU_F = (M_F/FTC).
CUI	(+)	Market capacity utilization index, CUI = (M_T/TCAP).
DTC	(+)	Total capacity production for dominant exporter.
FTC	(+)	Fringe total capacity production.
K_D	(+)	Capital stock in wheat production for dominant exporter.
K_F	(+)	The sum of capital stock in wheat production for fringe.
M_T	(+)	Market total wheat production.
MS_F	(-)	Fringe's market share, MS_F= $M_F/(M_D + M_F)$.
P	(+)	The dominant's wheat price in international wheat market.
PGI	(+)	Index of productivity growth.
r	(-)	Interest rate.
ULC_D	(+)	Unit labor cost for dominant exporter. The ratio of total annual wages and salaries to dominant's wheat production.
ULC_F	(-)	Unit labor cost for fringe.
UMC_D	(+)	Unit cost of input material for dominant exporter.

SIMULTANEOUS EQUATION SYSTEM

EQUATIONS

$$(1)\ \log P_t = \log a_o + a_1\log(MS)_{F,t} + a_2\log(CUI)_t + a_3\log(ULC)_{D,t} + a_4\log(UMC)_{D,t} + u_t$$

$$(2)\ \log(K^*{}_D)_t = d_D\log(b_o) + d_Db_1\log\left(\frac{P}{WPI}\right)_t + d_Db_2\log(M^*{}_T)_t + d_Db_3\log(CS_F)_{t-1}$$
$$+\ d_Db_4\log(r)_t + d_Db_5\log(CU_D)_{t-1} + d_D\log(K^*{}_D)_{t-1} + v_{D,t}$$

$$(3)\ \log(K^*{}_F)_t = d_F\log(c_o) + d_Fc_1\log\left(\frac{P}{WPI}\right)_t + d_Fc_2\log(M^*{}_T)_t + d_Fc_3\log(CS^*{}_F)_{t-1}$$
$$+\ d_Fc_4\log(r)_t + d_Fc_5\log(CU_F)_{t-1} + d_F\log(K^*{}_F)_{t-1} + v_{F,t}$$

$$(4)\ \log(M_F)_t = f_o + f_1\log P_t + f_2\log(AIP)_t + f_3\log(FTC)_{t-1} + f_4\log(ULC)_{F,t} + l_t$$

$$(5)\ \log(ULC)_{D,t} = j_o + j_1\log P + j_2\log(CPI)_{D,t-1} + j_3\log(CU)_{D,t} + j_4\log(PGI)_{D,t} + s_t$$

$$(6)\ \log(FTC)_t = m_o + m_1\log(K^*{}_F)_t + m_2\log(K^*{}_F)_{t-1} + q_t$$

$$(7)\ \log(DTC)_t = n_o + n_1\log(K^*{}_D)_t + n_2\log(K^*{}_D)_{t-1} + z_t$$

Identities:

$$(8)\ (MS)_F = \left(\frac{M_F}{M_T}\right), \qquad (12)\ (CUI) = \left(\frac{M_T}{TCAP}\right)$$

$$(9)\ M_D = M_T - M_F, \qquad (13)\ (CU)_D = \left(\frac{M_D}{DTC}\right)$$

$$(10)\ TCAP = FTC + DTC, \qquad (14)\ (CU)_F = \left(\frac{M_F}{FTC}\right)$$

$$(11)\ (CS)_F = \left(\frac{FTC}{TCAP}\right)$$

STATISTICAL RESULTS

The system of equations explained above may be estimated by the two-stage least squares method (2SLS), as they contain endogenous variables on the right hand side. Unfortunately, at the present time the unavailability of data for some variables such as capital stock, wages, average input prices, and unit material costs in wheat production for major wheat exporting countries does not allow us to test this model. Thus, we can not answer the first two questions raised earlier regarding the decline in the share of the dominant exporter due to the dynamic relations between market structure and behavior in the international wheat market. However, the modified reduced form of such a model, with the addition of important variables from the importers point of view, provides the basis for answering the third question regarding the factors influencing the market share of major exporting countries in international wheat markets.

The reduced form of the structural model described above is presented as the following market share equation.

$$MS_i = F(P,\ CUI,\ CPI_i,\ CU_i,\ PGI_i,\ UMC_i,\ CS_F,\ r) \qquad (19)$$

where MS_i is the market share of the i^{th} exporting country, and the remaining variables are as previously defined. Given that the export competitiveness of the exporting countries can be measured in terms of the variation of their market shares, the output of the model will determine the impact of the explanatory variables on market shares.

For estimation purposes, Equation (19) may be modified as follows:

$$MS_{ij} = F\left[RP_{ij},\ CUI,\ RCPI_i,\ ECU_{ij},\ RPGI_i,\ UMC_i,\ RCS_i,\ SSR_j,\ XS_{ij},\ Rr_{ij},\ POP_j,\ Q_j,\ MS_{ij,-1} \right] \tag{20}$$

where,

RP_{ij} = Relative cif (landed) prices of i in the j^{th} import market. It is the ratio of the cif price of the i^{th} exporter in the j^{th} import market to the market share weighted average cif prices of other exporters in the j^{th} market.

CUI_i = Capacity utilization index for i.

$$CUI_i = \frac{\sum_{i=1}^{n} E_i}{\sum_{i=1}^{n} TCAP_i}, \qquad i = \text{USA, CANADA, AUSTRALIA, ARGENTINA, FRANCE.}$$

$RCPI_i$ = Relative consumer price index for i. It is the ratio of the i^{th} country CPI to weighted average CPI,s of the competitors.

ECU_{ij} = Export capacity utilization of i in market j.

$ECU_{ij} = E_{ij}/TCAP_i$.

$TCAP_i$ = Total capacity of i = production for domestic consumption + production for exports + stock.

Q_j = Production in the j^{th} region.

UMC = Unit material cost for wheat production in exporting country i.

RCS_i = Relative capacity share of i.

$$= \frac{TCAP_i}{\sum_{i=1}^{n} TCAP_i}$$

XS_{ij} = Market promotional expenditure share of the i^{th} exporter in the j^{th} region.

$$= \frac{X_{ij}}{\sum_{i=1}^{n} X_{ij}}$$

SSR_j = Self sufficiency ratio in import region j. It is the ratio of the production in the import region j to total utilization (production + imports + stock) in that region

Rr_{ij} = Interest rate of i relative to other exporters to region j.

$MS_{ij,-1}$ = Market share of i lagged one period.

The governmental promotional expenditure shares in the import regions (XS_{ijt}) are added to Equation (20) in order to capture the impact of such policies on the market share of exporters in two major regional import markets of the developed and the less developed countries (DCs and LDCs respectively). Historically, countries within these regions have been importers of U.S. wheat and also have benefited from foreign wheat promotional programs. If sales have been increased by the U.S. promotional programs but market share has not, then we can conclude that the U.S. policy helps increase the overall demand for wheat and it has spillover effects by increasing the demand for wheat from U.S. competitors as well.

If, however, market share has increased, then we have tentative evidence that the U.S. credit policies do work in the way they are intended and further credit promotional programs could help keep the U.S. share of export wheat markets from slipping. In this latter case, we could argue that U.S. credit promotional programs are an effective competitive tool. In the former case, however, such policies would be of limited usefulness, stimulating all sales of wheat not necessarily those of just the U.S.

Due to collinearity between $RCPI_i$ and RPj, and Rrj and RPj we may drop both $RCPI_i$ and RPj from Equation (20). Also we drop SSR_j due to its collinearity with Q_j, and UMC_i, CUI, $RPGI_i$ and RCS_i are dropped since data are not available for these variables at present. The final equation for estimation in logarithmic form is presented in Equation (21) below.

$$\boxed{\begin{aligned}\log(MS)_{ijt} = \beta_o + \beta_1 \log(RP)_{ijt} + \beta_2 \log(ECU)_{ijt} + \beta_3 \log(XS)_{ijt} + \\ \beta_4 \log(POP)_{jt} + \beta_5 \log(Q)_{jt} + \beta_6 \log(MS)_{ij,-1} + U_t\end{aligned}} \quad (21)$$

Equation (21) is estimated for time-series regressions utilizing OLS as well as seemingly unrelated regressions (SUR) methods for each individual major wheat exporter in DC and LDC import regions over the 1962-1982 time period. The data for market shares (MS_{ijt}) and relative cif landed prices (RP_{ijt}) are taken from a recent study by Emami, Hueth, and Martin [1985], (Tables 4-6 to 4-11, and Tables 4-16 to 4-18, respectively). The data on ECU_{ijt} and Q_j are constructed from exporters' production data (Table 4-1). The data on XS_{ijt} are not available at the present, however, the data on special transactions (P.L. 480) by the U.S. in DCs and LDCs is constructed from USDA data (Table 4-22). Data on population are obtained from *United Nations Population and Vital Statistics Reports* (Table 4-23).

The OLS and SUR results of the market share equations, by each exporting country's importing regions, are presented in Tables (4-24 and 4-25) and (4-26 and 4-27), respectively. The comparison of OLS and SUR results indicates that the coefficients obtained by SUR are more efficient than those obtained by the OLS method. Based on SUR results, most of the coefficients on the independent variables included in the estimation have the expected signs and are significant. These findings suggest that the U.S. P.L. 480 expenditures in the DCs reduced the U.S. market share in that region. While the same expenditures in the LDCs have increased the U.S. market share in that region. A possible explanation for the decline of the U.S. market share in the DCs may be that the DCs substituted P.L. 480 aid for their imports from the U.S., while such aid was beneficial in the expansion of U.S. exports to LDCs.

Another interesting result is the positive effect of the population of the DCs and the negative effects of population of the LDCs on the individual exporting countries market shares. This result is obtained because wheat production in the LDCs is labor intensive, while in the DCs it is capital intensive. As population grows in the LDCs they produce more and import less. While the population growth in the DCs increases consumption more than it increases production, hence it increases their imports.

The most significant variable explaining positively the market shares of exporting countries is the export capacity utilization of exporting countries $(ECU)_{ijt}$. This variable represents the portion of the total wheat availability of an exporting country exported to either DCs or LDCs destinations. From the importing region's point of view, this variable represents the degree to which the importing region can rely on the exports of exporting countries (i.e., export reliability ratio).

The relative cif prices in importing regions have the expected negative signs (except for the U.S. price in the DCs and Argentina's price in the LDCs). The magnitude of the coefficients on this variable indicate that the market share relative price (cif) elasticities are significantly inelastic.

TABLE 4.22. VALUE OF THE U.S. P.L.480 PAYMENTS FOR WHEAT AND WHEAT FLOUR BY REGION, FISCAL YEAR 1955-1983 (VALUE IN 1000 U.S. DOLLARS).

COUNTRY	1965	1956	1957	1958	1959	1960	1961	1962	1963
DEVELOPED REGIONS	240727	256484	311804	96400	108720	43888	91223	116644	88153
N. AMERICA	0	0	0	0	0	0	0	0	0
ISRAEL	24997	14075	15081	17027	9622	11505	12243	17429	12310
EC-10	91004	120333	173145	21160	30957	13415	31264	4814	1252
E.F.T.A.	9823	8430	15379	6565	11883	1215	1259	13270	48
O. W. EUROPE	73866	67297	63766	33464	52938	16197	46457	81132	74643
OCEANIA	0	0	0	0	0	0	0	0	0
JAPAN	41037	46349	44433	18194	3320	1656	0	0	0
DEVELOPING REGIONS	57591	144408	285317	270876	336040	444910	504233	664610	686957
S. AFRICA	0	0	0	0	2132	2649	0	0	0
N. AFRICA	2298	30365	5057	4918	17823	38184	44027	101001	85628
C.E.U.C.A.	0	0	0	0	0	0	0	13	12
E.C.O.W.A.S.	0	0	0	0	670	2661	2142	927	0
E. AFRICA	0	0	0	0	962	707	1	383	95
O. S. AFRICA	0	0	0	380	1551	800	1364	1007	0
O. AFRICA	0	0	0	0	223	1024	650	260	5
L.A.F.T.A.	5902	50492	47067	24156	40162	82195	76976	130036	91441
C.A.C.M.	0	272	2027	1887	2346	1045	165	2550	0
CARIBBEAN	0	0	0	0	0	1459	1916	3497	0
O. AMERICA	0	0	0	0	0	0	0	0	0
S. ASIA	9848	20640	148225	174420	238636	244066	264219	183283	312413
S. E. ASIA	0	0	2	13	23	1347	20	38	1
E. ASIA	20586	20640	34423	41231	22710	34391	37894	38516	67028
MIDDLE EAST OIL	1961	3997	5136	2389	37	640	19336	6588	10448
MIDDLE EAST NO-OIL	16996	18002	43389	21482	8765	33840	65474	96511	29885
OCEANIA	0	0	0	0	0	0	0	0	0
CENTERALY PLANNED REGIONS	718	0	852	27278	16480	41980	71139	27339	34468
UNIDENTIFIED REGIONS AREAS N.E.S. AND NOT SPECIFIC	0	0	0	0	0	0	0	0	0
TOTAL	299036	400892	597973	394554	460240	530778	666596	708593	709578

COUNTRY	1964	1965	1966	1967	1968	1969	1970	1971	1972
DEVELOPED REGIONS	36159	95891	94720	17588	3470	15474	16121	13797	13872
N. AMERICA	0	0	0	0	0	0	0	0	0
ISRAEL	10779	7798	10602	5822	2360	14594	15789	13345	13484
EC-10	3208	1448	2	1032	0	0	0	0	0
E.F.T.A.	5008	6617	0	932	1036	857	313	412	343
O. W. EUROPE	17164	80028	84116	9802	74	23	19	40	45
OCEANIA	0	0	0	0	0	0	0	0	0
JAPAN	0	0	0	0	0	0	0	0	0
DEVELOPING REGIONS	637530	769144	660484	499737	621169	377035	380503	368365	377875
S. AFRICA	8223	0	0	2363	0	0	0	0	62
N. AFRICA	84441	92666	73061	60234	48911	21018	26936	32319	42163
C.E.U.C.A.	0	0	0	3	22	28	35	41	0
E.C.O.W.A.S.	0	0	2	2162	2208	859	2644	4403	3643
E. AFRICA	0	134	634	353	112	32	764	370	662
O. S. AFRICA	0	0	0	5	0	8	189	447	0
O. AFRICA	0	0	0	4341	3036	2120	219	1394	2055
L.A.F.T.A.	74902	89623	28911	47870	63920	63566	37674	34547	20319
C.A.C.M.	378	682	396	304	328	282	310	343	291
CARIBBEAN	968	266	936	3894	6568	6003	5745	6135	6952
O. AMERICA	0	0	0	42	15	217	25	213	-2
S. ASIA	383325	498467	481001	321268	457499	172667	172598	132467	109557
S. E. ASIA	23	404	15	10163	9765	20361	43836	46434	66136
E. ASIA	52189	44396	31803	32195	31939	72600	48072	54760	85224
MIDDLE EAST OIL	10618	16470	11410	4572	116	0	0	6319	13627
MIDDLE EAST NO-OIL	22402	26136	32315	9968	7740	27274	41456	39183	27302
OCEANIA	0	0	0	0	0	0	0	0	0
CENTERALY PLANNED REGIONS	36723	3203	0	1230	964	764	672	865	11
UNIDENTIFIED REGIONS AREAS N.E.S. AND NOT SPECIFIC	0	0	0	0	0	0	0	0	0
TOTAL	710412	868238	765204	518555	625603	393263	397196	373017	391758

COUNTRY	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
DEVELOPED REGIONS	10686	10130	8683	49632	77823	51437	39069	11026	4865	0	0
N. AMERICA	0	0	0	0	0	0	0	0	0	0	0
ISRAEL	10273	9949	8683	49632	67874	46860	5373	0	0	0	0
EC-10	0	0	0	0	0	0	0	0	0	0	0
E.F.T.A.	360	0	0	0	9949	4577	33696	11026	4865	0	0
O. W. EUROPE	53	181	0	0	0	0	0	0	0	0	0
OCEANIA	0	0	0	0	0	0	0	0	0	0	0
JAPAN	0	0	0	0	0	0	0	0	0	0	0
DEVELOPING REGIONS	282102	224262	478250	442976	449881	489453	580094	625776	598446	562536	653048
S. AFRICA	137	167	130	132	20	183	538	1912	1332	408	629
N. AFRICA	11300	27812	85250	139116	201451	229774	260873	342154	369294	370450	370410
C.E.U.C.A.	118	552	358	494	178	338	500	467	248	27	0
E.C.O.W.A.S.	2243	1329	3256	2677	1183	1871	7778	9909	9129	936	2574
E. AFRICA	263	3415	2061	1031	2113	4509	10766	23679	10651	14639	15276
O. S. AFRICA	624	2095	853	322	3796	1839	8547	12118	16908	6065	9791
O. AFRICA	22	0	3	0	900	0	10832	8307	10279	9940	9976
L.A.F.T.A.	17659	26779	55753	68252	5528	17505	21929	24364	6376	14838	32825
C.A.C.M.	845	649	2155	1515	1273	564	3499	12959	20419	34698	43786
CARIBBEAN	388	599	2733	1468	5558	6685	7331	14898	20842	15255	14724
O. AMERICA	39	69	89	17	6	418	197	307	3	12	16
S. ASIA	125072	79012	293120	182400	131186	136537	137034	131681	87492	73934	135310
S. E. ASIA	60224	52656	11657	9654	25459	27842	46549	29511	16390	19920	16630
E. ASIA	46960	12209	3933	24110	49881	37978	21679	12289	26073	0	0
MIDDLE EAST OIL	6187	0	0	0	0	0	0	0	0	0	0
MIDDLE EAST NO-OIL	11070	16839	16699	21673	21349	24410	19743	2141	2810	1494	1101
OCEANIA	0	0	0	0	0	0	0	0	0	0	0
CENTERALY PLANNED REGIONS	10	0	0	0	0	0	0	0	1356	4056	5080
UNIDENTIFIED REGIONS AREAS N.E.S. AND NOT SPECIFIC	0	0	0	0	0	0	0	0	0	0	0
TOTAL	292799	234592	486933	492607	527704	640890	619153	636802	604667	566592	658129

SOURCE: ERS/USDA.

TABLE 4.23 POPULATION BY REGIONS, (IN 1000) 1962-1983.

REGION NAME	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972
N. AMERICA	209513	212652	215865	216577	219003	[illegible]	223943	226455	228996	231057	233137
U.S.A.	190916	193700	196553	196897	198991	201106	203245	205406	207590	209373	211172
CANADA	18597	18952	19312	19680	20014	20353	20698	21049	21406	21684	21965
ISRAEL	2283	2373	2466	2563	2640	2720	2802	2897	2974	3053	3134
EEC	245275	248656	250717	252818	254027	255567	257118	258680	260253	261671	263097
FRANCE	46890	47504	49127	48758	49154	49552	49954	50359	50768	51166	51567
E.F.T.A.	37709	37994	38285	38577	38758	38944	39131	39317	39506	39707	39909
O. W. EUROPE	50197	50726	51259	51801	52359	52918	53486	54057	54633	55183	55739
OCEANIA DC	13202	13467	13736	14015	14267	14522	15142	15230	15318	15562	15810
AUSTRALIA	10731	10945	11164	11387	11603	11822	12406	12457	12507	12701	12898
JAPAN	95982	95938	97905	98881	99948	101026	102116	103213	104331	105738	107165
S. AFRICA LDC	20624	21132	21652	22185	22766	23352	23974	24602	25247	25910	26591
N. AFRICA LDC	67680	69346	71229	73010	74789	[illegible]	78599	80593	82904	84787	86886
C.E.U.C.A.	8706	8859	9013	9171	9345	9523	9706	9890	10080	10292	10508
E.C.O.W.A.S.	90127	92473	94883	97357	[illegible]	[illegible]	104876	107513	110217	113236	116347
E. AFRICA LDC	48866	50129	51424	52752	54192	[illegible]	57199	58766	60376	62061	63799
O. S. AFRICA	29590	30320	31070	31827	32537	33458	34300	35164	36051	37016	38005
O. AFRICA LDC	20996	21292	21698	22154	22630	23163	23678	24193	24663	29981	30374
L.A.F.T.A.	192143	197605	203226	209015	214765	220684	226771	233033	239475	245906	252518
ARGENTINA	21218	21532	21850	22173	22478	22787	23101	23419	23741	24060	24382
C.A.C.M.	11740	12114	12501	12904	13297	13701	14117	14550	14992	15456	15916
CARIBBEAN	11138	11363	11606	11861	12086	12323	12851	12788	13025	13285	13545
O. AMERICA LDC	2278	2352	2414	2491	2557	2632	2707	2785	2844	2916	2993
S. ASIA LDC	579051	592929	606943	621393	636656	652295	668322	684747	701577	717101	732975
S. E. ASIA LDC	212039	217320	222735	228295	234654	240541	246573	252769	259115	264624	270583
E. ASIA	42274	43450	44654	45890	46897	47925	48973	50044	51168	51163	52202
M. E. OIL	43589	44921	46274	47684	49182	50732	52332	53990	55705	57467	59291
M. E. NON-OIL	52640	53957	55309	56697	58106	59555	61047	62073	63619	65214	66849
OCEANIA LDC	4717	4833	4935	5059	5150	5309	5415	5551	5689	4045	4142
CENTRALLY PLANNED COUNTRIES	349180	354197	1045278	1064509	1078688	1092839	1107018	1121605	1205548	1222940	1240039
TOTAL WORLD POPULATION	2441539	2491298	3227077	3289477	3349210	3409823	3471895	3534425	3668307	3735271	3801553
TOTAL DC POPULATION	654161	662906	670233	675232	681004	687156	693738	699839	706011	711971	717991
TOTAL LDC POPULATION	1438198	1474295	1511566	1549736	1589318	1629629	1671140	1713041	1756748	1800360	1843523
TOTAL EXCLUDING CP COUNTRIES	2092359	2137101	2181799	2224968	2270522	2316985	2364878	2412960	2462759	2512331	2561514
TOTAL DC & LDC EXCLUDING U.S.	1901443	1943401	1985246	2028071	2071531	2115379	2161633	2207474	2255169	2302958	2350342
TOTAL DC & LDC EXCLUDING CANADA	2073762	2118149	2162487	2205288	2250508	2296632	2344130	2391831	2441353	2490647	2539549
TOTAL DC & LDC EXCLUDING AUSTRALIA	2081628	2126156	2170635	2213581	2258919	2305163	2352472	2400423	2450252	2499630	2548616
TOTAL DC & LDC EXCLUDING ARGENTINA	2071141	2115569	2159949	2202795	2249044	2294198	2341777	2389461	2439018	2488271	2537132

REGION NAME	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
N. AMERICA	235235	237354	239491	241414	243352	245306	247685	255037	257290	258735	262753
U.S.A.	212985	214815	216660	218340	220032	221738	223994	231096	233049	234101	237646
CANADA	22250	22539	22831	23074	23320	23558	23691	23941	24231	24654	24907
ISRAEL	3217	3302	3390	3495	3604	3716	3786	3871	3954	4023	4097
EEC	264532	265976	267432	267933	268440	259933	269771	270743	271701	272318	272592
FRANCE	51972	52379	52790	52920	53051	53182	53479	53713	53963	54219	54652
E.F.T.A.	40113	40319	40507	40648	40787	40944	41226	41346	41466	41636	41734
O. W. EUROPE	56303	56874	57452	57997	58548	59106	59874	60326	60725	61150	61603
OCEANIA DC	16062	16317	16577	16897	17222	17514	17575	17769	18085	18336	18572
AUSTRALIA	13098	13301	13507	13788	14074	14366	14422	14616	14927	15178	15369
JAPAN	108610	110075	111560	112385	113216	114053	115870	116782	117645	118449	119259
S. AFRICA LDC	27290	28007	28742	29543	[illegible]	31213	32184	33179	33849	34436	35321
N. AFRICA LDC	89033	91247	93514	96145	[illegible]	101639	105669	109975	112380	115858	[illegible]
C.E.U.C.A.	10730	10957	11188	11444	11705	11973	12555	12812	[illegible]	14050	[illegible]
E.C.O.W.A.S.	119550	122947	126245	129760	[illegible]	137102	[illegible]	142601	148007	[illegible]	[illegible]
E. AFRICA LDC	65580	67422	69309	71362	73481	75652	77068	79152	[illegible]	[illegible]	[illegible]
O. S. AFRICA	39023	40069	41142	42321	[illegible]	44785	46053	47830	[illegible]	52023	[illegible]
O. AFRICA LDC	31259	32111	32975	33900	[illegible]	36431	35763	37409	[illegible]	[illegible]	[illegible]
L.A.F.T.A.	259319	266317	273513	280974	[illegible]	296100	304856	311817	317260	322152	[illegible]
ARGENTINA	24709	25041	25377	25704	[illegible]	26571	26729	27034	[illegible]	29158	[illegible]
C.A.C.M.	16391	16889	17400	17933	[illegible]	[illegible]	19822	20743	[illegible]	21932	[illegible]
CARIBBEAN	13811	14083	14360	14642	[illegible]	15262	15529	15830	16160	16405	[illegible]
O. AMERICA LDC	3072	3139	3211	3283	[illegible]	3587	3494	3513	3579	3577	[illegible]
S. ASIA LDC	749210	765598	782564	799412	[illegible]	[illegible]	847331	865020	882915	925527	[illegible]
S. E. ASIA LDC	276329	283247	289223	274965	[illegible]	[illegible]	303106	312122	315330	320530	[illegible]
E. ASIA	53250	54330	55429	56491	[illegible]	58676	42777	43540	44170	44033	[illegible]
M. E. OIL	61186	63063	65199	67326	[illegible]	71750	74522	75958	79733	82964	[illegible]
M. E. NON-OIL	68527	70249	72015	73756	75541	77369	80654	81829	83679	85490	87047
OCEANIA LDC	4234	4337	4440	4548	[illegible]	4764	4950	4984	5041	5101	5223
CENTRALLY PLANNED COUNTRIES	1257744	1275980	1315692	1332171	[illegible]	1366397	1401710	1418211	1475117	[illegible]	[illegible]
TOTAL WORLD POPULATION	3870105	3940108	4012571	4080746	4150432	4222207	4305416	4381907	4430000	4597904	[illegible]
TOTAL DC POPULATION	724072	730217	736409	740769	745169	749572	755787	765974	770833	774647	[illegible]
TOTAL LDC POPULATION	1890259	1933911	1960470	2007806	2056384	2106233	2147919	2197822	2244027	[illegible]	[illegible]
TOTAL EXCLUDING CP COUNTRIES	2612361	2664128	2696379	2748575	2801523	2853310	2903706	2963695	3014833	[illegible]	3171257
TOTAL DC & LDC EXCLUDING U.S.	2399376	2449313	2480219	2530235	2581521	2634072	2679712	2732600	2781834	2854477	2933411
TOTAL DC & LDC EXCLUDING CANADA	2590111	2641539	2674048	2725501	[illegible]	2832242	2880015	2959755	2990652	3073944	3146350
TOTAL DC & LDC EXCLUDING AUSTRALIA	2599263	2650827	2683372	2734787	2787479	2941444	2899294	2949080	2999956	3083400	[illegible]
TOTAL DC & LDC EXCLUDING ARGENTINA	2587652	2639087	2671502	2722871	2775517	2829439	2876977	2936632	2986798	3069420	3141630

TABLE 4-24. ESTIMATED MODEL (OLS) IN LDCs REGION, 1962-1982.

Estimated Equation:

$$\log(MS)_{ijt} = ß_o + ß_1 \log(RP)_{ijt} + ß_2 \log(ECU)_{ijt} + ß_3 \log(X)_{ijt} + ß_4 \log(POP)_{jt} + ß_5 \log(Q)_{jt} + ß_6 \log(MS)_{ij,-1} + U_t$$

Coefficients	USA	Canada	Australia	Argentina	France
$ß_o$	14.77 (3.83) *****	7.23 (0.73)	16.98 (1.43) *	38.05 (2.12) **	3.62 (0.23)
$ß_1$	-0.28 (-1.28)	-0.97 (-2.04) **	-0.61 (-2.06) **	+0.10 (0.83)	-0.71 (-1.61) *
$ß_2$	0.42 (5.19) *****	0.57 (7.35) *****	0.57 (7.45) *****	0.80 (6.72) *****	0.84 (7.34) *****
$ß_3$	0.81 (1.84) **	NA	NA	NA	NA
$ß_4$	-1.40 (-3.08) *****	-0.81 (-0.75)	-1.71 (-1.23)	-2.59 (-1.31)	-0.57 (-0.33)
$ß_5$	0.59 (2.32) ***	0.51 (0.90)	0.74 (0.90)	-0.60 -(0.59)	0.43 (0.53)
$ß_6$	0.13 (0.97)	-0.15 (-1.38) *	0.50 (0.41)	-0.27 (-2.42) ***	-0.10 (-1.12)
DF	13	14	14	14	14
DW	1.99	2.49	2.32	1.70	2.08
R^2 Adjusted	0.83	0.87	0.92	0.87	0.92

Notes: 1. The t statistics are in the parentheses
2. The level of significat are indicated by *,s under t values:
* = %10 Level of Significant.
** = %5 Level of Significant.
*** = %2.5 Level of Significant.
**** = %1 Level of Significant.
***** = %0.5 Level of Significant.

TABLE 4-25. ESTIMATED MODEL (OLS) IN DCs REGION, 1962-1982.

Estimated Equation:

$$\log(MS)_{ijt} = \beta_o + \beta_1 \log(RP)_{ijt} + \beta_2 \log(ECU)_{ijt} + \beta_3 \log(X)_{ijt} + \beta_4 \log(POP)_{jt} + \beta_5 \log(Q)_{jt} + \beta_6 \log(MS)_{ij,-1} + U_t$$

Coefficients	USA	Canada	Australia	Argentina	France
β_o	-19.89 (-2.39) ***	42.34 (1.00)	23.98 (0.66)	145.60 (6.38) *****	-81.22 (-2.09) **
β_1	0.12 (0.49)	0.25 (0.59)	-0.11 (-0.14)	-0.90 (-3.12) *****	-0.64 (-0.34)
β_2	0.71 (5.95) *****	0.15 (1.21)	0.63 (6.57) *****	0.69 (12.52) *****	0.95 (8.63) *****
β_3	-0.81 (-0.87)	NA	NA	NA	NA
β_4	1.44 (1.80) **	-3.38 (-0.98)	-1.57 (-0.47)	-11.77 (-6.07) *****	6.43 (1.84) **
β_5	0.17 (0.33)	0.41 (0.60)	-0.18 (-0.21)	1.09 (2.08) **	-0.36 (-0.54)
β_6	0.43 (2.14) **	0.38 (1.12)	-0.10 (-0.57)	-0.12 (-1.61) *	-0.28 (-1.66) *
DF	13	14	14	14	14
DW	2.32	1.37	1.94	1.59	1.95
R^2 Adjusted	0.69	0.79	0.79	0.98	0.94

Notes: 1. The t statistics are in the parentheses
2. The level of significat are indicated by *,s under t values:
* = %10 Level of Significant.
** = %5 Level of Significant.
*** = %2.5 Level of Significant.
**** = %1 Level of Significant.
***** = %0.5 Level of Significant.

TABLE 4-26. ESTIMATED MODEL (SUR) IN LDCs REGION, 1962-1982.

Estimated Equation:

$$\log(MS)_{ijt} = ß_o + ß_1 \log(RP)_{ijt} + ß_2 \log(ECU)_{ijt} + ß_3 \log(X)_{ijt} + ß_4 \log(POP)_{jt} + ß_5 \log(Q)_{jt} + ß_6 \log(MS)_{ij,-1} + U_t$$

Coefficients	USA	Canada	Australia	Argentina	France
$ß_o$	14.00	4.72	19.22	36.98	4.73
	(4.63)	(0.58)	(1.98)	(2.55)	(0.38)
	*****		**	***	
$ß_1$	-0.32	-0.99	-0.66	-0.40	-0.52
	(-1.98)	(-2.54)	(-2.73)	(-4.30)	(-1.56)
	**	***	****	*****	**
$ß_2$	0.46	0.54	0.58	0.75	0.93
	(7.81)	(8.67)	(8.98)	(8.56)	(10.74)
	*****	*****	*****	*****	*****
$ß_3$	0.73	NA	NA	NA	NA
	(2.27)				
	***				
$ß_4$	-1.32	-0.56	-2.03	-2.28	-0.58
	(-3.72)	(-0.63)	(-1.76)	(-1.45)	(-0.43)
	*****		**	*	
$ß_5$	-0.55	0.42	0.96	-0.34	0.34
	(2.77)	(0.88)	(1.43)	(0.43)	(0.51)
	****		*		
$ß_6$	0.14	-0.15	0.26	0.34	-0.15
	(1.34)	(-1.69)	(0.26)	(-4.11)	(-2.07)
	*	*		*****	**
DF	13	14	14	14	14
DW	1.96	2.47	2.28	1.70	1.86
R^2 Adjusted	0.82	0.87	0.92	0.86	0.91

Notes: 1. The t statistics are in the parentheses

2. The level of significat are indicated by *,s under t values:

* = %10 Level of Significant.

** = %5 Level of Significant.

*** = %2.5 Level of Significant.

**** = %1 Level of Significant.

***** = %0.5 Level of Significant.

TABLE 4-27. ESTIMATED MODEL (SUR) IN DCs REGION, 1962-1982.

Estimated Equation:

$$\log(MS)_{ijt} = ß_o + ß_1 \log(RP)_{ijt} + ß_2 \log(ECU)_{ijt} + ß_3 \log(X)_{ijt} + ß_4 \log(POP)_{jt} + ß_5 \log(Q)_{jt} + ß_6 \log(MS)_{ij,-1} + U_t$$

Coefficients	USA	Canada	Australia	Argentina	France
$ß_o$	-21.00 (-3.25) *****	70.35 (2.37) ***	23.98 (0.80)	147.42 (7.93) *****	-89.11 (-3.01) *****
$ß_1$	0.21 (1.03)	-0.46 (-0.14)	-0.12 (-0.18)	-1.04 (-4.54) *****	-0.78 (-0.53)
$ß_2$	0.72 (8.97) *****	0.14 (1.64) *	0.64 (8.32) *****	0.67 (15.63) *****	0.87 (10.50) *****
$ß_3$	-0.87 (-1.40) *	NA	NA	NA	NA
$ß_4$	1.56 (2.55) ***	-5.73 (-2.28) ***	-1.38 (-0.51)	-11.92 (-7.49) *****	7.01 (2.64) ****
$ß_5$	0.68 (2.96) ****	0.77 (1.61) *	-0.38 (-0.56)	1.12 (2.59) ***	-0.33 (-0.63)
$ß_6$	0.43 (3.17) *****	0.17 (0.74)	-0.21 (-1.43) *	-0.11 (-1.93) **	-0.29 (-2.31) ***
DF	13	14	14	14	14
DW	2.21	1.17	1.89	1.66	1.81
R^2 Adjusted	0.69	0.79	0.78	0.98	0.94

Notes: 1. The t statistics are in the parentheses
2. The level of significat are indicated by *,s under t values:
* = %10 Level of Significant.
** = %5 Level of Significant.
*** = %2.5 Level of Significant.
**** = %1 Level of Significant.
***** = %0.5 Level of Significant.

DISCUSSION AND SUGGESTIONS FOR FUTURE RESEARCH

The admittedly preliminary results presented here suggest that the U.S. promotional programs have not had the desired effect of stimulating U.S. wheat exports to its major international buyers (one percent increase in promotional expenditures (X) increased the U.S. market share by only %0.7 in the LDCs and reduced its share by -%0.9 in the DCs). There are several possible reasons for the observed behavior of the LDCs. The first, and most difficult to document using objective economic criteria, is the influence of political factors. It is possible that the LDCs buy from the U.S. due to political considerations. If this is true then the apparent success of U.S. promotional programs in the LDCs is not valid; what we are actually capturing in the X coefficient is the influence of the omitted political factors.

The insignificance of the U.S. credit promotional policies in the DCs may well reflect credit or other promotional policies implemented by the other wheat exporting countries. The evidence here suggests that U.S. promotional policies may be serving to keep other countries from making inroads into U.S. markets. This interpretation is consistent with the earlier "competitive advertising" argument in which U.S. promotional policies simply serve to counteract the promotional ("advertising") policies of the other major wheat exporting countries.

The results presented here are preliminary for several reasons. First, we have used a very simple linear functional form in our econometric analysis to give us an idea of which are the major factors to include in a more sophisticated analysis. Of utmost importance in future research is the use of the DLP model described earlier for examining factors affecting market shares.

Second, we have not yet explicitly examined the governmental promotional policies of the major U.S. competitors. It is essential to look at other country's policies to identify the precise role of the U.S. governmental programs. We have argued here that the U.S. policies have been relatively unsuccessful in increasing U.S. market share in the LDCs, but it is still likely that these policies play an important role in keeping the U.S. market share from eroding more rapidly. The interaction of the various country's policies on international wheat markets shares is crucial for this analysis.

In order to formulate governmental wheat export policy which is most successful in promoting the U.S. and preventing further declines in the U.S. market share, it is essential that these topics be examined in greater depth. Further, it may be important to examine not only the U.S. credit and export subsidy policies but also the setting of the domestic loan rate. As Wilson [1986] argues, the domestic loan rate effectively sets the world price and this may, in turn, have repercussions on the U.S. position in international wheat markets.

ENDNOTES

1. For example see Balassa's "Revealed Comparative Advantage" index [1965], Hickman et al.'s "Pure Competetiveness" index [1977], Finger and Kreinin's "Finger Index" [1979]Perkins [1987], and Vollrath's "Revealed Competitive Advantage" index [February 1987] and [March 1987].

2. The IWA was signed for the first time in 1933. At that time it was considered to be an important supplement to the 1933 wheat acreage adjustment program. The 1933 IWA provided acreage and export reductions for major wheat exporting countries and import barrier reduction for importing countries for 1934. This agreement broke down within one year, but it was revived in 1949.

3. The Agricultural Act of April 11, 1964 provided a voluntary wheat-marketing certificate program for 1964-1965.

4. Equation (1) is derived as follows:

$$M_R = M_T - M_F$$

$$\frac{\partial M_R}{\partial P} = \frac{\partial M_T}{\partial P} - \frac{\partial M_T}{\partial P}$$

Multiply left hand side by $\left(\frac{P}{M_R}\right)\left(\frac{M_R}{P}\right)$
and each term on the right hand side by

$\left(\frac{P}{M_T}\right)\left(\frac{M_T}{P}\right)$ and $\left(\frac{P}{M_F}\right)\left(\frac{M_F}{P}\right)$ respectively. Then,

$$\left(\frac{\partial M_R}{\partial P}\right)\left(\frac{P}{M_R}\right)\left(\frac{M_R}{P}\right) = \left(\frac{\partial M_T}{\partial P}\right)\left(\frac{P}{M_T}\right)\left(\frac{M_T}{P}\right) - \left(\frac{\partial M_F}{\partial P}\right)\left(\frac{P}{M_F}\right)\left(\frac{M_F}{P}\right) \qquad (2)'$$

Let,

$e_R = \left(\frac{\partial M_R}{\partial P}\right)\left(\frac{P}{M_R}\right)$; $e_T = \left(\frac{\partial M_T}{\partial P}\right)\left(\frac{P}{M_T}\right)$; and $e_F = \left(\frac{\partial M_F}{\partial P}\right)\left(\frac{P}{M_F}\right)$, then (2)'

reduces to:

$$e_R = \left(\frac{P}{M_R}\right)\left[e_T\left(\frac{M_T}{P}\right) - e_F\left(\frac{M_F}{P}\right)\right]$$

$$\boxed{e_R = e_T \left(\frac{M_T}{M_R}\right) - e_F \left(\frac{M_F}{M_R}\right)} \qquad (3)'$$

Maximize the dominant exporter's profit subject to M_R and its costs C_D as a function of M_R.

$$\text{MAX } \Pi_D = P.M_R - C_D$$

$$\text{S.T. } M_R = M_T - M_F$$

The first order condition yields,

$$\frac{\partial \Pi}{\partial M_R} = 0 \Rightarrow P + M_R \frac{\partial P}{\partial M_R} = \frac{\partial C_D}{\partial M_R}$$

$$P + \frac{P}{e_R} = MC_D$$

$$P \left(1 + \frac{1}{e_R}\right) = MC_D$$

$$P = \left(\frac{e_R}{e_R+1}\right) MC_D$$

Substituting for e_R from (3)' gives,

$$P = \frac{e_T M_T - e_F M_F}{e_T M_T - e_F M_F + M_R} MC_D$$

$$P = \frac{e_T - e_F \frac{M_F}{M_T}}{e_T - e_F \frac{M_F}{M_T} + \frac{M_R}{M_T}} MC_D$$

but, $\frac{M_R}{M_T} = \frac{M_T - M_F}{M_T} = 1 - \frac{M_F}{M_T}$, thus,

$$P = \left[\frac{e_T - \left(\frac{M_F}{M_T}\right) . e_F}{(e_T+1) - \left(\frac{M_F}{M_T}\right)(e_F+1)} \right] . MC_D \qquad (1)$$

5. Yamawaki's Equation (5), [p. 432, 1985], has different signs than the signs are given here.

6. This follows from Yamawaki's argument for the derivation of his Equations (8) and (9), [pp. 432-434, 1985].

CHAPTER 5

SUMMARY AND CONCLUSIONS

The purpose of the study presented in this thesis was to investigate the role of the source of the external trade statistics in measuring the price responsiveness of foreign demands and relative price competitiveness of the major exporting countries in the trade of agricultural commodities in international markets. Currently agricultural economists interested in international trade and trade policy are engaged in a controversy regarding the price responsiveness of foreign demand and market shares of exporters for major agricultural commodities in world markets. The ultimate outcome of this controversy has very important implications for policy formation and reform as well as setting strategic marketing plans for U.S. agricultural exports. Policies based on incorrect information about the effects of price or other factors on exports can introduce new distortions in both domestic and international markets and produce serious problems.

To resolve this issue, most of researchers strove for alternative assumptions, models, and methodologies for estimating the price responsiveness of foreign demand and market shares of exporters in international markets. Although these efforts are important for improving the quality of information for policy makers, their estimation requires the use of external trade statistics which are subject to enormous problems that ultimately affects the empirical outcomes of those models.

Specifically, in the first two chapters, I reviewed controversies on the magnitude of the price responsiveness of trade flows in international markets, and examined critically two major methodologies currently employed for estimation of foreign demand price responsiveness. The existing body of the literature reviewed in chapter 2 does not consider the potential bias in their parameter estimates due to the problems inherent in trade statistics. In chapter 3 we saw that the trade data are not without problems. A review of trade data for 10 nonmanufactured agricultural commodities indicated that external trade statistics reported by the partner countries systematically differ. It was discovered that trade volumes reported by exporter countries consistently over report import volume as reported by importer countries. Also, the review of the methods of trade data compilation by individual countries included in the U.N. samples of world countries revealed that in general import reports include only imports for domestic consumption and exclude reexportation statistics.

After reviewing the potential sources of inconsistency, I agreed with Parniczky [p. 45, 1980], and assumed that the principal source of data inconsistency is due to "the role of *entrepot trade* (middleman) in commercial transactions." This assumption implies that major trade oriented economies import not only for their domestic consumption and reserves but for resale (with or without value added) to other countries. I have shown that, when the objective of the modeler is to estimate import demand for consumption in importing countries, if the modeler uses export data (which includes reexportation) and fits a traditional demand to the import market engaged in reselling its imports (commodity arbitrage), then the estimated demand coefficients will reflect not only the true demand for commodities assignable to consumers in that import market, but commodities assignable to consumption in other import markets. The comparison of the demand and export market share elasticities computed with export data and the similar elasticities computed with import reports indicated that use of export data produced bias demand and market share elasticities.

Chapter 4 analyzed the issue of the competitiveness of U.S. agriculture in world market in general, and wheat in particular. The competitiveness of U.S. agriculture in world markets has been a topic of considerable interest to analysts and policy makers over the past several years. The decline in world agricultural trade in general and the associated decline in U.S. farm exports have been key factors in what has become popularly referred to as the "crisis in American agriculture."

In an effort to revitalize the agricultural economy a number of programs have been introduced or expanded which intend to improve the U.S. competitive position in export markets. It appears that, to date, these initiatives have met with limited success. These expansion programs are usually shaped based on the policy maker's perception of the quantity-price sensitivity relationship.

The empirical information on such relationship currently is provided to policy makers from econometric models which may be labeled as *elasticity of substitution* (EOS) models. These models measure the degree to which the competitiveness of exporting countries (usually measured in terms of market share) is explained by factors such as a relative price index (usually fob), or other chosen variables in *export* markets. These models are subject to at least three criticisms: first they are mostly static, second their market equilibrium is on export side (they mostly utilize fob relative price indices), and third they use export data in their calculation of market shares and relative price indices.

As I discussed in chapter 3, the use of market share, calculated from export data, in a general market share equation model framework resulted bias relative price parameters. In chapter 4, the literature on the structure conduct and performance of international wheat market indicated that the organization of international wheat market have evolved towards an imperfect competitive market. Thus in chapter 4, I attempted to adapt Yamawaki's DLP model which previously was used in the assessment of other nonagricultural (U.S. iron and steel industry) markets to explain competitive relationship in world wheat market.

Unfortunately, due to the lack of actual and proxy data for some variables such as capital, I was not able to estimate the structural equation of such model. However, I estimated a reduced form market equation with some appealing results. The preliminary result indicates that the market share's of individual major wheat exporting countries in the LDCs market are more price sensitive than in the DCs market. The export capacity utilization (percentage of domestic production exported to a given destination) was the major factor positively affecting market shares of exporting country. The U.S. promotional expenditure in LDCs sustained its market share in that region, while such expenditures were ineffective in DCs market.

LIMITATIONS

The major limitation is the lack of literature on the quantitative decomposition of discrepancies between export and import reports of a given internationally traded commodity by the sources of discrepancies. This study assumed that such data discrepancies are solely due to the commodity arbitrage activities while other factors, described in chapter 3, assumed to have no effect on data inconsistencies. Further analysis should be undertaken to fully identify the reasons for the consistent differences in volumes of trade reported by exporters and importers.

POLICY IMPLICATIONS

The results obtained in this study have certain policy implications as follows:

(1). Policy makers should be aware of the data related deficiencies in the empirical estimates of foreign demand parameters provided for them.

(2). The significant influence of export capacity utilization (CU); previously defined as a proxy for reliability on exporters; indicates that the competitiveness of major exporting countries measured in terms of their market share may be improved by exporting higher volumes of the export commodity (regardless of the price). Then, if the objective of an exporting country is to maintain higher market shares in import markets that country should produce more, and export more through nonprice expansion programs. To avoid costs of stock-holdings, one should not reduce the amount of production rather policy makers in exporting countries should provide long-run incentives for the establishment of new "value added" export industries alongside the current "raw" farm-commodity export sector. Production of new "value added" wheat products will ease the burden on stocks and help the transition of comparative advantage from raw farm products to value added semi-raw wheat-related food products.

FEASIBLE FUTURE RESEARCH

At least part of the problem in formulating effective

U.S. agricultural trade expansion policy is a lack of complete understanding with respect to the factors affecting the dynamics of international competitiveness. The DLP model may be improved by including an additional sub-model describing national money markets of trading countries. This will produce a micro-macro DLP model which will include both micro and macro variables. The money market sub-model could be simply formed through the linkage of interest rates with monetary variables such as domestic nominal money supplies, exchange rates, and variables affecting the domestic money demands in trading countries. Models of price and exchange rate dynamics (PED) associated with Dornbusch [1976] and Mussa [1987] are good candidates for introducing macro variables into the DLP model.

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APPENDICES

APPENDIX A

COUNTRY COMPOSITIONS OF REGIONS AND SUB-REGIONS

APPENDIX A1
COUNTRY COMPOSITION OF REGIONS AND SUB-REGIONS
WITH ASSOCIATED CODES, TRADE SYSTEM TYPE, VALUATION PROCEDURES, AND TRADE PARTNER DEFINITIONS
LISTED BY ECONOMIC CLASSIFICATION (ECON)

UN CODE (UN3)	COUNTRY	ABBREV. COUNTRY NAME	REGION CODE (ECON)	LABELING SYMBOL (ECONDA)	ECONOMIC REGION	TRADE SYSTEM	VALUATION EXPORT	VALUATION IMPORT	PARTNER DEFINITION IMPORT	PARTNER DEFINITION EXPORT
124	CANADA	CANADA	102	N-AMR-DC	N AMERICA DC	G	FOBT	FOBT	CFC	CLC
630	PUERTO RICO	PUERTO-R	102	N-AMR-DC	N AMER DC					
840	UNITED STATES	US	102	N-AMR-DC	N AMERICA DC	G	FAS	FOBD	CPROD	COC
376	ISRAEL	ISRAEL	103	ISRAEL	ISRAEL	S	FOBT	CIFT	CPUR	CLC
56	BELGIUM-LUXEMB.	BELGIUML	104	EC-10	EC-10	S	FOBT	CIFT	CLC	CLC
208	DENMARK	DENMARK	104	EC-10	EC-10	G	FOBT	CIFT	CPROD	COC
250	FRANCE	FRANCE	104	EC-10	EC-10	S	FOBT	CIFT	CPROD	CLC
280	GERMANY, FEDERAL REP. OF	GRMNY-FR	104	EC-10	EC-10	S	FOBT	CIFT	CPROD	COC
300	GREECE	GREECE	104	EC-10	EC-1D	S	FOBT	CIFT	CFC	CLC
372	IRELAND	IRELAND	104	EC-10	EC-10	G	FOBR	CIFR	CPROD	CLC
380	ITALY	ITALY	104	EC-10	EC-10	S	FOBT	CIFT	CPROD	COC
528	NETHERLANDS	NETHLNDS	104	EC-10	EC-10	S	FOBT	CIFT	CFC	CLC
826	UNITED KINGDOM	UK	104	EC-10	EC-10	G	FOBT	CIFT	CFC	CLC
40	AUSTRIA	AUSTRIA	105	E-F-T-A	E.F.T.A	S	FOBT	CIFT	CPROD	COD
234	FAORDE IS.	FAEROE-I	105	E-F-T-A	E.F.T.A	G	FOBT	CIFT	CPROD	COC
246	FINLAND	FINLAND	105	E-F-T-A	E.F.T.A	G	FOBT	CIFT	CPROD	COS
352	ICELAND	ICELAND	105	E-F-T-A	E.F.T.A	S	FOBT	CIFT	CPROD	COC
578	NORWAY	NORWAY	105	E-F-T-A	E.F.T.A	G	FOBT	CIFT	CPROD	COC
620	PORTUGAL	PORTUGAL	105	E-F-T-A	E.F.T.A	S	FOBT	CIFT	CPROD	COC
752	SWEDEN	SWEDEN	105	E-F-T-A	E.F.T.A	G	FOBT	CIFT	CPROD	COC
756	SWITZERLAND	SWITZRLD	105	E-F-T-A	E.F.T.A	S	FOBT	CIFT	CPROD	CLC
20	ANDORRA	ANDORRA	106	OW-EURDC	O WEST EUR DC					
292	GIBRALTAR	GIBRLTAR	106	OW-EURDC	O WEST EUR DC	G	FOBD	CIFD	CPROD	CLC
304	GREENLAND	GREENLND	106	OW-EURDC	O WEST EUR DC	G	FOBT	CIFT	CPROD	COC
438	LIECHTENSTEIN	LIECHSTN	106	OW-EURDC	O WEST EUR DC					
470	MALTA	MALTA	106	OW-EURDC	O WEST EUR DC	G	FOBT	CIFT	CPROD	COC
492	MONACO	MONACO	106	OW-EURDC	O WEST EUR DC					
674	SAN MARINO	SAN-MRNO	106	OW-EURDC	O WEST EUR DC					
724	SPAIN	SPAIN	106	OW-EURDC	O WEST EUR DC	S	FOBT	CIFT	CPROD	CLC
890	YUGOSLAVIA	YUGOSLAV	106	OW-EURDC	O WEST EUR DC	S	FOBT	CIFT	CPROD	COC
36	AUSTRALIA	AUSTRAL	107	OCEAN-DC	OCEANIA DC	G	FOBT	FOBI	CPROD	CLC
554	NEW ZEALAND	NEW-ZLND	107	OCEAN-DC	OCEANIA DC	G	FOBT	CIFT	CPROD	CLC
392	JAPAN	JAPAN	108	JAPAN	JAPAN	G	FOBT	CIFT	CPROD	COC
72	BOTSWANA	BOTSWANA	207	S-AFRLDC	SOUTH AFRICA LDC					
426	LESOTHO	LESOTHO	207	S-AFRLDC	SOUTH AFRICA LDC					
516	NAMIBIA	NAMIBIA	207	S-AFRLDC	SOUTH AFRICA LDC					
710	SOUTH AFRICA	S-AFRICA	207	S-AFRLDC	SOUTH AFRICA LDC	G	FOBT	FOBT	CPROD	CLC
748	SWAZILAND	SWAZILND	207	S-AFRLDC	SOUTH AFRICA LDC					
12	ALGERIA	ALGERIA	208	N-AFRLDC	N AFRICA LDC	S	FOBT	CIFT	CPROD	CLC

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COUNTRY COMPOSITION OF REGIONS AND SUB-REGIONS
WITH ASSOCIATED CODES, TRADE SYSTEM TYPE, VALUATION PROCEDURES, AND TRADE PARTNER DEFINITIONS
LISTED BY ECONOMIC CLASSIFICATION (ECON)

UN CODE (UN3)	COUNTRY	ABBREV. COUNTRY NAME	REGION CODE (ECON)	LABELING SYMBOL (ECONDA)	ECONOMIC REGION	TRADE SYSTEM	VALUATION EXPORT	VALUATION IMPORT	PARTNER DEFINITION IMPORT	PARTNER DEFINITION EXPORT
818	EGYPT	EGYPT	208	N-AFRLDC	N AFRICA LDC	S	FOBT	CIFT	CFC	CLC
434	LIBYA	LIBYA	208	N-AFRLDC	N AFRICA LDC	G	FOBT	CIFT	CPUR	COS
504	MOROCCO	MOROCCO	208	N-AFRLDC	N AFRICA LDC	S	FOBT	CIFT	CPROD	COC
728	SPANISH NORTH AFRICA	SP-N-AF	208	N-AFRLDC	N AFRICA LDC					
732	SPANISH SAHARA	SP-SAHRA	208	N-AFRLDC	N AFRICA LDC					
736	SUDAN	SUDAN	208	N-AFRLDC	N AFRICA LDC	G	FOBT	CIFT	CFC	CLC
788	TUNISIA	TUNISIA	208	N-AFRLDC	N AFRICA LDC	S	FOBT	CIFT	CFC	CLC
120	CAMEROON	CAMEROON	209	CEUCA	C.E.U.C.A	S	FOBT	CIFT	CPROD	COC
140	CENTRAL AFRICAN REPUBLIC	C-AF-REP	209	CEUCA	C.E.U.C.A	S	FOBT	CIFT	CPROD	COC
178	CONGO (BRAZZAVILLE)	CONGO-BA	209	CEUCA	C.E.U.C.A	S	FOBT	CIFT	CPUR	COS
266	GABON	GABON	209	CEUCA	C.E.U.C.A	S	FOBT	CIFT	CPROD	CLC
132	CAPE VERDE IS.	CAPE-VRD	210	ECOWAS	E.C.O.W.A.S	S	FOBT	CIFT	CPROD	COC
270	GAMBIA	GAMBIA	210	ECOWAS	E.C.O.W.A.S	G	FOBT	CIFT	CFC	CLC
288	GHANA	GHANA	210	ECOWAS	E.C.O.W.A.S	G	FOBT	CIFT	CPROD	CLC
324	GUINEA	GUINEA	210	ECOWAS	E.C.O.W.A.S	G	FOBT	CIFT	CFC	CLC
384	IVORY COAST	IVORY-CT	210	ECOWAS	E.C.O.W.A.S	G	FOBT	CIFT	CPROD	CLC
430	LIBERIA	LIBERIA	210	ECOWAS	E.C.O.W.A.S	S	FOBT	CIFT	CPROD	CLC
466	MALI	MALI	210	ECOWAS	E.C.O.W.A.S	S	FOBT	CIFT	CPROD	CLC
478	MAURITANIA	MAURTNIA	210	ECOWAS	E.C.O.W.A.S	S	FOBT	CIFT	CPROD	CLC
562	NIGER	NIGER	210	ECOWAS	E.C.O.W.A.S	S	FOBT	CIFT	CPROD	CLC
566	NIGERIA	NIGERIA	210	ECOWAS	E.C.O.W.A.S	G	FOBT	CIFT	CPROD	CLC
686	SENEGAL	SENEGAL	210	ECOWAS	E.C.O.W.A.S	S	FOBT	CIFT	CPROD	CLC
694	SIERRA LEONE	SIER-LNE	210	ECOWAS	E.C.O.W.A.S	G	FOBT	CIFT	CFC	CLC
768	TOGO	TOGO	210	ECOWAS	E.C.O.W.A.S	S	FOBT	CIFT	CFC	CLC
854	UPPER VOLTA	UPPR-VLT	210	ECOWAS	E.C.O.W.A.S	S	FOBT	CIFT	CPROD	CLC
86	BRITISH INDIAN OC. TERR.	BR-IN-OC	211	E-AFRLDC	EAST AFR LDC					
108	BURUNDI	BURUNDI	211	E-AFRLDC	EAST AFR LDC	S	FOBT	CIFT	CPUR	COS
230	ETHIOPIA	ETHIOPIA	211	E-AFRLDC	EAST AFR LDC	G	FOBT	CIFT	CPROD	CLC
262	FR. TERR. OF AFARS, ISSAS	FR-T-A-I	211	E-AFRLDC	EAST AFR LDC	S	FOBT	CIFT	CPUR	COS
404	KENYA	KENYA	211	E-AFRLDC	EAST AFR LDC	G	FOBT	CIFT	CPROD	CLC
646	RWANDA	RWANDA	211	E-AFRLDC	EAST AFR LDC	S	FOBT	CIFT	CFC	CLC
690	SEYCHELLES	SEYCHLLS	211	E-AFRLDC	EAST AFR LDC					
706	SOMALIA	SOMALIA	211	E-AFRLDC	EAST AFR LDC	S	FOBT	CIFT	CFC	CLC
834	TANZANIA	TANZANIA	211	E-AFRLDC	EAST AFR LDC	G	FOBT	CIFT	CPROD	CLC
800	UGANDA	UGANDA	211	E-AFRLDC	EAST AFR LDC	G	FOBT	CIFT	CPROD	CLC
24	ANGOLA	ANGOLA	212	OSAFRLDC	O. SOUTH AFR LDC	S	FOBT	CIFT	CPROD	COC
174	COMORO IS.	COMORO-I	212	OSAFRLDC	O. SOUTH AFR LDC					
450	MADAGASCAR	MADAGSCR	212	OSAFRLDC	O. SOUTH AFR LDC	S	FOBT	CIFT	CPROD	COC
454	MALAWI	MALAWI	212	OSAFRLDC	O. SOUTH AFR LDC	G	FOR	FOBT	CPROD	CLC
480	MAURITIUS	MAURTIUS	212	OSAFRLDC	O. SOUTH AFR LDC	G	FOBT	CIFT	CPROD	CLC
508	MOZAMBIQUE	MOZMBQUE	212	OSAFRLDC	O. SOUTH AFR LDC	S	FOBT	CIFC	CPROD	COC
638	REUNION	REUNION	212	OSAFRLDC	O. SOUTH AFR LDC	S	FOBT	CIFT	CFC	CLC
716	SOUTHERN RHODESIA	S-RHODSA	212	OSAFRLDC	O. SOUTH AFR LDC	G	FOBT	FOBT	CPROD	CLC

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LISTED BY ECONOMIC CLASSIFICATION (ECON)

UN COOE (UN3)	COUNTRY	ABBREV. COUNTRY NAME	REGION CODE (ECON)	LABELING SYMBOL (ECONDA)	ECONOMIC· REGION	TRADE SYSTEM	VALUATION EXPORT	VALUATION IMPORT	PARTNER DEFINITION IMPORT	PARTNER DEFINITION EXPORT
894	ZAMBIA	ZAMBIA	212	OSAFRLDC	O. SOUTH AFR LDC	G	FOR	FOBP	CPROD	CLC
148	CHAD	CHAD	213	O-AFRLDC	O. AFRICA LDC	S	FOBT	CIFT	CPROD	COC
180	CONGO (DEM. REP. OF)	CONGO-DR	213	O-AFRLDC	O. AFRICA LDC					
204	DAHOMEY	DAHOMEY	213	O-AFRLDC	O. AFRICA LDC	S	FOBT	CIFT	CPROD	CLC
226	EQUATORIAL GUINEA	EQ-GUIN	213	O-AFRLDC	O. AFRICA LDC					
624	PORTUGUESE QUINEA	PORT-QUI	213	O-AFRLDC	O. AFRICA LDC	S	FOBT	CIFT	CPROD	COC
678	SAO TOME AND PRINCIPE	S-TM-PRN	213	O-AFRLDC	O. AFRICA LDC	S	FOBT	CIFT	CPROD	COC
654	ST HELENA	ST-HELEN	213	O-AFRLDC	O. AFRICA LDC					
32	ARGENTINA	ARGNTINA	214	LAFTA	L.A.F.T.A	S	FOBT	CIFT	CLC	CLC
68	BOLIVIA	BOLIVIA	214	LAFTA	L.A.F.T.A	S	FOBT	CIFT	CLC	CLC
76	BRAZIL	BRAZIL	214	LAFTA	L.A.F.T.A	S	FOBT	CIFT	CPUR	COC
152	CHILE	CHILE	214	LAFTA	L.A.F.T.A	S	FOBT	CIFT	CPUR	COS
170	COLOMBIA	COLOMBIA	214	LAFTA	L.A.F.T.A	S	FOBT	CIFT	CPUR	COS
218	ECUADOR	ECUADOR	214	LAFTA	L.A.F.T.A	G	FOBT	CIFT	CPUR	COS
484	MEXICO	MEXICO	214	LAFTA	L.A.F.T.A	G	FOBT	CIFT	CFC	CLC
600	PARAGUAY	PARAGUAY	214	LAFTA	L.A.F.T.A	S	FOBT	FOBT	CFC	CLC
604	PERU	PERU	214	LAFTA	L.A.F.T.A	S	FOBT	CIFT	CPROD	CLC
858	URUGUAY	URUGUAY	214	LAFTA	L.A.F.T.A	S	FOBT	CIFT	CFC	CLC
862	VENEZUELA	VENZUELA	214	LAFTA	L.A.F.T.A	G	FOBT	FOBT	CFC	CLC
188	COSTA RICA	COSTA-RC	215	C-A-C-M	C.A.C.M	S	FOBT	CIFT	CPROD	CLC
222	EL SALVADOR	EL-SALVD	215	C-A-C-M	C.A.C.M	S	FOBT	CIFT	CFC	CLC
320	GUATEMALA	GUATMALA	215	C-A-C-M	C.A.C.M	S	FOBT	CIFT	CPROD	CLC
340	HONDURAS	HONDURAS	215	C-A-C-M	C.A.C.M	S	FOBT	CIFT	CPROD	CLC
558	NICARAGUA	NICARGUA	215	C-A-C-M	C.A.C.M	G	FOBT	CIFT	CPROD	CLC
28	ANTIGUA	ANTIGUA	216	CARIBEAN	CARIBBEAN					
44	BAHAMAS	BAHAMAS	216	CARIBEAN	CARIBBEAN	G	FOBT	CIFT	CPUR	COS
52	BARBADOS	BARBADOS	216	CARIBEAN	CARIBBEAN	G	FOBT	CIFT	CPROD	CLC
92	BRITISH VIRGIN IS.	BR-VIR-I	216	CARIBEAN	CARIBBEAN	G	FOBT	FOBT	CPUR	COC
212	DOMINICA	DOMINICA	216	CARIBEAN	CARIBBEAN					
214	DOMINICAN REPUBLIC	DOMIN-RP	216	CARIBEAN	CARIBBEAN	G	FOBT	FOBT	CPUR	COS
308	GRENADA	GRENADA	216	CARIBEAN	CARIBBEAN					
312	GUADELDUPE	GUADLOUP	216	CARIBEAN	CARIBBEAN	S	FOBT	CIFT	CPROO	CLC
332	HAITI	HAITI	216	CARIBEAN	CARIBBEAN	G	FOBT	CIFT	CPROD	COC
388	JAMAICA	JAMAICA	216	CARIBEAN	CARIBBEAN	G	FOBT	CIFT	CPROD	CLC
474	MARITNIQUE	MARTNQUE	216	CARIBEAN	CARIBBEAN	S	FOBT	CIFT	CPROD	CLC
532	NETHERLANDS ANTILLES	NETH-ANT	216	CARIBEAN	CARIBBEAN	S	FOBT	CIFT	CPROD	CLC
662	ST LUCIA	ST-LUCIA	216	CARIBEAN	CARIBBEAN	S	FOBD	CIFD	CPROD	CLC
670	ST VINCENT	ST-VINCT	216	CARIBEAN	CARIBBEAN					
658	ST. KITTS-NEVIS-ANGUILLA	ST-KITTS	216	CARIBEAN	CARIBBEAN	S	FOBT	CIFT	CFC	CLC
780	TRINIDAD AND TOBAGO	TRINIDAD	216	CARIBEAN	CARIBBEAN	S	FOBT	CIFT	CPROD	CLC
850	UNITED STATES VIRGIN IS	US-VIRG	216	CARIBEAN	CARIBBEAN					
60	BERMUDA	BERMUDA	217	O-AMRLDC	O. AMER. LDC	G	FOBT	FOBT	CLC	CLC

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LISTED BY ECONOMIC CLASSIFICATION (ECON)

UN CODE (UN3)	COUNTRY	ABBREV. COUNTRY NAME	REGION CODE (ECON)	LABELING SYMBOL (ECONDA)	ECONOMIC REGION	TRADE SYSTEM	VALUATION EXPORT	VALUATION IMPORT	PARTNER DEFINITION IMPORT	PARTNER DEFINITION EXPORT
84	BRITISH HONDURAS	BR-HONDU	217	O-AMRLDC	O. AMER. LDC					
136	CAYMAN IS.	CAYMAN-I	217	O-AMRLDC	O. AMER. LDC					
238	FALKLAND IS. (MALVINAS)	FALKLO-I	217	O-AMRLDC	O. AMER. LDC	G	FOBT	CIFT	CPROD	CLC
254	FRENCH GUIANA	FR-GUIAN	217	O-AMRLDC	O. AMER. LDC	S	FOBT	CIFT	CPROD	CLC
328	GUYANA	GUYANA	217	O-AMRLOC	O. AMER. LDC	S	FOBT	CIFT	CPROD	CLC
500	MONTSERRAT	MONTSRRT	217	O-AMRLOC	O. AMER. LDC					
592	PANAMA CANAL ZONE	PANM-C-Z	217	O-AMRLOC	O. AMER. LDC					
590	PANAMA, EXCLUDING CANAL	PANAMA	217	O-AMRLDC	O. AMER. LDC	S	FOBT	CIFT	CPROD	COS
666	ST PIERRE ANO MIQUELON	ST-P-MIQ	217	O-AMRLDC	O. AMER. LDC					
740	SURINAM	SURINAM	217	O-AMRLDC	O. AMER. LDC	S	FOBT	CIFT	CFC	CLC
796	TURKS ANO CAICOS IS.	TURKS-IS	217	O-AMRLDC	O. AMER. LDC					
5D	BANGLADESH	BANGLDSH	218	S-ASILOC	S. ASIA LDC	G	FOBT	CIFT	CFC	CLC
64	BHUTAN	BHUTAN	218	S-ASILDC	S. ASIA LDC					
356	INOIA	INDIA	218	S-ASILDC	S. ASIA LDC	G	FOBT	CIFT	CFC	CLC
462	MALDIVES	MALOIVES	218	S-ASILOC	S. ASIA LDC					
524	NEPAL	NEPAL	218	S-ASILDC	S. ASIA LDC	G	FOBT	CIFT	CFC	CFC
586	PAKISTAN	PAKISTAN	218	S-ASILOC	S. ASIA LDC	G	FOBT	CIFT	CPROO	CLC
698	SIKKIM	SIKKIM	218	S-ASILOC	S. ASIA LDC					
144	SRI LANKA	SR-LANKA	218	S-ASILDC	S. ASIA LDC					
96	BRUNEI	BRUNEI	219	SE-ASLOC	S.E. ASIA LDC	G	FOBT	CIFT	CPROD	CLC
1D4	BURMA	BURMA	219	SE-ASLOC	S.E. ASIA LDC	G	FOBT	CIFT	CPUR	COS
116	CAMBODIA	CAMBOOIA	219	SE-ASLDC	S.E. ASIA LOC					
360	INDONESIA	INDONSIA	219	SE-ASLDC	S.E. ASIA LDC	S	FOBT	CIFT	CPROD	CLC
418	LAOS	LAOS	219	SE-ASLDC	S.E. ASIA LDC	S	FOBT	CIFD	CPROD	CLC
461	MAL PENISUL	MAL-PENL	219	SE-ASLDC	S.E. ASIA LDC					
459	MAL SABAH	MAL-SABH	219	SE-ASLDC	S.E. ASIA LDC					
46D	MAL SARWAK	MAL-SARK	219	SE-ASLDC	S.E. ASIA LDC	G	FOBT	CIFT	CPROD	CLC
458	MALAYSIA	MALAYSIA	219	SE-ASLDC	S.E. ASIA LDC	G	FOBT	CIFT	CPROO	CLC
6D8	PHILLIPINES	PHILIPP	219	SE-ASLDC	S.E. ASIA LDC	G	FOBT	FOBT	CPROD	CLC
626	PROTUGUESE TIMOR	PORT-TIM	219	SE-ASLDC	S.E. ASIA LDC					
702	SINGAPORE	SINGAPOR	219	SE-ASLDC	S.E. ASIA LDC	G	FOBT	CIFT	CPROD	COD
764	THAILAND	THAILAND	219	SE-ASLDC	S.E. ASIA LDC	G	FOBT	CIFL	CPROO	CLC
868	VIET-NAM, REPUBLIC OF	VIET-REP	219	SE-ASLOC	S.E. ASIA LDC					
157	CHINA+TAIWAN	CHINA-TI	220	E-ASIA	E. ASIA					
344	HONG KONG	HONG-KNG	220	E-ASIA	E. ASIA	G	FOBT	CIFT	CFC	CLC
410	KOREA, REPUBLIC OF	KOREA-RP	220	E-ASIA	E. ASIA	S	FOBT	CIFT	CPROD	CLC
446	MACAU	MACAU	220	E-ASIA	E. ASIA	S	FOBT	CIFT	CPROD	CLC
650	RYUKYU IS.	RYUKYU-I	220	E-ASIA	E. ASIA					
158	TAIWAN	TAIWAN	220	E-ASIA	E. ASIA					
48	BAHRAIN	BAHRAIN	221	M-E-OIL	MIDEAST OIL	S	FOBT	CIFT	CFC	CLC
364	IRAN	IRAN	221	M-E-OIL	MIDEAST OIL	S	FOBT	CIFT	CPUR	CLC
368	IRAQ	IRAQ	221	M-E-OIL	MIDEAST OIL	S	FOBT	CIFT	CPROO	CLC
414	KUWAIT	KUWAIT	221	M-E-OIL	MIDEAST OIL	S	FOBT	CIFT	CPROD	CLC

APPENDIX A1
COUNTRY COMPOSITION OF REGIONS AND SUB-REGIONS
WITH ASSOCIATED CODES, TRADE SYSTEM TYPE, VALUATION PROCEDURES, AND TRADE PARTNER DEFINITIONS
LISTED BY ECONOMIC CLASSIFICATION (ECON)

UN CODE (UN3)	COUNTRY	ABBREV. COUNTRY NAME	REGION CODE (ECON)	LABELING SYMBOL (ECONDA)	ECONOMIC REGION	TRADE SYSTEM	VALUATION EXPORT	VALUATION IMPORT	PARTNER DEFINITION IMPORT	PARTNER DEFINITION EXPORT
512	MUSCAT AND OMAN	M-OMAN	221	M-E-OIL	MIDEAST OIL					
634	QATAR	QATAR	221	M-E-OIL	MIDEAST OIL					
682	SAUDI ARABIA	SAUD-ARB	221	M-E-OIL	MIDEAST OIL	S	FOBT	CIFT	CLC	CFC
784	UNITED ARAB EMIRATES	U-AR-EMR	221	M-E-OIL	MIDEAST OIL					
4	AFGHANISTAN	AFGHNSTN	222	M-E-NOIL	MIDEAST NONOIL	G	FOBT	CIFT	CPROD	CLC
196	CYPRUS	CYPRUS	222	M-E-NOIL	MIDEAST NONOIL	G	FOBT	CIFT	CPROD	COS
274	GAZA STRIP (PALESTINE)	GAZA-STR	222	M-E-NOIL	MIDEAST NONOIL					
400	JORDAN	JORDAN	222	M-E-NOIL	MIDEAST NONOIL	S	FOBD	CIFD	CPROD	COC
422	LEBANON	LEBANON	222	M-E-NOIL	MIDEAST NONOIL	S	FOBT	CIFT	CPROD	CLC
760	SYRIA	SYRIA	222	M-E-NOIL	MIDEAST NONOIL	S	FOBT	CIFT	CPROD	CLC
792	TURKEY	TURKEY	222	M-E-NOIL	MIDEAST NONOIL	S	FOBT	CIFT	CPROD	COC
886	YEMEN	YEMEN	222	M-E-NOIL	MIDEAST NONOIL	G	FOBT	CIFT	CFC	CLC
16	AMERICAN SAMOA	AMER-SAM	223	OCEANLDC	OCEANIA LDC	G	FOBT	CIFT	CPUR	COC
80	BRITISH ANTARCTIC TERR.	BR-ANT-T	223	OCEANLDC	OCEANIA LDC					
90	BRITISH SOLOMON IS.	BR-SOLMN	223	OCEANLDC	OCEANIA LDC					
128	CANTON AND ENDERBURY IS.	CANTON-I	223	OCEANLDC	OCEANIA LDC					
162	CHRISTMAS IS.	CHRIS-IS	223	OCEANLDC	OCEANIA LDC					
166	COCOS (KELLING) IS.	COCOS-IS	223	OCEANLDC	OCEANIA LDC					
184	COOK IS.	COOK-IS	223	OCEANLDC	OCEANIA LDC					
242	FIJI	FIJI	223	OCEANLDC	OCEANIA LDC	G	FOBT	CIFT	CPROD	COS
260	FR. SOUTHERN ANTARCTIC	FR-S-A-T	223	OCEANLDC	OCEANIA LDC					
258	FRENCH POLYNESIA	FR-POLYN	223	OCEANLDC	OCEANIA LDC	S	FOBT	CIFT	CPROD	COC
296	GILBERT AND ELLICE IS.	GILB-ISL	223	OCEANLDC	OCEANIA LDC					
316	GUAM	GUAM	223	OCEANLDC	OCEANIA LDC	S	FOBT	CIFT	CFC	CLC
396	JOHNSTON IS.	JOHN-ISL	223	OCEANLDC	OCEANIA LDC					
488	MIDWAY IS.	MIDWAY-I	223	OCEANLDC	OCEANIA LDC					
520	NAURU	NAURU	223	OCEANLDC	OCEANIA LDC					
570	NEVE IS.	NEVE-IS	223	OCEANLDC	OCEANIA LDC					
540	NEW CALEDONIA	NEW-CALD	223	OCEANLDC	OCEANIA LDC	S	FOBT	CIFT	CPROD	CLC
548	NEW HEBRIDES	NEW-HEBR	223	OCEANLDC	OCEANIA LDC	G	FOBT	CIFT	CPROD	CLC
544	NEW QUINEA (TRUST TERR.)	NEW-QUIN	223	OCEANLDC	OCEANIA LDC					
574	NORFOLK IS.	NORF-ISL	223	OCEANLDC	OCEANIA LDC					
582	PACIFIC IS. (TRUST TERR.	PACF-ISL	223	OCEANLDC	OCEANIA LDC					
596	PAPUA	PAPUA	223	OCEANLDC	OCEANIA LDC	G	FOBT	FOBT	CPROD	CFC
612	PITCAIRN IS.	PITCRN-I	223	OCEANLDC	OCEANIA LDC					
772	TOKELAU IS.	TOKELAU	223	OCEANLDC	OCEANIA LDC					
776	TONGA	TONGA	223	OCEANLDC	OCEANIA LDC					
797	TUVALU	TUVALU	223	OCEANLDC	OCEANIA LDC					
872	WAKE IS.	WAKE-ISL	223	OCEANLDC	OCEANIA LDC					
876	WALLIS AND FUTURA IS.	WALLIS-I	223	OCEANLDC	OCEANIA LDC					
882	WESTERN SAMOA	W-SAMOA	223	OCEANLDC	OCEANIA LDC	G	FOBT	CIFT	CPUR	COC
8	ALBANIA	ALBANIA	324	E-EUR-CP	E. EUROPE C.P.					
100	BULGARIA	BULGARIA	324	E-EUR-CP	E. EUROPE C.P.	G	FOBT	FOBT	CPUR	COS
200	CZECHOSLOVAKIA	CZCHSLVK	324	E-EUR-CP	E. EUROPE C.P.	G	FOBT	FOBT	CPUR	COS

APPENDIX A1
COUNTRY COMPOSITION OF REGIONS AND SUB-REGIONS
WITH ASSOCIATED CODES, TRADE SYSTEM TYPE, VALUATION PROCEDURES, AND TRADE PARTNER DEFINITIONS
LISTED BY ECONOMIC CLASSIFICATION (ECON)

UN CODE (UN3)	COUNTRY	ABBREV. COUNTRY NAME	REGION CODE (ECON)	LABELING SYMBOL (ECONDA)	ECONOMIC REGION	TRADE SYSTEM	VALUATION EXPORT	VALUATION IMPORT	PARTNER DEFINITION IMPORT	PARTNER DEFINITION EXPORT
278	GERMANY, EASTERN	GRMNY-DR	324	E-EUR-CP	E. EUROPE C.P.	G	FOBT	FOBT	CPUR	COS
348	HUNGARY	HUNGARY	324	E-EUR-CP	E. EUROPE C.P.	G	FOBT	CIFT	CPROD	CLC
616	POLAND	POLAND	324	E-EUR-CP	E. EUROPE C.P.	G	FOBT	FOBT	CPUR	COS
642	ROMANIA	ROMANIA	324	E-EUR-CP	E. EUROPE C.P.	G	FOBT	FOBT	CPROD	CLC
810	USSR	USSR	325	USSR	U.S.S.R	G	FOBT	FOBT	CPROD	CLC
156	CHINA (MAINLAND)	CHINA	326	CHINA	CHINA					
192	CUBA	CUBA	327	OTHER-CP	OTHER C.P.	S	FOBT	CIFT	CPUR	COS
408	KOREA, NORTH	KORE-DPR	327	OTHER-CP	OTHER C.P.					
496	MONGOLIA	MONGOLIA	327	OTHER-CP	OTHER C.P.					
720	SOUTHERN YEMEN	YEMEN-S	327	OTHER-CP	OTHER C.P.	S	FOBT	CIFT	CFC	COS
866	VIET-NAM, NORTH	VIET-N-D	327	OTHER-CP	OTHER C.P.	S	FOBT	CIFT	CPROD	CLC
896	AREA N.E.S.	AREA-NES	428	UNIDENT	UNIDENT-AREA N.E.					
898	NOT SPECIFIED	NOT-SPEC	428	UNIDENT	UNIDENT-NOT SPECI					
0	UN WORLD	WORLD	777	WORLD						

APPENDIX A2

EXPLANATORY NOTES ON APPENDIX A1

The purpose of this appendix is to provide detailed information on eleven columns presented in Appendix A1.

Column 1 - UN Code (UN3): This column presents the United Nations three digit numerical country codes. Each code is uniquely designed to identify one country or area of the world which indeed facilitates data processing and information transmission. For more information, see United Nations Standard Country or Area Codes for Statistical Use, Statistical Papers, Series M, No. 49, Rev. 1.

Column 2 - Country Names: This column describes the full names of 225 countries/areas in the world.

Column 3 - Abbreviated Country Name: This column illustrates the 8 character abbreviated country or area names used for labeling trade matrices.

Column 4 - Region Code (ECON): The 3 digit region code (ECON) has the following characteristics:

1. The first digit classifies countries by economic regions. That is, the first digit is 1, 2, 3 and 4 when the country belongs to the regions of Developed Countries (DC), Less Developed Countries (LDC), Centrally Planned Countries (CP), and Unidentified (UNIDENT) countries,

respectively.

2. All three digits together classify countries by a sub-region within an economic region given by the first digit.

Column 5 - **Labeling Symbol (ECONDA)**: This column shows the abbreviated form of the sub-region names. This abbreviation was necessary due to the space limitation in computer output for trade matrices.

Column 6 - **Economic Region**: The purpose of this column is to describe the previous column. However, due to the space limitations there are some region names which desire more explanation as follows:

E.F.T.A.:	European Free Trade Association. United Kingdom and Denmark left the Association at the end of 1972.
C.E.U.C.A.:	Customs and Economic Union of Central Africa. Prior to 1969 this union was known as the Equatorial Customs Union.
E.C.O.W.A.S.:	Economic Community of West African States.
L.A.F.T.A.:	Latin America Free Trade Association.
C.A.C.M.:	Central American Common Market.

Column 7 - **Trade System**: In general, countries record and report their external trade statistics based on two different recording systems; namely, General (G) and Special (S) Trade systems. Under General Trade System all commodities that entered the country are recorded as imports, regardless if those commodities are being used for domestic consumption or not. However, under this system if the imported goods leave the country at the same condition as the time of entry (i.e., no improvements), then this system registers the exit of such commodities as re-exports. In terms of recording the exports, the General Trade System records all of the following categories of goods as total exports:

a. National goods which include goods produced domestically, and foreign goods which have been transformed.
b. Nationalized goods which include the foreign goods imported but have not been transformed.

The Special Trade system records as imports those goods which are directly imported or withdrawn from customs storage for domestic consumption, improvements or repair, as well as those which have been entered for transformation under customs control. Special exports include the exports of national products as well as the export of improved imports. For more information on trade system currently employed by trading countries, see UN [1977] Supplement to the Statistical Yearbook, pp., 193-194.

Columns 8 and 9 - Valuation of Exports/Imports: These columns present valuation methods employed by trading countries in compiling their trade statistics. Currently there are several value definitions used by countries in the valuation of their exports and imports. With regard to the valuation of exports (Column 8), we may identify at least the following four definitions:

1. Free on Board Carrier Transaction Value (FOBT): The value at which the goods were sold by exporters (i.e., transaction value) plus the cost of insurance and transportation for moving goods from production site to the board of carrier on the frontier border of the exporting country. Note that the transaction value includes the export duties, internal taxes and other charges imposed in the exporting country.
2. FOB Domestic Value (FOBD): This valuation procedure is similar to the previous one (FOBT) except for the transaction value which is based on the domestic values in the exporting country. Thus, this valuation method differs from FOBT by the amount of domestic transportation cost, insurance and export duties. This

valuation procedure is mostly employed to estimate the FOBT values of exports when the FOBT value data is not available.

3. Free on Rail Resale Value (FOR): Countries such as Malawi and Zambia value their exports at the place of dispatch based on the selling prices of exported goods at the place of consignment free on rail (FOR).
4. Free Alongside the Carrier Transaction Value (FAS): This valuation method is similar to the FOBT value but excludes the cost of loading goods on board of the transportation vehicle.

With regard to the valuation of imports (column 9), we may identify the following procedures:

1. CIFT (Transaction Cost, Insurance and Freight) Value: This value is the sum of FOBT value and thee cost of insurance and freight expenses to the frontier border of importing country. This valuation method is currently employed by most countries in the valuation of their imports. Note that this valuation procedure excludes the landing expenses in the import market.
2. CIFL Value: This value is the same as CIFT values except that includes the landing expenses in the import market.
3. CIF Domestic (CIFD) or CIF Resale (CIFR) Values: Some

countries value their imports on the same basis as the imported goods were sold in their domestic market. If the customs duties are present in the importing country, then the value of imports based on the domestic or resale prices will be higher than the value of imports based on the CIFT values by the amounts of duties plus the domestic transportation and insurance costs. This method of valuation is employed by the importing countries mainly for the sake of maximum collection of customs duties.

4. CIF Customs Value (CIFC): This is CIF values verified by the customs of importing countries. This method of valuation may or may not coincide with the previous valuation method depending on the customs price lists.
5. FOB Import Values: Currently several countries do not record their import values based on the CIf valuation procedures, they rather value their imports based on different types of FOB valuation methods. For example, they may record their import values based on the FOB Transaction Value (FOBT), FOB Domestic Values in exporting countries (FOBD), FOB Domestic Values in Importing country (FOBI) and FOB Value including the cost of packaging (FOBP).

Columns 10 and 11 - Definitions of Partner Countries: The partner country is defined as the country to which an importing/exporting country credits its imports/exports. UN [1977, pp. 194-97] identifies 3 partner definitions for imports and 3 partner definitions for exports as follows:

For imports [Column 10]:

(a) "country of first consignment" [CFC]: is defined as the country from which the goods were originally dispatched to the reporting country, with or without breaking bulk in the course of transport, but without any commercial transaction intervening between that country and the country of import.

(b) "country of origin or production" [CPROD]: means the country where the products were grown, raised or mined.

(c) "country of purchase" [CPUR]: means the country in which the seller of the goods carries on his business, or if the goods are bought through an agent, commissioner, etc., who is not buying on his own account, the country where the actual seller lives.

For exports [Column 11]:

(a) "country of last consignment or destination" [CLC]: is defined as the country to which the goods are actually dispatched, with or without breaking bulk in the course of transport, but without any commercial transaction intervening between that country and the country of export.

(b) "country of consumption" [COC]: is defined as the country in which the goods will be put to the use for which they were produced, or in which they will undergo a process of transformation.

(c) "country of sale" [COS]: means the country in which purchaser of the goods carries on his business, or if the goods are sold through an agent, commissioner, etc., who is not buying on his own account, the country where the business of the actual buyer is located.

APPENDIX A3

SPECIAL COUNTRY NOTES

Introductory Notes: The purpose of this Appendix is to provide more detailed information regarding countries and different valuation procedures employed by trading countries than is given in the text.

Country Notes: No separate external trade data are consistently compiled for several countries. The imports of these countries are generally included in the data compiled for a specified customs area. The following customs areas are used in this report and include the countries as noted with the corresponding U.N. country codes in the parenthesis.[1]

Country	code	Custom Area Included
Belgium	(056)	Belgium, Luxembourg (442)
France	(250)	France, Monaco (492)
Italy	(280)	Italy, San Marino (674)
Norway	(578)	Norway, Svalbard and Jan Mayen Islands (744)
South Africa	(710)	South Africa, Botswana (72), Lesotho (426), Namibia (516), Swaziland (748)
Spain	(724)	Spain, Spanish North Africa (728)
Switzerland	(756)	Switzerland, Liechtenstein (438)

United States (840) USA, Puerto Rico (630)

Valuation Notes: Generally the value of exports are reported on a Free on Board (FOB) basis in current U.S. dollars. The import values are reported on a Cost Insurance Freight (CIF) basis in current U.S. dollars. However, several countries report imports on an FOB basis.[2] These countries include: Australia (36), British Solomon Islands (90), Bulgaria (100), Canada (124), Czechoslovakia (200), Dominican Republic (214), Ecuador (218), Papua (596), Malawi (454), Netherlands Antilles (532), Paraguay (600), Philippines (608), Poland (616), Romania (642), South Africa (710), Southern Rhodesia (716), USSR (810), United States (840), Zambia (894), Bermuda (60), and British Virgin Islands (92). The numbers in parentheses are the UN country codes.

The cif values for imports of the above countries are often estimated using the following equation, adopted from F.A.O. Trade Yearbook, P., X., 1980.

CIF value = (112/100) (FOB value)

ENDNOTES

1. See UN Standard Country or Area Code for Statistical Use, Series M, No. 49,Rev.1, p. 10.

2. United Nations, 1977 Supplement to the Statistical Yearbook and the Monthly Bulletin of Statistics, 3rd Issue, pp. 192-247, U.N., New York, 1979.

APPENDIX A4
TRADE DATA AVAILABILITY TABLE (1962-1982)
UN/USDA COMMODITY TRADE TAPE REVIEW
LISTED BY UNITED NATIONS COUNTRY CODE (UN3)
A = DATA IS AVAILABLE, * = NO DATA REPORTED

UN CODE (UN3)	COUNTRY	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82
		REPORTING YEARS																				
0	UN WORLD	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
4	AFGHANISTAN	A	A	A	A	A	A	*	A	A	A	A	A	A	A	*	*	*	*	*	*	*
8	ALBANIA	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
12	ALGERIA	*	*	*	*	A	*	*	*	*	*	*	*	*	A	A	A	A	A	A	A	*
16	AMERICAN SAMOA	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
20	ANDORRA	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
24	ANGOLA	*	*	*	*	*	*	*	*	*	*	*	A	A	*	*	*	*	*	*	*	*
28	ANTIGUA	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
32	ARGENTINA	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
36	AUSTRALIA	*	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
40	AUSTRIA	*	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
44	BAHAMAS	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
48	BAHRAIN	*	*	*	*	*	*	*	*	A	*	A	A	A	A	A	A	A	A	A	A	*
50	BANGLADESH	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	A	A	*	A	*
52	BARBADOS	*	*	*	*	*	A	A	A	A	A	A	A	A	A	A	A	A	A	A	*	*
56	BELGIUM-LUXEMB.	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
60	BERMUDA	*	*	*	*	*	*	*	*	*	A	A	A	A	A	A	A	*	A	A	A	*
64	BHUTAN	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
68	BOLIVIA	A	A	A	A	A	A	A	A	A	A	A	A	*	*	*	*	*	*	*	*	*
72	BOTSWANA	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
76	BRAZIL	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
80	BRITISH ANTARCTIC TERR.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
84	BRITISH HONDURAS	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
86	BRITISH INDIAN OC. TERR.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
90	BRITISH SOLOMON IS.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
92	BRITISH VIRGIN IS.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
96	BRUNEI	A	A	A	A	A	A	*	A	A	A	A	A	A	A	A	A	*	A	A	A	A
100	BULGARIA	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
104	BURMA	A	A	A	A	A	A	*	A	A	A	A	A	A	A	A	*	*	*	*	*	*
108	BURUNDI	*	*	*	A	*	*	*	*	*	*	*	*	A	A	A	*	*	*	*	*	*
116	CAMBODIA	A	A	A	A	A	A	*	A	A	A	A	*	*	*	*	*	*	*	*	*	*
120	CAMEROON	A	A	A	A	A	A	*	A	A	A	A	A	A	A	A	A	A	A	A	*	A
124	CANADA	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
128	CANTON AND ENDERBURY IS.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
132	CAPE VERDE IS.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
136	CAYMAN IS.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	A	*	*
140	CENTRAL AFRICAN REPUBLIC	A	A	A	A	A	A	*	A	A	A	*	A	A	A	A	A	A	A	A	*	*
144	SRI LANKA	A	A	A	A	A	A	A	A	A	A	A	*	A	A	A	A	A	A	A	A	A
148	CHAD	A	A	A	A	A	A	*	A	A	A	A	A	A	A	*	*	*	*	*	*	*
152	CHILE	A	A	A	A	A	A	*	A	A	A	A	A	A	A	*	*	*	*	*	*	*
156	CHINA (MAINLAND)	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*

APPENDIX A4
TRADE DATA AVAILABILITY TABLE (1962-1982)
UN/USDA COMMODITY TRADE TAPE REVIEW
LISTED BY UNITED NATIONS COUNTRY CODE (UN3)
A = DATA IS AVAILABLE, * = NO DATA REPORTED

UN CODE (UN3)	COUNTRY	REPORTING YEARS 62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82
157	CHINA+TAIWAN	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
158	TAIWAN	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
162	CHRISTMAS IS.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
166	COCOS (KELLING) IS.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
170	COLOMBIA	A	A	A	A	A	A	*	A	A	A	A	A	A	A	A	A	*	A	A	A	A
174	COMORO IS.	A	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
178	CONGO (BRAZZAVILLE)	A	A	A	A	A	A	*	A	A	A	A	A	A	A	A	A	*	A	*	*	*
180	CONGO (DEM. REP. OF)	A	*	*	A	*	*	*	*	A	*	A	A	A	A	*	*	*	*	*	*	*
184	COOK IS.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
188	COSTA RICA	*	A	*	A	A	A	*	A	A	A	A	A	A	A	A	A	A	A	A	A	A
192	CUBA	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	A	A	*	*
196	CYPRUS	*	*	*	*	*	*	*	*	*	*	*	*	*	A	A	A	A	A	A	A	A
200	CZECHOSLOVAKIA	*	*	*	*	*	*	*	*	*	*	A	A	A	A	A	A	A	A	A	A	*
204	DAHOMEY	A	A	A	A	A	A	*	A	A	A	A	A	A	*	*	*	*	*	*	*	*
208	DENMARK	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
212	DOMINICA	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
214	DOMINICAN REPUBLIC	*	*	*	*	*	*	*	*	*	A	A	*	A	*	*	A	A	A	A	A	A
218	ECUADOR	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	*	A	A	*	*
222	EL SALVADOR	*	A	A	A	A	A	*	A	A	A	A	A	A	A	A	A	A	A	A	A	*
226	EQUATORIAL GUINEA	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
230	ETHIOPIA	A	*	*	*	*	A	*	A	A	A	A	A	A	A	*	*	*	A	A	A	*
234	FAORDE IS.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	A	A	A	A	A	A	A
238	FALKLAND IS. (MALVINAS)	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
242	FIJI	*	*	*	*	*	A	A	A	A	A	A	A	A	A	A	A	*	A	A	A	A
246	FINLAND	*	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
250	FRANCE	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
254	FRENCH GUIANA	A	*	*	*	A	A	*	A	A	A	A	A	A	A	A	A	A	A	A	A	A
258	FRENCH POLYNESIA	A	*	*	*	*	*	*	*	*	*	*	A	A	A	A	*	*	A	A	A	A
260	FR. SOUTHERN ANTARCTIC	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
262	FR. TERR. OF AFARS, ISSAS	A	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
266	GABON	A	A	A	A	A	A	*	A	A	A	*	*	*	A	A	A	*	A	*	*	*
270	GAMBIA	*	*	A	*	*	*	*	*	A	A	A	A	A	A	*	*	*	*	*	*	*
274	GAZA STRIP (PALESTINE)	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
278	GERMANY, EASTERN	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
280	GERMANY, FEDERAL REP. OF	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
288	GHANA	A	A	A	A	A	A	*	A	A	A	A	A	A	A	A	*	*	*	*	*	*
292	GIBRALTAR	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
296	GILBERT AND ELLICE IS.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	A	*	*	*
300	GREECE	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
304	GREENLAND	*	*	*	*	*	*	*	*	*	*	*	*	*	*	A	A	A	A	A	A	A

APPENDIX A4
TRADE DATA AVAILABILITY TABLE (1962-1982)
UN/USDA COMMODITY TRADE TAPE REVIEW
LISTED BY UNITED NATIONS COUNTRY CODE (UN3)
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UN CODE (UN3)	COUNTRY	REPORTING YEARS 62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82
308	GRENADA	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	A	A	*	*
312	GUADELOUPE	A	*	*	*	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
316	GUAM	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
320	GUATEMALA	*	*	*	A	A	A	A	A	A	A	A	A	A	A	A	*	*	A	A	A	*
324	GUINEA	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
328	GUYANA	*	*	*	*	*	*	*	*	A	A	A	A	A	*	*	*	*	A	*	*	*
332	HAITI	*	*	*	*	*	*	*	*	*	*	*	*	A	A	A	A	*	*	*	*	*
340	HONDURAS	*	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	*	A	A	A	*
344	HONG KONG	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
348	HUNGARY	*	*	A	A	A	A	*	A	A	A	A	A	A	A	A	A	*	A	A	A	A
352	ICELAND	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
356	INDIA	A	A	A	A	A	A	*	A	A	A	A	A	A	A	A	A	*	A	*	*	*
360	INDONESIA	A	*	*	*	*	A	*	A	A	A	A	A	A	A	A	A	A	A	A	A	A
364	IRAN	*	A	A	A	A	A	A	A	A	A	A	A	A	A	A	*	*	*	*	*	*
368	IRAQ	*	A	*	*	*	*	*	*	*	*	A	A	A	A	A	*	*	*	*	*	*
372	IRELAND	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
376	ISRAEL	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
380	ITALY	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
384	IVORY COAST	A	A	A	A	A	A	*	A	A	A	A	A	A	A	A	A	A	A	*	A	A
388	JAMAICA	A	A	*	*	*	*	*	*	*	*	*	*	*	A	A	*	*	A	A	A	*
392	JAPAN	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
396	JOHNSTON IS.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
400	JORDAN	*	*	A	A	A	A	*	*	A	A	A	A	A	A	A	A	A	A	A	A	A
404	KENYA	*	*	*	*	*	*	*	*	A	A	A	A	A	A	A	A	A	A	A	*	*
408	KOREA, NORTH	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
410	KOREA, REPUBLIC OF	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	*
414	KUWAIT	*	*	*	*	*	*	*	*	A	A	A	A	A	A	A	A	*	A	A	A	*
418	LAOS	A	A	A	A	A	A	A	A	A	A	A	A	A	*	*	*	*	*	*	*	*
422	LEBANON	*	*	*	*	*	A	*	A	A	A	A	A	*	*	*	*	*	*	*	*	*
426	LESOTHO	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
430	LIBERIA	*	A	*	*	*	A	*	*	A	*	A	A	A	A	*	A	*	A	A	A	*
434	LIBYA	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	*	A	A	A	*
438	LIECHTENSTEIN	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
446	MACAU	*	*	*	*	*	*	*	*	*	*	A	A	A	A	A	A	*	A	A	A	*
450	MADAGASCAR	A	A	A	A	A	A	*	A	A	A	A	A	A	A	*	A	A	A	A	A	*
454	MALAWI	*	*	*	*	A	A	A	A	A	A	A	A	A	A	A	A	*	A	A	*	*
458	MALAYSIA	A	A	A	A	A	A	*	A	A	A	A	A	A	A	A	A	*	A	A	A	*
459	MAL SABAH	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
460	MAL SARWAK	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
461	MAL PENISUL	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*

APPENDIX A4

TRADE DATA AVAILABILITY TABLE (1962-1982)

UN/USDA COMMODITY TRADE TAPE REVIEW

LISTED BY UNITED NATIONS COUNTRY CODE (UN3)

A = DATA IS AVAILABLE, * = NO DATA REPORTED

UN CODE (UN3)	COUNTRY	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82
462	MALDIVES	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
466	MALI	A	A	A	A	A	A	*	A	A	A	A	*	A	A	A	*	*	*	*	*	*
470	MALTA	*	*	*	*	*	*	*	A	A	A	A	A	A	A	A	A	A	A	A	A	*
474	MARITNIQUE	A	*	*	*	A	A	*	A	A	A	A	A	A	A	A	A	A	A	A	A	A
478	MAURITANIA	A	A	A	A	A	A	A	*	A	A	A	*	*	*	*	*	*	*	*	*	*
480	MAURITIUS	*	*	*	*	*	*	*	*	A	A	A	A	A	A	A	*	*	*	*	*	*
484	MEXICO	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	*	*	*	*	*
488	MIDWAY IS.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
492	MONACO	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
496	MONGOLIA	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
500	MONTSERRAT	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
504	MOROCCO	A	*	A	A	A	A	*	A	A	A	A	A	A	A	A	A	A	A	A	A	*
508	MOZAMBIQUE	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
512	MUSCAT AND OMAN	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	A	A	A	A
516	NAMIBIA	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
520	NAURU	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
524	NEPAL	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	A	A	*	*
528	NETHERLANDS	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	*
532	NETHERLANDS ANTILLES	*	A	A	A	A	A	*	A	A	A	A	A	A	A	A	A	*	*	*	*	*
540	NEW CALEDONIA	A	*	*	*	*	*	*	*	*	*	*	*	*	A	A	A	*	A	A	A	A
544	NEW QUINEA (TRUST TERR.)	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
548	NEW HEBRIDES	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	A	A
554	NEW ZEALAND	*	*	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
558	NICARAGUA	*	*	*	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
562	NIGER	A	A	A	A	A	A	*	A	A	A	A	A	A	A	A	*	*	*	*	A	*
566	NIGERIA	A	A	A	A	A	A	*	A	A	A	A	A	A	A	A	A	*	A	*	*	*
570	NEVE IS.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
574	NORFOLK IS.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
578	NORWAY	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
582	PACIFIC IS. (TRUST TERR.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
586	PAKISTAN	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
590	PANAMA, EXCLUDING CANAL	A	A	A	A	A	A	*	A	A	A	A	A	A	A	A	A	*	A	A	A	*
592	PANAMA CANAL ZONE	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
596	PAPUA	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
600	PARAGUAY	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	*	*	A	*	*	*
604	PERU	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	*	A	A	*	*
608	PHILLIPINES	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	*
612	PITCAIRN IS.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
616	POLAND	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	A	*	*
620	PORTUGAL	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
624	PORTUGUESE QUINEA	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*

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LISTED BY UNITED NATIONS COUNTRY CODE (UN3)
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UN CODE		REPORTING YEARS																				
(UN3)	COUNTRY	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82
626	PROTUGUESE TIMOR	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
630	PUERTO RICO	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
634	QATAR	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	A	A	A	*
638	REUNION	A	*	*	*	A	A	*	A	A	A	A	A	A	A	A	A	A	A	A	A	A
642	ROMANIA	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
646	RWANDA	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
650	RYUKYU IS.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
654	ST HELENA	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
658	ST. KITTS-NEVIS-ANGUILLA	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
662	ST LUCIA	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	A	A	*	*
666	ST PIERRE AND MIQUELON	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	A	A	A	*
670	ST VINCENT	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
674	SAN MARINO	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
678	SAO TOME AND PRINCIPE	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
682	SAUDI ARABIA	*	*	*	*	*	*	A	A	*	*	*	*	A	A	A	A	*	A	A	A	A
686	SENEGAL	A	A	A	A	A	A	*	A	A	A	A	A	A	A	*	*	*	A	A	A	*
690	SEYCHELLES	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	A	A	A	*
694	SIERRA LEONE	*	A	A	*	*	*	*	*	*	*	A	A	A	*	*	*	*	*	*	*	*
698	SIKKIM	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
702	SINGAPORE	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
706	SOMALIA	A	*	*	*	A	*	*	*	A	A	A	A	A	A	A	*	*	A	*	*	*
710	SOUTH AFRICA	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
716	SOUTHERN RHODESIA	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
720	SOUTHERN YEMEN	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
724	SPAIN	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	*
728	SPANISH NORTH AFRICA	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
732	SPANISH SAHARA	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
736	SUDAN	*	A	A	A	A	A	A	A	A	A	A	A	A	A	*	*	*	A	A	A	*
740	SURINAM	A	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
748	SWAZILAND	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
752	SWEDEN	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
756	SWITZERLAND	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
760	SYRIA	*	*	*	*	*	*	*	*	*	*	*	*	A	A	*	*	*	A	*	*	*
764	THAILAND	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
768	TOGO	A	A	A	A	A	A	*	A	A	A	A	A	A	A	A	A	*	A	*	A	*
772	TOKELAU IS.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
776	TONGA	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	A	A	A	A
780	TRINIDAD AND TOBAGO	*	*	*	*	*	*	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
784	UNITED ARAB EMIRATES	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	A	*	A	*
788	TUNISIA	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	*
792	TURKEY	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A

APPENDIX A

TRADE DATA AVAILABILITY TABLE (1962-1982)
UN/USDA COMMODITY TRADE TAPE REVIEW
LISTED BY UNITED NATIONS COUNTRY CODE (UN3)
A = DATA IS AVAILABLE, * = NO DATA REPORTED

UN CODE (UN3)	COUNTRY	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82
		REPORTING YEARS																				
796	TURKS AND CAICOS IS.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
797	TUVALU	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
800	UGANDA	*	*	*	*	*	*	*	*	A	A	A	A	A	A	A	*	*	*	*	*	*
810	USSR	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
818	EGYPT	*	*	*	*	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
826	UNITED KINGDOM	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
834	TANZANIA	A	*	*	*	*	*	*	*	A	A	A	A	A	A	A	*	*	A	A	*	*
840	UNITED STATES	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
850	UNITED STATES VIRGIN IS	*	*	*	*	*	*	*	*	A	A	A	A	*	*	*	*	*	*	*	*	*
854	UPPER VOLTA	A	A	A	A	A	A	*	A	A	A	A	A	A	A	*	*	*	A	A	A	*
858	URUGUAY	*	*	*	*	*	*	*	*	*	*	*	*	*	A	A	A	*	A	A	A	*
862	VENEZUELA	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	*	A	A	A	*
866	VIET-NAM, NORTH	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
868	VIET-NAM, REPUBLIC OF	*	A	A	A	A	A	*	A	A	A	A	A	*	*	*	*	*	*	*	*	*
872	WAKE IS.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
876	WALLIS AND FUTURA IS.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
882	WESTERN SAMOA	A	A	A	A	A	A	A	A	A	A	A	A	A	A	*	*	*	A	A	A	*
886	YEMEN	*	*	*	*	*	*	*	*	*	*	*	*	*	*	A	*	*	A	A	*	*
890	YUGOSLAVIA	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
894	ZAMBIA	*	*	*	*	A	A	*	*	A	A	A	A	A	A	*	*	*	*	*	*	*
896	AREA N.E.S.	A	A	A	A	A	A	*	A	A	A	*	A	A	A	A	A	A	A	A	A	*
898	NOT SPECIFIED	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*

APPENDIX B

EXPLANATORY TABLES FOR CHAPTER 3

APPENDIX B-1: COMPARISON OF COMMODITY WORLD TRADE REPORTS*
UNITED NATIONS TRADE DATA TAPES, UNADJUSTED DATA

PAGE 1 OF 4 PAGES

COMMODITY		1962	1963	1964	1965	1966	1967
		METRIC TONS					
WHEAT	W^E	37576218	37787501	42362433	42080076	51640849	43962341
	W^M	24017730	23854720	22736610	29645640	34274430	33545070
	W^A	13558488	13932781	19625823	12434436	17366419	10417271
RICE	W^E	3329102	5665301	5685483	6585423	5824849	4037566
	W^M	3391490	3482400	3742430	4364670	4071970	4285970
	W^A	-62388	2182901	1943053	2220753	1752879	-248404
BARLEY	W^E	4461037	3987577	6296289	5055974	5805475	7350497
	W^M	4986870	4219130	5576720	6002980	5981810	5955440
	W^A	-525833	-231553	719569	-947006	-176335	1395057
CORN	W^E	14777085	16173772	18539198	22847376	24372398	23397098
	W^M	16467460	18153080	18335830	21361910	23233670	22303650
	W^A	-1690375	-1979308	203368	1485466	1138728	1093448
RYE	W^E	763752	643339	498254	396943	442470	438769
	W^M	974520	765570	493880	442470	797430	523440
	W^A	-210768	-122231	4374	-45527	-354960	-84671
OATS	W^E	1086769	868139	1029184	1365424	1376067	1389764
	W^M	1379180	1178330	1060400	1439920	1384140	1191790
	W^A	-292411	-310191	-31216	-74496	-8073	197974
SUGAR	W^E	3058483	3729403	2972245	3830843	5509828	4549293
	W^M	9457740	6069890	6612890	6898310	7474660	7800630
	W^A	-6399257	-2340487	-3640645	-3067467	-1964832	-3251337
TOBACCO	W^E	592737	578932	620964	600192	654812	715324
	W^M	644580	676540	706340	723990	754440	942310
	W^A	-51843	-97608	-85376	-123798	-99628	-226986
SOYBEAN	W^E	4571952	4879895	5787411	639134	6933847	7567987
	W^M	4572230	4940890	5791350	6371850	7528300	8188280
	W^A	-278	-60995	-3939	-5732716	-594453	-620293
COTTON	W^E	2123429	2498870	2546012	2819938	3054113	2987120
	W^M	2650120	2744100	2813290	2714220	2858920	2977520
	W^A	-526691	-245230	-267278	105718	195193	9600

* : 1. W^E = Total exports reported by exporting countries.
2. W^M = Total imports reported by importing countries.
3. $W^A = (W^E - W^M)$.

APPENDIX B-1: COMPARISON OF COMMODITY WORLD TRADE REPORTS*
UNITED NATIONS TRADE DATA TAPES, UNADJUSTED DATA

COMMODITY		1968	1969	1970	1971	1972	1973
				METRIC TONS			
WHEAT	W^E	39452230	36494820	45163887	43263903	52449630	67110875
	W^M	24854170	32086670	34681660	34276410	33472310	39355410
	W^A	14598060	4408150	10482227	8987493	18977320	27755465
RICE	W^E	4524451	5639863	6228151	6725056	6233083	5232798
	W^M	2627760	4680620	4106110	4866870	4867350	4534180
	W^A	1896691	959243	2122041	1858186	1365733	698618
BARLEY	W^E	5549912	6027651	9506536	10365807	12921725	11617898
	W^M	5219780	6059930	8313720	8959640	7824530	8061820
	W^A	330132	-32279	1192816	1406167	5097195	3556078
CORN	W^E	24133690	24503104	26836744	28117530	34312071	44859839
	W^M	24696280	23987070	26685340	27128840	29188310	34998590
	W^A	-562590	516034	151404	988690	5123761	9861249
RYE	W^E	288381	242170	373661	802728	677650	1633708
	W^M	345010	290460	319970	561500	478790	552700
	W^A	-56629	-48290	53691	241228	198860	1081008
OATS	W^E	1000051	995870	1498822	1601812	2023781	1577514
	W^M	1072330	1140870	1480260	1529140	1425990	1407530
	W^A	-72279	-145000	18562	72672	597791	169984
SUGAR	W^E	4491492	5077775	6546897	8205622	9230489	8611305
	W^M	7082250	7844810	8679310	8759380	9151990	9610870
	W^A	-2590758	-2767035	-2132413	-553758	78499	-999565
TOBACCO	W^E	652095	736928	743099	802750	998898	950676
	W^M	772220	860650	815270	867800	1100760	1128040
	W^A	-120125	-123722	-72171	-65050	-101862	-177364
SOYBEAN	W^E	8144322	8833418	12204636	11836537	13407819	15262458
	W^M	7804980	9055540	12108620	12449750	12631330	12760310
	W^A	339342	-222122	96016	-613213	776489	2502148
COTTON	W^E	2553128	2719933	3062586	3030800	2902589	3508754
	W^M	2537610	2646660	2736980	2775020	2636220	3040490
	W^A	15518	73273	325606	255780	266369	468264

* : 1. W^E = Total exports reported by exporting countries.
2. W^M = Total imports reported by importing countries.
3. W^A = $(W^E - W^M)$.

APPENDIX B-1: COMPARISON OF COMMODITY WORLD TRADE REPORTS*
UNITED NATIONS TRADE DATA TAPES, UNADJUSTED DATA

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COMMODITY		1974	1975	1976	1977	1978	1979
				METRIC TONS			
WHEAT	W^E	53696039	63287989	59583562	63290785	67306511	66393084
	W^M	42448040	45467080	43604620	36648030	36533750	38885120
	W^A	11247999	17820909	15978942	26642755	30772761	27507964
RICE	W^E	5107281	5151430	7254972	8393115	6535077	5702095
	W^M	5835980	6960637	5621660	6348020	4817050	7777050
	W^A	-728699	-1809207	1633312	2045095	1718027	-2074955
BARLEY	W^E	10858008	11366049	13222961	11626181	14131433	14094616
	W^M	9430450	8750090	8883280	9185240	9062700	7009360
	W^A	1427558	2615959	4339681	2440941	5068733	7085256
CORN	W^E	45268749	46697200	57795669	53658386	61025647	61741276
	W^M	38369420	39638940	40405450	43368950	40690630	45879020
	W^A	6899329	7058260	17390219	10289436	20335017	15862256
RYE	W^E	813679	484350	585640	510196	729136	877345
	W^M	366210	318050	429520	368390	421860	438510
	W^A	447469	166300	156120	141806	307276	438835
OATS	W^E	1261953	1172298	1505537	1392472	1323433	1257817
	W^M	1191300	868100	1271860	1221880	1006250	857740
	W^A	70653	304198	233677	170592	317183	400077
SUGAR	W^E	9134000	6362437	6599885	9898156	5769117	1721659
	W^M	9489810	8223940	7862980	8506920	6672600	6574730
	W^A	-355810	-1861503	-1263095	1391236	-903483	-4853071
TOBACCO	W^E	1142847	898090	994621	987246	978093	775314
	W^M	1061640	1106610	1097310	1059920	1195520	1191330
	W^A	81207	-208520	-102689	-72674	-217427	-416016
SOYBEAN	W^E	16823915	16116877	19510990	19595443	23615206	21942385
	W^M	15995140	14487410	16574520	16559290	19093010	19572500
	W^A	828775	1629467	2936470	3036153	4522196	2369885
COTTON	W^E	2902772	2843114	2409376	2005888	1742936	1975622
	W^M	2529160	2755620	2911350	2743110	2805920	2884410
	W^A	373612	87494	-501974	-737222	-1062984	-908788

* : 1. W^E = Total exports reported by exporting countries.
2. W^M = Total imports reported by importing countries.
3. $W^A = (W^E - W^M)$.

APPENDIX B-1: COMPARISON OF COMMODITY WORLD TRADE REPORTS*
UNITED NATIONS TRADE DATA TAPES, UNADJUSTED DATA

COMMODITY		1980	1981	1982	1983	1984	1985
					METRIC TONS		
WHEAT	W^E	77226538	82474773	NA	84868172	NA	NA
	W^M	44632630	41013480	36460040	22549202	NA	NA
	W^A	32593908	41461293	NA	62318970	NA	NA
RICE	W^E	6067808	9777089	NA	8653159	NA	NA
	W^M	7297030	7988730	5892930	4170733	NA	NA
	W^A	-1229222	1788359	NA	4482426	NA	NA
BARLEY	W^E	15179832	16333282	NA	17222183	NA	NA
	W^M	9962920	11094600	12897300	9505386	NA	NA
	W^A	5216912	5238682	NA	7716797	NA	NA
CORN	W^E	66448829	60867042	NA	57069186	NA	NA
	W^M	49712850	46287470	41165260	35015372	NA	NA
	W^A	16735979	14579572	NA	22053814	NA	NA
RYE	W^E	1071756	NA	NA	NA	NA	NA
	W^M	624960	343490	355980	NA	NA	NA
	W^A	446796	NA	NA	NA	NA	NA
OATS	W^E	1293515	NA	NA	NA	NA	NA
	W^M	923020	609880	809150	NA	NA	NA
	W^A	370495	NA	NA	NA	NA	NA
SUGAR	W^E	1631675	21056226	NA	NA	NA	NA
	W^M	6416600	7052020	5979360	NA	NA	NA
	W^A	-4784925	14004206	NA	NA	NA	NA
TOBACCO	W^E	573621	996869	NA	865709	NA	NA
	W^M	1163700	1136670	1058670	10044050	NA	NA
	W^A	-590079	-139801	NA	-9178341	NA	NA
SOYBEAN	W^E	21142958	27292238	NA	NA	NA	NA
	W^M	23014090	20919600	23012670	NA	NA	NA
	W^A	-1871132	6372638	NA	NA	NA	NA
COTTON	W^E	2291679	2845271	NA	2445626	NA	NA
	W^M	3099060	2576410	2431810	2889408	NA	NA
	W^A	-807381	268861	NA	-443782	NA	NA

* : 1. W^E = Total exports reported by exporting countries.
2. W^M = Total imports reported by importing countries.
3. W^A = (W^E - W^M), NA = Not Available.

APPENDIX B-2: COMPARISON OF COMMODITY WORLD TRADE REPORTS*
UNITED NATIONS TRADE DATA, ADJUSTED IMPORTS

PAGE 1 OF 4 PAGES

COMMODITY		1962	1963	1964	1965	1966	1967
					METRIC TONS		
WHEAT	W^E	37576218	37787501	42362433	42080076	51640849	43962341
	W^M	30623570	34677250	39381300	42799560	51945620	43421710
	W^A	6952648	3110251	2981133	-719484	-304771	540631
RICE	W^E	3329102	5665301	5685483	6585423	5824849	4037566
	W^M	4106370	5776150	6432320	6769920	6563360	5353700
	W^A	-777268	-110849	-746837	-184497	-738511	-1316134
BARLEY	W^E	4461037	3987577	6296289	5055974	5805475	7350497
	W^M	5719460	4795480	6662910	6119220	6170410	6713460
	W^A	-1258423	-807903	-366621	-1063246	-364935	637037
CORN	W^E	14777085	16173772	18539198	22847376	24372398	23397098
	W^M	17964300	18864840	21692550	24424760	25982530	24713110
	W^A	-3187215	-2691068	-3153352	-1577384	-1610132	-1316012
RYE	W^E	763752	643339	498254	396943	442470	438769
	W^M	996000	792840	515110	467200	798070	530220
	W^A	-232248	-149501	-16856	-70257	-355600	-91451
OATS	W^E	1086769	868139	1029184	1365424	1376067	1389764
	W^M	1386310	1199830	1149510	1455930	1422960	1220110
	W^A	-299541	-331691	-120326	-90506	-46893	169654
SUGAR	W^E	3058483	3729403	2972245	3830843	5509828	4549293
	W^M	9641700	6266250	6727920	7188790	7596260	7959800
	W^A	-6583217	-2536847	-3755675	-3357947	-2086432	-3410507
TOBACCO	W^E	592737	578932	620964	600192	654812	715324
	W^M	756110	779470	819180	814460	819450	1013630
	W^A	-163373	-200538	-198216	-214268	-164638	-298306
SOYBEAN	W^E	4571952	4879895	5787411	639134	6933847	7567987
	W^M	4759740	5212780	6069530	6513380	7558250	8452220
	W^A	-187788	-332885	-282119	-5874246	-624403	-884233
COTTON	W^E	2123429	2498870	2546012	2819938	3054113	2987120
	W^M	2833290	3035180	3050930	3112040	3314710	3375150
	W^A	-709861	-536310	-504918	-292102	-260597	-388030

* : 1. W^E - Total exports reported by exporting countries.
2. W^M - Total imports reported by importing countries. Export reports are replaced for missing imports.
3. W^A - $(W^E - W^M)$.

APPENDIX B-2: COMPARISON OF COMMODITY WORLD TRADE REPORTS*
UNITED NATIONS TRADE DATA TAPES, ADJUSTED IMPORTS

COMMODITY		1968	1969	1970	1971	1972	1973
		YEAR					
		METRIC TONS					
WHEAT	W^E	39452230	36494820	45163887	43263903	52449630	67110875
	W^M	41092650	37855870	44159970	42780830	50140160	66392330
	W^A	-1640420	-1361050	1003917	483073	2309470	718545
RICE	W^E	4524451	5639863	6228151	6725056	6233083	5232798
	W^M	5350440	5652820	5467150	6406350	6063800	5613820
	W^A	-825989	-12957	761001	318706	169283	-381022
BARLEY	W^E	5549912	6027651	9506536	10365807	12921725	11617898
	W^M	5912790	6472550	9677590	10282520	12457530	11437450
	W^A	-362878	-444899	-171054	83287	464195	180448
CORN	W^E	24133690	24503104	26836744	28117530	34312071	44859839
	W^M	28351110	27004620	28440660	30091350	34475650	44060510
	W^A	-4217420	-2501516	-1603916	-1973820	-163579	799329
RYE	W^E	288381	242170	373661	802728	677650	1633708
	W^M	364140	297840	422700	766910	628050	1617430
	W^A	-75759	-55670	-49039	35818	49600	16278
OATS	W^E	1000051	995870	1498822	1601812	2023781	1577514
	W^M	1105880	1152330	1551800	1823130	2128480	1666340
	W^A	-105829	-156460	-52978	-221318	-104699	-88826
SUGAR	W^E	4491492	5077775	6546897	8205622	9230489	8611305
	W^M	7547320	7968490	8775110	9027190	10277640	10836520
	W^A	-3055828	-2890715	-2228213	-821568	-1047151	-2225215
TOBACCO	W^E	652095	736928	743099	802750	998898	950676
	W^M	854240	923120	881120	939320	1206510	1219520
	W^A	-202145	-186192	-138021	-136570	-207612	-268844
SOYBEAN	W^E	8144322	8833418	12204636	11836537	13407819	15262458
	W^M	8273500	9240770	12289590	12548120	13858710	14090940
	W^A	-129178	-407352	-84954	-711583	-450891	1171518
COTTON	W^E	2553128	2719933	3062586	3030800	2902589	3508754
	W^M	3237750	2983130	3167120	3292890	3255790	3681100
	W^A	-684622	-263197	-104534	-262090	-353201	-172346

* : 1. W^E = Total exports reported by exporting countries.
2. W^M = Total imports reported by importing countries. Export reports are replaced for missing imports.
3. $W^A = (W^E - W^M)$.

APPENDIX B-2: COMPARISON OF COMMODITY WORLD TRADE REPORTS*
UNITED NATIONS TRADE DATA TAPES, ADJUSTED IMPORTS

COMMODITY		1974	1975	1976	1977	1978	1979
		METRIC TONS					
WHEAT	W^E	53696039	63287989	59583562	63290785	67306511	66393084
	W^M	55996910	63372120	59074530	61454100	68684040	69210750
	W^A	-2300871	-84131	509032	1836685	-1377529	-2817666
RICE	W^E	5107281	5151430	7254972	8393115	6535077	5702095
	W^M	6975290	7093510	7567040	9159160	8475740	9989550
	W^A	-1868009	-1942080	-312068	-766045	-1940663	-4287455
BARLEY	W^E	10858008	11366049	13222961	11626181	14131433	14094616
	W^M	10798720	11081050	12361440	10382890	14102440	11719660
	W^A	59288	284999	861521	1243291	28993	2374956
CORN	W^E	45268749	46697200	57795669	53658386	61025647	61741276
	W^M	46329450	47722230	55329580	52969720	63661550	72346790
	W^A	-1060701	-1025030	2466089	688666	-2635903	-10605514
RYE	W^E	813679	484350	585640	510196	729136	877345
	W^M	811850	512590	611340	499370	670510	904650
	W^A	1829	-28240	-25700	10826	58626	-27305
OATS	W^E	1261953	1172298	1505537	1392472	1323433	1257817
	W^M	1450740	1204980	1689240	1311020	1338170	1272270
	W^A	-188787	-32682	-183703	81452	-14737	-14453
SUGAR	W^E	9134000	6362437	6599885	9898156	5769117	1721659
	W^M	9893180	8525340	8496540	10998890	8258530	6772570
	W^A	-759180	-2162903	-1896655	-1100734	-2489413	-5050911
TOBACCO	W^E	1142847	898090	994621	987246	978093	775314
	W^M	1149830	1149960	1182680	1135570	1264650	1253430
	W^A	-6983	-251870	-188059	-148324	-286557	-478116
SOYBEAN	W^E	16823915	16116877	19510990	19595443	23615206	21942385
	W^M	17330290	15955770	19487060	18965040	22549770	23912280
	W^A	-506375	161107	23930	630403	1065436	-1969895
COTTON	W^E	2902772	2843114	2409376	2005888	1742936	1975622
	W^M	3206650	3277750	3192330	2934800	3174690	3477660
	W^A	-303878	-434636	-782954	-928912	-1431754	-1502038

* : 1. W^E = Total exports reported by exporting countries.
2. W^M = Total imports reported by importing countries. Export reports are replaced for missing import.
3. $W^A = (W^E - W^M)$.

APPENDIX B-2: COMPARISON OF COMMODITY WORLD TRADE REPORTS*
UNITED NATIONS TRADE DATA TAPES, ADJUSTED IMPORTS

COMMODITY		1980	1981	1982	1983	1984	1985
				METRIC TONS			
WHEAT	W^E	77226538	82474773	NA	84868172	NA	NA
	W^M	81839310	87077460	92511410	NA	NA	NA
	W^A	-4612772	-4602687	NA	NA	NA	NA
RICE	W^E	6067808	9777089	NA	8653159	NA	NA
	W^M	10364460	11273120	10828970	NA	NA	NA
	W^A	-4296652	-1496031	NA	NA	NA	NA
BARLEY	W^E	15179832	16333282	NA	17222183	NA	NA
	W^M	14590270	18643040	18289510	NA	NA	NA
	W^A	589562	-2309758	NA	NA	NA	NA
CORN	W^E	66448829	60867042	NA	57069186	NA	NA
	W^M	74402960	76285360	67155630	NA	NA	NA
	W^A	-7954131	-15418318	NA	NA	NA	NA
RYE	W^E	1071756	NA	NA	NA	NA	NA
	W^M	1241800	1009380	689760	NA	NA	NA
	W^A	-170044	NA	NA	NA	NA	NA
OATS	W^E	1293515	NA	NA	NA	NA	NA
	W^M	1313740	1000820	974550	NA	NA	NA
	W^A	-20225	NA	NA	NA	NA	NA
SUGAR	W^E	1631675	21056226	NA	NA	NA	NA
	W^M	6656850	8732970	10528240	NA	NA	NA
	W^A	-5025175	12323256	NA	NA	NA	NA
TOBACCO	W^E	573621	996869	NA	865709	NA	NA
	W^M	1232320	1237780	1198170	NA	NA	NA
	W^A	-658699	-240911	NA	NA	NA	NA
SOYBEAN	W^E	21142958	27292238	NA	NA	NA	NA
	W^M	26744820	25280860	28581700	NA	NA	NA
	W^A	-5601862	2011378	NA	NA	NA	NA
COTTON	W^E	2291679	2845271	NA	2445626	NA	NA
	W^M	3990670	3252810	3228280	NA	NA	NA
	W^A	-1698991	-407539	NA	NA	NA	NA

* : 1. W^E = Total exports reported by exporting countries.
2. W^M = Total imports reported by importing countries. Export reports are replaced for missing imports.
3. $W^A = (W^E - W^M)$, NA = Not Available.

APPENDIX B-3: COMPARISON OF COMMODITY WORLD TRADE REPORTS*
F.A.O. EXPORT DATA VS., U.N. ADJUSTED IMPORT DATA

COMMODITY		1962	1963	1964	1965	1966	1967
		METRIC TONS					
WHEAT	W^E	37980559	42927364	51846296	50102139	56679868	46825275
	W^M	30623570	34677250	39381300	42799560	51945620	43421710
	W^A	7356989	8250114	12464996	7302579	4734248	3403565
RICE	W^E	6436986	7420148	7856490	8112371	7840073	7466673
	W^M	4106370	5776150	6432320	6769920	6563360	5353700
	W^A	2330616	1643998	1424170	1342451	1276713	2112973
BARLEY	W^E	6635958	5698871	7986163	8059399	6414005	7206430
	W^M	5719460	4795480	6662910	6119220	6170410	6713460
	W^A	916498	903391	1323253	1940179	243595	492970
CORN	W^E	19919364	21100083	22302124	25051918	25813851	27538052
	W^M	17964300	18864840	21692550	24424760	25982530	24713110
	W^A	1955064	2235243	609574	627158	-168679	2824942
RYE	W^E	2115757	1534674	669975	460458	762911	799174
	W^M	996000	792840	515110	467200	798070	530220
	W^A	1119757	741834	154865	-6742	-35159	268954
OATS	W^E	1444812	1242386	1343926	1732217	1370471	1200005
	W^M	1386310	1199830	1149510	1455930	1422960	1220110
	W^A	58502	42556	194416	276287	-52489	-20105
SUGAR	W^E	12805200	12176700	12685500	14453200	14224300	16030729
	W^M	9641700	6266250	6727920	7188790	7596260	7959800
	W^A	3163500	5910450	5957580	7264410	6628040	8070929
TOBACCO	W^E	854698	889370	1004884	964045	915418	1028886
	W^M	756110	779470	819180	814460	819450	1013630
	W^A	98588	109900	185704	149585	95968	15256
SOYBEAN	W^E	4925060	5232430	6289940	6974350	7488290	8136230
	W^M	4759740	5212780	6069530	6513380	7558250	8452220
	W^A	165320	19650	220410	460970	-69960	-315990
COTTON	W^E	3382690	3714730	3891360	3712800	3917490	3843558
	W^M	2833290	3035180	3050930	3112040	3314710	3375150
	W^A	549400	679550	840430	600760	602780	468408

* : 1. W^E - Total exports reported by F.A.O. trade yearbooks.
2. W^M - Total imports reported by importing countries. Export reports are replaced for missing imports.
3. $W^A = (W^E - W^M)$.

APPENDIX B-3: COMPARISON OF COMMODITY WORLD TRADE REPORTS*
F.A.O. EXPORT DATA VS., U.N. ADJUSTED IMPORT DATA

COMMODITY		1968	1969	1970	1971	1972	1973
					METRIC TONS		
WHEAT	W^E	47094815	42606063	50168258	52063045	57768636	75288103
	W^M	41092650	37855870	44159970	42780830	50140160	66392330
	W^A	6002165	4750193	6008288	9282215	7628476	8895773
RICE	W^E	6879379	7272382	7959405	8069473	7553972	9366413
	W^M	5350440	5652820	5467150	6406350	6063800	5613820
	W^A	1528939	1619562	2492255	1663123	1490172	3752593
BARLEY	W^E	6388232	7113996	10366182	11004428	13346267	12342180
	W^M	5912790	6472550	9677590	10282520	12457530	11437450
	W^A	475442	641446	688592	721908	888737	904730
CORN	W^E	28844082	27413901	29159973	30741254	36775564	48059154
	W^M	28351110	27004620	28440660	30091350	34475650	44060510
	W^A	492972	409281	719313	649904	2299914	3998644
RYE	W^E	569394	546382	620409	1027661	662208	2006315
	W^M	364140	297840	422700	766910	628050	1617430
	W^A	205254	248542	197709	260751	34158	388885
OATS	W^E	1027681	987081	1510711	1623812	2088410	1667691
	W^M	1105880	1152330	1551800	1823130	2128480	1666340
	W^A	-78199	-165249	-41089	-199318	-40070	1351
SUGAR	W^E	15593709	15152645	17328270	16828086	16993454	18344498
	W^M	7547320	7968490	8775110	9027190	10277640	10836520
	W^A	8046389	7184155	8553160	7800896	6715814	7507978
TOBACCO	W^E	1007411	1004782	993772	1024811	1206136	1215295
	W^M	854240	923120	881120	939320	1206510	1219520
	W^A	153171	81662	112652	85491	-374	-4225
SOYBEAN	W^E	8755623	9327660	12621436	12282270	13817443	15625860
	W^M	8273500	9240770	12289590	12548120	13858710	14090940
	W^A	482123	86890	331846	-265850	-41267	1534920
COTTON	W^E	3841315	3702063	3941627	4032272	4084887	4709605
	W^M	3237750	2983130	3167120	3292890	3255790	3681100
	W^A	603565	718933	774507	739382	829097	1028505

* : 1. W^E = Total exports reported by F.A.O. trade yearbooks.
2. W^M = Total imports reported by importing countries. Export reports are replaced for missing imports.
3. $W^A = (W^E - W^M)$.

APPENDIX B-3: COMPARISON OF COMMODITY WORLD TRADE REPORTS*
F.A.O. EXPORT DATA VS., U.N. ADJUSTED IMPORT DATA

COMMODITY		1974	1975	1976	1977	1978	1979
					METRIC TONS		
WHEAT	W^E	59139867	73530202	62637955	65314347	75918122	72442738
	W^M	55996910	63372120	59074530	61454100	68684040	69210750
	W^A	3142957	10158082	3563425	3860247	7234082	3231988
RICE	W^E	8895051	8804898	8992618	10870095	9685852	11855805
	W^M	6975290	7093510	7567040	9159160	8475740	9989550
	W^A	1919761	1711388	1425578	1710935	1210112	1866255
BARLEY	W^E	11598730	12604483	13795351	12973202	14584495	14083172
	W^M	10798720	11081050	12361440	10382890	14102440	11719660
	W^A	800010	1523433	1433911	2590312	482055	2363512
CORN	W^E	49638250	51659328	62027177	57426535	68754443	76123991
	W^M	46329450	47722230	55329580	52969720	63661550	72346790
	W^A	3308800	3937098	6697597	4456815	5092893	3777201
RYE	W^E	1202054	561403	609593	551807	782080	1006578
	W^M	811850	512590	611340	499370	670510	904650
	W^A	390204	48813	-1747	52437	111570	101928
OATS	W^E	1311883	1216593	1530339	1504022	1442261	1364439
	W^M	1450740	1204980	1689240	1311020	1338170	1272270
	W^A	-138857	11613	-158901	193002	104091	92169
SUGAR	W^E	18028507	16382187	16876716	21856748	18627643	18586197
	W^M	9893180	8525340	8496540	10998890	8258530	6772570
	W^A	8135327	7856847	8380176	10857858	10369113	11813627
TOBACCO	W^E	1376400	1260455	1317321	1297075	1439854	1362117
	W^M	1149830	1149960	1182680	1135570	1264650	1253430
	W^A	226570	110495	134641	161505	175204	108687
SOYBEAN	W^E	17227981	16458590	19756434	20011687	24090975	25470195
	W^M	17330290	15955770	19487060	18965040	22549770	23912280
	W^A	-102309	502820	269374	1046647	1541205	1557915
COTTON	W^E	3772640	3879152	4021736	3918998	4484878	4426713
	W^M	3206650	3277750	3192330	2934800	3174690	3477660
	W^A	565990	601402	829406	984198	1310188	949053

* : 1. W^E = Total exports reported by F.A.O. trade yearbooks.
2. W^M = Total imports reported by importing countries. Export reports are replaced for missing import.
3. W^A = $(W^E - W^M)$.

APPENDIX B-3: COMPARISON OF COMMODITY WORLD TRADE REPORTS*
F.A.O. EXPORT DATA VS., U.N. ADJUSTED IMPORT DATA

COMMODITY		1980	1981	1982	YEAR 1983	1984	1985
				METRIC TONS			
WHEAT	W^E	89933042	95121909	95886791	103003980	106853170	NA
	W^M	81839310	87077460	92511410	NA	NA	NA
	W^A	8093732	8044449	3375381	NA	NA	NA
RICE	W^E	13046983	13101241	11961947	11591135	12518006	NA
	W^M	10364460	11273120	10828970	NA	NA	NA
	W^A	2682523	1828121	1132977	NA	NA	NA
BARLEY	W^E	16232941	20262583	18472348	17748268	22487071	NA
	W^M	14590270	18643040	18289510	NA	NA	NA
	W^A	1642671	1619543	182838	NA	NA	NA
CORN	W^E	80301752	79422033	69993011	89042346	68458146	NA
	W^M	74402960	76285360	67155630	NA	NA	NA
	W^A	5898792	3136673	2837381	NA	NA	NA
RYE	W^E	1151069	994058	699937	927941	882317	NA
	W^M	1241800	1009380	689760	NA	NA	NA
	W^A	-90731	-15322	10177	NA	NA	NA
OATS	W^E	1617390	1195073	1105673	1277662	1643092	NA
	W^M	1313740	1000820	974550	NA	NA	NA
	W^A	303650	194253	131123	NA	NA	NA
SUGAR	W^E	18221034	18691538	20303802	18737252	18035401	NA
	W^M	6656850	8732970	10528240	NA	NA	NA
	W^A	11564184	9958568	9775562	NA	NA	NA
TOBACCO	W^E	1356200	1483842	1410728	1343815	1404554	NA
	W^M	1232320	1237780	1198170	NA	NA	NA
	W^A	123880	246062	212558	NA	NA	NA
SOYBEAN	W^E	26884129	26218085	28916013	26585052	25764372	NA
	W^M	26744820	25280860	28581700	NA	NA	NA
	W^A	139309	937225	334313	NA	NA	NA
COTTON	W^E	4813712	4306416	4448369	4300938	4230948	NA
	W^M	3990670	3252810	3228280	NA	NA	NA
	W^A	823042	1053606	1220089	NA	NA	NA

* : 1. W^E = Total exports reported by F.A.O. trade yearbooks.
2. W^M = Total imports reported by importing countries. Export reports are replaced for missing imports.
3. $W^A = (W^E - W^M)$, NA = Not Available.

APPENDIX B-4: COMPARISON OF COMMODITY WORLD TRADE REPORTS*
F.A.O. EXPORT DATA VS., F.A.O. IMPORT DATA

COMMODITY		1962	1963	1964	1965	1966	1967
					METRIC TONS		
WHEAT	W^E	37980559	42927364	51846296	50102139	56679868	46825275
	W^M	36652970	42642590	49032320	49923340	56462240	45494270
	W^A	1327589	284774	2813976	178799	217628	1331005
RICE	W^E	6436986	7420148	7856490	8112371	7840073	7466673
	W^M	6496290	7084400	7686290	7939710	7880700	7493430
	W^A	-59304	335748	170200	172661	-40627	-26757
BARLEY	W^E	6635958	5698871	7986163	8059399	6414005	7206430
	W^M	6619630	5453050	7503230	8106560	6621680	7034550
	W^A	16328	245821	482933	-47161	-207675	171880
CORN	W^E	19919364	21100083	22302124	25051918	25813851	27538052
	W^M	19614530	20009770	21844830	23823500	25868410	27148800
	W^A	304834	1090313	457294	1228418	-54559	389252
RYE	W^E	2115757	1534674	669975	460458	762911	799174
	W^M	2150880	1549300	699910	500730	747210	802020
	W^A	-35123	-14626	-29935	-40272	15701	-2846
OATS	W^E	1444812	1242386	1343926	1732217	1370471	1200005
	W^M	1487360	1259660	1286280	1562720	1456560	1256960
	W^A	-42548	-17274	57646	169497	-86089	-56955
SUGAR	W^E	12805200	12176700	12685500	14453200	14224300	16030729
	W^M	13910800	12464900	12296400	13564500	13969800	15082600
	W^A	-1105600	-288200	389100	888700	254500	948129
TOBACCO	W^E	854698	889370	1004884	964045	915418	1028886
	W^M	847020	888430	1001340	944120	937970	1008920
	W^A	7678	940	3544	19925	-22552	19966
SOYBEAN	W^E	4925060	5232430	6289940	6974350	7488290	8136230
	W^M	4947630	5201090	6142310	6628920	7647190	8251830
	W^A	-22570	31340	147630	345430	-158900	-115600
COTTON	W^E	3382690	3714730	3891360	3712800	3917490	3843558
	W^M	3495830	3680320	3775450	3778220	3875120	3896180
	W^A	-113140	34410	115910	-65420	42370	-52622

* : 1. W^E - Total exports reported by F.A.O. trade yearbooks.
2. W^M - Total imports reported by F.A.O. trade yearbooks, 1968, 1972, 1975, 1978, 1980, 1982, and 1984.
3. $W^A = (W^E - W^M)$.

APPENDIX B-4: COMPARISON OF COMMODITY WORLD TRADE REPORTS*
F.A.O. EXPORT DATA VS., F.A.O. IMPORT DATA

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COMMODITY		1968	1969	1970	1971	1972	1973
		METRIC TONS					
WHEAT	W^E	47094815	42606063	50168258	52063045	57768636	75288103
	W^M	46532970	42831590	48710130	51848290	54963030	70709610
	W^A	561845	-225527	1458128	214755	2805606	4578493
RICE	W^E	6879379	7272382	7959405	8069473	7553972	9366413
	W^M	7168610	6838540	8962100	9250540	9190310	9834370
	W^A	-289231	433842	-1002695	-1181067	-1636338	-467957
BARLEY	W^E	6388232	7113996	10366182	11004428	13346267	12342180
	W^M	6460660	7030370	10722970	10758610	13993720	12097160
	W^A	-72428	83626	-356788	245818	-647453	245020
CORN	W^E	28844082	27413901	29159973	30741254	36775564	48059154
	W^M	28074380	26748350	28981280	30623150	35516440	47008090
	W^A	769702	665551	178693	118104	1259124	1051064
RYE	W^E	569394	546382	620409	1027661	662208	2006315
	W^M	580110	549830	587470	827090	763750	1990280
	W^A	-10716	-3448	32939	200571	-101542	16035
OATS	W^E	1027681	987081	1510711	1623812	2088410	1667691
	W^M	1161170	1169000	1566640	1758230	2126290	1567140
	W^A	-133489	-181919	-55929	-134418	-37880	100551
SUGAR	W^E	15593709	15152645	17328270	16828086	16993454	18344498
	W^M	14520494	14240648	16852691	15562469	16095093	17179737
	W^A	1073215	911997	475579	1265617	898361	1164761
TOBACCO	W^E	1007411	1004782	993772	1024811	1206136	1215295
	W^M	1004710	1028730	1015900	1061560	1215400	1237450
	W^A	2701	-23948	-22128	-36749	-9264	-22155
SOYBEAN	W^E	8755623	9327660	12621436	12282270	13817443	15625860
	W^M	8322404	9382547	12294540	12689880	13848070	14654140
	W^A	433219	-54887	326896	-407610	-30627	971720
COTTON	W^E	3841315	3702063	3941627	4032272	4084887	4709605
	W^M	3939810	3729310	4035170	3978020	4057470	4634150
	W^A	-98495	-27247	-93543	54252	27417	75455

* : 1. W^E = Total exports reported by F.A.O. trade yearbooks.
2. W^M = Total imports reported by F.A.O. trade yearbooks, 1968, 1972, 1975, 1978, 1980, 1982, and 1984.
3. $W^A = (W^E - W^M)$.

APPENDIX B-4: COMPARISON OF COMMODITY WORLD TRADE REPORTS*
F.A.O. EXPORT DATA VS., F.A.O. IMPORT DATA

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COMMODITY		1974	1975	1976	1977	1978	1979
					METRIC TONS		
WHEAT	W^E	59139867	73530202	62637955	65314347	75918122	72442738
	W^M	60029390	68605800	65809400	63922040	71751640	76511300
	W^A	-889523	4924402	-3171445	1392307	4166482	-4068562
RICE	W^E	8895051	8804898	8992618	10870095	9685852	11855805
	W^M	8801820	8517180	9234900	10090240	10128480	11713670
	W^A	93231	287718	-242282	779855	-442628	142135
BARLEY	W^E	11598730	12604483	13795351	12973202	14584495	14083172
	W^M	12280380	12254600	13685230	12382130	14909110	14797800
	W^A	-681650	349883	110121	591072	-324615	-714628
CORN	W^E	49638250	51659328	62027177	57426535	68754443	76123991
	W^M	48911480	51477410	61803650	54907900	68065470	74794450
	W^A	726770	181918	223527	2518635	688973	1329541
RYE	W^E	1202054	561403	609593	551807	782080	1006578
	W^M	1134790	563800	661040	482560	770010	1054360
	W^A	67264	-2397	-51447	69247	12070	-47782
OATS	W^E	1311883	1216593	1530339	1504022	1442261	1364439
	W^M	1197160	1249770	1625130	1413120	1353950	1433070
	W^A	114723	-33177	-94791	90902	88311	-68631
SUGAR	W^E	18028507	16382187	16876716	21856748	18627643	18586197
	W^M	16867108	15980100	16599857	20216534	17773219	18121666
	W^A	1161399	402087	276859	1640214	854424	464531
TOBACCO	W^E	1376400	1260455	1317321	1297075	1439854	1362117
	W^M	1288040	1329950	1302230	1298440	1424890	1392510
	W^A	88360	-69495	15091	-1365	14964	-30393
SOYBEAN	W^E	17227981	16458590	19756434	20011687	24090975	25470195
	W^M	17467950	16258500	20005510	19094460	23165080	26099400
	W^A	-239969	200090	-249076	917227	925895	-629205
COTTON	W^E	3772640	3879152	4021736	3918998	4484878	4426713
	W^M	4159630	4007420	4174620	3956080	4345830	4564980
	W^A	-386990	-128268	-152884	-37082	139048	-138267

* : 1. W^E = Total exports reported by F.A.O. trade yearbooks.
2. W^M = Total imports reported by F.A.O. trade yearbooks, 1968, 1972, 1975, 1978, 1980, and 1984.
3. $W^A = (W^E - W^M)$.

APPENDIX B-4: COMPARISON OF COMMODITY WORLD TRADE REPORTS*
F.A.O. EXPORT DATA VS., F.A.O. IMPORT DATA

COMMODITY		YEAR 1980	1981	1982	1983	1984	1985
		METRIC TONS					
WHEAT	W^E	89933042	95121909	95886791	103003980	106853170	NA
	W^M	88099100	93214420	98971910	97744560	106504010	NA
	W^A	1833942	1907489	-3085119	5259420	349160	NA
RICE	W^E	13046983	13101241	11961947	11591135	12518006	NA
	W^M	12795820	13790390	11121890	12116929	11745757	NA
	W^A	251163	-689149	840057	-525794	772249	NA
BARLEY	W^E	16232941	20262583	18472348	17748268	22487071	NA
	W^M	14996900	18598930	18120840	17663701	22549145	NA
	W^A	1236041	1663653	351508	84567	-62074	NA
CORN	W^E	80301752	79422033	69993011	89042346	68458146	NA
	W^M	79619650	80171940	69383780	69260415	68114319	NA
	W^A	682102	-749907	609231	19781931	343827	NA
RYE	W^E	1151069	994058	699937	927941	882317	NA
	W^M	1101510	970870	729840	827088	866333	NA
	W^A	49559	23188	-29903	100853	15984	NA
OATS	W^E	1617390	1195073	1105673	1277662	1643092	NA
	W^M	1317430	981480	951380	1071960	1495398	NA
	W^A	299960	213593	154293	205702	147694	NA
SUGAR	W^E	18221034	18691538	20303802	18737252	18035401	NA
	W^M	18005381	18091472	19334296	18182448	18200661	NA
	W^A	215653	600066	969506	554804	-165260	NA
TOBACCO	W^E	1356200	1483842	1410728	1343815	1404554	NA
	W^M	1407810	1440550	1392610	1381442	1414072	NA
	W^A	-51610	43292	18118	-37627	-9518	NA
SOYBEAN	W^E	26884129	26218085	28916013	26585052	25764372	NA
	W^M	27546060	25851350	28238500	26778112	24800696	NA
	W^A	-661931	366735	677513	-193060	963676	NA
COTTON	W^E	4813712	4306416	4448369	4300938	4230948	NA
	W^M	5069830	4446350	4454970	4385940	4434755	NA
	W^A	-256118	-139934	-6601	-85002	-203807	NA

* : 1. W^E = Total exports reported by F.A.O. trade yearbooks.
2. W^M = Total imports reported by F.A.O. trade yearbooks, 1968, 1972, 1975, 1978, 1980, 1982, and 1984.
3. W^A = (W^E - W^M), NA = Not Available.