EXCHANGE RATES AND PRICING-TO-MARKETS (PTM)

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This paper sets up a model where firms, which sell their products both in domestic and foreign markets, pre-set price in terms of destination country currency, and where firms in the market produce differentiated products. Using Spence-Dixit-Stiglitz (S-D-S) type substitute function and Green's theorem the paper derives the demand for the firm's brand (domestic and export). The paper shows how PTM results when the changes of the exchange rate are uncertain if firms price their products following Leland (1972)'s concepts of PIU and PDU.

1. INTRODUCTION

To the firm facing exchange risks in international markets advance planning in production, market selection, and pricing strategy is important since, if the firm fixes prices in the firm's domestic currency, export market prices will continuously change as exchange rate changes. As S. Grassman's [1973] study shows, with around two-thirds of the export from the small open economies denominated in the exporter's currencies, the distributor in the importing country has to adjust their profit margins to keep local currency prices constant and to conform to the exporter's prices they pay. If the distributors keep their profit margins constant, then consumers have to face continuous price changes as exchange rate changes. In addition to that, if the exporting firm changes prices frequently and distributors keep profit margins constant, consumers may face big swings in their prices to pay as well as frequent price changes. As Gottfries [1986] shows, the existence of consumer's search cost induces inelastic 'customers flow' adjustment to the change of prices. But large search cost per period by frequent price changes, meanwhile, leads downward shift in the demand curve which the firm faces.1 So, without price planning in terms of price change interval and the magnitude of

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1 See Barro [1972] for this point.
price changes, customers, especially those who invest in equipments, plants, machinery, and other fixed assets which functions well with the products from the exporting firm, may feel insecure and change the supplier to other exporting or domestic producers.\footnote{Shapiro[1989] cites the example of U.S. bicycle manufacturers who were unprepared for the 1971 currency realignment and hence failed to expand its domestic market share through comparatively advantageous pricing latitude. For the example of the need for advance planning, see also Shapiro(p. 332)} Decisions of firms in period $t$ which maximize the expected utility of profit, with demand as a function of only prices and income, and cost as a function of quantity produced and variable inputs, have no impact on the future profits beyond period $t+1$. Thus, firms maximize expected profits by choosing prices once in every period. When the exchange rate changes are uncertain, with exporter currency denomination and price pre-setting at the end of the period $t-1$, what is uncertain to the exporting firms is the quantity demanded for the current period and hence the nominal revenue in its own currency. In general functional form the firm faces demand $q$ in its export market as follows:

$$q = q(p, e),$$

where $e \in E$ denotes the realized exchange rates between the currencies of the exporting and the importing country. When the home country currency depreciates the firm faces higher demand when the firm pre-set price $p^*$ at the end of the last period. When the home country currency appreciates the firm faces lower demand. Since exchange rate changes are uncertain, and hence the demand is, risk preferences of the firm determine the pricing decision of that firm. The paper consists of 5 sections. This introduction section is followed by the derivation of the demand of the brand $k$ of firm $k$, using Green’s 2 stage budgeting procedure, in section II. The causes of PTM in relation with mark-up pricing are discussed in section III. Section IV shows how PTM results when the manager of a firm, facing uncertain exchange rate changes, prices their product using Leland’s principles of PIU and PDU. And section V concludes with some discussions on the implications of the results which are shown in the paper.

\section*{II. DEMAND FOR DIFFERENTIATED PRODUCTS}

Assume a customer consumes in many varieties. Then his utility from the brands of the product of firms in industry $I$, where $m$ foreign and domestic firms produce differentiated products, can be represented by Spence-Dixit-Stiglitz (S-D-S) type subutility function

$$u_i(q_1, \ldots, q_m) = \left\{ \sum_{i=1}^m q_i^\xi \right\}^{1/\xi},$$  \hspace{1cm} (1)