QUARTERLY IMPORT DEMAND FOR NORTH AMERICAN FLUE-CURED TOBACCO

by

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CHAPTER I

INTRODUCTION

Historical Role and Importance of Tobacco

Tobacco is one of the oldest internationally traded commodities of the United States. Historically, United States and North American tobacco has enjoyed a privileged position within the agricultural trade sector, being viewed as superior in quality relative to competing foreign tobacco. This quality difference has contributed to the leadership role occupied by North American tobacco exports. The United States is the world's largest exporter of tobacco. In 1977 the United States exported 289,714 metric tons of tobacco, compared to the second largest exporter, Brazil, which exported 108,111 metric tons [USDA, FAS].[1/]

The tobacco industry has also contributed favorably to the United States' balance of trade. The total value of unmanufactured tobacco exported by the United States in 1977 was $1.06 billion, compared to $322 million that was imported [USDA, FAS]. This represents a net positive value in the tobacco balance of payments of approximately $743 million. In 1976, the value of manufactured and unmanufactured tobacco exports

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[1/] Quantity export figures for 1974-76 are, in metric tons, as follows:

	U.S.	Brazil
1974	295,482	93,017
1975	255,390	101,197
1976	262,179	106,648

exceeded their respective imports by $1 billion [USDA, FAS]. In 1975 the tobacco industry aided the United States balance of payments with a net addition of $624,344,000 [USDA, FAS].

Flue-cured tobacco also plays an important role in Virginia's agriculture. In 1977 Virginia had 20,908 farms engaged in the production of tobacco. Approximately 109 million pounds of tobacco were produced on the 66,889 acres which comprised the above farms. In 1977 the Virginia tobacco industry marketed $128 million worth of flue-cured tobacco [Agricultural Stabilization and Conservation Service, p. 37].

Characteristics of Flue-Cured Tobacco

Flue-cured tobacco is distinct from all other tobacco because of the limited use of nitrogen in the cultivation of the plant and the artificial heat used in drying the leaf. The drying process entails close control of humidity and temperature. The first step in drying the leaf involves introducing a moderate temperature and a high relative humidity in the drying area. The leaf web and stem are then dried by increasing the temperature and lowering the humidity. The operator must ensure that temperature and humidity remain within strict bounds [Garner, p. 408]. This process turns leaf and stem to a bright yellow color.

Forms of tobacco other than flue-cured are dried by allowing air to flow across the leaves or by building a fire from some material that will leave a residue on the tobacco leaf. This residue gives the tobacco leaf some desired characteristic after the drying process is completed.

This study considers the flue-cured tobacco trade only. Flue-cured tobacco leaf has been chosen for analysis because of three major considerations:

(a) It accounts for the largest quantity of leaf moving within the international tobacco system, and represented 67%, 69%, 65% and 66% of United States exports of tobacco during the years 1974-1977 respectively [USDA, FAS].

(b) It is a relatively homogeneous product, with an associated demand schedule that is evidently distinct from other forms of tobacco.[1/]

(c) North American flue-cured tobacco has traditionally had very few substitutes. However, several non-North American countries have recently begun producing flue-cured tobacco that is similar in quality to that produced in the United States. Hence, some insight into United States-foreign competition in the flue-cured trade is desirable.

Objective of the Study

The objective of this study is to estimate the structure of the import demand equations for internationally traded flue-cured tobacco produced in North America. These import demand equations relate the quantities of North American leaf demanded by importing countries to the prices of North American leaf, the prices of competing producers' leaf, and other variables affecting demand. The relationships may be used not only to estimate future imports of flue-cured tobacco by the selected importing countries, but also to develop price and export policies

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[1/] Flue-cured tobacco does vary in the price by market and by leaf quality. For an analysis of the pricing system, see Goris.

designed to improve North American flue-cured tobacco trade revenues. Import demand equations are estimated for the Federal Republic of Germany, Japan and the United Kingdom. These three countries are the largest foreign customers of North American flue-cured tobacco. The aggregated United States flue-cured exports to the above countries totaled 49.8 percent, 48.0 percent, 50.6 percent and 44.0 percent in the years 1974 through 1977, respectively.

Importance of the Study

Declining United States Market Share

Recent trends indicate that the market share of United States flue-cured tobacco is declining. Figure 1.1 indicates the market shares of flue-cured tobacco exports originating in the United States, India, Canada, Brazil, Philippines and South Korea for the years cited. It shows that United States flue-cured tobacco exports declined from 58 percent of world trade in 1960 to 39.2 percent in 1975. This decrease was accompanied by steadily increasing market shares for India and the Philippines, and tremendous gains in market shares for Brazil and South Korea.

These trends are not surprising since, as shown in Figure 1.2, the United States' export price for flue-cured tobacco has been consistently and significantly higher than export prices in the other countries cited. Most of the loss in United States market share has resulted from

Figure 1.1. Market Share of World Flue-Cured Tobacco Exports for the Specified Countries, 1960-1976

SOURCE: U.S.D.A., Foreign Agricultural Service.

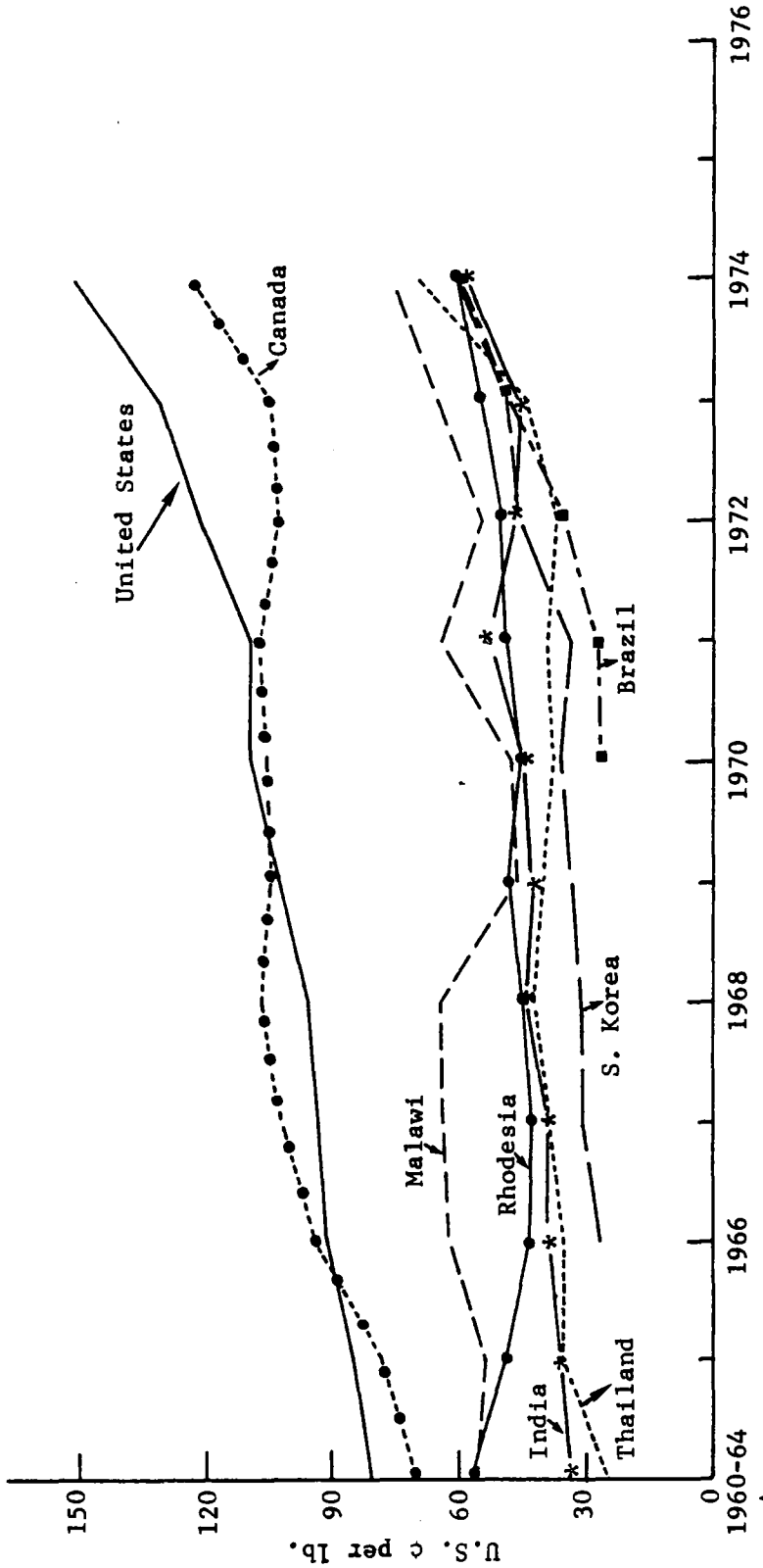

Figure 1.2. Flue-Cured Tobacco: Average Estimated Export Prices, By Major Producers, 1960-76

SOURCE: U.S.D.A., Foreign Agricultural Service, FAS 2362-75.

increases in non-North American exports. United States exports have remained fairly constant (Appendix A).[1/]

Changing Tariff Structures

North American tobacco exports not only face increased competition from third world countries, but also face changing conditions within importing countries. One such change is the expansion of the European Economic Community's (EC) tariff system. With the enlargement of the European Community from six to nine countries, United States tobacco exports to the United Kingdom, Ireland, and Denmark faced a changing tariff structure under the Community's tariff harmonization procedure. The tariff harmonization proceeded over the period April 1, 1973 to July 1, 1977, at which time the new members' tariffs were to be in complete accord with the tariffs of the original members. After July 1, 1977, all tariffs were to be established by the Common External Tariff for all European Community member countries (Appendix B).

Changes in the International Monetary System

Tobacco exporters also face a new international monetary regime. This new regime began in March 1973 with the collapse of the Bretton-Woods agreement, which had been enforced since July 1944. Under Bretton-Woods, currencies were exchanged according to established or fixed ratios--the system of fixed exchange rates. This system came under

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[1/] Appendix A contains tables which give the reader some insight into the relative nature of the United States flue-cured tobacco economy.

heavy strains until its final collapse in March 1973 [Krenin].[1/] Most notable of these strains were the dollar glut of 1959-1968 and the two devaluations of the dollar in August 1971 and February 1975.

The new system of flexible exchange rates was instituted in March 1973. This system allowed the market rather than governments to determine relative values of currencies.[2/] Flexible rates responded to the overextended position of the United States on the world monetary system by causing a depreciation of the dollar. This generally improved conditions for export of United States tobacco.

Technological Changes

The flue-cured tobacco industry not only has undergone changes in tariffs and monetary arrangements, but also has developed and benefited from new manufacturing technology. The new tobacco technology has developed a demand for substitutes for expensive flue-cured tobacco. Manufacturers are now able to blend scrap, filler, and cake with high grade flue-cured leaf without sacrificing the quality and taste that appeals to consumers.[3/] This blending process, as well as the use of

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[1/] An excellent account of the Bretton-Woods system and the problems that the system faced is contained in Krenin, Chapters 7 and 9.

[2/] The international monetary sphere now operates under a "dirty" or "managed" float. Central banks will step into the financial markets and will buy or sell currencies. This will hopefully have the desired effect upon the currency in question. See Krenin, p. 50-55. For a more detailed analysis, see Day.

[3/] The terms scrap, filler, and cake refer to a treated form of low grade, low cost tobacco.

some synthetic substances, is a good substitute for the undiluted high grade product.

Changes in Tastes and Preferences

The industry has also witnessed a shift in consumer tastes and preferences. One must assume that the shift toward low tar and nicotine cigarettes is a result of new information relating smoking to health hazards. Production of a low tar and low nicotine cigarette requires a different type and blend of tobacco from that which prevailed in former years. The industry is therefore attempting to grow varieties of tobacco that have low tar and nicotine concentrations and is tending to prefer those varieties which possess these characteristics. Hence we are witnessing a structural shift in the industry toward the low tar and nicotine varieties as well as an increased demand for high quality (upper stalk) leaves.

Summary of Chapters

This study will be developed by chapters as follows: Chapter II presents a discussion of the institutional structure of international trade in United States tobacco. This includes industry competition, contractual arrangements, and export restrictions. Chapter III contains a review of the literature relating to tobacco import demand, and an exposition of the theory of import demand analysis. Chapter IV includes a discussion of the demand models identified for use in this study and the statistical estimation techniques employed. Chapter V presents operational definitions of the variables used in the analysis. Chapter

VI contains results of demand estimations, and the associated elasticities. Chapter VII sumarizes the major conclusions of the analysis.

CHAPTER II

FLUE-CURED TOBACCO IN INTERNATIONAL TRADE

The exchange of any commodity is complicated by national boundaries and the accompanying national interests that each nation attempts to protect. The exchange of goods is further complicated by trade coalitions--groups of nations which have one policy toward specific countries and/or commodities. It is not within the scope of this study to analyze every nation's policies toward imports or even tobacco imports. However, the following includes a discussion of several supra-national coalitions and the policies they have toward imported flue-cured tobacco. It also briefly covers the marketing processes and relationships commonly encountered in the United States flue-cured tobacco industry.

Supra-National Coalitions

The supra-national trading group that has had the greatest effect upon the United States and North American flue-cured tobacco trade is the Eurpoean Community. The six original EC members agreed at the 1957 Rome Conference to integrate many of their economic policies, and to promote free flow of goods, labor and capital within the community. Harmonization of the countries' agricultural policies was especially difficult. In order to better achieve their goals in the agricultural sector, the EC adopted the Common Agricultural Policy (CAP). This policy applies flexible levies to incoming agricultural products and seeks to maintain prices of agricultural products for EC producers.

On January 1, 1974 the original six members of the EC--West Germany, France, Italy, The Netherlands, Belgium and Luxembourg--were joined by Denmark, Ireland and the United Kingdom. These newcomers to the EC have proceeded to harmonize their economic policies, over a five year period, with those of the original six members. The harmonization schedule is reported in Appendix Table B. Enlargement of the EC has not been welcomed by the United States tobacco industry since the EC's policies attempt to protect the Community's tobacco producers and since they favor trading partners other than the United States and Canada.

Associations other than the European Community that have an effect upon international tobacco movement are: The European Free Trade Association (EFTA), Latin American Free Trade Association (LAFTA), Central American Common Market (CACM) and the Carribean Free Trade Area (CARIFTA).[1/] These Western trade associations have not taken any major steps toward discriminating against North American flue-cured tobacco as such. But they do, of course, favor member-produced agricultural commodities over those produced in nonmember countries. COMECON represents the eastern bloc, Soviet-sphere trade alliance. COMECON primarily coordinates economic planning and trade for the member countries and seeks to minimize United States involvement in Eastern Europe. United States trade with the COMECON members has been increasing over the last decade.[2/]

[1/] For a list of these associations and their membership, see Appendix D.

[2/] For a list of COMECON members see Appendix D. For a detailed discussion of the COMECON Trade Alliance, see Spero.

Tariff Barriers

Only the European Community has significant policies that affect North American flue-cured tobacco exports. The EC's Common External Tariff (CXT) includes tobacco and tobacco products and applies to all tobacco entering the EC from North America (see Appendix C). The Common External Tariff is denominated in Units of Account (U.A.), to which each member country's currency is given a fixed relationship. An imported item's value is determined by converting the importing country's currency into Units of Account and adding a duty based on the CXT schedule.

The CXT is structured such that more expensive tobacco leaf is charged (on an ad valorem basis) a higher tax. This, of course, generates an incentive to import lower grades of tobacco. Since North American tobacco is perceived as a relatively high quality product, it sells for a relatively high price on international markets. In addition, it is often exported in partially processed form, which adds value to the leaf. Hence North American leaf is especially disadvantaged by the European Community's CXT.

Japan's tobacco imports, by contrast, are controlled by the Japanese Tobacco and Salt Public Corporation. This state monopoly buys all tobacco for domestic cigarette production and controls the amount of manufactured tobacco imported into Japan. Since the Japanese tobacco monopoly is the sole purchaser of unmanufactured tobacco, there is no tax placed on these imports. However, the monopoly places a 355 percent ad valorem tax on cigarettes.

Non-Tariff Barriers

Governments wishing to protect domestic industry while refraining from direct tariffs, may employ one or more of the following measures: quality restrictions, licensing requirements, export subsidies, minimum import prices, import calendars, state trading, mixing regulations, health and sanitary regulations, and standards and labeling [Hillman, p. 496]. North American tobacco exporters typically face licensing requirements, subsidies on tobacco exports, minimum import prices, and state buying monopolies.[1/] Each of these factors impedes the United States industry's ability to compete with member-country or preferred-country producers, even in the absence of specific import levies.

The Tobacco Export Process

Tobacco Auctions

One of the early stages in the export of United States tobacco is the tobacco auction sale. Producers bring cured tobacco to local warehouses where the sorted lots are graded. Actual sale of tobacco occurs on the warehouse floor. Potential buyers inspect the numerous lots available at the auction and the auctioneer accepts bids from the group on the floor. The highest bidder then receives the lot in question and the group moves to the next bundle of tobacco. This process requires that floor buyers be familiar with the numerous grades of tobacco and the demand for these grades by final users. The flue-cured tobacco

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[1/] For a summary of the barriers the tobacco exporter faces, see Howland and Stevens.

season begins in July in the Florida-Georgia belt and moves gradually north, ending in the Old Belt (Virginia) perhaps as late as November.

The tobacco auction process is complicated by the imposition of a government price support for United States tobacco. The United States also employs an allotment program which limits the number of acres planted in tobacco and therby effectively limits the quantity produced.

Tobacco Buying Agents

Flue-cured tobacco leaf purchases fall into three categories:

(a) purchases by domestic firms for domestic North American cigarette production;

(b) purchases by foreign firms for foreign cigarette production; and,

(c) purchases by domestic firms for sale or transfer to foreign firms for foreign cigarette production.

The third category involves leaf exporters who act as purchasing and first-processing agents for foreign firms. These intermediaries are in competition with domestic manufacturers and with foreign buyers who have decided not to use their services. Many North American and foreign manufacturers purchase tobacco leaf from these intermediary companies on an occasional basis, for example to compensate for an unexpected draw-down of stocks, or inability to obtain the grade of tobacco desired.

In many instances, North American family firms have been dealing with foreign buyers for many years and the requirements of these buyers are familiar to the North American firm handling the account. Contracts

and buying orders are very often placed on an informal basis. The form of payment or credit used in those transactions varies greatly. Of the ten largest firms exporting United States tobacco, eight are owned by United States firms and two by United Kingdom firms. The former include: Universal Leaf, Thorpe and Ricks, Dibrell Brothers, China American, A. C. Monk, Adams, Austin, and Carolina Leaf Association. The latter are the Export Leaf Corporation, which buys for the British American Tobacco Company, and the Imperial Tobacco Ltd., which buys for Imperial Ltd. of the United Kingdom.

Placing and Filling An Order

When a foreign importer wishes to buy United States tobacco, it contacts the appropraite officers or sales agents of an exporting firm. A buy order is instituted and a date is set for raw tobacco delivery to the importer. Export companies specialize in the purchase of tobacco, stemming and cutting of the leaf, packaging of the leaf for shipment, and sometimes storage. Each company employs floor buyers who go directly to the auction floor and purchase tobacco. The tobacco is then sent to the exporter's stripping and packing plant where it is packed for overseas shipment according to buyer specification. Importers are given some leeway with regard to delivery time and tax and duty considerations. It is not uncommon to find an exporter storing tobacco leaf for a period of time in order to export the leaf under more advantageous tax and duty laws.

Since United States companies execute export contracts in dollars, each importer must enter the exchange market and buy dollars with his

domestic currency.[1/] At the time the contract is established, the exchange rate used for the sale agreement is specified. Should the market exchange rate subsequently change, a new contract may have to be negotiated, especially if the change sufficiently reduces either party's profit margin.

Foreign manufacturers instituting buy orders usually employ representatives in the United States during the marketing season. If the quality and/or price of leaf are not in line with established criteria, exporters report these conditions to the manufacturer's representative and a decision is reached whether to continue purchasing or to wait for additional tobacco to enter the market. Each foreign manufacturer may use several export companies to meet leaf tobacco needs. Since manufactured tobacco products are blends of many grades of tobacco, foreign buyers tend to seek export companies which have the greatest success in meeting their specific grade and price requirements.

Flue-cured tobacco characteristics vary by producing belt.[2/] Importers also tend to buy in the belts where tobacco characteristics best suit the tastes and preferences of their domestic markets. Japan and the United Kingdom purchase much of their flue-cured tobacco from

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[1/] This also indicates that the exporter is speculating against foreign currency in favor of the dollar. If the exporter does not hedge the amount of the contract by purchasing an equivalent amount of the foreign currency, he will lose money in the event of a decline in the dollar's value, relative to this currency, over the period of contract. In recent years, failure to hedge in this manner would not be a sound strategy since the dollar has been weakening relative to many currencies.

[2/] Belts refer to the tobacco growing regions in the United States. The major belts are: Georgia-Florida, South Carolina-North Carolina, Eastern North Carolina, and Old Belt (Virginia).

the Eastern North Carolina and Old Belts. West German importers prefer flue-cured tobacco from the Georgia-Florida belt. These geographic preferences are tempered by supplemental purchases from the remaining growing areas.

CHAPTER III

LITERATURE REVIEW

Very few studies have addressed the issue of foreign trade in flue-cured tobacco. No study, to date, has attempted to estimate structural demand equations for internationally traded flue-cured tobacco. Two areas are addressed in this review: (1) elasticity-of-demand studies for flue-cured tobacco, and (2) foreign trade and exchange rate models.

Commodity Elasticity Studies

Capel (1966)

In an unpublished 1966 Ph.D. dissertation, Capel developed a demand analysis of the flue-cured tobacco export trade.[1/] His major objective was to predict changes in net revenue to flue-cured tobacco growers caused by policies affecting the export price of flue-cured tobacco. He predicted price and export quantity figures for the years 1970 to 1975 by first estimating the elasticity of substitution of United States flue-cured tobacco exports with those of competing nations' tobacco exports. Capel developed two estimates of this elasticity of substitution by regressing two equations: the first with quantity dependent and price independent, the second with price dependent and quantity

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[1/] This work, along with two similar papers on wheat and cotton, are summarized in the referenced report by Johnson, 1971.

independent. Only price and quantity variables were employed. Quantities of exported United States flue-cured tobacco were expressed as ratios of tobacco quantities exported by competing nations. Likewise, the price variable consisted of the ratio of the price of United States tobacco to a weighted average price of competing exporters' tobacco. Each equation was estimated in a double log form using Ordinary Least Squares.

The Capel estimates of quantity-dependent demand elasticities of substitution for the United Kingdom, West Germany and Japan were -2.47, -3.57 and -0.81 respectively. His estimates of price - dependent demand elasticities were -3.3, -4.03, and -5.98 respectively. The quantity-dependent elasticity of substitution for the United Kingdom can be interpreted as saying that a one percent increase in United States price relative to competing suppliers' prices is associated with a decrease of 2.47% in the relative quantity of flue-cured tobacco purchased from the United States. The quantity-dependent elasticities for the United Kingdom and West Germany indicate that flue-cured tobacco importers are price shoppers and ready buyers of competing nations' tobacco. The corresponding elasticity for Japanese imports (-0.81) was not significant at the 5% probability level. For further discussion and development of the elasticity of substitution, see Capel, Johnson (1971), and Harberger.

Baante (1965)

C. A. Baante has also analyzed several aspects of the export demand for United States flue-cured tobacco. Using annual data for the period 1951 to 1960, Baante tried estimating demand elasticities of

substitution for certain countries' United States tobacco imports but coefficients were not statistically significant at the five percent level of probability.

He then attempted to estimate equations in which quantity of United States flue-cured tobacco demanded for import was the dependent variable, and import price and per capita income of the selected importing country were the independent variables. The resulting price elasticity of demand for all exported United States flue-cured tobacco was -.734. This elasticity estimate, as well as the remaining coefficients on the independent variables, were not significant at the five percent level of probability. Had it been significant, it would have indicated that a one percent increase in the price of United States flue-cured tobacco results in a .734% decrease in the quantity of tobacco purchased by importers. This suggests that international demand for the commodity is somewhat inelastic. In the absence of corresponding cross-price elasticity estimates, relating changes in competing nations' prices with purchases of United States leaf, a comparison of Capel's and Baante's results is not possible.

Miller (Circa 1972)

Miller has developed a market share model of the elasticity of demand for United States flue-cured tobacco exports. In his first estimated equation, he regressed the United States market share of internationally traded flue-cured tobacco on the United States market share lagged one quarter, the ratio of United States tobacco prices to Rhodesian tobacco prices, a trend variable, and a dummy variable

accounting for a United Nations sanction placed on Rhodesia. The second equation was similar but did not include the trend variable. Ordinary Least Squares estimates were obtained using annual data for the period 1954 to 1971. The estimated short run price elasticities of demand, at the mean of the time period, for the two estimated equations were -.451 and -.863, respectively. Miller's second equation implies that a one percent increase in United States price relative to Rhodesian price results in a decrease of .863 percent in the United States market share of internationally traded flue-cured tobacco.

Exchange Rate Analysis

Schuh's articles on the role of the exchange rate in the pricing of agricultural commodities [1974], and the need for a macroeconomic approach to agricultural modeling [1976], have opened new areas of research. Numerous analysts have undertaken tests of Schuh's hypothesis that the exchange rate has had a significant effect upon agricultural trade and prices.

Johnson, Grennes and Thursby utilized a world trade model to conclude that the exchange rate does not play a more important role in domestic wheat prices than do commercial policies established by importing nations, or United States shipping policies which force up ship transportation costs [Johnson (1977), p. 625].

Fletcher and Just modeled the role of the United States exchange rate on U.S. wheat prices during 1972-73. Their paper compared exchange rate realignment, world wheat production short-falls, and the rapid rise in world income, with the intention of determining the relative impact

of each on the sharp increase in United States wheat prices in that period. The resulting export demand estimates indicated the exchange rate had a very important influence on the price of United States wheat. World wheat production short falls and increased income did not have as great an effect on United States wheat prices as did the exchange rate change.

The debate over the relevance of the exchange rate, and in fact over the structure of import demand equations has not been exhausted. Many researchers are attempting to add definitive information to this field of inquiry.

CHAPTER IV

MODEL SPECIFICATION

Importers' Input Demand for United States Leaf

This present chapter contains a discussion of the models used to estimate Japanese, West German, and United Kingdom demand for North American flue-cured tobacco. The generalized form of the import demand equation is as follows:

$$(4\text{-}1) \quad QLNA_i = f(PLNA_i, PLOC_i, PC_i, INV_i, E_i, TRM_i)$$

where:

$QLNA_i$ = quantity of leaf imported by country i from North America;

$PLNA_i$ = price of North American leaf paid by importers in country i;

$PLOC_i$ = aggregate price of non-North American leaf paid by importers in country i;

PC_i = price of cigarettes in importing country i;

INV_i = inventories of leaf on hand in importing country i;

E_i = the currency exchange rate between importing country i and the United States; and

TRM_i = trade restricting measures imposed by importing country i on imported North American tobacco.

One may derive the above specification from the importer's profit function since the quantity of flue-cured tobacco demanded by the importer

is a derived demand for raw leaf tobacco. This can be shown by constructing an importer's profit (π) function for flue-cured leaf tobacco as:

$$(4\text{-}2) \quad \pi = \text{Total Revenue} - \text{Total Costs}$$
$$= PC \cdot QC - PLNA \cdot EUS \cdot QLNA - PLOC \cdot EO \cdot QLOC - POI \cdot QOI.$$

where:

π = importer's profit,

PC = price of cigarettes in the importing country,

QC = quantity of cigarettes sold by the importer in the importing country,

PLNA = export price of leaf in North America,

EUS = exchange rate between the importing country and the United States or Canada,

QLNA = quantity of leaf purchased from North America,

POI = prices of other inputs (e.g. paper, labor, capital) in the importing country,

QOI = quantities of other inputs utilized by the importer in the manufacturing process,

PLOC = aggregate export price of leaf in non-North American producing countries,

EO = aggregate exchange rate between the importing country and non-North American producing countries, and

QLOC = quantity of leaf purchased from other countries.

Expressing the quantity of cigarettes (QC) as a function of the quantity of North American leaf, quantity of non-North American leaf,

and quantity of other inputs, one may take the partial derivative of the profit function (4-2) with respect to the quantities of North American and non-North American leaf. Setting the partial derivatives equal to zero, and simultaneously solving the two equations for QLNA and QLOC, one generates input demand functions for these latter variables.

Mathematically the process is as follows:

$$(4\text{-}2)\quad \pi = PC \cdot f(QLNA, QLOC, QOI) - PLNA \cdot EUS \cdot QLNA - PLOC \cdot EO \cdot QLOC - POI \cdot QOI.$$

$$(4\text{-}3)\quad \frac{\partial \pi}{\partial QLNA} = PC \cdot d[f(QLNA, QLOC, QOI)]/dQLNA - PLNA \cdot EUS = 0.$$

$$(4\text{-}4)\quad \frac{\partial \pi}{\partial QLOC} = PC \cdot d[f(QLNA, QLOC, QOI)]/dQLOC - PLOC \cdot EO = 0.$$

$$(4\text{-}5)\quad \frac{\partial \pi}{\partial QOI} = PC \cdot d[f(QLNA, QLOC, QOI)]/dQOI - POI = 0.$$

Placing PLNA·EUS in (4-3) on the right-hand-side of (4-3) indicates that the profit-maximizing price of North American lead, expressed in units of currency of the importing country, should be equal to the leaf's value marginal product to the importer. Marginal product d[f(QLNA, QLOC, QOI)]/dQLNA in (4-3) is generally a function of QLNA, QLOC, and QOI. Solving for QLNA as a function of all other variables indicates that the quantity of North American leaf demanded by the importer is a function of the quantity used of non-North American leaf (QLOC), the quantities used of other inputs (QOI), the price of cigarettes (PC), and exchange rate (EUS). By simultaneously solving (4-3), (4-4), and (4-5), QLOC and QOI are expressed as functions of PLOC and

POI, their respective prices. The result is input demand function (4-1).

This derivation does not directly justify the presence of inventories (INV) and trade restricting measures (TRM) in (4-1). The inventory variable must be included because of its effect upon the production time horizon. Inventory can act as a substitute for new purchases. When inventory is large, the importer will not purchase as much tobacco even if demand for the finished product is high. In the reverse of this case, low stock levels may signal an increase in new purchases. The time lag between current cigarette manufacture and purchases of raw leaf is in fact buffered by the inventory variable.

Tariff barriers placed on raw leaf tobacco in fact augment tobacco prices paid by importers. Therefore, these measures are sometimes modeled as price changes. We here specify trade restricting measures separately since they often include nontariff barriers which may affect demand other than through the leaf price variable.

Expected Coefficient Signs

Expected coefficient signs in import demand equation (4-1) are derived from examination of (4-2), (4-3), and (4-4). For example, since QLNA and QLOC are substitutes in f(QLNA, QLOC, QOI), rising prices (PLOC) of competing tobacco should increase the quantity of North American tobacco demanded. That is, importers should substitute North American for non-North American tobacco if the price of the former remains constant and the price of the latter rises.

Likewise, since the price of cigarettes (PC) positively influences the value marginal product of North American leaf, an increase in cigarette prices increases demand for North American tobacco. Cigarette prices may increase due to a shift to the right of the retail demand schedule for cigarettes. Realizing this shift, producers would increase profit by producing more cigarettes. This would in turn require, by way of cigarette production function f(QLNA, QLOC, QOI), use of additional North American tobacco.

If the importer is operating in stage II of the cigarette production function, the value marginal product of North American leaf is a negative function of quantity of North American leaf. Since by (4-2) the importer equates price of leaf with its value marginal product, quantity of North American leaf demanded by the importer should be negatively related to its own export price.

Since the exchange rate merely converts units of United States currency into the importing country's currency, increases the exchange rate denominated in United States currency (EUS) should also negatively affect quantity of North American leaf demanded.

To the extent trade restricting measures (TRM) refer to tariff levels, increases in TRM are again equivalent to increases in price of leaf, and hence should be negatively associated with quantity of leaf demanded.

As leaf inventories increase, the quantity of new leaf stocks necessary for future production periods declines. This would decrease the quantity of raw leaf to be purchased for use in these future

production periods. Therefore, the relationship between leaf inventories and quantity of leaf demanded is also expected to be negative.

Methods of Estimation

Simultaneous Equations Approach

Baumol (p. 55) has noted that one can observe a single point on a demand curve with a high degree of certainty. By the time one observes the second point, the entire demand curve may have shifted due to a change in its underlying conditions, and without the researchers knowledge. In addition, demand relationships are often estimated in situations where corresponding supply relationships are not perfectly elastic or inelastic. In response to this latter problem, researchers often employ a system of simultaneous equations. However, simultaneous equation estimation is not universally accepted as the best method of estimation even when it is theoretically advised.

In his examination of econometric models of international trade flows, Magee has noted that the simultaneous equation approach has proven superior to single equation approaches only for finished manufacturers and total exports [Kenen, p. 183]. George and King [p. 17] noted that, while demand functions often "ought" to be estimated using simultaneous equation techniques, there is often little evidence of the "advantages of simultaneous equations over single equation estimation."

If each of the three countries modeled in this analysis is capable of affecting North American flue-cured export prices, a simultaneous equation approach would theoretically be required. The procedure to be

followed if this condition existed would be to estimate the three countries' demand equations together with a fourth equation representing the rest of the world's North American flue-cured tobacco purchases, and together with a fifth identity equating all quantities demanded with the total amount of North American flue-cured tobacco produced. This would involve five endogenous variables, including four endogenous quantities demanded and North American price. Additional complications would arise if non-North American nations' production was assumed to be neither perfectly elastic nor inelastic.

During the time period of this analysis, the shares of total North American flue-cured tobacco production purchased by Japan, West Germany, and the United Kingdom have averaged 11.95%, 19.53%, and 21.50%, respectively.[1/] (See Figure 4.1, and note that exports of flue-cured tobacco have averaged only 34% of North American production during the same period.) These proportions are probably too low to justify the assertion that any of the three importers, acting alone, would significantly affect North American prices. Therefore, the simultaneous equation approach would not seem justified for this study.

Single and Grouped Equation Approaches

The usual method of estimating import demand equations, under the assumptions of negligible single-buyer market power and perfectly elastic supply, is ordinary least squares. One problem that may arise with this estimation technique is that some variables not included in the models may affect disturbances in each model. Examples of these

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[1/] For the market share of each importing country, see Appendix E.

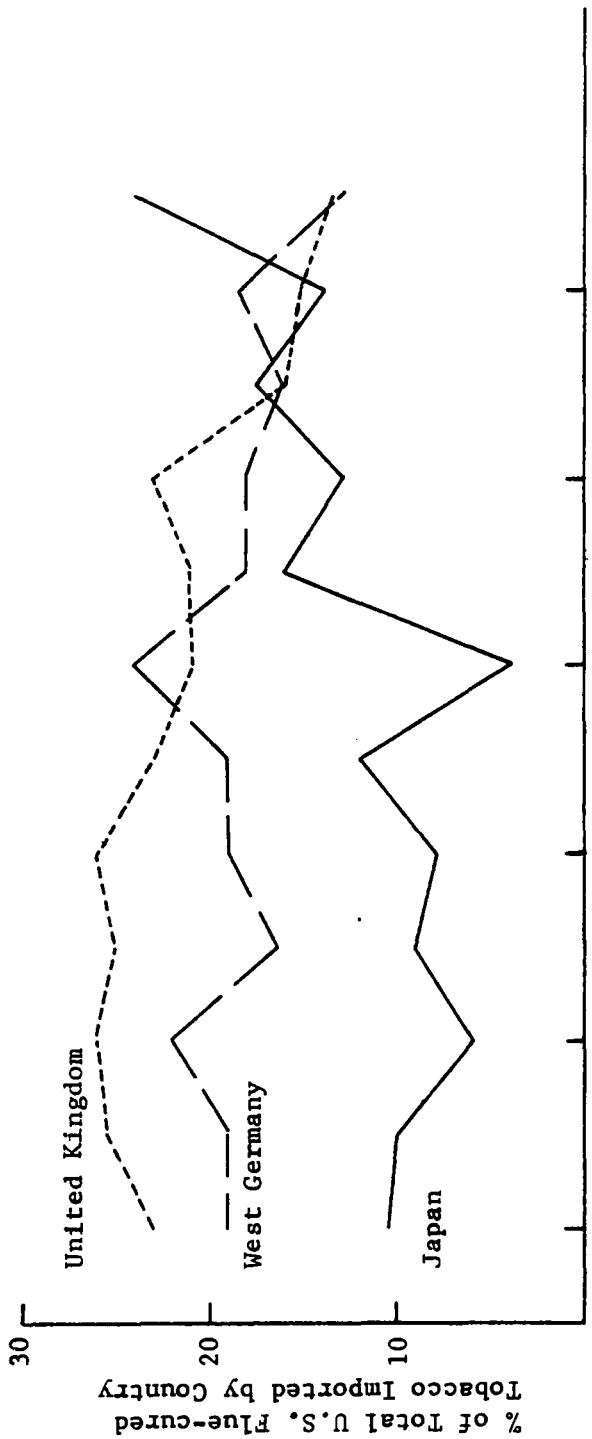

Figure 4.1. Annual Amounts of U.S. Flue-Cured Tobacco Imported by Japan, West Germany and the United Kingdom, 1965-1975

SOURCE: U.S. Commerce Department, Commodity by Country, Schedule B.

disturbances may be international labor strikes, poor weather globally (affecting shipping), international political instability, or poor tobacco growing seasons in several exporting countries. Under these conditions, the estimated demand functions are related by covariances in their disturbance terms created by the joint action of the omitted variables.

A technique designed to compensate for this problem is seemingly unrelated regression (SUR) or grouping of equations. This procedure accounts for the error covariances caused by the omitted variables. If the true errors are correlated across models, use of the SUR estimator reduces true standard errors of estimate over those which would have prevailed in ordinary least squares estimation [Kmenta, pp. 517-527]. A suspicion that variables omitted in this analysis, such as those mentioned above, do affect demand in two or three of the countries studied strongly supports the SUR approach.

CHAPTER V

DATA AND MODEL DEVELOPMENT

Equation Specifications

The following import demand equations for North American flue-cured tobacco are specified for Japan, West Germany, and the United Kingdom.

The import demand equation for Japan is:

QMJNA = f(PNAJ, PNJ, EJN, PCJ, QMJNLAG3, DJ1, DJ2, DJ3).

where:

QMJNA = quarterly quantity of flue-cured tobacco imported by Japan from North America, in millions of lbs;

PNAJ = quarterly average price of flue-cured tobacco paid by Japan in North America, in yen per lb;

PNJ = quarterly average price of flue-cured tobacco paid by Japan to non-North American tobacco exporters, in dollars per lb;

EJN = quarterly average exchange rate between Japan and United States, in yen per dollar;

PCJ = quarterly average price of cigarettes in Japan, in yen per 20 cigarettes;

QMJNLAG3 = quarterly quantity of flue-cured tobacco imported by Japan from North America, lagged three quarters, in millions of lbs;

DJ1,DJ2,DJ3) = dummy variables accounting for seasonality in Japanese tobacco imports.

The import demand equation for West Germany is:

QMWGA = f(PNAW, PNW, EWG, PCW, QMWGLAG3, TRMWG, DW1, DW2, DW3).

where:

QMWGA = quarterly quantity of flue-cured tobacco imported by West Germany from North America, in millions of lbs;

PNAW = quarterly average price of flue-cured tobacco paid by West Germany in North America, in marks per lb;

PNW = quarterly average price of flue-cured tobacco paid by West Germany to non-North American tobacco exporters, in dollars per lb;

EWG = quarterly average exchange rate between West Germany and the United States, in marks per dollar;

PCW = quarterly average price of cigarettes in West Germany, in pfennigs per cigarette;

QMWGLAG3 = quarterly quantity of flue-cured tobacco imported by West Germany from North America, lagged three quarters, in millions of lbs;

TRMWG = trade restricting measures that raise the price of North American tobacco entering Germany; and

DW1,DW2,DW3 = dummy variables accounting for seasonality in West German tobacco imports.

The import demand equation for the United Kingdom is:

QMUKA = f(PNAU, PNU, EUK, GNPU, QMUKLAG3, TRMUK, DU1, DU2, DU3).

where:

QMUKA = quarterly quantity of flue-cured tobacco imported by the United Kingdom from North America, in millions of lbs;

PNAU = quarterly average price of flue-cured tobacco paid by the United Kingdom in North America, in pounds sterling per lb;

PNU = quarterly average price of flue-cured tobacco paid by the United Kingdom to non-North American tobacco exporters, in dollars per lb;

EUK = the exchange rate between the United Kingdom and the United States, in dollars per pound sterling;

PCUK = quarterly average price of cigarettes in the United Kingdom, in cents per cigarette;

QMUKLAG3 = quarterly quantity of flue-cured tobacco imported by the United Kingdom, lagged three quarters, in millions of lbs;

TRMUK = trade restricting measures that raise the price of North American tobacco entering the United Kingdom;

DU1,DU2,DU3 = dummy variables accounting for seasonality in United Kingdom tobacco imports.

Variable Specifications

Quantity Demanded

The dependent variable in each model is the quantity of flue-cured tobacco imported from the United States and Canada (North America) to

the respective country. Canada is usually considered a competitor of the United States tobacco industry. However, institutional characteristics of the United States and Canadian tobacco industries are very similar. Not only do the United States and Canada share geographical proximity, but these countries also have the highest priced flue-cured tobacco in the world. One does not have to investigate United States-Canadian relations too far to see the close economic ties of one country to the other. For this reason, plus the opinion expressed by importers that Canadian and United States flue-cured tobacco is similar in quality, the dependent variable was integrated into an aggregated North American flue-cured export quantity. Estimates were obtained by adding the stemmed and unstemmed quantities of United States flue-cured exports to reported Canadian flue-cured exports.

North American Leaf Price

The price variable for North American flue-cured tobacco is also an aggregated figure. North American prices (PNAJ, PNAW, PNAU) are trade weighted aggregate prices, following the form:

$$\frac{PUS \cdot QUS + PCANADA\ QCANADA}{QUS + QCANADA},$$

where:

PUS = quarterly price of United States flue-cured tobacco exported to country i;

QUS = quarterly quantity of United States flue-cured tobacco exported to country i;

PCANADA = quarterly price of Canadian flue-cured tobacco exported to country i; and

QCANADA = quarterly quantity of Canadian flue-cured tobacco exported to country i.

In general these aggregates differ by importing country since each importer's United States and Canadian purchase mix differs from the other. Historically, United States and Canadian flue-cured tobacco prices have been very similar; however, the Canadian price is usually slightly below the United States price.

Non-North American Leaf Price

Export prices charged by non-North American producing countries (PNJ, PNW, PNU) are also modeled as weighted aggregate figures. The countries identified as competitors with North America in the flue-cured tobacco export industry and included in this study are: Brazil, India, Malawi, Philippines, South Korea and Thailand. Ideally, prices paid in each of these countries by the respective importing country should be specified separately. However, due to expected high correlations among these prices, it was necessary to aggregate and weight prices in these countries into a single variable.

The method used for ariving at the trade-weighted aggregate price followed the form

$$\frac{P_i Q_i + P_j Q_j + \ldots + P_n Q_n}{Q_i + Q_j + \ldots + Q_n},$$

where i, j, ..., and n represent respective non-North American exporting countries and P, Q represent respective prices and quantities associated with each country.

Exchange Rates

The exchange rate for Japan (EJN) and West Germany (EWG) is expressed in terms of yen or deutschmarks per dollar. In keeping with international monetary practices, the United Kingdom's exchange rate (EUK) is quoted in terms of dollars per British pound sterling. This study only partly covers a period of highly fluctuating foreign currency prices. Prior to 1973 the international monetary system was regulated under a regime of fixed exchange rates. After 1973 this regulation was abandoned and rates began to change more rapidly.

Cigarette Price

The price of cigarettes represents the revenue side of the importer's profit function. No cigarette price data were avialable for the United Kingdom. However data were available for Japan (PCJ) and West Germany (PCW). The Japanese series is quoted as the average prices of the four best-selling brands in Japan, in yen per pack of 20. The West German series also represents the mean price of the best selling brands in West Germany, and is quoted in pfennigs (one hundred pfennigs to one deutschmark) per cigarette.

There are heavy government controls on retail cigarette prices in each country studied. Japan's cigarette prices are completely determined by the government tobacco monopoly, while West Germany has very high retail cigarette taxes that effectively raise the price of the

manufactured cigarette. All cigarette price data are reported on an annual basis; no quarterly figures are readily available for manufactured cigarettes.

Income

Instead of specifying cigarette prices, one could hypothesize that income is a determinant of flue-cured tobacco leaf demand. Income can be substituted into the wholesale demand equation since the latter is a derived demand. That is, the retail level demand function for cigarettes can be substituted for PC in the wholesale level demand equation [Foote, p. 103].

One readily available measure of income is gross national product. For the present study, inclusion of a deflated per capita income would note be required since:

(a) West Germany and the United Kingdom, especially, have experienced little variation in the sizes of their populations during the study period, and

(b) It may be argued that, on a quarterly basis, retail cigarette buyers perceive nominal incomes and nominal cigarette prices.

Inventories

As has been shown, an important element in the demand for North American flue-cured tobacco should be the level of flue-cured leaf stocks on hand in each importing country. For example, when importers' warehouses are full of unprocessed leaf, tobacco import volumes are expected to be relatively light. Inventories of North American leaf act as a substitute for new purchases of North American leaf. The

problem is, then, to ascertain how much previously-stocked North American leaf has been consumed so as to reduce these inventories.

Although gross tobacco consumption figures in importing countries are available, blend proportions of North American with other flue-cured tobacco are not known. Likewise, quantities of stocks available in importing nations are not public information. In order to develop a proxy for leaf inventories, one may appeal to the fact that flue-cured tobacco must remain in storage for some time in order to properly age. Hence, a lagged purchase quantity of North American tobacco may act as a reasonable estimate of current North American stocks on hand. This proxy is highly approximate; aging times may vary and are in any event classified information. Also, the proxy only represents North American flue-cured stocks and thus does not reflect the fact that North American and non-North American tobacco act as substitutes.

Trade Restricting Measures

Trade restricting variables (TRMWG and TRMUK) only apply to West Germany and the United Kingdom and are specified as specific or ad valorem tariffs. The Japanese control the purchase of tobacco through their sole tobacco buyer, a state owned and controlled corporation, so that no tariffs are involved. Harmonization of United Kingdom and West German tobacco tariffs was discussed in Chapter II. Their historical tariff schedules on flue-cured tobacco are shown in Appendix C.

It should be noted that much of the tax burden on tobacco falls on the finished cigarette product. The incidence of the retail tax was not considered in this study since it is not placed directly on the raw

flue-cured leaf. The present study also avoided distinguishing between revenue generating tax and a sumtuary tax that aids one group of exporters over another.

Zero-One Variables

A final aspect of these models are the dummy variables designed to account for seasonality of imports. Typically, importers purchase flue-cured tobacco during the third quarter of the calendar year. The commodity is then prepared for shipment and shipped in the fourth quarter. Recent trends have shown this practice to be less common than formerly. Importers are beginning to purchase a more processed leaf, which typically requires additional processing time in the United States. There has also been an increasing tendency to store purchased leaf in North America, and to re-purchase leaf from domestic buyers in times of an unexpected inventory draw-down in the importing country. Still, the historical data do reflect marked seasonal preference in shipment patterns.

Data Sources

Quantities and Prices

Monthly data on United States flue-cured tobacco export prices and export quantities were obtained from "Commodity by Country, Schedule B" (U.S. Census Bureau), for the years 1965-1974. This publication distinguishes between stemmed and unstemmed flue-cured tobacco. Export quantity variables QMJNA, QMWGA, and QMUKA represent both stemmed and

unstemmed exports; price variables PNAJ, PNAW, PNAU are quantity-weighted averages of stemmed and unstemmed tobacco prices.

Export price and quantity figures for the specified non-North American flue-cured producing countries and for Canada were obtained from the United Nations publication, "Commodity Trade Statistics, Statistical Series D." This series includes all tobacco and is quoted in a cumulative quarterly form. Estimates of flue-cured tobacco export quantities were obtained through multiplying reported all-tobacco export volumes by ratios of flue-cured to total tobacco produced in each country in each year. Estimates of flue-cured tobacco prices were obtained by multiplying reported all-tobacco prices by the (constant) approximate ratio of flue-cured to all-tobacco prices in each country (Foreign Agricultural Service, USDA). See Appendix F.9 for the conversion factors employed.

United Nations data are not only reported very late (usually a two to two and a half year lag) but often do not correspond to other sources. We must, however, accept the difficulty and frustration associated with the UN series, since no other complete tobacco trade series is available. Hopefully steps will be taken to improve the collection and reporting procedures.[1/]

[1/] With the exception of the years 1971-1972, Statistical Series D has been printed on a quarterly basis since 1965. For reasons unexplained, only the central computer of the United Nations in New York has this information and the data must be obtained directly from their statistical office. This data series is being placed on microfilm and the series will soon be complete.

GNP's and Exchange Rates

Data on Gross National Products and exchange rates were obtained from International Financial Statistics, published by the International Monetary Fund. The GNP is found on line "99a" for each importing country. The exchange rate is found on line "rf pure rate/market rate" for West Germany and Japan and on line "rh pure rate/market rate" for the United Kingdom.

Cigarette Prices

Cigarette prices were obtained directly from the Tobacco Division of the Foreign Agricultural Service, U.S.D.A., who in turn gathered them from agricultural attache's reports. Figures quoted in the reports are average prices per cigarette of the best selling brands in each country. The leading Japanese brands are Hi-Lite, Seven-Stars, Peace and Cherry.

Trade Restricting Measures (Tariffs)

Information on trade restircting measures was obtained from "A Summary of Tariff and Nontariff Barriers on Tobacco in Free World Markets, 1973." This is publication FAS M-257, June 1974, of the Foreign Agricultural Service, U.S.D.A. The data used in this analysis to represent trade restricting measures, namely ad valorem and specific taxes, are contained in Appendix C. Data and conversion factors described above are reported in Appendix F.

CHAPTER VI

RESULTS OF ANALYSIS

Estimates of the flue-cured tobacco demand equations are reported and discussed in this chapter. All regression results reported here were estimated in linear form using the seemingly unrelated regression technique discussed in Chapter IV. The variables used in this study have been defined in Chapter V.

Each equation discussed in this section reflects the impact that "own" price, "cross" prices, incomes, stocks and seasonality have on the quantity demanded of North American flue-cured tobacco. Equation estimates vary between importing countries.

Japan

The estimated equation representing Japanese demand for North American flue-cured tobacco is reported in Table 6.1. Prices and GNP in this equation have been deflated by the Japanese consumer price index (CPIJ), and both prices and income are expressed in yen rather than dollars. Estimated equations not following this format exhibited poor statistical reliability and unlikely coefficient magnitudes. A definition of variable names, and a discussion of each variable coefficient and elasticity estimate, follows.

Table 6.1. Japanese Import Demand Equation for North American Flue-Cured Tobacco[a/]

	Intercept	DPNAJT1	DPNJT	DGNPJ	DJ1	DJ2	DJ3
Regression coefficient	-13.8201	-.0363	.1227	.00019	-12.5599	-27.5926	-28.9203
t-value	.7313	1.6688	3.4018	3.2704	3.0859	7.3389	7.6293
Variable units	Millions of pounds	Yen/lb	Yen/lb	Yen	0 or 1	0 or 1	0 or 1
Variable mean value		408.3074	215.1371	157366.4795			
Elasticity		1.354	2.408	2.68			
Hypothesized sign		Negative	Positive	Positive			

[a/] This is part of a seemingly unrelated regression system with 85 degrees of freedom.
R^2 = .8135 F-ratio = 21.081 Root mean square error = 7.1306
The dependent variable is quantity of North American flue-cured tobacco imported by Japan (QMJN), with mean value 10.9596 (in millions of pounds).

Deflated Variable Names

DPNAJTI = deflated export price of North American flue-cured tobacco imported by Japan, lagged one quarter, in yen per pound;

DPNJT = deflated aggregate export price of non-North American flue-cured tobacco imported by Japan, in yen per pound; and

DGNPJ = deflated Japanese Gross National Product, in yen.

Own Price

The one-quarter-lagged "own"-price variable (DPNAJTI) exhibits the correct sign (negative) and is significant at the five percent level of probability using a one tailed test. The coefficient (-.0363) indicates that as the price of North American flue-cured tobacco increases by one 1970 Japanese yen, the quantity of flue-cured tobacco demanded by Japan decreases by 36,300 pounds.[1/] This results in an elasticity of -1.354 at the mean of the observations.

The somewhat greater than unitary own-price elasticity reflects Japan's movement away from total dependence on North American tobacco. In the 1950's and 1960's, Japan bought flue-cured tobacco primarily from North America. One would expect that the own price elasticity over that time period was inelastic. However, during the 1970's the Japanese have invested in the tobacco industries of countries identified in this study

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[1/] Using the mean value of the exchange rate (336.3970 yen per U.S. dollar) over the period of the study, an increase of the price of North American flue-cured tobacco by one U.S. cent would decrease the quantity demanded by 122,112 pounds.

as competitors with the North American tobacco industry, namely Brazil, the Philippines and South Korea. One of the goals of Japan's investment program is to obtain leaf in these countries that is equivalent to North American flue-cured tobacco. The relatively high own-price elasticity may indicate this program has been successful.

Cross Prices

More substantial evidence of the success of this program is available from inspection of the non-North American or "cross"-price coefficient. This coefficient has the hypothesized sign (positive) and is significant at the one percent level. Should prices charged by non-North American nations decrease by one yen, the quantity of North American flue-cured tobacco demanded by Japan would decrease by 122,700 pounds.[1/] The corresponding cross-price elasticity of demand is 2.408, indicating a high degree of price sensitivity in Japanese selection of tobacco suppliers.

The associated indifference map between North American and non-North American tobacco faced by the Japanese importer is relatively linear. Hence there is a high rate of substitutability between non-North American and North American flue-cured tobacco. The Japanese will substitute widely between tobacco sources when a price change initiates such a response. In other words, increases in the amounts of North American flue-cured tobacco purchased would little affect the quantities

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[1/] Using the mean value of the exchange rate (336.3970), a one U.S. cent decrease in the price of non-North American tobacco would decrease the Japanese demand for North American flue-cured tobacco by 413,462 pounds.

of non-North American tobacco that would have to be given up in order to preserve buyer indifference. This does not mean, however, that North American and non-North American tobacco are viewed in Japan as nearly identical commodities.

Real Income (Gross National Product)

Real income is used in this model to reflect one determinant of the retail demand for cigarettes. This variable (DGNPJ) is significant at the one percent level using a one-tailed test and exhibits the hypothesized positive sign. The coefficient (.00019) indicates that for a 100 yen increase in real income, the quantity of North American flue-cured tobacco demanded by Japan would increase by 19,000 pounds.

The associated income elasticity is 2.68. For a one percent increase in real income, the quantity of North American flue-cured tobacco demanded by Japan will increase by 2.68 percent. Hence North American flue-cured tobacco is apparently a "superior" good to the average Japanese smoker.

Seasonal Dummy Variables

All three dummy variables designed to account for seasonality (DJ1, DJ2, DJ3) are significant at the one percent level of probability, using a two tailed test. The three dummy variables also have negative signs, indicating the Japanese preference, all other factors constant, for importing in the fourth quarter. In recent years the Japanese have tended to stagger their shipments and no longer rely as heavily on the fourth quarter as they did previously.

The dummy variables indicate that, on an average over the historical period covered, Japan preferred importing 12.56 million pounds less flue-cured tobacco in the first quarter than in the fourth quarter. Likewise, they preferred importing 27.59 and 28.92 million pounds less in the second and third quarters, respectively, than in the fourth quarter. This assumes that all other variables (e.g. prices, income, and stocks) remain constant.

Factors Nonsignificant at the Ten Percent Level

Exchange Rate. The exchange rate is incorporated in the Japanese model by multiplying it by export prices expressed in dollars. Hence exchange rate changes are considered equivalent to price changes. When the exchange rate variable was included as a separate variable, both exchange rate and price variables were nonsignificant at the 10 percent level, using a one tailed test.

Price of Cigarettes. The price of Japanese cigarettes (PCJ) was also found to be a nonsignificant factor in Japanese demand for North American flue-cured tobacco. This was primarily due to the small amount of variation, over the studied period, in these prices. In fact Japanese cigarette prices changed only once over this period: the average price increased from 75 yen to 90 yen in 1974.

The Japanese tobacco monopoly has also set a relatively low retail price on cigarettes in their domestic markets. This has meant that persons with low incomes have been able to purchase sufficient quantities of cigarettes to satisfy their smoking appetites while holding the cigarette share of their income budget to an acceptable level.

Flue-Cured Tobacco Inventories. The proxy variable for flue-cured tobacco stocks in this study is the import quantity (dependent variable) lagged three quarters. This variable was not satistically significant at the 10 percent level, using a one tailed test. It would be unwise to conclude from this nonsignificance that Japanese flue-cured tobacco stocks have no effect on quantities of new tobacco the monopoly wishes to purchase. A lagged purchase quantity is an imperfect representative of current stocks since this proxy assumes a definite manufacture date or curing period for tobacco in inventory. The length of such curing period is unknown, as is the volume of current stocks.

Trade Restricting Measures. The Japanese tobacco monopoly earns all its revenue from taxes placed on manufactured cigarettes. No tariff is placed on the raw leaf since this is imported by the monopoly itself.

West Germany

The selected equation representing West Germany demand for North American flue-cured tobacco is given in Table 6.2.

Own Price

The own price variable (PNAW) in this equation exhibits the hypothesized sign (negative) and is significant at the ten percent level using a one tailed test. The coefficient indicates that as North American flue-cured tobacco prices increase by one United States cent, the quantity of flue-cured tobacco demanded by West Germany decreases by 338,857 pounds.[1/] The associated own-price elasticity at the centroid

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[1/] If the price were to increase by one United States dollar, the quantity demanded by West Germany would decrease by 33.8 million pounds.

Table 6.2. West German Quarterly Import Demand Equation for North American Flue-Cured Tobacco[a/]

	Intercept	PNAW	PNW	GNPW	QMWGLAG4	DW2	DW3
Regression coefficient	34.1939	-33.8857	8.7657	.00357	-.2920	21.0500	18.1923
t-value	2.4426	-1.2275	1.3071	.7402	-1.7604	5.4498	4.8332
Variable units	Millions of pounds	$/lb	$/lb	D-marks	Millions of pounds	0 or 1	0 or 1
Variable mean value		.9597	.4968	2799.25	19.6036		
Elasticity		-1.676	.2245	.515	-.295		
Hypothesized sign		Negative	Positive	Positive	Negative		

[a/] This is part of a seemingly unrelated regression system with 85 degrees of freedom.
R^2 = .5872 F-ratio = 6.876 Mean square error = 7.5389
The dependent variable is quantity of North American flue-cured tobacco imported by West Germany (QMWG) with mean value of 19.4005 (in millions of pounds).

is -1.676. That is, for a one percent increase in the price of North American flue-cured tobacco, the West Germans would, at the mean of the sample, demand 1.676 percent less North American flue-cured tobacco.

Cross Prices

The cross price coefficient (8.7657) is positive as hypothesized and significant at the ten percent level in a one tailed test. This indicates that for a one United States cent decrease in the price of competing flue-cured tobacco, West German importers demanded, over the time period of study, 87,657 fewer pounds of North American flue-cured tobacco.

The associated elasticity is .2245. This says that for a one percent drop in competing prices, the West German demand for North American flue-cured tobacco would decrease by only .22 percent. The realtive inelasticity indicates that West Germany would be hesitant to replace North American with non-North American flue-cured tobacco in the event of decreased production, and thus higher prices in North America. In consequence, the indifference curves between non-North American and North American flue-cured tobacco faced by West Germany have been relatively convex to the origin over the period of study. This means that West Germans prefer using tobacco from the two regions in relatively fixed proportions.

This inelasticity of the cross-price coefficient is enhanced by West Germany's membership in the Eurpoean Community. West Germany grants preferential treatment to many of the countries identified as competitors with the North American tobacco industry. Preferential

treatment programs such as the Generalized System of Preferences and the Common External Tariff were discussed in Chapter II. These programs have adverse effects upon North American tobacco exports and aid the exports of the competing countries. This, of course, is an EC policy to entice importers to purchase tobacco from non-North American sources. Such programs add to the inelasticity of the cross-price variable because they tend to inhibit substitution in the face of relative price changes.

Flue-Cured Tobacco Stocks

The proxy variable for flue-cured tobacco stocks is the West German import quantity (dependent variable) lagged four quarters (QMWGLAG4). Its coefficient (.2920) is significant at the five percent level using a one tailed test and exhibits the hypothesized negative sign. This suggests that for a one million pound increase in the amount of North American flue-cured tobacco purchased four quarters ago, there will be a decrease of 292,000 pounds in the quantity purchased during the present time quarter. The associated elasticity is -.295; that is, for a one percent increase in the quantity of North American flue-cured tobacco purchased four quarters previously, there will be a .295 percent decrease in the quantity purchased in the present quarter.

The use of a four quarter lag for West German stocks represents a somewhat shorter holding period than what some industry spokesmen suggest. However, considering the cost associated with rising interest rates, improved technology, and the relative security associated with tobacco supplies, these stock estimates may not be unreasonable.

There is some evidence to indicate that West Germany may be importing North American tobacco through Italy. This enables the German manufacturer to reduce tariffs by taking advantage of the Lira-Unit of Account exchange rate which, when converted into German marks, yields a lower tariff payment. While this action has not been documented, it would certainly produce disturbance in the present model: the Germans would not appear to buy as much North American flue-cured tobacco as they actually consume and they would be able to supplement their flue-cured stocks with this transshipped tobacco, effectively stretching use of their North American leaf inventories over a longer time period.

Seasonal Dummy Variables

The dummy variables (DW1, DW2, DW3) are, as in the Japanese model, designed to account for the seasonality of purchases not explained by other variables. DW1 is not significant at the ten percent level, using a one tailed test indicating West German importers have no preference for first quarter over fourth quarter shipments. The remaining two dummy variables (DW2, DW3) are both significant at the one percent level and both have positive coefficients. They say that West Germany would rather import 21 million and 18 million pounds more flue-cured tobacco in the second and third quarters respectively, than in the fourth quarter, all other factors constant. The West Germans tend to purchase the majority of their North American flue-cured tobacco early in the marketing season. This means they are ready to import most of this tobacco as early as June or July.

Factors Nonsignificant at the Ten Percent Level

Price of Cigarettes. The price of cigarettes (PCW) variable was nonsignificant, under a one-tailed test, when included as an explanatory variable in this model. Although the price of cigarettes in West Germany is not directly controlled by the government, the tax on cigarettes there is a large part of the price paid by retail customers. Because of this high tax incidence, the proportionate effect or a pre-tax retail price increase on the post-tax retail price is quite small. It is not surprising that customers would pay little attention to these cigarette price changes.

Income. Income in West Germany (represented by gross national product, GNPW) was also found to be nonsignificant in the flue-cured tobacco demand equation. This implies that, at sample mean cigarette prices and incomes, West German income increases would result in sharply dropping marginal utilities for North American flue-cured tobacco, relative to marginal utilities for all other goods.

Exchange Rate. The Mark-to-Dollar exchange rate (EWG) is also nonsignificant in the West German demand model. In any transactions (e.g. tariff payments) involving the Eurpoean Community the Unit of Account is the monetary unit used for payment. Since Dollar-to-Unit of Account exchange rates are not included in the statistical model, fluctuations in these rates may obscure the final relationship perceived by West German tobacco importers between the Mark and the United States Dollar. West German tobacco importers may also have Dollar-denominated assets obtained from other business activities. These importers may deal in dollars and thereby avoid the currency exchange market.

Specific and Ad Valorem Tariffs of the Eurpoean Community. Specific and ad valorem levies imposed on tobacco imports by the EC's Common External Tariff were also nonsignificant, using a one tailed test. Imposition and/or changes made in these tariffs are performed in open meeting by representatives of the member governments. This process would enable tobacco importers to anticipate tariff changes and hedge against the outcome.

The United Kingdom

The selected equation representing the United Kingdom's demand for North American flue-cured tobacco is given in Table 6.3.

Own Price

The own price variable (PNAU) in this equation is significant at the one percent level in a one-tailed test and has a negative sign as hypothesized. The coefficient (-67.63) indicates that as the price of North American flue-cured tobacco increases by one United States cent, the quantity of flue-cured tobacco demanded by the United Kingdom decreases by 676,315 pounds.[1/]

The associated elasticity at mean prices and quantities is -1.905. This elasticity suggests that a one percent increase in the price of North American flue-cured tobacco results in a 1.905 percent decrease in the United Kingdom's purchases of North American flue-cured tobacco.

[1/] If the price would increase by one dollar, the quantity demanded by the United Kingdom would decrease by approximately 67.6 million pounds.

Table 6.3. The United Kingdom Import Demand Equation for North American Flue-Cured Tobacco[a/]

	Intercept	PNAU	PNAULAG1	PNU	GNPU	QMUKLAG3	DU1	DU2	DU3
Regression coefficients	142.3541	-67.6315	-83.4038	26.0227	.3217	-.2640	-17.4080	-16.5457	-11.2158
t-value	8.1947	-3.1755	-3.8659	1.9876	5.4561	-1.9837	3.3045	3.0164	1.8138
Variable units	Millions of pounds	$/lb	$/lb	$/lb	British pound sterling	Million of pounds	0 or 1	0 or 1	0 or 1
Variable mean value		1.1546	1.1381	.7055	236.4837	42.1731			
Elasticity		-1.905	-2.377	.4478	1.8526	-.27			
Hypothesized sign		Negative	Negative	Positive	Positive	Negative			

[a/] This is part of a seemingly unrelated regression system with 85 degrees of freedom.
R^2 = .7049 F-ratio = 8.063 Mean Square Error = 11.1608
The dependent variable is quantity of North American flue-cured tobacco imported by the United Kingdom (QMUK) with mean value of 40.9962 and is in millions of pounds.

This estimate may initially seem more elastic than reasonable. However, it is consistent with major structural changes that have occurred in the world tobacco economy as noted in Chapter I. Specifically, since 1965 the United Kingdom has dropped from the largest to the third largest importer of North American flue-cured tobacco. Over the period of this study (1965-1974) the quantity of United States flue-cured tobacco imported by the United Kingdom declined by 32 percent, while the price paid for this tobacco rose by 97%. These trends have continued through 1977.

Own Price in Previous Quarter

A one-quarter lag on the own price variable (PNAULAG1) was also significant at the one percent level using a one tailed test, and has a negative sign as hypothesized for an own price variable. The coefficient suggests that for an increase of one United States cent in the previous quarter's North American tobacco price, the current quantity demanded for shipment by the United Kingdom decreases by 834,038 pounds. The associated elasticity at the mean is -2.377, suggesting that for a one percent increase in the previous quarter's price, current United Kingdom purchases decline by 2.377 percent.

The United Kingdom model is the only model to exhibit a significant lagged price variable in conjunction with a significant current price variable. One explanation for the significance of the lagged price variable is that United Kingdom buyers use last quarter's prices in conjunction with current prices to predict price trends. All else constant, lower prices last quarter tend to suggest a steeper rate of

increase in current prices and, therefore, encourage more intensive buying in the current quarter. United Kingdom importers tend to purchase tobacco from all North American tobacco belts. They may rely on early prices in the more southern belts to help guide purchase plans for the remainder of the year. Another explanation for significance of the lagged price variable is that there may be a substantial time delay between purchase and shipment of tobacco. Reasons for the delay would be processing time in North America, waiting time at ports, and simple delays in reporting.

Cross Prices

The cross price variable, that is the weighted average price charged by selected non-North American tobacco producers, is significant at the five percent level using a one tailed test, and exhibits the hypothesized positive sign. The coefficient (26.0227) implies that for a one United States cent increase in the price of non-North American tobacco, United Kingdom buyers are willing to purchase 260,227 additional pounds of North American flue-cured tobacco. The associated centroid elasticity (.4478) falls in the inelastic portion of the import demand schedule. That is, a one percent increase in the price of non-North American tobacco increases United Kingdom purchases of North American tobacco by only .45 percent. Such cross-price inelasticity implies buyer indifference curves that are relatively convex to axes representing import quantities of North American and non-North American tobacco. United Kingdom, like West German, importers show strong preference for fixed blends of tobaccos from these two producing regions.

Income (Gross National Product)

United Kingdom Gross National Product (GNPU) was significant at the one percent level in a one-tailed test. The associated sign was positive as hypothesized. The coefficient for GNPU (.3217) implies that a one pound sterling increase in United Kingdom GNP would increase demanded imports of North American flue-cured tobacco by 321,170 lbs. In terms of an elasticity, a one percent increase in GNP results in a 1.85 percent increase in the quantity demanded of North American flue-cured tobacco. The magnitude of this elasticity is reasonable, since we would expect a high income elasticity to be associated with the more expensive leaf produced in North America. It is not clear, however, why income response in the United Kingdom should be so different from that in neighboring West Germany.

Flue-Cured Tobacco Stocks

The proxy variable for the United Kingdom's North American flue-cured stocks, the North American quantity imported by the United Kingdom three quarters previously (QMUKLAG3), is significant at the five percent level in a one-tailed test. The coefficient exhibits the hypothesized negative sign for a stock variable, and implies that for every one million pound increase in North American flue-cured tobacco imported three quarters ago, there will be a decline of 264,000 pounds in imports demanded in the present quarter. In other words, for every additional pound of tobacco the United Kingdom purchases from North America this quarter, one can expect demand three quarters hence to fall by .264 lb,

assuming all other factors constant. This coefficient has an associated elasticity at the centroid of -.27.

The West German lagged quantity, reported above, is one quarter longer than used in the United Kingdom model. One might conclude that the West Germans hold their stocks, on the average, for a quarter longer than is the usual United Kingdom practice.

Seasonal Dummy Variables

The three dummy variables for the United Kingdom correct for unexplained seasonality of North American flue-cured tobacco exports to the United Kingdom; all three coefficients exhibit negative signs. The first and second quarter coefficients (DU1 and DU2) are significant at the one percent level using a one tailed test, while the third quarter variable (DU3) is significant at the five percent level using a one tailed test. Essentially, the negative coefficients indicate the United Kingdom preference for importing in the fourth quarter.

The coefficient of DU1 (-17.41) indicates that United Kingdom buyers would rather import 17.41 million fewer pounds of tobacco in the first quarter than in the fourth quarter, all other factors remaining constant. These buyers would also prefer to import 16.5 million fewer pounds in the second quarter, and 11.2 million fewer pounds in the third quarter, than in the fourth quarter.

United Kingdom buyers have historically been heavy fourth quarter importers, primarily because they tend to be late buyers on the United States tobacco circuit. The United Kingdom seasonal import pattern is,

however, much more regular than the Japanese pattern of large imports in one or two quarters and negligible imports in others.

Factors Nonsignificant at the Ten Percent Level

The Dollar to Pound exchange rate (EUK) was statistically nonsignificant when included in this analysis. Over the period of study, the British pound generally depreciated with respect to the United States and Canadian dollar. This would suggest a corresponding weakening of United Kingdom demand for North American flue-cured tobacco denominated in dollars. However, due to the diversified nature of the United Kingdom tobacco industries, relative devaluations of the pound may be offset by forward dollar purchase or by payment in dollars raised through corporate extensions within North America.

Trade Restricting Measures. Specific and ad valorem tariffs imposed by the United Kingdom on flue-cured tobacco imports were also nonsignificant factors (one tailed test) in the United Kingdom's import demand schedule. Hence, harmonization of United Kingdom with E.C. Common External Tariffs appears to not have been a major shock to the North American flue-cured tobacco export industry. Importers have apparently taken steps to insulate themselves from the effects of these tariffs.

CHAPTER VII

CONCLUSIONS

This study has developed estimates of Japanese, West German and United Kingdom demand schedules facing North American flue-cured tobacco exporters. The equations and their accompanying elasticities are reported in Chapter VI. Following is a summary of the major findings from this analysis.

Factors in the Demand for North American Flue-Cured Tobacco

Significant Factors

The own-price variable was significant in each equation, and each own-price elasticity was highly elastic at sample mean export volumes and prices. Hence exporters could expect, on average, to earn greater revenues by reducing export prices, all other factors constant. There is also little statistical support for the contention that North American tobacco exporters can maintain the present high price differential between their own and other nations' flue-cured tobacco.

The cross price coefficient in the Japanese model was highly elastic, indicating that Japan is a price shopper in the world flue-cured tobacco market. Cross price coefficients in the West German and United Kingdom models, on the other hand, were strongly inelastic. Cigarette manufacturers in these countries evidently prefer utilizing

North American tobacco in relatively constant proportions with tobacco from other areas.

Gross national product (income) was a significant factor in Japanese and United Kingdom, but not West German, demand for North American flue-cured tobacco. Sample-mean income elasticities in the first two countries were greater than one, implying that North American flue-cured tobacco is viewed as a "superior" product and imports will increase more than in proportion to increases in national income.

The stocks or inventory variables for which lagged imported quantities of North American flue-cured tobacco were employed as proxy variables, were significant in West German and United Kingdom models. This implies that European buyers take into account stockpile levels of North American flue-cured leaf when deciding upon additional imports.

Seasonal dummy variables were significant for all three countries. The Japanese and United Kingdom models indicate a preference for importing North American flue-cured tobacco in the fourth quarter. The West Germans appear to prefer imports in the second or third quarter.

Nonsignificant Factors

In the theoretical development of the demand models (Chapter IV), several other variables were hypothesized to affect flue-cured export demand, including exchange rates, prices of cigarettes, and tariffs. None of these were statistically significant in the estimated equations.

Exchange rates were of particular theoretical interest in this study. It was hypothesized that exchange rates, included as separate regression variables, would be significant factors in the import demand

equations. With the partial exception of Japan, where they were used to convert prices to a yen-per-pound basis, the analysis did not support the importance of exchange rates in North American flue-cured tobacco import demand. Some industry representatives had foreseen this result. One should note that the time period of this study, 1965-1974, contains only about two years of data under flexible exchange rate regimes. Updating of this analysis to include later years under the flexible exchange rate might produce support for the exchange rate hypothesis.

Price of cigarettes in Japan and West Germany, and tariffs in all three countries also were not significant factors affecting demand for North American flue-cured tobacco. This nonsignificance may be due primarily to low levels of variation in these variables over the sample time period.

Trend factors and population variables, though not identified as components of the theoretical structural equations in Chapter IV, are employed in many commodity demand studies, especially those emphasizing prediction. When included in the present analysis both trend and population variables were consistently nonsignificant.

Data Series

It has been suggested in Chapter V that some data series describing international tobacco trade are not highly reliable. Series representing United States imports, exports, and prices of tobacco [U.S. Bureau of the Census] are generally good, but there are several data series that could be improved.

Chief among these is the United Nations Commodity Trade Statistics. This series is presently four years behind in its coverage. Data collection of non-North American prices and quantities is haphazard and one must approach this source skeptically. If the U.N. does not begin updating this publication more rapidly, alternative data sources should be instituted. The Foreign Agricultural Service, U.S.D.A., could institute a non-North American flue-cured export price series (such as the one developed for this study) and update it with information from United States reporting agencies and the United Nations.

Other data necessary for this study that were not readily available or available in a standard form were cigarette prices in foreign countries. A series should be developed by the Foreign Agricultural Service that would allow easy access to this information.

Policy Recommendations

Many countries are now able to produce flue-cured tobacco with characteristics that are very similar to North American flue-cured tobacco. It is clear from the foregoing analysis that non-North American flue-cured tobacco, non-tobacco additives, and new processing technology have changed the once price-inelastic demand for North American flue-cured tobacco to a price-elastic demand.

In order for the North American flue-cured tobacco industry to maximize long run export revenues, some very stringent policy measures must be introduced. Essentially, the export price of North American flue-cured leaf should be lowered relative to non-North American flue-cured leaf. This can be achieved by reducing domestic costs of

producing, marketing and transporting flue-cured tobacco; by offering government subsidies for tobacco destined for foreign markets;[1/] and by discontinuing present allotment-quota and price-support advance programs which limit production of, and place a price floor under, domestically produced tobacco. We have not attempted in this study to model the above policy alternatives, so that a cost-benefit evaluation of these policies cannot be made. However, only the policy calling for cancellation of the allotment-quota, price-support advance program would represent a saving in immediate administrative costs.

The North American flue-cured tobacco industry would also be able to increase export revenues if they were able to undertake price discrimination in the spatially separated markets to which it ships. Price discrimination calls for equating marginal revenues across markets with the marginal cost of domestic tobacco production [Henderson and Quandt, p. 215]. If own-price elasticities differ across markets, this involves shipping different annual quantities to each market and realizing different average prices in each. Since West Germany's and United Kingdom's own-price elasticities are similar, and these markets have easy access to one another, they could in this framework be treated as one buying group, while the Japanese market could be considered another entity. In order for North American exporters to perform this price discrimination some implicit or explicit collusion would be required. A state tobacco export monopoly might conceivably perform this function.

[1/] A widely used subsidy in international commodity trade is the government's underwriting of shipping costs from North America to the importing country.

The present United States policy calling for expansion of industrialized nations' economies would increase th quantity of North American flue-cured tobacco purchased by the countries analyzed in this study, since the income coefficients for all three countries are positive. In the case of the United Kingdom and Japan, the associated income elasticities were greater than one. Hence, increases in economic activity in these two countries would tend to more than proportionally increase the quantities of North American flue-cured tobacco that they import.

Finally, North American flue-cured tobacco exporters and others may also consider increasing their efforts to promote their product on international markets. This would have to be a concerted effort by producers, wholesalers, retailers, manufacturers and government agencies.

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APPENDIX A

Appendix Table A.1. Annual Exports of U.S. Flue-Cured Tobacco, 1960-1975 (Millions of U.S. Pounds)

Year	U.S. Exports	World Exports	% U.S. Share
1960	409	705	58.0
1961	403	727	55.4
1962	375	776	48.3
1963	403	786	51.3
1964	396	864	45.8
1965	351	844	41.6
1966	423	710	59.6
1967	427	750	56.9
1968	444	800	55.5
1969	430	833	51.6
1970	368	812	45.3
1971	342	798	42.7
1972	425	977	43.5
1973	496	1,127	44.0
1974	520	1,231	42.0
1975	464	1,183	39.2

SOURCE: U.S.D.A. Economic Research Service.

Appendix Table A.2. Annual Exports of Non-U.S. Flue-Cured Tobacco, 1970-1975 (Millions of U.S. Pounds)

Year	World Exports	Indian Exports	Indian Share (%)	Canadian Exports	Canadian Share (%)	Brazilian Exports	Brazilian Share (%)	Philippian Exports	Philippian Share (%)	Korean Exports	Korean Share (%)
1970	812	86	10.6	47	5.8	10	1.2	6	.7	32	3.9
1971	814	103	12.6	48	5.9	38	4.7	40	4.9	26	3.2
1972	977	150	15.3	51	5.2	40	4.0	31	3.2	21	2.1
1973	1,127	165	14.6	62	5.5	61	5.4	28	2.5	33	2.9
1974	1,231	160	13.	53	4.3	103	8.3	27	2.2	64	5.2
1975	1,183	151	12.8	42	3.5	125	10.6	23	1.9	75	6.3

SOURCE: U.S.D.A., Foreign Agricultural Service.

Appendix Table A.3. Flue-Cured Tobacco: Estimated Average Grower Prices in Selected Countries, 1970-1976 ($ Per Lb.)

Country	1970	1971	1972	1973	1974	1975	1976
United States	.72	.77	.85	.88	1.05	1.00	1.11
Canada	.62	.64	.77	.79	.92	.92	.98
Brazil	.18	.18	.19	.25	.33	.26	.27
India	.33	.34	.19	.34	.39	.43	.40
Rep. of Korea	.47	.60	.68	.70	.86	.93	1.08
Philippines	.19	.18	.19	.33	.38	.40	.41
Thailand	.33	.33	.33	.34	.48	.48	.52

SOURCE: U.S.D.A., Foreign Agricultural Service.

Appendix Table A.4. Flue-Cured Tobacco: Percentage Changes in Grower Prices From Previous Year, Selected Countries, 1970-1976

Country	1970	1971	1972	1973	1974	1975	1976
United States	0	.06	.09	.03	.16	-.05	.10
Canada	.016	.03	.17	.02	.14	0	.06
Brazil	.075	0	.05	.24	.76	-.27	.04
India	.20	.03	-.73	.44	.13	.09	-.07
Rep. of Korea	.15	.22	.12	.03	.18	.07	.14
Philippines	-.56	-.05	.05	.42	.13	.05	.02
Thailand	.12	0	0	.03	.29	0	.08

SOURCE: U.S.D.A., Foreign Agricultural Service.

Appendix Table A.5. Flue-Cured Tobacco Production In Selected Countries, 1960-1975 (Thousands of Pounds)

Year	United States	India	Brazil	Korea	Canada	Philippines	Thailand
1960	1,250,635	157,000	112,066	36,284	205,514	75,397	19,473
1961	1,257,891	154,560	128,929	47,529	195,441	62,412	23,416
1962	1,408,448	163,520	93,303	56,424	187,621	63,228	22,740
1963	1,371,462	185,920	158,747	50,510	186,648	82,452	23,192
1964	1,387,804	224,870	103,030	89,615	143,197	77,161	22,594
1965	1,058,970	209,000	197,382	96,274	159,185	73,303	30,553
1966	1,108,074	172,400	99,306	119,059	223,703	32,729	31,593
1967	1,263,159	203,374	131,923	103,845	204,267	72,752	36,028
1968	581,541	208,555	125,703	110,960	211,274	97,774	41,182
1969	1,052,806	264,552	168,112	101,855	240,105	88,184	45,244
1970	1,192,961	178,352	788,410	95,580	214,139	92,592	46,978
1971	1,101,962	166,227	194,446	112,783	212,000	66,138	50,002
1972	1,012,415	307,320	171,107	177,792	180,958	55,777	52,428
1973	1,145,923	244,931	148,810	169,754	267,099	42,990	45,973
1974	1,241,526	309,967	242,506	157,408	252,294	65,697	66,419
1975	1,419,560	209,999	380,443	165,345	218,890	74,339	86,938

SOURCE: U.S.D.A., Foreign Agricultural Service.

APPENDIX B

Appendix Table B.1. Harmonization Schedule for Denmark, Ireland, and the United Kingdom in the Enlarged European Economic Community[a/]

Date	Schedule for Eliminating Difference Between Present Tariff and CXT	Schedule for Eliminating Present Tariff	
		Leaf	Products
	percent	percent	percent
April 1, 1973	--	--	-20
July 1, 1973	--	-20	--
Jan. 1, 1974	-40	-20	-20
Jan. 1, 1975	-20	-20	-20
Jan. 1, 1976	-20	-20	-20
July 1, 1977	-20	-20	-20

[a/] The first column above refers to the schedule for each new country's adoption of the CXT. On January 1, 1974, for example, each new country will eliminate 40 percent of the difference between its tariff and the CXT.

Columns two and three refer to intra-community tariffs. Each country will eliminate all tariffs on EC-produced leaf and products in 20 percent increments.

SOURCE: Johnson, 1973.

APPENDIX C

Appendix Table C.1. Common External Tariff (CXT) For Imported Tobacco from North America

(A) Flue-Cured and burley tobacco valued at 280 ua/100kg and over: 14% duty, not to exceed 45 ua/100 kg.

(B) Tobacco other than flue-cured and burley valued at 280 ua/100 kg and over:
15% duty, not to exceed 70 ua/100 kg.

(C) All types of tobacco valued under 280 ua/100 kg.:
23% duty, with a minimum duty of 28 ua/100 kg and a maximum duty of 33 ua/100 kg.

(D) Associate members of the EC ship their tobacco duty free into the EC.

(E) Countries exporting their tobacco to the EC under the Generalized System of Preferences (GSP) face rates only 50% of the above schedule. However, not more than 60,000 tons of flue-cured tobacco may enter the EC under this agreement.

Information obtained from Mr. Ken Howland of the Tobacco Division of the Foreign Agricultural Service, U.S.D.A., Washington, D.C.

APPENDIX D

Appendix Table D.1. Member Countries of Specified Trade Coalitions

Eurpoean Free Trade Area (EFTA)

The United Kingdom
Denmark
Sweden
Norway
Austria
Switzerland
Portugal
Finland
Iceland

Latin American Free Trade Area (LAFTA)

Argentina
Bolivia
Brazil
Chile
Colombia
Ecuador
Mexico
Paraguay
Peru
Uruguay
Venzuela

Central American Common Market (CACM)

Costa Rica
El Salvador
Guatemala
Honduras
Nicaragua

Caribbean Free Trade Area (CARIFTA)

Antigua
Barbados
Guyana
Trinidad and Tobago
Dominica
Grenada
British Honduras
St. Kitts - Nevis
Anquilla
St. Lucia
St. Vincent
Montserrat
Jamaica

European Community (EC)

Federal Republic of Germany
France
Italy
Netherlands
Belgium - Luxembourg
United Kingdom
Denmark
Ireland

Appendix Table D.1. Continued

COMECON

The Soviet Union
Poland
Czechoslovakia
Hungary
German Democratic Republic

APPENDIX E

Appendix Table E.1. Percentages of Total Exported United States Flue-Cured Tobacco Imported by Japan, West Germany and the United Kingdom, 1965-1976

Year	Quantity Imported by Japan	Percent of U.S. Exports	Quantity Imported by West Germany	Percent of U.S. Exports	Quantity Imported by the United Kingdom	Percent of U.S. Exports
	1,000 pounds	percent	1,000 pounds	percent	1,000 pounds	percent
1965	36,574	10.4	67,374	19.0	81,377	23.2
1966	42,016	10.0	80,480	19.0	107,361	25.5
1967	26,259	6.0	94,784	22.0	111,410	26.0
1968	41,925	9.0	73,521	16.6	112,194	25.3
1969	34,708	8.0	79,759	19.0	111,388	26.0
1970	44,207	12.0	71,013	19.0	83,470	22.9
1971	13,418	4.0	80,882	24.0	73,301	21.0
1972	66,082	16.0	75,507	18.0	89,800	21.0
1973	55,260	13.0	74,519	18.0	95,285	23.0
1974	77,107	17.0	71,289	16.0	71,463	16.0
1975	55,142	14.1	72,820	18.6	60,034	15.3
1976	90,391	23.9	50,133	13.2	51,248	13.5

APPENDIX F

Appendix Table F.1. Quarterly Quantities of North American Flue-Cured Tobacco Imported by Japan, West Germany and the United Kingdom, 1965-1974

Year	Japan (QMJN)	West Germany (QMWG)	United Kingdom (QMUK)
	pounds		
1965	0	8,030,861	16,712,596
	0	18,059,990	28,890,244
	0	25,420,233	69,205,076
	36,573,529	11,342,530	51,464,594
1966	5,462,461	18,440,346	26,687,555
	970	12,471,649	16,755,248
	0	39,799,197	43,324,337
	36,553,062	11,863,743	58,978,253
1967	582,000	22,884,686	32,050,423
	3,369,034	33,171,251	34,020,241
	0	15,299,210	38,705,205
	22,308,368	24,495,883	50,744,634
1968	10,372,176	8,007,420	36,716,273
	2,312,135	20,057,337	36,737,028
	18,897	34,207,232	41,785,101
	29,221,398	11,552,020	39,069,754
1969	1,846,800	6,512,185	17,841,354
	19,234	37,998,168	46,735,272
	464,950	25,992,307	52,570,319
	32,374,094	9,889,183	16,124,181
1970	5,372,395	11,147,013	24,611,865
	889,649	21,439,276	20,547,361
	0	21,071,300	60,061,397
	37,934,933	17,910,642	39,383,687
1971	1,167,147	14,709,967	34,539,866
	0	40,506,814	55,083,525
	3,601,064	30,085,772	56,084,342
	8,650,156	1,483,657	74,689,810
1972	32,714,226	19,598,012	48,617,151
	0	24,190,811	54,842,794
	2,131,540	24,274,003	72,679,226
	31,236,372	9,913,500	94,590,388

Appendix Table F.1. Continued

Year	Japan (QMJN)	West Germany (QMWG)	United Kingdom (QMUK)
	pounds		
1973	19,062,745	4,155,388	35,818,328
	0	32,350,121	27,480,578
	1,756,200	17,392,446	21,446,545
	34,722,562	20,006,223	51,710,448
1974	25,453,950	5,720,379	33,100,358
	0	31,833,151	15,645,150
	558,000	28,501,698	19,123,770
	51,653,533	4,234,121	44,675,565

SOURCES: Canadian Data, U.N. Commodity Trade Statistics; U.S. Data, U.S. Commerce Department Commodity by Country, Schedule B.

Appendix Table F.2. Quarterly Average Prices of North American Flue-Cured Tobacco Imported by Japan, West Germany and the United Kingdom, 1965-1974

Year	Japan (PNAJ)	West Germany (PNAW)	United Kingdom (PNAU)
	dollars per pound		
1965	0.778	0.660	0.897
	0.975	1.077	0.874
	0.909	0.804	1.015
	0.958	0.707	0.998
1966	0.860	0.828	0.995
	1.000	0.862	0.918
	0.932	0.855	1.010
	0.960	0.857	1.030
1967	0.960	0.845	1.107
	0.860	0.897	0.944
	1.020	0.923	1.126
	0.930	0.908	1.109
1968	0.960	0.890	1.087
	0.850	0.850	1.016
	0.608	0.818	1.147
	1.137	0.836	1.189
1969	1.250	0.930	1.090
	0.970	0.930	0.995
	1.480	0.900	1.185
	1.269	0.860	1.270
1970	1.280	0.970	1.119
	1.120	0.990	0.998
	1.120	0.970	1.240
	1.070	0.939	1.150
1971	0.930	0.920	1.240
	1.080	1.020	1.050
	1.490	0.970	1.130
	1.480	1.000	1.110
1972	1.410	1.020	1.180
	1.170	1.010	0.990
	1.620	0.990	1.030
	1.570	1.020	1.060

Appendix Table F.2. Continued

Year	Japan (PNAJ)	West Germany (PNAW)	United Kingdom (PNAU)
	dollars per pound		
1973	1.570	1.025	1.450
	1.240	1.110	1.369
	1.790	1.120	1.480
	1.730	1.106	1.477
1974	1.720	1.230	1.376
	1.330	1.190	1.457
	1.700	1.220	1.498
	2.010	1.330	1.777

SOURCES: Canadian Data, U.N. Commodity Trade Statistics; U.S. Data, U.S. Department of Commerce, Commodity by Country, Schedule B.

Appendix Table F.3. Quarterly Average Prices of Competing Nation Flue-Cured Tobacco Imported by Japan, West Germany and the United Kingdom, 1965-1974[a/]

Year	Japan (PNJ)	West Germany (PNW)	United Kingdom (PNV)
	dollars per pound		
1965	0.376	0.531	0.585
	0.370	0.531	0.585
	0.503	0.592	0.632
	0.689	0.651	0.632
1966	0.619	0.559	0.836
	0.660	0.559	0.581
	0.676	0.608	0.571
	0.650	0.574	0.488
1967	0.621	0.535	0.706
	0.635	0.466	0.787
	0.539	0.468	0.656
	0.384	0.455	0.646
1968	0.457	0.482	0.656
	0.640	0.471	0.871
	0.595	0.511	0.694
	0.481	0.515	0.806
1969	0.460	0.489	0.580
	0.650	0.490	0.762
	0.685	0.503	0.526
	0.692	0.512	0.661
1970	0.495	0.403	0.708
	0.670	0.438	0.560
	0.757	0.402	0.616
	0.689	0.403	0.715
1971	0.500	0.403	0.650
	0.690	0.479	0.740
	0.631	0.049	0.720
	0.478	0.044	0.708
1972	0.950	0.516	0.785
	0.640	0.056	0.760
	0.630	0.058	0.753
	0.788	0.053	0.740
1973	0.608	0.668	0.869
	0.607	0.707	0.920
	0.740	0.792	0.970
	0.766	0.738	0.816

Appendix Table F.3. Continued

Year	Japan (PNJ)	West Germany (PNW)	United Kingdom (PNV)
	dollars per pound		
1974	0.658	0.685	0.930
	0.810	0.797	0.103
	0.889	0.791	1.054
	1.124	0.890	1.120

[a/] This is a weighted average price of flue-cured tobacco exported by those countries identified in chapter four as competitors with North American flue-cured tobacco exports.

SOURCE: U.N. Commodity Trade Statistics.

Appendix Table F.4. Quarterly Gross National Product in Japan, West Germany, and the United Kingdom, 1965-1974

Year	Japan (GNPJ)	West Germany (GNPW)	United Kingdom (GNPU)
	billions of yen	millions of d-marks	million of pounds
1965	71,690	1,797.53	154.30
	69,668	1,934.86	158.19
	72,527	2,008.80	162.75
	96,886	2,160.21	170.46
1966	80,174	1,926.96	162.59
	77,979	2,066.09	169.35
	84,645	2,106.09	170.81
	110,601	2,253.91	178.66
1967	94,686	1,942.81	174.50
	97,578	2,043.33	181.04
	103,543	2,083.19	182.86
	134,928	2,325.82	187.94
1968	110,100	2,204.41	183.97
	115,313	2,242.33	189.58
	120,467	2,299.21	194.83
	159,541	2,368.15	205.14
1969	123,894	2,415.36	195.39
	132,451	2,515.75	205.11
	139,144	2,614.55	245.58
	181,147	2,691.19	230.42
1970	149,104	2,633.14	225.55
	158,948	2,783.18	208.41
	165,676	2,832.65	220.60
	202,770	2,921.68	209.08
1971	170,076	3,015.17	230.17
	175,663	3,064.12	251.03
	182,405	3,135.91	261.28
	220,350	3,166.91	274.95
1972	187,194	3,312.79	272.76
	195,398	3,294.96	274.91
	205,959	3,366.30	279.03
	258,232	3,460.35	304.12
1973	238,728	3,643.70	304.13
	253,433	3,711.47	310.39
	263,620	3,756.66	327.73
	277,708	3,845.41	346.68

Appendix Table F.4. Continued

Year	Japan (GNPJ)	West Germany (GNPW)	United Kingdom (GNPU)
	billions of yen	million of d-marks	million of pounds
1974	274,752	3,889.43	313.20
	297,620	3,968.41	349.83
	308,662	4,040.94	378.95
	316,130	4,126.37	413.08

SOURCE: International Monetary Fund. International Financial Statistics.

Appendix Table F.5. Quarterly Average Exchange Rates Between Yen, D-Marks, Pounds Sterling and the U.S. Dollar, 1965-1974

Year	Japan (ENJ)	West Germany (EWG)	United Kingdom (EUK)
	yen/dollar	D-marks/dollar	pounds/dollar
1965	361.00	3.977	0.3583
	362.00	4.003	0.3581
	362.30	4.011	0.3568
	360.90	4.006	0.3567
1966	362.10	4.016	0.3579
	362.50	4.000	0.3583
	362.40	3.989	0.3582
	362.50	3.977	0.3583
1967	362.20	3.975	0.3574
	361.90	3.986	0.3583
	361.70	4.004	0.3591
	361.90	3.999	0.4154
1968	362.00	3.981	0.4163
	361.50	3.995	0.4195
	358.80	3.976	0.4184
	357.70	4.000	0.4193
1969	357.90	4.024	0.4176
	359.00	4.003	0.4182
	357.60	3.966	0.4177
	357.80	3.690	0.4187
1970	357.50	3.663	0.4174
	358.70	3.631	0.4155
	357.90	3.632	0.4166
	357.60	3.648	0.4196
1971	357.40	3.630	0.4137
	357.40	3.497	0.4133
	334.20	3.318	0.4023
	314.80	3.268	0.3918
1972	304.20	3.168	0.3823
	301.10	3.156	0.4092
	301.00	3.202	0.4132
	302.00	3.202	0.4259
1973	265.83	2.838	0.4036
	265.30	2.425	0.3873
	265.70	2.420	0.4143
	280.00	2.703	0.4304

Appendix Table F.5. Continued

Year	Japan (ENJ)	West Germany (EWG)	United Kingdom (EUK)
	yen/dollar	D-marks/dollar	pounds/dollar
1974	276.00	2.523	0.4177
	284.10	2.555	0.4183
	298.50	2.653	0.4288
	300.95	2.409	0.4258

SOURCE: International Monetary Fund, International Financial Statistics.

Appendix Table F.6. Quarterly Average Consumer Price Indexes in Japan, West Germany and the United Kingdom, 1965-1974[a/]

Year	Japan (CPIJ)	West Germany (CPIW)	United Kingdom (CPIU)
1965	0.750	0.865	0.780
	0.771	0.874	0.798
	0.764	0.907	0.805
	0.784	0.907	0.813
1966	0.790	0.907	0.813
	0.805	0.915	0.813
	0.805	0.915	0.835
	0.812	0.915	0.835
1967	0.830	0.923	0.842
	0.826	0.923	0.850
	0.830	0.923	0.850
	0.860	0.923	0.857
1968	0.874	0.932	0.872
	0.881	0.932	0.894
	0.887	0.932	0.894
	0.900	0.948	0.909
1969	0.907	0.957	0.925
	0.925	0.965	0.940
	0.948	0.965	1.006
	0.954	0.970	0.995
1970	0.987	0.989	0.972
	0.996	0.998	0.949
	0.993	1.002	0.940
	1.031	1.007	1.027
1971	1.040	1.035	1.055
	1.058	1.050	1.093
	1.068	1.057	1.108
	1.085	1.068	1.122
1972	1.089	1.090	1.140
	1.109	1.102	1.160
	1.121	1.116	1.179
	1.137	1.134	1.208
1973	1.173	1.161	1.230
	1.230	1.182	1.268
	1.268	1.193	1.289
	1.308	1.217	1.332

Appendix Table F.6. Continued

Year	Japan (CPIJ)	West Germany (CPIW)	United Kingdom (CPIU)
1974	1.431	1.246	1.387
	1.502	1.266	1.471
	1.554	1.278	1.508
	1.620	1.295	1.575

[a]/Base year = 1967.

SOURCE: International Monetary Fund, International Financial Statistics.

Appendix Table F.7. Selected Quarterly Average Cigarette Prices in Japan and West Germany, 1965-1974

Year	Japan (PCJ)	West Germany (PCW)
	yen per 20 cigarettes	pfennigs per cigarette
1965	75	8.00
	75	8.00
	75	8.00
	75	8.00
1966	75	8.40
	75	8.40
	75	8.40
	75	8.40
1967	75	9.20
	75	9.20
	75	9.20
	75	9.20
1968	75	9.27
	90	9.27
	90	9.27
	90	9.27
1969	90	9.27
	90	9.27
	90	9.27
	90	9.27
1970	90	9.30
	90	9.30
	90	9.30
	90	9.30
1971	90	9.30
	90	9.30
	90	9.30
	90	9.30
1972	90	9.30
	90	9.30
	90	9.30
	90	9.30

Appendix Table F.7. Continued

Year	Japan (PCJ)	West Germany (PCW)
	yen per 20 cigarettes	pfennigs per cigarette
1973	90	11.20
	90	11.20
	90	11.20
	90	11.20
1974	90	11.25
	90	11.25
	90	11.25
	90	11.25

SOURCE: Mr. Daniel Stevens, Tobacco Division, Foreign Agricultural Service; and Foreign Agricultural Attaches Monthly Reports.

Appendix Table F.8. Price Conversion Factors Used to Arrive at a Flue-Cured Tobacco Export Price for Each Specified Country, 1965-1975[a/]

Year	Canada	Brazil	India	Malawi	S. Korea	Philippines	Thailand
1965	1.02	1.00	1.100	1.420	.89	1.210	1.125
1966	1.02	1.00	1.090	1.720	1.06	1.230	1.090
1967	1.03	1.00	1.130	2.190	1.089	1.240	1.030
1968	1.01	1.00	1.170	1.986	1.140	1.400	.976
1969	1.02	1.00	1.160	1.485	1.230	1.318	1.110
1970	1.02	1.00	1.120	1.000	1.030	1.500	.970
1971	1.09	1.00	1.136	1.100	1.040	1.530	1.000
1972	1.02	1.06	.977	1.480	1.110	1.420	1.000
1973	1.32	1.17	1.02	1.690	1.290	1.220	1.070
1974	1.28	1.15	1.05	1.780	1.270	1.219	1.030
1975	1.27	1.08	1.00	—	1.038	1.230	1.000

[a/] The procedure for obtaining flue-cured tobacco export prices for the competing countries identified in this study is discussed in chapter five. The above factors are multiplied times the price of tobacco reported by the F.A.S. to obtain the flue-cured tobacco price.

SOURCE: U.S.D.A., Foreign Agricultural Service.

Appendix Table F.9. Flue-Cured Tobacco as a Percentage of Total Tobacco Produced in the Specified Country, 1960-1976[a]

Year	Canada	Brazil
	percent	
1960	96.0	34.6
1961	93.0	38.0
1962	93.5	32.7
1963	92.7	38.5
1964	93.0	34.0
1965	94.8	47.5
1966	95.5	33.0
1967	94.9	40.8
1968	96.7	40.0
1969	97.0	40.0
1970	96.5	43.5
1971	96.0	44.7
1972	97.0	41.0
1973	97.0	39.0
1974	98.0	49.0
1975	97.6	60.0
1976	97.0	62.0

Year	India	Thailand
	percent	
1960	24.9	32.6
1961	22.5	33.0
1962	21.6	34.6
1963	23.0	34.0
1964	28.6	34.0
1965	24.0	38.0
1966	26.0	38.7
1967	25.9	44.0
1968	26.0	49.0
1969	33.2	47.0
1970	24.0	49.0
1971	21.5	51.0
1972	33.3	48.0
1973	31.0	46.0
1974	31.8	54.1
1975	28.0	57.2
1976	25.0	57.0

Appendix Table F.9. Continued

Year	Philippines	Malawi[b/]	South Korea
	percent		
1960	53.0	--	58.0
1961	47.0	--	66.0
1962	43.5	--	66.0
1963	49.0	--	79.0
1964	45.0	--	82.0
1965	46.0	--	79.5
1966	38.6	6.0	75.0
1967	51.0	11.3	67.7
1968	43.3	18.9	67.8
1969	43.9	23.0	78.0
1970	42.5	21.0	77.0
1971	43.0	23.0	71.0
1972	52.0	28.0	69.6
1973	25.0	31.0	72.0
1974	38.0	38.0	74.6
1975	51.0	42.0	72.5
1976	54.0	42.0	70.0

[a/] The conversion process for competing flue-cured tobacco was discussed in chapter five. The above information is used to determine the quantity of flue-cured tobacco exported by the specified country.

[b/] 1960-1965 data for Malawi are not available.

SOURCE: U.S.D.A., Foreign Agricultural Service.

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QUARTERLY IMPORT DEMAND FOR NORTH AMERICAN FLUE-CURED TOBACCO

by

James C. Richardson

(ABSTRACT)

Decreases in the North American market share of flue-cured tobacco exports indicates that producers on this continent have entered into an era of competition from foreign flue-cured tobacco exporters. In order to understand this problem and obtain additional information on the factors influencing importation of North American flue-cured tobacco, quarterly import demand equations were estimated for the three major importers of North American flue-cured leaf--Japan, West Germany and the United Kingdom.

Factors hypothesized to affect import demand in these countries included: import price of North American leaf (own price), import prices of leaf produced in selected non-North American countries (competing prices), price of cigarettes in the importing country, inventories on hand in the importing country, the exchange rate between U.S. dollars and the importing country's currency, and tariffs placed on the imported tobacco.

At mean variable values, imports of North American flue-cured tobacco were found to be highly elastic with respect to own price

changes. West German and United Kingdom imports were inelastic with respect to competing price changes. Variables accounting for manufacturer inventories and for seasonality were also significant.

The high own-price elasticities encountered in this study suggest that North American flue-cured export revenues would rise if prices charged to importing countries were lowered. One method of accomplishing this would be discontinuance of the tobacco allotment-quota and price support programs. There is insufficient evidence to support the contention that export revenues are affected by exchange rates, foreign tariff levels or cigarette prices.