The buyer margins of firms' exports ☆

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ABSTRACT

We use detailed data on exporters from Costa Rica, Ecuador and Uruguay as well as on their buyers to show that: aggregate exports are disproportionally driven by few multi-buyers exporters; and each multi-buyer exporter's foreign sales of any product in a given destination are in turn accounted for by a dominant buyer. We propose an analytically solvable multi-country model of endogenous selection in which dominant exporters, dominant products and dominant buyers emerge in parallel as multi-product sellers with heterogeneous technologies compete for buyers with heterogeneous needs. The model not only provides an explanation of the existence of dominant buyers but also makes specific predictions on how the relative importance of dominant buyers should vary across export destinations depending on their market size and accessibility. We show that these predictions are borne out by our data and discuss their welfare implications in terms of gains from trade.

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1. Introduction

Few firms engage in exporting. Most of those that do sell only a small number of products to a small number of buyers in a small number of destinations. However, the small group of exporters selling a lot of products to a lot of buyers in a lot of destinations accounts for a dominant share of aggregate exports. Analogously, only a small fraction of dominant products accounts for the bulk of sales by *each* of those dominant exporters, and only a small fraction of dominant buyers accounts for the bulk of each dominant exporter's sales in any given destination. While the facts concerning dominant exporters and dominant products are well known (see, e.g., Bernard et al., 2007; Mayer and Ottaviano, 2008; Bernard et al., 2012; Mayer et al., 2014), those on dominant buyers have so far remained largely unexplored.[1]

We document these facts using detailed information on exporters from Costa Rica, Ecuador and Uruguay as well as on their buyers. As explaining the existence of dominant buyers calls for new theories in which heterogeneous sellers interact with heterogeneous buyers, we then propose a simple analytically solvable multi-country model of endogenous selection in which dominant exporters, dominant products and dominant buyers emerge in parallel as multi-product sellers with heterogeneous technologies compete for buyers with heterogeneous needs. The model not only provides an explanation of the existence of dominant buyers but also makes specific predictions on how the relative importance of dominant buyers should vary across destinations depending on their market size and geography. We finally show that these predictions are indeed borne out by our

[1] We discuss the related literature below.

data and discuss their welfare implications in terms of gains from trade.

In so doing, we make two distinct contributions to the theory and the empirics of international trade with heterogeneous firms. As for theory, on the demand side our model introduces buyer heterogeneity by merging the 'representative consumer approach' to product differentiation (Chamberlin, 1933; Spence, 1976; Dixit and Stiglitz, 1977) with the 'address (or characteristics) approach' (Hotelling, 1929; Lancaster, 1966, 1979).[2] Whereas the former is the current standard in international trade theory, the latter is more popular in industrial organization, with very few applications to international trade since early works by Lancaster (1980) and Helpman (1981).[3] As in the representative approach, in our model consumers demand varieties of a horizontally differentiated product ('love of variety'). However, as in the address approach, they prefer different versions of those varieties. Taste heterogeneity is introduced by assuming that different versions of the same variety can be described as points in a characteristics space. Consumers' preferences are defined over all potential versions, and each consumer has her own ideal version ('address') in the characteristics space. Aggregate preferences for within-variety diversity arise from the dispersion of ideal points over the characteristics space and, for a given price vector, a version's demand is defined by the mass of consumers preferring that version over the others. In particular, for each variety there is a measure of ideal versions that, in the wake of Salop (1979), are located around a circle with consumers uniformly distributed along the circle. However, unlike Hotelling (1929) and Salop (1979) but similar to Capozza and Van Order (1978), a consumer can buy a variable amount of her ideal version of each differentiated variety as long as this is available in her ideal version. Due to love of variety, the consumer demands all and only the varieties available in her ideal version.[4] A crucial feature of our model that drives its empirically relevant comparative statics is that demand exhibits variable elasticity as in Ottaviano et al. (2002).

On the supply side, firms are monopolistically competitive. Following Mayer et al. (2014), we assume that each firm first chooses in which country to enter as well as which variety and which version of that variety to produce. This defines its 'core variety' and the 'core version' of that variety. Then, again upon entry, the firm randomly draws its efficiency in producing that version. This defines the firm's 'core competence'. After having discovered its core competence, the firm may also decide to produce non-core varieties, serve non-core customers or export to foreign markets but in all three cases it faces additional costs of 'proliferation', 'adaptation' or 'exportation' respectively. This implies that in equilibrium more efficient firms produce more varieties, serve more customers and export to more destinations. Moreover, the number of varieties sold and customers served as well as the distribution of sales across varieties sold and customer served change across destinations depending on the toughness of local competition. In particular, tougher competition forces firms to sell fewer varieties. These are the ones closer to the 'core variety' for which the proliferation cost is lower. In addition, due to variable demand elasticity, tougher competition makes firms skew

the sales of the varieties they keep on producing towards the core ones. Analogously, tougher competition also forces firms to focus on their 'core versions', hence on their 'core buyers', for which the adaptation cost is lower. Due to variable elasticity, it also makes firms skew their sales towards the core buyers. As a result, consumers whose ideal versions were initially further away from the firms' core versions are not served anymore with the corresponding varieties disappearing from their consumption baskets. This implies a welfare loss in terms of foregone product variety that is, however, compensated by the availability of new varieties supplied by new firms as the distance between the core and ideal versions of the new varieties is shorter than the distance between the core and ideal versions of disappeared varieties. Thanks to the compression of markups, to the selection of firms, varieties and versions, and to the reallocation of expenditure shares towards core versions, tougher competition also reduces prices. For all these reasons, average utility increases with the toughness of competition. While the predictions on varieties are analogous to those in Mayer et al. (2014), those on buyers are novel. These are the predictions we bring to the data.

As for the empirics of international trade, our paper contributes to an emerging literature that has started to examine the extensive and intensive margins of exports along the buyer dimension. Modelling marketing costs and distinguishing the cost needed to reach the first customer from the one needed to reach additional customers, Arkolakis (2010) exploits the US-Mexico NAFTA liberalization episode to argue that exports growth materialized through increases not only in the number of exporters ('new firm margin') but also and more importantly through the number of their customers ('new consumer margin'). In so doing, he uses disaggregated product data rather than buyer information.[5] Blum et al. (2010, 2012), Eaton et al. (2013), Monarch (2014), and Monarch and Schmidt-Eisenlohr (2016) do make use of data that identify the buyers, but for different purposes than ours. In particular, Blum et al. (2010, 2012) use data on Chilean exporters and matched Colombian importers to motivate their model of trade intermediaries. Eaton et al. (2013) use customs data on the relationships Colombian firms have with their US buyers to quantify several types of trade costs and learning effects exploring their impacts on aggregate export dynamics. Monarch (2014) utilizes data on US importers and Chinese exporters to uncover the frictions associated with changing exporting partners. Monarch and Schmidt-Eisenlohr (2016) also exploit US import data to estimate the value of long-term trade relationships for certain countries. Closer to our paper, Bernard et al. (forthcoming) use export information from Norway to study the impact of foreign buyers' size heterogeneity on aggregate trade elasticity.[6] However, differently from our paper, their analysis does not deepen the investigation of the firm-product level and does not cover the distributions of sales across buyers.[7]

Also related to our analysis are a number of recent studies that examine the relationships between buyers and sellers in given pairs of countries within specific sectors. Macchiavello (2010) exploits data

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[2] See Anderson et al. (1991) for a discussion of the pros and cons of different approaches to product differentiation.

[3] See, e.g., Casella and Rauch (2002), Rauch and Casella (2003) and Rauch and Trindade (2003).

[4] Helpman (1981) adopts a 'pure' address model. There is only one differentiated product and the fact that a consumer has her own ideal version of that product rules out 'love for variety' across versions. Anderson et al. (1991) determine the formal conditions under which address (and discrete choice) models can give rise to aggregate 'love for variety' across versions of the same product when individual preferences for ideal versions are aggregated at the product level. In this respect, though our demand system violates those conditions, our approach could be interpreted as capturing the idea of an intermediate level of aggregation between the individual consumer and the product market as in the marketing literature since Smith (1956).

[5] In Arkolakis (2010) consumers with identical tastes may end up consuming different CES bundles of differentiated varieties due to imperfect marketing penetration. In particular, a consumer buys a good only if she is aware of its existence, and becomes aware of its existence only if she observes a costly ad posted by its producer. The producer serves the market only if it is profitable to incur the marginal cost to reach at least one consumer and then incurs an increasing marginal penetration cost to access additional consumers. Assuming that the marketing technology exhibits increasing returns to scale with respect to population size but decreasing returns to scale with respect to the number of consumers reached, the model is used to reconcile the positive relationship between entry and market size with the existence of many small producers.

[6] Some of our findings concur with those reported by Bernard et al. (2013) for Norwegian exporters.

[7] Our paper is also related to McCalman (2018) who introduces demand side heterogeneity by relaxing the assumption of homotheticity and therefore allowing expenditure shares to depend on buyers' income levels in addition to relative prices.