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Home Bias in Primary Agricultural and Processed Food Trade: Assessing the Effects of National Degree of Uncertainty Aversion

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Abstract: This study investigates the effects of national degrees of uncertainty aversion (unfamiliarity avoidance) on the magnitude of bias towards domestic products rather than imports. The empirical analysis is implemented for primary agricultural and processed food products, using a panel dataset covering trade between and within OECD countries. Primary agricultural products are often blended and associated with reference prices. Conversely, processed food products exhibit higher levels of product differentiation. The empirical results confirm expectations by emphasizing the magnifying effects of uncertainty aversion on home bias in the case of processed food products but not in the case of primary agricultural products. These magnifying effects are primarily associated with processed food products destined for final household consumption. Other results reveal significant variations between different countries (based on geo-economic and national income categories). Our results also indicate that home bias and uncertainty aversion effects on home bias have not decreased over time. The empirical results remain robust under different estimation methods.

Key Words: agricultural and food trade, home bias, uncertainty aversion, unfamiliarity avoidance, border effects, cultural determination of trade preferences, gravity model, estimation methods

JEL Classification: F14, F15, Q17, Z19

1. Introduction

Home bias in trade commonly describes the national tendency to purchase domestic products relative to foreign products, over and above any supply cost considerations. Home bias is the result of many potential factors. Trade policies, such as tariffs and Non-Tariff Barriers (NTBs), create a bias toward the purchase of domestic products by limiting the accessibility of foreign products to the local market and by creating price wedges between domestic and foreign products. Inherent consumers' preferences for domestic products also generate home bias and are commonly described

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in terms of taste bias (e.g., Head and Mayer, 2000; Evans, 2003; Fontagné et al., 2005).[2, 3] However, these inherent preferences can be also explained through national psychological attributes that condition the behaviour of consumers toward foreign products vis-à-vis domestic products. Specifically, more conservative and uncertainty-avoiding consumers, who prefer not to experience the unfamiliar, are expected to purchase less foreign products relative to domestic products. Also, more conservative and uncertainty-avoiding business cultures would induce firms to do more domestic business and less international business. Therefore, countries with higher national degrees of uncertainty aversion are expected to exhibit higher magnitudes of home bias.[4] This study contributes to the literature by empirically investigating the existence and significance of this type of relationship. It provides a better understanding of the patterns of international trade through the national uncertainty aversion attribute.

The concept of home bias is closely related to McCallum's (1995) original concept of border effects. McCallum (1995) evaluated the relevance of the international borders between Canada and the United States (US) for international trade. After controlling for economic size and distance, McCallum (1995) found that a Canadian province exports twenty-two times more to another province than to a US state. Wei (1996) introduced the concept of home bias in trade of goods as an alternative concept to McCallum's (1995) border effects, defining home bias as an estimate of the national propensity to purchase domestic products relative to imported foreign products, and investigating the magnitude of home bias for the Organization for Economic Cooperation and

[2] Trefler (1995) noted that bias in consumers' preferences toward domestic products partly explains the lower levels of observed international trade than those predicted by the Heckscher-Ohlin trade model.

[3] Disdier and Mayer (2007) indicated that consumers prefer goods produced in nearby countries because of the greater similarity in tastes.

[4] There is a considerable literature that documented significant magnitudes of home bias in financial markets (e.g., French and Poterba, 1991; Tesar and Werner, 1995). The existence of home bias in financial portfolios is considered as a puzzle since the expected utility paradigm predicts higher levels of diversification in local and foreign financial assets. Many studies emphasized the role of uncertainty aversion in explaining the puzzle of home bias in financial markets (e.g., Epstein and Miao, 2003; Uppal and Wang, 2003).

Development (OECD) countries. Wei (1996) found that the OECD countries purchased, on average, ten times more domestic goods than imported foreign goods after controlling for economic size and distance. The magnitude of home bias dropped to around three after controlling for linguistic ties, contiguity, and relative distance from the rest of the world (i.e., remoteness).[5] These early studies promoted a large strand of empirical literature that estimated the magnitude of border effects and home bias for different geographic regions and industrial levels (e.g., Helliwell, 1996, 1998; Head and Mayer, 2000; Nitsch, 2000; Wolf, 2000; Chen, 2004; Fontagné et al., 2005; Olper and Raimondi, 2008a).

Many empirical studies examined the factors that determine the magnitude of home bias and border effects. Head and Mayer (2000) investigated the market fragmentation inside the European Union (EU). They showed that home bias for a given EU country toward domestic products vis-à-vis products that are imported from other EU countries is explained by the inherent preferences of consumers toward domestic goods. Head and Mayer (2000) conjectured that this bias is generated from cultural differences and past protectionist policies that induced domestic suppliers to customize their products to local tastes. However, Evans (2003) found that inherent nationality differences are not the main factor explaining the magnitude of border effects for the OECD countries, deriving this conclusion using a dataset covering many manufacturing industries (including the food processing industry) and an aggregate of non-manufactured products. Evans (2003) showed that substitutability between domestic and foreign products, trade policy barriers, and differences in international and domestic transactions costs are important determinants of the magnitude of border effects. Alternatively, Fontagné et al. (2005) found that the bias in consumers'

[5] Helliwell (1998) estimated the magnitude of home bias for the OECD countries over the period 1988-1992 by carrying out the estimation for each year separately. Helliwell (1998) detected higher levels of home bias than Wei (1996), averaging around a magnitude of ten after controlling for linguistic ties, contiguity, and remoteness.

preferences toward domestic products vis-à-vis foreign products, in addition to trade policy barriers (e.g., tariffs and NTBs), significantly contributes in explaining the magnitude of home bias.[6, 7]

Rauch (2001), Wagner et al. (2002), and Combes et al. (2005) emphasized the role of business and social networks in alleviating the significance of home bias. The effects of these networks are channelled through reductions in information costs and diffusion of preferences. Reductions in information costs occur because "Immigrants know the characteristics of many domestic buyers and sellers and carry this knowledge abroad" (Rauch, 2001, p.1184). The diffusion of preferences occurs because immigrants partially preserve biased preferences for products produced in their countries of origin. Also, they can introduce these products to the nationals of their new residence countries. Anderson and van Wincoop (2004) provided a comprehensive summary that highlights the effects of national cultural attributes on the magnitude of home bias.

Few empirical studies estimated the magnitude of border effects and home bias in primary agricultural and processed food trade. Furtan and van Melle (2004) estimated the magnitude of the border effects for Canada's trade with the US and Mexico for selected primary agricultural commodities. Olper and Raimondi (2008a) estimated the magnitude of the border effects for aggregate trade in primary agricultural products among the OECD countries through the period 1994-2003. They found that the overall estimate of the border effects depicting the tendency of intranational export relative to international export is between nine and thirteen. Olper and Raimondi (2008a) also discovered that international trade among the EU countries was very

[6] Mayer and Zignago (2005) found that the magnitude of intranational imports of a given developed country, measured as the value of domestic production minus exports, is 61 times more than international imports from other developed countries, but is 285 times more than international imports from developing countries. They noted that these differences in market accessibility are not mainly caused by trade policy barriers. Mayer and Zignago (2005) argued that inherent consumers' preferences for products imported from other developed countries and disparity in the quality of goods can explain these differences in market accessibility.

[7] There are many other empirical studies that explained the determinants of border effects but have not estimated the effect of biased consumers' preferences. For example, Chen (2004) showed that technical barriers to trade, information costs, and spatial clustering of firms significantly explain the magnitude of border effects among the EU countries.

substantially greater than trade between the EU countries and the Central and Eastern European Countries (CEECs). Furthermore, they also found that trade among the CEECs and trade between the CEECs and the OECD countries were higher than trade between the CEECs and the EU countries. These results indicate limitations in the extent of integration between the EU countries and the CEECs over this data period.

Olper and Raimondi (2008b) estimated the border effects for 18 food industries classified according to International Standard Industrial Classification (ISIC) four-digit level over the period 1996-2001. Their dataset covered the QUAD countries composed of Canada, the EU, Japan, and the US. Olper and Raimondi (2008b) found that trade barriers (i.e., tariffs and NTBs) are significant factors that determine the magnitude of the border effects. However, they also showed that consumers' preferences matter in explaining the magnitude of the border effects. In a companion study, Olper and Raimondi (2008c) examined the market access asymmetry in the same food industries for the QUAD countries over the same period (1996-2001), finding that differences in trade barriers significantly explain the relative asymmetry in border effects between these countries. Yet, this study reaffirmed the important role of home bias in preferences and the substitution elasticity in explaining the differences in border effects.

The empirical literature (e.g., Head and Mayer, 2000; Evans, 2003; Fontagné et al., 2005; Combes et al., 2005; Olper and Raimondi, 2008b) is primarily concerned about estimating and comprehending the accessibility to foreign markets and the extent of market integration. Determining the factors underlying home bias and border effects aims at better understanding the role of trade-related policies and the role of other national idiosyncratic factors, such as the national uncertainty aversion attribute, in developing trade patterns. Differences in national idiosyncratic factors would potentially result in asymmetries in the extent of international market integration associated with current and future trade agreements and trade liberalization policies. Therefore, the implications of these national idiosyncratic factors for trade patterns should be encompassed through the process of negotiating, developing, and implementing trade policies.

This study contributes to the existing empirical literature on home bias by estimating the implications of the national degree of uncertainty aversion for the magnitude of home bias. This study uses Hofstede's (1980, 2001) unique dataset that underlines significant differences in the uncertainty aversion attribute across countries. Huang (2007) used this dataset to disentangle the effects of unfamiliarity from transportation costs when explaining the negative effect of geographic bilateral distances on bilateral trade flows.[8] Huang (2007) used a gravity empirical specification where the distance coefficient is a function of the national uncertainty aversion attribute.[9] Huang (2007) found that countries with higher levels of uncertainty aversion exported relatively less to more distant countries, particularly in the case of differentiated products.

In this study, the empirical investigation of the effect of the national uncertainty aversion attribute on the magnitude of home bias is carried out for primary agricultural products and for processed food products, focusing on imports. Domestic and imported primary agricultural products generally exhibit little differentiation. These products are often blended and associated with reference prices.[10] Conversely, processed food products are characterized by higher levels of differentiation (e.g., intrinsic product attributes, country of production labelling). The unfamiliar attributes of foreign processed food products are expected to have higher impacts for uncertainty-avoiding consumers who would prefer to adhere to the consumption of domestic products. Therefore, it can be hypothesized that the effect of the national uncertainty aversion attribute on

[8] Many empirical studies have used Hofstede's (1980, 2001) dataset to examine the effects of cultural characteristics on various aspects of national economies. For example, Huang (2008) used this dataset to examine the role of cultural attributes in adopting and developing risky industries whereas Chambers and Hamer (2010) used it to evaluate the effects of cultural attributes on national economic performance.

[9] This specification is realized through the introduction of an interaction term between the bilateral distance variable and the uncertainty aversion variable.

[10] According to Rauch (1999) and Feenstra (2004, p. 166), this can only be done when differentiation is limited.

home bias is more prominent in the case of processed food products than in the case of primary agricultural products.

The remainder of this study is organized as follows. Section 2 presents the empirical specification. Section 3 describes the sources and construction of the dataset. This is followed by Section 4 that presents and discusses the benchmark empirical results where the effects of the national degree of uncertainty aversion on the magnitude of home bias are estimated. Section 5 presents and discusses the results from alternative empirical specifications. Also, this section estimates and discusses the temporal trends of home bias. This is followed by Section 6 that presents and discusses the empirical results when using alternative estimation methods. Section 7 concludes.

2. Empirical Specification

This study employs a basic empirical gravity equation (Bergstrand, 1985, 1989; Deardorff, 1998; Eaton and Kortum, 2001; Anderson and van Wincoop, 2003; Feenstra, 2004). This basic gravity equation is most commonly estimated in the gravity literature (e.g., Anderson and van Wincoop, 2003; Feenstra, 2004; Baier and Bergstrand, 2007; Grant and Lambert, 2008; Olper and Raimondi, 2008a, 2008b, 2008c; Lambert and McKoy, 2009; Disdier and Fontagné, 2010). It comprises an exporter-specific set of variables (e.g., exporter's production capacity and exporter's multilateral resistance term), an importer-specific set of variables (e.g., importer's consumption capacity and importer's multilateral resistance term), and a set of bilateral variables representing policy, geographic, and socio-economic linkages between countries. This basic empirical gravity equation is used here to investigate the effects of the national uncertainty aversion attribute on the magnitude of home bias in primary agricultural and processed food trade. This is done empirically by allowing for the magnitude of home bias to interact with the national degree of uncertainty aversion.

Let $TRADE_{ijt}$ represent the bilateral trade value from country i to country j at time t. The benchmark empirical gravity equation is represented by:

(1) $$TRADE_{ijt} = G_{it} G_{jt} DIST_{ij}^{-\lambda} \exp\left[\left(\alpha_0 + \alpha_1 UAI_{i,j}\right) HB_{ij} + \beta RTA_{ijt} + \gamma LANG_{ij} + \delta CONT_{ij}\right] u_{ijt}$$

where G_{it} and G_{jt} depict the time-varying exporter-specific and importer-specific attributes, respectively, $DIST_{ij}$ is the bilateral geographic distance between countries i and j with λ being the elasticity of bilateral trade flows with respect to bilateral distance, HB_{ij} is the binary variable of interest that depicts home bias and it takes the value of one for intranational trade (i.e., when $i = j$) and zero otherwise (i.e., when $i \neq j$), where intranational trade is typically proxied by domestic production minus exports. This empirical specification allows for the coefficient on HB_{ij} to be influenced by the national degree of uncertainty aversion represented by the Uncertainty Aversion Indicator (UAI). Note that for intranational trade observations where $HB_{ij} = 1$ (i.e., when $i = j$), we have $UAI_i = UAI_j$ which is implied through $UAI_{i,j}$ in the gravity equation (1). The UAI dataset is derived from Hofstede (1980, 2001) and is further discussed in the next section. The binary variable RTA_{ijt} takes the value of one when the exporting country i and the importing country j share a common membership in a Regional Trade Agreement (RTA), such as the EU and the North American Free Trade Agreement (NAFTA), and zero otherwise. The binary variable $LANG_{ij}$ takes the value of one when countries i and j speak the same language and zero otherwise whereas the binary contiguity variable $CONT_{ij}$ takes the value of one when countries i and j share a common border and zero otherwise. Finally, u_{ijt} represents a log-normally distributed stochastic error term.

The basic empirical investigation is carried out using the log-linear transformation of the gravity equation (1):

(2) $$\ln TRADE_{ijt} = g_{it} + g_{jt} - \lambda \ln DIST_{ij} + \left(\alpha_0 + \alpha_1 UAI_{i,j}\right) HB_{ij} + \beta RTA_{ijt} + \gamma LANG_{ij} + \delta CONT_{ij} + \varepsilon_{ijt}$$

where $g_{it} \equiv \ln G_{it}$ is the exporter's time-varying fixed effect, $g_{jt} \equiv \ln G_{jt}$ is the importer's time-varying fixed effect, and $\varepsilon_{ijt} \equiv \ln u_{ijt}$ is a normally distributed stochastic term. We also estimate the empirical gravity equation in levels when subsequently conducting a sensitivity analysis.

3. Data Description

The empirical investigation covers primary agricultural and processed food trade between and within 23 OECD countries that are listed in Table 1 over the period 1988-2005. Summary statistics of the list of variables used in the empirical analysis are presented in Table 2. Bilateral trade in primary agricultural and processed food products are collected from the OECD's Structural Analysis (STAN) bilateral trade database. Following the empirical literature on home bias in trade (e.g., Head and Mayer, 2000; Chen, 2004; Olper and Raimondi, 2008b), intranational trade is computed by subtracting total exports from total production. Production values are derived from the OECD's STAN database for industrial analysis. The sectors in the STAN database are classified according to the ISIC-Revision 3 (ISIC-Rev.3). The primary agricultural sector is the aggregate of ISIC-Rev.3 classes A (agriculture, hunting, and forestry) and B (fishing). The food processing sector is the aggregate of ISIC-Rev.3 classes D-15 (manufacture of food products and beverages) and D-16 (manufacture of tobacco products).

The UAI dataset is sourced from Hofstede (1980, 2001) who implemented an international survey over 88,000 local employees working in marketing and customer services of IBM subsidiaries in more than 50 different countries. Uncertainty aversion is defined as the extent of "feeling uncomfortable with uncertainty and ambiguity, and valuing beliefs and institutions that provide certainty and conformity." Hofstede (1980, 2001) constructed a unique UAI dataset that reflects mean national attitudes to uncertainty. Hofstede (1980, 2001) generated the UAI dataset primarily using the responses of employees to three main factors. The first factor is *rule orientation* which is depicted through the extent of agreement with the statement "company rules should not be broken even when the employee thinks it is in the company's best interest". A stronger disagreement with this statement is explained to reflect higher levels of tolerance to uncertainty. The second factor is *employment stability* which is depicted through employee's intention to continue with the company for more than a specified number of years. A higher valuation of employment stability is described to reveal lower levels of tolerance toward uncertainty. The third factor is *stress* which is expressed through the response to the question "how often do you feel nervous or tense at work". Higher levels of stress reveal lower levels of tolerance to uncertainty. Hofstede (1980, 2001) used average values to develop country-specific indicators.[11]

European countries of Anglo-Frisian, Germanic, and Scandinavian cultures (e.g., Denmark, the Netherlands, and the United Kingdom), where significant proportions of the population adhere to Protestantism and Anglicanism, have lower levels of UAI. Meanwhile, European countries with Latin and Greek cultures (e.g., Belgium, Greece, and Portugal), with the majority of the population adhering to Catholicism and Eastern Orthodoxy, and Japan, generally exhibit higher levels of UAI. In our dataset, the mean value of UAI is 64.7 with a standard deviation of 24.1. The minimum value of UAI is 23 (reported for Denmark) whereas the maximum value of UAI is 112 (reported for Greece). The individual UAI values for the OECD countries and the religion composition of each OECD country are presented in Table 1. Finally, we use Head and Mayer's (2002) bilateral distance measure that accounts for the dispersion of the economic activities within each country. The dataset is obtained from the *Centre d'Études Prospectives et d'Informations Internationales (CEPII)*.

[11] See Huang (2007) for a more detailed descriptive summary of Hofstede's (1980, 2001) measure of UAI.

4. Benchmark Empirical Results

Table 3 and Table 4 report the empirical results for primary agricultural products and for processed food products, respectively. Columns (i) of Table 3 and Table 4 show that the magnitude of home bias for the OECD countries over the sample period is $\exp(3.39) = 29.7$ for primary agricultural products and $\exp(3.55) = 34.8$ for processed food products. After controlling for the effects of RTAs that facilitate international trade, columns (ii) of Table 3 and Table 4 indicate that the magnitude of home bias increases to $\exp(4.11) = 60.9$ and to $\exp(4.45) = 85.6$ for primary agricultural and processed food products, respectively. When measured for international trade specifically between EU countries, the magnitude of home bias drops to $\exp(4.11)/\exp(0.80) = 27.4$ and to $\exp(4.45)/\exp(1.03) = 30.6$ for primary agricultural and processed food products, respectively.[12]

Columns (iii) of Table 3 and Table 4 report the results when introducing the interaction term between the home bias binary variable and the UAI variable. The results show that the magnitude of home bias in primary agricultural trade is unaffected by the national degree of uncertainty aversion since the estimated coefficient on the interaction term is not statistically significant. However, the results emphasize that the magnitude of home bias in processed food trade is considerably affected by the national degree of uncertainty aversion. The estimated coefficient on the home bias binary variable now takes a lower value of 3.29 that remains statistically significant at the 1% level. The estimated coefficient on the interaction term between the home bias binary variable and the UAI variable is 0.0183 which is also statistically significant at the 1% level.

[12] Similarly, when measured relative to international trade between NAFTA countries, the magnitude of home bias moderately drops to $\exp(4.11)/\exp(0.26) = 47.0$ and to $\exp(4.45)/\exp(0.20) = 70.1$ for primary agricultural and processed food products, respectively.

These results imply significant differences in the magnitude of home bias in processed food trade across the OECD countries that are characterized by different national degrees of uncertainty aversion. The magnitude of home bias ranges from $\exp(3.29+0.0183\times 23) = \exp(3.71) = 40.9$ for a minimum degree of uncertainty aversion of 23 (reported for Denmark) to $\exp(3.29+0.0183\times 112) = \exp(5.34) = 208.5$ for a maximum degree of uncertainty aversion of 112 (reported for Greece). When measured for international trade specifically between EU countries, the corresponding magnitude of home bias ranges from $\exp(3.71)/\exp(1.06) = 14.2$ to $\exp(5.34)/\exp(1.06) = 72.2$, respectively for these two countries. One interesting illustration applies for the Netherlands and Belgium that are characterized by a close geographic proximity (separated by a minimum bilateral distance of 160.8 Km). These countries have considerably different UAI values of 53 and 94, respectively. This difference in the national degree of uncertainty aversion implies significantly different magnitudes of home bias in processed food trade of 70.8 and 149.9, respectively. These values become 24.5 and 51.9 when measured for international trade between EU countries.

It is important to note that significant proportions of primary agricultural products are purchased by firms in the food processing industry and are not destined for immediate final consumption. Therefore, these patterns could potentially contribute in explaining the non-significance of the estimated coefficient on the interaction term between the home bias binary variable and the UAI variable in the case of primary agricultural products. However, national uncertainty aversion attitudes may not be exclusively expressed through consumer behaviour since they can be also transferred into the business culture in the food processing industry. In these cases, food processing firms in countries with higher national degrees of uncertainty aversion could be more inclined to do business at the intranational level rather than at the international level. Consequently, such business cultures could generate home bias in the purchases of domestic vis-à-vis foreign primary agricultural products. In any case, our empirical results show no statistically significant effects of the national degree of uncertainty aversion on the magnitude of home bias for primary agricultural products.

Other results show that larger distances have more restricting effect on trade in primary agricultural products (where a 1% increase in distance reduces trade by 1.4%) compared to trade in processed food products (where a 1% increase in distance reduces trade by 0.9%). The results reveal that EU countries trade 2.2 and 2.9 times more in primary agricultural and processed food products when compared to trade levels between OECD countries, respectively. The results also imply that NAFTA countries trade 1.3 and 1.2 times more in these products when compared to trade levels between OECD countries, respectively. Finally, countries speaking a common language trade 1.3 and 1.6 times more in primary agricultural and processed food products, respectively, whereas contiguous countries trade 1.5 and 1.9 times more in these products, respectively.

5. Empirical Results from Alternative Specifications

5.1. EU Countries versus Other OECD Countries

The results in columns (iv) of Table 3 and Table 4 compare the magnitude of home bias for the EU countries to the magnitude of home bias for the other (non-EU) OECD countries. The estimation is carried out by assigning distinct coefficients on the home bias variables for the EU countries and for the other OECD countries. Column (iv) of Table 3 shows that the magnitudes of home bias in primary agricultural trade for the EU countries and for the other OECD countries are $\exp(4.02) = 55.7$ and $\exp(3.53) = 34.1$, respectively. The national degree of uncertainty aversion has no statistically significant effects on the magnitudes of home bias. When measured relative to international trade between EU countries, the magnitude of home bias for the EU countries drops to

$\exp(4.02)/\exp(0.79) = 25.3$. This estimate implies that, on average for a given EU country, domestic purchases of primary agricultural products are around 25 times greater than purchases of products imported from other EU countries. These results are reminiscent of those reported in Head and Mayer (2000) where the magnitude of home bias inside the EU region is estimated for disaggregated manufacturing industries. Head and Mayer (2000) found that the EU market is fragmented and exhibits significant consumption bias in the demand for domestic products relative to products imported from other EU countries. They argued that this consumption bias is associated with inherent consumers' preferences and not with formal trade policy barriers.

Column (iv) of Table 4 indicates that the magnitudes of home bias in processed food trade for the EU countries and for the other OECD countries are influenced by the national degree of uncertainty aversion. The magnitude of home bias for the EU countries ranges from $\exp(3.87) = 47.9$ for Denmark's minimum value of UAI of 23 to $\exp(5.03) = 152.9$ for Greece's maximum value of UAI of 112. When measured relative to international trade between EU countries, the corresponding magnitude of home bias for the EU countries becomes considerably smaller and ranges from $\exp(3.87)/\exp(1.04) = 16.9$ to $\exp(5.03)/\exp(1.04) = 54.1$. The magnitude of home bias for the other OECD countries ranges from $\exp(3.71) = 40.9$ for the lowest UAI value among the other OECD countries of 46 (reported for the US) to $\exp(5.12) = 167.3$ for the highest UAI value among the other OECD countries of 92 (reported for Japan).[13]

Figure 1 portrays the effect of the national degree of uncertainty aversion on the magnitude of home bias in processed food trade for the EU countries and for the other OECD countries. It shows that, at lower levels of uncertainty aversion, the magnitude of home bias for the EU countries is higher than that for the other OECD countries. However, the magnitude of home bias exhibits

[13] The empirical application is also carried out for a sub-sample that exclusively covers intranational and international trade within and between the EU countries. The corresponding home bias estimates for the EU countries are equivalent to those derived from the results reported in columns (iv) of Table 3 and Table 4.

greater increases for the other OECD countries with increases in the national degree of uncertainty aversion. The magnitude of home bias for the other OECD countries exceeds that for the EU countries at an intermediate UAI value of around 75 (reported for Italy). Figure 1 also presents the effect of the national degree of uncertainty aversion on the magnitude of home bias for the EU countries when measured relative to trade between EU countries.

5.2. Implications of Economic and Financial Development Levels

Columns (v) of Table 3 and Table 4 report the results when the empirical specification is augmented by a supplemental interaction term between HB and the logarithm of the value of Gross Domestic Product (GDP) per Capita denoted by $GDPC$. The latter is sourced from the World Bank's World Development Indicators database. Countries with higher levels of income per capita are likely to have more developed infrastructure, and business and communication networks that facilitate imports from foreign countries. Hence, higher levels of economic development are expected to result in lower magnitudes of home bias. In the case of primary agricultural products, the estimated coefficient on $HB \times UAI$ remains statistically insignificant. The estimated coefficient on $HB \times GDPC$ is negative and statistically significant at the 5% level, implying that higher income per capita OECD countries have lower magnitudes of home bias in primary agricultural trade. For example, the magnitudes of home bias corresponding to income per capita levels of 5,000 US$ and 30,000 US$ are $\exp(7.08 - \ln(5{,}000) \times 0.32) =$ $\exp(4.35) = 77.5$ and $\exp(7.08 - \ln(30{,}000) \times 0.32) =$ $\exp(3.78) = 43.8$, respectively.

In the case of processed food products, the estimated coefficient on $HB \times GDPC$ is negative and statistically significant at the 1% level implying that higher income per capita countries have lower magnitudes of home bias. The estimated coefficient on $HB \times UAI$ remains positive and statistically significant at the 1% level, but it is slightly lower compared to that estimated from the benchmark specification in column (iii) of Table 4. Figure 2 presents the relationship between HB and UAI for three different income per capita levels of 5,000 US$, 15,000 US$, and 30,000 US$. Figure 2 reveals higher increases of home bias for lower income per capita countries with increases in the value of UAI.

Columns (vi) of Table 3 and Table 4 present the results when the previous empirical specification is extended by the inclusion of an interaction term between HB and a measure depicting the level of development in financial markets denoted by $FINDEV$. As in Huang (2007), we use the indicator constructed by Bekcer and Greenberg (2003) as a measure of the level of development in financial markets. It can be argued that more developed financial markets facilitate international business and hence imports, leading to decreases in the magnitude of home bias. The estimated coefficients on $HB \times FINDEV$ are not statistically significant either for primary agricultural products or for processed food products.

5.3. Implications of Firm Localization Choices

The magnitude of home bias reflects the implications of many potential factors such as trade-related policies, consumer bias, and firm localization choices (i.e., industrial agglomeration). The latter is particularly relevant when discussing the effects of the national degree of uncertainty aversion on the magnitude of home bias. Higher levels of uncertainty aversion generate increases in home bias because of the higher national propensity to purchase domestic rather than foreign products. However, higher levels of uncertainty aversion could also have an effect on trade flows through firm localization choices. Consequently, the magnitude of home bias can be impacted by the national degree of uncertainty aversion that is expressed through firm localization decisions. When higher national degrees of uncertainty aversion induce more firms to be located inside the national borders and to serve the domestic market via intranational trade, the magnitude of home bias is expected to increase. Alternatively, when higher national degrees of uncertainty aversion induce more firms to be located outside the national borders and to serve the domestic market via international trade, the magnitude of home bias is expected to decrease. As a result, it can be argued that a country with a higher national degree of uncertainty aversion has a lower propensity to receive Foreign Direct Investment (FDI) in the food processing sector and, hence, to host foreign affiliates of Multinational Enterprises (MNEs). This lower propensity to receive FDI can be caused by restricting regulations that limit foreign ownership of capital and by a business culture that favours domestic investment vis-à-vis FDI.

We investigate this possibility by introducing an interaction term between the home bias binary variable and an FDI intensity variable for processed food products. The FDI intensity variable is represented by the value of inward FDI stock relative to the size of the food processing sector. Inward FDI datasets are sourced from the OECD's International Direct Investment Statistics database. The size of the food processing sector is represented by the total value of production derived from the OECD's STAN database.[14] As in Head and Ries (2001), the potential source of correlation between international trade and FDI is lessened using the lagged values of inward FDI intensity variable. The lagged FDI intensity variable is predetermined with respect to current trade flows. We report the empirical results when using one-year lagged values of FDI intensity measure in column (vii) of Table 4. The estimated coefficient on $HB \times FDI$ is statistically insignificant and the remaining coefficients stay robust to this specification.[15]

[14] The value of inward FDI stock in the primary agricultural sector is negligible. Import observations for Australia, Belgium, New Zealand, and Switzerland are excluded from the dataset because of the unavailability of inward FDI stock data in the food processing sector.

[15] Equivalent results are obtained when using either current values or longer lags for the FDI intensity measure.

5.4. Implications of the Destinations of Traded Products

Using the Broad Economic Categories (BEC) classification, international food trade can be sorted into international trade flows destined mainly for industry and international trade flows destined mainly for household consumption. These datasets are derived from the United Nations' Comtrade database. Corresponding datasets on intranational food trade destined mainly for industry and intranational food trade destined mainly for household consumption are sourced from the comprehensive OECD's STAN Input-Output Tables. Intranational food trade destined mainly for industry is represented by the total intermediate expenditures on domestically produced products by industry. Intranational food trade destined mainly for household consumption is represented by the final consumption expenditures on domestically produced products by households. The empirical investigation is carried out for primary agricultural categories (i.e., BEC 111 mainly for industry and BEC 112 mainly for household consumption) and for processed food categories (i.e., BEC 121 mainly for industry and BEC 122 mainly for household consumption).[16]

The empirical results are reported in Table 5. They show that the national degree of uncertainty aversion does not have statistically significant effects on the magnitude of home bias either for primary agricultural products destined for industry (i.e., BEC 111) or for primary agricultural products destined for household consumption (i.e., BEC 112). In the case of processed food products, the empirical results reveal that the national degree of uncertainty aversion increases the magnitude of home bias, more significantly for processed food products destined for household consumption (i.e., BEC 122) and to a lesser extent for processed food products destined for industry (i.e., BEC 121). The corresponding estimated coefficients on $HB \times UAI$ are positive and statistically significant at the 1% level and 10% level, taking the values of 0.0258 and 0.0115, respectively.

[16] Intranational food trade data from the OECD's STAN Input-Output Tables are available for 1995, 2000, and 2005. We construct a panel dataset covering these years. However, Switzerland's import observations are excluded from the dataset because of the unavailability of intranational data.

These results suggest that the magnifying effects of the national degree of uncertainty aversion on home bias in processed food trade can be attributed primarily to consumers' preferences and to a lesser extent to business culture and practices of domestic firms.

5.5. Temporal Trends

Next, we empirically investigate the temporal trends of home bias. Specifically, we examine whether the magnitude of home bias and the effect of the national degree of uncertainty aversion on the magnitude of home bias have decreased over time. Regional and multilateral trade agreements, improvements in information technology, development in international business networks, and increased foreign travel are expected to facilitate international trade through time and, hence, to result in reductions in the magnitude of home bias. However, concurrent increases in non-negotiated trade barriers and NTBs (Copeland, 1990; Crowley, 2006; Feinberg and Reynolds, 2007), and rigidities in supply chains can potentially offset these effects. Furthermore, the persistence of national cultural characteristics over time (Williamson, 2000) is expected to maintain the effects of the national degree of uncertainty aversion on home bias over time.

For this purpose, the benchmark empirical specification is augmented by the interaction variables $HB \times TREND$ and $HB \times UAI \times TREND$, where $TREND$ represents the time trend variable. The results for primary agricultural and processed food products are reported in columns (i) and (iii) of Table 6, respectively. The results show that the estimated coefficients on these interaction variables are not statistically significant. The remaining results are equivalent to the benchmark results. These results suggest that the magnitude of home bias and the effect of the national degree of uncertainty aversion on the magnitude of home bias have not changed over time. In order to isolate any potential effect from the presence of time-varying exporter and importer fixed effects, the empirical model is also estimated when using non-time-varying exporter and importer fixed effects. Columns (ii) and (iv) of Table 6 report the corresponding empirical results. The estimated coefficients on the interaction variables remain statistically insignificant.

6. Alternative Estimation Methods

This section presents the results when using alternative estimation methods. The results are reported in Table 7 for primary agricultural products and in Table 8 for processed food products. To facilitate comparison, columns (i) of Table 7 and Table 8 display the benchmark empirical results (i.e., those presented in columns (iii) of Table 3 and Table 4). Santos Silva and Tenreyro (2006) advocated the use of the Poisson Pseudo-Maximum Likelihood (PPML) procedure to estimate the multiplicative form of the gravity equation. They showed that the PPML procedure yields consistent estimates in the presence of heteroskedasticity. Furthermore, estimating the multiplicative form of the gravity equation is convenient in the presence of zero bilateral trade flow observations. Martin and Pham (2008) and Burger et al. (2009) argued that the standard PPML estimator may suffer from a bias, particularly when a large number of zero observations are present in the dataset. They proposed the threshold Tobit estimator of Eaton and Tamura (1994) and the Zero-Inflated PPML (ZIPPML) model to estimate the gravity equation, respectively. Santos Silva and Tenreyro (2009) responded by showing that the PPML method performs well when the data is generated as a finite mixture of gamma variates, naturally characterized by a large proportion of zeros. They also argued that the simulation outcomes in Martin and Pham (2008) are defective since the data is not generated by a constant elasticity model.

From this brief review, it is clear that the empirical literature has yet to settle the issue of the appropriate estimation methodology for gravity equations. Our dataset covers bilateral trade flow observations at the aggregate industrial level for mainly developed countries. Hence, this dataset is characterized by limited number of zero bilateral trade flow observations (57 observations in the case of primary agricultural products and 3 observations in the case of processed food products). However, the estimation of the multiplicative form of the gravity equation using the PPML estimator would indicate whether accounting for the type of heteroskedasticity outlined in Santos Silva and Tenreyro (2006) would have an impact on the results. Columns (ii) of Table 7 and Table 8 present the results when using the PPML estimator for the multiplicative gravity equation (1). As outlined in Santos Silva and Tenreyro (2006), the PPML estimator is characterized by the first order conditions of $\sum_k \left(y_k - \exp\left(x_k \varphi \right) \right) y_k = 0$, where y_k is the dependent variable, and x_k is a vector of explanatory variables.[17] The estimated coefficients are slightly modified but remain quantitatively and qualitatively similar to the benchmark results.[18]

Given the potential occurrence of contemporaneous error correlation between the empirical equations for primary agricultural products and processed food products, we employ Zellner's (1962) method of Seemingly Unrelated Regression Equations (SURE).[19] This method is accompanied with the Breusch-Pagan Lagrange Multiplier (LM) test to detect the significance of contemporaneous correlation. The results from the SURE method, reported in columns (iii) of Table 7 and Table 8, are also equivalent to the benchmark results, although the Breusch-Pagan LM test

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[17] Santos Silva and Tenreyro (2006) showed that the PPML estimator is more efficient than the Non-linear Least Squares (NLS) and the Gamma Pseudo-Maximum Likelihood (GPML) estimators. The first order conditions using the NLS and GPML estimators are respectively given by $\sum_k \left(y_k - \exp\left(x_k \varphi \right) \right) \exp\left(x_k \varphi \right) y_k = 0$ and $\sum_k \left(y_k - \exp\left(x_k \varphi \right) \right) \exp\left(x_k \varphi \right)^{-1} y_k = 0$. Santos Silva and Tenreyro (2006) noted that the NLS estimator gives more weights to observations with larger $\exp\left(x_k \varphi \right)$ which are generally associated with larger variance. They also noted that trade data between larger countries are generally of higher quality. However, the GPML estimator gives more weights to trade observations between smaller countries that are more likely to be associated with measurement errors.

[18] The empirical estimation is also carried out when dropping the zero bilateral trade flow observations from the dataset, and when using the threshold Tobit estimator. The results remain robust.

[19] Let the superscripts a and f depict primary agricultural products and processed food products, respectively. The log-linear gravity equations for primary agricultural products and processed food products are stacked and estimated as $\begin{pmatrix} y^a \\ y^f \end{pmatrix} = \begin{pmatrix} x^a & 0 \\ 0 & x^f \end{pmatrix} \begin{pmatrix} \varphi^a \\ \varphi^f \end{pmatrix} + \begin{pmatrix} \varepsilon^a \\ \varepsilon^f \end{pmatrix} \Rightarrow y = x\varphi + \varepsilon$, where $E\left(\varepsilon | x \right) = 0$ and $Var\left(\varepsilon | x \right) = \begin{pmatrix} \sigma^{aa} I & \sigma^{af} I \\ \sigma^{fa} I & \sigma^{ff} I \end{pmatrix}$.

indicates positive and statistically significant contemporaneous error correlation between the two equations.

Frankel (1997) argued that heteroskedasticity concerns associated with the economic size of the importer and exporter can naturally prevail in regressions of trade equations. Frankel (1997) advocated the use of size-weighted least squares estimation in order to induce the regression to rely more on information extracted from trade flows between larger trading partners. This is because trade flows involving smaller trading partners are likely to exhibit more variation. We address this issue through a weighted SURE with weights specified as $\ln\left(PROD_i\right)+\ln\left(GDP_j\right)$, where $PROD_i$ stands for the value of production of the exporter sourced from the OECD's STAN database and where GDP_j represents the GDP value of the importer derived from the World Bank's World Development Indicators database. The results are presented in columns (iv) of Table 7 and Table 8 and again indicate that the benchmark results remain robust.

Finally, as discussed in Huang (2007), a reverse causality effect could prevail where countries exhibit lower degrees of uncertainty aversion with higher levels of international trade. In other words, there is a concern of endogeneity between international trade and national degree of uncertainty aversion. To address this issue, the UAI variable is instrumented using the religion composition of the OECD countries in terms of the percentages of the population adhering to Protestantism, Catholicism, Anglicanism, and Eastern Orthodoxy.[20] It is well established in the literature that religion can affect the economic behaviour of consumers (Guiso et al., 2003, 2009). Countries with higher proportions of the population adhering to Catholicism and Eastern Orthodoxy have generally higher levels of UAI than countries with higher proportions of the population

[20] Religion data, reported in Table 1, are derived from the *Annual Report on International Religious Freedom 2001* for all the OECD countries except the United States. This report is available at: http://www.state.gov/g/drl/rls/irf/2001/. Religion data for the United States are compiled from the *American Religion Identification Survey (ARIS) 2001*. This survey is available at: http://www.americanreligionsurvey-aris.org/. Equivalent empirical results are obtained when using religion data from La Porta et al. (1997), as in Huang (2007).

adhering to Protestantism and Anglicanism. Columns (v) of Table 7 and Table 8 present the results from the Instrumental Variable (IV) regression using the Generalized Method of Moment (GMM) estimator.[21] Compared to the benchmark results, the estimated coefficients exhibit limited variation.

7. Concluding Remarks

This study investigates the effects of the national degree of uncertainty aversion on the magnitude of home bias in primary agricultural and processed food trade. Uncertainty-avoiding consumers are expected to purchase more domestic products relative to foreign products, resulting in higher magnitudes of home bias. However, this tendency is expected to be more prominent when distinctions between domestic and foreign products are feasible and relevant. Furthermore, the national uncertainty aversion attribute can be transferred into the business culture of domestic industries. Hence, an uncertainty-avoiding business culture would result in firms doing more domestic business vis-à-vis international business. This study investigates these propositions empirically for primary agricultural and processed food products using a panel dataset covering international and intranational trade between and within the OECD countries over the period 1988-2005. Primary agricultural products generally exhibit limited differentiation on the basis of their sources and are often blended and associated with reference prices. Conversely, processed food products display higher levels of differentiation with respect to the production sources and intrinsic product attributes. Consequently, higher national degrees of uncertainty aversion are expected to result in higher magnitudes of home bias in processed food trade.

[21] Consider $y_k = x_k\varphi + e_k$ where $\dim(\varphi) = M$ and $x_k = (x_{1k}, x_{2k})$ with x_{2k} being endogenous. Assume R instruments $z_k = (x_{1k}, z_{2k})$. The moment conditions are given by $E[e_k z_k] = E[(y_k - x_k\varphi) z_k] = 0$. Given that $R > M$, the solution is represented by $\hat{\varphi}_{IV} = \left(x'z(z'z)^{-1} z'x\right)^{-1} x'z(z'z)^{-1} z'y$.

The empirical results support these basic propositions. The magnitude of home bias is not influenced by the national degree of uncertainty aversion in the case of primary agricultural products. However, in the case of processed food products, the empirical results identify the magnifying effects of the national degree of uncertainty aversion on home bias. Also, the empirical results indicate that these magnifying effects are associated primarily with processed food products destined for final household consumption, and to a lesser extent with processed food products destined for industry. Furthermore, the empirical results reveal that the magnitude of home bias and the effect of the national degree of uncertainty aversion on the magnitude of home bias have not changed over time.

Many empirical studies explained the magnitudes of home bias and border effects through trade policy barriers, information costs, consumers' tastes, and industrial agglomeration. This study empirically underscores the significant effects of the national uncertainty aversion attribute in determining the magnitude of home bias in differentiated processed food trade. This study also reveals the limitations of these effects for less differentiated primary agricultural products.

Policy makers and analysts involved in international trade negotiations should account for the effects of the national uncertainty aversion attribute when assessing the implications of current and future trade liberalization policies. Differences in the national degree of uncertainty aversion would result in differences in the national propensity to purchase domestic products vis-à-vis foreign products (i.e., home bias). Consequently, these differences would have implications for the effects of trade agreements and trade liberalization policies on international trade flows. The empirical results of this study highlight the magnifying effects of the national uncertainty aversion attribute on home bias in processed food trade. Hence, a free trade agreement involving trade partners with different (lower) national degrees of uncertainty aversion would potentially have different (enhancing) implications for the extent of market integration, growth of trade flows, and welfare. Finally, importing countries characterized by higher national degrees of uncertainty aversion might be advised to reduce trade barriers and develop international business networks to counter the magnifying effects of national uncertainty aversion on home bias and improve efficiency in the food processing sector.

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Table 1. National Uncertainty Aversion Indicator (UAI) for OECD Countries

Country	UAI	Protestant (%)	Catholic (%)	Anglican (%)	Orthodox (%)
Australia	51	19	27	22	3
Austria	70	5	78	0	2
Belgium-Lux.	94	1	75	0	1
Canada	48	28	46	8	1
Denmark	23	86	1	0	0
Finland	59	86	0	0	1
France	86	2	64	0	0
Germany	65	33	34	0	1
Greece	112	0	1	0	97
Ireland	35	1	92	3	0
Italy	75	1	85	0	0
Japan	92	1	1	0	0
Korea (Rep. of)	85	19	6	0	0
Mexico	82	5	88	0	0
The Netherlands	53	22	30	0	0
New Zealand	49	20	14	18	0
Norway	50	93	1	0	0
Portugal	104	4	80	0	0
Spain	86	1	94	0	0
Sweden	29	84	2	0	1
Switzerland	58	40	46	0	1
United Kingdom	35	10	10	45	0
United States	46	50	25	2	0

Notes: The Uncertainty Aversion Indicator (UAI) dataset is sourced from Hofstede (1980, 2001). Religion data are derived from the *Annual Report on International Religious Freedom 2001* for all the OECD countries except the United States. This report is available at: http://www.state.gov/g/drl/rls/irf/2001/. Religion data for the United States are compiled from the *American Religion Identification Survey (ARIS) 2001*. This survey is available at: http://www.americanreligionsurvey-aris.org/.

Table 2. Summary Statistics

	Mean	Standard Deviation	Minimum	Maximum
All Bilateral Trade (Million of Current US$) - Primary Agricultural Products	1,646.2	12,251.7	0	250,327.4
International Trade (Million of Current US$) - Primary Agricultural Products	154.3	518.9	0	9,780.3
Intranational Trade (Million of Current US$) - Primary Agricultural Products	34,469.6	48,222.4	2,898.3	250,327.4
All Bilateral Trade (Million of Current US$) - Processed Food Products	3,166.2	25,880.7	0	529,832.5
International Trade (Million of Current US$) - Processed Food Products	337.5	845.6	0	11,125.1
Intranational Trade (Million of Current US$) - Processed Food Products	65,400.5	106,616.3	4,103.4	529,832.5
UAI (Indicator)	64.7	24.1	23.0	112.0
Distance (Km)	5,947.2	5,559.0	66.8	19,539.5

Table 3. Home Bias and Uncertainty Aversion - Primary Agricultural Products

	(i)	(ii)	(iii)	(iv)	(v)	(vi)
	Basic Gravity Spec.	Basic Gravity Spec., Effect of RTAs	Effect of UAI	EU and Other OECD Home Bias	Control for GDPC	Control for Financial Dev.
HB	3.39a (0.11)	4.11a (0.12)	3.99a (0.23)		7.08a (1.37)	7.17a (1.40)
HB×UAI			0.0014 (0.0027)		-0.0009 (0.0031)	-0.0037 (0.0042)
HB (EU)				4.02a (0.30)		
HB×UAI (EU)				-0.0006 (0.0038)		
HB (Other OECD)				3.53a (0.37)		
HB×UAI (Other OECD)				0.0074 (0.0061)		
HB×GDPC					-0.32b (0.14)	-0.28b (0.14)
HB×FINDEV						-0.02 (0.02)
DIST	-1.54a (0.02)	-1.42a (0.03)	-1.42a (0.03)	-1.43a (0.03)	-1.43a (0.03)	-1.42a (0.03)
LANG	0.17a (0.04)	0.23a (0.05)	0.23a (0.05)	0.23a (0.05)	0.23a (0.05)	0.23a (0.05)
CONT	0.39a (0.05)	0.41a (0.05)	0.42a (0.05)	0.42a (0.05)	0.42a (0.05)	0.42a (0.06)
EU		0.80a (0.06)	0.81a (0.06)	0.79a (0.07)	0.80a (0.06)	0.84a (0.06)
NAFTA		0.26c (0.14)	0.26c (0.14)	0.28b (0.13)	0.28b (0.14)	0.28b (0.14)
No. of Obs.	9522	9522	9522	9522	9522	9522
R^2	0.84	0.85	0.85	0.85	0.85	0.85

Notes: The empirical specification includes exporter's time-varying fixed effect and importer's time-varying fixed effect. Robust standard errors are in parentheses, with "a", "b", and "c" denoting statistical significance at 1%, 5%, and 10% level, respectively.

Table 4. Home Bias and Uncertainty Aversion - Processed Food Products

	(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)
	Basic Gravity Spec.	Basic Gravity Spec., Effect of RTAs	Effect of UAI	EU and Other OECD Home Bias	Control for GDPC	Control for Financial Dev.	Control for Inward FDI
HB	3.55a (0.08)	4.45a (0.08)	3.29a (0.15)		7.28a (1.01)	7.14a (1.09)	3.22a (0.19)
HB×UAI			0.0183a (0.0020)		0.0162a (0.0025)	0.0167a (0.0029)	0.0189a (0.0025)
HB (EU)				3.57a (0.21)			
HB×UAI (EU)				0.0130a (0.0022)			
HB (Other OECD)				2.30a (0.27)			
HB×UAI (Other OECD)				0.0307a (0.0047)			
HB×GDPC					-0.40a (0.11)	-0.41a (0.11)	
HB×FINDEV						0.01 (0.01)	
HB×FDI							0.01 (0.01)
DIST	-1.08a (0.02)	-0.93a (0.02)	-0.92a (0.02)	-0.88a (0.02)	-0.89a (0.02)	-0.89a (0.02)	-0.91a (0.02)
LANG	0.42a (0.03)	0.50a (0.03)	0.49a (0.03)	0.49a (0.03)	0.52a (0.03)	0.52a (0.03)	0.50a (0.03)
CONT	0.57a (0.03)	0.61a (0.03)	0.64a (0.03)	0.64a (0.03)	0.63a (0.03)	0.63a (0.03)	0.63a (0.03)
EU		1.03a (0.04)	1.06a (0.04)	1.04a (0.04)	1.07a (0.04)	1.05a (0.04)	1.06a (0.04)
NAFTA		0.20b (0.09)	0.20b (0.09)	0.21b (0.09)	0.23a (0.09)	0.22b (0.09)	0.19b (0.09)
No. of Obs.	9522	9522	9522	9522	9522	9522	7866
R^2	0.90	0.90	0.90	0.90	0.90	0.90	0.90

Notes: The empirical specification includes exporter's time-varying fixed effect and importer's time-varying fixed effect. Robust standard errors are in parentheses, with "a", "b", and "c" denoting statistical significance at 1%, 5%, and 10% level, respectively.

Table 5. Home Bias and Uncertainty Aversion – Results Using BEC Classification

	Primary Agricultural Products			Processed Food Products		
	(i)	(ii)	(iii)	(iv)	(v)	(vi)
	Basic Dataset	BEC 111	BEC 112	Basic Dataset	BEC 121	BEC 122
HB	3.88a (0.49)	4.17a (0.65)	2.53a (0.55)	3.36a (0.30)	2.96a (0.61)	3.55a (0.43)
HB×UAI	0.0017 (0.0063)	0.0042 (0.0095)	0.0081 (0.0092)	0.0192a (0.0042)	0.0115c (0.0063)	0.0258a (0.0055)
DIST	-1.51a (0.07)	-1.97a (0.13)	-1.59a (0.11)	-0.86a (0.04)	-1.16a (0.09)	-0.83a (0.05)
LANG	0.29b (0.13)	0.49a (0.17)	0.26c (0.15)	0.51a (0.08)	0.11 (0.18)	0.55a (0.09)
CONT	0.50a (0.13)	0.69a (0.22)	0.36b (0.17)	0.72a (0.10)	0.50a (0.18)	0.77a (0.10)
EU	0.87a (0.13)	0.71a (0.26)	1.32a (0.28)	1.13a (0.10)	1.37a (0.20)	1.18a (0.12)
NAFTA	0.30 (0.19)	0.12 (0.29)	0.28 (0.20)	0.29b (0.13)	0.20 (0.24)	0.30c (0.16)
No. of Obs.	1518	1518	1518	1518	1518	1518
R^2	0.84	0.81	0.81	0.90	0.78	0.89

Notes: BEC= Broad Economic Categories. The empirical specification includes exporter's time-varying fixed effect and importer's time-varying fixed effect. Robust standard errors are in parentheses, with "a", "b", and "c" denoting statistical significance at 1%, 5%, and 10% level, respectively.

Table 6. Temporal Trends of Home Bias - Primary Agricultural and Processed Food Products

	Primary Agricultural Products		Processed Food Products	
	(i)	(ii)	(iii)	(iv)
	Time-Varying Fixed Effects	Non-Time-Varying Fixed Effects	Time-Varying Fixed Effects	Non-Time-Varying Fixed Effects
HB	3.82a (0.28)	3.78a (0.26)	3.38a (0.30)	3.18a (0.31)
HB×UAI	0.0030 (0.0061)	0.0021 (0.0053)	0.0186a (0.0036)	0.0179a (0.0034)
HB×TREND	0.01 (0.04)	0.01 (0.04)	-0.02 (0.03)	0.01 (0.03)
HB×UAI×TREND	-0.0003 (0.0005)	-0.0002 (0.0005)	-0.0001 (0.0004)	0.0002 (0.0005)
DIST	-1.42a (0.03)	-1.43a (0.03)	-0.91a (0.02)	-0.92a (0.02)
LANG	0.23a (0.05)	0.22a (0.05)	0.49a (0.03)	0.49a (0.03)
CONT	0.41a (0.05)	0.40a (0.05)	0.63a (0.03)	0.62a (0.03)
EU	0.81a (0.06)	0.72a (0.05)	1.05a (0.04)	0.97a (0.02)
NAFTA	0.25c (0.13)	0.33b (0.13)	0.19b (0.08)	0.30a (0.09)
No. of Obs.	9522	9522	9522	9522
R^2	0.85	0.84	0.90	0.89

Notes: In columns (i) and (iii), the empirical specification includes exporter's time-varying fixed effect and importer's time-varying fixed effect. In columns (ii) and (iv), the empirical specification includes exporter's non-time-varying fixed effect and importer's non-time-varying fixed effect. Robust standard errors are in parentheses, with "a", "b", and "c" denoting statistical significance at 1%, 5%, and 10% level, respectively.

Table 7. Sensitivity Analysis - Primary Agricultural Products

	(i)	(ii)	(iii)	(iv)	(v)
	Benchmark Estimation	PPML Estimation	SURE	Weighted SURE	Religion as IV, GMM Estimation
HB	3.99a (0.23)	3.82a (0.11)	3.99a (0.19)	3.75a (0.19)	4.12a (0.28)
HB×UAI	0.0014 (0.0027)	0.0019 (0.0013)	0.0014 (0.0028)	0.0036 (0.0029)	-0.0071 (0.0049)
DIST	-1.42a (0.03)	-1.10a (0.03)	-1.42a (0.02)	-1.42a (0.02)	-1.43a (0.03)
LANG	0.23a (0.05)	0.11c (0.06)	0.23a (0.06)	0.21a (0.06)	0.24a (0.05)
CONT	0.42a (0.05)	0.42a (0.05)	0.42a (0.06)	0.39a (0.06)	0.38a (0.05)
EU	0.81a (0.06)	0.92a (0.05)	0.81a (0.06)	0.82a (0.05)	0.83a (0.06)
NAFTA	0.26c (0.14)	0.42a (0.10)	0.26c (0.15)	0.25c (0.14)	0.24c (0.13)
No. of Obs.	9522	9522	9522	9522	9522
R^2, *Pseudo-*R^2	0.85	0.99	0.85	0.86	0.85
ρ			0.32	0.35	
Breusch-Pagan LM Test			χ^2=1034.66 *p*-value=0.00	χ^2=1156.49 *p*-value=0.00	

Notes: PPML= Poisson Pseudo-Maximum Likelihood; SURE= Seemingly Unrelated Regression Equations; IV= Instrumental Variable; GMM= Generalized Method of Moment. The empirical specification includes exporter's time-varying fixed effect and importer's time-varying fixed effect. Robust standard errors are in parentheses, with "a", "b", and "c" denoting statistical significance at 1%, 5%, and 10% level, respectively.

Table 8. Sensitivity Analysis - Processed Food Products

	(i)	(ii)	(iii)	(iv)	(v)
	Benchmark Estimation	PPML Estimation	SURE	Weighted SURE	Religion as IV, GMM Estimation
HB	3.29a (0.15)	3.54a (0.08)	3.29a (0.12)	3.17a (0.13)	3.41a (0.29)
HB×UAI	0.0183a (0.0020)	0.0103a (0.0007)	0.0183a (0.0018)	0.0186a (0.0018)	0.0112a (0.0031)
DIST	-0.92a (0.02)	-0.82a (0.02)	-0.92a (0.02)	-0.94a (0.02)	-0.92a (0.02)
LANG	0.49a (0.03)	0.68a (0.04)	0.49a (0.03)	0.50a (0.03)	0.51a (0.03)
CONT	0.64a (0.03)	0.38a (0.04)	0.64a (0.04)	0.59a (0.04)	0.59a (0.03)
EU	1.06a (0.04)	1.20a (0.03)	1.06a (0.03)	1.07a (0.03)	1.00a (0.04)
NAFTA	0.20b (0.09)	0.12b (0.06)	0.20b (0.09)	0.17b (0.08)	0.21a (0.08)
No. of Obs.	9522	9522	9522	9522	9522
R^2, *Pseudo*-R^2	0.90	0.99	0.90	0.91	0.90
ρ			0.32	0.35	
Breusch-Pagan LM Test			χ^2=1034.66 *p*-value=0.00	χ^2=1156.49 *p*-value=0.00	

Notes: PPML= Poisson Pseudo-Maximum Likelihood; SURE= Seemingly Unrelated Regression Equations; IV= Instrumental Variable; GMM= Generalized Method of Moment. The empirical specification includes exporter's time-varying fixed effect and importer's time-varying fixed effect. Robust standard errors are in parentheses, with "a", "b", and "c" denoting statistical significance at 1%, 5%, and 10% level, respectively.

Figure 1. Effect of Uncertainty Aversion on the Magnitude of Home Bias - Processed Food Products

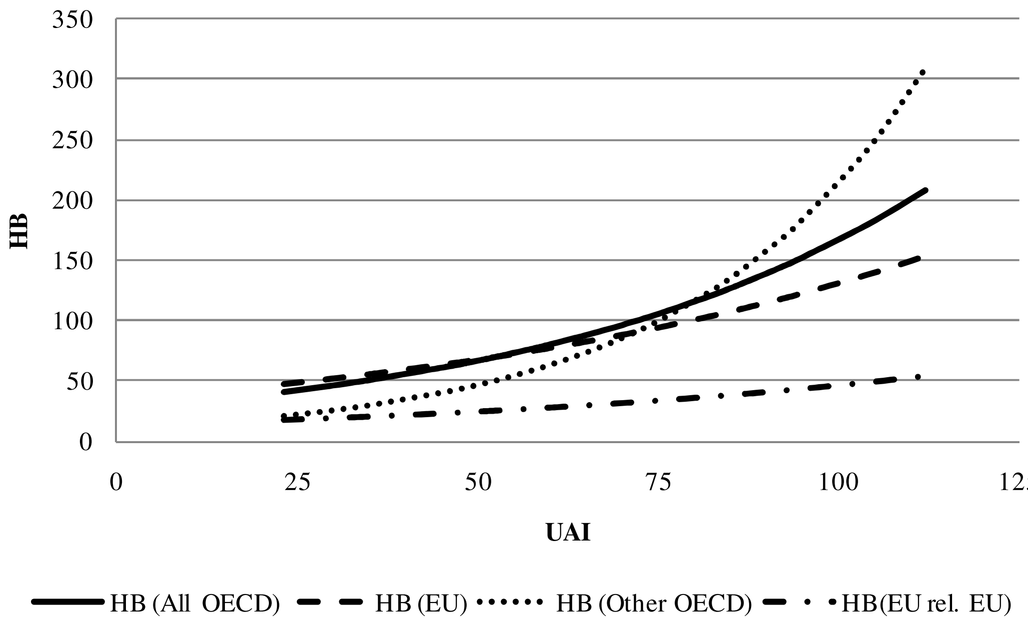

Figure 2. Effect of Uncertainty Aversion on the Magnitude of Home Bias for Different Levels of Income per Capita - Processed Food Products