



Buyer-seller relationships in international trade: Evidence from U.S. States' exports and business-class travel[☆]

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ABSTRACT

International trade has become increasingly dependent on the transmission of complex information, often realized via face-to-face communication. This paper provides novel evidence for the importance of in-person business meetings in international trade. Interactions among trade partners entail a fixed cost of trade, but at the same time they generate relationship capital, which adds bilateral specific value to the traded products. Differences in the face-to-face communication intensity of traded goods, bilateral travel costs and foreign market size determine the optimal amount of interaction between trade partners. Using U.S. state level data on international business-class air travel as a measure of in-person business meetings, I find robust evidence that the demand for business-class air travel is directly related to volume and composition of exports in differentiated products. I also find that trade flows in R&D intensive manufactures and goods facing contractual frictions are most dependent on face-to-face meetings. The econometric identification exploits the cross-state variation in bilateral exports and business-class air travelers by foreign country and time period, circumventing any spurious correlation induced by cross-country differences driving aggregate travel and trade patterns.

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1. Introduction

International trade has become increasingly dependent on the transmission of complex information. As traded goods involve a high degree of differentiation (Rauch, 1999) and production networks spread across the globe (Hummels et al., 2001), partnerships between buyers and sellers are key for successful trade transactions. In creating and maintaining business relationships, close communication between trade partners – often realized via face-to-face interactions – turns out to be essential.¹ In-person meetings facilitate information

sharing, necessary for product innovations and for better meeting markets' needs.²

The importance of personal interactions in international trade has become increasingly recognized by trade economists. A direct connection between face-to-face communication and exporting is implicit in several distinct literatures. For example, the incomplete contracts literature relies on the key assumption that firms make relationship-specific investments, such as the production of inputs specialized for the needs of a single final good producer.³ This degree of input customization presumably requires considerable amounts of complex information exchanged within a buyer-seller link for successful outsourcing, suggestive of information becoming an input into product adaptation. Moreover, close communication between firms impacts international trade even absent of customization

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¹ In a recent global survey of 2300 Harvard Business Review subscribers, respondents said that face-to-face meetings are key to building long-term relationships (95%), negotiating contracts (89%), meeting new clients (79%), understanding and listening to important customers (69%). Similar survey evidence is documented by Oxford Economics in a report that highlights the importance of business travel investments for firm performance.

² IBM Global CEO Study (2006) reports survey evidence that business partners are the second most important source of innovation for a firm after its own employees. In line with business surveys, Egan and Mody (1992) provide ample anecdotal evidence gathered from interviews with U.S. importers on the role of partnerships in trade. They report: “[collaborative relationships] are often an essential source of information about developed country markets and production technology as well as product quality and delivery standards.” (p. 321) “In exchange for larger, more regular orders from buyers, suppliers collaborate with buyers' product designers. Collaboration in design and manufacturing at early stages of product development cuts costs and improves quality.” (p. 326).

³ See for example Grossman and Helpman (2002), Antras (2003).

motives. Face-to-face interactions remain one of the most effective ways for knowledge transfers, coordination and monitoring, having a direct impact on the nature and growth of tasks trade and offshoring.⁴ Finally, a different rationale for the use of communication in trade is provided by the informative advertising literature.⁵ Advertising delivers product information to buyers, who are otherwise unaware of the varieties available in the market. Thus, consumers' willingness to buy traded goods is directly dependent on the information provided by the sellers at a cost.⁶

While academic research and business surveys suggest that close communication between trade partners is essential for international trade, providing empirical evidence in support of it has been difficult. Information transmission is not directly observable, and often times existing measures (such as the volume of telephone calls, or extent of internet penetration) cannot distinguish between its use for production or personal consumption purposes. Both measurement problems are overcome when communication is realized *in person* across national borders, because in this particular case information flows leave a 'paper trail' in the form of business-class airline tickets.⁷

In this paper I employ novel U.S. state level data on international business-class air traffic to examine the importance of face-to-face meetings in international trade. The analysis proceeds in three steps. First, I investigate the extent to which personal interactions, facilitated by international air travel, represent a valuable input to trade in complex manufactures. Second, I examine whether the direct dependence of international business class air travel on trade flows is robust in the face of common covariates, overcoming concerns of spurious correlation. Third, by exploiting industry level variation in manufacturing exports, I estimate the face-to-face communication intensity of trade across manufacturing sectors, and investigate whether there is any systematic variation between the estimates and external measures of product complexity.

A preview of the data I will describe later in more detail reveals a direct relation between international business class air travel and international trade. Fig. 1 plots by state the volume of bilateral manufacturing exports against the number of U.S. outbound business-class air travelers for each foreign destination country. Fig. 2 shows a similar graph, but now the data cut holds the foreign destination country constant and displays the intra-national variation in bilateral exports and business class air travelers across geographic locations. Both data plots reveal a strong correlation between in-person business meetings and international trade. But the correlations may also be spurious if they are an artifact of systematic differences across source and destination locations in time-varying factors such as economic size, income or development level. For example, a state like New York may invest more in transportation infrastructure relative to other states, boosting both air travel and trade flows. Similarly, a rich country such as France imports more goods, of higher quality, and at the same time provides attractive touristic destinations. This justifies the need of a more rigorous econometric analysis to establish the extent to which in-person meetings are valued in international trade.

⁴ See for example Grossman and Rossi-Hansberg (2008), Head et al. (2009), Keller and Yeaple (2010).

⁵ See for example Grossman and Shapiro (1984), and the application to international trade in Arkolakis (forthcoming).

⁶ In line with this, the marketing literature explicitly addresses the importance of "relationship selling" for products that are complex, custom-made and delivered over a continuous stream of transactions (Crosby et al., 1990).

⁷ Considering the business-class air passengers as representing business people traveling for business purposes is consistent with existing evidence from the airline industry. For example, British Airways reports that "three quarters of people we carry in first class are top executives or own their own companies" (New York Times, Feb. 5, 1993).

To guide the empirical strategy, I formalize an exporter's decision to undertake costly international travel for trade related purposes. When buyers across foreign markets have heterogeneous tastes for the available products and sources, export firms may have an incentive to invest in building partnerships with foreign buyers in order to enhance the desirability of their products and secure large export sales. Personal interactions among trade partners entail a fixed cost of trade, but at the same time they generate relationship capital, which enters as an input into products' market specific appeal. By becoming a choice variable in the firm's profit maximization problem, in-person meetings can be expressed as a direct function of the volume of exports and of the relationship intensity of the traded goods, conditional on travel costs. I take these predictions to the data and estimate an aggregate input demand equation for business-class air travel to determine its responsiveness to changes in the scale and composition of U.S. manufacturing exports. Intuitively, if buyer-seller interactions are necessary for trade in complex manufactures, then one should observe a match across narrowly defined geographic locations (i.e., U.S. states) between export patterns and business class air travel demands for the same importing country.

Central in motivating the estimation strategy and data sources are considerations regarding the econometric identification. International air travel may be spuriously related to trade volumes when observed at highly aggregated level and when identified from cross-country variation. This is because both bilateral travel and trade flows are in large part determined by gravity-type variables (economic size, income, distance, cultural barriers), and they respond to the same transportation cost shocks. To overcome identification concerns, this paper employs data disaggregated by U.S. state and foreign country. The intra-national geographic dimension provides sufficient cross-state variation in exports and air travel patterns to permit full control of the time-varying country pair characteristics, this way removing any potential for spurious correlation driven by cross-country differences. Furthermore, the regional disaggregation of the U.S. data uncovers another important source of variation: cross-state differences in agglomeration patterns and industrial specialization. Since the regional economic geography is predetermined at the time destination-specific business-class air travel decisions are made, intra-national geography essentially serves the role of an exogenous cross-sectional shock to observed trade patterns. This provides the empirical motivation for the model specification used in this paper. That is, by using an input demand estimation approach with bilateral air travel flows regressed on trade variables, the model identification exploits the exogenous variation in the volume and composition of exports induced by regional agglomeration and industrial specialization factors.

The main findings of the paper are the following. An increase in the volume of exports raises the local demand for business class air travel. Conditional on total value, the degree of product differentiation of manufacturing exports has an additional positive effect on the demand for business class air travel. Furthermore, the face-to-face communication intensity of trade across manufacturing sectors – measured as the dependence of business air travel demand on industry level exports – is shown to be positively correlated with existing measures of product complexity, such as the industry R&D intensity, Nunn's (2007) measure of contract intensity, and Rauch's (1999) classification of goods. This finding provides empirical confirmation to the insight that trade in complex, innovation intensive manufactures, as well as trade in goods facing contractual frictions is most dependent on face-to-face meetings (Leamer and Storper, 2001). It is important to point however that in spite of the compelling case that regional economic geography provides in support of the exogeneity of the trade variables, this estimation strategy cannot guarantee an insulation of the trade variables from all other possible sources of

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