THE IMPORT DEMAND FOR U.S. BURLEY TOBACCO IN EUROPEAN MARKETS

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One of the chief complaints against the federal tobacco program is that it sets prices too high relative to foreign tobaccos: most foreign burley tobaccos are priced between one-third and one-half the price of U.S. burley. Critics feel that if the government program were changed so that burley production could increase, prices would be lower, and more burley tobacco would be consumed. Production increases could bring about two beneficial effects. First, U.S. burley tobacco would be more competitive in overseas markets, and, therefore, exports could increase. Second, U.S. imports of foreign burley could decrease. This study examines the validity of the first argument; its main objective is to evaluate the elasticity of demand for U.S. burley tobacco in European markets. Of course, the more price elastic is the demand for U.S. burley in these European markets, the more exports will expand if U.S. prices are lowered. Evidence is also provided on the growth potential of these foreign markets.

The United States has seen substantial erosion of its share of world burley trade since the late 1960s. The U.S. accounted for 49 percent of world burley exports in 1965, but it has accounted for only about 27 percent of world exports since 1975 (USDA, *Foreign Agricultural Circular*). However, the volume of its exports has doubled since 1965. Therefore, the erosion of the U.S. market share has come from an increase in exports from other countries, rather than a decrease in U.S. exports.

Imports of burley tobacco by the United States have been increasing steadily. From 1960–69, flue-cured and burley imports totaled 4,936 metric tons, compared to this country's production during that period of approximately 8.2 billion metric tons: imports accounted for less than .01 percent of total production for the United States. During 1977–79, we imported 19,969 metric tons of burley alone, while producing 760,049 metric tons. Imports during this more recent period were about 2.6 percent of U.S. production (USDA, *Foreign Agricultural Circular* and *Tobacco Situation*); in recent years, this country has been one of the leading burley importers.

The U.S. is not the only large exporter and importer of burley tobacco. Italy, Greece, South Korea, and almost every other burley exporting country import substantial amounts of burley. These foreign exporters typically import large amounts of American burley tobacco.

These apparent contradictions, which have some countries importing and exporting large amounts of burley at the same time, exist because the quality of U.S. burley is substantially higher than that of any other burley. Apparently, American-blend cigarettes must contain a certain amount of high quality burley in order to assure the desired smoking characteristics. Thus, American burley commands a substantially higher price than foreign burley, and the U.S. can be the leading burley exporter, as well as a significant importer.

Therefore, the great differences between the prices of U.S. and foreign burleys could be totally the result of quality differences. However, this does not preclude some substitution between U.S. and foreign burleys. As long as this possibility exists, the total demand for the American product could be very price responsive.

In order for total revenue of U.S. burley producers to increase from additional production (therefore reducing the price), the elasticity of demand for burley tobacco must be greater than unity in absolute value. Other studies (Mann; Reed) have found that the demand for burley tobacco in the domestic market is inelastic. Therefore, other things equal, the only way that an increase in the quota can increase revenue to producers is if the export demand elasticity for U.S. burley is elastic enough to offset this loss of revenue in the domestic market.

Previous studies on the market for burley tobacco have concentrated on our domestic market (Mann; Sutton). The only study that examines the impact of the U.S. burley price on U.S. exports of burley is by Reed. Reed used an equation in his block recursive model to explain exports of burley and found that exports were price responsive; however, he found that the demand for U.S. exports was inelastic.

Capel's study on exports of flue-cured tobacco is the only attempt at studying the demand for any type of tobacco on a national basis. He used

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a market share model to explain U.S. flue-cured exports to various foreign markets. His model specified the U.S. market share as a function of the relative price of U.S. tobacco. The main difficulty he encountered was that data on the total amount of flue-cured tobacco imported by a particular country were not available. Total flue-cured imports had to be constructed from data on total tobacco imports and estimates of the U.S. market share from agricultural attachés. Capel found that the elasticity of substitution between U.S. flue-cured and other flue-cured tobacco varied greatly from country to country.

MODEL SPECIFICATION

The model specified here is somewhat similar to Capel's model. The main difference is that Capel's model explained the U.S. share of a market, whereas this model estimates the volume of U.S. exports to that market. We chose to predict the volume of American exports rather than the share, because no reliable data are available on total imports of burley tobacco by country or region. A three-equation recursive model was used to explain the market for U.S. burley in European markets. The specification for a given country follows:

$$(1) \quad USX = g(CP, RP)$$
$$(2) \quad CPP = f(Y)$$
$$(3) \quad CP = CPP \cdot POP$$

where

USX is imports of unmanufactured burley tobacco from the U.S. (in metric tons),
CP is cigarette production in the importing countries (in millions of pieces),
RP is the relative price of U.S. burley tobacco in the importing country (unit free),
CPP is per capita cigarette production in the importing country,
Y is per capita GNP in the importing country (in thousand dollars), and
POP is population in the importing country.

Equation 1 explains a country's import demand for U.S. burley tobacco. Import demand is a function of cigarette production and of the price of U.S. burley relative to the price of burley from other exporting nations.[1] Foreign prices were transformed into dollars using an exchange rate, thus the relative price of U.S. burley is unit free. This specification assumes that American burley tobacco is different from that produced by other burley exporters (as Capel's specification did), and that all non-U.S. burleys are perfect substitutes among themselves.

The country's cigarette production is included in equation 1 to capture the fact that the demand for burley tobacco is derived from the demand for cigarettes. Typically, manufacturers, in a given marketing year, wish to buy tobacco to replace that which has been used in the making of cigarettes. Hence, there is a structural link between cigarette production (or tobacco disappearance) and the demand for tobacco (and, therefore, the import demand for tobacco). This specification is consistent with the specifications of Reed and Sutton in which the demand for burley was structurally influenced by domestic disappearance.

Equation 2 explains the importing country's per-capita production of cigarettes. Per-capita cigarette production is a function of per-capita income. Cigarette prices are not included in this specification, because data on cigarette prices are available from only a few foreign countries. In addition, the prices of various brands of cigarettes vary so widely in foreign countries that the data could be misleading.

Equation 3 is simply an identity. In this model, population and per-capita income do not have a direct link to burley imports. The structure is that population and per-capita income affect cigarette production, which, in turn, affects burley imports.

Earlier specifications of equation 1 included production of burley tobacco by the importing country as a variable. Also, the prices of U.S. burley and of foreign burley were included as separate variables. These earlier specifications were judged inferior to equation 1 on the basis of t-values on coefficients and $\bar{R}^2$.

The European countries included in the analysis were Denmark, West Germany, Italy, and the Netherlands, of the European Economic Community (EEC); and Finland, Norway, Portugal, Sweden, and Switzerland, of non-EEC Europe. These countries are the leading European importers of U.S. burley. In addition to the individual country models, separate models for the EEC, non-EEC Western Europe, and all Western Europe were fitted in order to provide a more aggregated view.

DATA

The Common Agricultural Policy of the EEC plays an important role in determining the EEC's trading pattern for tobacco. Two components are particularly relevant to this study. One is the buyer's premium, which is an amount paid to manufacturers per pound of EEC-grown burley tobacco that they purchase. This makes the real cost of EEC-grown tobacco to manufacturers lower than the average grower's price. The second element is the tariff on imported burley to-

[1] The foreign prices used in the denominator of the relative price varied by importing region. See Schnepf for a complete description of all prices used.

bacco from the United States. Therefore, the buyer's premium was subtracted from all EEC prices, and the tariff was added to the U.S. prices used for this study.

Data on imports of U.S. burley, cigarette production, and all burley prices (including the buyer's premium and tariffs) were obtained from the USDA. Population, GNP, and exchange rates came from the International Monetary Fund. The observation period was from 1959 to 1978 on an annual basis.

Unfortunately, the data on imports of burley from the U.S. are not adjusted by transshipments for any countries. Even if transshipments of American burley were known, it would not account for re-exports after U.S. burley had been blended with other burleys or other types of tobaccos. This is a problem when analyzing the European market for U.S. burley.

Rotterdam is a leading port for all of Europe because it can handle large ships. Goods are commonly shipped there, then loaded on smaller ships that are sent to other European ports, or sent by land to other European countries. Such transshipments are taken into account in the compilation of trade data for many agricultural products such as grains and oilseeds, but not for tobacco. If Sweden receives American tobacco that is transshipped through Rotterdam, trade statistics will show this as an export from the U.S. to the Netherlands, and an export the Netherlands to Sweden. For this reason, the Netherlands is a fair-sized exporter of tobacco, while its production of tobacco is virtually zero (USDA, *Foreign Agricultural Circular*). This overestimates U.S. burley exports to the Netherlands and underestimates exports to other European countries.

RESULTS

Seemingly unrelated regression (SUR) was employed to estimate the coefficients for equations 1 and 2. This method was used for it was felt that error terms between countries could be correlated because of omitted variables or other reasons. SUR provides estimates of parameters that are asymptotically more efficient than ordinary least squares by using the correlation between contemporaneous disturbances of the country models (Kmenta). The correlation between error structures in this study was large enough to change substantially the results between OLS and SUR. All functional forms are log-linear, hence, elasticities are constant.

The results for equation 1, which explains imports of U.S. burley, indicated that the lack of transshipment data greatly distorted the results. For many countries, neither cigarette production nor the relative price of American tobacco explained imports from the U.S. Therefore, individual country results are not reported here, but are available upon request. Instead, only the results for the EEC, non-EEC Western Europe, and Western Europe are reported.

Tables 1 and 2 show the coefficient estimates and standard errors for the regional models. All coefficients are elasticities, because the specification is log-linear. The results of the import demand equations indicate that cigarette production is a major determinant of burley imports for the EEC and total Western Europe. The elasticities of demand for U.S. burley with respect to cigarette production for these two areas were .68 and .71, respectively. If one assumes that the proportion of U.S. burley in an American-blend cigarette manufactured in these markets remains the same, these elasticities measure the percentage of additional cigarette production that is of the American blend. In other words, if U.S. bur-

TABLE 1. Results of the Import Demand Equation for U.S. Burley Tobacco by Region[a]

Region	Intercept	CP[b]	RP[b]
All EEC	1.84	.68**	- .78
	(2.66)	(.19)	(.32)
All Non-EEC Western Europe	5.05*	.21	1.13
	(2.38)	(.19)	(.73)
All Western Europe	- .04	.77**	- .03
	(1.92)	(.14)	(.38)

[a] All coefficients are elasticities. Standard errors are in parentheses.
[b] CP = cigarette production in importing countries. RP = relative price of U.S. burley in importing countries.
* Significance at the 5 percent level.
** Significance at the 1 percent level.

TABLE 2. Results of the Cigarette Production Equation by Region[a]

Region	Intercept	Y[b]
All EEC	-.28**	.31**
	(.05)	(.02)
All Non-EEC Western Europe	-.18**	.35**
	(.05)	(.03)
All Western Europe	-.29**	.33**
	(.05)	(.02)

[a] All coefficients are elasticities. Standard errors are in parentheses.
[b] Y = Per Capita GNP in importing countries.
** Significance at the 1 percent level.

ley imports can serve as a guide as to the amount of American-blend cigarettes produced, then these results show that 68 percent of the increase in cigarette production in the EEC will be American blends. For non-EEC Western Europe, only 21 percent will be American blends under these assumptions.

U.S. burley exports were found to be significantly price responsive for the EEC only, with a price elasticity of demand of −.78. The price elasticity of demand for non-EEC Western Europe model was actually positive. However, one must remember the problems with transshipments for the non-EEC Western Europe model. Transshipments from EEC countries are not accounted for by the import data for non-EEC countries.

The price elasticity is negative, but not significant, for the aggregated European model. One problem with the aggregated European model is that the cost of imported U.S. burley differs between EEC and non-EEC countries because of the EEC tariff on U.S. burley. In addition, the buyer's premium, which is paid to EEC manufacturers for use of Italian burley, is not relevant to non-EEC countries.[2] Therefore, the accuracy of the relative price variable is diminished in the equation for all Western Europe.

The results of the cigarette production equations (Table 2) indicate that per-capita income is an important determinant of cigarette production for the regions studied. All income elasticities were less than one and were significantly different from zero at the 1-percent level. The income elasticities ranged between .31 and .35.

By substituting the results of equations 1 and 2, and using the identity (equation 3), one can obtain reduced-form elasticities for the demand for U.S. burley. These reduced-form elasticities are shown in Table 3. All reduced-form elasticities are of the expected sign, except for the elasticity of relative price for non-EEC Western Europe.

TABLE 3. Reduced-Form Elasticities for the Demand for U.S. Burley Tobacco[a]

Region	RP[b]	POP[b]	Y[b]
All EEC	-.78	.68	.21
All Non-EEC Western Europe	1.13	.21	.07
All Western Europe	-.03	.77	.25

[a] All coefficients are elasticities.
[b] RP = relative price of U.S. burley in importing countries. POP = population in the importing countries. Y = Per Capita GNP in importing countries.

CONCLUDING REMARKS

The results of this study indicate that, at least in some foreign markets, U.S. burley sales are price responsive. That is consistent with the more aggregated results by Reed. However, even in the markets studied, demand elasticities are less than unity. Given the results of this study and previous estimates that the demand for cigarette tobacco in the U.S. is inelastic, one must be skeptical of the argument that increases in production will bring large increases in burley tobacco exports. Exports and domestic disappearance do increase, but this increase will not compensate for the lower price when one considers the domestic and European markets for burley.

It is possible that other world markets have a much greater import demand elasticity than found in this study. Asian countries such as South Korea and Taiwan, which are major growth markets, and African countries may be much more price conscious in their purchasing decisions. This is an obvious avenue for future research.

Burley producers and the burley industry as a whole must remember that total burley exports from the U.S. have been increasing. A key to this trend has been the promotional work in overseas markets, which has increased the demand for American-blend cigarettes. In some markets, the increase in burley imports from the U.S. has outstripped the increases in cigarette production (on a percentage basis). A continuation of this would be of great benefit to burley producers.

It is difficult to say anything about American exports to non-EEC Western Europe. The result that cigarette production in non-EEC Western Europe has little effect on burley imports from the U.S. may indicate a great potential for expanding the American-blend cigarette and, therefore, the demand for U.S. burley. It is possible that in future years, the American-blend cigarette could play as great a role in non-EEC Western Europe as it currently plays in the EEC. Market development and promotion could be a key in this regard.

It appears that income increases could also play an important role in the future. Many European countries have had fairly high rates of economic growth, especially West Germany. However, changes in the Common Agricultural Policy could temper these effects. Even though the tariff on U.S. tobacco was lowered recently, the entry of Greece, a major burley exporter, into the EEC could have a significant impact on U.S. exports. Greece's entry into the EEC would make its burley tobacco much less expensive for EEC manufacturers because of the buyer's premium.

The results of this study indicate that popula-

[2] The relative price used in the analysis for "all Western Europe" is the relative price in the EEC.

tion increases can have substantial impacts on burley imports from the U.S. However, Europe's population has been growing at a fairly low rate in recent years (about .25 percent per year). The developing countries mentioned earlier may be the key to increased exports as a result of population and income growth. However, the essential finding from this study is that increases in American production will not generate large increases in exports or export revenues for U.S. burley producers in European markets. Demand factors, such as population, income, and opening of new markets, may hold much more promise.

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