An Economic Analysis of Import Demand for Canola Oil in the United States

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Abstract:

The study analyzes the impacts of economic and noneconomic factors on import demand for canola oil. The import demand pattern for canola oil in the United States is influenced by changes in the world's oilseeds market and government oilseeds programs and policies, including tariffs and subsidies. The U.S. import demand for canola oil was specified as a function of its own import price, prices of substitute edible vegetable oils (soybean oil and palm oil), disposable personal income, the Canadian-U.S. dollar exchange rate, lagged imports, trend factor, and seasonality. Generalized Least Squares (GLS) was employed to estimate equation parameters. Based on analysis of monthly data for January 1989 through October 1993, U.S. import demand for canola oil was influenced mostly by prices of substitute vegetable oils (soybean and palm oils), the U.S.-Canadian exchange rate, and the change in consumers' tastes and preferences. The elimination of tariffs and subsidies under the auspices of the U.S.-Canadian Free Trade Agreement and the passage of the 1990 U.S.Farm Bill should lead to the continued expansion of canola and canola oil production in the United States. Moreover, canola oil may continue to gain in market share in the United States due to consumer preference for its health benefits driving consumption upward with rising pressure on price.

----KEYWORDS----

canola oil, demand

Introduction

During the last three decades food consumption patterns in the United States have been changing gradually. These changes have significantly influenced trade flows in some of the world's major agricultural commodities. Forces responsible for shaping the demand for food are varied. They include not only economic and demographic factors but also changes in lifestyles which influence consumers' tastes and preferences.[1]

The most recognizable pattern in food consumption behavior during the last twenty years has been the shift away from diets rich in animal products toward more fruits and vegetables, cereals, and grain products. Consumer demand for high quality dietary fats and oils created increasing demand for vegetable oils. Vegetable oil consumption in the United States has increased more than 40% over the period 1970-1993.[2]

Canola oil is "the healthiest" among all commercially traded oils. It contains an almost perfectly balanced mixture of fatty acids for human nutrition and health. Canola oil is free of cholesterol and is very effective in reducing the risk of cardiovascular diseases. Canola oil has the lowest saturated fat content of any vegetable oil, only 6% compared with 15% for soybean oil, the dominant U.S. vegetable oil, and 86% for palm oil.[3] The perception of canola oil as a healthy oil has boosted its consumption dramatically.

Individual companies are promoting the benefits of canola oil to the consumer. The educational campaign generally focuses on identifying canola oil as a readily recognizable product for consumer, (2) promoting its health benefits, (3) emphasizing the positive technical attributes of canola oil, and (4) promoting the identity of canola oil in final consumer products like salad dressing.[4]

Since canola oil was approved by the Food and Drug Administration in 1985 as an edible product, its consumption in the United States has grown from virtually zero to over 900 million pounds in 1993. Domestic production has responded to the increase in consumer demand as U.S. acreage and production of canola has been increasing steadily.[5]

However, domestic supply could not meet the rapid acceptance and sharp growth in consumer demand for canola oil. The record crush (initial processing) in 1994/1995 was expected to produce 481 million pounds of canola oil, a level far below the 1994/1995 total demand of 1.4

billion pounds, resulting in 963 million pounds of canola oil being imported mostly from Canada.[6] Greater canola oil imports have largely satisfied the accelerating demand for the last five years, as consumption has outpaced domestic production. In effect, the United States appears dependent upon imported oil to satisfy usage. Production and imports of canola oil for the period 1981-1994 are illustrated in Figure 1.

Despite growing popularity of canola oil among consumers there is no solid consensus about how its role will evolve in the U.S. vegetable oil market. In Canada canola oil has moved from a relatively minor share of vegetable oil consumption less than two decades ago to close to 62% of the total vegetable oil consumed at present. In the United States canola oil still accounts for a small segment of the vegetable oil industry. The likelihood that canola oil will capture a larger share of the U.S. vegetable oil market depends on a number of factors driving the demand of this product and products that compete with canola oil for market share. The distribution between the quantity of canola oil imported and produced domestically is affected in part by import prices. These prices determine the profitability of domestically producing and crushing canola as opposed to importing the oil.

Objectives

The objectives of the study are to determine the factors influencing the demand for canola oil and to estimate the impact of these factors on the U.S. import demand for canola oil. The paper is organized as follows. The U.S. oilseed market and government oilseed programs and policies influencing import demand are analyzed, related literature is reviewed, a U.S. import demand model is specified, results and interpretations are presented, and conclusions are drawn.

Import Demand for Canola Oil in the United States

The import demand pattern for canola oil in the United States is influenced by changes in the world's oilseeds market and government oilseeds programs and policies, including tariffs and subsidies. Since the early 1950's while global demand for vegetable oil was rising, supplies have often outstripped demand, generating surpluses. The United States began supplying countries in

the developing world with oils at subsidized rates. From 1956 through 1980, the Commodity Credit Corporation (CCC) of the U.S. Department of Agriculture assisted in exporting about 2.4 billion pounds of vegetable oil. The resulting higher volumes of U.S. vegetable oil exports were associated with rising domestic oil prices relative to world prices. Subsequently, domestic consumers began to substitute lower priced imported oils for relatively higher priced domestic oils.[7]

Tariff reduction under the Canadian-U.S. Free Trade Agreement benefited imports of canola oil from Canada. Canola oil had one of the lowest tariffs among all imported vegetable oils, and in January 1992 the tariff was removed entirely under the special reduction agreement for oilseeds. Consequently, imported canola oil gained a price advantage over other imported oils.[8]

Implementation of the U.S. 1990 Farm Bill had an influence on the domestic supply of minor oilseeds, including canola. Two aspects of the legislation, planting flexibility and oilseed marketing provisions, encouraged farmers to expand acreage of canola. During the 1991-1994 period, acreage has increased from 155 thousand to 354 thousand acres, and about 15% of the canola received payments under the marketing loan provision.[9]

Nevertheless, Canada remains the main exporter of canola oil to the United States. Until recently Canada has had artificially low export prices, although not as low as those for Europe. The Western Grain Transportation Act (WGTA) of Canada provided annual subsidy payments to the railways to hold down freight rates charged to farmers for shipment of bulk grains and oilseeds into export positions. In 1994 the Canadian government eliminated the transportation subsidies. This move should cause downward pressure on Canadian oilseed exports as a result of the increase in total marketing costs.[10]

Imports from Europe are coming mainly from France, Poland, and Germany. European imports are highly subsidized, which partly displaces Canadian canola imports in the United States and negatively affects domestic production.[11]

There have been serious arguments regarding subsidy elimination. The United States threatened to impose punitive taxes on some European goods, including canola oil. The round of negotiations under the General Agreement on Tariffs and Trade (GATT), which began in 1986, considered mainly this topic. Reforms in the European Union's Common Agricultural Policy (CAP) after 1992 have significantly reduced E.U. farm subsidies and cut the amount of oilseeds

that will be allowed to enter the world market. This amount equals about nine million tons of soybeans, sunflower seed, and canola per year.[11]

However, it is still unclear whether a worldwide agreement on trade liberalization will produce any changes in the oilseeds market. The GATT may increase the world price for canola and encourage U.S. producers to supply canola oil at competitive prices. The questions in this case are how much of the potential premium (due to the increase in price) will American consumers be willing to pay for less saturated fat and where the canola consumed in the United States will be produces and processed?

Literature Review

Gould, Cox, and Paradi[12] hypothesized that the U.S. consumption of fats and oils for food was determined by relative prices and tastes and preferences, reflected by socioeconomic variables. It was found that the impacts of changing the U.S. socioeconomic factors on fats and oils consumption were generally statistically significant and appeared intuitively reasonable.

Longmire and Morey,[13] studying the effects of exchange rates on the U.S. farm exports, found that strengthening of the U.S. dollar in the early 1980's adversely affected U.S. farm exports and resulted in surpluses of commodity stocks.

Effects of promotional programs on the U.S. palm oil demand were examined by Othman, Houston, and Ames.[14] Their study found that a campaign focusing negative attention on the health issue of tropical oils induced structural change in the U.S. domestic consumption of edible palm oil. It was also found that prices of tropical oils were insignificant in determining short-run soybean and cottonseed oil demand. Results showed that exchange rates did not contribute to declining U.S. palm oil imports.

Model Specification and Data

Economic theory suggests that important economic factors that influence the demand for a good are income and the price of that good relative to its complement and substitute goods. The effect of income growth on food expenditures depends on income elasticity of demand which

measures the effect of changes in income with respect to demand. However, the income factor is not expected to be large for such a good as vegetable oil due to its small proportion in consumers' expenditures.

Relative prices play a substantial role in consumers' choice of vegetable oil due to the high degree of substitutability of vegetable oils. However, noneconomic factors such as dietary concerns can offset or accentuate the effect of economic factors on food consumption. A comparison of dietary fats for canola oil and its major competitors indicates the implicit advantages of canola oil over soybean and palm oils as previously indicated.

The U.S. import demand for canola oil was specified as a function of its own import price, prices of substitute edible vegetable oils (soybean oil and palm oil), disposable personal income, the Canadian-U.S. dollar exchange rate, lagged imports, trend factor, and seasonality.

The general form of equation follows:

$$Q_t = f(PC_{t-1}, PS_{t-1}, PP_{t-1}, EX_{t-1}, INC_{t-1}, Q1_{t-1}, T_t, D_t) \qquad (1)$$

where Q represents per capita imported quantity of canola oil (MT), PC is real own price of canola oil (¢/lb), PS is real price of soybean oil (¢/lb), and PP is real price of palm oil (¢/lb), EX is the Canadian-U.S. dollar real exchange rate ($Canadian/$U.S.), INC is real per capita disposable personal income (dollars), Q1 is lagged imports (MT), T is the trend factor (1,2,3,...), and D is the dummy variable for seasonality (1 for April-September, 0 otherwise). The CPI base year for all real values is 1987.

The variables for vegetable oil prices (PC, PS, and PP), exchange rate (EX), and income (INC) were lagged to account for the time needed for the delivery process of the imported commodity after procurement.[14] The variable for lagged imports (Q1) was included in the model to account for import adjustments to income and relative price changes over time.[15] A trend variable (T) was introduced to reflect changes in consumers' tastes and preferences resulting from the increased awareness of the "health" benefits from canola oil. Although canola oil was approved by the FDA as an edible product in 1985, it was not until in 1989 that the U.S. Department of Agriculture started to generate records on edible rapeseed oil (canola oil) separately from industrial rapeseed oil. Therefore, the study is based on monthly data for January

1989 through October 1993. Finally, the dummy variable (D), which equals 1 for the months of the second and third quarters of the year and 0 otherwise, was included in the model to account for the seasonality of import demand.

Data on imported quantities and oil prices were obtained from Oil Crops Situation and Outlook Reports[6] published by the U.S. Department of Agriculture and unpublished sources at the U.S. Department of Agriculture, Foreign Agricultural Service.[16] Data on consumer income, the U.S. consumer price index (CPI), and exchange rates are from the U.S. Department of Commerce, Survey of Current Business.[17] Data on the Canadian consumer price index (CPI) is from U.S. Department of Commerce, National Trade Data Bank, CD-ROM.[18]

Following the works of Gould, Cox, and Paradi,[12] Miller and Fratianni,[15] Othman, Houston, and Ames,[14] and Seleka and Henneberry,[19] a log-log function was used to estimate the U.S. import demand for canola oil as specified in equation 1:

$$LN(Q_t) = B_0 + B_1 LN(PC_{t-1}) + B_2 LN(PS_{t-1}) + B_3 LN(PP_{t-1}) + B_4 LN(EX_{t-1})$$
$$+ B_5 LN(INC_{t-1}) + B_6 LN(Q_{t-1}) + B_7 T + B_8 D + U_t . \qquad (2)$$

Generalized Least Squares (GLS) was employed to estimate equation parameters.

Results and Interpretation

Results of GLS estimation of the U.S. import demand equation for canola oil are presented in Table 1. Since the log-log function was used in estimation, the coefficients of variables in log form also represent elasticities. Overall the canola oil import demand model was consistent and did not contradict economic theory.

As expected, the own price and income effects on import demand were not large due to the small contribution of canola oil in consumers' expenditures. The own price and income coefficients were not significant at $\alpha=0.10$. Moreover, international purchasing is complicated by variable exchange rates; and the impact of income may not be reflected in the short-run nature of monthly data.

On the other hand, price coefficients of the substitute vegetable oils were statistically significant at $\alpha=0.05$ or better and had positive signs indicating the increase of import demand for

canola oil with the increase of prices of substitute oils. Cross-price elasticities were far greater than zero, suggesting that the import demand for canola oil is sensitive to prices of other vegetable oils. Demand appears substantially more responsive to changes in the price of soybean oil than that of palm oil, implying that soybean oil is the more important substitute for canola oil.

The exchange rate coefficient exhibited a strong influence on the import demand for canola oil. The negative sign of the coefficient indicates a decrease in import demand with an increase in the price of Canadian dollars and vice versa. Thus a higher price for Canadian dollars means a higher price in U.S. dollars for canola oil imports and vice versa.

The coefficient for the trend variable was positive and significant at $\alpha=0.01$. As expected, the sign and significance of the coefficient reflected the growing preference for canola oil as its health attributes have become known. The coefficient for the lagged import variable for canola oil was not significant.

Seasonality tendencies appeared consistent for the canola oil market. The coefficient was significant at $\alpha=0.05$. The positive sign suggested that in spring and summer, the harvest period for canola , imported quantity is higher than in fall and winter. The R-squared was 0.8627 indicating that more than 86% of the variability in the quantity of import demanded was explained by the model.

Conclusions

In general, the demand for canola oil is expected to continue strong because of continual strong demand for the world oilseeds complex. Moreover, canola oil may continue to gain in market share in the United States due to consumer preference for its health benefits driving consumption upward with rising pressure on price.

Based on analysis of monthly data for January 1989 through October 1993, U.S. import demand for canola oil was influenced mostly by prices of substitute vegetable oils (soybean and palm oils), the U.S.-Canadian exchange rate, and the change in consumers' tastes and preferences. Thus, in the case of low prices for substitutes, especially soybean oil, and an unfavorable U.S.-Canadian exchange rate, there is a dampening effect on the U.S. import demand for canola oil. However, the events of such negative influences are countered by the rising preference for canola

oil, "the healthiest oil" among all commercially traded oils.

In the midst of rising demand for canola oil, opportunities are occurring for producers and potential producers in the United States. Two occurrences have come into play which should lead to the continued expansion of canola and canola oil production in the United States. One was the elimination of tariffs and subsidies under the auspices of the U.S.-Canadian Free Trade Agreement and the other was passage of the 1990 U.S.Farm Bill. With the elimination of Canadian subsidies, prices rose for canola oil, a clear signal to U.S. producers and potential producers. Fomenting this impetus were the increased planting flexibility and oilseed marketing loan provisions via the 1990 Farm Bill, making canola appear more favorable as a production alternative.

In summary, rising demand for canola oil, "the healthiest oil," and a more favorable competitive advantage bode well for American consumer and producer.

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