

Determinants for Contribution of Pineapple Growers for Export Volume in Gampaha District in Sri Lanka

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ABSTRACT

Pineapple is the third largest agricultural product after tea and coconut, which has a demand in export market. Although the nature has blessed with an ideal climate for growing wide range of delicious fruits including pineapple, Sri Lanka is not in a position to meet the growing demand. Therefore, that is very important to study about the export performance of fresh pineapple in Sri Lankan context. The general objective of this study was to identify the determinants of contribution of pineapple growers for export volume in Gampaha district. A structured questionnaire based survey was carried out to collect the data from random sample of 130 pineapple growers in Dompe and Diulapitiya DS divisions in Gampaha district. The result of Tobit model revealed that the contribution of pineapple growers for exports of pineapple was significantly determined by the age of grower, experience of grower, pineapple cultivated land extent, amount supply for local market, domestic price and export price. In the study of specific objectives, there was an upward trend from 1990 to 2004 and trend was declined from 2004 to 2012 with some fluctuations. The reason was that the export of preserved pineapple has shown a significant improvement within last few years and in developing the forecasting model for future forecast and the generalized model for current situation analysis for fresh pineapple exports in Sri Lanka. Vector Autoregressive Model (VAR) was used to develop the forecast model and the generalized model was developed without considering the time factor. The result revealed that the export of fresh pineapple was significantly determined by the average exchange rate and the domestic price.

Keywords: Export performance, Fresh pineapple, Gampaha district, Tobit model, VAR, model

INTRODUCTION

The pineapple is considered as one of the most important tropical fruits in the world. Its pleasant flavor and exquisite taste qualities have made it as one of the choicest fruits throughout the world¹. Pineapple is the third most important tropical fruit in the world production after banana and citrus³.

According to the Food and Agriculture Organization, pineapple was a major tropical fruit with over 9.2 lakh hectares of cultivated land and

18.2 million tons (mt) of pineapple produced in the world. The world market for fresh pineapple has been growing rapidly during the past years and further expansions will be expected in the future. Thailand, Brazil, Philippine, Costa Rica and China are the countries that are playing a major role in producing pineapple in the world.

Nature has blessed Sri Lanka with an ideal climate for growing a wide range of delicious fruits in different agro-climatic areas. Cool climatic conditions in the central hill country area are ideal

for temperate crops and low country and dry or wet areas are suitable for a variety of exotic tropical fruits such as banana, pineapple, papaya, mango, and lemon. There is a suitable climatic condition to grow the pineapple in Sri Lanka. Elevation is up to 1000 m from the sea level. Optimum temperatures is (24-27) °C and mean annual rainfall is 1000 mm. Low country wet and intermediate zones are more suitable with well drained, deep and gravel soil².

Sri Lanka produces around 5.4 lakh metric tons of fruits annually and exports both fresh and processed varieties to many destinations in the world. Sixty five percent of the fresh product is targeted to the Middle East and the Maldives Island

and almost about 98 % of the processed products to the European market. United Arab Emirates, Saudi Arabia, Maldives, India, UK, Kuwait, India, Germany, Qatar, Pakistan have been enlisted as top fruit and vegetable importing countries from Sri Lanka.

Pineapples in Sri Lanka are grown on 4,750 ha, which producing around 35,000 mt per year as an intercrop in the coconut triangle. Currently, Sri Lanka is placed 34th, which gives the less than one per cent of total world production among the world's pineapple producers. However, Sri Lanka produces some of the finest pineapples in the world, which has a huge potential for a huge export market. Although, it is not supported and promoted

Table 1: Description of variables used to achieve general objectives

Notation	Variable	Description
Y	Contribution for export volume from the total production	Percentage
β_0	Intercept parameter	
GEN	Gender	Dummy(1=Male, 0=Female)
LMKT	Amount of pineapple supply for the local market	Kilograms
AWARE	Awareness of the growers on export quality of the fruit	Percentage
PRHL	Pre- harvest losses	Kilograms
AGE	Age of the grower	Years
EDU 1	Education dummy 1	Dummy(1=Secondary, 0 = Otherwise)
EDU 2	Education dummy 2	Dummy(1=Tertiary, 0 = Otherwise)
LAND	Amount of pineapple cultivated land area	Acres
EXP	Experience of the grower	Years
EP	Export price	Rupees
DP	Domestic price	Rupees
COP	Cost of production	Rupees
CROP	Cropping pattern	Dummy(1=Mix cropping, 0=Mono cropping)
ε	Random Error	

In the model specification, $Y = \beta_0 + \beta_1 AGE + \beta_2 GEN + \beta_3 EXP + \beta_4 LAND + \beta_5 EDU1 + \beta_6 EDU2 + \beta_7 LMKT + \beta_8 DP + \beta_9 EP + \beta_{10} PRHL + \beta_{11} COP + \beta_{12} AWARE + \beta_{13} CROP + \varepsilon$

adequately, pineapples grown in Sri Lanka are in demand as they are nutritious and delicious. The Sri Lanka's production of pineapple is increasing year by year, there is a big problem related with finding exportable quality pineapples in sufficient quantities. In case of Sri Lanka, there is a big gap between the total pineapple production and the total export volume of pineapple.

Considering about the Sri Lankan conditions, some pineapple growers are offering their total production directly to the exporters. Some are offering their total production to the wholesalers and also others are giving their production both the exporters and the wholesalers in different quantities. Several factors may affect for their contribution for the export volume of pineapple. This study was aimed to estimate the determinants of the contribution of pineapple growers for export volume in Gampaha district as Gampaha district contributes a significant portion to the total pineapple production of the country.

It is very important to examine the export performance of pineapple of Sri Lanka considering more than 20 years. It assists to identify the pattern and the variations, which have been occurred and it is very valuable for taking decisions in future. Annual time series from 1990 to 2012 was utilized to achieve the specific objectives. The past export performance was examined using a graph drawn the times in years versus exports of kilograms. The forecast model and the generalized model were developed using EVIEWS8 statistical software. The general objectives of this study are to identify the determinants of contribution of pineapple growers for export volume in Gampaha district. The specific objectives are to study the past export performance

Table 2: Description of variables used to achieve specific objectives

Notation	Variable	Description
EXPO	Export volume of pineapple	Kilograms
TP	Total production of pineapple	Kilograms
DP	Domestic price	Rupees
AER	Average exchange rates	Rupees
LX	Land extent	Hectares

of fresh pineapple since 1990 to 2012 in Sri Lanka and to develop the forecasting model and generalized model for fresh pineapple exports in Sri Lanka.

METHODOLOGY

A structured questionnaire based survey was carried out to collect the data from random sample of 130 pineapple growers in Dompe and Diulapitiya DS divisions in Gampaha district to achieve the general objective. The tobit model was used to find out the relationship between dependent variable and other explanatory variables using STATA statistical package while descriptive analysis was used to explain the characteristics of the sample.

Specific objectives were achieved using secondary data, which has been collected as time series. The past performance of fresh pineapple since 1990 in Sri Lanka was studied using a graph drawn with times in years versus export of pineapple in kilograms. Vector Autoregression Model (VAR) was used with three major steps namely Lag

Table 3: Results of the tobit regression

Variable	Coefficient	Std.Err	Sig Value
Constant	- 0.279	0.390	0.475
AGE	0.005	0.002	0.055*
GEN	0.010	0.107	0.923
EXP	-0.011	0.004	0.004***
LAND	0.003	0.001	0.043**
EDU 1	-0.048	0.100	0.633
EDU 2	0.050	0.085	0.556
LMKT	-1.62e-06	3.00e-07	0.000***
DP	-0.008	0.001	0.000***
EP	0.026	0.006	0.000***
PRHL	3.13e-06	2.27e-06	0.170
COP	1.08e-08	9.13e-09	0.241
AWARE	0.010	0.010	0.299
CROP	-0.146	0.093	0.120
No. of observations	130	Log Likelihood	31.399473
Prob > Chi2	0.0000	Pseudo R2	1.2827

*: Significance at 10%, **: Significance at 5%, ***: Significance at 1%

selection, Johansen Cointegration and Vector Error Correction Model to develop the forecast model and the generalized model was developed without considering the time factor and with consideration of the natural logarithm values of secondary data.

RESULTS AND DISCUSSION

According to the tobit regression, age of the grower has been significant at 10 % significant level and land extent of pineapple cultivated has been significant at 5 % significant level. Experience of the grower, amount supply for local market, domestic price and export price have been significant at 1 % significant level.

There is a fluctuation of export performance of fresh pineapple from 1990 to 1995. It can be seen upward trend up to 2004 and after 2004, it shows a downward trend up to 2012 (Fig.1). Pineapples are exported from Sri Lanka in the form of fresh, juice, dried or preserved⁴. According to the record

of department of customs, it can be clearly identified that export of preserved pineapple has shown a significant improvement and quantity of exports has increased from 38 mt in 2000 to 394 mt in 2009. Exports of dried pineapple has commenced also in 2003 and both the exports of pineapple in the form of juice and dried are also showing the decline. Therefore, preserved pineapple has played a major role while being a reason to decrease the fresh pineapple exports.

Five information criteria were used for the lag selection. In the lag selection maximum lag was one with majority rule within five information criteria. This lag was used for Johansen Cointegration test and vector error correction model (VECM). Pre-conditions for Johansen Cointegration test was tested using graphical illustration and correlogram specifications. In running Johansen Cointegration test it could be found that there was one cointegrated equation and it allowed running the vector error correction model. Five forecast models were

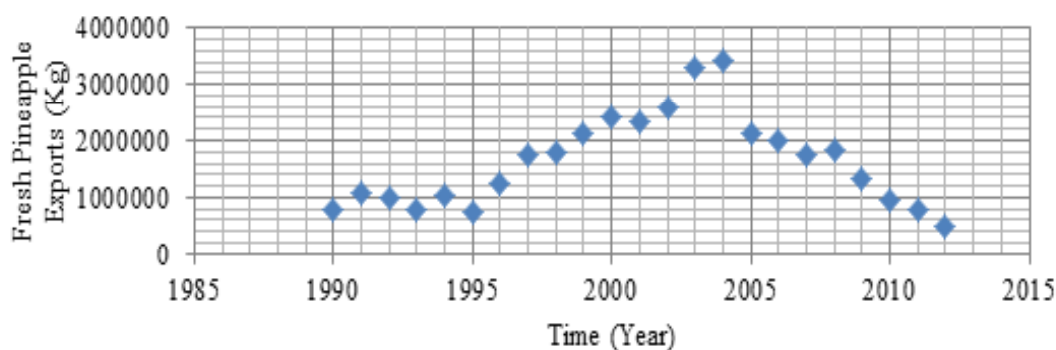


Fig. 1: Export performance of fresh pineapple since 1990 to 2012

Table 4: Summary of the selection of lag length criteria

Lag	Log L	LR	FPE	AIC	SC	HQ
		(Sequential Modified LRtest statistic)	(Final prediction error)	(Akaike information criterion)	(Schwarz information criterion)	(Hannan-Quinn information criterion)
0	40.53499	NA	2.33e-08	-3.384284	-3.135589	-3.330311
1	121.7553	116.0290*	1.20e-10*	-8.738595	-7.246421*	-8.414755*
2	148.9728	25.92145	1.59e-10	-8.949788*	-6.214134	-8.35608

* indicates lag order selected by the criterion

Table 5: Summary statistics of generalized model

	Coefficient	Std.Error	Prob.
C ₁	18.17692	11.79778	0.1418
C ₂	-0.958530	1.041800	0.3704
C ₃	-0.307994	0.669820	0.6515
C ₄	3.301724	0.511467	0.0000*
C ₅	-1.370684	0.240959	0.0000*
R ²	0.769777	Adjusted R ²	0.715607

obtained and one was selected with its minimum difference between R² value and adjusted R² value. Selected forecast model is given below:

$$D(LNEXPO) = 0.247990 * (LNAER(-1) - 0.879475091127 * LNDP(-1) - 0.0716542650241 * LNEXPO(-1) - 16.0725350048 * LNLX(-1) + 6.99109083174 * LNTP(-1) + 13.6476932737) + 3.289959 * D(LNAER(-1)) - 0.442323 * D(LNDP(-1)) - 0.238153 * D(LNEXPO(-1)) + 2.411853 * D(LNLX(-1)) - 1.273884 * D(LNTP(-1)) - 0.171802$$

The generalized model was developed with natural logarithm values. In the model specification,

$$LNEXPO = C_1 + C_2 * LNLX + C_3 * LNTP + C_4 * LNAER + C_5 * LNDP + \epsilon$$

The exports of fresh pineapple were significantly affected by the average exchange rate and the domestic price at 5 % significant level. The coefficient of the average exchange rate was 3.30 with a positive sign and it shows a very strong

impact of currency devaluation over last twenty three years.

In this generalized model adjusted R² was 71.56 % and it implies that the exports of pineapple can be explained by the independent variables namely average exchange rate, domestic price, total production of pineapple, pineapple cultivated land area up to the level 71.56 %.

CONCLUSIONS

The contribution for exports of fresh pineapple was significantly determined by the age of the grower, experience of the grower, pineapple cultivated land extent, amount given for local market, domestic price and export price. The export performance of fresh pineapple had an upward trend from 1990 to 2004 and a downward trend from 2004 to 2012. Forecast model was developed by selecting the best model from five forecast models. Generalized model has been developed without considering the time factor and result revealed that the export of fresh pineapple was significantly determined by the average exchange rate and the domestic price of pineapple and the adjusted R² value was 71.56 %.

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