

# The Geography of Consumer Prices

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## Abstract

This project analyzes spatial aspects of microeconomic price setting, particularly, the role distance and national borders play in driving micro- and macro-level real exchange rates, i.e. cross-country deviations from the Law of One Price.

We develop a fully specified, two-country dynamic general equilibrium model of microeconomic price setting, in which pricing policies are location-specific. In the model, price-setting firms operating at different locations, and selling one product engage in Dixit-Stiglitz-type monopolistic competition. Firms have a production function with a single labor input, and they are affected by both idiosyncratic and aggregate productivity shocks. Price adjustment is costly, with the cost including a fixed component *a la* Klenow and Willis (2006). In each time period, firms decide whether to change their price and pay the associated cost of adjustment, or not to change the price and rather let it depreciate at the average rate of inflation. The profit of the firm is determined by the demand of a representative consumer in each location. Consumers treat the products of the different stores as substitutes, and they derive utility from a CES-aggregate of consumption from different stores at different locations. Consumers also differ in their perception of prices at other locations, by taking prices elsewhere higher than they actually are. The difference in perceived prices stems from two potential sources, distance-related transaction costs and the existence of national borders.

In order to confront the model with the data, we draw on a rich microeconomic panel data set of consumer prices collected in two neighboring countries in Europe, Hungary and Slovakia. The sample consists of store-level price quotations of a wide range of goods and services, originally collected for calculating national CPIs. Our particular focus is on a sub-sample of truly homogenous goods and services, such as an A4-size drawing paper, flour or poppy-seed. The items are narrowly defined and truly identical in the two countries. We present key descriptive features of the two data sets, including facts of the frequency and size of price changes, distribution of relative prices, and cross-location pricing patterns. As both price data sets contain information on within-country location (counties in Hungary, localities on Slovakia), we are also able to zoom on stores operating close to the common border.

Using a method of moments approach, we parameterize and estimate the matrix of perceived price differences, and generate markups consumers at particular locations experience relative to actual prices in stores at other locations. Putting further structure on the pair-wise markups in perceived prices across locations, the procedure ultimately entails structurally estimating a low number of parameters, principally one parameter on distance and one on the border. The estimation procedure is based on matching moments in relative price distributions, and key microeconomic and aggregate statistics (frequency, average size) of prices in the two countries.

Overall, the paper provides a novel, structural perspective on quantifying gravity- and border-effects in price setting behavior.

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