STICKY PRICES AND THE LAW OF ONE PRICE: EVIDENCE FROM SCANDINAVIAN DUTY-FREE SHOPS

Sticky nominal prices and wages are central to macroeconomic theories, but just why might it be difficult for money prices to change from day to day as market conditions change? One reason is based on the idea of "menu costs." Menu costs could arise from several factors, such as the actual costs of printing new price lists and catalogs. In addition, firms may perceive a different type of menu cost due to their cutsomers' imperfect information about competitors' prices. When a firm raises its price, some customers will shop around elsewhere and find it convenient to remain with a competing seller even if all sellers have raised their prices. In the presence of these various types of menu cost, sellers will often hold price constant after a change in market conditions until they are certain the change is permanent enough to make incurring the costs of price change worthwhile.*

If there were truly no barriers between two markets with goods priced in different currencies, sticky prices would be unable to survive in the face of an exchange rate change. All buyers would simply flock to the market where a good had become cheapest. But when some trade impediments exist, deviations from the law of one price do not induce unlimited arbitrage, so it is feasible for sellers to hold prices constant despite exchange rate changes. In the real world, trade barriers appear to be significant, widespread, and often subtle in nature.

Apparently, arbitrage between two markets may be limited even when the physical distance between them is zero, as a surprising study of pricing behavior in Scandinanvian duty-free outlets shows. Swedish economists Marcus Asplund and Richard Friberg studied pricing behavior in the duty-free stores of two Scandinavian ferry lines and the airline SAS, all of whose catalogs quote the prices of each good in several currencies for the convenience of customers from different countries.† Since it is costly to print the catalogs, they are reissued only from time to time with revised prices. In the interim, however, fluctuations in exchange rates induce multiple, changing prices for the *same* good. For example, on the Birka Line of ferries between Sweden and Finland, prices

*It is when economic conditions are very volatile that prices seem to become most flexible. For example, restaurant menus will typically price their catch of the day at "market" so that the price charged (and the fish offered) can reflect the high variability in fishing outcomes.

†"The Law of One Price in Scandinavian Duty-Free Stores," *American Economic Review* 91 (September 2001), pp. 1072–1083.

were listed in both Finnish markka and Swedish kronor between 1975 and 1998, implying that a relative depreciation of the markka would make it cheaper to buy cigarettes or vodka by paying markka rather than kronor.

Despite such price discrepancies, Birka Line was always able to do business in both currencies—passengers did not rush to buy at the lowest price. Swedish passengers, who held relatively large quantities of their own national currency, tended to buy at the kronor prices, whereas Finnish customers tended to buy at markka prices. Often, Birka Line would take advantage of publishing a new catalog to reduce deviations from the law of one price. The average deviation from the law of one price in the month just before such a price adjustment was 7.21 percent, but only 2.22 percent in the month of a price adjustment. One big impediment to taking advantage of the arbitrage opportunities was the cost of changing currencies at the onboard foreign exchange booth—roughly 7.5 percent. That transaction cost, given different passengers' currency preference at the time of embarkation, acted as an effective trade barrier.‡

Surprisingly, Birka Line did not completely eliminate law-of-one-price deviations when it changed catalog prices. Instead, Birka Line practiced a kind of pricing to market on its ferries. Usually, exporters who price to market discriminate between different consumers based on their different locations, but Birka was able to discriminate based on different nationality and currency preference, even with all potential consumers located on the same ferry boat.

The idea that currency preference, exchange costs, and calculation costs create fixed transaction cost bands within which price differentials can persist receives further support from Asplund and Friberg's data on SAS in-flight duty-free catalogs. SAS also practiced pricing to market, but with smaller planned deviations from the law of one price for more expensive items (for example, the $138 Mont Blanc pen). For a given percentage price discrepancy, the gains to purchasing at the lowest price are greater the more expensive the item. The finding that SAS had more latitude for pricing to market with low-cost items is therefore consistent with the presence of fixed barriers to arbitrage.

‡Customers could pay in the currency of their choice not only with cash, but also with credit cards, which involve much lower foreign exchange conversion fees but convert at an exchange rate prevailing a few days after the purchase of the goods. Asplund and Friberg hypothesize that for such small purchases, uncertainty and the costs of calculating relative prices (in addition to the credit-card exchange fees) might have been a sufficient deterrent to transacting in a relatively unfamiliar currency.