Pricing-to-Market and Exchange Rate Pass-Through in the Sri Lankan Crepe Rubber Export Markets

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Abstract: This article analyses the impact of the pricing-to-market (PTM) strategy on the Sri Lankan crepe rubber. The fluctuation in the value of the Sri Lankan rupees can alter the prices of exported goods in terms of foreign currencies. This affects the Sri Lankan products either to be more or less expensive to the foreign buyers and consequently, it effects on export demand. Hence, analyzing the effects of PTM is an important element in assessing the relationship of the exchange rates and export prices of tradable goods. Within and between models of panel regression was used to analyse the exchange-rate-pass -through (ERPT) of Sri Lankan crepe rubber in the world market. The within model was used to analyse the short-run pricing-to-market and the between model was used to analyse the long-run pricing-to market. Data of eight export market destinations spans from 2003 to 2014 were used in the analysis. Results indicated that the short-run pricing-to market is a strategically viable plan to expand the Sri Lankan crepe rubber market via exchange rate pass through.

Keywords: Pricing-to-market, Exchange rate pass through (ERPT), Crepe rubber export, Regression, Panel data

Introduction

Rubber was first introduced to Sri Lanka in 1876 by then colonial rulers, the British. It is one of the country's major exports even today. In the year 2010 August, rubber was placed third in the composition of exports, behind textiles and garments and tea (CBSL, 2010). In the country where the contribution of GDP from the agriculture sector is 11.9 %, the rubber sector's contribution is 0.3 % (CBSL, 2010). So, it directly contributes to the economic country. Sri Lanka is very popular in the world market for crepe rubber. Which accounted for a higher percentage of the total exports of rubber products. Currently, Thailand, Indonesia, and Malaysia are major competitive

exporters to Sri Lanka. Sri Lanka has to compete with these exporters, but the Sri Lanka rubber market is unstable in previous years. Hence, it is threatening to keep a steady international export market for Sri Lanka crepe rubber. In locally, crepe rubber industries have to adjust their production according to demand of product. It is difficult to take the production decision when demand frequently fluctuates. In addition, fluctuation in the value of the Sri Lankan rupees can alter the prices of exported goods in terms of foreign currencies. Therefore, it leads to the Sri Lankan products either more or less expensive to foreign buyers, and consequently affecting export demand. This unexpected fluctuation in exchange rates is usually accompanied by increasing export prices and decreasing trade volumes. So, it is important to analyses the viability of expanding the crepe rubber market. Therefore, this study is focused on determining the impact of ERPT in export market of Sri Lankan crepe rubber. Predict where the implementing exchange rate pass through is strategically viable plan to expand the export market or not.

Objectives
1. Determine the impact of exchange rate pass through in export market of Sri Lankan crepe rubber.
2. Predict where the implementing exchange rate pass through is strategically viable plan to expand the export market or not.

Hypothesis
- Fluctuation in value of the Sri Lankan rupees strategically viable plan to expand the market shares of crepe rubber export market in short run as well as in long run.

Materials and Methods

This study is primary bond on hypothesis of, fluctuation in value of Sri Lankan rupees strategically viable plan to expand the market shares in short run as well as in long run to analyses hypothesis, the Sri Lankan rubber industry ship its crepe rubber to more than 20 countries among the export destinations, 8 countries were selected for this study. Annual export income was obtained from exporting 1000kg of crepe rubber to 8 countries. The details were taken from the data span of export development board of Sri Lanka from 2003 to 2014, exchange rates were taken in directly from quotation and which were obtain from annual report publish by central bank of Sri Lanka. In here to analyze the data pricing to market model of Krugman (1986), Dornbusch (1987) and Knetter (1989) (hereafter KDK model) and their econometric methods were used.

$$\ln \left(-\frac{1}{T} \sum P_i\right) = \alpha + \beta \ln \left(-\frac{1}{T} \sum E_i\right) + u_i, \ Ii = 1, \dots, N,$$

where β = a measure of pricing-to-market across export destination markets due to estimation of cross-sectional variables over the long- run, Ei reflects the market specific exchange rate of exporting

country i on time average. Results from country-level within regression can be interpreted as explaining transient pricing-to-market practices, since the specification focus on movements away from the estimate of the firm's constant unit export price. The coefficients generated by this specification explain which country variables are associated with deviations from the firm's average position. On the other hand, a significant coefficient in the exchange variable in the between estimator is more likely to be associated with a long- run pricing-to-market strategy. A coefficient of -1 on the exchange variable indicates a complete exchange rate pass through; 0 shows no pass-through. A body of literature on pricing to market model of Krugman (1986), Dornbusch (1987) and Knetter (1989) (hereafter KDK model) and their econometric methods were reviewed initially. These economic models are important and essential in that they yield an econometric model to estimate the PTM model for short-run analysis.

(1) $Q_{it} = f\,(E_{it}P_{it})\,v_{it}$, $i = 1, ..., N$ and $t = 1, ... , T$,

Where P_{it} is price in terms of the exporter's currency, E_{it} reflects the market specific exchange rate in period t, where the observations corresponding to the prices in country i are the market- specific exchange rate, and zero when there is no trade. v_{it} is a random variable that may shift demand in market i in period t.

The exporter's cost is given by

(2) $C_t = C\,(\sum Q_{it})\,\delta_t$, $t = 1, ..., T$,

Where C_t measures costs in the exporter's domestic currency units, which are summed over all destination markets, and δ_t is a random variable that may shift the cost function (e.g., changes in input prices) in period t. Substituting equation (1) for Q_{it} in equation (2), the maximiz ation problem becomes

(3) Max $\Pi = \sum [P_{it}\,f\,(E_{it}P_{it})\,v_{it}]$ -C$\{\sum f[(E_{it}P_{it})\,v_{it}]\}\delta_t$

Differentiating equation (3) with respect to P_{it} and expressing in terms of elasticities, the first order conditions are

(4) $\quad P_{it} = c_t \left(\dfrac{\varepsilon_t^i}{\varepsilon_t^i - 1} \right)$, $i = 1, ..., N$ and $t = 1, ..., T$,

Where c_t is the marginal cost of production in period t and and is the demand elasticity for imports in importing country i in period t. Equation (4) states that the price discriminating monopolist will equate marginal cost to marginal revenue in each market.

(5) $\ln P_{i,t} = \alpha + \sum \phi_t x_t + \sum \lambda_i x_i + \sum \beta_i \ln E_{i,t} + u_{i,t}$, $i = 1, ..., N$ and $t = 1, ..., T$,

where $P_{i,t}$ is the export unit value to market destination country i in period t; x_t is a dummy variable to cap the exporting country; $-_t$ measures the time effect corresponding to the t periods; λ_i measures the country effect corresponding to the individual i destination markets; βi measures the exchange rate pass-through for the individual i countries; and $u_{i,t}$ is error term. The two-way within regression model in equation (5) examines export pricing behavior across destination markets. The within estimator regresses

the country-specific deviations from the mean of the dependent variable on the country-specific deviations from the means of the independent variables as such:

$$(6) \ \ln(P_{i,t} - \tfrac{1}{T}\sum P_i) = \alpha + \beta \ln(E_{i,t} - \tfrac{1}{T}\sum E_i) + u_i, \, i = 1, \ldots, N \text{ and } t = 1, \ldots, T,$$

Where β = a measure of non-competitive pricing, because the estimator focuses on movements away from the estimates of complete exchange pass-through from year to year price. E_{it} reflects the market specific exchange rate in period t, where the observations corresponding to the prices in country i are the market-specific exchange rate, and zero otherwise.

In practice, one can take several steps to make equation (6) easily estimable. For example, take the data on individual country i as in

(7) $P_{i,t} = \alpha + \beta E_{i,t} + v_i, \, i = 1, \ldots, N$ and $t = 1, \ldots, T$,

The between estimator (cross sectional only) measures the long-run effects; it tells us the price discrimination. It regresses the mean of the dependent variable on the means of the independent variables as follows:

$$(8) \ \ln(-\tfrac{1}{T}\sum P_i) = \alpha + \beta \ln(-\tfrac{1}{T}\sum E_i) + u_i, \, Ii = 1, \ldots, N,$$

where β = a measure of pricing-to-market across export destination markets due to estimation of cross-sectional variables over the long-run, Ei reflects the market specific exchange rate of exporting country i on time average.

Results from country-level within regression can be interpreted as explaining transient pricing- to-market practices, since the specification focus on movements away from the estimate of the firm's constant unit export price. The coefficients generated by this specification explain which country variables are associated with deviations from the firm's average position. On the other hand, a significant coefficient in the exchange variable in the between estimator is more likely to be associated with a long-run pricing-to-market strategy. A coefficient of -1 on the exchange variable indicates a complete exchange rate pass through; 0 shows no pass-through. A coefficient between these two numbers suggests incomplete pass-through, indicating evidence of pricing-to- market. This decomposition enables us to show an individual evidence for a short-run pricing-to- market practice and a long-run pricing-to-market strategy separately. These dichotomized empirical results have not been documented in the previous monotonic pricing-to-market (PTM) research.

Our hypothesis is motivated by the literature and theory which suggests that the long-run impact on economic variables matters. All the previous pricing-to-market research in panel analysis used a within effects model, which only produces an estimate for a short-run pricing-to-market practice. Moreover, a significant short-run pricing-to-market estimate is not warranted to fully describe a long-run

pricing strategy in which expanding market shares might be one of solutions to a rising imbalance between Sri Lanka domestic crepe rubber production and domestic consumption.

Results and Discussion

The paper decomposes pricing-to-market activities into their cross-sectional (between regression) and time-series components (within regression). The significant negative coefficient in the within specification in Table 1 indicates that exchange-rate pass-through occurs for Sri Lankan crepe rubber exports. Export prices are adjusted downward by 1.6% for a 1% depreciation of the Sri Lankan rupees relative to the foreign currencies. There is insignificant "between" exchange rate coefficient parameter (p-value = 0.6086 not reported in Table 1).

Table 1: Within and Between Estimations for Impacts of Exchange Rates on Sri Lankan crepe rubber export prices: 2003 – 2014

	A	B	r^2
Within	0.5035078	-1.619415	0.1745
	0.43 **	-4.29 **	
Between	5.497071	-0.0118512	0.0464
	66.59	-0.54 **	

Note: Coefficients are elasticities and numbers in parentheses are t-statistics. ** indicates a statistical significance level of 5%.

In fact, expanding market-shares of crepe rubber exports by implementing exchange rates pass-through has been a strategically viable plan for short run, given the rising imbalance between Sri Lankan domestic crepe rubber production and consumption.

The conventional econometric model to examine exporter's price behavior across its destinations is a two-way within model of panel regression of exchange rates on export prices with time and country dummies. Findings of a significant coefficient parameter in the exchange rate variable on the conventional within model caught to be interpreted as evidence of short-run pricing-to-market only. On the other hand, between specifications produces a parameter estimate for long-run pricing-to-market behaviour.

This study found statistically significant coefficients in the within and insignificant coefficient in the between model, indicating that the pricing-to-market of Sri Lankan crepe rubber exporters across their export destinations are not both transient and persistently long. These results add

further evidence of pricing-to-market behavior in the exchange rate pass-through literature. Furthermore, the negative significant coefficients in the within models agree with what Davis *et al*. 2014 found and suggest that U.S. broiler meat exporters offer broiler meat at a partially-exchange-rate adjusted price to defend its market share in the selected destination markets, followed by a strong appreciation of U.S. dollar relative to the currencies of the importing countries.

The potential imbalance between rising Sri Lanka domestic production and stagnant domestic consumption could be a major concern, because a stagnant domestic consumption tends to put a downward pressure on price. Information on pricing-to-market behavior in the short-run could prove to be beneficial to the export industries in some other countries because it allows for better timing of decisions given volatile exchange rate changes.

Lastly, this study shows that in Sri Lanka, expanding of crepe rubber market is a viable strategy in short run. The potential imbalance between rising Sri Lanka domestic production and stagnant domestic consumption could be a major concern, because a stagnant domestic consumption tends to put a downward pressure on price. Information on pricing-to-market behavior in the long-run as well as in the short-run could prove to be beneficial to

the export industries in some other countries because it allows for better timing of decisions given volatile exchange rate changes. Lastly, this study shows that in Sri Lanka, expanding of crepe rubber market is not a viable strategy in short run as well as in long run. Policy makers must be careful when evaluating policy impacts; policies may be ineffective in the short run or in the long run.

Conclusion

Expanding the market shares of crepe rubber exports by implementing exchange rates pass -through has been a strategically viable plan for short run. Depreciation Sri Lankan rupees will impact on export price of crepe rubber with in model regression suggests that short run pricing to market is viable for Sri Lankan crepe rubber export market but it is not viable for the long run.

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