DEMAND DECOMPOSITION IN TRADE: QUALITY AND TASTE

The trade literature has long focused exclusively on firms’ productivity as an explanation for the variation in firm-product export performance. While supply characteristics are the main determinant to explain entry into foreign markets, this is less the case to explain firm performance conditioning upon entry in a market. There is now a substantial stock of papers arguing that the supply side needs to be complemented with demand-related aspects to explain sales variation. For instance, several papers highlight the role played by product “quality.” Earlier contributions using the CES utility can be found in Feenstra (1994), Broda and Weinstein (2006) and Baldwin and Harrigan (2011).1

Quality is typically modelled as a demand shifter, which may capture very different effects. Furthermore, quality is generally an ordinal concept2 which is, therefore, hard to measure. In addition, quality is not incorporated into preferences as suggested by the literature in industrial organization (Tirole, 1988). As a consequence, it is fair to say that the word “quality” is used mainly to describe what stems from the demand side. Recently, Hottman, Redding and Weinstein (2016) choose to call “firm appeal,” that is, product differentiation, what cannot be explained by economies of scope and cost differences. The question that remains is whether there is more to say about what firm appeal means?

A recent paper by Di Comite, Thisse and Vandenbussche (2014) strongly argues there is. Using Belgian firm-level export data, they show that when accounting for quality and cost through firm-product dummies, and for destination-specific competition effects, through country-product dummies, only around 55% of the variation in export quantities at firm-product level is explained. This leaves 45% of the variation in export quantities still unexplained.3 By comparison, the same set of explanatory variables

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1 Other papers using different demand preferences include Verhoogen (2008), Khandelwal (2010), Roberts, Xu and Zhang (2012), Dhingra (2013), as well as Eckel, Neary, Iacovone and Javorcik (2015).
2 It is difficult to compare the quality of any two varieties of the same product, unless data on costs or input prices are available, like in Verhoogen (2008).
3 Hottman, Redding and Weinstein (2016) find that 50 to 75% of the variance in U.S. firm size can be attributed to differences in firm appeal; 23 to 30% to differences in product scope; and less than 20% to average marginal cost differences.
explain between 79% and 96% of the variation in prices, depending on how the price data are reported (in weights or units). Di Comite, Thisse and Vandenbussche (2014) argue that “taste effects,” as modelled in the Hoteling-Lancaster tradition within a “love-for-variety” monopolistic competition model, could well account for the remaining 45% of the variation in firm-product exported quantities across destinations.

To illustrate, consider Figure 1 which shows the quantity and price rankings of Belgian export to different markets at the firm-product level. We find that the relative exported quantities of the same firm-product across a range of very different destinations vary a lot, whereas relative prices are remarkably regular across markets and keep the same ranking. This implies that the bilateral cross-country rank correlation of exported quantities (triangles, on average 70%) is low compared to that of export prices (squares, on average 90%), suggesting that country-level variation in consumer tastes is high even if the observation of prices alone would fail to see it.

Figure 1: Correlations of export prices as well as quantities across destinations.

Note: The squares dots indicate pairwise (bilateral) price rank correlations in the Belgian data of similar products across destinations. The triangles dots indicate bilateral country pairwise quantity rank correlations of similar products across destinations, ranked from high to low. The horizontal lines give average correlations.

Di Comite, Thisse and Vandenbussche (2014) attribute the unexplained variation in export quantities to “taste” differences embedded in consumer preferences across destinations. A unique feature of their model is that quality and taste factors can
operate in opposite directions in consumer demand. For example, a high quality good may have a bad match with local tastes and as a result not sell much, despite its high quality. Empirically this amounts to saying that while quality can be captured by a parallel demand shifter resulting in an upward shift of the residual demand curve, taste for a product is a demand slope shifter that can work in any direction affecting quantities. Together, these demand shifters jointly determine the sales of a product (next to cost and competition effects). This feature offers more flexibility than other demand models in which taste and quality mostly work in the same direction.

For example, in the case of quadratic preferences, a unique feature is that “taste” does not affect the price of a product, whereas quality does. This distinction between taste and quality, is a distinction long-made in industrial organization that delineates horizontal from vertical product differentiation through their distinct effect on price when quantities purchased by consumers are allowed to vary. Spatial models of product-market competition argue that horizontal product-characteristics (flavor, color etc.) need not affect price, but that they can explain market share differences. In most other current trade models, parallel demand shifters affects the equilibrium product price but obfuscates the distinction between horizontal and vertical product features. In addition, quality alone cannot explain why the total variability explained by the same set of explanatory variables differs so much between prices and quantities.

The model by Di Comite, Thisse and Vandenbussche (2014) belongs to the family of quadratic utility models. However, in its standard form, the quadratic utility model does not necessarily offer a good alternative to the CES when it comes to explaining the variability in sales quantities (Melitz and Ottaviano, 2008; Ottaviano, Tabuchi and Thisse, 2002). Absent a specific taste demand parameter, the standard quadratic utility model with heterogeneous costs and quality only explains 55% of the quantity variation observed (as argued above). Allowing for taste differences generates asymmetry in demand across countries. This offers a rational for the missing variability in quantities which is firm-product-country specific. The quadratic utility model augmented with taste, as a separate demand shifter, is currently the only model that allows for a clear distinction between quality and taste in a “love-for-variety model.”
The incorporation of taste adds to the increasing popularity of the linear demand models in applied work in addition to features such as varying markups and the presence of competition effects (Mayer, Melitz and Ottaviano, 2014; Dhingra, 2013; Eckel and Neary, 2010; Foster, Haltiwanger and Syverson, 2008).

Summing up, when the interest of the researcher lies in the identification of quality and taste effects of a given firm or firm-product, the approach proposed by Di Comite, Thisse and Vandenbussche (2014) offers an attractive alternative to several other models in the literature.

While the model has been developed to estimate demand parameters at the firm-product level, it can also be used at higher levels of aggregation. Researchers with access to firm-level data (Amadeus, Orbis) or product-level data (Comext, Comtrade) can thus also estimate demand parameters stemming from the model. For policy purposes, the model has recently been used in this context. While the model in principle allows for the construction of both quality and taste indices, the empirical implementation of a quality index, purged from taste effects is easiest to implement. A quality index cleaned from taste effects was developed at the CN8 product-level for each of the 10,000 products exported to the European market by different exporting countries (Vandenbussche, 2014; Di Comite, 2012). In Figure 2, we show for one particular country, Latvia, how the distribution of relative quality for Latvia’s CN8 exported products to the EU market has evolved over the period 2003-2013. The distribution of quality was normalized with respect to the EU average in the same period 2003-2013. The plot clearly suggests a shift of the quality distribution of exported products to the right, which corresponds to an improvement of the quality distribution for Latvia in that period. The evolution of the quality index for Latvia is consistent with and offers a potential explanation for the evolution of Latvia’s export market shares which have been rising over the same period (see Figure 3).

This simple illustration highlights the usefulness of this new quality metric for both academic and policy-related work and warrants further investigation. The construction of taste indices is more demanding in terms of data and thus still awaits empirical implementation.
Figure 2: Distribution of the quality index for CN8 products exported by Latvia with respect to the EU28 average.

Note: When the quality index is equal to 1, the quality of the CN8 Latvian product has the same level as the EU28 average. Higher values indicate better qualities.

Figure 3: Market share of Latvian exports in total EU28 imports.

References


