# Is religious freedom beneficial to international trade?*

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## Abstract

This paper attempts to investigate the influence of religious freedom on international trade using a modified gravity model. To avoid biased results arising from zero trade flows and heteroskedasticity problems, the study used the Poisson pseudo-maximum likelihood (PPML) estimation, as suggested by Santos Silva and Tenreyro (2006), to estimate the effects of religious freedom on trade in goods and services covering the years 2003, 2005, and 2007. I found that religious regulation and favoritism discouraged both goods and services trade. Second, governmental and social regulation of religion has a greater negative impact on services trade than on goods trade. Third, social regulation of religion exerts negative influences on services trade more than governmental religious regulation and favoritism do, and this effect on services trade is greater than on goods trade. Fourth, religious regulation and favoritism have a greater service-import restricting effect in countries with weak trade regimes. Fifth, religious regulation and favoritism have a greater service-import restricting effect in countries with high tariff and non-tariff barriers. In short, religious freedom contributes to enhancing trade by circumventing cultural and institutional differences among trading partners.

*Keywords:* religious freedom, religious regulation, religious favoritism, Poisson pseudo-maximum likelihood (PPML), trade in goods and services

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# 1 Introduction

Whenever the shock of religious terrorism and violence rears its head, Samuel Huntington's prophecy seems to be plausible. Huntington (1993: 29) claims that the clash of civilization occurs at two levels. At the micro level, "adjacent groups along the fault lines between civilizations struggle over the control of territory". At the macro level "states from different civilizations, compete for relative military and economic power". Pointing out that conflict along the fault line between Western and Islamic civilizations has been going on for 1,300 years, Huntington (1993: 31) predicts: "This centuries-old military interaction between the West and Islam is unlikely to decline. It could become more virulent." Huntington (1993: 29) considers religion to be at the core of cultural divides, and acknowledges that "differences in culture and religion create differences over policy issues, ranging from human rights to immigration to *trade and commerce*… "(emphasis added).

Haynes (2013), meanwhile, points out that religion is almost a synonym for culture; the primary factor differentiating cultures is religion, particularly religious differences. In most developed countries, religious freedom is a constitutional right, sometimes considered the "first freedom" (McConnell, 2000); it is included, for example, in the first amendment to the American Constitution. However, even where religious freedom is explicitly enshrined as a fundamental right, it cannot always be sufficiently observed, especially in the presence of social regulation stemming from neighboring coreligionists.

Could religious freedom, whether *de facto* or *de jure*, be helpful in mitigating civilization "fault lines", thus enhancing trade and commerce between trading partners?

Economists have paid little attention to the unique role of religious freedom in the global economy. Some sociologists reported that the presence of religious freedom contributed to better business and economic performance, providing peace and stability which are particularly important for the business environment and investment opportunities (Grim et al., 2014). Religious freedom is also strongly correlated with lower corruption (Lipset and Lenz, 2000). If we accept that religious freedom affects economic outcomes positively, then we cannot

reject the hypothesis that it can influence international trade as well.

Research has shown that religious variety has a more positive effect than religious similarity on both international trade in goods (Helble, 2007; Lewer and Van den Berg 2007) and international trade in services (Lee, 2013; Lee and Park, 2015). It can be said that religious openness may be related to a strong legal regime that enhances contract enforceability by reducing cultural and institutional gaps between the transacting parties. Consequently, government policies facilitating religious freedom are likely to affect international trade. In particular, government policies that secure religious freedom may be more influential on service trade, which relies heavily on 'trust', than goods trade. To date, no study has presented an empirical analysis of the relationship between religious freedom and international trade. This is due mainly to a lack of relevant data that go beyond religious affiliation and cover many countries.

This study attempts to explore the effects of religion-related policies and practices of a country on international trade in goods and services, using three indexes developed by Grim and Finke(2006). They developed these indexes based on a questionnaire survey of 243 questions over 198 countries. The three indexes are government regulation, government favoritism, and the social regulation of religion. Government regulation of religion is defined as restrictions placed on the practice, profession, or selection of religion by official laws or policies of the state. Government favoritism, defined as subsidies, privileges, or favorable sanctions provided by the state, indicates supportive actions for a selected religion or a small group of religions.[1] Social regulation indicates restrictions placed on the practice, profession, or selection of religion by other religious groups, associations, or the culture at large. The three indexes were constructed through factor analysis and the values range from 0 to 10 after rescaling.

The results of this study can be summarized as follows. First, religious regulation and favoritism discourage international trade in both goods and services. Second, governmental regulation and social

[1] One could argue that government regulation and government favoritism in relation to religion can only indirectly influence religion. However, considering Huntington's concept of the "fault lines" between civilizations, established over long periods of time, a particular government's deliberate support for, or opposition to, a specific religion could have a significant impact on religious freedom.

regulation of religion have a greater negative impact on service trade than goods trade. Third, social regulation of religion exerts negative influences on service trade more than governmental regulation and favoritism of religion, and this effect on service trade is greater than on goods trade. Fourth, religious regulation and favoritism have a greater service import-restricting effect in countries with weak trade regimes. Fifth, religious regulation and favoritism have a greater service import-restricting effect in countries with high non-tariff barriers and high mean tariff rates.

The remainder of this paper is organized as follows. Section 2 presents a literature survey and discusses empirical technique used in the study. Section 3 introduces the empirical model and data used. Section 4 presents the empirical results. Section 5 discusses further the effect of religious freedom on international service trade, focused, more specifically, on the relationship between religious freedom and trade regime on the one hand, and the relationship between religious freedom and tariff/non-tariff barriers on the other. Section 6 provides concluding remarks.

## 2 Literature survey

There are few studies on the effects of religion on international trade. Both Helbe (2007) and Lewer and Van den Berg (2007) examined religious cultures and international trade in goods and compared the relative impact from different religious beliefs. However, their results were quite different from one another: Helbe (2007) found that countries with Christian and Muslim majorities were likely to trade more with co-religionists, whereas Lewer and Van den Berg (2007) reported that Buddhism and Judaism are the only religions that had positive institutional and network effects on trade in goods.

Gravity model estimation, based on dynamic panel data, often involves two technical problems: the presence of heteroskedasticity and bias from excluding zero bilateral trade flows. In an influential paper, Santos Silva and Tenreyro (2006) focused on econometric problems resulting from heteroskedastic residuals and the prevalence of zero

bilateral trade flows. As a robust alternative approach, Santos Silva and Tenreyro recommended the Poisson pseudo-maximum likelihood (PPML) estimator, which has been used widely for the estimation of gravity equations (Liu 2009; Westerlund and Wilhelmsson 2011).

The contrasting results of Helbe (2007) and Lewer and Van den Berg (2007) might reflect biases from heteroskedasticity and sample selection in the data. The data were limited to 151 countries for the former and 84 for the latter, due to limited religion-related data. Furthermore, Helbe (2007) used a Tobit estimation technique, which is questionable in the presence of heteroskedasticity, whereas Lewer and Van den Berg (2007) used scaled OLS with a fixed effect. As a result, it may be difficult to assess the biases resulting from heteroskedasticity and sample selection. Lee (2013), through the PPML estimation model, demonstrated that religion exerted a greater influence on services trade than on goods trade. Lee and Park (2015), using both PPML estimation and the Heckman sample selection model, reported that religious openness has a more significant impact on the services trade than does religious similarity. However, there is no reported research on the effect of religious freedom on international trade. This study is aimed at filling that gap. Could religious regulation and favoritism affect international trade in goods and services? If so, do they exert identical influences on the goods and services trades?

The most outstanding type of governmental regulation or support for religion is to impose taxes or to grant a subsidy to certain religions. When taxes are charged to a certain religious group or person, the religion's activity will be constrained. When a subsidy is provided, in contrast, the religion's activity will be facilitated. As religion affects trade in goods and services, religious regulation and favoritism are likely to affect international trade in goods and services simply because they can affect the free formation and development of religion. It has been demonstrated that religion is an important variable that affects the decision-making of a company's CEO (Hilary and Hui, 2009). More specifically, transactions between multi-national enterprises account for 70% of the world total trade volume, and the sales of these multinational enterprises to their foreign affiliates exceed their total amount of exports across the world. Thus, there is high possibility that religious freedom affects trade in goods and services.

# 3 Empirical methodology and data

## 3.1 Model specification

Grim and Finke (2006) developed, through factor analysis, three indexes of religion with reference to the International Religious Freedom Report: the Government Regulation Index (GRI), the Government Favoritism Index (GFI), and the Social Regulation Index (SRI). They were based on survey results that were conducted with a questionnaire of 243 questions over 198 countries every 2 years from 2001 to 2005 (ARDA, 2005). These indexes were set in the range from 0 to 10 after rescaling. In the same manner, ARDA (2008, Association of Religion Data Archives; available at www.TheARDA.com) estimated the three indexes above based on their survey results conducted from 2003 to 2008. Grim and Finke (2006) pointed out that the data above (ARDA, 2005) were based mainly on the results of a survey conducted in 2003 and that the latter data (ARDA, 2008) resulted primarily from surveys conducted in 2003, 2005, and 2007.

Annex Table 1 shows the correlation coefficients among these three variables. It can be seen that GRI is more correlated with SRI (correlation coefficient = 0.74) than GFI. That is, in a country where the government regulates a certain religion through related policies, the social regulation on the religion is also accordingly strict.

To maintain consistency with the ARDA (2008) data, this study estimates the effect of GRI, GFI, and SRI on the international trade in goods and services in the years 2003, 2005, and 2007 based on a gravity model. The gravity equation is specified as a log-linear regression. In practice, this model is often augmented with other covariates that potentially affect bilateral trade, such as income, distance (as a proxy of trading costs), and other country characteristics. Specifically, the following gravity model was estimated:

$$r(s)exp_ito_{jt}=\beta_1 ln(GDP_i \cdot GDP_j)_t+\beta_2 ln(dist)_{ij}+\beta_3 landlocked_{ij}+\beta_4 contiguity_{ij}+ \beta_5 comlang_{ij}+\beta_6 colony_{ij}+\delta_1 GRI_i+\delta_2 GRI_j+\delta_3 GFI_i+\delta_4 GFI_j+\delta_5 SRI_i+\delta_6 SRI_j+\varepsilon_{ijt.} \quad (1)$$

where r(s)$exp_i to_{jt}$ is the amount of real good (service) exports from country i to country j in year t; $(GDP_i \cdot GDP_j)_t$ is the product of real GDP in countries i and j at time t; $dist_{ij}$ is the distance between country i and j; $landlocked_{ij}$ is a dummy variable that equals 1 when country i (j) is landlocked; $contiguity_{ij}$ is a dummy variable that equals 1 when country i is contiguous with j; $comlang_{ij}$ is a dummy variable that equals 1 if countries i and j share a common language; $colony_{ij}$ is a dummy variable that equals 1 if country i (j) has ever been a colony of country j (i); $GRI_{ij}$ is the GRI on a certain religion in country i (j); $GFI_{ij}$ is the GFI for a certain religion in country i (j); $SRI_{ij}$ is the SRI on a certain religion in country i (j), and $\varepsilon_{ijt}$ is the residual, where $\epsilon_{ijt} = \gamma_i + \eta_j + \nu_t$.

In the gravity regression described above, the simple OLS estimation produces biases arising from heteroskedasticity and sample selection. Alternative methods, including standard random effect and fixed effect estimation, could be used to control unobserved factors influencing bilateral trade in goods and services. However, these methods cannot correct the biases stemming from heteroskedasticity and sample selection. Santos Silva and Tenreyro (2006) showed that heteroskedasticity was a problem, both in the traditional gravity equation and in a gravity equation that takes into account multilateral resistance terms or fixed effects, as suggested by Anderson and van Wincoop (2003). Santos Silva and Tenreyro (2006) pointed out that, even controlling for fixed effects, the presence of heteroskedasticity could generate biases. We used the Breusch-Pagan test to confirm that the data were heteroskedastic. Additionally, a significant proportion of trade data reported '0' trade values in both trade in goods and trade in services, as discussed below.

## 3.2 Data

The data sets used in this study and their sources are as follows: the total volumes of goods exports were obtained from the IMF "Direction of Trade Statistics" (DOTS) CD-ROM, and service trade statistics were from the United Nations Service Trade database (http://unstats.un.org/unsd/servicetrade/). Those two values were then deflated by the US consumer price index (CPI), obtained from World Development Indicators (http://www.worlddevelopmentindicators.net/). GDP and popula-

tion data were taken from Penn World Table (PWT) 6.3. Distance, common language, colony, landlocked, and contiguity data are all from the Centre d'Etudes Prospectives et d'Informations Internationales (CEPII), http://www.cepii.fr/anglaisgraph/bdd/gravity.htm).

The statistics of major variables used in our estimations are presented in Table 1.

Table 1. Summary of statistics

(n=82039)

| Variable | Mean | SD | Min. | Max. |
|---|---|---|---|---|
| Volume of goods exports | 0.14 billion | 1.34 billion | 0.00 | 88.9 billion |
| Volume of service exports | 1.02 billion | 3.46 billion | 0.00 | 63.9 billion |
| Log of real GDP in pairs | 49.40 | 2.80 | 39.33 | 59.19 |
| Log of distance | 8.71 | 0.78 | 4.55 | 9.89 |
| Landlocked country dummy | 0.32 | 0.47 | 0.00 | 1.00 |
| Contiguity dummy | 0.02 | 0.14 | 0.00 | 1.00 |
| Common language dummy | 0.14 | 0.34 | 0.00 | 1.00 |
| Common colony dummy | 0.01 | 0.11 | 0.00 | 1.00 |
| Government regulation index | 3.02 | 3.05 | 0.00 | 9.82 |
| Government favoritism index | 4.82 | 2.69 | 0.00 | 9.17 |
| Social regulation index | 4.60 | 2.93 | 0.00 | 10.00 |

The three religion-related indexes – GRI, GFI, and SRI – taken from ARDA (2008) included 198 countries in 2003, 2005, and 2007. Consequently, the total number of international goods export data points in 2003, 2005, and 2007 should be 198 × 197 × 3 = 117,018. However, due to discrepancies[2] between trade data and ARDA (2008) data, the actual number was 82,039. Among these, 28,096 (34%) observations included zero values of actual trade. Among 7,004 data sets of international trade in services in 2003, 2005, and 2007, 317 (~5%) observations included

[2] For example, three religion-related indexes of the US were omitted in ARDA (2008) and, thus, the observation values of the exports from the US around the world were excluded. In contrast, there were eight countries whose trading records were not available even though their religion-related indexes were reported in ARDA (2008): Tibet, Timor, Andorra, Liechtenstein, Monaco, San Marino, Montenegro, and Kosovo.

zero values of actual service exports. When zero values of actual trade represent a significant proportion of all observations, it is advantageous to use the PPML estimation. The dependent variable $r(s)exp_ito_j$, indicating the amount of international goods (service) exports from country i to country j in regression equation (1), is not in logarithmic form but the level variable of goods (service) exports[3].

The following are some examples of religion-related indexes. For Uruguay, GRI, GFI, and SRI of a certain religion are all '0' while for Saudi Arabia, they are 9.8, 9.2, and 10, respectively. That is, Saudi Arabia has strict governmental regulations on religions other than Islam, as well as exclusive governmental support for Islam. Moreover, social regulations on religions other than Islam prevail absolutely. Some countries involve overwhelming social regulation on religion although governmental regulation is insignificant. Israel is one example; its indexes are 4.1, 7.9, and 9.6, respectively.

# 4 Estimation results

Regression results presented in Table 2 compare the effects of the three religion-related variables, GRI, GFI, and SRI, on international goods trade with their effects on services trade, in both exporting countries and importing countries. As the model predicts, the estimated coefficients of conventional variables had the expected signs, and were statistically significant, except for the contiguity country dummy variable. The estimated coefficients on the log of GDP and common language dummy variable were significantly positive. In some models, estimated coefficients for the contiguity country dummy variable had negative signs, specifically in service exports, but most of them were statistically insignificant. The estimated coefficients on the common colony dummy variable had the expected positive signs, but most of them were statistically insignificant. This is probably because of a bias stemming from sampling.

To summarize, briefly, the estimated coefficients on bilateral dis-

[3] In the PPML estimation, the common type of regression equation is $Y = \exp(\alpha+\beta X)$, Thus, Y, the dependent variable, should not be a log value but a level variable.

tance were significantly negative. The estimated coefficient on the log of bilateral distance (-1.08, s.e. = 0.018) in Model 1 implies that an increase in the log of bilateral distance by 0.78 (its standard deviation) leads to a 0.84% decrease in goods exports. In all Models, the estimated coefficients of GDP were significantly positive, indicating that a larger GDP increases a country's trade volume in both goods and services. In our estimation, when a country's GDP increased by 10%, goods exports increased as much as 0.84% in Model 1 and services exports increased by 7.1% in Model 2 accordingly.

The following provides further explanation of the regression coefficients of the religion-related variables, GRI, GFI, and SRI. First, throughout the Models, the estimated coefficients of GRI, GFI, and SRI were all negative and statistically significant, indicating that religious regulation and favoritism discourage trade in goods and services in both exporting and importing countries. This means that institutional or social regimes that favor a certain religion, thus regulating other religions, can exert negative influences on international trade in goods and services. To see this more in detail, when one compares the estimated coefficient of an exporting country's GRI based on Models (1) and (2), the estimated coefficient for goods exports (gri_exporting country) was -0.064 (s.e. = 0.009) and that for services exports was -0.133 (s.e. = 0.015), and both were statistically significant. This indicates that an increase in GRI by one standard deviation (3.05) leads to a 0.2% decrease in goods exports and 0.41% decrease in services exports.[4] This applies to importing countries too. The effect of governmental religious regulation on goods and services imports (gri-importing country) is illustrated by Models (7) and (8). The estimated coefficients of governmental regulation on religion were -0.089 and -0.128, respectively. As governmental

[4] One may argue that the degree of the effect of religious regulation on trade is too small. I would counter this argument by mentioning that the magnitude of the coefficient itself is not that important, and even the smallest amount of estimated coefficient would not be negligible. This is due to the following two reasons. First, the three religion-related independent variables (GRI, GFI, and SRI) are all indexes that vary from 0 to 10, whereas the dependent variable is the real volume of goods (services) exports. Consequently, one could not conclude that the effect of religion-related independent variables on the dependent variable is negligible simply because the measurement units of two variables differ. Another point is that the US was omitted in the sample. The US is presumably considered to have less (no) religious regulation or favoritism regime whereas its proportion of world trade both in goods and services is highly significant. Consequently, if the US was included in the sample, the magnitude of the estimated coefficient would be greater.

## Table 2. Effects of religious regulation and favoritism on trade in goods and services

| | Exporting Country | | | | | | Importing Country | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Governmental Regulation | | Governmental Support | | Social Regulation | | Governmental Regulation | | Governmental Support | | Social Regulation | |
| | Model (1) | Model (2) | Model (3) | Model (4) | Model (5) | Model (6) | Model (7) | Model (8) | Model (9) | Model (10) | Model (11) | Model (12) |
| | Goods | Services | Goods | Services | Goods | Services | Goods | Services | Goods | Services | Goods | Services |
| Log of real GDP in pairs | 0.854*** (0.009) | 0.706*** (0.018) | 0.839*** (0.010) | 0.707*** (0.019) | 0.848*** (0.010) | 0.710*** (0.020) | 0.857*** (0.010) | 0.749*** (0.015) | 0.840*** (0.010) | 0.711*** (0.018) | 0.848*** (0.010) | 0.725*** (0.018) |
| Log of distance | -1.083*** (0.018) | -0.915*** (0.031) | -1.151*** (0.020) | -0.972*** (0.031) | -1.114*** (0.020) | -0.947*** (0.034) | -1.066*** (0.019) | -0.867*** (0.027) | -1.149*** (0.020) | -0.984*** (0.030) | -1.114*** (0.021) | -0.953*** (0.030) |
| Landlocked country dummy | -0.362*** (0.040) | -0.303*** (0.076) | -0.338*** (0.041) | -0.262*** (0.076) | -0.348*** (0.040) | -0.241*** (0.078) | -0.374*** (0.040) | -0.305*** (0.074) | -0.338*** (0.041) | -0.250*** (0.076) | -0.351*** (0.041) | -0.296*** (0.074) |
| Contiguity country dummy | 0.254*** (0.061) | -0.048 (0.075) | 0.216*** (0.065) | -0.123 (0.079) | 0.286*** (0.064) | 0.023 (0.074) | 0.275*** (0.061) | -0.094 (0.077) | 0.214*** (0.066) | -0.149* (0.077) | 0.292*** (0.066) | -0.087 (0.078) |
| Common language dummy | 0.580*** (0.063) | 0.886*** (0.073) | 0.574*** (0.063) | 0.877*** (0.072) | 0.568*** (0.057) | 0.797*** (0.071) | 0.589*** (0.063) | 0.916*** (0.076) | 0.572*** (0.064) | 0.915*** (0.072) | 0.567*** (0.057) | 0.949*** (0.069) |
| Common colony dummy | 0.029 (0.063) | 0.193** (0.094) | 0.038 (0.065) | 0.202** (0.097) | 0.058 (0.081) | 0.143 (0.106) | 0.050 (0.062) | 0.151 (0.106) | 0.032 (0.068) | 0.123 (0.104) | 0.066 (0.072) | 0.071 (0.114) |
| GRI_exporting country | -0.064*** (0.009) | -0.133*** (0.015) | | | | | | | | | | |
| GFI_ exporting country | | | -0.078*** (0.010) | -0.046** (0.023) | | | | | | | | |
| SRI_exporting country | | | | | -0.116*** (0.009) | -0.136*** (0.012) | | | | | | |
| GRI_importing country | | | | | | | -0.089*** (0.009) | -0.128*** (0.012) | | | | |
| GFI_importing country | | | | | | | | | -0.071*** (0.009) | -0.100*** (0.012) | | |
| SRI_importing country | | | | | | | | | | | -0.126*** (0.010) | -0.145*** (0.009) |
| No. of obs. | 73961 | 6512 | 73961 | 6512 | 73961 | 6512 | 73961 | 6512 | 73961 | 6512 | 73961 | 6512 |
| R-square | 0.70 | 0.57 | 0.67 | 0.55 | 0.69 | 0.54 | 0.68 | 0.61 | 0.67 | 0.57 | 0.68 | 0.57 |

Note: t-values in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively. The dependent variable is the log of real good(service) exports from country i to country j.

religious regulation increased by one standard deviation, goods imports decreased by as much as 0.27% and services imports decreased by as much as 0.39%. It was demonstrated that governmental religious regulation exerted a more negative effect on services trade than on goods trade.

The effects of governmental religious favoritism (gfi-exporting country) on both goods and services exports are shown in Models (3) and (4). The estimated coefficients were -0.078 and -0.046, respectively, and both were statistically significant. This implies that an increase in governmental favoritism on religion (GFI) by one standard deviation (2.69) leads to a 0.21% decrease in goods exports and a 0.12% decrease in services exports.

The effects of governmental favoritism regarding religion (gfi_importing country) on goods and services imports are demonstrated in Models (9) and (10). The estimated coefficients were -0.071 and -0.10, respectively. As governmental religious support increased by one standard deviation, goods imports decreased by as much as 0.19% and services imports decreased by as much as 0.27%. This result indicates that governmental support for a specific religion causes more negative effects on services trade than on goods trade.

Why does governmental religious regulation and favoritism cause more negative effects on services trade than on goods trade? This seems to be a matter of 'trust' in relation to the differences in attributes of services and goods markets. Because the issue of trust is more important in services trade than in goods trade, a country's legal and institutional measures that secure religious variety or freedom would be expected to enhance mutual trust between transacting parties and, as a result, services trade would be expected to be more affected than goods trade. That is, governmental religious regulation or support might negatively affect religious freedom, which may make transacting parties in another country trust the other less.

The following text examines the effect of social regulation concerning religion (SRI) on goods and services exports. The effects of an exporting country's social regulation concerning religion (sri_exporting country) on goods and services trade are shown in Models (5) and (6), respectively. The estimated coefficients were -0.116 and -0.136, respectively. As an exporting country's social regulation on religion increased by one

standard deviation (2.93), exports of goods and services decreased by as much as 0.34% and 0.40%, respectively. The effects of an importing country's social regulation regarding religion (sri_importing country) on goods and services imports are demonstrated in Models (11) and (12), respectively. The estimated coefficients were -0.126 and -0.145, respectively. This means that an increase in SRI by one standard deviation (2.93) leads to a 0.37% decrease in goods imports and a 0.42% decrease in services imports. If one compares the estimated coefficients of SRI in Model (5) and Model (11) on the one hand, and Model (6) and Model (12) on the other, the social regulation of religion caused a more negative effect on importing countries than exporting countries and, in particular, services trade was more negatively affected than goods trade.

Another issue is that when one compares the estimated coefficients, SRI caused a more negative effect on trade than GRI or GFI. In particular, this negative effect was greater regarding services trade than goods trade and this was so more in importing countries than in exporting countries.

What is the reason behind this? It seems that social regulation of a certain religion more strongly controls religious freedom than governmental regulation or support, which can damage trust between transaction partners. Take a hypothetical country: if the extent of social regulation regarding religion is intense in this country, this country is more likely to have a certain dominant religion. Facing high social regulation vis-à-vis other religions, people in this country may have a tendency to trust their co-religionists more and other religionists less. This can affect an international transaction negatively. Considering that trust matters more in services trade than goods trade, this effect may be larger in services trade than goods trade. This may be true to a greater extent in an importing country than in an exporting country.

To summarize the arguments, it can be said that, as demonstrated from Model (1) to Model (12), religious regulation or support negatively affected both goods and services trade. Religious regulation, including governmental and social regulation, exerted more negative influences on services trade than on goods trade and, in particular, social regulation had a more negative influence on both goods and services trade than governmental religious regulation or support. Moreover, the negative effects were greater in importing countries than exporting countries.

# 5 Interaction between religious freedom and trade regime

To further analyze the effect of religious freedom on services trade, where the matter of trust is more important, this section investigates the relationship between the three religion-related variables described earlier and trade regimes and the relationships between these three variables and tariff and non-tariff barriers. To represent the trade regime, two additional variables are introduced: an index for the Legal System and Property Rights (lspr) and an index of Freedom to Trade Internationally (fti). These two indexes were obtained from the World Development Indicator (WDI); the former ranges from 1.2 to 9.6, and the latter from 0 to 9.8. The higher the value of the index is, the stronger the trade regime is. As variables that represent trade barriers, the indexes of Non-Tariff Barriers (ntb) and of Mean Tariff Rate (mtr) were introduced. These variables were quantified for use as indexes. Contrary to the 'conventional' notion, as the index value of these variables is higher, it indicates that the Non-Tariff Barrier or Mean Tariff Rate is lower, accordingly. The former ranges from 2.4 to 9.8 while the latter from 0 to 10. These variables were obtained from WDI too. Because these four variables were all time series data, data for 2003, 2005, and 2007 were used for consistency with the trade data and the religious freedom index data. As shown in Annex Table 1, these four indexes were all positively correlated. As the level of Freedom to Trade Internationally (fti) is high, the level of Legal System and Property Right (lspr) is high, and the levels of Non-Tariff Barriers (ntb) and of Mean Tariff Rates (mtr) are low, accordingly.

The basic ideas regarding the empirical analysis in this Section are as follows. Religious regulation and support would restrict services imports more in a country where the trade regime is weak (levels of lspr and fti are lower). Annex Table 1 shows the correlation among the three religion-related variables (gri, gfi, sri), and lspr and fti. Governmental regulation on religion (gri) and social regulation (sri) were negatively correlated with lspr and fti. In contrast, GFI was positively correlated with lspr and fti, which is different from the expected sign. Because the dependent variable of the regression equation is 'the amount of services

exports from country i to country j', the governmental support (gfi) and regulation (gri) and social regulation (sri) regarding religion in service-importing country j and the lspr in the same country j were used to make the three interaction variables (lspr*gfi_im, lspr*gri_im, lspr*sri_im). Likewise, another three interaction variables (fti*gfi_im, fti*gri_im, fti*sri_im) between the former three religion-related variables and the Freedom to Trade Internationally (fti) in country j were introduced, and the estimation equation (1) was re-estimated. Because it is expected that religious regulation and favoritism would involve more import-restricting effects in the trade regime in service-importing country j, the six interaction variables are all likely to be negative.

Table 3. Interaction between religious freedom and trade regime

| | Model (13) | Model (14) | Model (15) | Model (16) | Model (17) | Model (18) |
|---|---|---|---|---|---|---|
| lspr*gfi_im | 0.010*** | | | | | |
| | (0.002) | | | | | |
| lspr*gri_im | | -0.016*** | | | | |
| | | (0.002) | | | | |
| lspr*sri_im | | | -0.006*** | | | |
| | | | (0.002) | | | |
| fti*gfi_im | | | | -0.006*** | | |
| | | | | (0.002) | | |
| fti*gri_im | | | | | -0.015*** | |
| | | | | | (0.002) | |
| fti*sri_im | | | | | | -0.018*** |
| | | | | | | (0.001) |
| No. of obs. | 5846 | 5846 | 5846 | 5846 | 5846 | 5846 |
| R-square | 0.59 | 0.61 | 0.57 | 0.57 | 0.62 | 0.57 |

Note: Independent variables such as the log of real GDP in pairs, log of distance, landlocked country dummy, and contiguity country dummy, etc., were included in the regressions but not reported.

Table 3 shows the empirical results. From Model (13) to Model (18), except for Model (13), all showed the expected negative signs, and were statistically significant. As shown in Model (13), the exceptional variable was the interaction variable (lspr*gfi_im) between the service-importing country's legal system and property rights (lspr) and governmental religious support (gfi) in the same country, which was of positive value. In contrast, as shown in Model (16), the interaction variable

(fti*gfi_im) between the service-importing country's free trade index and governmental support for religion in that country (gfi) was negative, as expected. Consequently, it can be said that religious regulation and favoritism exert more import-restricting effects when the trade regime in the service-importing country is weak.

As mentioned above, it is expected that religious regulation and favoritism would exert more import-restricting effects in a service-importing country because the tariff and non-tariff barriers in that country are higher (i.e., the indexes of Non-Tariff Barriers (ntb) and Mean Tariff Rate (mtr) were lower). As shown in Annex Table 1, the three religion-related variables (gri, gri, sri) and Non-Tariff Barriers (ntb) and Mean Tariff Rate (mtr) were all negatively correlated, except the relationship between gfi and ntb.

Likewise, the six interaction variables (ntb*gfi_im, ntb*gri_im, ntb*sri_im; mtr*gfi_im mtr*gri_im, mtr*sri_im) between these indexes and the former three religion-related variables were introduced and regression equation (1) was re-estimated. All six interaction variables would be expected to be negative. Table 4 shows that in all Models, from (19) to (24), all six variables were negative, as expected. It was found that religious regulation and favoritism had more import-

Table 4. Interaction between religious freedom and trade barriers

| | Model (19) | Model (20) | Model (21) | Model (22) | Model (23) | Model (24) |
|---|---|---|---|---|---|---|
| ntb*gfi_im | -0.003*** | | | | | |
| | (0.002) | | | | | |
| ntb*gri_im | | -0.017*** | | | | |
| | | (0.002) | | | | |
| ntb*sri_im | | | -0.014*** | | | |
| | | | (0.002) | | | |
| mtr*gfi_im | | | | -0.003* | | |
| | | | | (0.002) | | |
| mtr*gri_im | | | | | -0.014*** | |
| | | | | | (0.002) | |
| mtr*sri_im | | | | | | -0.013*** |
| | | | | | | (0.001) |
| No. of observations | 5580 | 5580 | 5580 | 5819 | 5819 | 5819 |
| R-square | 0.57 | 0.61 | 0.56 | 0.57 | 0.61 | 0.56 |

Note: Independent variables such as the log of real GDP in pairs, log of distance, landlocked country dummy, and contiguity country dummy, etc., were included in the regressions but not reported.

restricting effects in a service-importing country when the Non-Tariff Barriers (ntb) and Mean Tariff Rate were high in that country.

# 6 Conclusions

Previous research has confirmed that religion affects international trade by shaping cultural and institutional traits. However, the impacts of religious freedom on international trade have not been explored previously. I sought to fill this gap by investigating empirically how religious freedom affects international trade: in particular, the impacts of religious regulation and favoritism on trade in goods and services. Considering the nature of trade in services, including their intangibility, non-storability, and the simultaneity of production and consumption, trust can be a more important factor for trade in services than for trade in goods. In this respect, religious freedom can enhance trust among the people engaged in trade in services together with an institutional regime to guarantee the enforcement of international contracts among different religious adherents.

Using gravity models with the Poisson pseudo-maximum likelihood (PPML) technique to correct for the presence of heteroskedasticity and zero trade flows, I estimated the effects of religious regulation and favoritism on goods and services trade covering 2003, 2005, and 2007, based on the ARDA (2008) data.

I found that religious regulation and favoritism discouraged international trade in both goods and services. Second, governmental regulation and social regulation of religion have a greater negative impact on services trade than goods trade. Third, social regulation of religion exerts negative influences on services trade more than governmental regulation and favoritism in relation to religion, and this effect on services trade is even greater than on goods trade.

To examine further the effects of religious freedom on services trade, additional empirical analyses were conducted on the relationship between three religion-related variables: i.e., governmental regulation or favoritism and social regulation of religion, and the trade regime in a service importing country on one hand, and the relationship between

these three variables and tariff/non-tariff barriers in a service importing country on the other. As a result, the following aspects were also observed. First, governmental favoritism and regulation and social regulation of religion involved more import-restricting effects when the trade regime in the service-importing country was weak. Second, governmental regulation and favoritism and social regulation of religion exerted more import-restricting effects when the tariff/non-tariff barriers in the service-importing country were high.

The results of this study demonstrate that religious freedom provides more opportunities to trade. As to the significance of these study findings regarding policy implications, a service-importing country's religion-related policies and institutions may be considered as major variables when a country seeks to expand or vary its services export market. Indeed, governmental favoritism or regulation or social regulation of a certain religion in a service-importing country involves negative effects on services trade. Moreover, more attention may have to be paid to the social regulation of religion in a service-importing country than to governmental regulation or favoritism in that country.

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Annex Table 1: Correlation matrix

| | gri | gfi | sri | lspr | ntb | mtr | fti |
|---|---|---|---|---|---|---|---|
| gri | 1.00 | | | | | | |
| gfi | 0.40 | 1.00 | | | | | |
| sri | 0.74 | 0.42 | 1.00 | | | | |
| lspr | -0.16 | 0.10 | -0.08 | 1.00 | | | |
| ntb | -0.18 | 0.09 | -0.10 | 0.66 | 1.00 | | |
| mtr | -0.29 | -0.01 | -0.19 | 0.53 | 0.52 | 1.00 | |
| fti | -0.13 | 0.11 | -0.17 | 0.54 | 0.66 | 0.63 | 1.00 |