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CONSTANT MARKET SHARE ANALYSIS OF LATIN AMERICA'S  
AGRICULTURAL EXPORT GROWTH

by

Fausto Medina-Lopez, Myles J. Mielke, and Luis R. Sanint

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Washington, D.C. 20250

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ABSTRACT

A Constant-Market-Share (CMS) technique is used to analyse the past performance of Latin American agricultural exports, selected agricultural exports of Argentina, and coffee exports of Brazil and Colombia. The methodology measures export growth of a country or region as it relates to dynamic or stagnant markets and commodities. A residual term is then calculated and used to represent a degree of competitiveness among alternative exporters of relatively homogeneous goods. Results indicated that the region's export growth was insufficient to maintain a constant share of world trade. This performance was largely attributed to a lack of competitiveness. Argentina faced growing competition for its traditional export commodities. Brazil's share of the U.S. coffee market declined, but it gained shares in more dynamic (faster growing) markets. Colombia increased its share of the U.S. coffee market as well as its share in other markets.

Keywords: Agricultural trade, coffee, constant-market-share, competitiveness, export performance, Latin America, Argentina, Brazil, Colombia.

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## SUMMARY

The central purpose of this paper is to demonstrate the use of the Constant-Market-Share (CMS) technique as a practical and easy to apply analytical tool for studying a country's relative trade performance. The paper consists of two main parts. The first part presents a description of the analytical procedure, its basic assumptions, levels of analysis, and alternative formulations. The second part illustrates the application of the CMS procedure to the agricultural trade of Latin America.

The CMS technique is an ex post analysis of a country's trade performance measured against a growth standard. This standard or norm could be defined simply as the average growth of total world trade, the average export (import) growth of a group of commodities, or average growth of a particular commodity from competing exporters. In effect, the CMS methodology assumes that a country's trade performance is determined by its ability to maintain a constant share of world trade. If a country's exports, for example, fail to expand at least at the same rate as the average for other exporters, then its share of world trade will decline.

The CMS methodology is an exploratory tool that is used to elicit general hypotheses that require further investigation. Once a country's trade growth is factored into the three components, called "effects", the difference between the normative and actual growth performance can be discussed in terms of demand and supply conditions. In general, the commodity-composition and market-distribution components, known as structural effects, are associated with demand factors. The competitive effect is frequently, but not always, related to a country's supply characteristics.

The CMS procedure was applied to three cases involving agricultural exports from Latin America. The first examined the region's aggregate export performance in relation to the rest of the world during 1960-79. The results showed that, for most of the sub-periods measured, the region's agricultural export growth was below par for the world as a whole. Consequently, the Latin American share of world agricultural trade declined during the period. The poorer export performance was attributed to a concentration of exports in slow growing markets, and to factors that had a negative impact on the competitive effect. The region's competitive position was hindered by relatively fast rising agricultural prices and by domestic demand growing more rapidly than domestic production. These factors outweighed the favorable results from a concentration on export commodities that were growing faster than the world average. The regional analysis was extended to include a discussion of the export performance of individual countries within the region and specific export commodities.

The Argentine example demonstrates the use of the CMS technique as applied to the export performance of an individual country. The

country's share of the aggregate value of selected export commodities declined over the 1964-78 period. Although its agricultural trade was favored by a concentration on rapidly expanding export commodities, export growth was limited by an unfavorable distribution of markets (i.e., slower growing markets) and by slower growth in production (compared to other exporters) which inhibited its competitive position. The CMS technique was also applied to measure the competitive- and market-distribution effects of five principal export commodities whose world shares had declined (wheat, corn, beef, oilseed meal, and linseed oil). Supply and demand conditions were then reviewed in an attempt to explain the reduction in export shares.

The final case study involves world coffee exports during 1960-79, with an emphasis on Brazilian and Colombian trade. The results of the CMS analysis suggests that Brazil's reduced trade share was linked to supply problems. In fact, production losses due to poor weather and production and export controls were likely factors in the country's loss of competitiveness. On the other hand, Colombia's share of the world coffee market expanded during most of the period. A relatively high concentration of coffee exports to dynamic markets (Europe and Japan) and improved production efficiency apparently accounted for the positive results of the CMS measurements.

This section of the paper also included an analysis of the U.S. coffee market using a modification of the standard CMS procedure. The CMS results showed that three major exporters - Colombia, Mexico and Indonesia - increased their shares of the U.S. coffee market during 1968-81. This may have resulted in part from the decline of Brazil's exports to the U.S. market, and, in the case of Indonesia, a growing demand for fuller varieties. Mexico also had a locational advantage over other competitors.

Additional analyses were conducted to test and demonstrate the sensitivity of the CMS results to changes in the way the components are calculated. This involved the use of different years for the base periods, and the separate calculation of the CMS effects using volumes and values for the original trade data. In the latter case, the CMS results were found to be sensitive to the use of volume versus value data. The results differed greatly in the case of coffee exports to the United States, but the results were less sensitive for estimates of Argentine exports, with the exception of linseed oil.



## INTRODUCTION

For many countries international trade represents the main source of foreign exchange earnings. For them, these earnings constitute the major resource for financing economic development and the importation of required goods and services. Thus, for those countries the driving force behind their participation in international trade is to expand or at least retain their market shares. This ensures a continuous flow of foreign earnings to keep their economies moving and the living standards of their peoples hopefully improving. To remain competitive in the international trade has become not only a national goal or social aspiration, often expressed in the countries' development plans, but also a matter of national security.

It is against this context, in which market imbalances have become a common feature, that trade policy is formulated. The major issues at stake concern the economic and policy conditions in world markets and within the countries themselves that affect the rate of trade expansion and in turn its desired impact on economic development. The observation of those patterns provides information about the issues to be addressed in domestic and international forums, and suggests the possible avenues in which solutions should be pursued. Nevertheless, a scientific study of these issues requires more than a simple analysis of trends. It implies the identification of forces behind of those trends and the specification of modelistic constructions explaining them. In this context, this paper proposes of offer a modest but, hopefully, useful contribution to the understanding of the factors responsible for a country's or region's export growth.

A comprehensive analysis of the export performance of a country is a complex task. It involves a systematic examination of factor endowments, available technology and production functions, market structure, demand patterns, and government policies in the exporting country, its customers and its competitors. Trade analysts have developed several techniques to evaluate export performance and, representing different levels of sophistication with various degrees of success. Some of the measures used are derived from a consistent theoretical framework, while others are empirical constructs supposedly representing notions of either competitive or comparative advantage. However, there is not a single analytical tool that can pursue the whole task by itself. In most of the cases, such a task is carried out by trade researchers with a combination of different methodological procedures. Among the empirical approaches most widely used, the Constant-Market-Share (CMS) analysis has been found to offer a useful method for examining a country's export growth.

The purpose of this paper is to present a brief description of the analytical framework of the CMS analysis, its basic assumptions, implications and limitations. Also included are three empirical illustrations of the use of the technique as applied to the agricultural export performance of Latin America.

### THE CONSTANT-MARKET-SHARE MODEL 1/

A country's ability to expand its exports as fast as the world average may be traced to a combination of three factors:

- o Exports may be concentrated in commodities for which the world demand is growing slower (faster) than that of the world average for all commodities.
- o Exports may be concentrated proportionately more in relatively stagnant (dynamic) markets, than those in which the demand is growing faster (slower) than the world average.
- o The country in question may or may not have been able or willing to compete effectively with other sources of supply.

The first two factors determine the "export structure" of a country and reflect its performance with respect to commodity and geographic diversification of its exports in keeping with growth in world trade. The third factor determines the country's relative "competitiveness" and is most likely to reflect internal supply problems rather than external demand constraints. The CMS analysis is an empirical method that enables us to differentiate numerically the past export growth of a country into the components outlined above. 2/

A country's trade performance in the CMS model is measured by its ability to maintain a constant share of world trade over time. The difference between the actual export growth and that hypothesized by this constant-share norm can be broken down into three effects: the commodity-composition effect, the market distribution effect, and the competitive effect. The three components correspond to the three factors of export performance indicated above (see Methodological Appendix for a discussion of the model's limitations).

#### Algebraic Specifications

The calculations involved in the application of the CMS procedure require the use of the following notation:

- v - total value of a country's exports in period 1.
- v' - total value of a country's exports in period 2.
- v<sup>i</sup> - value of a country's exports of commodity i in period 1.
- v'<sub>i</sub> - value of a country's exports of commodity i in period 2.

- $v_{ij}$  - value of a country's exports of commodity  $i$  to country  $j$  in period 1.
- $v'_{ij}$  - value of a country's exports of commodity  $i$  to country  $j$  in period 2.
- $r$  - rate of growth of world exports, period 1 to period 2.
- $r_i$  - the rate of growth of world exports of commodity  $i$  from period 1 to period 2.
- $r_{ij}$  - the rate of growth of world exports of commodity  $i$  to market  $j$  from period 1 to period 2.

The rates of world export growth are calculated as follows:

$$r = \frac{V' - V}{V}, \text{ where } V \text{ and } V' \text{ are the world exports for periods 1 and 2 respectively.}$$

It follows from the above definitions that the value of a country's exports in period 1 and 2 are, respectively, derived by:

$$\sum_{ij} v_{ij} = \sum_i v_i = v, \text{ and } \sum_{ij} v'_{ij} = \sum_i v'_i = v' \quad (1.2)$$

Note: The same notation is used for both export value and volume.

### Levels of Analysis

The application of the constant-share norm can be carried out at three different levels of analysis, depending on the nature of the market that is being studied. In one-level analysis, a country's exports may be viewed as a single good destined for a single market. That is, they are completely undifferentiated as to commodity and market of destination. If a country maintained its world market share from period 1 to period 2, it would follow that its exports grew at the same rate as world exports, that is, at  $r$ . Then the following identity would hold:

$$v' - v \equiv rv + [(v' - v) - rv] \quad (1.3)$$

(1)                      (2)

Expression (1.3) divides the growth of a country's exports into two components: (1) the growth effect - the hypothetical growth of a country's export trade had it changed at the same rate as the world average (i.e., if the country had maintained its average trade share during the period), and (2) a residual, or the competitive effect. In the usual CMS treatment, if the country's export growth was faster than the world rate  $r$ , then it is said that the country was competitive, that is, it

increased its average share of the world market. If smaller, the country has been losing competitiveness. In this context, then, a change in an exporter's share of world trade determines its competitive position.

However, it is possible for a country just to maintain its export share in every individual market and yet still grow faster (slower) than the average of world exports [Rigaux, 10]. Such a country can be said to have a favorable (unfavorable) export structure, that is, one that is skewed (relative to the world's structure) toward goods or geographic markets which grow rapidly (slowly) in world trade.

In the case of a CMS analysis that is oriented to study the world market for a particular commodity class, a two-level analysis would imply the following expression: 3/

$$v' - v \equiv rv + \underbrace{\left( \sum_i r_i v_i - rv \right)}_{(2)} + \underbrace{\left[ (v' - v) - \sum_i r_i v_i \right]}_{(3)} \quad (1.4)$$

(1)

Here, the growth of a country's exports is broken into three components: (1) the growth effect; (2) the commodity-composition of the country's exports; and (3) the competitive effect, indicating the difference between the country's actual export growth and the hypothetical change if it had maintained its world share for each commodity. The commodity-composition effect (2) would be negative if a country had concentrated its exports on commodities for which world demand was growing slower than the average expansion of world trade in general. It would be positive in the reverse case.

A country's export growth may also be influenced by the distribution of markets as well as by commodity composition. Some countries may have access to rapidly growing markets while others trade with relatively slow-growing partners. This phenomenon can be incorporated into the previous CMS formulation. After partially combining terms, the CMS identity equation is as follows: 4/

$$v' - v \equiv rv + \underbrace{\left( \sum_i r_i v_i - rv \right)}_{(2)} + \underbrace{\left( \sum_{ij} r_{ij} v_{ij} - \sum_i r_i v_i \right)}_{(3)} + \underbrace{\left[ (v' - v) - \sum_{ij} r_{ij} v_{ij} \right]}_{(4)} \quad (1.5)$$

This three-level analysis breaks down a country's export growth into four components: (1) the growth effect, (2) the country's commodity composition of exports, (3) the country's geographic distribution of exports, and (4) the residual, or competitive effect.

The first two terms are identical to those discussed for equation 1.4. The market-distribution effect (3) would tend to be negative if a country's exports had failed to concentrate on relatively high growth markets in world trade. This effect would be positive in the reverse

case. The competitive effect (4) shows the difference between the actual growth of a country's exports and the growth that would have been realized if the country had maintained its share of trade for each commodity and in each geographic market being considered. This residual term indicates the gain or loss of competitive power depending on whether it is positive or negative.

### Model Extensions

The CMS model, by providing valuable information on their country's export performance, enables policymakers to formulate specific policies to influence trade growth in one way or another. For instance, if a CMS analysis shows a negative residual, policymakers should look into factors that affect their country's competitive trade position in search for an explanation of declining export shares; that is, price differentials, product quality, marketing efficiencies and costs, export policies, etc.. If the distributive effect were negative, then policymakers would be well advised to reassess trade with countries or regions whose demand was growing slower than the world average. Thus, the CMS analysis is perhaps best considered as an exploratory analytical tool, whose results shed light on some problem areas that can be further studied by using more sophisticated methodological techniques.

The CMS analysis may be used in conjunction with traditional econometric methods in the analysis of the competitive residuals. This may allow the separation of demand and supply influences, and the determination of the extent to which a country's competitiveness depends on price and non-price factors. In any case, competitive residuals can be regressed against relative prices or quantifiable supply or demand shifters. Such an analysis, in addition to providing causal relationships, would also allow researchers to forecast the residuals and consequently to formulate probability statements about the future values of exports (see Leamer and Stern, [4] for a further discussion of this topic).

The purpose of this section is to examine the agricultural export growth of Latin America during 1960-79 using the CMS analytical framework. Emphasis is placed on exploring how the export market shares have changed for countries of the region and for selected commodities. Three empirical constructions are presented here:

- o The agricultural export performance of Latin America.
- o The agricultural export performance of Argentina.
- o The Latin American coffee export performance.

The first example offers an illustration of the CMS technique at the aggregate level. The second and third examples provide more disaggregated applications at the country and commodity levels. In every case, the usefulness and limitations of the technique are emphasized, and the possibilities and direction of further and more sophisticated analysis are also indicated.

The focus of the first application is on the use and interpretation of the traditional CMS effects. No sensitivity test is carried out on those results, with the exception of pointing out the effects of changing the sequence of calculation of the commodity and market effects. On the other hand, the second and third examples explore the impact on the original CMS results of using different weighting schemes (initial period versus final period structures), the use of export values instead of quantities, and an alternative choice for the "world" norm of average growth.

#### AGRICULTURAL EXPORT PERFORMANCE OF LATIN AMERICA

Latin America failed to expand its volume of agricultural exports as fast as the world average during 1960-79, and exhibited, as a result, a declining relative participation in world agricultural trade. <sup>5/</sup> This relatively poor agricultural export performance has been blamed by some on constraints placed on international demand. In contrast, others suggest that such slow export growth has been mainly due to constraints operating on the supply side.

The supporters of the demand-deficiency hypothesis trace the slow growth to factors such as: low income elasticity of demand for agricultural products; development of synthetic substitutes for some agricultural commodities (i.e., cotton); production economies in the use of raw materials in developed countries; restrictive import policies of developed countries; and a declining external demand for agricultural products during the seventies brought about by world recession and stagnant economies.

On the other hand, the defenders of the supply-inelasticity hypothesis mention factors such as: the internal policies of the countries themselves which have failed to develop a strong export capacity; differential rates of increases in productivity and the level of prices; an increasing proportion of agricultural production retained for domestic demand; differential rates of development for new exports; and deficiencies in the marketing and financing of agricultural export goods.

Although the above issues are complex and deserve a more comprehensive study, they were initially explored in the context of the CMS analysis for Latin American trade. Five-year averages were used to minimize the fluctuations observed on a year-to-year basis. The technique was applied to five sub-periods: 1960/64 - 1965/69; 1965/69 - 1970/74; 1970/74 - 1975/79; 1965/69 - 1975/79; and 1960/64 - 1975/79. These periods were selected to provide a picture of structural changes taking place over time. Nineteen commodity groups (two-digit SITC) were included in the analysis. Values rather than quantities were used in this exercise for lack of relevant data at the aggregate quantity level (see Appendix table A1) for an illustration of the calculations required to estimate the CMS effects for a two-commodity trade world during the 1960/64-75/79 period.

Results of the CMS Analysis

Table 1 shows the estimates of the source of Latin American agricultural export growth for the indicated sub-periods. The absolute values of export earnings for each CMS component were expressed as a percentage of the actual increase in the value of Latin American agricultural exports.

The results show that for most of the sub-periods studied, the region's agricultural export earnings did not grow as fast as the world average, and consequently failed to maintain a constant share of the world market. Between 1960/64 and 1975/79, Latin American agricultural exports grew by \$19.42 billion, that is, \$1.67 billion less than the hypothetical increase implied by the CMS norm. This divergence between the actual and hypothetical growth was attributed to an unfavorable market distribution effect (-\$1.48 billion) and to a loss of competitiveness (-\$1.57 billion). Together, the negative effects offset the relatively favorable commodity composition of the region's agricultural exports (\$1.39 billion). 6/

Latin America's agricultural exports were able to grow faster than the world average only in the sub-periods of 1965/69-1975/79 and 1970/74-1975/79, mainly due to a favorable composition of the region's export basket and some gains in competitiveness achieved during 1975-79. The market distribution effect was unfavorable, particularly in the 1970's, as the major importers of Latin American agricultural commodities (i.e., developed market economies) faced a slowdown in their economic growth as a result of higher energy prices and the resulting world recession. However, Latin America also failed to redirect the majority of its agricultural exports to more rapidly growing markets such as middle-income countries and centrally-planned economies, which resulted in an adverse affect on its agricultural export growth. Thus, a concentration in the wrong geographic markets was apparently one reason for the region's relatively poor agricultural export performance.

The region faced a loss of competitiveness, at least during 1960-1974, which was in part the result of rising relative prices. 7/ The negative competitive effect, however, was mainly associated with the slow growth in agricultural production and an increasing domestic demand for agricultural commodities, which diverted to local uses production that would have otherwise been allocated to exports. Therefore, supply rather than demand problems appear to have been the main source of slow agricultural export growth for Latin America during 1960-79. 8/

Country Analysis

A disaggregation of the CMS analysis, at the country level, allowed for the indentification of the winners and losers in the overall agricultural export performance of Latin America. Table 2 shows the results of this disaggregation. The countries were classified according to their agricultural export performance (poor or good) and their degree of agricultural export commodity concentration. 9/ A country's agricultural

Table 1--Constant-Market-Share analysis of the sources of change in Latin American agricultural exports to the world market 1/

(Millions of U.S. dollars; percentage of actual growth of exports)

CMS Components <u>2/</u>	Periods									
	1960/64 - 65/69		1965/69 - 70/74		1970/74 - 75/79		1965/69 - 75/79		1960/64 - 75/79	
	Value	%	Value	%	Value	%	Value	%	Value	%
Actual export growth	954	100.0	4,767	100.0	13,699	100.0	18,466	100.0	19,420	100.0
World growth effect	1,422	149.0	5,661	118.7	11,802	86.1	18,383	99.5	21,085	108.6
Commodity composition	149	15.6	187	3.9	521	3.8	822	4.5	1,387	7.1
Market distribution	11	1.2	-326	-6.8	-634	-4.6	-1,456	-7.9	-1,479	-7.6
Competitiveness effect	-628	-65.8	-755	-15.8	2,010	14.7	717	3.9	-1,573	-8.1

1/ The world market includes Canada, United States, EEC-9, EFTA, Other Western Europe, Japan, Australia, New Zealand, South Africa, Latin America, Developing Asia, Developing Africa, Eastern Europe, USSR, Centrally Planned Asia, and the rest of the world.

2/ See the appendix section for an illustration of the derivation of the result presented here.



Table 2--Latin America: Agricultural export performance  
by country (percentages)

Category and country	Agricultural Exports						
	World	Latin America	Country's total exp.	Index of concentration	Annual growth rates	Instability index of ex- port earnings	
	1975/79				1960-79		
<u>Poor Export Growth 1/</u>							
<u>High Commodity Concentration</u>							
Guyana	0.09	0.6	48.1	62.6	7.2	24.8	
Haiti	0.04	0.3	43.3	77.8	4.7	18.2	
Ecuador	0.37	2.5	40.1	61.7	8.7	9.3	
Barbados	0.03	0.2	37.4	71.6	3.4	19.6	
<u>Middle Commodity Concentration 2/</u>							
Dominican Rep.	0.35	2.4	69.8	47.6	8.9	17.1	
Panama	0.07	0.5	44.7	50.7	9.4	11.2	
Jamaica	0.10	0.7	20.9	41.1	3.9	17.9	
Peru	0.23	3.5	18.6	41.3	5.7	16.1	
Trinidad & Tob.	0.05	0.4	3.9	43.7	5.6	17.0	
Venezuela	0.06	0.4	0.8	52.0	6.9	22.5	
<u>Low Commodity Concentration</u>							
Argentina	2.43	16.4	71.2	26.3	7.9	14.3	
Uruguay	0.22	1.4	55.9	27.5	5.5	13.6	
Mexico	0.94	6.3	28.5	25.0	8.4	9.1	
<u>Good Export Growth 1/</u>							
<u>High Commodity Concentration</u>							
Cuba	2.32	15.6	91.0	95.7	17.3	16.9	
Colombia	1.20	8.0	76.9	70.5	10.4	10.8	
El Salvador	0.38	2.6	69.0	66.9	10.0	11.6	

--Continued

Table 2--Latin America: Agricultural export performance by country (percentages) 1/, continued

Category and country	Agricultural Exports					
	Share in:			Index of:	Annual	Instability
	World	Latin America:	Country's total exp.:	concentration	growth rates	index of ex-earnings
	<u>1975/79</u>				<u>1960-79</u>	
<u>Middle commodity concentration 2/</u>						
Guatemala	0.47	3.1	73.3	41.3	13.8	11.3
Costa Rica	0.34	2.3	72.6	43.4	13.1	7.3
Honduras	0.24	1.6	72.3	40.7	10.7	11.4
Chile	0.13	0.9	8.5	43.3	10.2	26.5
<u>Low commodity concentration</u>						
Paraguay	0.13	0.9	85.3	23.6	13.0	10.9
Nicaragua	0.29	1.9	81.4	27.6	12.9	13.0
Brazil	4.14	27.8	55.0	31.8	11.8	10.1
Bolivia	0.05	0.3	12.5	25.8	23.2	14.3

1/ The period for this analysis was 1961/65 to 1975/79.

2/ Index of concentration: Mid-range (40-55), mean = 47.5.

export performance was judged to be good (poor) if the CMS analysis showed gains (losses) in competitiveness. In addition, Table 2 also shows an index of fluctuations (or instability) of agricultural export earnings. 10/ Thirteen countries, of the twenty-four studied, displayed poor agricultural export growth during 1960-79. They accounted for about 37 percent of Latin American agricultural exports in 1975-79. Ten of them (Guyana, Haiti, Ecuador, Barbados, Dominican Republic, Panama, Jamaica, Peru, Trinidad & Tobago, and Venezuela) displayed, in addition, concentration export indices over 40 percent. The rest (Argentina, Uruguay and Mexico), in spite of having a more diversified agricultural export structure, showed a poor performance mainly related to internal forces affecting their agricultural sectors. Furthermore, eight of those thirteen poor performers (Dominican Republic, Guyana, Venezuela, Haiti, Barbados, Peru, Jamaica, and Trinidad & Tobago) were also exposed to high export earnings fluctuations, originating in either unstable export prices or quantities. The average export instability index was 14.8 percent.

Among the eleven countries with a good agricultural export performance, only three displayed a high degree of commodity concentration (Cuba, Colombia, and El Salvador), with Cuba as the extreme case with a concentration index of 95.7 percent (mainly sugar). The group of good export performers, with the exception of Cuba and Chile, was also less affected by fluctuations in their agricultural export earnings. Bolivia, in spite of its still small relative participation in the total of Latin American agricultural exports (0.3 percent in 1975-79), was the country that displayed the largest agricultural export growth during the period (23.2 percent per annum). An interesting finding was that Central America, as a whole, performed well during the period. These countries are traditionally net exporters of agricultural commodities, from which they derive most of their foreign exchange earnings. Brazil, accounting for almost 28 percent of the region's agricultural trade, was the single largest agricultural exporter. All the countries with positive competitiveness also displayed annual growth rates of agricultural export earnings greater than Latin American and world averages for the period; 9.8 and 9.6, respectively.

#### Commodity Analysis

One of the major characteristics of the Latin American agricultural export structure was its high dependence on a few commodities for export earnings. During 1960-79, about three-fourths of agricultural export earnings (approximately 30 percent of the total exports) were obtained through the sale of ten commodities: beef, wheat, maize, bananas, sugar, coffee, cocoa (including products), tobacco, soybeans (including meal), and cotton. Coffee and sugar were the principal commodities, with an average export value of \$10.3 billion (61 percent of the combined export value) during 1975-79. Since the early 1970's, soybeans has been the third largest export earner (\$1.8 billion export value for 1975-79). Those three commodities represented about half of the region's agricultural exports during 1960-79. Thus, the agricultural export performance of Latin America was highly dependent on the export performance of three commodities.

As indicated by the results of the CMS analysis, the composition of the agricultural basket of Latin American exports has been favorable during the period under review. However, the aggregate results hide the performance of individual commodities. A CMS analysis of those ten major commodities was also conducted, and the results are displayed in Table 3. The ten commodities studied were evenly distributed between poor and good export performers, according to their favorable or unfavorable export growth between 1961/65 and 1975/79. In the first category were found beef, wheat, maize, cotton and coffee. The second group included bananas, cocoa, sugar, tobacco and soybeans. As mentioned earlier, soybeans was the commodity that displayed the largest gains in competitiveness during the period. A further analysis of the export performance of these commodities revealed that the major source of their export growth was supply-induced [5]. The main exception was soybeans, for which demand factors were responsible for its large expansion.

Table 3--Latin America: Export performances indicators of major agricultural commodities, 1975-79

Commodity	Share in Latin America's agricultural exports	World market share <u>1/</u>	Competitiveness effect <u>2/</u>
	<u>Percent</u>		
<u>Poor Export Growth</u>			
Beef	3.0	13.0	-67.5
Wheat	1.9	3.9	-55.8
Maize	2.6	7.9	-53.9
Cotton	4.1	16.5	-31.5
Coffee	24.6	58.8	-21.9
<u>Good Export Growth</u>			
Bananas	3.3	77.0	8.8
Cocoa	4.1	24.2	14.6
Sugar	19.8	52.2	16.2
Tobacco	1.7	12.0	99.4
Soybeans	7.7	23.0	2,061.3

1/ Latin America's share of the world exports of each commodity.

2/ Competitive effect as a proportion of actual export growth.

### Conclusions

Without pursuing a complete treatment of the causes of the slow growth of Latin American agricultural exports, the CMS technique provided an initial exploration of those causes in terms of the region's changes in export structure and competitive position. The results derived from this type of analysis were useful as guidelines for a further and more sophisticated examination of those causes, mainly applying econometric methods [5]. The conclusions obtained from both kinds of approaches were consistent in identifying supply problems rather than import demand forces as the main factors affecting Latin American agricultural export growth. The application of the CMS technique in this section was straightforward and, in the absence of a further analysis, the results should be used cautiously.

## THE AGRICULTURAL EXPORT PERFORMANCE OF ARGENTINA

Argentina's agricultural exports posted modest gains during the past two decades. The nominal value of agricultural exports increased from an average \$1.4 billion in the mid-sixties to \$4.7 billion by the late seventies. In real terms, this translated into a 1.5 percent per annum growth in 1975 dollars. In contrast, total exports grew by almost 4 percent per year and, consequently, the agricultural share of total exports fell from an average 93 percent in the sixties to about 70 percent in the seventies. In terms of its position in world trade, Argentina's share of world agricultural exports declined from 3.2 percent (1964/66) to 2.7 percent (1977/79). The causes of this decline have been open to much speculation centered on the country's ability to effectively compete in world trade, and in particular with respect to its traditional export commodities including beef, wheat, corn, wool, and sunflower and linseed products. On the other hand, there were significant export gains from the expansion of new crops during the sixties and seventies, notably grain sorghum, soybeans, and fruits, which together accounted for over one-fifth of agricultural export value by the late seventies.

A three-level, CMS analysis was conducted to examine Argentina's agricultural export performance. Its purpose was to establish an initial hypothesis as to whether the country's relative slow growth in agricultural exports could be attributed to structural factors (commodity and market composition) and/or to competitive factors, both price and non-price. The historical period chosen for this study covered the mid-sixties to the late seventies. This time period was selected because it represented recent history and a relatively liberal trade environment for Argentine agriculture, with the exception of 1974-76.<sup>11/</sup> The initial period was 1964-66 (period 1), and the ending period was 1977-78 (period 2) - complete export statistics by country of destination were not yet available for 1979. The CMS effects were estimated using both period 1 and period 2 bases, and a comparison of the two results was made. This provided additional information as to the sensitivity of the CMS effects when other than the initial export structure was used.

Choice of commodities and markets was limited by data availability, but an attempt was made to disaggregate as much as possible. Seventeen commodity categories were chosen using two-to-four digit SITC codes (Appendix Table A2). Together, they accounted for 80 percent of Argentina's agricultural exports.<sup>12/</sup> Argentina's trade world was divided into 15 regions, four of which were major country markets (Japan, PRC, USA, and USSR). The remaining regions were identified by geographic proximity (Appendix Table A3).

Trade values were used in the first part of the empirical analysis. Therefore, the interpretation of the CMS effects will have to take into account the potential bias in the results, as discussed in the Methodological Appendix. The second part of the empirical analysis examined five commodities more closely using both value and volume trade. The measurement of each individual competitive effect was of

particular interest in determining how much it may have been biased by using export value rather than export volume.

#### CMS Results Using Period 1 Base

Table 4 presents the results of the CMS analysis for Argentine agricultural exports using the initial-period structure (export shares based on period 1 values). If Argentina had maintained its share of the aggregate value of the 17 commodities, it would have increased its nominal export value by \$3.17 billion (growth or world trade effect). The actual increase in export value, however, was \$2.48 billion, leaving a difference of \$687 million (28 percent of the actual increase in export value). The difference between the hypothetical and actual increase in trade was attributed to structural and competitive factors. A favorable commodity-composition effect (+\$337 million) overcame a negative market-distribution effect (-\$97 million), resulting in a positive structural effect of \$240 million. The net structural effect was offset by a highly negative competitive effect (-\$927 million).

Table 4--Argentine CMS results using Period 1 shares.

CMS components	Value	Change in exports
	<u>1,000 dollars</u>	<u>Percent</u>
<u>Actual change in export value</u>	2,483,380	100
Growth effect	3,170,397	128
Commodity composition effect	337,058	14
Market distribution effect	-97,443	-4
Competitive effect	-926,632	-38

The positive commodity-composition effect reflects a faster rate of growth for Argentine exports than the world average. In other words, the country had a higher concentration of faster growing commodities than the world's trade structure. The negative market-distribution effect, although not large, indicates that to country's exports were skewed toward markets that were not expanding as rapidly as the total world market. These results reflect the country's export performance based on the market distribution and commodity composition structure in period 1.

The interpretation of the competitive effect is subject to certain reservations. International trade theory suggest that the lack of competitiveness is related to relatively higher export prices compared to

other competitors. In the case of Argentina, however, it does not appear that higher prices were the reason for the country's failure to be competitive. Argentina's export prices were largely determined by external supply and demand conditions. Only a few of its exports dominated the world market sufficiently to influence price trends (grain sorghum and linseed oil would be examples). In addition, the lack of storage capacity forced exporters to sell most crops within a few months of harvest, making them price competitive. Finally, there was generally an absence of quality differentials that could demand a higher price in the world market (River Plate corn was an exception). A further discussion of the implications of the competitive effect for Argentine exports will be presented later.

#### CMS Results Using Period 2 Base

By using a standard for a single-period, only part of the information available is being used. The calculations of the foregoing CMS effects were based on a trade structure that existed during the mid-sixties (period 1). However, those results do not reveal whether or not the country's export performance indicators had changed by the final period. A calculation of the CMS effects using period 2 as a base and a comparison with the initial period results provides a preliminary indication as to the direction of change in structure and competitiveness. If the final-period export structure is used, the values (or quantities) for period 2 replace those for period 1 in the CMS identity equation (1.5). The rates ( $r$ ) of world export growth would then be calculated as follows:

$$r' = \frac{V' - V}{V'} , \quad \text{Where } V \text{ and } V' \text{ are the world exports for periods 1 and 2, respectively.}$$

The results of the CMS analysis using period 2 are presented in Table 5. The difference between the constant-share growth and actual change in Argentina's exports was not as large as when using the period 1 base--it was roughly half a billion less. The smaller differential suggests that the country's export performance had improved by the later seventies. The relative contribution of the structural and competitive effects were also changed. The market-distribution effect showed an improvement from higher to a lower negative value, indicating a higher concentration of exports in faster growing markets. There was a substantial deterioration in the commodity-composition effect reflecting a higher concentration of exports in slower growing commodities (compared to the world average). In contrast, the absolute value of the competitive effect was reduced by almost five-fold, although it remained negative. The net results of the structural and competitive effects was still negative, but to a much lesser degree compared to the initial period results. A comparison of the two CMS results indicate that the more recent structure and competitive position of Argentine agricultural trade had improved, vis-a-vis the world standard, although not enough to increase exports at the same rate as world trade expansion.

Table 5--Argentine CMS results using period 2 shares.

CMS components	Value	Change in exports
	<u>1,000 dollars</u>	<u>Percent</u>
<u>Actual change in export value</u>	2,483,380	100
Growth effect	2,680,798	108
Commodity-composition effect	61,897	2
Market-distribution effect	-62,159	-2
Competitive effect	-197,156	-8

The disproportionate concentration of the country's exports in slow growing markets can not be satisfactorily explained. Argentina had few long-term trade agreements with countries in slower growing markets. These markets were not traditional trading partners, except for countries of the European Community (EC) and the United States. Argentina's trade shares were reduced in these two markets between periods 1 and 2 (Appendix Table A2). The inability to completely account for the negative market effect suggests that future export trade strategy should involve an analysis of potential import markets, including measurements of import demand elasticities, import regulations and policies, and marketing infrastructure, to mention a few.

The highly negative competitive effect was the most significant factor in Argentina's unfavorable export performance. As suggested earlier, reasons other than price competitiveness (or the lack thereof) have to be examined in order to explain the slower growth. Historically, Argentine export trade has been influenced by economic policies designed to promote industrial development to the detriment of traditional agricultural production. The crop sector in particular was affected by these policies which included high export taxes, a chronically overvalued peso, and administered domestic prices - the latter being in effect during 1974-75. As a result, growth in agricultural output was insufficient, on the average, to maintain the country's share of world trade [6].

As for the positive commodity effects, there were several export commodities that registered favorable growth trends compared to the world average. Impressive export gains were made in two relatively new crops, grain sorghum and soybeans. Cattlemen increasingly produced sorghum as a dual purpose crop for forage and grain. Soybean production was boosted by the growing demand for protein feed and as a substitute for corn as a cash crop. In both cases, rapid increases in production soon exceeded domestic needs and new export crops were created. In the case of



soybeans, the Argentine government lifted an export ban in 1976 only after domestic supplies had been assured. Oilseed production in general was favored because it contributed to industrial development through the establishment of oilseed crushing facilities. Non-traditional export commodities, such as fruits, were actively promoted through export tax rebates and favorable exchange rates.

#### CMS Results for Individual Commodities

An analysis of individual commodities provides additional information, and perhaps insights not possible from the broader-based CMS analysis. Five commodities were chosen whose trade shares had declined between periods 1 and 2. It was of interest to determine if the decline was largely due to competitive factors as in the previous results. As mentioned earlier, it was also decided to calculate the CMS effects for the individual commodities using both value and volume trade. This analysis would indicate the degree of distortion caused by using export value instead of export volume. The CMS results were estimated for both beginning and ending base periods. The empirical estimations for single commodities required a two-level analysis, with the omission of the commodity effect.

The results of the CMS calculations are presented in Tables 6 and 7. Except for linseed oil, the relative contributions of the CMS effects for value and volume are similar. In other words, the market-distribution and competitive effects accounted for roughly the same percentage of the difference between the actual and hypothetical change in exports regardless of whether volumes or values were used. The largest relative differences between volume and value estimates occurred for linseed, beef, and corn. The substantial differences in the linseed estimates indicate that the CMS results should be calculated from volume data, when possible, and especially when export prices are changing more rapidly relative to export volume.

In both periods, the competitive effect was the dominant factor contributing to the large differential between the actual and the constant-share growth in exports. As with the earlier CMS results for the aggregated agricultural exports of Argentina, the signs of the CMS effects did not change between periods 1 and 2. The relative contribution of the CMS effects changed little when using period 1 or period 2 bases, indicating similar export structures during both periods.

The negative competitive effects would indicate, theoretically, that Argentine export prices were, on the average, above the world price (see Methodological Appendix). A preliminary analysis of the relationship between Argentine and world export unit values suggest the opposite - that Argentine export values were below the world average. Argentine prices for the five commodities ranged 9-26 percent below comparable world prices in period 1, and 16-33 percent in period 2. Thus, high Argentine prices do not explain the lack of competitiveness. Other

Table 6--CMS results for five individual commodities,  
value and volume comparisons, period 1 base.

Item	: Actual : change : (1)	: Growth : effect : (2)	: Market : effect : (3)	: (3) : (1)-(2) : 1/	: Compe- : titive : effect(4):	: (4) : (1)-(2) : 1/
				Percent		Percent
Beef						
Value <u>2/</u>	: 110,395	1,038,267	-85,474	(9)	-842,398	(91)
Volume <u>3/</u>	: -117	438	-115	(21)	-440	(79)
Wheat						
Value <u>2/</u>	: 54,919	569,077	74,817	(-15)	-588,975	(115)
Volume <u>3/</u>	: -1,296	1,894	420	(-13)	-3,610	(113)
Corn						
Value <u>2/</u>	: 408,969	775,299	-47,018	(13)	-319,312	(87)
Volume <u>3/</u>	: 2,467	5,852	-161	(5)	-3,224	(95)
Oilmeal						
Value <u>2/</u>	: 192,921	372,438	-84,376	(47)	-95,141	(53)
Volume <u>3/</u>	: 604	1,401	-360	(45)	-437	(55)
Linseed oil						
Value <u>2/</u>	: 51,114	62,604	-20,129	(177)	8,639	(-77)
Volume <u>3/</u>	: 31	26	-31	(-620)	36	(720)

1/ Figures in parentheses are the relative contributions of the market-distribution and competitive effects to the difference between the actual change in exports and the growth effect (the hypothetical change in exports based on the world standard). Numbers were rounded for inclusion in the table.

2/ In thousand of dollars.

3/ In 1,000 metric tons.

possible answers will emerge from a more detailed examination of each commodity in the following paragraphs.

Argentine beef exports experienced a sharp reduction in market shares between the two periods (Appendix Table A2). Its greatest losses occurred in the EC, the largest world market for fresh beef, as sanitary and other import regulations became increasingly restrictive. Argentine exports were shifted to high-growth markets of other Western European countries, Africa, the USSR, and the Caribbean basin. But this was not enough to overcome reduced shares in the EC, South America, Asia, the Middle East, and Eastern Europe. Argentina was not able to take advantage of the rapidly growing market for fresh beef in the United

Table 7--CMS results for five individual commodities,  
value and volume comparisons, period 2 base.

Item	Actual change (1)	Growth effect (2)	Market effect (3)	(3) :(1)-(2): 1/	Compe- titive effect (4):	(4) :(1)-(2) 1/
				Percent		Percent
<u>Beef</u>						
Value <u>2/</u>	110,395	297,622	-1,056	(1)	-186,171	(99)
Volume <u>3/</u>	-117	145	4	(-2)	-266	(102)
<u>Wheat</u>						
Value <u>2/</u>	54,919	245,984	-2,369	(1)	-188,696	(99)
Volume <u>3/</u>	-1,296	1,035	179	(-8)	-2,510	(108)
<u>Corn</u>						
Value <u>2/</u>	408,969	482,943	-2,199	(3)	-71,775	(97)
Volume <u>3/</u>	2,467	3,687	-123	(10)	-1,097	(90)
<u>Oilmeal</u>						
Value <u>2/</u>	192,921	224,268	-10,124	(32)	-21,223	(68)
Volume <u>3/</u>	604	927	-101	(31)	-222	(69)
<u>Linseed oil</u>						
Value <u>2/</u>	51,214	55,719	-11,983	(226)	7,478	(-166)
Volume <u>3/</u>	31	27	-20	(-500)	24	(600)

Note: See references to footnotes in Table 6.

States - U.S. beef imports doubled between periods 1 and 2. U.S. regulations prohibited the importation of fresh beef from areas where hoof-and-mouth disease was endemic as was, and is, the case in Argentina. It appears, therefore, that Argentina's competitive position in beef exports was largely the result of demand constraints rather than supply limitations. In fact, domestic per capita beef consumption rose to record levels during the seventies to absorb the surplus from increasing production and declining export sales.

Argentine grain exports faced a different set of circumstances. World wheat imports increased by over one-third between periods 1 and 2 and corn imports almost tripled in volume. Argentina's competitiveness in this expanding world market was hindered by slow production growth. Domestic economic policies were generally unfavorable to the crop sector, and in particular to traditional exports such as wheat, corn, sunflower and linseed oil. 13/

The exportable supply was unable to meet increasing world demand and Argentina lost markets primarily to Australia, Canada, and the United States. Argentine wheat shares declined in every market except the Caribbean Basin, Northern Africa, and Eastern Europe. Argentine's share of corn exports declined in three of its major markets--the EC, South America, and the USSR.

Oilseed trade is more complex to analyze because of the multi-product nature of the industry. The oilseed sector faced the same policy environment as grains, although soybeans registered spectacular growth during the seventies due to increasing demand. However, oilseed meal exports, which included soybean meal, did not expand as rapidly as world demand. Most of the increase in oilseed production was generated by raw bean exports and increased internal use of soybean meal for livestock feed. It appears, therefore, that Argentina's competitive trade position in oilseed meal was limited by the growing export demand for seed exports and by the domestic demand for oilseed by-products. Brazil's strong growth in soybean meal exports was also a competitive factor, although it is hard to say to what degree. A significant portion of the oilmeal that was exported was concentrated in slow-growth markets including the EC and Eastern Europe, its two largest markets.

### Conclusions

The agricultural export performance of Argentina during the past two decades was unsatisfactory, according to the CMS analysis. Agricultural exports experienced a disproportionate decline in world market shares during the period. This was mainly attributed to unfavorable market distribution and competitive factors. However, the inability of Argentine agricultural exports to be competitive does not appear to have been significantly related to relatively higher prices for the country's major commodities. Instead, the country's competitiveness was more influenced by domestic policies that failed to promote agricultural production in order to take advantage of growing world demand for food. This lost opportunity undoubtedly cost Argentina in terms of foreign reserves, employment, tax revenues, and the like. It may also have weakened Argentina's reputation as a reliable supplier and given its competitors a marketing advantage.

Argentina's economic viability depends in part on its ability to expand export trade, of which agriculture accounts for 75-80 percent of the total. The country's ability to recapture lost markets and to expand shares in other markets will largely depend on domestic policy. There has been considerable improvement in the growth of production and trade since the mid-seventies. Some argue that this improvement has vindicated the new policy measures implemented after 1976. These called for reduced government intervention in the marketing and trade of agricultural commodities. Specific policy changes included freer exchange rate movements, reduced export taxes, freed domestic prices, and the promotion of non-traditional exports. The consequences of the new policy direction

were, however, clouded by a sharp change in Argentina's market orientation following the U.S. grain suspension in 1980. The decade began with the majority of Argentine grain and oilseed exports (and a sizeable portion of the beef trade) going to the Soviet Union, which sought alternatives to U.S. supplies.

#### LATIN AMERICA COFFEE EXPORT PERFORMANCE

In this section, a two-level CMS framework was used to analyze export shares in the green coffee market (classification 071.1 SITC). First, the technique was applied to analyze Brazil's and Colombia's coffee export performance for the past two decades. A variation of the CMS framework was then used to analyze changes in the shares of the major exporting countries in the U.S. coffee market during the seventies. The discussion will focus on the breakdown of change in total exports between demand-pull effects and the residual, or competitive effect.

Coffee is an important foreign exchange earner for many developing countries. Export sales of this commodity accounted for over 24 percent of the Latin American agricultural exports during 1960-79. As a matter of fact, for a long time the region had been the leading source of world coffee production and exports. <sup>14/</sup> Although this commodity is widely produced and exported by most of the countries of the region, Brazil and Colombia have traditionally been the major regional suppliers. During 1975-79, they accounted for 38 and 22 percent of total world production and 32 and 25 percent of total world exports, respectively.

World coffee trade absorbs a major part of total coffee production, as most coffee is consumed in non-producing countries; Latin America exported nearly three-fourths of its production during 1975-79. Coffee imports totaled \$14 billion in 1980, or about 5.5 percent of world agricultural imports for that year. The United States has long been the major world coffee importer. This single country accounted for about 30 percent of the world coffee imports during 1975-79, with nearly 70 percent of its imports coming from Latin America. Of the latter, Colombia, Brazil and Mexico accounted for about 40 percent of U.S. coffee imports from Latin America in 1975-79.

The world coffee market during the past two decades has been characterized by large fluctuations in production, stocks and prices. This was due to participants' attempts to exercise market control, and by the introduction of agreements to reduce instability and substitute for free market mechanisms. The first world coffee agreement was signed in 1962 by the major partners in world coffee trade. It was based on export quotas, and was renewed for a five year period in 1968. A new agreement was signed in 1976, based on fixed and variable quotas to account for exportable surpluses.

Brazil and Colombia have been trying to exercise some control over world coffee trade by using coffee stock management to stimulate or discourage the participation of competitors in the market, especially via higher or lower prices. The expansion of African, Asian, and Central American production reflects relatively low barriers to entry into the world coffee industry.

#### Brazil's Coffee Export Performance

Brazil, the largest coffee producer and exporter, has alternated its policy objectives among trying to maintain a constant share of the market, defending its volume of exports, and maximizing foreign exchange earnings in response to short-run, balance-of-payments pressures (table 8). [2] With the depletion of inventories and the big frost of 1975, Brazil could no longer aim at maintaining a constant share of the market, so the objectives of Brazilian policymakers turned to obtaining the maximum foreign exchange from the sale of the scarce product by concentrating exports in the most dynamic markets.

The CMS analysis indicates that from the early sixties to the late seventies, Brazilian coffee exports declined by 420,000 tons (table 9). In contrast, the world volume of coffee trade expanded by about 26 percent. This relative loss is attributed mostly to the competitive effect. Although Brazil exported to relatively dynamic markets as indicated by the positive market-distribution effect, negative competitive factors more than offset those gains. The large negative competitive effect was the result, in part, of poor weather (several frosts and droughts in 1962, 1967, 1969, 1972, and 1975) and, in part, as the result of production and export controls imposed to sustain a higher price and obtain larger foreign exchange earnings.

In order to determine which competitive factor was more important, a simple least squares regression was run for the residual values on the real unit export values of Brazilian coffee. The results reveal that the latter explains only 26 percent of the variations in the competitive effect. Furthermore, the residual effect was much larger in the seventies than in the sixties, suggesting that the major cause of its lower market share was the big frost of 1975.

#### Colombia's Coffee Export Performance

Colombia expanded coffee exports by 100,000 tons from the early sixties to the late seventies, about the same as the hypothetical growth effect. The negative market-distribution effect for the period is the result of Colombia's relatively high concentration of exports in the U.S. market (about 36 percent during 1976-79), which was a declining market. As Colombia increased the proportion of its exports into more dynamic markets in the seventies (Western and Eastern Europe, Japan), the distribution effect became positive. The favorable competitive effect

Table 8--Participation of Brazil and Colombia in World and U.S. Coffee Imports  
(1000 metric tons)

Trade flow	1960-63		1964-67		1968-71		1972-75		1976-79	
	Q	%	Q	%	Q	%	Q	%	Q	%
World	2,801	100.0	2,981	100.0	3,321	100.0	3,540	100.0	3,547	100.0
from:										
Brazil	1,045	37.3	942	31.6	1,112	33.5	922	26.0	625	17.6
Colombia	367	13.1	356	11.9	391	11.8	426	12.0	477	13.4
United States	1,387	100.0	1,312	100.0	1,319	100.0	1,232	100.0	1,082	100.0
from:										
Brazil	521	37.6	386	29.4	380	28.8	259	21.0	152	14.0
Colombia	244	17.6	192	14.6	160	12.1	181	14.7	170	15.7
Other	622	44.8	734	55.9	779	59.1	792	64.3	760	70.3

U.S. as percent of world coffee imports:

1964-67 -- 44.0  
 1968-71 -- 39.7  
 1972-75 -- 34.8  
 1976-79 -- 30.5

Source: FAO, Trade Yearbook, selected issues. USDA, U.S. Foreign Agricultural Trade Statistical Report, selected issues.

Table 9--Coffee exports: CMS analysis for Brazil and Colombia, 1960-79

CMS Components	Brazil						Colombia					
	1960/63-1968/71		1968/71-1976/79		1960/63-1976/79		1960/63-1968/71		1968/71-1976/79		1960/63-1976/79	
	Q 1/	%	Q	%	Q	%	Q	%	Q	%	Q	%
Actual change in exports	67	100.0	-487	100.0	-420	100.0	24	100.0	86	100.0	110	100.0
Growth effect	195	291.0	76	-15.5	278	-66.1	68	283.3	26	30.2	98	89.1
Market distribution effect	21	31.3	-11	2.2	14	-3.3	-17	-70.8	2	2.3	-27	-24.5
Competitiveness effect	-149	-222.3	-552	113.3	-712	169.4	-27	-112.5	58	67.5	39	35.4

1/ Q is quantity expressed in 1,000 metric tons.



reflected gains over other major competitors who had problems with production, such as Brazil, and to the adoption of improved technologies in Colombia new varieties and better production practices.

Breaking the analysis into two sub-periods, it appears that during the sixties there was a deterioration of Colombia's share that can be attributed to both the distribution and competitive effects. However, these losses were overcome in the seventies, when all effects became positive and large enough to result in an overall increasing share of world coffee trade for the 1960-79 period.

#### The United States Market for Coffee Imports

A two-level CMS analysis was applied to estimate changes in shares of the major coffee exporting countries in the U.S. market. The formulation of the identity equation is a slight variation of that used by Hyun [3]. The modified version is:

$$\Delta M_j = S_j \Delta M + M' \Delta S_j \quad (1.6)$$

Where:

- M = total U.S. green coffee imports in period 1.
- M' = total U.S. green coffee imports in period 2.
- M<sub>j</sub> = total coffee exports of country j to the United States.
- S<sub>j</sub> = share of exporting country j of U.S. green coffee imports.
- Δ = discrete change from period 1 to period 2.

This formulation divides the changes in country j's coffee exports to the U.S. market into those associated with: (1) the hypothetical increase (or decrease) in total U.S. coffee imports ( $S_j \Delta M$ ); and (2) the competitive effect ( $M' \Delta S_j$ ). The first term deals with the hypothetical changes of country j's exports to the U.S., if its market share of U.S. coffee imports had remained constant over the period of the analysis. The second term has the same meaning previously explained for the competitive effect.

Two four-year averages of both trade quantities and values were used to compare changes in export shares among the major coffee exporting countries to the United States. The initial base period was 1968-71 and the final period, 1978-81. A comparison of the results provides a sensitivity test of the CMS procedure to the change in the unit of measurement. Along with the major Latin American coffee exporters to the U.S. (Brazil, Colombia and Mexico), Indonesia and Ivory Coast were also included in the analysis. These five countries accounted for over 51 percent of U.S. coffee imports in 1981. Other exporting nations of

Africa, Asia and Latin America (mainly Central America) were grouped into an aggregate category called "Rest of the World" (ROW). Table 10 shows the results of the CMS calculations.

Use of Trade Quantities. Between the two base periods, U.S. green coffee imports decreased by 231,500 metric tons. This reduction implied a negative growth effect for all the countries exporting coffee to the United States (table 10, column 2). In spite of that, Colombia, Mexico and Indonesia displayed positive growth in their actual coffee export volumes to the United States, increasing their shares in that market. The ROW countries, despite experiencing negative growth in their aggregate coffee exports, increased their share of the U.S. market because their exports declined at a slower rate than that hypothesized by the CMS norm. Brazil and the Ivory Coast also registered negative competitive effects.

The success of several countries in capturing a larger share of the U.S. green coffee market may have been the result of Brazil's deliberate policy of expanding into more dynamic markets (i.e., Europe and Japan), leaving room for other suppliers to move into the declining U.S. market. The Ivory Coast, and other countries that experienced declining shares of the U.S. coffee market, also became major exporters to the EC.

The biggest increase in export volume corresponded to Indonesia (25,100 tons). This may have been the result of increased demand for the variety "robusta" which is used as a filler for medium and bitter blends, and also as a substitute for "Brazils" in the soluble coffee market. The price differential between those two varieties increased significantly. Mexico, with the second largest increase (21,700 tons), has a locational advantage over other producers, while Colombia (with a gain of 20,400 tons) has traditionally been concentrated in the U.S. market [1].

Use of Trade Values. Richardson [9] has shown that the CMS effects calculated by using trade quantities versus trade values will be consistent, i.e., they will display the same signs, if and only if the elasticity of substitution between any two suppliers of the same product is greater than one in absolute value. If this restriction does not hold, the same effects might have different signs in the two sets of calculations. Richardson also points out that, even if the assumption holds, the value effect almost always understates the quantity effect. This hypothesis was tested for U.S. coffee imports and the results are found in Table 10 (see Methodological Appendix for a discussion of this assumption).

The elasticity of substitution among the different coffee varieties appears to be greater than one, in absolute value, as reflected by a display of the same sign (positive or negative) for the competitive effect in both sets of calculations. However, it is clear that the competitive effect was substantially smaller when trade values were used, understating the actual magnitude of changes in quantity shares, and introducing a bias in the calculation of the CMS effects. This clearly

Table 10--CMS analysis of U.S. green coffee imports, 1968/71-1978/81  
Trade Quantities Versus Trade Values

Exporting Country	Trade Quantities (1,000 metric tons)				Trade Values (Million U.S. Dollars)			
	Actual change in imports	Growth effect	Competi- tiveness effect	(3) as % of (1)	Actual change in imports	Growth effect	Competi- tiveness effect	(7) as % of (5)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Brazil	-210.2	-36.2	-174.0	82.8	328.0	442.6	-114.6	-34.9
Colombia	20.4	-38.4	58.8	288.2	478.0	438.5	39.5	8.3
Mexico	21.7	-19.4	41.1	189.4	243.0	203.4	39.6	16.3
Ivory Coast	-29.9	-8.4	-21.5	71.9	81.0	81.3	-0.3	-0.4
Indonesia	25.1	-16.9	42.0	167.3	137.0	136.5	0.5	0.4
ROW	-58.6	-112.1	53.5	-91.3	1,151.0	1,117.4	33.6	2.9

constitutes a shortcoming for the interpretation of CMS when values are used.

### Conclusions

In summary, the CMS methodology proved to be a valuable framework for identifying demand and competitive factors in world coffee trade. Although Brazil lost part of its share in the U.S. green coffee market (a declining market), the loss was favorable in terms of its export performance as evidenced by the positive market-distribution effect. Brazil concentrated its exports in more dynamic markets than its main competitor, Colombia. However, the difference in the distribution effects between the two countries was small, perhaps due to the fact that exports were carefully controlled by the quotas set by international coffee agreements.

## FOOTNOTES

1/ This section relies heavily on Leamer and Stern [4] and Richardson [7].

2/ This analytical tool was first applied in the foreign trade context by Tyszynki [11], to analyze the export performance of countries exporting manufactured goods from 1899-1950.

3/ A two-level CMS analysis can include either a commodity-concentration or a market-distribution effect, but not both. The corresponding expression for a two-level analysis that includes the market-distribution effect, but excludes the commodity-composition effect, is given by:

$$v' - v \equiv rv + \left( \sum_j r_j v_j - rv \right) + [(v' - v) - \sum_j r_j v_j]$$

4/ An alternative but equivalent formulation of the CMS identity is also given by Richardson [7, p. 101] as follows:

$$v' - v \equiv S(\Delta v) + \left[ \sum_i S_i(\Delta v_i) - S(\Delta v) \right] + \left[ \sum_{ij} S_{ij}(\Delta v_{ij}) - \right]$$

$$(1) \qquad (2)$$

$$\left[ \sum_i S_i(\Delta v_i) \right] + [(v' - v) - \sum_{ij} S_{ij}(\Delta v_{ij})]$$

$$(3) \qquad (4)$$

Where  $S$  represents the country's share of world exports in period 1 (i.e.  $\frac{v}{V}$ ), and  $\Delta V$ , the growth of world exports from period 1 to period 2.

The order of the CMS effects is the same (total growth, commodity, market, and competitive effects, respectively).

5/ During this period, world agricultural export volume grew at an annual rate of 3.5 percent, while Latin America's growth rate was only 2.5 percent per year. Latin America's share of the world agricultural export volume declined from 15.0 percent in 1960 to 12.7 percent in 1979.

6/ If the sequence of calculation of the commodity and market effects had been reversed, the values of those effects would have been:

$$\begin{aligned} \text{Market distribution effect: } & \sum_j r_j v_j - rv = -\$1.61 \text{ billion} \\ \text{Commodity composition effect: } & \sum_{ij} r_{ij} v_{ij} - \sum_j r_j v_j = \$1.52 \text{ billion} \end{aligned}$$

This method of calculation would not affect the other CMS effects (see Appendix Tables A1).

7/ During 1960-79, Latin American agricultural export prices grew at 7.3 percent per year, exceeding the annual growth rates achieved by the world (6.2 percent) and other developing countries' (6.5 percent), based on agricultural export unit values.

8/ This was also the conclusion derived from a more comprehensive study of this subject carried out by one of the authors of this paper [5].

9/ The indices of commodity export concentration were calculated by using the normalized Hirschmann index [12, p. 296], to make values ranging from 0 to 1 (maximum concentration), according to the following formula:

$$H_j = \frac{\sqrt{\sum_{i=1}^{19} \left(\frac{x_i}{X}\right)^2} - \sqrt{1/19}}{1 - \sqrt{1/19}}$$

where

$j$  = country index;  $x_j$  = export value of commodity  $i$ ;  $X = \sum_{i=1}^{19} x_i$ ; and 19 = number of agricultural products at the two-digit SITC level.

10/ The concept of export instability refers to sizeable, short term movements of exports from their growth trend. The instability index was measured using a coefficient of variation methodology.

11/ During this period, more restrictive trade policies were implemented by the Argentine government.

12/ Cattle hides, which account for about 5.0 percent of Argentina's agricultural exports, was excluded for lack of relevant data.

13/ Annual production growth rates were around one percent for wheat, corn, and linseed during 1965-79. Sunflower output was considerably reduced from earlier years [6].

14/ Latin America's share of world coffee production and exports was over 66 and 61 percent, respectively, in 1960-79.

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## METHODOLOGICAL APPENDIX



Despite the usefulness of the CMS procedure for assessing a country's export performance, this analytical tool is hampered by several conceptual limitations as well as by problems of empirical application.

### Conceptual Limitations

On a conceptual basis, the CMS analysis is affected by the following limitations:

- (1) The CMS analysis is stated as an identity which is satisfied ex post and implies nothing about the behavioral axioms and economic regularities which lie behind the elements of the identity. Therefore, it can not provide any causal explanation for a country's export growth. The CMS analysis is, in effect, a system of categorization and classification without deep roots in theory.
- (2) The CMS procedure is an ex post methodology that provides an evaluation of the past shifts in a country's export shares. It can not be extended reliably in an ex ante theoretical analysis of export growth. This procedure, in the form presented above, has no stochastic basis and therefore it can not be used for the purpose of econometric projection of the probable future changes in market shares. It is possible to use the CMS for projecting future trends on the basis of the currently existing country's export structure, assuming a continuation of the most recent trends. However, the lack of probability basis excludes its worth in the formulation of valid probability statements about demand parameters or future events.

This method should not be construed as a replacement for traditional econometric demand analysis, but could be used along with it in the analysis of the competitive residuals [4].

- (3) The "competitive" effect, obtained as a residual in the empirical analysis, is theoretically assumed to be related to changes in relative prices. That is, a country's competitiveness, and therefore its market share, is the result of the country's export prices as compared to the prices of other exporters of like commodities. Thus, the demand for exports in a given market from two competing sources of supply is described by the relationship:

$$\frac{q_1}{q_2} = f\left(\frac{p_1}{p_2}\right), \quad \text{and } f' < 0 \quad (1.1)$$

Where  $q_i$  and  $p_i$  are the quantity sold and price of the commodity, respectively, from the  $i$ th supply source. This implies an inverse relationship between changes in shares and changes in prices. Thus, when a country fails to maintain its share in world markets, the competitive effect will be negative, indicating price increases for the country in question greater than its competitors.

This brings us to the second assumption which requires that the elasticity of substitution be greater than one in absolute value. If this assumption does not hold, the interpretation of the competitive effect would be difficult, i.e., an increase in relative prices (decrease in competitiveness) could lead to an increase in shares.

A third assumption is that competing individual commodities, independent of their source of supply, are homogeneous. The commodities should be "homogeneous," but neither "perfectly homogeneous," nor very differentiated. In these two latter cases, the definition of competitiveness in terms of relative price changes does not hold [7, p. 30]. This assumption is needed since the CMS analysis requires a constant ratio of quantity demanded to avoid the income effects entering into the picture such that the elasticity of substitution will depend only on relative prices. That is, two commodities in question are so similar that the change in demand for each to non-price economic variables is the same, and at the same time they are dissimilar enough to induce the purchase of both. Agricultural commodities tend to meet this requirement more than most exports because of the homogeneity of products.

- (4) There is another theoretical problem that has to do with the homogeneity of traded goods. When commodities are very homogeneous, relative prices are locked into a very small range of variation--such as with many primary commodities. Geographical market shares may be more sensitive to demand-shift factors rather than relative prices. Commodity market shares may be much more sensitive to supply factors such as a bumper crop or a long strike, again not influenced by prices. On the other hand, when commodities are differentiated by the nationality of the supplier, relative prices are likely to be only one of the factors entering the export share function. The question of homogeneity is in practical terms a question of the level of aggregation at which the CMS analysis is to be conducted. In general, the CMS results should not be expected to be the same at different levels of commodity or geographical aggregation.
- (5) Because the CMS analysis is usually based on value shares and not quantity shares, price movements hamper the interpretation of the components of the CMS identity. As Richardson [8] has noted, a positive commodity effect, usually attributed to a favorable commodity-composition structure, could also be explained by a skewness in exports whose relative prices are rising rapidly (if based on value shares). Conclusions based on changes in value shares will be incorrect, therefore, because: (a) if the absolute value of the elasticity of substitution is less than one, changes in quantity and value shares will have opposite signs; and (b) if the absolute value of the elasticity of substitution is greater than one, changes in value shares will almost always understate changes in quantity shares. Therefore, whenever available, the CMS analysis should be carried out with quantities rather than with export values.

- (6) Finally, the idea of constancy of market shares is questionable when consideration is given to differential impacts of economic fluctuations. This suggests that countries whose exports tend to be cyclically sensitive will show cyclical competitive effects - positive in the upswing and negative in the downswing. Since the CMS analysis usually seems to be applied over only two or three periods in a given study, this possible cyclical variation has never been verified [4].

#### Empirical Limitations

The empirical estimation of the CMS effects also presents some problems of application as follows:

- (1) The interpretation of the competitiveness effect, expressed only in terms of changes in relative prices, fails to take into account other price and non-price factors such as: (a) differential rates of export price inflation, (b) changes in product quality, (c) improvement in market efficiency, (d) terms of export financing, (e) differential transportation costs, (f) government policies, such as reduced trade interference or inducement to export, (g) discriminating tariffs, (h) pressures of internal demand, etc.
- (2) The selection of the world "standard" in the calculation of the CMS effects should by no means be arbitrary. The growth in world exports may not be an appropriate "standard" for the export performance analysis of a particular country, commodity or market. An appropriate standard for examining a country's competitiveness is the sum of all its relevant competitors, in all or selected commodities. Care should be then given to the choice of the "world" market from which all the CMS effects are calculated. This implies not only that the world standard will vary from one particular exporter to another, but it might also vary from commodity to commodity.
- (3) The technique is sensitive both to the level of commodity aggregation and to the level of market consolidation. A different set of these parameters may produce different results and presumably also different conclusions.
- (4) The CMS technique is sensitive to the sequence in which the commodity-composition and market distribution effects are calculated. That is, the CMS results may be different depending on the order in which those two effects are calculated [7].
- (5) Information is often wasted because of the failure to make use of the final-period structure of the country's exports, an implication of the so-called "index number problem" - see Richardson [8, p. 234] for a more detailed discussion of this problem. The CMS effects are usually calculated by only using the initial-period as the base period, implying that the country's export structure remains

unchanged over time. If the final-period data were used, these would provide a means of judging how the (static) structural effects change over the period since they yield a different set of CMS effects for a later point in time. By changing the base period that is used as the weighting factor in calculating the CMS effects, some changes in a country's export structure may be identified.

- (6) Finally, the CMS analysis is a static procedure. Its conclusions, based on a constant share norm, are valid only for the particular time period chosen, the level of commodity aggregation adopted and for the particular breakdown of markets.

APPENDIX TABLES

Table A1--Calculations for the derivation of the constant-market-share effects for changes in Latin American agricultural exports, period 1 (1960/64) base.

Market of destination	Food, Beverages and Tobacco Exports 1/				Agricultural Raw Material Exports 2/				[(2)/(1)]-1	[(6)/(5)]-1	[(3)x(9)]	[(7)x(10)]	[(11)+(12)]
	World		Latin America		World		Latin America						
	1960/64	1975/79	1960/64	1975/75	1960/64	1975/79	1960/64	1975/79					
	v	v'	v	v'	v	v'	v	v'					
1j	1j	1j	1j	2j	2j	2j	2j	r	r	r v	r v	r v	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	
\$U.S. Millions				Percent				\$U.S. Millions					
Canada	750	2,663	87	224	248	850	4	15	2.5507	2.4274	222	10	232
United States	3,730	13,818	1,716	5,517	1,720	4,781	212	243	2.7046	1.7797	4,641	377	5,018
EEC-9	11,696	59,564	1,518	6,373	5,830	18,182	442	665	4.0927	2.1187	6,231	936	7,149
EFTA	1,324	6,424	180	908	662	2,428	34	100	3.8520	2.6677	693	91	784
Other W. Europe	716	4,087	142	1,157	444	1,997	29	74	4.7081	3.4977	669	101	770
Japan	1,034	10,891	93	823	1,266	6,322	177	332	9.5329	3.9937	887	707	1,594
Australia, N.Z. & So. Africa	302	1,158	25	51	267	615	22	7	2.8344	1.3034	71	391	462
Latin America	1,400	7,650	307	2,074	402	1,359	109	353	4.4643	2.3806	1,371	259	1,630
Developing Asia	2,792	16,462	46	784	992	5,688	19	215	4.8961	4.7339	225	90	315
Developing Africa	1,334	7,458	58	571	173	945	2	20	4.5907	4.4624	266	9	275
Centrally planned Asia	415	1,691	100	309	256	1,051	3	108	3.0747	3.1055	307	9	316
Eastern Europe	1,562	5,325	118	1,011	1,162	2,843	52	56	2.4091	1.4466	284	75	359
U.S.S.R.	980	8,974	229	3,007	582	1,260	24	59	8.1571	1.1649	1,868	28	1,896
Rest of the world	115	1,700	4	129	20	233	13	0	13.7826	10.6500	55	138	193
Total	28,150	147,865	4,623	22,938	14,024	48,554	1,142	2,247	4.2528	2.4622	17,772	3,221	20,993

--cont Inued

Table A1--Calculations for the derivation of the constant-market-share effects for changes in Latin American agricultural exports, period 1 (1960/64) base - continued

Market of destination	Total Agricultural Exports				[(2)/(1)]-1	[(3)x(5)]	[3.6573 x (3)]	r v	r v
	World		Latin America						
	1960/64	1975/79	1960/64	1975/79					
	v	v'	v	v'					
j	j	j	j	j	j j	j	j j	j j	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(8)	
	<u>\$U.S. Millions</u>				<u>Percent</u>	<u>\$U.S. Millions</u>			
Canada	998	3,513	91	239	2.5200	229	333	232	
United States	5,450	18,599	1,928	5,760	2.4127	4,652	7,051	5,018	
EEC-9	17,526	77,746	1,960	7,038	3.4360	6,735	7,168	7,149	
EFTA	1,986	8,852	214	1,008	3.4572	740	783	784	
Other W.									
Europe	1,160	6,084	171	1,231	4.2448	726	625	770	
Japan	2,300	17,213	270	1,155	6.4839	1,751	988	1,594	
Australia, N.Z. & So. Africa	569	1,773	47	58	2.1160	99	172	462	
Latin America	1,802	9,009	416	2,427	3.994	1,664	1,522	1,630	
Developing Asia	3,784	22,150	65	999	4.8536	315	238	315	
Developing Africa	1,507	8,403	60	591	4.5760	275	219	275	
Centrally planned Asia	671	2,742	103	417	3.0864	318	377	316	
Eastern Europe	2,724	8,168	170	1,067	1.9985	340	622	359	
U.S.S.R.	1,562	10,234	253	3,066	5.5519	1,405	925	1,896	
Rest of the world	135	1,933	17	129	13.3185	226	62	193	
Total	42,174	196,419	5,765	25,185	3.6573	19,475	21,085	20,993	

--continued

Table A1--Calculations for the derivation of the constant-market-share effects for changes in Latin American agricultural exports, period 1 (1960/64) base - continued

Commodity category	Actual World Exports		Actual Latin American Exports		[(2)/(1)]-1	[(3)x(5)]	[3.6573 x (3)]	r v	r v
	1960/64	1975/79	1960/64	1975/79					
	v	v'	v	v'	r	r v	rv	r v	r v
	1	1	1	1	1	1 1	1	1 j	1 j
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
	<u>\$U.S. Millions</u>				<u>Percent</u>	<u>\$U.S. Millions</u>			
Food, beverages and tobacco (SITC 0+1+22+4)	28,150	147,865	4,623	22,938	4.2528	19,660	16,908	17,772	
Agricultural raw materials (SITC 2-22-27-28)	14,024	48,554	1,142	2,247	2.4622	2,812	4,177	3,221	
Total agricultural exports	42,174	196,419	5,765	25,185	3.6573	22,472	21,085	20,993	

--continued



Table A1--Summary of calculations of the constant-market-share effects  
for changes in Latin American agricultural exports,

1960/64 - 1975/79

CMS Components	Value	Distribution
	<u>Million Dollars</u>	<u>Percent</u>
<u>Actual Export Growth</u> <u>1/</u>	19,420	100.0
Due to:		
Increase in world trade (rv)	21,085	108.6
Commodity composition <u>2/</u>	1,387	7.1
Market distribution <u>3/</u>	-1,479	-7.6
Competitiveness effect <u>4/</u>	-1,573	-8.1

$$\underline{1/} \quad v' - v = 25,185 - 5,765 = 19,420$$

$$\underline{2/} \quad \sum_i r_i v_i - rv = 22,472 - 21,085 = 1,387$$

$$\underline{3/} \quad \sum_i \sum_j r_{ij} v_{ij} - \sum_i r_i v_i = 20,993 - 22,472 = -1,479$$

$$\underline{4/} \quad (v' - v) - \sum_{ij} r_{ij} v_{ij} = 19,420 - 20,993 = -1,573$$

Table A2--Commodity Composition Analysis

- (A) Argentina's increased share of world imports for commodities growing faster than the world average.
- (B) Argentina's increased share of world imports for commodities growing slower than the world average.
- (C) Argentina's reduced share of world imports for commodities growing faster than the world average.
- (D) Argentina's reduced share of world imports for commodities growing slower than the world average.

<u>COMMODITY</u>	<u>ARGENTINA'S TRADE SHARE</u>	
	<u>Percent</u>	
	<u>1964/66</u>	<u>1977/78</u>
(A) Other cereals (mostly grain sorghum)(M)	16.7	28.9
Edible oils (peanut and sunflower) (S)	9.2	20.3
Apples (M)	8.9	11.0
Wool (M)	6.1	6.2
Oilseeds (mostly soybeans)(L)	.0	5.8
Sugar (L)	.3	1.3
(B) Bran and milling products (S)	19.1	20.2
Canned meat (M)	11.3	11.4
Cotton (L)	.1	2.1
Rice (M)	.3	1.2
Tobacco (M)	.4	.7
(C) Corn (L)	12.6	7.8
Oilseed cake and meal (L)	10.2	6.1
(D) Linseed oil (S)	67.2	59.8
Beef (L)	22.8	6.6
Wheat (L)	8.9	3.9
Total of the 17 commodities	6.6	5.6

Note: See Table A3 for definitions of (L), (M), (S).

Table A3--Market Distribution Analysis

- (A) Argentina's increased share in markets growing faster than the world average.
- (B) Argentina's increased share in markets growing slower than the world average.
- (C) Argentina's reduced share in markets growing faster than the world average.
- (D) Argentina's reduced share in markets growing slower than the world average.

<u>MARKET</u>	<u>ARGENTINA'S MARKET SHARE</u>	
	<u>Percent</u>	
	<u>1964/66</u>	<u>1977/78</u>
(A) Non-EC Western Europe (L)	7.0	8.2
Central America, Mexico, and Caribbean (M)	1.9	7.2
Northern Africa (M)	.1	5.6
Non-African Middle East (M)	2.7	3.3
Other Africa (M)	.9	2.8
(B) Japan (L)	1.5	4.1
Eastern Europe (L)	1.9	3.1
Other Asia (L)	.3	2.2
Other industrial nations (S)	.9	1.1
(C) South America (M)	32.0	21.4
U.S.S.R. (L)	5.5	4.4
People's Republic of China (M)	16.2	2.4
(D) European Community (L)	10.0	7.0
United States (M)	5.4	5.3
(L) Large market - over \$3 billion in trade.		
(M) Medium-size market - \$1-3 billion in trade.		
(S) Small market - less than \$1 billion in trade.		

