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Quality, trade, and exchange rate pass-through☆

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ABSTRACT

We investigate theoretically and empirically the effects of real exchange rate changes on the behavior of firms exporting multiple products with heterogeneous levels of quality. Our model, which features a demand elasticity that falls with quality, predicts more pricing-to-market and a smaller response of export volumes to a real depreciation for higher quality goods. We provide strong support for the model predictions using a unique data set of Argentinean firm-level wine export values and volumes between 2002 and 2009 combined with experts wine ratings to measure quality. The heterogeneity we find in the response of export prices and volumes to changes in exchange rates remains robust to alternative measures of quality, samples, and specifications.

1. Introduction

Exchange rate fluctuations have small effects on the prices of internationally traded goods. Indeed, empirical research typically finds that the pass-through of exchange rate changes to domestic prices is incomplete, leading to deviations from the Law of One Price.[1] Possible explanations for partial pass-through include short run nominal rigidities combined with pricing in the currency of the destination market (Engel, 2002; Gopinath and Itskhoki, 2010; Gopinath et al., 2010; Gopinath and Rigobon, 2008), pricing-to-market strategies whereby exporting firms differentially adjust their markups across destinations depending on exchange rate changes (Atkeson and Burstein, 2008; Knetter, 1989, 1993), or the presence of local distribution costs in the importing economy (Burstein et al., 2003; Corsetti and Dedola, 2005).[2]

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[1] For a survey of the literature, see Burstein and Gopinath (2014) and Goldberg and Knetter (1997).

[2] Also, Alessandria and Kaboski (2011) emphasize the role of search frictions as a source of incomplete pass-through. Nakamura and Steinsson (2012) argue that price rigidity and product replacements lead aggregate import and export price indices to appear smoother than they actually are, biasing exchange rate pass-through estimates.

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Thanks to the increasing availability of highly disaggregated firm- and product-level trade data, a strand of the literature has started to investigate the heterogeneous pricing response of exporters to exchange rate changes.[3] Amiti et al. (2014) find that Belgian exporters with high import shares and high export market shares have a lower exchange rate pass-through. Berman et al. (2012) show that highly productive French exporters change significantly more their export prices in response to real exchange rate changes, leading to lower pass-through. Chatterjee et al. (2013) focus on multi-product Brazilian exporters and find that within firms, pricing-to-market is stronger for the products firms are most efficient at producing.

Evidence on the role of product-level characteristics in explaining heterogeneous pass-through remains scarce, however. In this paper, we explore how the heterogeneous pricing-to-market behavior of exporters, which leads to incomplete pass-through, can be explained by the quality of exported goods. We model theoretically the effects of real exchange rate changes on the pricing decisions of multi-product firms that are heterogeneous in the quality of the goods they export, and empirically investigate how such heterogeneity impacts exchange rate pass-through for export prices. Consistent with the predictions of the model, our empirical analysis shows that pass-through decreases with the quality of exported goods. Assessing the role of quality in explaining pass-through is a challenge as quality is generally unobserved. To address this issue we focus on the wine industry, which is an agriculture-based manufacturing sector producing differentiated products, and combine a unique data set of Argentinean firm-level destination-specific export values and volumes of highly disaggregated wine products with experts wine ratings as a directly observable measure of quality.[4]

The first contribution of the paper is to present a theoretical model to guide our empirical specifications. Building on Berman et al. (2012) and Chatterjee et al. (2013), we extend the model of Corsetti and Dedola (2005) by allowing firms to export multiple products with heterogeneous levels of quality. In the presence of additive (per unit) local distribution costs paid in the currency of the importing country, which are assumed to be higher for higher quality goods, the model shows that the demand elasticity perceived by firms falls with a real depreciation and with quality. In response to a change in the real exchange rate, exporters therefore change their prices (in their own currency) more, and their export volumes less, for higher quality goods. As a result, pass-through decreases with quality. Once we allow higher income countries to have a stronger preference for higher quality goods, as the evidence from the trade literature tends to suggest (e.g., Crinò and Epifani, 2012; Hallak, 2006), the heterogeneous response of prices and quantities to exchange rate changes is predicted to be stronger for exports to higher income destination countries.

In contrast to models where quality is only a demand shifter (e.g., Melitz, 2003; Khandelwal et al., 2013), our extension to Corsetti and Dedola (2005) with local distribution costs predicts that the demand elasticity perceived by exporters falls with quality. Other models with endogenous and variable markups deliver the prediction that quality affects the perceived demand curve, and that pass-through decreases with quality: Atkeson and Burstein (2008) with imperfect competition à la Cournot where high performance firms have high market shares; Melitz and Ottaviano (2008) with fixed costs of entry and non-CES preferences where high performance firms have a lower price elasticity of demand; and Auer et al. (2014) with monopolistic competition and non-homothetic preferences where high market share firms perceive a lower demand elasticity. Overall, by showing that pass-through decreases with quality, our empirical analysis validates all these classes of models, but we also provide evidence, consistent with our Corsetti and Dedola (2005) framework, that distribution costs matter in explaining our findings.

The second, and main, contribution of the paper is to bring the predictions of our model to the data. The firm-level trade data we rely on are from the Argentinean customs and provide, for each export flow between 2002 and 2009, the name of the exporting firm, the country of destination, the transaction date, the Free on Board (FOB) value of exports (in US dollars), and the volume (in liters) of each wine exported, where a wine is defined according to its name, grape (Chardonnay, Malbec, etc.), type (white, red, or rosé), and vintage year. As we do not directly observe prices, we compute FOB export unit values as a proxy for export prices at the firm–product–destination level, using data on the value and volume exported. To assess the quality of wines, we rely on two well-known experts wine ratings, the Wine Spectator and Robert Parker. Our approach to measuring quality is similar to Crozet et al. (2012) who match French firm-level exports of Champagne with experts quality ratings to investigate the relationship between quality and trade.

Our data are well-suited for identifying heterogeneous pass-through due to differences in product quality. First, as the level of disaggregation of the customs data is unique, we can define a "product" in a much more precise way compared to papers that rely on trade classifications such as the Combined Nomenclature (CN) or the Harmonized System (HS) to identify products (e.g., Amiti et al., 2014; Auer and Chaney, 2009; Berman et al., 2012; Chatterjee et al., 2013). Second, as the quality scores from the Wine Spectator and Parker rating systems are assigned to each wine according to its name, grape, type, and vintage year, the trade and quality data sets can directly be merged with each other. As a result, when using the Wine Spectator ratings that have the largest coverage of Argentinean wines, our sample includes 209 multi-product firms exporting 6,720 different wines with heterogeneous levels of quality (this contrasts with Crozet et al., 2012, who cannot distinguish between the different varieties sold by each firm, and therefore assume that each firm exports one type of Champagne only). Aggregating our data at the 12-digit HS-level would reduce our sample size by a factor of six, which would in turn significantly lower the within-firm variation in the quality of exported wines as the 209 exporters would only be selling at most five different "products." Third, the level of disaggregation of our data ensures that compositional or quality changes do not affect movements in unit values. For instance, Feenstra and Romalis (2014) demonstrate that the variation in trade unit values defined at the 4-digit Standard International Trade Classification (SITC) level is mostly attributable to differences in product quality. Fourth, thanks to the granularity of our data, our pass-through estimates are not affected by the "product replacement bias" put in evidence by Nakamura and Steinsson (2012), which may be a problem when using aggregate data (also, see Gagnon et al., 2014). Finally, export values are FOB and therefore measure the revenue received by exporters at the border, excluding nontradable components such as transportation costs, tariffs, or distribution and retail costs in the importing country.

To the best of our knowledge, our paper is the first to exploit such highly disaggregated product-level exports data to investigate empirically the pricing strategies of exporters in response to real exchange rate fluctuations.[5] We find that pass-through for export prices is incomplete, but large: in our baseline regression, in response to a ten percent change in the real exchange rate, exporters change their export prices (in Argentinean pesos) by 1.9%, therefore pricing-to-market is low and pass-through is large at 81%. Higher quality wines are more expensive and are exported at a higher price. Most interestingly, we show that

[3] Many papers examine the response of import prices (which include transportation costs) or consumer prices (which further include distribution and retail costs) to changes in currency values (e.g., Campa and Goldberg, 2005, 2010; Gopinath and Rigobon, 2008). For earlier evidence from the perspective of exporters, see Goldberg and Knetter (1997) and Knetter (1989, 1993). For more recent evidence at the firm-level, see Campos (2010), Fitzgerald and Haller (2014), and Li et al. (2015).

[4] Other papers that focus on specific industries include Auer et al. (2014) and Goldberg and Verboven (2001) for cars, Hellerstein (2008) for beer, and Nakamura and Zerom (2010) for coffee.

[5] Papers using similarly detailed product-level data usually observe retail or wholesale prices rather than trade prices (e.g., Hellerstein, 2008; Nakamura and Zerom, 2010).