A Multilevel investigation into the effect of cultural distance on bilateral trade: The roles of product type and uncertainty avoidance

By: Ying Wang, Zhiyong Yang, and Mahmut Yasar

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Abstract:

Previous research shows mixed findings about how cultural distance may affect bilateral trade. To reconcile the mixed findings, we examine how key moderators at both the country-pair level (product type) and the country level (uncertainty avoidance) affect the magnitude of the effect of cultural distance on bilateral trade. Using trade data on electronic products from 90 nations during 2008–2 014, we show that cultural distance in general has a negative impact on bilateral trade. However, the effect is more pronounced when the trade is on experience (versus search) products, or if the importing country is low (versus high) in uncertainty avoidance. Apart from its moderating effect, experience (versus search) product also has a negative main effect on bilateral trade, but its impact is stronger for countries low (versus high) in uncertainty avoidance.

Keywords: multi-level modelling | cultural distance | product type | uncertainty avoidance | bilateral trade

Article:

1 INTRODUCTION

International trade is an important part of global economic development. According to the United Nations Conference on Trade and Development (2017), the average annual growth rate of global international trade reached 6.36% during 1981–2016, far higher than the average annual growth rate of 2.79% for the world economy during the same period. What are the key factors that determine bilateral trade across countries? Various studies have shown that trade flows are

significantly affected by gravitational forces of income and physical distance, with bilateral trade volumes being positively related to the income levels (GDPs) of the trading pairs and negatively related to their geographical distance (Anderson & van Wincoop, 2003).

More recently, scholars have begun to examine the impact of cultural distance between nations on bilateral trade, after controlling for the effects of gravitational forces (Cyrus, 2015; Felbermayr & Toubal, 2010; Guiso, Sapienza, & Zingales, 2009; Hellmanzik & Schmitz, 2015; Tadesse & White, 2010). However, the findings are indecisive. While most studies showed that cultural distance hinders bilateral trade (Felbermayr & Toubal, 2010; Guiso, Sapienza, & Zingales, 2009; Hellmanzik & Schmitz, 2015; Tadesse & White, 2010), others found that there is no effect of cultural distance on bilateral trade (Cyrus, 2015). Still others even showed that cultural distance enhances, rather than hinders, bilateral trade (Linders, Slangen, de Groot, & Beugelsdijk, 2005). These mixed findings are primarily attributed to methodological factors, such as dimensions of cultural distance (such as distance in general versus distance on a specific cultural dimension), number of dimensions included in the distance index, and the data used to test the relationship (see Beugelsdijk, Ambos, & Nell, 2018 for a review). However, little research has been conducted to understand these mixed findings from a conceptual perspective.

To fill this void, the present research theorizes that the uncertainty associated with international trade is a key to explain the mixed effects of cultural distance. This theorization is consistent with previous research on the relationship between cultural distance and entry mode choice, showing that increased cultural distance between the country pair increases uncertainties and therefore influences entry mode choice (Kogut & Singh, 1988). Because of the uncertainty account, we expect that the degree of uncertainty associated with product type (experience versus search) sets up a boundary condition for the effect of cultural distance on trade flows, as prior studies (Mitra, Reiss, & Capella, 1999) showed that experience (versus search) products evoke a higher degree of uncertainty among consumers and encourage self-verification goals. In addition, our proposed uncertainty account also suggests that uncertainty avoidance at the country level may be another important contextual factor to facilitate or hinder the effect of cultural distance at the country-pair level, because a country's uncertainty avoidance is directly related to its level of tolerance to potential risks involved in such a trade. Notably, our theorization is in line with previous findings that bilateral trade involves not only product-related risks (such as performance risk, social risk, and financial risk), but also opportunistic risks due to relationship-specific investments among trading countries (Garcia & Sangiorgi, 2011).

Apart from the issues raised above, a systematic review of the international trade literature further demonstrates a dearth of research that addresses the level-of-analysis issue in studying the effect of cultural difference on bilateral trade. Previous studies on cross-country flows that take place at the international level have mostly focused on how bilateral trade is influenced by either country-pair–level variables—such as cultural distance (Tadesse & White, 2010), bilateral trust (Guiso, Sapienza, & Zingales, 2009), language difference (Melitz & Toubal, 2014), and religion disparity (Gokmen, 2017)—or country-level factors—such as uncertainty avoidance (Hofstede, 2008) and ethnic network (Rauch & Trindade, 2002). However, no research in this domain has been conducted to examine how country-level factors may moderate the effects of country-pair–level variables on bilateral trade. As Guiso, Sapienza, and Zingales (2006) noted, a country's baseline cultural characteristics play an important role in its trade with other countries.

The examination of interactions between country- and country-pair–level variables is especially important in studying the effect of cultural distance on bilat eral trade, since a country's baseline cultural traits may set up boundary conditions for the effects of cultural distance at the country-pair level. In this case, if our proposed uncertainty account is valid, uncertainty avoidance at the country level is likely to set up important boundary conditions for the impact of cultural distance on bilateral trade at the country-pair level.

To fill these gaps, we conduct this research to address the following questions: to what extent is cultural distance relevant and diagnostic to trade flows between two countries? Which type of products is more immunized by cultural distance, search or experience products? And among what countries is the effect of cultural distance on bilateral trade more profound, countries that have high or low levels of uncertainty avoidance? Our study contributes to the literatures on cultural distance and bilateral trade in several important ways. First, to our knowledge, this research represents the first effort to advance our understanding of the boundary conditions for the effect of cultural distance on bilateral trade. Previous research in this domain paints an unclear picture regarding the effect of cultural distance. We are among the first to reconcile these mixed findings by discovering product type and the level of uncertainty avoidance of the importing country as two important boundaries for the impact of cultural distance on bilateral trade. Second, we also contribute to the literature on international trade through a theoretical explanation on why cultural distance affects bilateral trade in some cases but not in others. We theorize that the level of perceived uncertainty heightened by cultural distance is the core to understand its effect. This is a significant contribution, because it uncovers a key mechanism through which cultural distance affects bilateral trade. Armed with this information, governments can develop effective strategies to reduce perceived uncertainty and increase international trade volumes with the countries that even have a large cultural distance. Apart from theoretical contributions, this research contributes to the literature from a methodological perspective. In particular, we are among the first to employ a multi-level model to partition the variance of bilateral trade into country-pair–level and country-level, and employ predictors from both levels to explain the variance. Furthermore, this approach also allows us to examine cross-level interactions so that the nature of the relationship between cultural distance and bilateral trade can be better understood.

2 CONCEPTUAL BACKGROUND

2.1 Cultural Distance and Bilateral Trade

Bilateral trade is driven by the utility obtained from the transaction, that is, the difference between potential benefits and costs, where the ultimate source of gain is the difference in relative prices in autarky between countries. Costs are made up of various aspects, such as manufacturing costs, transportation costs, information costs, communication costs, exchange-rate costs, and tariffs and nontariff barriers (Anderson & van Wincoop, 2003). Some of these costs are associated with physical distance, language difference, religion disparity, ethnicity difference, legal and regulatory differences, currency difference, and policy barriers (Anderson & van Wincoop, 2003; Rauch & Trindade, 2002). From a cultural perspective, language difference, religion disparity, ethnicity difference and difference in migratory histories are often viewed as intangible differences between bilateral trade partners (Beugelsdijk et al., 2018).

Language barrier, for example, increases communication costs and the likelihood of misunderstanding and thus adds costs to bilateral trade (Melitz & Toubal, 2014).

More recently, research has focused on cultural distance between trading partners, which is broadly defined as the extent to which the norms and values of one country are different from those of its trading partner (Sousa & Bradley, 2006). This stream of research seeks to use cultural distance to explain trade flows that take place at the international level (Cuypers, Ertug, Heugens, Kogut, & Zou, 2018). However, extant literature in this domain paints an unclear picture about how cultural distance may affect bilateral trade. On one hand, a majority of studies showed that the greater the cultural distance between the two trading countries, the lower their bilateral trade is (Gokmen, 2017; Guiso, Sapienza, & Zingales, 2009). Employing bilateral trade data from 67 countries over the years from 1996 to 2001, Tadesse and White (2010) found that cultural distance between trading partners is negatively associated with trade flows both at the aggregated and disaggregated levels. Studies on the effect of cultural proximity, which is the opposite of cultural distance, yield a similar pattern of findings. For example, using the trade flow data of audiovisual services from 2000 to 2012, Hellmanzik and Schmitz (2015) showed that virtually proximate countries (that is, smaller cultural distance) trade significantly larger volumes than virtually distant countries. On the other hand, some studies reported inconsistent patterns. Using 92 countries' bilateral trade data in 1999, Linders et al. (2005) revealed that greater cultural distance is related to higher volumes of trade, which is contradictory to the dominant view that cultural distance hinders bilateral trade. In addition, in a study examining the relationship between cultural distance and exports among 90 countries between 1981 and 2008, Cyrus (2015) showed that cultural distance has a null effect on trade flows.

We expect that such mixed findings are mainly caused by perceived uncertainty induced by cultural distance. Because of the perceived uncertainty account, product type (search versus experience products) at the country-pair level and uncertainty avoidance (high versus low) at the country level set up boundary conditions for the effect of cultural distance on bilateral trade. Remarkably, the proposed research direction is in line with a recent trend that examines the impact of cultural distance on bilateral trades across product categories. For example, comparing audiovisual services to total services, Hellmanzik and Schmitz (2015) showed that cultural difference has a stronger impact on the trade of audiovisual services than on the trade of total services. Similarly, other studies (Felbermayr & Toubal, 2010; Guiso, Sapienza, & Zingales, 2009) showed that the effect of cultural distance is quantitatively large and statistically significant for differentiated goods, but economically and statistically indistinguishable for homogeneous goods. The authors attributed the role of cultural distance mainly to informal trade costs, such as difficulty in writing contracts (Felbermayr & Toubal, 2010; Guiso, Sapienza, & Zingales, 2009) and loyalty to a particular type of music and movies (Hellmanzik & Schmitz, 2015). These authors, however, did not explain the core psychological reasons behind such differences. In this research, we suggest that the level of perceived uncertainty associated with the product category is the key. Since search (versus experience) products are usually associated with less uncertainty (Franke, Huhmann, & Mothersbaugh, 2004), search versus experience product type offers a great platform for us to examine how it sets up boundaries for the effect of cultural distance at the country-pair level.

In addition to product type at the country-pair level, uncertainty avoidance at the country level is also anticipated to play an important role on the effect of cultural distance on bilateral trade. Uncertainty avoidance reflects deep psychological needs concerning control and security (Li, Griffin, Yue, & Zhao, 2013). Although the trade literature has not used this factor as a potential moderator in the effect of cultural distance, previous research shows that the interplay between uncertainty-aversion and information frictions exerts significant influences in international trade (Kasa, 2000). Next, we present the literature review on how product type (search versus experience products) leads to different levels of perceived uncertainty, along with how countries high (versus low) in uncertainty avoidance differ in their sensitivity to potential uncertainties in bilateral trade.

2.2 Experience Versus Search Products

Products can be classified into two categories, namely search products and experience products (Nelson, 1970). Search products are dominated by attributes for which consumers have the ability to acquire information on product quality prior to purchase, whereas experience products are those that require sampling or purchase in order to evaluate product quality (Mudambi & Schuff, 2010). Examples of search products include athletic shoes and mobile phones, whereas examples of experience products include travel packages and dinners at new restaurants (Bei, Chen, & Widdows, 2004; Wang, Yang, & Brocato, 2018). Search products are more informative than experience products and it is simpler and easier for consumers to evaluate their qualities and to make purchase decisions (Hsieh, Chiu, & Chiang, 2005). Relative to search products, consumers need longer time, more money and cognitive effort, or other resources to verify the qualities of experience products prior to buying decisions (Huang, Lurie, & Mitra, 2009). Furthermore, search products are dominated by the intrinsic attributes that are easy to access, concrete, and more objective for comparing the quality of the product, whereas consumers need to bench upon extrinsic attributes to evaluate the quality of experience products (Bei, Chen, & Widdows, 2004). For example, recommendations of others are likely to be used more for experience products (such as travel packages) than for search products (such as natural supplement pills).

Previous research showed that experience (versus search) products involve more uncertainty when consumers are making purchase decisions (Franke, Huhmann, & Mothersbaugh, 2004; Mitra, Reiss, & Capella 1999; Wang, Yang, & Brocato, 2018; Weathers, Sharma, & Wood, 2007). Here uncertainty is a conceptual dimension of consumer risk, or feelings caused by not being able to know the actual outcome of a purchase when making the decision (Weathers, Sharma, & Wood, 2007). For search products, consumers can gather sufficient information during search to make an informed buying decision with little uncertainty regarding product quality. However, because of the difficulty involved in information search for experience products, consumers will be more skeptical of product quality for experience products in comparison with search products (Franke, Huhmann & Mothersbaugh, 2004). The lack of sufficient information prior to a purchase decision enhances uncertainty, influencing whether or not a consumer will take an extensive amount of time deciding to buy (Wang, Yang, & Brocato, 2018). In situations where consumers are not confident in their ability to judge the quality of offerings, perceived risk is salient and trust in the business partners becomes more important (Hsieh, Chiu & Chiang, 2005).

2.3 Uncertainty Avoidance

Uncertainty avoidance refers to “the extent to which the members of institutions and organizations within a society feel threatened by uncertain, unknown, ambiguous or unstructured situation” (Hofstede, 2008, p. 113). Individuals of the countries high in uncertainty avoidance (such as Russia and Japan) believe and behave in a strict manner and avoid unconventional ways of thinking and behaving, whereas those belonging to countries low in uncertainty avoidance (such as Singapore and Denmark) display more ease in regards to ambiguous and unknown situations (Hofstede, 2001). The difference among countries in the level of uncertainty avoidance has significant implications to their sensitivity and receptiveness to perceived risk. Low uncertainty avoidance cultures are characterized by risk-taking, willingness to change and adjust, ease with the unknown, and optimism about the future, whereas high uncertainty avoidance cultures value stability, predictability, risk avoidance, resistance to change, strict control systems, and discomfort with unknown futures (Puumalainen et al., 2015).

Translating these findings into the context of bilateral trade, customers from cultures with high (versus low) uncertainty avoidance tend to be more hesitant toward new products and information, which will affect their purchases of imported products and exporters’ production or sales decision (Wennekers et al., 2007). This is an inevitable part of international trade, as previous research shows that the degree of ambiguity and uncertainty is much higher in international business transactions than in domestic transactions (Hofstede, 2001). Since people from countries with high (versus low) uncertainty avoidance have a lower level of ambiguity tolerance and are less likely to interact with others with different cultural values (Homburg, Kuester, Beutin, & Menon, 2005), we believe that uncertainty avoidance will not only affect a country's level of trade with other countries, but also moderate the effect of cultural distance on trade volumes as discussed next.

3 HYPOTHESIS DEVELOPMENT

3.1 Country-Pair–Level Effects

3.1.1 Main Effect of Cultural Distance

Although the extant literature documents mixed findings on the relationship between cultural distance and bilateral trade, we predict that cultural distance in general is negatively related to bilateral trade. Bilatera l trade is by nature associated with high levels of uncertainty, regarding strategy determination, trade partner selection, negotiation, delivery, and trade partner behaviour at the micro-level (Hofstede, 2008), as well as with exchange rates, trade policies, institutional environment, political risk, and economic fluctuation at the macro-level (Beugelsdijk et al., 2018). Because of this, cultural distance has played a pivotal role in explaining variations in cross-national flows and interactions (Cuypers et al., 2018).

Greater cultural distance between trading partners—dissimilarities between two nations’ patterned ways of thinking, feeling, and acting—tends to form an intangible barrier to bilateral trade. The cultural differentiation may cause trouble and misconception in defining,

understanding, and predicting each other's behaviour (Malhotra, 2012), which affects mutual trust, obstructs the establishing and maintaining of business relationships and reduces the possibility of trade. Across countries with larger cultural distance, producers or dealers usually spend more resources (time, money) exploring the consumption preferences of consumers in another country that are different from those consumers in their home country (Ghemawat, 2001). In addition, it usually takes more effort to make the residents of the destination country understand and accept their products (Qu & Yang, 2015), which can further drive up transaction costs. Also, it often takes more time and effort for trading partners to reach an agreement due to the incomplete information and uncertainty related to the deep-rooted differences in national cultures (Lopez-Duarte & Vidal-Suarez, 2013). When two nations have smaller cultural distance (such as similar norms and values), trade is facilitated by ease of communication, mutual trust, and similar lifestyle and taste (Zhou, 2011). In the same vein, smaller cultural distance decreases the transaction costs between countries (Beugelsdijk et al., 2018), which significantly facilitates bilateral trade (Tadesse & White, 2010). Formally, we propose,

H1. Cultural distance is negatively associated with bilateral trade.

3.1.2 Main Effect of Product Type (Experience Versus Search)

We also anticipate that the trade volume of experience products is less than that of search products. By nature, search products are associated with less uncertainty than experience products (Franke, Huhmann, & Mothersbaugh, 2004). Experience products are associated with more risks compared to search products (Hsieh, Chiu, & Chiang, 2005). Because higher rates of perceived risk involve stronger motivation for information processing and the costs of searching for information prior to purchase—including time, money, cognitive effort and other sources—are much higher in the case of experience products (Franke, Huhmann, & Mothersbaugh, 2004), the transaction costs for experience products will be higher than those for search products. In addition, since consumers cannot make effective evaluations on the essential attributes and purchase outcomes of an experience product until they try to use it (Franke, Huhmann, & Mothersbaugh, 2004), such uncertainty is likely to increase the chance that the trade of experience products is blocked. Consequently, we hypothesize,

H2. The bilateral trade in experience products is less than that in search products.

3.1.3 Interaction between Cultural Distance and Product Type

We further expect that the effect of cultural distance on bilateral trade is moderated by product type in such a way that the negative effect of cultural distance on bilateral trade is stronger for experience (versus search) products. Due to an already higher level of perceived uncertainty associated with experience (versus search) products, potential partners may be more careful in their decision process, and in their demands for direct product experience and product sampling. However, cultural distance creates interference for such processes, which is especially salient for experience (versus search) products. It is easier to seek and process information for search products than for experience products, as critical properties and functions of search products can easily be assessed before a purchase (Franke, Huhmann, & Mothersbaugh, 2004). As a result, the same level of cultural distance may create more difficulty in trading decisions for experience

(versus search) products. In line with our argument, previous research on how cultural biases affect economic exchange showed that lower bilateral trust leads to less trade between two countries and that this effect is stronger for differentiated (versus standardized) goods (Guiso, Sapienza, & Zingales, 2009). Similarly, cultural proximity (that is, lower cultural distance) positively affects trade volumes; such an effect is smaller among homogeneous products than among differentiated products (Felbermayr & Toubal, 2010). Formally, we have,

> ***H3.*** There is a negative interaction between cultural distance and product type in such a way that the negative effect of cultural distance on bilateral trade is stronger when the trade is on experience (versus search) products.

3.2 Country-level Effects

Most studies of international trade neglect the levels-of-analysis issue. By nature, countries are multi-level entities, where country-pairs (lower level units) are nested within countries (higher level units). For instance, multiple country-pairs (such as US–Canada, US–Australia, US–Japan) are nested to the same importing country (the US in this case). As a result, bilateral trade between the US and those countries are inevitably influenced by the characteristics of the common importing country, the US. Researchers used to analyze such hierarchical data using the disaggregated data pooled across all importing countries, in which the country-pair is used as the unit of analysis when the observations from each importing country are probably statistically dependent on one another. In this case, the probability of committing a Type I error is inflated and exceeds the nominal alpha level to varying degrees, with estimates biased with smaller estimated standard errors (Zhou, Yang, & Hui, 2010). We overcome this problem by disentangling the variance of bilateral trade into the country-pair level (that is, variability due to heterogeneity among country-pairs) and the country level (that is, variability due to heterogeneity among importing countries), and separate the effects of bilateral trade that are caused by country-pair differences from those caused by the characteristics of the importing countries.

A second advantage of using the multi-level modelling approach is that it allows us to research the interplay between variables that describe the country-pairs and variables that describe the importing countries. These kinds of cross-level interactions shed new light on how group-level factors may set up boundary conditions for the effects of individual-level factors (Laroche, Yang, Kim, & Richard, 2007; Zhou, Yang, & Hui, 2010). Next, we conceptualize how the uncertainty avoidance of the importing country exerts not just a direct effect on bilateral trade, but also moderates the effect of cultural distance at the country-pair level. As a result, this improved methodology allows us to provide useful insights that appear to have been overlooked in prior research.

3.2.1 Main Effect of Uncertainty Avoidance

We expect that the level of uncertainty avoidance of the importing country is negatively associated with its bilateral trade with other countries. People in high (versus low) uncertainty avoidance countries are more likely to avoid uncertainty, as uncertainty usually makes them feel greater stress and anxiety (Li et al., 2013). People in countries with high uncertainty avoidance

are also less tolerant of things and beliefs that are different from their own (Qu & Yang, 2015). In contrast, consumers in low uncertainty avoidance countries are more open to innovation and willing to change and adjust, and thus they will show more interest in imported products with new ideas or information or with different cultural traits (Hofstede, 2008). Furthermore, bilateral trade in many cases involves a joint effort between trading partners, such as collaborative forecasting, joint new product development, and even exchanging strategic information on markets and technologies (Garcia & Sangiorgi, 2011). However, one country may occasionally exploit such information for its own gain at the expense of the other country. Therefore, the sharing of strategic information between partnering countries turns out to be a realistic concern in international trade. This is especially true for countries with a high level of uncertainty avoidance, because people in such countries tend to avoid uncertain situations. Consistent with this reasoning, previous studies show that uncertainty avoidance discourages governments from engaging in activities with uncertain outcomes (Guiso, Sapienza, & Zingales, 2006, 2009). As a result, high uncertainty-aversion countries trade less (Homburg et al., 2005), have a lower rate of new product adoption (Lynn & Gelb, 1996), and are more loyal to domestic retailers (Straughan & Albers-Miller, 2001). Therefore, we propose,

> ***H4.*** The level of uncertainty avoidance of the importing country is negatively related to its bilateral trade with other countries.

Cross-Level Interaction between Uncertainty Avoidance and Cultural Distance

Apart from the main effect, we also predict a cross-level interaction that involves the differential impact of cultural distance on bilateral trade (the country-pair effects) across high and low uncertainty avoidance countries (a country-level variable). Specifically, we expect that the negative impact of cultural distance on bilateral trade is less profound for countries high (versus low) in uncertainty avoidance. As discussed earlier, countries with high (versus low) uncertainty avoidance are resistant to change and therefore engage in less bilateral trade with other countries. However, for the selected countries with which they trade, we expect that countries high (versus low) in uncertainty avoidance are likely to form stronger ties with these trading partners. Such stronger ties between country pairs are anticipated to serve as an important mechanism to reduce the uncertainty associated with bilateral trade, and thus buffer the negative effect of cultural distance. Consistent with our reasoning, previous research shows that countries high in uncertainty avoidance exhibit stronger interpersonal and interorganizational ties (Qu & Yang, 2015) and focus more on problem solving and prevention (Roth, 1995). Similarly, companies in high uncertainty avoidance countries emphasize more on trust-based relationships with their suppliers (Homburg et al., 2005), form stronger ties with business partners (Qu & Yang, 2015), and engage in intensive joint actions with partnering firms (Ganesan, 1994). The forgoing discussion suggests that the stronger ties formed between country-pairs among countries high (versus low) in uncertainty avoidance help reduce the level of uncertainty in bilateral trade and thus mitigate the detrimental impact of cultural distance. Therefore, we hypothesize,

> ***H5.*** There is a positive interaction between cultural distance and the level of uncertainty avoidance of the importing country, such that the negative effect of cultural distance on bilateral trade is weaker if the importing country has high (versus low) uncertainty avoidance.

3.2.2 Cross-Level Interaction between Uncertainty Avoidance and Product Type

We further predict a cross-level interaction between product type at the country-pair level and uncertainty avoidance at the country level, such that the negative effect of experience (versus search) products on bilateral trade is less profound among high (versus low) uncertainty avoidance countries. Societies with high uncertainty avoidance feel threatened by ambiguity, and usually strive for structure through formal rules and regulations to reduce ambiguity; in contrast, those with low uncertainty avoidance have greater tolerance on ambiguity and prefer fewer controls (Hofstede, 2001). In the context of trading, flexibility is less valued in high (versus low) uncertainty avoidance countries, and product quality is ensured more through fixed rules and procedures, including well-documented quality standards and total quality management (Homburg et al., 2005). Precise and error-free functioning of a product is more emphasized by cultures with high uncertainty avoidance (Nakata & Sivakumar, 1996), as high product quality is viewed as an approach to prevent problems and thus a way to reduce risk (Roth, 1995). Such quality-assurance measures become an effective approach to reduce the uncertainty (and potential risks) associated with experience products. As a result, inflexible rules and procedures in high uncertainty avoidance societies are likely to undermine the negative effect of experience (versus search) product type on bilateral trade. Taken together, we propose,

> ***H6.*** There is a positive interaction between product type and the level of uncertainty avoidance of the importing country, in such a way that the negative effect of product type (experience versus search) on bilateral trade is weaker if the importing country has high (versus low) uncertainty avoidance.

4 EMPIRICAL MODEL

In the empirical part, our main goal is to partition the variance of bilateral trade into both country-pair-level and country-level, and examine how the country-pair-level factors (that is, cultural distance, product type, and the interaction between them) and the country-level variable (unc ertainty avoidance) explain the two levels of variance. To this end, we follow Zhou, Yang, and Hui (2010) and estimate a multi-level mixed effects model (MLM) that allows us to utilize both between- and within-group variations in variables. Following previous research (Felbermayr & Toubal, 2010; Gokmen, 2017; Melitz & Toubal, 2014), we use imports to represent bilateral trade.

In the multi-level mixed effects model, random coefficients are hierarchically nested; typically, country-pairs (Level 1) are nested in importing countries (Level 2). The Level 1 (country-pair level) model is:

$$LnT_{tij} = \beta_{0i} + \beta_{1i}(CDIS_{ij}) + \beta_{2i}(PROD) + \beta_{3i}(CDIS_{ij} \times PROD) + \beta_{controls} FControls_{tij} + \alpha Year + r_{tij} \quad (1)$$

where i denotes the importing country; j denotes the exporting country; t denotes the years (t = 2008, 2009, …., 2014); u is the error term; LnT_{tij} is the natural logarithm of imports of country i from country j in year t; $CDIS_{ij}$ represents the cultural distance between country i and

country *j*; *PROD* is a dummy variable that represents product type (1 = *experience products*; 0 = *search products*); $CDIS_{ij} \times PROD$ is the interaction between $CDIS_{ij}$ and *PROD*; *FControls* include $LnGDP_{ti}$ (the natural logarithm of GDP of country *i* in year *t*), $LnGDP_{tj}$ (the natural logarithm of GDP of country *j* in year *t*), $LnGDIS_{ij}$ (the natural logarithm of geographical distance between country *i* and country *j*), $CONTIG_{ij}$ (a dummy variable presenting whether country *i* and country *j* are contiguous: 1 = contiguity; 0 = no contiguity), $COMCUR_{tij}$ (a dummy variable presenting whether the currencies of country *i* and country *j* are the same in year *t*: 1 = common currency; 0 = no common currency), and RTA_{tij} (a dummy variable representing whether the country-pair between country *i* and country *j* had a regional trade agreement when bilateral trade occurred in year *t*: 1 = RTA; 0 = no RTA); *Year is* a year variable; and r_{tij} is the time-varying disturbance term.

The Level-2 (country level) model predicts the variability among importing countries in each of the parameters in the Level-1 model. In other words, we allow the intercept and the slopes to vary across importing countries.

The Level-2 models are specified as below,

$$\beta_{0i} = \gamma_{00} + \gamma_{01}(UA_i) + \gamma_{02}(PD_i) + \gamma_{03}(IDV_i) + \gamma_{04}(MAS_i) + u_{0i} \quad (2a)$$

$$\beta_{1i} = \gamma_{10} + \gamma_{11}(UA_i) + u_{1i} \quad (2b)$$

$$\beta_{2i} = \gamma_{20} + \gamma_{21}(UA_i) + u_{2i} \quad (2c)$$

$$\beta_{3i} = \gamma_{30} + \gamma_{31}(UA_i) + u_{3i} \quad (2d)$$

where β_{0i} is the intercept of the Level-1 model, which is influenced by the importing country's uncertainty avoidance (UA_i), power distance (PD_i), individualism (IDV_i) and masculinity (MAS_i). β_{1i}, β_{2i} and β_{3i} are the coefficients on cultural distance ($CDIS_{ij}$), product type (*PROD*), and the interaction between product type and cultural distance ($CDIS_{ij} \times PROD$) in the Level-1 model, which are influenced by the importing country's uncertainty avoidance (UA_i). u_{0i}, … , u_{3i} are the level-2 error terms.

Substituting Equations 2a-2d into Equation 1 yields the following combined model, which was estimated to test the hypotheses:

$$\begin{aligned} LnT_{tij} = {} & \gamma_{00} + \gamma_{01}(UA_i) + \gamma_{02}(PD_i) + \gamma_{03}(IDV_i) \\ & + \gamma_{04}(MAS_i) + \gamma_{10}(CDIS_{ij}) + \gamma_{11}(UA_i)\,(CDIS_{ij}) \\ & + \gamma_{20}(PROD) + \gamma_{21}(UA_i)\,(PROD) + \gamma_{30}\,(CDIS_{ij} \times PROD) \\ & + \gamma_{31}(UA_i)\,(CDIS_{ij} \times PROD) + \gamma_{controls}\,FControls_{tij} + \alpha Year + error \end{aligned}$$

4.1 Data

Disaggregated bilateral trade data at the product-level (the Harmonized System [HS] 6 Rev. 2007) was used to test our hypotheses. The product-level trade flow data came from Observatory of Economic Complexity, which was compiled from the United Nations Statistical Division (COMTRADE database, https://comtrade.un.org). In particular, we used bilateral trade volume of electronic products over 2008–2014 among 90 countries at the four-digit level (see Table 1 for the complete list of these countries). The electronic product categories include home appliances

(HS codes 8415, 8418, 8422, 8450, 8451, 8508, 8509, 8510, and 8516), audio and video equipment (HS codes 8521, 8525, 9007, and 9008), cameras and equipment (HS code 9006), computers (HS code 8471), printers, monitors, and peripherals (HS codes 8443, 8523, 8527, and 8528), and mobile phones (HS codes 8517, 8518). The volume of trade in electronic products among these 90 countries accounted for more than 90% of the total electronics trade volume of the world.

TABLE 1. Country or Region List

Albania*	**Ethiopia***	**Lebanon***	**Singapore**
Angola*	Fiji*	Libya*	Slovak Rep (Slovakia)
Argentina	Finland	Malawi*	Slovenia
Australia	France	Malaysia	South Africa
Austria	Germany	Malta	Spain
Bhutan*	Ghana*	Mexico	Sri Lanka*
Brazil	Greece	Morocco	Suriname
Bulgaria	Guatemala	Mozambique*	Sweden
Burkina Faso*	Honduras*	Nepal*	Switzerland
Canada	Hong Kong	Netherlands	Tanzania*
Cape Verde*	Hungary*	New Zealand	Thailand
Chile	India	Nigeria*	Trinidad and Tobago
China	Iraq*	Norway	Turkey
Colombia	Ireland	Pakistan	Ukraine*
Costa Rica	Israel	Panama	United Arab Emirates*
Croatia	Italy	Peru	United Kingdom
Czech Rep	Jamaica	Philippines	Uruguay
Denmark	Japan	Poland	U.S.A.
Dominican Rep*	Jordan*	Portugal	Venezuela
Ecuador	Kenya*	Russia	Vietnam
Egypt*	Korea South	Saudi Arabia*	Zambia*
El Salvador	Kuwait*	Senegal*	
Estonia	Latvia	Sierra Leone*	

Note: Hofstede's cultural dimension data of the 60 countries (without an asterisk) came from http://geerthofstede.com/research-and-vsm/dimension-data-matrix/, whereas that of the 30 countries (marked with an asterisk) came from https://www.hofstede-insights.com.

We focused on electronic products occurring between 2008 and 2014 for four reasons. First, focusing on a relatively long-time window enables one to minimize the possible impact of other factors, such as political conflict. Second, we chose electronic products for this study due to their relatively stable volume of bilateral trade over time. Third, previous research examining product type along the dimension of search (versus experience) products has mainly focused on this product category (Bei, Chen, & Widdows, 2004; Mudambi & Schuff, 2010; Nelson, 1970; Wang, Yang, & Brocato, 2018; Weathers, Sharma, & Wood, 2007). Finally, focusing on one product category to test our hypotheses can also minimize the potential confounds caused by industry.

4.2 Dependent Variable

Following previous research (Felbermayr & Toubal, 2010; Gokmen, 2017; Melitz & Toubal, 2014), the dependent variable in our model is the natural log of import flows of electronic products from country *i* to country *j* in year *t*, which came from Observatory of Economic Complexity.[1]

4.3 Independent Variables

Independent variables at the country-pair level (Level 1)

Given our hypotheses, the main independent variable of interest in this study is the cultural distance between country *i* and *j* ($CDIS_{ij}$). Following previous research (Kogut & Singh, 1988), we used Hofstede's four dimensions[2] of national culture data (http://geerthofstede.com/research-and-vsm/dimension-data-matrix/and https://www.hofstede-insights.com) to derive the composite index of cultural distance,

$$CDIS_{ij} = \sum_{d=1}^{4} \left[(I_{di} - I_{dj})^2 / V_d \right] / 4$$

where $CDIS_{ij}$ is the composite cultural difference between country *i* and *j*, which is corrected for differences in the variances of each dimension; *d* proxies the cultural dimensions (that is, power distance, uncertainty avoidance, masculinity, and individualism); I_{di} represents the cultural dimension scores for the d^{th} cultural dimension and i^{th} country; I_{dj} proxies the cultural dimension scores for the d^{th} cultural dimension and j^{th} country; V_d represents the variance of the index of d^{th} dimension. This measure has been widely used in the international business literature to reflect cultural distance (Beugelsdijk, Ambos, & Nell, 2018)

Another country-pair variable, product type (0 = *search product*; 1 = *experience product*), was coded in the same way as in previous studies (Bei, Chen, & Widdows, 2004; Mudambi & Schuff, 2010; Nelson, 1970; Wang, Yang, & Brocato 2018; Weathers, Sharma, & Wood, 2007). In particular, home appliances, audio and video equipment, and cameras and equipment were classified as experience products, whereas computers, mobile phones, and printers, monitors and peripherals were coded as search products (see Table 2 for product classification and sources). To further verify product type, we conducted a survey with 65 Mechanical Turk workers (58.5% men; Mage = 42.28, SD = 11.98). In line with previous research (Hsieh, Chiu, & Chiang 2005; Huang, Lurie & Mitra, 2009), participants were first told that the quality of some products and services is easy to assess before purchase but that other products and services cannot be easily

[1] Using the natural log of export flows as the dependent variable yielded the same pattern of results in support of *H1* to *H6*, though the cultural distance × product type interaction at the country-pair level and the uncertainty avoidance × cultural distance cross-level interaction did not reach statistical significance at $p < .05$. Since consumers from the importing countries dictate which products are produced and sold by creating demand for exporting countries to supply goods and services, we focus on import data as an indication of bilateral trade in this research. Also, import data is considered more reliable than export data since customs more carefully track import for tariff revenue reasons, whereas exporting data also involves re-export and entreport (World Integrated Trade Solutions, 2018).

[2] Using Hofstede's six dimensions to derive the composite index of cultural distance yielded a similar pattern of results (see the second column in Table 3). Since only a subsample of countries ($n = 71$) had Hofstede's six dimensions, we reported the results associated with the four-dimensional index in the paper to preserve the data from all 90 countries.

assessed until after use. They were then asked to imagine that they were shopping at a retail store for products, and asked to indicate their ability, before purchase, to access product quality for each of the six products on a seven-point scale ranging from 1 = *not at all* to 7 = *very well.* We randomized product order between subjects. We used multi-level regression to account for both between- and within-subject variance in the perceived ability to evaluate product quality before purchase. Specifically, we tested a two-level model, in which the individual product was treated as the Level-1 unit and participants as Level-2 unit. The main explanatory variable at Level 1 is product type (experience versus search). Consistent with our expectations, there was a significant effect of product type (β = -.19, t = -4.66, $p < .001$), such that the perceived ability to evaluate the quality of experience products before purchase was significantly lower than that of search products ($M_{\text{experience}}$ = 4.62 vs. M_{search} = 5.19).[3] These results lent further support for our classification of products. Descriptive statistics and the correlations among country-pair variables are shown in Table 3.

TABLE 2. Product Classification (Experience vs. Search)

Product Category	Type	Sources	Post-Test Results
Audio & Video Equipment	Experience	Bhattacherjee et al., 2006 Mudambi & Schuff, 2010 Nelson, 1970 Wang, Yang, & Brocato, 2018 Weathers et al. 2007	Experience
Cameras & Equipment	Experience	Huang, Lurie & Mitra, 2009 Wang, Yang, & Brocato, 2018	Experience
	Search	Nelson, 1970 Mudambi & Schuff, 2010	
Home Appliances	Experience	Nelson, 1970 Wang, Yang, & Brocato, 2018	Experience
Desktop/Laptop Computers	Search	Wang, Yang, & Brocato, 2018 Weathers et al., 2007	Search
Printers, Monitors & Peripherals	Search	Mudambi & Schuff, 2010 Wang, Yang, & Brocato, 2018 Weathers et al., 2007	Search
Mobile Phones	Search	Bei et al., 2004 Mudambi & Schuff, 2010 Wang, Yang, & Brocato, 2018	Search

4.3.1 Independent variables at the country level (Level 2)

The uncertainty avoidance of the importing countries, which came from Hofstede's national culture dimensions data (http://geerthofstede.com/research-and-vsm/dimension-data-matrix/and https://www.hofstede-insights.com), was the independent variable at the country level (Level 2).

[3] The means of the six products are: $M_{\text{Audio \& Video Equipment}}$ = 4.58, $M_{\text{Cameras \& Equipment}}$ = 4.58, $M_{\text{Home Appliances}}$ = 4.69, $M_{\text{Desktop/Laptop Computers}}$ = 5.46, $M_{\text{Printers, Monitors \& Peripherals}}$ = 5.00, and $M_{\text{Mobile Phones}}$ = 5.11.

TABLE 3. Descriptive Statistics and Correlation Matrix

Constructs	Mean	S.D.	Min	Max	VIF	1/VIF	1	2	3	4	5	6	7	8	9	10	11	12	13
1. LnT_{tij}	12.19	3.03	6.91	24.75			**1.00**												
2. $CDIS_{ij}$	2.33	1.65	0.01	11.21	1.03	0.97	-0.01***	**1.00**											
3. $PROD$	0.59	0.49	0	1	1.02	0.98	-0.11***	-0.00***	**1.00**										
4. $LnGDP_{ti}$	26.43	1.81	20.95	30.49	1.43	0.70	0.24***	0.05***	0.06***	**1.00**									
5. $LnGDP_{tj}$	26.43	1.81	20.95	30.49	1.10	0.91	0.33***	0.05***	0.06***	-0.22***	**1.00**								
6. $LnGDIS_{ij}$	8.51	0.93	4.74	9.89	2.18	0.46	-0.14***	0.09***	-0.05***	0.10***	0.10***	**1.00**							
7. $CONTIG_{ij}$	0.04	0.21	0	1	1.24	0.80	0.13***	-0.12***	0.02***	-0.01***	-0.01***	-0.41***	**1.00**						
8. $COMCUR_{tij}$	0.04	0.18	0	1	1.13	0.88	0.11***	-0.00***	0.02***	0.02***	0.02***	-0.28***	0.12***	**1.00**					
9. RTA_{tij}	0.33	0.47	0	1	1.80	0.56	0.14***	-0.05***	0.05***	-0.02***	-0.02***	-0.62***	0.21***	0.27***	**1.00**				
10. UA_i	0.51	0.50	0	1	1.11	0.90	0.04***	-0.12***	0.01***	0.06***	0.02***	-0.13***	0.06***	0.07***	**0.09*****	**1.00**			
11. PD_i	0.49	0.50	0	1	1.59	0.63	-0.05***	-0.11***	-0.02***	-0.28***	0.09***	0.00***	0.04***	-0.09***	**-0.15*****	**0.04*****	**1.00**		
12. IDV_i	0.49	0.50	0	1	1.80	0.56	0.11***	0.14***	0.03***	0.37***	-0.11***	-0.12***	-0.00***	0.10***	**0.17*****	**-0.13*****	**-0.58*****	**1.00**	
13. MAS_i	0.55	0.50	0	1	1.20	0.84	0.08***	0.00	0.01***	0.34***	-0.07***	0.10***	-0.00***	-0.05***	**-0.08*****	**-0.12*****	**0.02*****	**0.17*****	**1.00**

Note: *** $p < .001$

4.3.2 Control variables

We also included control variables in both Level-1 and Level-2 models. At the country-pair level (Level 1), GDP, geographical distance, contiguity, common currency, and RTA were included as covariates (Feenstra, 2004). These data came from the Centre d'études prospectives et d'informations internationales, Paris (http://www.cepii.fr/CEPII/en/bdd_modele/presentation.asp?id=8). At the country level (Level 2), the other three country level factors, namely individualism/collectivism, power distance, and masculinity/femininity were included as control variables.

5 RESULTS

5.1 Testing hypotheses at the country-pair level (Level 1)

Our hypotheses were tested using multi-level modelling via Stata 14. As shown in the first column of Table 4, cultural distance was negatively related to bilateral trade (b = -.056, p = .001), indicating that cultural distance was negatively associated with bilateral trade, with a one standard deviation increase in cultural distance reducing imports by 5.6%. Thus, *H1* was supported. Further, the effect of product type was negative and significant (b = -1.374, p < .001), which means that the trade volume of experience products was significantly (137.4%) less than that of search products. Thereby *H2* was supported. Consistent with *H3*, the cultural distance × product type interaction term was negatively related to bilateral trade (b = -.013, p = .029), showing that the negative impact of cultural distance on bilateral trade was stronger when the trade was on experience products than on search products. Notably, multicollinearity was not an issue in our data, as all the VIF values were lower than 2.1, far below the cut-off value of 10 (see Table 3 for VIF values).

TABLE 4. Parameter Estimates from MLM [Dependent Variable =LnT_{tij}]

	Four Dimensional CD		**Six Dimensional CD**	
	(*N* = 90 Countries)		**(*N* = 71 Countries)**	
	b	***p*-value**	**b**	***p*-value**
$CDIS_{ij}$ $(\hat{\beta}_{1i})$	-0.056	0.001	-0.104	0.000
	(0.017)		(0.030)	
$PROD_{ij}$ $(\hat{\beta}_{2i})$	-1.374	0.000	-1.482	0.000
	(0.018)		(0.023)	
$CDIS_{ij} \times PROD$ $(\hat{\beta}_{3i})$	-0.013	0.029	-0.013	0.153
	(0.006)		(0.009)	
$LnGDP_{ti}$	0.448	0.000	0.499	0.000
	(0.011)		(0.014)	
$LnGDP_{tj}$	0.729	0.000	0.770	0.000
	(0.010)		(0.013)	
$LnGDIS_{ij}$	-0.679	0.000	-0.780	0.000
	(0.025)		(0.032)	
$CONTIG_{ij}$	0.777	0.000	0.936	0.000
	(0.117)		(0.136)	
$COMCUR_{tij}$	0.430	0.000	0.367	0.000
	(0.064)		(0.066)	

	Four Dimensional CD (*N* = 90 Countries)		Six Dimensional CD (*N* = 71 Countries)	
	b	***p*-value**	**b**	***p*-value**
RTA_{tij}	0.152	0.000	0.120	0.000
	(0.026)		(0.028)	
$UA_i\,(\hat{\gamma}_{01})$	-0.680	0.000	-0.994	0.000
	(0.067)		(0.100)	
$PD_i\,(\hat{\gamma}_{02})$	0.204	0.000	0.144	0.013
	(0.047)		(0.058)	
$IDV_i\,(\hat{\gamma}_{03})$	-0.061	0.221	-0.097	0.133
	(0.050)		(0.064)	
$MAS_i\,(\hat{\gamma}_{04})$	0.057	0.163	0.024	0.634
	(0.041)		(0.051)	
$UA_i \times CDIS_{ij}\,(\hat{\gamma}_{11})$	0.215	0.000	0.322	0.000
	(0.024)		(0.043)	
$UA_i \times PROD\,(\hat{\gamma}_{21})$	0.403	0.000	0.626	0.000
	(0.024)		(0.032)	
$UA_i \times CDIS_{ij} \times PROD\,(\hat{\gamma}_{31})$	-0.132	0.000	-0.233	0.000
	(0.008)		(0.013)	
LTO_i			0.030	0.594
			(0.056)	
IVR_i			0.020	0.694
			(0.052)	
Year	-0.045	0.000	-0.043	0.000
	(0.002)		(0.002)	
Constant	78.299	0.000	72.4333	0.000
	(3.561)		(4.095)	
Observations	409,367		318,738	
Snijders/Bosker R^2 of Level 1	0.278		0.289	
Snijders/Bosker R^2 of Level 2	0.444		0.462	

Notes:
[a] Standard errors in parentheses.
[b] CDIS = cultural distance; PROD = product type; GDP = gross domestic product; GDIS = geographical distance; CONTIG = contiguity; COMCUR = common currency; RTA = regional trade agreements; UA = uncertainty avoidance; PD = power distance; IDV = individualism; MAS = masculinity; LTO = long-term orientation; IVR = indulgence versus restraint.

5.2 Testing hypotheses at the country level (Level 2)

Supporting *H4*, there was a negative association between the importing country's uncertainty avoidance and the trade volume (b = -.680, $p < .001$), suggesting that uncertainty avoidance of a country reduced its bilateral trade with other countries. Moreover, results showed that the effect of uncertainty avoidance on the relationship between cultural distance and bilateral trade was positive and significant (b = .215, $p < .001$), indicating that the detrimental effect of cultural distance on bilateral trade was weaker when the importing country was high (versus low) in uncertainty avoidance. Thus, *H5* was supported. Supporting *H6*, the effect of uncertainty avoidance on the relationship between product type and bilateral trade was positive and significant (b = .403, $p < .001$), showing that the negative impact of product type (experience

versus search) on bilateral trade was weaker when the importing country was high (versus low) in uncertainty avoidance.

5.3 Effects of control variables

As for the control variables, at the country-pair level, bilateral trade was positively associated with GDP of the importing country (b = .448, p < .001), GDP of the exporting country (b = .729, p < .001), contiguity (b = .777, p < .001), common currency (b = .430, p < .001), and RTA (b = .152, p < .001), but negatively associated with geographical distance (b = -.679, p < .001), as shown in the first column of Ta ble 4. These results indicate that bilateral trade was increased when the trading countries had higher GDPs, shared the same border, had the same currency, signed regional trade agreements, and located nearby to each other. These findings are consistent with previous literature (Feenstra, 2004). At the country level, bilateral trade was positively associated with the importing country's power distance (b = .204, p < .001), suggesting that countries high (versus low) in power distance imported more. However, there was no effect of individualism (b = -.061, p = .221) and masculinity (b = .057, p = .163) on trade volume, as shown in the first column of Table 4. Notably, adding the characteristics of exporting countries (that is, uncertainty avoidance, power distance, individualism, and masculinity) into our model as covariates did not change the significant level or the pattern of results reported above, suggesting that our results were robust.

5.4 Sensitivity Analysis

Several approaches were used to test the robustness of our results, including two-way random effects (Two-Way RE) model, random-effects/random-intercept (RE) model and fixed-effects (FE) model. Following Goldstein (2003), we estimated Two-Way RE model using a multi-level model with crossed-terms (instead of nested) that represent the country pairs (α_{ij}) and years (α_t).

$$LnT_{tij} = \beta_{0i} + \beta_{1i}(CDIS_{ij}) + \beta_{2i}(PROD) + \beta_{3i}(CDIS_{ij} \times PROD) + \beta_{controls} FControls_{tij} + \alpha_{ij} + \alpha_t + u_{tij}$$

The results of the Two-Way RE model are presented in the first column of Table 5. As shown in Table 5, the parameter estimates of MLM and those of the Two-Way RE model were quite similar, thereby lending support for the robustness of our results.

TABLE 5. Parameter Estimates from Two-Way RE, RE, and FE Models [Dependent Variable =LnT_{tij}]

	Two-way random effects		**Random effects**		**Fixed effects**	
	b	***p*-value**	**b**	***p*-value**	**b**	***p*-value**
$CDIS_{ij}$ $(\hat{\beta}_{1i})$	-0.056	0.001	-0.040	0.020		
	(0.017)		(0.017)			
$PROD_{ij}$ $(\hat{\beta}_{2i})$	-1.374	0.000	-1.372	0.000	-1.391	0.000
	(0.018)		(0.018)		(0.017)	
$CDIS_{ij} \times PROD$ $(\hat{\beta}_{3i})$	-0.013	0.029	-0.013	0.024	-0.013	0.026
	(0.006)		(0.006)		(0.006)	
$LnGDP_{ti}$	0.445	0.000	0.361	0.000	0.467	0.000

	Two-way random effects		Random effects		Fixed effects	
	b	***p*-value**	**b**	***p*-value**	**b**	***p*-value**
	(0.011)		(0.011)		(0.031)	
$LnGDP_{tj}$	0.728	0.000	0.668	0.000	0.064	0.052
	(0.010)		(0.010)		(0.033)	
$LnGDIS_{ij}$	-0.679	0.000	-0.689	0.000		
	(0.025)		(0.026)			
$CONTIG_{ij}$	0.778	0.000	0.856	0.000		
	(0.117)		(0.119)			
$COMCUR_{tij}$	0.439	0.000	0.331	0.000	0.158	0.036
	(0.064)		(0.065)		(0.076)	
RTA_{tij}	0.149	0.000	0.047	0.066	0.003	0.922
	(0.026)		(0.025)		(0.029)	
$UA_i\,(\hat{\gamma}_{01})$	-0.677	0.000	-0.562	0.000		
	(0.067)		(0.068)			
$PD_i\,(\hat{\gamma}_{02})$	0.203	0.000	0.141	0.003		
	(0.047)		(0.047)			
$IDV_i\,(\hat{\gamma}_{03})$	-0.059	0.236	0.016	0.752		
	(0.050)		(0.050)			
$MAS_i\,(\hat{\gamma}_{04})$	0.060	0.145	0.153	0.000		
	(0.041)		(0.041)			
$UA_i \times CDIS_{ij}\,(\hat{\gamma}_{11})$	0.215	0.000	0.199	0.000		
	(0.024)		(0.024)			
$UA_i \times PROD\,(\hat{\gamma}_{21})$	0.403	0.000	0.402	0.000	0.400	0.000
	(0.024)		(0.024)		(0.024)	
$UA_i \times CDIS_{ij} \times PROD\,(\hat{\gamma}_{31})$	-0.132	0.000	-0.132	0.000	-0.131	0.000
	(0.008)		(0.008)		(0.008)	
Constant	-13.091	0.000	-9.343	0.000	-0.903	0.443
	(0.441)		(0.414)		(1.177)	
Observations	409,367		409,367		409,367	
R^2	0.286		0.278		0.522	

Notes:

[a] Standard errors in parentheses.

[b] CDIS = cultural distance; PROD = product type; GDP = gross domestic product; GDIS = geographical distance; CONTIG = contiguity; COMCUR = common currency; RTA = regional trade agreements; UA = uncertainty avoidance; PD = power distance; IDV = individualism; and MAS = masculinity.

[c] The regressions include year dummy variables.

Furthermore, we estimated a fixed-effects model to check the robustness of our results for the time-variant covariates and a random-effects or random-intercept model with a fixed year specific intercept and a country-pair specific random intercept. As presented in Table 5, the results were consistent with the results from both the MLM and Two-Way RE model. Thus, our results were robust.

We also separately estimated the MLM for each year to check the sensitivity of our results. As reported in Table 6, the pattern of results in each year was largely consistent with that of the MLM from the aggregated data in Table 4. Our results remain robust to our sensitivity checks.

TABLE 6. Parameter Estimates from MLM for Each Year [Dependent Variable =LnT_{tij}]

	Year 2008		Year 2009		Year 2010		Year 2011		Year 2012		Year 2013		Year 2014	
	b	***p*-value**	**b**	***p*-value**	**b**	***p*-value**	**b**	***p*-value**	**b**	***p*-value**	**b**	***p*-value**	**b**	***p*-value**
$CDIS_{ij}$ $(\hat{\beta}_{1i})$	-0.101	0.000	-0.070	0.001	-0.068	0.001	-0.075	0.000	-0.084	0.000	-0.060	0.004	-0.062	0.003
	(0.021)		(0.020)		(0.020)		(0.021)		(0.021)		(0.021)		(0.021)	
$PROD$ $(\hat{\beta}_{2i})$	-1.352	0.000	-1.392	0.000	-1.378	0.000	-1.366	0.000	-1.333	0.000	-1.300	0.000	-1.337	0.000
	(0.049)		(0.047)		(0.047)		(0.047)		(0.048)		(0.047)		(0.047)	
$CDIS_{ij} \times PROD$ $(\hat{\beta}_{3i})$	-0.005	0.775	0.005	0.759	-0.006	0.696	-0.004	0.789	-0.009	0.587	-0.018	0.265	-0.019	0.227
	(0.016)		(0.016)		(0.016)		(0.016)		(0.016)		(0.016)		(0.016)	
$LnGDP_{ti}$	0.499	0.000	0.491	0.000	0.484	0.000	0.493	0.000	0.504	0.000	0.491	0.000	0.500	0.000
	(0.014)		(0.014)		(0.014)		(0.014)		(0.014)		(0.014)		(0.014)	
$LnGDP_{tj}$	0.843	0.000	0.828	0.000	0.820	0.000	0.816	0.000	0.829	0.000	0.829	0.000	0.835	0.000
	(0.013)		(0.013)		(0.013)		(0.013)		(0.013)		(0.013)		(0.013)	
$LnGDIS_{ij}$	-0.547	0.000	-0.553	0.000	-0.564	0.000	-0.573	0.000	-0.575	0.000	-0.596	0.000	-0.645	0.000
	(0.034)		(0.033)		(0.033)		(0.034)		(0.034)		(0.032)		(0.034)	
$CONTIG_{ij}$	0.767	0.000	0.814	0.000	0.741	0.000	0.812	0.000	0.772	0.000	0.666	0.000	0.598	0.000
	(0.124)		(0.121)		(0.123)		(0.124)		(0.125)		(0.123)		(0.125)	
$COMCUR_{tij}$	0.601	0.000	0.644	0.000	0.694	0.000	0.653	0.000	0.590	0.000	0.631	0.000	0.650	0.000
	(0.144)		(0.131)		(0.134)		(0.127)		(0.126)		(0.126)		(0.125)	
RTA_{tij}	0.570	0.000	0.476	0.000	0.561	0.000	0.525	0.000	0.641	0.000	0.533	0.000	0.475	0.000
	(0.065)		(0.063)		(0.062)		(0.063)		(0.061)		(0.058)		(0.059)	
UA_i $(\hat{\gamma}_{01})$	-0.828	0.000	-0.685	0.000	-0.681	0.000	-0.614	0.000	-0.811	0.000	-0.639	0.000	-0.648	0.000
	(0.086)		(0.084)		(0.084)		(0.085)		(0.085)		(0.084)		(0.085)	
PD_i $(\hat{\gamma}_{02})$	0.221	0.000	0.223	0.000	0.245	0.000	0.246	0.000	0.217	0.000	0.254	0.000	0.194	0.000
	(0.055)		(0.054)		(0.054)		(0.055)		(0.055)		(0.055)		(0.055)	
IDV_i $(\hat{\gamma}_{03})$	-0.102	0.082	-0.079	0.170	-0.091	0.112	-0.062	0.283	-0.108	0.063	-0.030	0.597	-0.067	0.249
	(0.059)		(0.057)		(0.058)		(0.058)		(0.058)		(0.058)		(0.058)	
MAS_i $(\hat{\gamma}_{04})$	0.017	0.729	0.061	0.191	0.074	0.118	0.078	0.105	0.053	0.267	0.042	0.372	0.105	0.030
	(0.048)		(0.047)		(0.048)		(0.048)		(0.048)		(0.047)		(0.048)	
$UA_i \times CDIS_{ij}$ $(\hat{\gamma}_{11})$	0.255	0.000	0.190	0.000	0.204	0.000	0.201	0.000	0.238	0.000	0.197	0.000	0.192	0.000
	(0.029)		(0.029)		(0.029)		(0.029)		(0.029)		(0.029)		(0.029)	
$UA_i \times PROD$ $(\hat{\gamma}_{21})$	0.499	0.000	0.487	0.000	0.428	0.000	0.335	0.000	0.424	0.000	0.353	0.000	0.334	0.000
	(0.066)		(0.064)		(0.064)		(0.064)		(0.065)		(0.064)		(0.064)	
$UA_i \times CDIS_{ij} \times PROD$ $(\hat{\gamma}_{31})$	-0.165	0.000	-0.148	0.000	-0.136	0.000	-0.121	0.000	-0.143	0.000	-0.123	0.000	-0.118	0.000
	(0.023)		(0.022)		(0.022)		(0.022)		(0.022)		(0.022)		(0.022)	
Constant	-18.27	0.000	-17.77	0.000	-17.40	0.000	-17.54	0.000	-18.12	0.000	-17.78	0.000	-17.71	0.000
	(0.572)		(0.559)		(0.560)		(0.566)		(0.566)		(0.554)		(0.568)	
Observations	57,267		57,621		58,563		58,956		58,147		59,892		58,921	
Snijders/Bosker R^2 of Level 1	0.290		0.284		0.283		0.280		0.281		0.280		0.284	
Snijders/Bosker R^2 of Level 2	0.433		0.420		0.418		0.412		0.417		0.418		0.422	

Notes:

[a] Standard errors in parentheses.

[b] CDIS = cultural distance; PROD = product type; GDP = gross domestic product; GDIS = geographical distance; CONTIG = contiguity; COMCUR = common currency; RTA = regional trade agreements; UA = uncertainty avoidance; PD = power distance; IDV = individualism; and mas = masculinity.

TABLE 7. Parameter Estimates from MLM [Dependent Variable =LnT_{tij}]

	GLOBE CD (N = 50 Countries)		TSK CD (N = 36 Countries)	
	b	***p*-value**	**b**	***p*-value**
$CDIS_{ij}$ $(\hat{\beta}_{1i})$	-0.015	0.573	-0.101	0.000
	(0.026)		(0.026)	
$PROD_{ij}$ $(\hat{\beta}_{2i})$	-1.801	0.000	-1.923	0.000
	(0.020)		(0.020)	
$CDIS_{ij} \times PROD$ $(\hat{\beta}_{3i})$	-0.004	0.593	-0.022	0.003
	(0.007)		(0.008)	
$LnGDP_{ti}$	0.518	0.000	0.551	0.000
	(0.023)		(0.030)	
$LnGDP_{tj}$	0.810	0.000	0.758	0.000
	(0.021)		(0.028)	
$LnGDIS_{ij}$	-0.844	0.000	-0.853	0.000
	(0.047)		(0.050)	
$CONTIG_{ij}$	0.748	0.000	0.749	0.000
	(0.205)		(0.210)	
$COMCUR_{tij}$	0.634	0.001	0.086	0.625
	(0.188)		(0.176)	
RTA_{tij}	0.093	0.019	-0.069	0.123
	(0.039)		(0.045)	
UA_i $(\hat{\gamma}_{01})$	-0.709	0.000	-0.555	0.000
	(0.096)		(0.105)	
PD_i $(\hat{\gamma}_{02})$	0.286	0.001	0.452	0.000
	(0.088)		(0.076)	
IDV_i $(\hat{\gamma}_{03})$	0.065	0.479	0.377	0.000
	(0.092)		(0.090)	
MAS_i $(\hat{\gamma}_{04})$	0.153	0.047	0.020	0.805
	(0.077)		(0.080)	
$UA_i \times CDIS_{ij}$ $(\hat{\gamma}_{11})$	0.062	0.035	0.071	0.025
	(0.029)		(0.032)	
$UA_i \times PROD$ $(\hat{\gamma}_{21})$	0.353	0.000	0.298	0.000
	(0.025)		(0.029)	
$UA_i \times CDIS_{ij} \times PROD$ $(\hat{\gamma}_{31})$	-0.031	0.000	-0.083	0.000
	(0.008)		(0.009)	
Year	-0.051	0.000	-0.048	0.000
	(0.003)		(0.003)	
Constant	86.415	0.000	82.583	0.000
	(5.180)		(5.982)	
Observations	209,775		148,283	
Snijders/Bosker R^2 of Level 1	0.301		0.318	
Snijders/Bosker R^2 of Level 2	0.471		0.538	

Notes:

[a] Standard errors in parentheses.

[b] CDIS = cultural distance; PROD = product type; GDP = gross domestic product; GDIS = geographical distance; CONTIG = contiguity; COMCUR = common currency; RTA = regional trade agreements; UA = uncertainty avoidance; PD = power distance; IDV = individualism; MAS = masculinity; LTO = long-term orientation; IVR = indulgence versus restraint.

c "GLOBE CD" uses GLOBE scores (https://globeproject.com/study_2004_2007#data) to calculate cultural distance; "TSK CD" uses the updated set of national cultural scores proposed by Taras, Steel and Kirkman (2012) to calculate cultural distance.

Finally, we used alternative measures of cultural distance to confirm the robustness of our results. We used GLOBE scores, the data of which came from Global Leadership Organizational Behavior Effectiveness (https://globeproject.com/study_2004_2007#data), and the updated set of national cultural scores proposed by Taras, Steel, and Kirkman (2012), to calculate the cultural distance separately according to the calculation method proposed by Kogut and Singh (1988). As presented in Table 7, the pattern of main variables and interactions was consistent with that of the MLM using Hofstede's cultural dimensions in Table 4. Taken together, these results lend strong support for the robustness of our findings.

6 DISCUSSION

Previous research documents inconsistent findings about the effect of cultural distance on bilateral trade. Some researchers reported that cultural distance is negatively related to bilateral trade (Felbermay & Toubal, 2010; Guiso, Sapienza, & Zingales, 2009; Tadesse & White, 2010), whereas other scholars showed that cultural distance has no impact on bilateral trade (Cyrus, 2015). Still others found that cultural distance is positively associated with bilateral trade (Linders et al., 2005). In this research, we propose that these inconsistent findings are mainly driven by the degree of uncertainty associated with trade flows. To advance our understanding about the effect of cultural distance on bilateral trade, we examined the moderating role of two important factors in international trade—namely product type and uncertainty avoidance of the importing country—both are closely related to the degree of uncertainty. Our theoretical framework posits that cultural distance in general has a negative impact on bilateral trade, because cultural distance increases the degree of uncertainty in trade flows. However, such a negative effect is more pronounced when the trade is on experience (versus search) products, or if the importing country has low (versus high) uncertainty avoidance. In addition, experience (versus search) product type has a negative effect on bilateral trade, but the effect is stronger for the countries low (versus high) in uncertainty avoidance.

6.1 Theoretical Contributions

Our research brings important contributions to the literature on cultural distance and on bilateral trade. First, this research contributes to the cultural distance literature by uncovering the degree of uncertainty as a key process through which cultural distance affects bilateral trade. Previous studies in this domain (Felbermay & Toubal, 2010; Gokmen, 2017; Tadesse & White, 2010) have mainly attributed the hindering effect of cultural distance to the increased costs associated cultural differences between trading partners (such as translation, potential misunderstandings, and communication difficulty caused by cultural differences). Extending this stream of research, we theorize that enhanced uncertainty is a conceptual factor that underlies the effect of cultural distance on bilateral trade. This is not a trivial discovery, as it provides a clear guideline for future researchers to identify theoretical moderators that can hinder or augment the effect of cultural distance.

Second, we also contribute to the bilateral trade literature by showing that both country-pair-level and country-level factors can set up boundary conditions for the effect of cultural distance on bilateral trade, as long as they affect the degree of uncertainty in trade. Associated with this contribution, our research also provides novel insights on why cultural distance hinders bilateral

trades in some situations but not in others. We show that product type (search versus experience products) and the level of uncertainty avoidance (high versus low) of the importing country are some of the factors that can help explain the inconsistent findings documented in the literature.

Finally, from a methodological perspective, our research sheds light on the importance of using a multi-level approach to study cultural-distance effects by separating the variance of bilateral trade into the country-pair level (that is, variance caused by the characteristics of trading partners) and country level (that is, variance due to heterogeneity among importing countries). Our findings show that the hindering effect of cultural distance is more profound among the countries low (versus high) in uncertainty avoidance. As a result, this novel approach allows us to provide additional insights that appear to have been neglected by previous researchers.

6.2 International Trade Implications

From an international trade standpoint, the findings of this study suggest that, despite the wider acceptance of international business, trading with culturally distant countries are still perceived as involving higher levels of uncertainty and risks. Our research suggests that the unknown properties of trade, not the actual cultural difference itself, make international trade more intimidating. Thus, the focus of international trade officers must be to reduce uncertainties associated with bilateral trade. In other words, although cultural distance is hard to shorten, governments can reduce perceived uncertainty associated with trade flows as an effective approach to increase international trade volumes. On one hand, international trade officers need to convince the potential partners of the policies, methods, equipment, and specific remedies applied by their countries to protect consumers and to assure security of the transactions. On the other hand, exporting firms can utilize the interactive nature of the internet to facilitate communication with prospective consumers in importing countries, by either providing virtual advisors or by offering customer testimonials to potential buyers in the importing countries to help them develop a sense of knowledge about the products.

Furthermore, another implication is that international trade officers should apply appropriate strategies for each type of products individually according to its uncertainty levels. The individualization of uncertainty is necessary insofar as each type of products is different, especially when taking experience products into consideration. It may be helpful for international trade officers to position these product types on an uncertainty map before any marketing promotion campaign or strategic planning is implemented. In addition, our study also suggests that international business practitioners perhaps should place much more attention on minimizing the effects of uncertainty than on minimizing cultural difference. Nowadays, consumers are faced to a larger extent with experience products (that is, information products) that are also very new and difficult to conceptualize. As such, adapting to this trend, international business practitioners may develop strategies to help potential customers to mentally make their experience products tangible. Marketing promotions can be utilized to establish and increase the mental representation of merchandise in the minds of consumers of the importing countries, thus diminishing the perceived uncertainty that consumers will experience when making a purchase. Free trials for new purchasers, imaginary or vivid information cues, customer testimonials, and/or advice from salespersons are good approaches in this respect since they can help consumers develop a sense of knowledge and experience through a direct or an indirect channel.

Finally, our findings also offer implications for selecting market entry strategies across nations. There has been a long debate among international business scholars over the merits of two alternative market-entry strategies for new products: the waterfall strategy, which involves the sequential introduction of new products across multiple countries, and the sprinkler strategy, which implies simultaneous introduction of new products (Ma, Yang, & Mourali, 2014). Our findings suggest that, for countries that have similar levels of cultural distance, the choice of the two strategies could be dependent on product type and on the level of uncertainty avoidance of the target market. When exporting a search product, countries may consider adopting a waterfall strategy, introducing the products initially in predominantly low-uncertainty–avoidance cultures and subsequently moving to high-uncertainty–avoidance societies. Compared to experience products, search products are more receptive to consumers, which is more salient in low (versus high) uncertainty avoidance societies. Using such societies as the lead markets can result in a faster diffusion rate. When the product is an experience product, however, both strategies may be suitable and a simultaneous introduction would result in a faster diffusion rate than a sequential introduction.

6.3 Limitations and Future Research

The present study has some limitations that might be addressed by future research. First, the results of our study should be interpreted with caution due to the use of the data from one industry. Although focusing on one industry over a prolonged time period (2008 to 2014) minimizes the potential confounds caused by other factors, it is fruitful for future researchers to apply our model to other product categories to see if our findings can be generalizable to other industries. Our findings are expected to be replicated in other product categories, because electronic goods in general are leaning toward the experience product category. Using electronics products renders a conservative test of our theory. That said, future research is needed to test whether this speculation is correct. Second, this study centres on the moderating effect of uncertainty avoidance, while controlling for the effects of other cultural dimensions. Future research may expand the current study by identifying other country-level factors that may have an influence on bilateral trade. For example, the cooperation tendency in a country may influence bilateral trade because bilateral trade requires the cooperation of trading partners.

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