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Positive and negative effects of distance on export prices☆

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ABSTRACT

In a model of international trade with non-homothetic preferences and endogenous product quality where some firms choose common quality for all destinations, we find a novel effect of distance on quality and export prices. This effect is either positive or negative depending on whether the importer is, respectively, poor or rich relative to the other export destinations. Interestingly, the effect goes against the well-documented Alchian–Allen effect if the importer is relatively rich. This is because greater distance to relatively rich countries decreases the demand for quality. The estimated effects of distance in a sample of product-level imports to nine Latin American countries and the United States support our theory.

1. Introduction

Vertical or quality differentiation is playing an increasingly important role in shaping the patterns of international specialization and trade.[1] Trade costs (often proxied by distance) along with incomes per capita in exporting and importing countries are among the most important factors affecting the quality and prices of traded goods (e.g., Hummels and Skiba, 2004; Markusen, 2013; Feenstra and Romalis, 2014). The existing literature treats these factors as independent of each other. For example, the effect of trade costs and distance on export prices is usually[2] considered positive, independent of the incomes in exporting and importing countries (e.g., Hummels and Skiba, 2004; Baldwin and Harrigan, 2011). Theoretically, this independence is based on the assumption that firms are infinitely flexible to choose quality and prices separately for each market.

Not all firms, however, may have the flexibility to set quality to market, and the trade literature provides examples of both quality-to-market and common-quality types of varieties.[3] In this paper, we show that, when both types of varieties

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[1] Schott (2004) showed that, over time, countries increasingly specialize in different quality segments of the same products rather than across products. Hummels and Klenow (2005) and Fieler (2011) showed that models with quality fit the data much better than models without quality.

[2] The exception is the work of Manova and Zhang (2012), who reported the distance elasticities of export prices from China to be negative for rich destinations and positive for poor destinations.

[3] See Verhoogen (2008), Bastos and Silva (2010), Sheu (2011), Manova and Zhang (2012), Martin (2012), Harrigan et al. (2015) for theory and empirics consistent with the market-specific quality. Flam and Helpman (1987), Fajgelbaum et al. (2011), and Hallak and Sivadasan (2013) modeled firms producing

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are present, the effects of incomes and trade costs on the quality and prices of exports are interdependent. The most striking result of this interdependency is that the effect of trade costs on export prices can reverse to become negative in the empirically relevant case when the importer country is richer than the exporter's "average destination."[4] This result is novel to the literature on quality and trade that has consistently found a robust positive relationship between distance and export prices.[5]

Theoretically, we start with a multi-country model of international trade with endogenous quality choice and international trade subject to standard iceberg transport costs. In the spirit of Linder (1961), we assume that richer consumers have a stronger preference for quality, and we refer to the incentive for firms to adjust the quality according to consumer preferences as the "Linder effect."[6] In order to model the differences in a firm's ability to adjust quality to specific markets, we consider two types of firms: (i) those facing variety-specific fixed costs and (ii) those facing market-specific fixed costs for each variety.[7] We show that in equilibrium, the first type of firm offers one common quality to all markets, while the second type of firm offers market-specific quality. Importantly, the number of the common-quality varieties is the same across destinations, while the number of market-specific varieties decreases with distance. Given the 'love-of-variety' preferences, this results in a higher relative demand for the common-quality varieties to the more distant locations. Consequently, the average sectoral price for more distant locations converges to the price of the common-quality varieties. If the importer is richer than the exporter's average destination, the common-quality price is lower than the market-specific price. Therefore, as the distance increases the average price converges from above to the common price. Thus, distance has a negative effect on the average price. Conversely, if the importer is relatively poor, the average price converges from below, and distance has a positive effect on the average price.

At the same time, distance-related trade costs, such as transport costs, affect quality through the so-called Alchian–Allen effect by reducing the relative price of more expensive higher-quality exports. This is because the transport costs do not increase proportionally with the price of the traded goods, making the more expensive goods relatively cheaper at the destination.[8] In order to incorporate the Alchian–Allen effect, we extend the baseline model by explicitly allowing for the "quality iceberg" transport costs that decrease in quality. The size of the trade cost is a decreasing percentage of the price.[9] In the extended model, the total effect of trade costs on the export prices depends on *both* the Alchian–Allen and Linder effects. As distance increases, the Alchian–Allen effect always creates incentive to export higher quality, while the Linder effect can have either a positive or negative effect on price. Notably, if the importing country is richer than the exporter's average destination, the Linder effect can potentially offset the Alchian–Allen effect. If, however, the foreign country happens to be relatively poor, the effect of trade costs on quality and export prices would be positive, since both the Alchian–Allen and Linder effects are positive.

We test our predictions using highly disaggregated product-level data on imports from nine Latin American countries and the U.S. for the years 2000–2005. The main advantage of our data is that, in addition to export prices (proxied by unit values), they contain detailed product-level trade costs, allowing us to control for the shifts in the composition of exports due to trade costs. Consistent with our theory, we find that the effect of distance on export prices is significantly stronger for the exports to countries where income is lower than the income of the average export destination. According to our theory, this is when both the Alchian–Allen and Linder effects work in the same direction. In the opposite case, when the importer is relatively rich, we find that the effect of distance is often either insignificant or even *negative*. Although it is consistent with our theory, this finding is not easily reconcilable with other existing theories. The effect of contiguity on export prices also supports our theory. These results hold for both the OECD and upper-middle income sets of exporters. In our sample, the positive association between distance and unit values prevalent in the previous literature is restricted to the specification that does not account for the Linder effect.

Our paper makes several distinct contributions to the literature. First, our focus on the *joint* effect of trade costs and incomes on export prices and quality fills an important gap in the quality and trade literature because, when these effects are treated as independent,[10] the empirical relationship between incomes, trade costs, and export prices may be misspecified.

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the common quality for both domestic and foreign markets, while Iacovone and Javorcik (2010) showed that Mexican varieties exported to the U.S. are sold domestically at higher prices, which is consistent with common quality.

[4] The income of the exporter's "average destination" in a given sector is calculated as the sales-weighted geometric average income of all destinations of this exporter in a given sector.

[5] This relationship is predicted by various models of trade. In Hummels and Skiba (2004) and Feenstra and Romalis (2014), distance affects trade through non-ad valorem transportation costs, while in Baldwin and Harrigan (2011) and Johnson (2012), distance-related trade costs affect the selection of heterogeneous firms into exports markets.

[6] According to Linder, "a whole array of forces influences the demand structure of a country. We shall, however, argue that the level of average income is the most important single factor and that it has, in fact, a dominating influence on the structure of demand."

[7] Every variety comes in one quality. If a firm produces a different quality, it is a distinct variety.

[8] See for example Hummels and Skiba (2004), Irarrazabal et al. (2015), Feenstra and Romalis (2014), and Johnson (2012) for a discussion on the Alchian–Allen effect in trade.

[9] Quality iceberg transport costs were introduced in the literature byHallak and Sivadasan (2013). Lugovskyy and Skiba (2015) provide micro foundations for the quality iceberg transport costs.

[10] The origins of the literature on the effect of income on quality and prices can be traced to Linder (1961) (see Schott, 2004; Hallak, 2006; Choi et al., 2009, for examples of more recent research). Hummels and Skiba (2004) use the Alchian–Allen effect to interpret variation in export prices. See also Goldberg and Knetter (1997) for an extensive review of the pricing-to-market literature.