How does religion bias the allocation of Foreign Direct Investment? The role of institutions[1]

Jérôme Hergueux[2]

ABSTRACT. We construct a gravity model of worldwide foreign direct investment stock (FDI) in order to study the effect of religion on FDI allocation. We establish empirically that both bilateral religious similarity and bilateral religious diversity foster FDI at the country pair level. These apparently contradicting results confirm an empirical puzzle that has already emerged in the literature, particularly in the case of trade in goods. We investigate whether the answer to this puzzle could lie on the fact that the effect of these two variables play for different types of countries, depending on the level of efficiency of their institutions.

JEL Classification: F21; F23; O50; Z12.
Keywords: Culture; Religion; Institutions; Trust, Foreign Direct Investment.

RÉSUMÉ. Nous construisons un modèle de gravité des stocks d'investissements directs à l'étranger (IDE) détenus au niveau mondial afin d'étudier l'effet de la religion sur l'allocation des IDE. Nous établissons empiriquement que la proximité religieuse bilatérale et la diversité religieuse bilatérale favorisent toutes deux les IDE entre couples de pays. Ces résultats apparemment contradictoires confirment une énigme empirique déjà observée dans la littérature, particulièrement dans le cas du commerce de biens. Nous formulons et testons l'hypothèse selon laquelle la solution à cette contradiction pourrait se trouver dans le fait que ces deux variables jouent pour différents types de pays, en fonction du niveau d'efficacité de leurs institutions.

Classification *JEL* : F21; F23; O50; Z12.
Mots-clefs : Culture ; religion ; institutions ; confiance ; investissements directs à l'étranger.

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2. University of Strasbourg, Large and Sciences Po, Department of Economics. Research Fellow, Berkman Center for Internet & Society at Harvard University. 23 Everett Street, 2nd floor, Cambridge, MA, 02138, USA. Tel: +1 617-495-7547. E-mail: jhergueux@cyber.law.harvard.edu

1.   INTRODUCTION

In the last decade, the literature in international economics has been increasingly concerned about uncovering the cultural determinants of economics exchanges. Behind this empirical inquiry is the idea that culture may be thought of as a comprehensive system of moral values and behavioural standards that emerges in order to foster trust and economic cooperation in human communities (Henrich *et al.*, 2004). If the purpose of culture is to promote proximity and trust among individuals and if, as Kenneth Arrow wrote, "every commercial transaction has within itself an element of trust" (Arrow, 1972, p. 357), then culture is likely to have a significant impact on economic exchanges. This issue has generally been addressed by testing for the significance of several indicators of cultural proximity in economic models of international transactions. Among potential vectors of cultural proximity, religion has received some particular attention. This is both because of data availability and of religion's pervasive influence on the definition of the moral values and behavioural standard that are specific to any given culture, an idea which traces back to Weber (1904), and has recently been investigated in empirical work such as Guiso *et al.* (2003).

Typically, religion has entered empirical economic analysis in two different ways. On the one hand, it has been investigated whether more religious proximity between two countries is associated with a rise in the volume of trade between them. Guo (2004), Helble (2007) and Guiso *et al.* (2009) find this to be the case. Guiso *et al.* (2009) show that the effect of religious proximity is further strengthened if one focuses on trade in differentiated goods. Because trade in differentiated goods is thought to be much more trust intensive than trade in homogeneous goods, the authors interpret this as evidence that the effect of religious proximity on economic exchanges is mediated by an increase in the level of bilateral trust. On the other hand, some other empirical studies in international economics like Helble (2007) and Dolansky and Alon (2008) have followed the track opened by Barro and McCleary (2003) who established a robust empirical correlation between the level of religious diversity within a country and its economic growth prospects. These authors find that more religiously diverse country pairs generally sustain higher levels of economic exchanges. The theoretical rationale as to why this should be the case has nothing to do with trust. The argument globally revolves around the fact that more religiously diverse countries should be more open-minded, more innovative and less risk averse. Individuals accustomed to religious diversity should thus be more willing to explore and engage in potentially beneficial economic exchanges opportunities, because of their increased open-mindedness and capacity to understand and integrate competing world views and managerial practices.

At the end of the day, the current literature leaves us with one puzzling empirical result: at the country pair level, both religious similarity and religious diversity are found to foster trade. Helble (2007) finds the effect of religious diversity to be consistently stronger than the effect of religious proximity. He concludes that "a common religion may favor trade, but the presence of many religions should be clearly preferred" (Helble, 2007, p. 410).

The primary goal of this paper is twofold:

1. To see whether those apparently conflicting results can extend to the case of another type of economic transaction: foreign direct investment (FDI). There are two main reasons for the focus of this paper on FDI. First, an FDI is no more than an investor deciding to transfer some capital in a foreign country, anticipating that he will be able to repatriate his profits. This type of long term investment should therefore be particularly vulnerable to any form of mistrust, for it can imply high sunk costs. This means that if religion really has an effect on economic exchanges through trust, it should reveal itself particularly strongly for FDI. Second, while some papers have already studied the effect of religion on trade in a systematic fashion, this has not been the case for FDI.

2. As it turns out that this empirical puzzle also applies to FDI, we build on a theoretical framework initially developed by Greif (1994; 2006) in order to propose and put to test an explanation for this result. We argue that religious similarity is a natural and non costly signal that helps breeding trust and promoting economic exchanges for countries that have relatively weak institutions. In these countries, national institutions tend to inconsistently define and protect property rights. Religious proximity thus acts as a convenient manner to deal with uncertainty, as it provides both parties with an informal way to insure that trust will be reciprocated and that free-riding types of behaviour will be prevented. Conversely, religious proximity loses its comparative advantage for breeding trust and securing property rights to formal institutions in countries that effectively have the means to incur the costs of making them work efficiently. In the more institutionally developed countries, religious proximity should thus have less of an influence on the volume of economic exchanges.

In addition, the institutionally developed countries are also the ones that are the more likely to extract the benefits, if any, that arise from hosting a high number of religious communities. Indeed, a high level of religious diversity in weak institutions countries can foster tensions in community relations rather than open-mindedness and innovation. Hence, contrary to what we expect for religious proximity, the positive impact of religious diversity on the volume of economic exchanges should be stronger for countries that are highly institutionally developed. All in all, our hypothesis boils down to saying that if both religious proximity and religious diversity foster economic exchanges, it may be because their effect plays for different types of countries, depending on the level of efficiency of their formal institutions.

As a secondary research issue, we also note that the concept of religious similarity that we use in this paper does not allow to distinguish between the potentially different effects of hosting a common religious majority or a common religious minority. A country pair may be considered more religiously proximate both because it has a common religious majority or a common religious minority. Distinguishing between those two can turn out to be important. Rauch and Trindade (2002) and Helble (2007) show that ethnic and religious cross border minorities are very efficient at fostering international trade. We thus try to explore whether this is also the case for FDI stock.

In terms of methodology, we use a dataset constructed by McCleary and Barro (2006) which provides the share of the population affiliated with each of 7 major religious denominations in 192 countries to construct indicators of religious proximity, religious diversity, common religious majority and common religious minority at the country pair level. We then construct a gravity model of FDI and try to test our hypothesis by running controlled regressions of worldwide bilateral FDI stock on our 4 religious variables, interacting them when needed with indicators of the efficiency of the institutions in the considered countries. Note that the focus of this paper is on estimating the impact of our religious variables on worldwide FDI stock allocation, *without distinguishing between each actual religious denomination*. We think that this approach is appropriate because it sidesteps the difficulty of having to state hypothesis about the relative efficiency of different religious denominations for promoting interpersonal trust and economic exchanges. Rather, it is much simpler to stick to the functionalist hypothesis that any religion is a comprehensive system of moral values and behavioural standards that emerges in order to foster trust and economic cooperation at the community level.

The rest of the paper proceeds as follows. Section 2 briefly provides some background about how religion, institutions and trust may be important for promoting economic exchanges, with some special focus on FDI. Section 3 describes the religious variables and the identification strategy. Section 4 and 5 respectively present the empirical results and robustness checks. Section 6 provides some concluding remarks.

2. RELIGION, INSTITUTIONS, TRUST AND ECONOMIC EXCHANGES: SOME BACKGROUND

In this section, we first review the existing evidence on the potential role of religion for promoting interpersonal trust, securing property rights and promoting economic exchanges. We then develop a theory as to how religion may interact with the quality of formal institutions in order to foster trust and economic exchanges. We finish by presenting a very simple model explaining how trust may enter FDI allocation decisions.

2.1. Why should religion matter for trust and economic exchanges?

The idea that culture may be thought of as a comprehensive system of moral values and behavioural standards that emerges in order to foster interpersonal trust and cooperation at the community level has been first proposed in the field of evolutionary biology (Sober and Wilson, 1998; Richerson and Boyd, 2004). Human societies rest on the capacity of individuals to cooperate with one another in order to achieve mutually beneficial goals. However, those who commit themselves to cooperating often take the risk that others may choose a free-riding type of behaviour in which they benefit from cooperation without incurring its cost. In this prisoner's dilemma type of social interactions, a cooperative equilibrium can only be sustained at the society's level if individuals have good reasons *ex ante* to *trust* others, *i.e.* to believe that they will keep up with their cooperative commitments. The essence of what

we call "culture" would be to provide individuals with moral values that prevent free-riding types of behaviour and with behavioural standards that help individuals form an expectation about the probability that such behaviour will be undertaken. In the field of economics, Henrich *et al.* (2004) have begun to test empirically this hypothesis. It has also inspired several empirical works investigating the role of culture in fostering interpersonal trust and promoting economic growth (Algan and Cahuc, 2010) or economic development (Tabellini, 2010).

Among cultural vectors, religion is thought to be one powerful vehicle for inculcating specific moral values and behavioural standards in a group of individuals (Atran and Norenzayan, 2004; Durkheim, 1912; Irons, 1991; Wilson, 2002). Experimental evidence tend to support this theory (Shariff and Norenzayan, 2007; Sosis and Ruffle, 2004). The moral values that any religion promotes are backed up by the believer's faith in their sacrality, while the behavioural standards that it advocates constitute an implicit and community specific *language* which breeds cultural proximity and trust between individuals (Iannaccone, 1998). Even in highly developed countries where religion generally plays less of a direct social role, the moral values and behavioural standards that it advocates continue to influence the way individuals tend to manage their daily interactions (Kaufmann, 1997).

When it comes to economic transactions, there are numerous ways through which a party can try to free-ride on his counterpart, so that trust should be an important element of any commercial transaction. Several case studies like Ensminger (1997), Richman (2002) or Greif (2006) shed light on religion's role for breeding trust and promoting economic exchanges between trading partners. This qualitative material begins to be supplemented by some quantitative analysis (Michalopoulos *et al.*, 2010). Empirically, however, it is difficult to claim that any statistical association between religion and the volume of economic exchanges is mediated by an increase in trust, for it is subject to the difficulty of gathering reliable data on bilateral trust levels. Guiso *et al.* (2009) directly address this difficultly by using survey answers to compute a matrix of bilateral trust levels for 18 countries mostly located in the European Union. They obtain that "religious similarity has a positive impact on trust: compared to a case where no common religion is shared, a match where 90% of the citizens share the same religion (*e.g.*, Italy and Spain) raises trust by 15 percentage points (corresponding to 40% of its standard deviation)" (Guiso *et al.*, 2009, p. 1112). They then show that the variance in bilateral trust levels which is explained by religious proximity has a significant impact on the volume of trade that occurs between European countries.

2.2. How should religion interact with the quality of formal institutions for promoting trust and economic exchanges?

North (1990, p. 3) defines institutions as "the rules of the game in a society or, more formally, humanly devised constraints that shape human interaction". Within any society, North explains, this bundle of rules and constraints is devised in order to prevent free-riding types of behaviour and promote trust in social and economic interactions. In the view of evolutionary biology, religious moral values and behavioural standards are typically the kind

of rules that emerge spontaneously in a society in order to prevent free riding and promote cooperation. These rules can thus be considered as "institutions" in their own right. However, economists have been traditionally more concerned about studying the impact of another kind of rules and constraints. Those rules and constraints, let us call them "formal institutions", do not emerge spontaneously but are the result of a procedure which organises those rules in a hierarchical system that we call the "law". Roughly speaking, what distinguishes those juridical rules from the cultural or religious ones is that those who break them *systematically* incur the risk that somebody asks for the enforcement of the rule by a third party (*i.e.* the police) to the judiciary. In the case of FDI, studies by Wei (2000) and Stein and Daude (2001) show that bad quality of formal institutions in the host country is highly detrimental to its FDI prospects.

Focusing on the case of international trade, Greif (1994; 2006) shows both theoretically and empirically that religious norms and behavioural standards have been relied upon very early in history in order to promote trust and cooperation between trading partners of the same religious community. The invention of what we call "formal institutions" is in fact quite recent and is the result, Greif argues, of the progress of communication and transport technologies which allowed profitable large scale economic exchanges between different communities to occur. The fixed and variable cost of establishing and making those formal institutions work efficiently is very high, but if done properly, it permits to prevent free-riding types of behaviour more efficiently and enables to breed trust and cooperation even between communities that do not share the same culture or religion. As a result, the role of religious proximity for breeding trust and promoting economic exchanges should be decreasing with the efficiency of a country's formal institutions.

If verified empirically, this reasoning could provide an explanation for the puzzling empirical result that both religious similarity and religious diversity seem to have a positive impact on bilateral trade volumes. The effect of these two variables could in fact play for different types of countries, depending on the level of efficiency of their formal institutions. Thus, religious similarity should play more of a role for promoting economic exchanges in countries that have relatively weak formal institutions. Conversely, it is also likely that the benefits, if any, from hosting a wide variety of religious communities in terms of increased open-mindedness and capacity to understand and integrate competing world views and managerial practices will only arise in countries that have the means to ensure that inter-community relationships goes smoothly, that is in countries that have relatively strong formal institutions. Guo (2004) investigates empirically the role of religious similarity for fostering trade between the United States, China and their respective trading partners. He notices that "the effect of religious similarity on foreign trade becomes less important with greater per capita GNP" (Guo, 2004, p. 804). Given that the efficiency of a country's formal institutions is highly correlated to its GDP per capita (Stein and Daude, 2001), the above hypothesis could also provide an explanation for this kind of results.

2.3. How does trust enter FDI stock allocation decisions[3]?

Let us consider a party *A* who has a long term investment opportunity in a foreign country with party *B*. In order to find out if this long term investment opportunity has a positive net present value, *A* has to incur an investigation cost *c*. After this cost is paid, *A* knows with certainty if his opportunity is profitable ($Vh > 0$, with probability *p*) or not ($Vh < 0$, with probability $1 - p$).

If the net present value of the long term investment project happens to be positive (*i.e.* $Vh > 0$), *A* can enter into a contractual relationship with *B*. In doing so, however, *A* assumes that *B* will behave according to the terms of the contract, that is in a cooperative fashion. This is because once the investment decision has been taken, *B* can always choose to cheat on *A* and prevent him from repatriating his profits and selfishly hoarding all of the *Vh* quantity. Knowing this risk *ex ante*, *A* tends to attribute a probability π to this event. Hence, the *ex ante* payoff *P* of *A* is given by the following quantity:

$$P = [p(1 - \pi).Vh] - c \qquad (1)$$

Subsequently, *A* will pay the investigation cost *c* and eventually take advantage of this long term investment opportunity (if it is profitable, *i.e.* if $Vh > 0$) if and only if the quantity *P* is positive. This means that no matter how big the net present value of the long term investment opportunity *Vh* may be, and no matter how small the investigation cost *c* is, if the interpersonal trust level $(1 - \pi)$ between *A* and *B* is sufficiently low, the long term investment opportunity will never be investigated and hence never undertaken. The fundamental question is then to investigate how *A* will frame his expectation about the probability π that *B* will defect once he decided to invest. Within our theoretical framework, both religious proximity and the quality of formal institutions in the host country are criteria that should decrease *A*'s expectation about the probability π that *B* will ultimately choose a free-riding type of behaviour. In addition, the conscious or unconscious prominence of religious proximity as such a criterion for *A* should be decreasing with the quality of formal institutions in *B*'s country.

Head and Ries (2008) point out that about two-third of FDI actually take the form of mergers and acquisitions (M&A) rather than new plants. They conclude that FDI are primarily the manifestation of an international market for corporate control. In an alternative model in which headquarters bid to control overseas assets, Head and Ries argue that the higher the inspection costs of the local subsidiary managers for the headquarters management team, the lower the value of the subsidiary to headquarters. Hence, "if two head offices of equal potential value-added [are] bidding, the one with lower inspection costs [will] bid higher" (Head and Ries, 2008, p. 5). In such a setting however, the theoretical role of religious proximity for promoting interpersonal trust, reducing inspection costs and promoting FDI remains the same, even more so that most M&A are indeed friendly rather than hostile.

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3. This section builds on Guiso *et al.*'s (2009) model of the role of trust in economic decisions.

3.   EMPIRICAL STRATEGY

3.1. Data and religious variables

Our data on worldwide bilateral FDI stock is taken from the OECD database for the year 2006. It provides bilateral FDI stock for 27 source countries and 190 destination countries (see the data appendix for more details). The calculation of our religious variables is based on McCleary and Barro's (2006) database[4]. It provides the share of the population affiliated with each of 7 major religious denominations in 192 countries: r = Catholic, Protestant, Jewish, Muslim, Hindus, Buddhist and Orthodox. Remaining religious affiliations are merged into two heterogeneous categories labelled "other eastern religions" and "other religions". Non religious people are gathered into a "no religion" category. All of the data is collected from surveys based material in which people state by themselves the religion, if any, to which they adhere. Using such a dataset is arguably more relevant than the country wide estimations of religious affiliations conducted by the CIA World Factbook or Britannica Book of the Year. As far as behaviour is concerned, and notwithstanding the limited reliability and availability of institutional statistics on religion (Helble, 2007), it is better to know whether somebody considers himself as pertaining to one particular religious group rather than to know if some international institution classifies him as such.

Following Helble (2007) and Guiso *et al.* (2009), we introduce religious proximity between two countries as the empirical probability that two randomly chosen individuals in each country will share the same religion. Let us call this variable *Religious Similarity*. We compute it by taking the product of the fraction of individuals in country i and in country j who are affiliated to religion r and by summing up across all religions r. We leave the categories recorded as "other eastern religions", "other religions" and "no religion" out of the calculation. According to our argument about how religion should impact trust and FDI, including these heterogeneous categories doesn't make much sense and may introduce noise in the variable's calculation. Hence, we calculate bilateral religious similarity according to the following formula[5]:

$$Re\,ligious\ Similarity_{i,j} = \sum_{r=1}^{n} r_i . r_j \qquad (2)$$

According to this definition, a country pair can be considered relatively more religiously proximate both because it has a common religious majority or a common religious minority. This definition is practical, but it prevents from distinguishing between the potentially different effects of hosting a common religious majority or a common religious minority on trust and FDI: is the magnitude of religion's effect strengthened when two countries have an increasing part of their population which is affiliated to the same religion, or

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4. This database is freely available at: http://rbarro.com/data-sets/. It is described in details in McCleary and Barro (2006).
5. For instance, the Religious Similarity score of the country pair "Poland-Afghanistan" is near from 0. Conversely, the Religious Similarity score of the country pair "Turkey-Tunisia" is near from 1.

are religious minorities also efficient at sustaining cross border trust and promoting FDI? Indeed, Rauch and Trindade (2002) and Helble (2007) find that ethnic and religious cross border minorities are also very efficient at promoting international trade. In order to disentangle between those two options, we compute two dummy variables along with the Religious Similarity variable. One is for two countries sharing a common religious majority (*Common Maj. Religion*), *i.e.* more than 50% of the population is affiliated to the same religion in both countries. The other is for two countries sharing a common religious minority (*Common Min. Religion*), *i.e.* between 5 and 50% of the population is affiliated to the same religion in both countries.

Finally, we also compute an indicator of religious diversity in both countries. Following McCleary and Barro (2003), we calculate the Herfindahl index of religion in each country (*i.e.* an indicator of the concentration of each country's religious market) and take 1 minus this quantity. Then, we compute the product of the two indicators for each couple of countries. We obtain a variable which grows to one when both countries tend to host a higher number of religions with their market shares being distributed as evenly as possible. Hence, religious diversity is calculated according to the following formula[6]:

$$Religious\ Diversity_{i,i} = \left(1 - \sum_{r=1}^{n} r_i^{\,2}\right).\left(1 - \sum_{r=1}^{n} r_j^{\,2}\right) \tag{3}$$

Most empirical works which included a religious proximity variable as a control in their estimations so far assumed that religion should be controlled for because people generally exchange with whom they can understand and look like them. However, religious diversity has also received some attention from empiricists. Barro and McCleary (2003) show that more religiously diverse countries have better economic growth prospects. Helble (2007) and Dolansky and Alon (2008) find that more religiously diverse country pairs generally sustain higher levels of economic exchanges. We include this variable in the analysis in order to see if we can reproduce this result in the context of FDI.

3.2. Identification strategy

We estimate a gravity model of bilateral FDI stock. The use of the gravity model to estimate bilateral FDI stock traces back to Eaton and Tamura (1994). It generally fits the data very well. Kleiner and Toubal (2010) provide a theoretical framework for analysing this empirical success. Baldwin and Taglioni (2006) analyse and propose convenient corrections for the most frequent errors that are made in empirical works which estimate gravity models. In this paper, we do not resort to the OLS estimation technique. This is because resorting to a linear model for estimating FDI stock implies that the left-hand side variable should be log-linearized. However, a lot of country pairs do not share FDI stock. Those zero observations are then often dropped out of the dataset. About half of the observations in our database are recorded as zero, so that the selection bias in this case

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6. For instance, the Religious Diversity score of the country pair "Turkey-Mauritania" is near from 0. Conversely, the Religious Diversity score of the country pair "South Korea-China" is near from 1.

is likely to be substantial. In order to cater with this issue, some authors estimate the model using $ln(\alpha + fdi)$ as the dependent variable, with α being a small quantity comprised between 0 and 1. However, FDI are generally reported in millions of USD, which results in introducing a significant bias in the data.

Santos Silva and Tenreyro (2006) point at another important issue with log-linearized estimation techniques. They show that because the expected value of a logarithm is not equal to the logarithm of the expected value (*i.e.* $E(ln\,y) \neq ln\,E(y)$), the estimated coefficients of these models are severely biased in the presence of heteroskedasticity. They use Monte Carlo simulations to illustrate this fact under various patterns of heteroskedasticity. As a convenient alternative, the authors propose to estimate these models using the Poisson pseudo-maximum likelihood technique, whose estimates are not affected by this problem[7]. Since heteroskedasticity is an issue in the OECD dataset (Breusch-Pagan test: $p < 0.000$) and since the Poisson estimation technique is also a natural way to deal with the large number of zero observations in the data, we use this technique in order to estimate our gravity models.

Following Anderson and Van Wincoop (2003), we include country of origin and country of destination fixed effects in all the regressions. This procedure enables us to control properly for all the effects that are specific to any given home and host country in the sample. As a consequence, we must only include bilateral variables as control variables in the model. Along with the religious variables, we include 4 standard gravity control variables[8]:

– *ln Distance*: the logarithm of the distance between the two countries' largest cities, weighted by the share of each city on the total population of the country considered.
– *Contiguity*: a dummy variable which indicates if the two countries share a common border.
– *Common language*: a dummy variable which indicates if a common language is spoken at least by 9% of the population in the two countries.
– *Colonial relationship*: a dummy variable which indicates if the two countries have ever had a colonial link in their past history.

Expressed in more formal terms, we estimate the following gravity model:

$$E(fdi_{i,i}) = c.Bil_{i,i}^{\alpha}.Rel_{i,i}^{\beta}.Home_i^{\gamma}.Host_i^{\delta} \tag{4}$$

where *c* is a constant, $Bil_{i,i}$ is the set of bilateral controls, $Rel_{i,i}$ is the set of the bilateral religious variables of interest and $Home_i$ and $Host_i$ are the set of country of origin and country of destination fixed effect.

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7. See Wooldridge (2002 chapter 19) for further details on this point.
8. The standard gravity control variables used in this paper are those of the Cepii. The database is freely available at: http://www.cepii.fr/anglaisgraph/bdd/distances.htm

4.   RESULTS

4.1.   Religion and foreign direct investment

TABLE 1 presents the results of gravity model (4). Column (1) presents the estimates of the baseline model, *i.e.* without the religious variables. All bilateral control variables are correctly signed and of the usual magnitude found in this kind of empirical work (for the sake of comparison, see for instance Head and Ries (2008)). The overall fit of the model is rather high (pseudo $R^2 = 0.92$). This is mainly due the inclusion of country of origin and country of destination fixed effects, which systematically capture all effects that are particular to the home and the host country for any given country pair. As the contiguity and the colonial relationship variables turn out to be insignificant when estimating gravity model (4), we leave them out of the analysis in our subsequent estimations[9].

In model (2) to (5), we include each religious variable in turn. In line with our hypothesis, we observe that both religious similarity and religious diversity have a positive and strongly significant impact on bilateral FDI stock[10]. This result holds when we include these two variables in the model at the same time (model (6)). It also holds when we include all four religious variables in the model (model (7)). In this case, however, the religious similarity variable is only significant at the 10% level, which is likely to be due to high multicollinearity between this variable and the common religious majority variable (see the data appendix for more details on this point).

In addition, we observe in models (3) and (4) that the coefficients on the common religious majority and the common religious minority variables are positive and statistically significant, respectively at the 1% and 5% levels. This result indicates that along with sharing a religious majority, sharing a religious minority also tends to foster FDI at the country pair level. This result is consistent with what Helble (2007) finds in the case of trade. As one could expect, however, both variables lose all statistical significance when included along with the religious similarity variable in model (7).

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9. Including those variables does not change the nature of our results.

10. One anonymous referee pointed out that because a significant share of the population in many FDI source countries in the sample is either Catholic or Protestant, the religious similarity variable could be largely capturing some Christian religion effect. It turns out that this is not the case. By disaggregating our common religious majority and common religious minority variables by religion, we obtain positive and highly statistically significant effects for all religions for which we have sufficient data to estimate a coefficient (*i.e.* the Catholic, Protestant, Orthodox and Muslim religions for common religious majorities; the Catholic and Muslim religions for common religious minorities). When Protestantism is considered as a common religious minority, the estimated coefficient is positive but not statistically significant. The only case that does not explicitly fit within our theoretical framework is when Islam is considered as a common religious minority (all observations related to France as the FDI source country). In this case, the coefficient is actually negative and statistically significant.

Table 1 – Religion and foreign direct investments

Dependent variable: bilateral FDI stock

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
ln Distance	−0.473***	−0.472***	−0.481***	−0.493***	−0.477***	−0.465***	−0.464***
	(0.058)	(0.043)	(0.043)	(0.044)	(0.042)	(0.042)	(0.042)
Common language	0.365**	0.463***	0.497***	0.479***	0.497***	0.478***	0.480***
	(0.153)	(0.134)	(0.134)	(0.136)	(0.127)	(0.125)	(0.126)
Colonial relationship	0.182						
	(0.128)						
Contiguity	0.194						
	(0.150)						
Religious Similarity		1.450***				1.004***	1.055*
		(0.397)				(0.346)	(0.594)
Common Maj. Religion			0.590***				−0.002
			(0.150)				(0.259)
Common Min. Religion				0.309**			−0.131
				(0.136)			(0.142)
Religious Diversity					2.628***	1.931***	2.221***
					(0.626)	(0.591)	(0.731)
Constant	6.991***	4.216***	4.363***	4.383***	3.939***	3.924***	3.908***
	(0.750)	(0.727)	(0.716)	(0.698)	(0.659)	(0.677)	(0.678)
Country of origin fixed effects	YES	YES	YES	YES	YES	YES	YES
Country of destination fixed effects	YES	YES	YES	YES	YES	YES	YES
Observations	3375	3286	3286	3286	3286	3286	3286
Pseudo R-squared	0.92	0.93	0.93	0.92	0.93	0.93	0.93

Notes: All models are estimated through the Poisson pseudo-maximum likelihood technique. Robust standard errors are clustered at the country-pair level and reported in parentheses. ***, ** and * denote statistical significance at the 1%, 5% and 10% level.

4.2. Interacting religion with the quality of formal institutions

So far, we have been able to replicate for FDI the result that seems to emerge from the recent literature on international trade: both a rise in bilateral religious similarity and bilateral religious diversity is associated with a rise in FDI stock prospects. In this section, we try to test whether the answer to this puzzle could lie on the fact that the positive effect of these two variables on bilateral FDI stock plays for different types of countries, depending on the quality level of their formal institutions. We hypothesize that religious similarity should play more of a role for breeding interpersonal trust and promoting FDI in countries that have relatively weak formal institutions. Conversely, we state that if religious diversity can promote bilateral FDI, it should be in countries that have relatively strong formal institutions.

In order to test for this possible explanation, we add in the regressions an interaction term between both indicators of religious similarity and religious diversity and some indicators of the quality of the formal institutions in the host country in 2005[11]. This is one year prior to the FDI stock allocation decisions under analysis, which makes sense as FDI opportunities are usually evaluated ahead of time and take some time to implement. If the above hypothesis is correct, then the coefficients on the interaction terms should be negative for religious similarity and positive for religious diversity. We select two alternative indicators of the quality of formal institutions in the host country to perform this test. Both are computed by Kaufmann *et al.* (2006) as part of the World Bank's Worldwide Governance Indicators project. For each country, the authors combine the views of a large number of enterprise, citizen and expert survey respondents drawn from a wide variety of survey institutes, think tanks, non-governmental organizations, and international organizations into single dimension governance indicators. As a first indicator, we take the quality of the rule of law as a quite broad measure of the quality of formal institutions in the host country. As a second indicator, we take the first and most studied institutional determinant of FDI (Wei, 2000): the level of corruption (with a higher score meaning less corruption). The results are displayed in Table 2.

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11. We do not consider the quality of the institutions in the home country because this variable has proven itself to be a poor predictor of outward FDI (see Bénassy-Quéré *et al.* (2007)).

Table 2 – Interaction between religion and the quality of institutions

Dependent variable: bilateral FDI stock

	(1)	(2)	(3)	(4)
ln Distance	−0.503***	−0.501***	−0.487***	−0.485***
	(0.043)	(0.043)	(0.042)	(0.042)
Common language	0.453***	0.450***	0.485***	0.486***
	(0.129)	(0.129)	(0.126)	(0.127)
Religious Similarity	2.564***	2.612***		
	(0.384)	(0.390)		
Interaction Religious Similarity*rulelaw	−1.012***			
	(0.272)			
Interaction Religious Similarity*corruption		−0.978***		
		(0.262)		
Religious Diversity			1.587**	1.918***
			(0.669)	(0.704)
Interaction Religious Diversity*rulelaw			0.639**	
			(0.256)	
Interaction Religious Diversity*corruption				0.396*
				(0.236)
Constant	4.317***	4.352***	4.114***	4.063***
	(0.715)	(0.712)	(0.657)	(0.659)
Country of origin fixed effects	YES	YES	YES	YES
Country of destination fixed effects	YES	YES	YES	YES
Observations	3286	3270	3286	3270
Pseudo R-squared	0.93	0.93	0.93	0.93

Notes: All models are estimated through the Poisson pseudo-maximum likelihood technique. Robust standard errors are clustered at the country-pair level and reported in parentheses. ***, ** and * denote statistical significance at the 1%, 5% and 10% level.

We observe that the empirical results are in line with our hypothesis. The coefficients on the interaction terms between religious similarity and the quality of formal institutions are both negative and highly statistically significant. This result means that the role of religious similarity for promoting FDI tends to weaken as the quality of formal institutions in the host country increases. Stated differently, religious similarity can be considered a substitute to the quality of formal institutions in the host country for promoting trust, reducing transaction or inspection costs and, ultimately, fostering FDI.

Conversely, the coefficients on the interaction terms between religious diversity and the quality of formal institutions are both positive and statistically significant, although at a lesser level. This result indicates that the FDI promoting effect of bilateral religious diversity plays relatively more for countries that already exhibit relatively high quality of their formal institutions.

5.   ROBUSTNESS CHECKS

The advent of the 2007 financial crisis and the liquidity constraints it has generated in many countries around the world has arguably changed much in both the macroeconomic context and main economic determinants of FDI position decisions. One way to grasp this fact is to look at the trend in worldwide FDI outflows:

Figure 1 – FDI Outflows
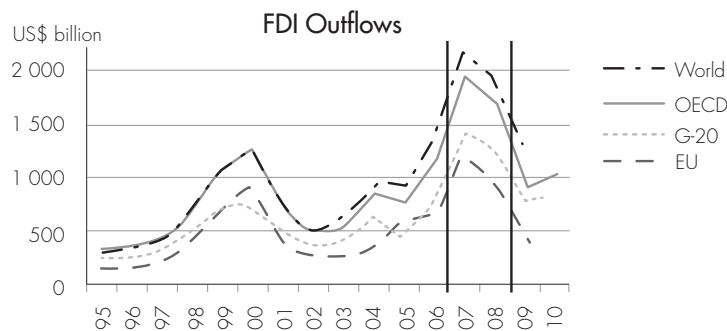
As we can see, worldwide FDI outflows have been steadily increasing from 2002 onwards. A peak is reached in early 2007, at the moment when the financial crisis started to unfold. The years 2007-2008 have seen a very sharp decline in FDI outflows. According to the OECD 2010 Factbook[12], this sharp decline is the consequence of the post financial crisis depressed economic environment and reduction in liquidity availability.

In order to test for the robustness of our results, we thus replicate our analysis of the determinants of worldwide FDI stock positions in the 2008 post financial crisis context. For the sake of comparability, we base the analysis on the very same set of home and host countries and use the same identification strategy. TABLE 3 presents the results of the estimation of gravity model (4) using this new FDI stock dataset.

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12. Freely available online at : http://www.oecd-ilibrary.org/economics/oecd-factbook-2010_factbook-2010-en

Table 3 – Religion and foreign direct investments (post financial crisis)

Dependent variable: bilateral FDI stock

	(1)	(2)	(3)	(4)	(5)	(6)
ln Distance	−0.054	−0.074	−0.081	−0.059	−0.045	−0.034
	(0.128)	(0.129)	(0.129)	(0.128)	(0.126)	(0.127)
Common language	0.659***	0.668***	0.636***	0.662***	0.669***	0.636***
	(0.228)	(0.227)	(0.231)	(0.227)	(0.226)	(0.226)
Colonial relationship	0.103	0.139	0.126	0.136	0.113	0.062
	(0.200)	(0.198)	(0.193)	(0.194)	(0.202)	(0.192)
Contiguity	0.596***	0.580***	0.619***	0.617***	0.599***	0.653***
	(0.196)	(0.197)	(0.198)	(0.196)	(0.195)	(0.197)
Religious Similarity	1.300**				1.077**	2.196***
	(0.510)				(0.512)	(0.823)
Common Maj. Religion		0.319				−0.583
		(0.215)				(0.388)
Common Min. Religion			0.117			−0.115
			(0.177)			(0.189)
Religious Diversity				1.654**	0.911	1.405
				(0.725)	(0.748)	(0.856)
Constant	−0.077	0.172	0.222	−0.179	−0.253	−0.447
	(1.386)	(1.388)	(1.391)	(1.353)	(1.345)	(1.361)
Country of origin fixed effects	YES	YES	YES	YES	YES	YES
Country of destination fixed effects	YES	YES	YES	YES	YES	YES
Observations	3568	3568	3568	3568	3568	3568
Pseudo R-squared	0.88	0.88	0.88	0.88	0.88	0.88

Notes: All models are estimated through the Poisson pseudo-maximum likelihood technique. Robust standard errors are clustered at the country-pair level and reported in parentheses. ***, ** and * denote statistical significance at the 1%, 5% and 10% level.

A clear indication that a change in worldwide FDI stock positions has occurred during the 2006-2008 period is that the distance variable, a generally stable and strong determinant of FDI stock allocation, is no longer significant in any estimation. Conversely, the contiguity variable, which was statistically insignificant in all of TABLE 1's estimations, is now positively and highly significantly associated with a rise in FDI prospects. Note that the model now does a less good job explaining FDI stock position, as its overall fit decreases from pseudo $R^2 = 0.93$ to pseudo $R^2 = 0.88$.

Models (1) and (4) in TABLE 3 confirm that both religious similarity and religious diversity have a positive and statistically significant impact on bilateral FDI stock. When the religious similarity and the religious diversity variables are included in the model at the same time, however, the latter variable now appears as statistically insignificant (model (5)). This is in part likely to be due to high multicollinearity between the religious similarity and the religious diversity variables. The same thing holds when all four religious variables are included in the model at the same time (model (6)). In contrast to the results in TABLE 1, neither the common religious majority (models (2)) nor the common religious minority (model (3)) variables appear as significantly associated with a rise in FDI prospects.

In TABLE 4, we turn to the study of the interaction between both variables of religious similarity and religious diversity and our indicators of the quality of the formal institutions in the host country. Models (1) and (2) confirm the statistical significance and negative sign of the interaction between religious similarity and the quality of formal institutions. Models (3) and (4), however, tend to weaken TABLE 2's results as regards religious diversity: while both interaction terms are actually of positive sign, none of them achieves statistical significance.

Overall, we interpret the outcome of the analysis of the determinants of worldwide FDI stock positions in the 2008 post financial crisis context as globally supportive of our main results: a rise in bilateral religious similarity and bilateral religious diversity are both associated with a rise FDI stock prospects. Moreover, while the positive interaction between bilateral religious diversity and the quality of formal institutions is not confirmed in the 2008 analysis, the negative interaction between this latter variable and bilateral religious similarity is consistently and precisely estimated in all of our models.

Table 4 – Interaction between religion and the quality of institutions (post financial crisis)

Dependent variable: bilateral FDI stock

	(1)	(2)	(3)	(4)
Common language	0.686***	0.669***	0.716***	0.716***
	(0.211)	(0.218)	(0.205)	(0.206)
Contiguity	0.672***	0.680***	0.664***	0.664***
	(0.152)	(0.150)	(0.147)	(0.147)
Religious Similarity	2.193***	2.274***		
	(0.467)	(0.463)		
Interaction Religious Similarity*rulelaw	−0.745**			
	(0.315)			
Interaction Religious Similarity*corruption		−0.765**		
		(0.324)		
Religious Diversity			1.531**	1.645**
			(0.778)	(0.830)
Interaction Religious Diversity*rulelaw			0.128	
			(0.294)	
Interaction Religious Diversity*corruption				0.049
				(0.253)
Constant	−0.759	−0.730	−0.800	−0.808
	(0.575)	(0.572)	(0.506)	(0.507)
Country of origin fixed effects	YES	YES	YES	YES
Country of destination fixed effects	YES	YES	YES	YES
Observations	3568	3549	3568	3549
Pseudo R-squared	0.88	0.88	0.88	0.88

Notes: All models are estimated through the Poisson pseudo-maximum likelihood technique. Robust standard errors are clustered at the country-pair level and reported in parentheses. ***, ** and * denote statistical significance at the 1%, 5% and 10% level.

6. CONCLUDING REMARKS

This paper has established empirically that an increase either in bilateral religious similarity or in bilateral religious diversity are both associated with a rise in FDI prospects at the country pair level. This result extends to FDI an empirical puzzle that has already emerged in the case of trade in goods. Remarkably, in all of our estimations, the estimated FDI promoting effect of religious diversity is higher than that of religious similarity, which is consistent with what Helble (2007) finds in the case of trade. Our value added here rests on the fact that

we provide and put to test an explanation for this empirical puzzle: religious similarity seems to foster FDI relatively more in countries that exhibit relatively low quality institutions, while the reverse holds for religious diversity.

We can thus endorse the conclusion that "a common religion may favor [FDI], but the presence of many religions should be clearly preferred" (Helble, 2007, p. 410). However, this statement may only be true under an institutional condition, that is, if the quality of formal institutions in the host country is sufficiently high. Especially in developing countries where this is not the case, religious similarity remains an efficient substitute to the quality of formal institutions for promoting trust and increasing FDI prospects. In order to confirm this result, we thus suggest that future research should explore this explanation whenever such empirical puzzle has appeared, and particularly in the case of trade in goods.

In the current context of a rise in business opportunities in the developing world, we think that our empirical results provide a strong rationale for the growing practice in business schools to teach students about cultural specificities in economic and business practices. Indeed, religiously based interpersonal trust is generally grounded in the displaying of religion-specific signals of trustworthiness that constitute a real "language" enabling individuals to discriminate, be it consciously or unconsciously, between those who really pertain to their moral community (*i.e.* the trustworthy "insiders") from eventual free-riders (*i.e.* the "outsiders") (Iannaccone, 1998). In our globalizing world, a significant amount of those specific cultural markers of trustworthiness are increasingly easy to recognize and master for anyone interested in learning about them. Hence, their displaying – or a least their understanding – by non community members could be such as to create an intercommunity initial trust base without which some mistrust sensitive economic opportunities, such as an FDI, would not be ever investigated, let alone undertaken.

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DATA APPENDIX

Table A 1 – List of the countries included in the sample

Source countries	Destination countries			
Australia	Afghanistan	Djibouti	Liberia	Sao Tome and Princ.
Austria	Albania	Dominica	Libya	Saudi Arabia
Canada	Algeria	Dominican Rep.	Lithuania	Senegal
Czech Republic	Angola	Ecuador	Luxembourg	Serbia and Mont.
Denmark	Antigua and Barbuda	Egypt	Macao	Seychelles
Finland	Argentina	El Salvador	Macedonia	Sierra Leone
France	Armenia	Equatorial Guinea	Madagascar	Singapore
Germany	Aruba	Eritrea	Malawi	Slovakia
Greece	Australia	Estonia	Malaysia	Slovenia
Hungary	Austria	Ethiopia	Maldives	Solomon Islands
Iceland	Azerbaijan	Fiji	Mali	Somalia
Ireland	Bahamas	Finland	Malta	South Africa
Italy	Bahrain	France	Marshall Islands	South Korea
Japan	Bangladesh	Gabon	Mauritania	Spain
Luxembourg	Barbados	Gambia	Mauritius	SriLanka
Netherlands	Belarus	Georgia	Mexico	St. Kitts and Nevis
New Zealand	Belgium	Germany	Micronesia	St. Lucia
Norway	Belize	Ghana	Moldova	St. Vincent and Gren.
Poland	Benin	Greece	Mongolia	Sudan
Portugal	Bermuda	Grenada	Morocco	Suriname
Slovakia	Bhutan	Guatemala	Mozambique	Swaziland
South Korea	Bolivia	Guinea	Myanmar	Sweden
Spain	Bosnia and Herzeg.	Guinea-Bissau	Namibia	Switzerland
Switzerland	Botswana	Guyana	Nepal	Syria
Turkey	Brazil	Haiti	Netherlands	Taiwan
United Kingdom	Brunei Darussalam	Honduras	Netherlands Antilles	Tajikistan
United States	Bulgaria	Hong Kong	New Caledonia	Tanzania
	Burkina Faso	Hungary	New Zealand	Thailand
	Burundi	Iceland	Nicaragua	Togo
	Cambodia	India	Niger	Tonga
	Cameroon	Indonesia	Nigeria	Trinidad and Tobago
	Canada	Iran	North Korea	Tunisia
	Cape Verde	Iraq	Norway	Turkey
	Cayman Islands	Ireland	Oman	Turkmenistan
	Central African Rep.	Israel	Pakistan	Uganda
	Chad	Italy	Panama	Ukraine
	Chile	Jamaica	Papua New Guine	United Arab Emirates
	China	Japan	Paraguay	United Kingdom
	Colombia	Jordan	Peru	United States
	Comoros	Kazakhstan	Philippines	Uruguay
	Congo	Kenya	Poland	Uzbekistan
	Costa Rica	Kiribati	Portugal	Vanuatu
	Côte d'Ivoire	Kuwait	Qatar	Venezuela
	Croatia	Kyrgyzstan	R. D. of Congo	Viet Nam
	Cuba	Lao	Romania	Yemen
	Cyprus	Latvia	Russian Federation	Zambia
	Czech Republic	Lebanon	Rwanda	
	Denmark	Lesotho	San Marino	

Table A 2 – Descriptive statistics of main variables

Variable	Obs.	Mean	Std. Dev.	Min	Max
fdi 2006	3286	2835.82	16675.1	0	375348
fdi 2008	3568	3338.59	19948.41	0	449521
Religious Similarity	3286	0.17	0.21	0	0.96
Common Maj. Religion	3286	0.13	0.34	0	1
Common Min. Religion	3286	0.24	0.43	0	1
Religious Diversity	3286	0.27	0.22	0	0.94
ln Distance	3286	8.53	0.92	3	9.88
Contiguity	3286	0.03	0.16	0	1
Common Langage	3286	0.11	0.32	0	1
Colonial Relationship	3286	0.04	0.2	0	1
Rule of Law	3286	−0.01	1.02	−2.21	2.05

Table A 3 – Matrix of correlation between the religious variables

	Religious Similarity	Common Maj. Religion	Common Min. Religion	Religious Diversity
Religious Similarity	1.000			
Common Maj. Religion	0.846***	1.000		
Common Min. Religion	−0.020	−0.117***	1.000	
Religious Diversity	−0.173***	−0.230***	0.663***	1.000

Notes: ***, ** and * denote statistical significance at the 1%, 5% and 10% level.