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Information matters: A theoretical comparison of some cross-border trade barriers

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ABSTRACT

There is widespread evidence that geographical borders reduce trade. This paper presents a theoretical model capable of providing a succinct comparison of three broad forms of trade barriers involving i) trade costs, ii) localized tastes, and iii) information frictions. Despite being traditionally under-researched, it provides the stark finding that information frictions often generate the relatively more powerful marginal effect in reducing cross-border trade, and associated levels of welfare. This result remains robust under a number of extensions that further document the roles of product differentiation and alternative forms of trade costs.

1. Introduction

A vast literature provides widespread evidence that geographical borders reduce trade. This evidence applies across a broad range of markets at both country- and state-level despite suitable controls for region size, distance and other relevant factors. Further empirical findings show that traditional explanations for this phenomenon, such as the effects of tariffs and transportation costs, are unable to fully explain its prevalence. Instead, the findings point to some less conventional trade barriers, including the existence of information frictions or localized tastes (see Grossman, 1998, and the surveys by Anderson and van Wincoop, 2004 and Head and Mayer, 2013). However, an explicit theoretical comparison of these rival explanations remains absent from the literature. Addressing this omission is important to help further understand trade barriers and to guide policymakers towards the most appropriate tools for promoting trade and globalization.

As a first step towards such an aim, this paper presents a succinct model that can compare some theoretical mechanisms for three broad forms of trade barriers, and assess their relative power in determining cross-border trade, and associated levels of welfare. In particular, it compares i) 'trade costs' including cross-border tariffs, transportation costs, and transaction costs, ii) 'localized tastes' where buyers exhibit a (perceived) dis-utility of trading with sellers from outside their home region, and iii) 'information frictions' where buyers incur costs of gathering and interpreting information about sellers from regions other than their own. Despite being traditionally under-researched, our model provides the stark finding that information frictions often provide the relatively larger marginal effect on reducing cross-border trade, and associated welfare.

Among other implications, this suggests that even small information frictions may provide a strong barrier to trade. Moreover, aside from traditional trade policies that aim to reduce tariffs or transportation costs, our results point to the potential merit of less-standard trade policies that aim to reduce information frictions. Such information based policies improve the transparency and accessibility of market information, by for example, improving broadband connections, encouraging online cross-border information sources, or promoting common format/multi-lingual product labeling.

To provide a clean comparison between such broad explanations, we refrain from using a full-scale trade model. Instead, we take an original step by 'importing' a simple version of a popular information framework by Wolinsky (1986) and Anderson and Renault (1999) that is being used increasingly to explain market phenomena (e.g. Armstrong et al., 2009; Bar-Isaac et al., 2012; Haan and Moraga-González, 2011), and extending it into a trade context.

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To ease exposition, we present the model within a partial equilibrium setting, although we also show how it can be extended to provide a general equilibrium analysis.

In more detail, we consider a market for a single differentiated good with many potential buyers and sellers, where buyers are distributed over multiple geographic regions. Given sufficiently moderate entry costs, each region hosts a single seller. We assume that buyers can trade freely with their 'home' seller. However, to trade with a 'foreign' seller, buyers must first incur a cross-border information cost to identify and/or interpret the seller's product and price. This captures the possibility that information about foreign sellers is harder to obtain, and/or harder to interpret as it may be presented in a different format or language. Buyers can gather information about any number of foreign sellers under a sequential search process, incurring the cross-border information cost each time. After having decided to stop searching, a buyer can then exit, trade with its home seller, or trade with a searched foreign seller. However, buying from a foreign seller may i) be less attractive due to the buyer's relative preference for home produce through localized tastes, and ii) require the buyer and/or the foreign seller to further incur a trade cost, as consistent with various cross-border tariffs, transportation costs, or transaction costs.

Sections 3–5 of the paper then derive the equilibrium, and demonstrate the different mechanisms by which each form of trade barrier reduces cross-border trade and welfare. After comparing the effects of buyer trade costs, seller trade costs, information frictions, and localized tastes, we offer the striking result that information frictions often generate the largest marginal effects. This arises because buyers' optimal search behavior is relatively more sensitive to the level of information frictions, which then makes them especially potent in deterring buyers from considering offers from foreign sellers.

In addition, we also show how our findings can help understand a conflict within the literature regarding the interaction between trade barriers and product differentiation. Some evidence finds that the effects of trade barriers are weaker in markets with higher product differentiation. However, other evidence is consistent with an argument made by Rauch (1999) which asserts that markets with higher product differentiation should have larger trade barriers because information search is relatively more costly. To help understand this debate, our model can illuminate the relevant theoretical mechanisms, and suggest an over-arching explanation for the conflicting evidence.

Next, Section 6 considers some empirical implications from our main results and illustrates how our model could be used as the basis for an estimation approach. While there is little direct evidence within the existing literature, a few papers report findings that are consistent with our main prediction. For example, papers such as Fink et al. (2005); Gomez-Herrera et al. (2014), and (Lendle et al., 2016), suggest that information cost proxies, including telecommunication costs or the existence of a common language, are statistically more significant in reducing cross-border trade than some more traditional trade barriers, such as shipping costs and tariff levels.

Finally, Section 7 examines the robustness of our results with several extensions. First, and most substantially, Section 7.1 considers our results under an alternative form of trade cost. The main model assumes additive 'per-unit' trade costs that do not vary in the level of a product's price. As argued by Sørensen (2014) and the references therein, such trade costs are common, and important both theoretically and empirically. However, we re-examine our results under a more complex case of multiplicative 'iceberg' trade costs that vary in a product's price. Here, we provide conditions under which our main results remain robust, and also show, in contrast to the main model, how seller trade costs can be more powerful than buyer trade costs, and how the effects of buyer trade costs and localized tastes can be separately identified. Sections 7.2–7.4 then consider the robus\tness of our results when sellers cannot set different prices to home and foreign buyers, when there is any number of regions $n \geq 2$, and when there is more than a single seller in each region.

Our paper builds most closely on Wilson (2012) who uses a version of Wolinsky (1986) and Anderson and Renault (1999) to examine the relative impact of search costs and switching costs on market power and welfare. Here, we i) adapt and extend his analysis to a qualitatively different multi-region trade context, ii) provide a general re-interpretation of his switching cost variable to capture buyer (additive) trade costs and localized tastes, iii) analyze a new variable to assess the effects of seller trade costs, iv) develop a measure of cross-border trade and show how it, and other measures of welfare, vary with the considered trade barriers, v) assess how these relationships vary with the level of product differentiation, and vi) extend the results to include multiplicative trade costs.

More generally, our paper adds to the emerging theoretical literature on information and trade (e.g. Allen (2014), Albornoz et al. (2012), Dasgupta and Mondria, 2014, Eaton et al. (2014), and Steinwender (2015)). For instance, Steinwender (2015) presents a partial equilibrium model to show how information frictions reduce average trade levels by delaying agents' access to market information. Closer to our approach are the papers by i) Allen (2014) who provides a multi-region trade model where sellers undergo an optimal search process to find the best regional price, and ii) Dasgupta and Mondria (2014) who consider information frictions in the form of rational buyer inattention in order to provide a micro-foundation for the gravity trade model. In contrast, we consider buyer information frictions in the form of optimal buyer search, and provide a simple model to explicitly compare the power of information frictions in determining cross-border trade and associated welfare relative to other forms of trade barriers.

Our results also complement a number of recent empirical papers that document the role of information in determining cross-border trade. For instance, Fink et al. (2005) and Portes and Rey (2005) show how communication costs and communication traffic help explain trade patterns, Allen (2014) finds evidence of substantial information frictions in regional agriculture, and Steinwender (2015) details how improvements to transatlantic information increased the volume and volatility of cotton trade. Other empirical work demonstrates how borders still limit trade in online markets, while documenting the effects of information frictions in the form of language differences or variations in the level of trust (Gomez-Herrera et al., 2014; Hortaçsu et al., 2009, and Lendle et al., 2016). Our paper helps underpin this research by demonstrating the relative theoretical significance of information frictions, and by further understanding the channels by which information affects trade.

2. Model

Like Steinwender (2015), we focus on a partial equilibrium setup.[1] In particular, we consider a market with many potential buyers and sellers, where each seller sells a single differentiated product or 'brand'. The market is divided across n regions. Like Allen (2014), and as consistent with a global trading environment, we assume the number of regions is 'large', $n \to \infty$.

The buyers are symmetrically distributed across regions, and, without loss, the number of buyers per region is normalized to one. Any buyer who chooses not to buy within the market receives a zero outside option utility. However, within the market,

[1] However, the presented utility function and the later welfare calculations can be micro-founded within a wider general equilibrium framework. See Appendix A for more details.