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## Hofstede national culture and international trade

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### ABSTRACT

The objective is to analyse if international trade is affected by different national cultures. International trade of 21 World Bank listed countries is estimated as function of the Hofstede cultural dimensions, gross domestic product and population. First, we estimate the combined Hofstede culture dimensions and find significant positive effects on countries' international trade. Secondly, we decompose the Hofstede culture dimensions and estimate the effects of each separate dimension on international trade, finding only the MAS dimension to significantly affect international trade. We estimate additional equation versions to account for occasional trade restrictions with no international trade, as well as estimating how international trade varies between years. These additional estimations further support our original findings, and therefore act as robustness check.

### KEYWORDS

International trade; cultural distance; Hofstede national cultural dimensions; gravity model

### JEL CLASSIFICATION

M14; F14; F23; M20

## I. Introduction

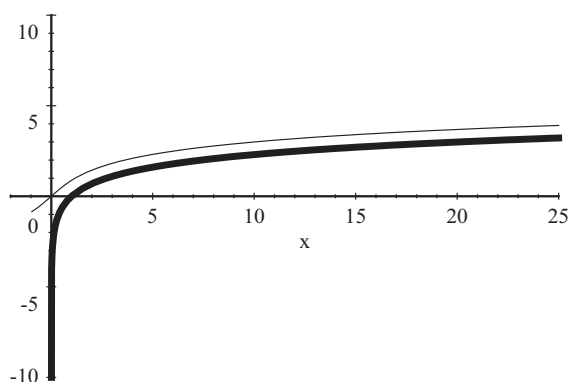
Researchers have widely analysed the relationship between export and national culture (Chaiyabut 2013; Ghemawat and Reiche 2011; Nes, Solberg, and Silkoset 2007) and some previous research has sought to analyse the relationship between exports and the Hofstede national cultural dimensions (Chung 2007; Hancioglu, Dogan, and Yildirim 2014). In this article, the authors provide an approach to analysing the relationship between national culture and international trade in terms of the econometric model and the selection of variables.

The research question of this article is whether international trade is affected by national culture; therefore, we investigate this relationship by mainly focusing on Hofstede cultural dimensions as a cultural trait (Hofstede, 1994b; Hofstede 2002). The empirical model applied in this research seeks to analyse how differences in countries' national culture affect their general trading approach (Munoz-Sepulveda and Rodriguez 2015; Kandogan 2016; Shi and Wang 2011), since it can be presumed to reflect a society's characteristics and success and increase the flow of goods and investments. The current study also captures how international trade is affected by countries' market size (population), economic size (gross domestic product (GDP)), religion, law and legal regulations as well as government.

International business researchers and practitioners are skilled in spotting national cultural differences, which they often view as an opportunity, by acting according to an appropriate approach. This enables them to plan the best course of action in the business approach. Knowledge of national cultural differences can be a doorway into new unknown markets. It can help researchers and practitioners to get a sense of the national cultural values in the market (Hofstede 2001; Sivakumar and Nakita 2001; Straughan and Albers-Miller 2001; Wagner 2012).

A small economy is generally believed to be more highly dependent on trade than a large economy (Krugman 1991), thus indicating that a small economy should rely more heavily on trade. We, therefore, use modelling accounting for economies of scale, with the incorporation of a country's economic and market size, along the lines of Krugman (1991). The data used in this article cover trades, Hofstede national cultural dimensions, GDP and population and reflect the time period from the year 2000 through 2011. Three hypotheses are put forward and addressed:

- Hypothesis 1: International trade is affected by national cultural dimensions.
- Hypothesis 2: International trade is affected differently according to different national cultural dimensions.



**Figure 1.** Inverse hyperbolic sine function (thick line) and the natural logarithm function (thin line). Source: Author's calculations.

- Hypothesis 3: International trade is affected by religion, law and system of politics and government.

We also reflect on how the market size is captured with population, and the economic weight or mass of countries is measured with GDP. We seek to analyse the national culture and trade relationships for a range of countries. Some previous research had analysed the relationship between exports and the Hofstede national cultural dimensions (Chung 2007). We hope to be able to bring light on the relationship between national culture and international trade and to emphasize the awareness needed in successful entry into foreign markets.

The article starts by reviewing the literature on national culture and international trade. This is followed by a description of the research methodology, research design and results. The article concludes by discussing the implications of the results for future research and limitations of the current study. The article is divided into five parts in continuation of the introduction. It starts with the literature review followed by introduction on the model set-up that is based on the idea that economic affairs are related to geography and trade flows, and trade patterns are subject to the size and location of an economy. Chapter four discusses the results and is followed by a summary and conclusions.

## II. Literature

Weber (1947) discussed, in his book titled *The Theory of Social and Economic Organization*, the importance of culture in relation to economic

development. Since then, researchers have explored the relationship between national culture and business and trade, employment, population, marketing, economic wealth, social networks as well as political stability (Hofstede et al. 2004; Hofstede and Hofstede, 2004; 1994; Johnson and Lenartowicz 1998; Zaheer and Zaheer 1997; Stremersch and Tellis 2004). Franke, Hofstede and Bond (1991) examined the relationship between economic growth and national culture in 20 countries for the periods of 1965–1980 and 1980–1987. The results of their study were that, when compared with Hofstede's (1980a) national cultural dimensions, two dimensions can be found that significantly relate to economic growth, namely individualism and long-term orientation (LTO) (Franke, Hofstede, and Bond 1991). Cross-cultural researchers have tried to uncover and explain national cultural differences (Chen, Mannix, and Okumura 2003; Earley and Singh 1995; Brockner 2003; Kitayama 2002; Tsui, Nifadkar, and Ou 2007; Von Glinow, Shapiro, and Brett 2004). Kluckhohn (1985) argued that culture consists of patterned ways of thinking, feeling and reacting and that the essential core of culture consists of conventional ideas and values. Cultural values have been defined as a set of conscious and subconscious beliefs and norms, which are often anchored in the morals, law, customs and practices of a society, that indicate what is right and wrong and specify general preferences (Adler 1981; Kirkman et al. 2009). Hofstede (1980b, 1991) argued that what makes a nation is the following: a common language, common literature, written language, educational system, media, laws and the common values shared by the members of a community.

Hofstede's research on national culture has had a major influence on the understanding of different national cultures within societies, has been a topic for many researchers, and has been cited many times (McSweeney 2002; Shi and Wang 2010). The objective of Hofstede's research was to conduct a comparative study using IBM's employees as his research's population. Hofstede conducted two independent surveys within multinational subsidiaries of IBM. The company at that time operated in 40 countries and 66 worldwide locations with 116,000 employees. The survey was conducted twice in 1968 and 1972. Hofstede later expanded the database by adding 10 countries and 3 regions (Hofstede, 1980b,

1991; 2001; Hofstede and Hofstede 1994, ; Hofstede et al. 1990). In the original framework, Hofstede introduced four dimensions of culture, i.e. Power distance (PDI), Individualism (IDV), Masculinity (MAS) and Uncertainty and Avoidance (UAI) (Hofstede 2001). Hofstede and Bond (1988) later added the fifth dimension to the framework called Confucian dynamism, which was later renamed by Hofstede as LTO.

The PDI dimension serves as an indicator of relational inequality and can be used to examine distributive justice at the national level (Hofstede 1991; 2001). The IDV dimension in Hofstede's model serves as a bipolar variable. It describes the relatively individualistic or collectivist ethic evident in a particular society. Hofstede (1994a) argues that in collectivist societies, children grow up learning to identify themselves as members of a group (initially a family) and that they learn quickly to distinguish between in-group members and out-group members. As they grow, they remain loyal to their group. In individualistic societies, however, children learn to think of themselves as 'I' instead of 'we' and that they will someday have to make it in a society on their own merits (Hofstede 1991, 2001). The MAS dimension values assertiveness, performance, success and competition, which are measured to see the degree to which they dominate over the more feminine or masculine values. Countries that score high on masculinity could be expected to have leaders who are performance, success and competitiveness driven. By contrast, countries that score lower on MAS (and are considered more feminine) could be expected to have leaders who emphasize the need for personal relationships, quality of life and caring for the elderly and conserving the environment (Hofstede 1991, 2001). The UIA dimension has been defined as the degree to which people prefer to experience structured situations over unstructured ones. It declares the clarity of rules of behaviour for any given situation. The rules may be expressed or they may be unwritten and be simply a matter of custom or tradition (Hofstede 1991, 2001). Hofstede (2001) argued that societies with strong UIA have a scheme for situations and feel that what is different is dangerous, whereas countries with low UIA do not experience differences as a threat. The LTO is a dimension that is concerned with the Confucian ideal and refers to values such as persistence and thrift, past and present orientation, as well as respect for tradition and fulfilling social obligations (Bond and Chi 1997).

Many factors can affect international trade, such as religion, law and system of politics and government. Ghemawat and Reiche (2011, 5) pointed out that when looking at national cultural differences and multinational trade, one has to look at the differences and 'diversity of the religious beliefs around the world'. Christianity accounts for 33% of the world population; Islam, 21%; Hindu, 14% and the non-religious, 16%. In total, there are 19 major religions in the world with 270 large religious groups (Ghemawat and Reiche 2011). Different religions may have different views and traditions concerning dietary difference and alcohol consumption. We also have to look at different forms of governments in the world; some carry elements of dictatorship, a military government and pluralistic democracies, etc. (Hofstede, Hofstede, and Minkov 2010). Finally, various laws and regulations in different countries can affect trade, such as protective tariffs, e.g. there are strict import rules and quotas when one imports meat to Iceland from abroad, which are stricter when one exports these products. Also, there are different types of intergovernmental agreements where regional barriers, i.e. free-trade areas, common external tariffs and different import quotas, exist or do not exist between states.

This research on the relationship between national culture and international trade is in line with some previous analyses, including those by Chung (2007), who accounted for the Hofstede national cultural dimensions when analysing exports. The Hofstede cultural dimensions (Hofstede, 1980a, 2001; Hofstede and Bond, 1988) have gained recognition, and analyses of cultural effects on foreign direct investment (FDI) include those by Kandogan (2016) and Lucke and Eichler (2016). Brainard (1997) used the gravity model in international trade to proxy FDI with affiliate sales of multinational enterprises. The economic wealth, measured in terms of GDP, proved useful when Markusen (2013) analysed international trade. Markusen and Venables (1998) considered multinational firms and the New Trade Theory and also accounted for trade cost on the pattern of international trade (Markusen and Venables 2000).

The objective of this article is to analyse trade using a gravity-model setting. The gravity-model setting has been used by Bergstrand (1985), with conventional distance-measurement estimation (Distance Calculator 2016) by referring to economic

geography (Krugman 1991; Markusen 2004). Usage of a gravity model has been applied efficiently to analyse cross-country variations of international trade, and findings have indicated more international trade between areas that are geographically close to one another (Isard and Peck 1954; Beckerman, 1956; Kristjánsdóttir (2012a, 2012b, 2013 and 2016). Moreover, studies by Tinbergen (1962) and Pöyhönen (1963) presented exports as a function of the economic size and distance between countries (Larue and Mutunga 1993).

### III. Model set-up

In the field of international economics, economic geography has gained attention, and Krugman (1991) received a Nobel Prize in Economics for contributing to research in the field of New Trade Theory and New Economic Geography. The New Economic Geography implies that economic affairs are related to geography, in that trade flows and trade patterns are subject to the size and location of economics, thus allowing for accountancy of distance to reflect on geographical location. Newton's gravity equation explains gravity as dependent on mass and distance, with the gravitational pull being weakened with increased distance. Additional research that analyses cross-country variations in exports can be found in research by Borchert and Yotov (2017), Cali and Mulabdic (2017) as well as Tadesse, White and Huang (2017). International trade analysis on cross-country trade and culture includes analysis by De Jong, Smeets and Smits (2006) and Georgieva, Jandik and Lee (2012).

Bergstrand's (1985) gravity equation for international trade has gained recognition. In Equation (1) it holds that  $Y$  presents the mass of either country  $i$  or  $j$ ;  $D$ , the distance and  $A$ , 'any other' factor (Bergstrand 1985); it holds that  $e^{(\ln(u_{ij}))} = 0$ . The following relationship is tested for trade between country ( $i$ ) and country ( $j$ ) over time ( $t$ ). Bergstrand (1985) presented his specification as the one written out in Equation (1):

$$PX_{ij} = \beta_0 (Y_j)^{\beta_1} (Y_i)^{\beta_2} (D_{ij})^{\beta_3} (A_{ij})^{\beta_4} u_{ij}. \quad (1)$$

Like in the Bergstrand's (1985) study, the dependent variable presents aggregate trade flows. A slightly modified specification of the Bergstrand (1985) specification of the gravity model, with export written

out as  $EXP_{ij,t}$  and all variable coefficients in exponential format, can be presented in Equation (2):

$$EXP_{ij,t} = e^{\gamma_0} (Y_{i,t})^{\gamma_1} (Y_{j,t})^{\gamma_2} (D_{ij})^{\gamma_3} (A_{ij})^{\gamma_4} e^{\zeta_{ij,t}}. \quad (2)$$

With the incorporation of GDP, as well as population and distance, a new specification can be presented in Equation (3), similarly to the specification of the equational system:

$$EXP_{ij,t} = e^{\zeta_0} (GDP_{i,t})^{\zeta_1} (POP_{i,t})^{\zeta_2} (DIS_{ij})^{\zeta_3} e^{\lambda_{ij,t}}. \quad (3)$$

When transformed to a log-linear format, Equation 3 becomes the specification presented in Equation (4). In Equation (4), growth and inflation in the economy have been compensated for by deflation of the values. This linearization yields the following equation:

$$\begin{aligned} \ln(EXP_{ij,t}) = & \varphi_0 + \varphi_1 \ln(GDP_{i,t}) + \varphi_2 \ln(POP_{i,t}) \\ & + \varphi_3 \ln(DIS_{ij}) + \Psi_{ij,t}. \end{aligned} \quad (4)$$

The modification then continues by replacing the conventional distance measure ( $DIS$ ), with the Hofstede cultural distance, as indicated by Equation (5):

$$\begin{aligned} \ln(EXP_{ij,t}) = & v_0 + v_1 \ln(GDP_{i,t}) + v_2 \ln(POP_{i,t}) \\ & + v_3 \ln(Hofstede_i) + \zeta_{ij,t} \end{aligned} \quad (5)$$

We continue with further modifications of the model. Export is now replaced with trade, since we want to capture trade with the trade measure, which is the more general form of international trade. The trade of country  $i$  become the dependent variable, as represented by Equation (6):

$$\begin{aligned} \ln(Trade_{i,t}) = & \tau_0 + \tau_1 \ln(GDP_{i,t}) \\ & + \tau_2 \ln(POP_{i,t}) \\ & + \tau_3 \ln(Hofstede_i) + \kappa_{i,t}. \end{aligned} \quad (6)$$

The dependent variable is then treated by applying to it the following inverse hyperbolic sine function:  $\sinh^{-1}(x) = \ln(x + (1 + x^2)^{0.5})$ . See Figure 1. The model is developed further, through treating the dependent variable with the inverse hyperbolic sine function  $\sinh^{-1}$ , as represented by Equation (7):

$$\begin{aligned} \sinh^{-1}(Trade_{i,t}) = & \theta_0 + \theta_1 \ln(GDP_{i,t}) \\ & + \theta_2 \ln(POP_{i,t}) \\ & + \theta_3 \ln(Hofstede_i) + \varrho_{i,t}. \end{aligned} \quad (7)$$

We extend the model specification further by specifically evaluating the trade difference between years.

Since the trade difference can potentially become zero or negative, the inverse hyperbolic sine functional treatment of the dependent variable is especially useful. This is represented by Equation (8):

$$\begin{aligned} \sinh^{-1}(\text{Trade\_diff}_{i,t}) = & \kappa_0 + \kappa_1 \ln(\text{GDP}_{i,t}) \\ & + \kappa_2 \ln(\text{POP}_{i,t}) \\ & + \kappa_3 \ln(\text{Hofstede}_i) + \eta_{i,t} \end{aligned} \quad (8)$$

Three variables are then added to Equation (8): Government, Religion and Law, as indicated in Equation (9). These are added to analyse if they hinder or stimulate international business trade.

$$\begin{aligned} \ln(\text{Trade}_{i,t}) = & \varpi_0 + \varpi_1 \ln(\text{GDP}_{i,t}) + \varpi_2 \ln(\text{POP}_{i,t}) \\ & + \varpi_3 \ln(\text{Hofstede}_i) + \varpi_4 \text{Government}_{i,t} \\ & + \varpi_5 \text{Religion}_i + \varpi_6 \text{Law}_i + \xi_{i,t}. \end{aligned} \quad (9)$$

We continue with the estimation procedure. The estimation Equation (10) has the same additional explanatory variables included in Equation (9), but the dependent variable is treated with the inverse hyperbolic sine function.

$$\begin{aligned} \sinh^{-1}(\text{Trade}_{i,t}) = & \omega_0 + \omega_1 \ln(\text{GDP}_{i,t}) + \omega_2 \ln(\text{POP}_{i,t}) \\ & + \omega_3 \ln(\text{Hofstede}_i) + \omega_4 \text{Government}_{i,t} \\ & + \omega_5 \text{Religion}_i + \omega_6 \text{Law}_i + \vartheta_{i,t}. \end{aligned} \quad (10)$$

Finally, Equation (11) is derived with the same set of variables, except that the dependent variable is now the difference in trade between years – the trade difference, denoted as  $\text{Trade\_diff}_{i,t}$ ; so it is comparable to the dependent variable in Equation (8).

$$\begin{aligned} \sinh^{-1}(\text{Trade\_diff}_{i,t}) = & \theta_0 + \theta_1 \ln(\text{GDP}_{i,t}) + \theta_2 \ln(\text{POP}_{i,t}) \\ & + \theta_3 \ln(\text{Hofstede}_i) + \theta_4 \text{Government}_{i,t} \\ & + \theta_5 \text{Religion}_i + \theta_6 \text{Law}_i + o_{i,t}. \end{aligned} \quad (11)$$

The variables presented in Equations (6)–(11), which are estimated in the current study are defined more specifically in Table 1, together with different components of the Hofstede measure.

The data span the time from 2000 through 2011. The data set was obtained from Hofstede (2001), IMD (2012) and the World Bank (2017).

The dependent variable, trade, accounts for trade in country  $i$  over time  $t$ , and the first explanatory variable  $\text{HOFSTED}_i$  represents the local culture in country  $i$ . The Hofstede cultural index is composed of five cultural dimensions that were identified by Hofstede; these dimensions affect behaviour of individuals and organizations (Hofstede, 1980a; Hofstede and Bond, 1988). Based on the gravity-model approach (Bergstrand 1985), the data sample further includes the GDP, denoted by GDP, and the market size is represented by population POP. The Hofstede cultural mean and variation are presented in Table 2.

**Table 1.** Variable definition.

$\text{Trade}_{i,t}$	Merchandise trade of country (i) over time (t). Trade is presented as % of GDP. Obtained from the World Bank (2017).
$\text{Hofstede}_i$	Hofstede overall culture measure (Hofstede 1991, 2001; Gudmundsdottir, Gudlaugsson, and Adalsteinsson 2015).
$\text{PDI}_i$	Power Distance (PDI) reflects the extent to which a society's members accept and expect power to be distributed equally (Hofstede 1991, 2001)
$\text{IDV}_i$	Individualism (IDV) reflects the degree to which individuals relate to themselves and their restricted family, in opposition to collectivism, when individuals are integrated into strong and cohesive groups (Hofstede 1991, 2001).
$\text{MAS}_i$	Masculinity (MAS) reflects the distribution of roles between genders. Countries that score high on masculinity could be expected to have leaders who are performance, success and competitive driven. On the other hand, countries which score lower on MAS could be expected to have leaders that emphasize the need for personal relationships, quality of life and caring for the elderly and show concern with the environment (Hofstede 1991, 2001).
$\text{UAI}_i$	Uncertainty Avoidance (UAI) reflects the extent to which people prefer to experience structured over unstructured situations. It declares how clear the rules for behaviour are for any given situation. The rules may be expressed or they may be unwritten and are simply a matter of custom or tradition (Hofstede 1991, 2001).
$\text{LTO}_i$	Long-term orientation (LTO) reflects how concerned individuals are with values such as persistence and thrift, past and present orientation, respect for tradition and fulfilling social obligations (Hofstede 1991, 2001).
$\text{GDP}_{i,t}$	Gross domestic product (GDP), in the host country (i), current USD running over time (t). Data on GDP (current US\$) are obtained from the World Bank (2012).
$\text{POP}_{i,t}$	Population, total in host country (i) at time (t). IMD Infrastructure, Population. Obtained from the IMD (2012).
$\text{Religion}_i$	Religion is a variable measuring religion differences between countries, providing each country with one particular value (World Religion 2017).
$\text{Law}_i$	Legal regulations facing the business environment in each particular country. Defined by the World Bank (2016) as the 'Ease of doing business index (1 = most business-friendly regulations)'. World Bank (2016) defines the variable by the ease of doing business, ranking economies from 1 to 190, with first place being the best ranking. High ranking (low numerical rank) indicates that the regulatory environment is conducive to business operation. This Law index averages the country's percentile rankings on 10 topics covered in the World Bank's Doing Business. The ranking on each topic is the simple average of the percentile rankings on its component indicators.
$\text{Government}_{i,t}$	Government is a variable accounting for government policy, running over countries and years (IMD 2012). It measures if the adaptability of government policy to changes in the economy is high, applying WCY executive survey based on an index from 0 to 10).

**Table 2.** Summary statistics for the basic sample.

Variable	Description	Obs.	Mean	SD	Min	Max
$Trade_{i,t}$	Percentage of gross domestic product	252	74.99	37.67	17.24	184.90
$Hofstede_i$	Hofstede culture index	252	245.06	46.16	148.19	330.59
$GDP_{i,t}$	US \$, current prices	252	1.26e+12	2.70e+12	7.92e+09	1.51e+13
$POP_{i,t}$	Total population, all ages	252	35.73	63.34	.28	313.19
$Religion_i$	Country religion	252	.1611567	.2350915	0	.867998
$Law_i$	Law in particular country, facing new business	252	40.12245	31.11585	1	130
$Government_{i,t}$	Government policy in particular country, over time	252	4.48231	1.333659	0	7.789474

The data sample covers the following 21 countries: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Hungary, Iceland, Ireland, Italy, the Netherlands, Norway, Poland, Portugal, Slovak Republic, Spain, Sweden, Switzerland, the United Kingdom and the United States. The sample estimated runs over the period of 12 years from 2000 through 2011. The sample is full for countries, i.e. observations are not missing for any country, with the number of observations being  $21 \times 12 = 252$ .

The Hofstede cultural index sometimes has a value higher than 100; for the five individual dimensions of the index, values are scaled again, taking 100 as the maximum value, before summing them up for the overall Hofstede measure. The Hofstede index, when combined, thus has the potential to take the value of 0–500. To further expand the model and account for additional factors, we choose to include three more variables in our estimation: the legal framework, religion and Government policy.

First, Law is accounted for by including a variable obtained from the World Bank (2017) that accounts for the legal regulations facing the business environment in each particular country. The variable is defined by the World Bank (2017) as the ‘Ease of doing business index (1 = most business-friendly regulations)’. We choose to apply the 2016 value of the index and put it in for all years, for each particular country. The variable, therefore, runs over countries, and each country has a specific value.

Second, Religion is a variable that provides a particular value for each country in the sample and reflects on religion-related differences between countries. This variable was obtained from World Religion (2017). More specifically, it accounts for the protestant ratio of Christian protestant population in the overall population of a particular country.

Third, Government is a variable that accounts for government policy that is estimated for different countries and years (IMD 2012). It measures if the

adaptability of government policy to changes in the economy is high, based on the World Competitiveness Yearbook executive survey based on an index from 0 to 10).

#### IV. Estimation results

The data set applied is estimated using the STATA statistical program. In Table 3, the estimates based on Equations (6)–(8) are presented; they were obtained from estimating trade as the dependent variable in the estimation equation.

Estimates for Equations (6) and (7), which are presented in Table 3, indicate that countries’ trades are found to be significantly affected by the Hofstede cultural dimensions. Also, economic size is found to have significant negative effects on trade; this finding is consistent with a theory which states that as economies grow, they depend less on trade (Markusen 2004). However, larger market size, in terms of population, is found to have negative effects on trade. Furthermore, estimates from Equation (8), which are provided in the last column of Table 3, indicate that the trade difference between years is not found to be significantly affected by any of the estimated factors, although estimated signs are generally consistent. These findings support Hypothesis 1.

Table 4 provides several estimates. First, the estimate for the combined Hofstede cultural dimensions is provided. Second, the estimate for each one of the five separate Hofstede dimensions is provided, together with the economic measures of GDP and Population.

The first column in Table 4 is identical with the first column in Table 3 and is only included for comparison. Like in Table 3, the economic weight measured with GDP is found to have negative effects on trade, and market size generally has insignificant effects on trade. Estimates indicate that of the five national cultural dimensions only the MAS dimension, i.e. masculinity, is found to significantly affect trade, with positive effects

**Table 3.** Estimates for international trade.

Regressors	$\ln(\text{Trade}_{i,t})$	$\sinh^{-1}(\text{Trade}_{i,t})$	$\sinh^{-1}(\text{Trade}_{diff,t})$
	Based on Equation (6)	Based on Equation (7)	Based on Equation (8)
$\ln(\text{Hofstede}_i)$	.46*** (2.93)	.46*** (2.93)	.97 (1.30)
$\ln(\text{GDP}_{i,t})$	-.15*** (-3.22)	-.15*** (-3.22)	-.14 (-0.59)
$\ln(\text{POP}_{i,t})$	-.03 (-0.43)	-.03 (-0.43)	.12 (0.46)
Constant	5.72*** (3.17)	6.41*** (3.55)	-1.17 (-0.14)
R-sq.	0.3163	0.3162	0.0149
Obs.	252	252	252

Robust *t*-statistics are reported in parentheses.

\*\*\*Significant at the 1% level.

\*\*Significant at the 5% level.

\*Significant at the 10% level.

**Table 4.** Estimates for trade, based on dimensions.

Regressors	$\ln(\text{Trade}_{i,t})$	$\ln(\text{Trade}_{i,t})$	$\ln(\text{Trade}_{i,t})$	$\ln(\text{Trade}_{i,t})$	$\ln(\text{Trade}_{i,t})$	$\ln(\text{Trade}_{i,t})$
Based on Equation (6)						
$\ln(\text{Hofstede}_i)$	.46*** (2.93)					
$\ln(\text{PDI}_i)$		.07 (1.19)				
$\ln(\text{IDV}_i)$			.08 (0.79)			
$\ln(\text{MAS}_i)$				.13*** (4.12)		
$\ln(\text{UAL}_i)$					.07 (0.99)	
$\ln(\text{LTO}_i)$						.03 (0.43)
$\ln(\text{GDP}_{i,t})$	-.15*** (-3.22)	-.19*** (-4.08)	-.23*** (-6.60)	-.16*** (-4.43)	-.20*** (-4.84)	-.23*** (-6.36)
$\ln(\text{POP}_{i,t})$	-.03 (-0.43)	.02 (0.38)	.06* (1.71)	-.03 (-0.75)	.04 (0.71)	.06 (1.47)
Constant	5.72*** (3.17)	9.00*** (7.02)	9.93*** (11.46)	8.04*** (8.90)	9.29*** (7.94)	9.94*** (11.30)
R-sq.	0.3163	0.2942	0.2921	0.3235	0.2931	0.2909
Obs.	252	252	252	252	252	252

Robust *t*-statistics are reported in parentheses.

\*\*\*Significant at the 1% level.

\*\*Significant at the 5% level.

\*Significant at the 10% level.

on trade. In other words, the MAS dimension is the only Hofstede cultural dimension found to positively affect a country's international trade. These results are in line with those by Yenyurt and Townsend (2003), which indicated that masculinity has positive effects on new product acceptance rate. Furthermore, Frank (2012) pointed out that a certain amount of competitive behaviour is needed for international trade, when entering foreign markets. These findings support Hypothesis 2.

Table 5 provides estimates for the augmented equation system, in which three variables have been added. The added variables are government, laws and religion. They are added to better estimate how international trade is affected by factors in the macroeconomic environment.

The estimates indicate that international trade is affected by laws and religion, but not by government policy. The natural logarithm function and the inverse hyperbolic sine function provide comparable estimates. However, when trade difference between years is estimated, significant variability is not identified for individual years. These findings support

Hypothesis 3 according to law and religion but not in terms of the government policy.

## V. Summary and conclusions

This article analyses whether there is a direct connection between national culture and international trade. The primary objective was to analyse combined national cultural effects; the current study then continued by estimating uncombined national cultural effects separately as well as the effects of the law system, religion and government policy.

The overall country's trade was chosen as the dependent variable. The Hofstede cultural dimensions that were chosen to capture national cultural differences, economic size and market size are also considered in the estimation procedures.

We have found national culture to have an impact on the international trade of countries; this finding indicates that variations in national culture are likely to affect trade between countries; therefore, this result supports the first hypothesis. Also, the



**Table 5.** Estimates for trade. Government, religion and law added as variables.

Regressors	$\ln(\text{Trade}_{i,t})$	$\ln(\text{Trade}_{i,t})$	$\sinh^{-1}(\text{Trade}_{i,t})$	$\sinh^{-1}(\text{Trade}_{diff_{i,t}})$
Based on	Equation (6)	Equation (9)	Equation (10)	Equation (11)
<i>Government</i> <sub><i>i,t</i></sub>		-.02 (-1.21)	-.02 (-1.21)	-.16 (-1.32)
<i>Religion</i> <sub><i>i</i></sub>		-.63*** (-6.56)	-.63*** (-6.56)	.49 (0.72)
<i>Law</i> <sub><i>i</i></sub>		.01*** (3.76)	.01*** (3.76)	.01 (0.37)
$\ln(\text{Hofstede}_i)$	.46*** (2.93)	-.57*** (-3.18)	-.57*** (-3.17)	.67 (0.68)
$\ln(\text{GDP}_{i,t})$	-.15*** (-3.22)	-.08** (-2.24)	-.08*** (-2.24)	-.18 (-0.71)
$\ln(\text{POP}_{i,t})$	-.03 (-0.43)	-.14*** (-3.33)	-.14*** (-3.33)	.17 (0.57)
Constant	5.72*** (3.17)	11.86*** (10.92)	12.55*** (11.56)	-.45 (-0.07)
R-sq.	0.316	0.496	0.496	0.027
Obs.	252	252	252	252

Hofstede national culture has been decomposed into different dimensions, thus resulting in interesting results. Of the five Hofstede dimensions, only the MAS dimension has been found to have a significant impact on trade, which is consistent with previous research, which indicated that countries that score high on the MAS dimension tend to be more willing to consume foreign-imported goods. This finding supports the second hypothesis.

Economic weight of economies is found to weaken their trading volumes, which corresponds to theories that imply that as economies become larger, they tend to be more self-sufficient and thus rely less on international trade with other countries. Along the same lines, the market size of countries is generally not estimated to have an impact on their trading volumes.

The results indicate that national culture impacts international trade and increased economic and market size lead to less dependence on international trade, with larger economics being more self-sufficient than smaller ones. All the regression estimates obtained can potentially be useful when one considers successful approaches of marketing to foreign countries with different national cultures. Furthermore, the estimation has been extended by adding government policy, religion and law. Both law and religion have been found to have significant effects on international trade; however, the government policy in the countries analysed has been found to have no effect on international trade. The results support Hypothesis 3 in terms of law and religion but not government policy.

Main contribution of the paper is that knowledge of the Hofstede separate cultural dimensions, as well as religion can be useful when entering into international trade. The masculinity/femininity dimension and religion are found to most significantly affect international trade. The findings of the current study are interesting and correspond with prior research, which indicated

that countries that score high on the MAS dimension tend to more eager to buy foreign-imported goods than local products, and that these countries tend to value competitiveness, assertiveness, ambition, as well as the accumulation of wealth and material possessions. Successful businesses therefore should be aware of the social status of the economy, with respect to masculinity/femininity and religion, before entering into international trade.

In conclusion, we have found international trade to be affected by national culture and the overall impact of national culture on international trade to vary, depending on the national cultural dimension that is considered. We also find law and religion to impact international trade. This suggests that business companies should consider these findings before entering into international trade.

Further research could apply these findings and seek to analyse in more details why these factors affect international as they do.

### Disclosure statement

No potential conflict of interest was reported by the authors.

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## Appendix

The functional form that allows for zeros and negative values in the logarithm functional treatment of values is the inverse

hyperbolic sine function. It has a similar functional shape as the conventional logarithm function for positive values. More specifically, the inverse hyperbolic sine function is presented as  $\sinh^{-1}(x) = \ln(x + (1 + x^2)^{0.5})$ .