Abstract

An Analysis of Demand and Supply of Coffee in Thailand

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This analysis of demand and supply of coffee in Thailand has two main objectives : First, to study the production and marketing, including import and export ; and recond, to analyse the factors affecting the demand and supply of coffee. Secondary data from 1983 to 2006 were used in the methodology of descriptive and quantitative analysis (Ordinary Least Square : OLS) The results of the study have indicated that the growth of domestic consumption and importing of coffee increases annually by 29.28% and 6.45% respectively, but the growth of production and exporting decreases by 3.27% and 7.52% per annum, respectively. Besides, the farm prices are decreased because of the decreased price in the world market. The two important factors affecting the demand are population and farm prices. The government's price policy and export prices can affect exporting, but the per capita income and imported and imported prices also affect importing. For the supply of coffee in Thailand, the results of this study show that the affecting factors are the wholesales' prices of fertilizer, the past three years of farm prices and the harvested areas, respectively. In short, the study found that the coffee's farm prices are directly related to New York's Robusta prices and irregular higher price movements.

Problems and Significance

Coffee is an important crop in Thailand and we gain the benefits from exporting of about 500-900 million Baht per year, especially this crop is very important for the farmers in the South of Thailand. During 1996-2006, the growth rate of coffee planted area is 3.82% and domestic demand of coffee has the growth rate of about 3.57% or domestic demand is 20% of the total product. The farm prices of coffee are increased to 16.01% per year. However, after 1997 the situation of coffee production has changed from 80,810 tons to 59,644 tons at present. While increasing demand, the prices have decreased because of the increased processing factories. During 1997-2005 coffee production has decreased by 3.27% per year while the demand of coffee has increased to 29.28% per year. So, the prices of coffee should be increasing by 2.27 % per year because of the decreased prices in the world market. Besides, the quality of coffee was not high.

Because the trade of coffee has changed, the consumer's demand was increasing while the coffee production was uncertain because of unplanned production. At the same time, the regulation of Free Trade Area (FTA) affected the production and coffee trading. So, the analysis of coffee demand and supply in Thailand was very important to study the factors affecting the demand and supply of coffee for production planning and government policy.

Objectives of the Study

The analysis of demand and supply of coffee in Thailand has 2 objectives;

1. To study the marketing and production of coffee including import and export.
2. To analyse the factors affecting demand and supply of coffee.

Benefits of the study

There are 3 benefits of the study;

1. Understanding the marketing and production of coffee including import and export.
2. Finding the factors affecting to demand and supply of coffee.
3. Obtaining the government and related sector's data base for the future policy.

Scope of the Study

The scope of study and analysis of demand and supply of coffee covered marketing, production, import and export of coffee. Besides, the government regulation and policy were studied in this research. The other theme was the factor affecting to demand and supply of coffee for 24 years. (1983 – 2006)

Research Methodology

1. Data collection

Secondary data source was used in this research. Time series data from 1983 to 2006 came the from Internet and documents which related to marketing, production, import and export of coffee. These data came from private and government sectors, especially the results of other research studies in Thailand.

2. Data analysis

2.1 Descriptive analysis has been used as an analytical tool to analyse the general marketing and production of coffee inside and outside of Thailand. Besides, the problems and government policy which related to coffee from past to present were studied in this research. The results were shown in the forms of mean, percentages and tables.

2.2 Quantitative analysis has been used as an analytical tool by using the econometical model in order to analyse the factor affecting demand and supply of coffee.

Besides, the model was used to apply for import, export and the relationship between farm prices in Thailand and New York's prices of coffee.

3. Hypothesis of the Study

1. The coffee's farm prices and number of population are related to the coffee demand.
2. The export prices of coffee and government's intervention policy are related to the exported coffee.
3. The harvested areas of coffee, wholesale prices of fertilizers and coffee's farm prices are related to coffee supply.
4. The import prices of coffee and per capita income are related to the imported coffee.
5. The coffee farm prices are related to the New York's prices of coffee and the irregular movement in Brazil.

Modelling of the Coffee Studying

1. Demand

1.1 Domestic demand of coffee

$$DCOF_t = f(FPC_t , POP_t)$$

Where;

$DCOF_t$ = the processing factories' domestic demand of coffee in a year t.
(unit : ton)

FPC_t = the coffee's farm price in a year t which weighted with consumer price index. (unit : ton)

POP_t) = the number of population in a year t. (unit : million person)

1.2 Export demand of coffee

$$EXCOF_t = f(FOB_t , DUM)$$

Where;

$EXCOF_t$ = the export demand of coffee in a year t. (unit : ton)

FOB_t = the export price of coffee weighted with consumer price index in a year t. (unit : baht per kilogram)

DUM = the government's price policy to intervent to exporting.

DUM = 1 in 1990-1994, 1997, 2000-2001, 2003-2004

DUM = 0 in other years.

2. Supply

2.1 Domestic supply of coffee

$$SCOF_t = f(AREA_t , FPC_{t-3} , WPFR_{t-1})$$

Where;

$SCOF_t$ = the supply of coffee. (unit : ton)

$AREA_t$ = the harvested area of coffee in a year t. (unit : rai)

FPC_{t-3} = the coffee's farm price in the last 3 year. (unit : baht per kilogram)

$WPFR_{t-1}$ = the wholesale's price of fertilizer in a previous year weighted with consumer price index. (unit : baht per kilogram)

2.2 Import of instant coffee

$$IMCOF_t = f(CIF_t , CAP_t)$$

Where;

$IMCOF_t$ = the quantity import of instant coffee.
(unit : ton)

CIF_t = the import price of coffee
weighted with consumer price index in a year t.
(unit : baht per kilogram)

CAP_t = per capita income in a year t.
(unit : baht per head)

3. Model of Relative Price

$$FPC_t = f(PNY_t , DUM_1)$$

Where;

FPC_t = the coffee's farm price weighted with
consumer price index in a year t.
(unit : baht per kilogram)

PNY_t = the Robasta's New York price
weighted with consumer price index in a year t.
(unit : baht per kilogram)

DUM_1 = the irregular years that affect the increase of prices.
DUM_1 = 1 in 1986, 1995.
(Frost dew in Brazil)

= 1 in 1998. (from Elnino)

= 0 in other years.

4. Equilibrium Model

$$DCOF_t + EXCOF_t + ENDST_t = SCOF_t + (IMCOF_t * 2.6) + BGST_t + IMPT_t$$

Where;

$ENDST_t$ = the ending year stock of coffee.

$BEGST_t$ = the beginning year stock of coffee.

$IMCOF_t$ = import of instant coffee.

$IMPT_t$ = import of coffee.

t = 1, 2,……..,24

A rate of exchange

Coffee	:	Instant Coffee
2.6 kg.	:	1 kg.

Results and Discussion

In 2005-2006, the total product of coffee in the World Market was 4.420 million tons, with the growth rate of about 2.49% Brazil is the biggest producer in the world is 3.91 % while the growth rate of import is 14.49% because of the increased consumption in the world market. Most coffee is for export, and the rest is for domestic consumption. Prices of coffee in the world have been increased for 12 years, especially Robusta.

Thailand has a total product of coffee in 2006 of about 46,873 tons which has decreased from 2005 by about 12,771 tons. The minus rate of growth was 12.06 % Besides, the harvested areas have the minus rate of growth too.(-1.52%) 98% of the total product is Robusta that is planted in the South of Thailand and the rest is Arabica in the North of Thailand. Average Product of Thai coffee is 109 kilogram per rai in 2006 with the total cost of production of about 30,000 baht per rai.

The domestic demand has increased to 29.28% although the total product has decreased. However, 70% of the total product is exported and the growth rate of import in the form of instant coffee is about 6.45 % During 1997-2006, the farm prices have the increased growth rate of about 3.58 % because the total product decreases and but the consumption increases.

The problems of production and marketing in Thailand are summed up as follows;

Production ;

1. 98 % of the total product is Robusta but the world market is Arabica.
2. Thailand's total cost is higher than Vietnam and Indonesia which are the bigger producers.
3. Thai coffee has lower quality.

Marketing ;

1. Lower values of coffee for exporting are about 99%
2. Thailand farm prices of coffee have changed fluctuated depending on the world market prices.
3. Thai coffee does not have a standard level of quality, so farm prices are lower.

An analysis of coffee's demand and supply in Thailand is based on the time series data during 1983-2006. The results of study are divided into 3 parts;

1. Demand of coffee

1.1 Domestic demand of coffee

$$\underset{\text{(t-test)}}{\ln DCOF_t} = -21.182 - \underset{(-1.777)}{0.304 \ln FPC_t} + \underset{(7.824)}{7.525 \ln POP_t}$$

$N = 24 \qquad R^2 = 0.88 \qquad DW = 1.76 \qquad SEE = 0.281$

The total product of coffee goes to the processing factories. So, the coffee demand is the processed factories' demand ($DCOF_t$) which depended on the farm prices (FPC_t) and population (POP_t). The model could explain the variables' relation of about 88% and have a significance level of each independent variables of about 95% and 99%,respectively. Besides, there was no problem of autocorrelation and higher error.

The price elasticity of demand was 0.304, showing that the processed factories' demand would decrease by 0.304 % if the farm prices of coffee increased by 1%. The elasticity of demand with respect to number population increased by 1% , the domestic demand of coffee would increase by 7.525%.

Thus, the population has more impact on coffee domestic demand than farm prices because the elasticity demand of population was higher than the farm prices.

1.2 Export demand of coffee

$$\ln EXCOF_t = 9.918 + 0.706 \ln FOB_t + 1.685 \ln DUM$$
(t – test) (1.849) (1.522)

$N = 24$ $R^2 = 0.70$ $DW = 1.14$ $SEE = 0.653$

The model of export demand could explain the variables' relation of about 70% Both coefficient of the export price (FOB_t) and dummy variable of government intervented price policy (DUM) have significance at the level of 95%.

The elasticity demand of export price was 0.706. That means exporting quantity would increase by 0.706% if the export price of coffee increase by 1%. The elasticity of the government policy has shown that quantity of export would increase by 5,392 kilogram if the government supported the exporting regulations.

2. Supply

2.1 Domestic supply of coffee

$$\ln SCOF_t = 4.936 + 0.058 \ln AREA_t + 0.249 \ln FPC_{t-3} - 1.820 \ln WPER_{t-1}$$
(t-test) (0.462) (1.705) (-4.501)

$N = 23$ $R^2 = 0.60$ $DW = 1.05$ $SEE = 0.254$

There were 3 factors affecting domestic supply of coffee ; harvested area ($AREA_t$), farm price at past 3 years (FPC_{t-3}), and wholesale price of fertilizer at a previous year ($WPFR_{t-1}$). These factors could explain the coffee production of about 60%. The significance of those factors' coefficient were 70%, 95%, and 99% , respectively.

The elasticity supply of farm price at the past 3 years was 0.249. That means the farmers would take care of the coffee production which increase by 0.249%, if a farm price at the past 3 years increased by 1%. Other important factor affecting production, was the wholesale price of fertilizers at a previous year because the total product would decrease by 1.820%, if those previous prices increased by 1%. For the harvested areas , the elasticity of supply was 0.058 . That means the total product would increase by 0.058% if the harvested area increased by 1%. Thus, the most important factor of domestic supply was the wholesale price of fertilizers at a previous year because its coefficient was higher than the other two factors.

2.2 Import of instant coffee

$$\ln IMCOF_t = -2.215 - 0.601 \ln CIF_t + 0.781 \ln CAP_t$$
(t-test) (-2.333) (0.358)

$N = 23$ $R^2 = 0.75$ $DW = 1.50$ $SEE = 0.386$

The import of instant coffee depended on the import price (CIF_t) and per capita income (CAP_t). Both factors could explain the model by about 75% The significance level of those factors was 95% and 70% , respectively. If the import price increased by 1% import of instant coffee would decrease by 0.601% because the elasticity of import coffee was 0.601. The per capita income was more important than the import prices because the coefficient of this factor was more than the import prices. Thai imported coffee would increase by 0.781% if the domestic per capita income increased by 1%.

3. Model of Relative Prices

$$\ln PFC_t = -0.547 + 0.653 \ln PNY_t + 0.347 \ln DUM_1$$
(t-test) (9.125) (2.946)

$N = 23$ $R^2 = 0.87$ $DW = 2.306$ $SEE = 0.175$

The domestic farm prices of coffee in Thailand depend on the affecting factors; Robusta New York prices (PNY_t) and irregular year that affect the increase of prices. (DUM_t) Both factors could explain the domestic farm prices about 87% and those factors show the significant level at about 99%. When the Robusta New York Prices increased by 1% , it let to the increase of farm prices in Thailand by 0.653%. Besides, the domestic farm prices would increase by 0.347% if the irregular situations happened in the world, such as floods and droughts. The comparison of affecting factors between Robusta New York Prices and irregular year shows that the first factor has affected more than the second.

Recommendation

The analysis of demand and supply of coffee in Thailand has generated the results as shown in this research . However, some important recommendations are summarized below:

1. The government should have the target of coffee's production and efficiency regulations of yields per unit, especially Good Agricultural Practice. (GAP)
2. The government should have the solution for increasing the yields per unit in order to substitute for importing.
3. The future research should study the affected impact from the taxes regulations of FTA.

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