



## Impact of religious proximity on energy trade: Policy implications based on international evidence

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### ABSTRACT

#### Article History

Received: 30 September 2025

Revised: 17 June 2025

Accepted: 3 July 2025

Published: 5 August 2025

#### Keywords

Culture

Energy goods

Energy trade

Religious proximity.

#### JEL Classification:

F14; Q40; Q41; Q47.

This study aims to examine the role of religious proximity in shaping bilateral energy trade. It explores how shared religious beliefs, values, and practices between countries influence their engagement in the trade of fossil energy resources—specifically coal, oil, and natural gas. The analysis uses a panel dataset comprising 3,407 country pairs from 88 nations over the period 1996–2019. Religious proximity is operationalized through a Grubel–Lloyd index constructed from three religiosity dimensions: religious affiliation, the perceived importance of religion, and attendance at religious services. An extended gravity model is employed to estimate the relationship between religious proximity and energy trade, using Poisson pseudo-maximum likelihood (PPML) to account for heteroskedasticity and zero trade flows. The results reveal a statistically significant negative association between religious proximity and bilateral energy trade. Countries that are more religiously aligned are less likely to engage in energy trade with one another. This relationship holds across various model specifications and sub-periods. Among the three religiosity dimensions, the perceived importance of religion exerts the strongest and most consistent negative effect, particularly during specific historical intervals. Religious proximity, while often assumed to foster cooperation, may instead reflect underlying ideological or cultural barriers that limit economic exchange in energy markets. The findings challenge conventional assumptions about cultural similarity facilitating trade and suggest a more nuanced, context-dependent role of religion in international economic relations. Policy-makers and international energy negotiators should consider cultural-religious dynamics as potential sources of friction in energy cooperation. Understanding the inhibiting role of religious alignment can inform strategies to mitigate soft barriers in trade policy and multilateral energy agreements, particularly in geopolitically sensitive regions.

**Contribution/Originality:** This study is the first to quantify religious proximity using a multidimensional index and examine its impact on bilateral energy trade. It reveals a counterintuitive negative relationship, challenging conventional assumptions about cultural similarity facilitating trade and offering new insights into the cultural determinants of energy market integration.

## 1. INTRODUCTION

Energy poverty, characterized by the absence of access to affordable, reliable, and modern energy services, has become a significant challenge for both advanced and emerging economies. This issue disproportionately affects the global population, constraining economic development, educational opportunities, and overall living standards. Consequently, addressing energy poverty has become a focal point for scholars and policymakers, with energy trade identified as a viable solution. Energy trade, which involves the exchange of energy resources such as coal, oil, and gas between nations, has the potential to significantly reduce energy poverty by improving energy access and

lowering costs. Despite the importance of energy trade, the underlying factors influencing it remain insufficiently examined. Among these, a compelling question arises: Does religious affinity between nations influence energy trade?

The possible correlation between religion and energy trade originates from the convergence of two domains of literature. The first domain investigates the connection between religiosity and energy poverty. Ampofo and Mabefam (2021) identified a positive correlation between religiosity and energy poverty, positing that religious individuals tend to experience diminished social capital and heightened life dissatisfaction, which can exacerbate energy poverty. Leslie, Pourkhanali, and Roger (2022) further underscored the significance of religion in energy consumption, noting that certain religious demographics, such as Hindu households, display lower energy consumption levels compared to others, while Jewish and Buddhist households demonstrate moderate consumption. These observations indicate that religiosity and religious customs may affect energy utilization and, consequently, energy trade.

The second domain of literature explores the broader implications of religion on trade dynamics. Numerous studies have indicated that religious proximity among nations can facilitate trade. Turco and Maggioni (2018) illustrated that shared religious values between trading partners can lower the entry costs to foreign markets and enhance preferential access. Helble (2007) found that traditional religious principles among trading partners could cultivate stronger networks and foster more advantageous trading conditions, whereas Lewer and Van den Berg (2007) contended that shared religious cultures promote the formation of exchange networks, thereby enabling the execution of intricate global transactions.

Current literature suggests that religiosity can influence economic behaviors, including consumption patterns and perceptions regarding energy use (Ampofo & Mabefam, 2021; Leslie et al., 2022). Furthermore, research on trade and cultural factors has revealed that common religious beliefs among nations may nurture trust, diminish transaction costs, and strengthen trade relationships (Helble, 2007; Lee & Park, 2016; Lewer & Van den Berg, 2007). However, these contributions predominantly focus on broad trade patterns or firm-level outcomes, neglecting the sector-specific ramifications of religious proximity.

To date, no thorough empirical investigation has examined whether and how religious proximity between countries affects bilateral energy trade a realm that intersects not only with economic considerations but also with ideologies, governance structures, and sustainability practices. This gap is particularly significant, as energy trade is intricately linked to political and environmental contexts, where value systems including religious convictions can directly or indirectly influence trade preferences, alliances, and policy frameworks.

This study addresses this gap by systematically examining the impact of religious proximity on energy trade across 3,407 country pairs from 88 nations between 1996 and 2019. We construct a novel Grubel-Lloyd index of religious proximity, incorporating three dimensions of religiosity: religious membership, the perceived importance of religion, and attendance at religious services. Using an extended gravity model with Poisson pseudo-maximum likelihood estimation, we find robust evidence that religious proximity is negatively associated with energy trade a finding that contrasts with previous research linking cultural similarity to greater trade flows.

By introducing religion as a determinant of bilateral energy trade, this paper makes three key contributions to the literature. First, it extends the cultural trade literature to a strategically important and politically sensitive sector. Second, it introduces a multi-dimensional measure of religious proximity that captures both cognitive and behavioral aspects of religiosity. Third, it provides empirical evidence that challenges the assumption that cultural closeness always facilitates trade, thereby offering new insights for scholars and policymakers concerned with energy cooperation, diplomacy, and sustainable development.

The remainder of this paper is structured as follows: Section 2 provides a review of the pertinent literature; Section 3 outlines the model, data sources, and estimation techniques; Section 4 presents the empirical findings

along with discussions; and Section 5 concludes by summarizing the main results and the implications of our research.

## 2. LITERATURE REVIEW

Religious proximity can exert a significant influence on energy trade by shaping trust, cultural alignment, and policy preferences between trading nations. The relationship between religion and trade is multifaceted: while religious similarity often fosters trust and reduces institutional distance thereby strengthening trade ties it can also produce divergent outcomes depending on how religious beliefs intersect with energy policy and transition goals. The following sections examine these dynamics in greater depth.

Religious similarity has been shown to enhance bilateral trust, which is essential for the smooth functioning of international trade, including the exchange of energy resources. When nations share religious values, trust-based institutions are more likely to emerge, facilitating deeper economic cooperation (Lee & Park, 2016). Interestingly, religious pluralism the coexistence of diverse religious traditions within a society can also promote trade by encouraging openness and minimizing cultural friction. This inclusive environment may be even more conducive to trade than religious homogeneity alone (Lee & Park, 2016).

Religious beliefs also influence public attitudes toward energy policy. In the United States, for example, highly religious individuals, particularly those with fundamentalist orientations, are more likely to oppose government investment in renewable energy (Urbatsch & Wang, 2021). Similarly, in Latin America, religious groups such as Catholics and evangelicals have demonstrated lower levels of support for energy transition initiatives compared to secular populations (Parker, 2015).

The relationship between religion and energy security is similarly complex. In rural China, religious beliefs have been associated with greater energy poverty, limiting access to clean and affordable energy services (Dong, Ren, & Glauben, 2024). Yet, religious teachings particularly those rooted in Christianity and Islam frequently promote principles of social justice and environmental stewardship, which can support sustainable energy development when integrated into broader policy frameworks (Clarke, 2016).

Moreover, the dynamics of energy commerce particularly concerning oil can significantly influence geopolitical alliances and the formulation of foreign policy. The proximity of religious beliefs may enhance diplomatic collaboration by bolstering cultural affinity among nations engaged in energy exchange (Górecka, Pavlić Skender, & Zaninović, 2021). However, while closeness in religious beliefs might foster trust and facilitate trade, it also has the potential to hinder energy transitions, particularly in contexts where religious tenets conflict with climate action or sustainability efforts.

Additionally, religious proximity can exert a substantial influence on energy trade, yet this association is intricate and shaped by a variety of socio-economic and cultural dimensions. A significant body of literature emphasizes the importance of social capital, which Deller, Conroy, and Markeson (2018) define as the trust, norms, and networks embedded in institutions and organizations. Religious institutions often serve as key sources of social capital by fostering communal practices and shared values. This observation aligns with the conclusions drawn by Wuthnow (2002) and Deller et al. (2018), who assert that religious social capital can enhance economic prospects even for those outside the faith by establishing inclusive networks grounded in trust.

Conversely, in the absence of shared norms and practices among different groups, social capital may be diminished, thus restricting access to economic endeavors such as energy consumption. As Conley et al. (2022) contend, social capital is vital for facilitating economic engagement; however, its advantages are not uniformly accessible. Strindlund, Abrandt Dahlgren, and Ståhl (2022) further assert that social capital can perpetuate exclusion by erecting barriers for outsiders, consequently undermining efforts aimed at alleviating poverty.

This concern is particularly pronounced in the domain of energy poverty, where social capital can act either as a remedial or aggravating factor. Ren, Zhu, Jin, and Xu (2023) note that while social capital can facilitate

overcoming barriers to energy access, its benefits typically accrue to individuals who already possess social or economic capital, thus entrenching existing disparities.

Religiosity may also influence energy poverty through individual attitudes. Okulicz-Kozaryn (2010) suggests that highly religious individuals might find significance beyond material wealth, which could reduce dissatisfaction with low living standards. However, this perspective might also hinder efforts to improve material conditions, including energy access. In support of this, Leslie et al. (2022) document divergent patterns of energy consumption across religious communities, shaped by social norms, community involvement, and household demographics.

The complex interplay between religion, social capital, and energy consumption highlights the multifaceted implications of religious affiliation on economic inclusion and resource distribution. Furthermore, as Conley et al. (2022) emphasize, religious social capital may enhance both individual and community health, especially within minority populations by cultivating relational networks and facilitating resource sharing. Nonetheless, the unequal distribution of these advantages constrains the broader efficacy of religious social capital in addressing systemic challenges such as energy poverty and economic disparity.

In the third stream of inquiry, religiosity emerges as a significant force shaping global trade dynamics by fostering trust, reducing transaction costs, and enabling the formation of networks that enhance trade efficiency. Turco and Maggioni (2018) demonstrate that religious proximity can substantially lower the sunk costs associated with exporting particularly for Turkish firms by building trust and easing entry into markets with similar religious compositions, such as Muslim-majority countries. This finding is consistent with Lewer and Van den Berg (2007), who argue that shared religious cultures foster strong exchange networks, facilitating the completion of complex international transactions.

Similarly, Lee (2013) and Lee and Park (2016) highlight the institutional and network advantages of religious similarity, which promote international trade in both goods and services by reducing informal barriers. Helble (2007) adds that shared religious values can even result in more favorable tariff conditions, granting preferential access to export markets. Doan and Ha (2023) extend this argument to environmental goods, showing that religious proximity between nations encourages trade in products aligned with shared ethical or ecological values.

The influence of religiosity also extends beyond trade in goods. Religious similarity reduces institutional distance, thereby facilitating service sector exchanges (Lee & Park, 2016). In the domain of cross-border mergers and acquisitions, Maung, Tang, Wilson, and Xu (2021) find that firms from more religious countries tend to engage in fewer and smaller transactions, reflecting greater risk aversion shaped by religious beliefs. This pattern is reinforced by Berry-Stölzle and Irlbeck (2021), who observe a negative relationship between religiosity and firm-level risk-taking, suggesting that religious norms inform corporate decision-making.

Moreover, religiosity appears to enhance trust in financial interactions. Chen, Chen, Tan, and Zheng (2020) show a positive correlation between religiosity and the use of trade credit, implying that religious norms support reliability in financial relationships. The influence of religion on consumer behavior is also noteworthy. For instance, Dekhil, Boulebech, and Bouslama (2017) find that while religiosity does not inherently deter luxury consumption, it does shape consumer attitudes and preferences. Investor behavior, too, is impacted by religious observance. Klein, Turk, and Weill (2017) document distinct stock market responses to sukuk and bond issuances during Ramadan, underscoring the need to incorporate religious factors in financial market analysis.

In summary, the relationship between religiosity and global trade is multifaceted. It encompasses trust-building mechanisms, institutional alignment, risk preferences, and cultural norms, all of which influence the flow of goods, services, capital, and information across borders.

### 3. MODEL SPECIFICATION

We use an enhanced gravity model to assess the effect of religious proximity on energy trade. While previous research has incorporated essential gravity model variables as key determinants of energy trade,

a consensus has yet to be reached (Górecka et al., 2021; Taghizadeh-Hesary, Rasoulinezhad, Yoshino, Sarker, & Mirza, 2021). To address this, we apply a comprehensive set of fixed effects to the bilateral trade data, which helps mitigate estimation bias. As a result, factors such as bilateral resistance (e.g., physical distance, shared borders) and multilateral resistance are accounted for and excluded from our model's estimation.

$$ETrade_{ijt} = \alpha_{it} + \alpha_{jt} + \alpha_j + \beta_1 ReligiostyP_{ijt} + \beta_2 CONTROL_{ijt} + \varepsilon_{ijt} \quad (1)$$

In this model, the subscripts  $i$  and  $j$  represent the countries, while  $t$  denotes the year.  $ETrade$  refers to the total energy trade exports and imports. The data on bilateral energy trade products are sourced from the BACI-CEPII dataset, which aligns with the Harmonized System nomenclature using a 6-digit code. All trade values are expressed as the natural logarithm of current billions of USD. Following the approach of Doan and Ha (2023) we utilize three variables to capture different dimensions of religiosity: the "knowledge" or "cognitive" dimension encompasses religious beliefs and concepts; the "feeling" or "affective" dimension pertains to religious sentiments; and the "behavioral" dimension reflects actions such as church attendance, prayer, and religious living. Drawing on Doan and Ha (2023), we rely on the World Values Survey (WVS) to measure these religious dimensions using the following questions: (1) "Are you a religious person, regardless of whether you attend religious services?"; (2) "How important is religion in your life?"; and (3) "How often do you attend religious services?" These dimensions are quantified based on the percentage of respondents who identify with a religion (*Member*), who consider religion to be highly important in their lives (*Importance*), and who attend religious services several times a year (*Attendance*). We then calculate a simple average to obtain an overall measure of religiosity (*Religiosty*). Finally, to examine whether differences in religiosity influence energy trade, we develop a normalized measure of religiosity proximity by applying the principles of the Grubel-Lloyd index (Grubel & Lloyd, 1975).

$$ReligiostyP_{ijt} = \left( 1 - \frac{|Religiosty_{it} - Religiosty_{jt}|}{Religiosty_{it} + Religiosty_{jt}} \right) \quad (2)$$

A higher index indicates a greater proximity to religiosity between the two countries. Using this same logic, we also calculate each component individually (*MemberP*, *ImportanceP*, *AttendanceP*).

For the analysis, we employ a standard gravity model vector,  $CONTROL_{ijt}$ , which includes key variables such as the product of the exporter's and importer's GDP, physical distance ( $D$ ), and binary indicators for shared borders (*contig*), a common official language (*comlang\_off*), a shared colonial history (*comcol*), and membership in the same free trade agreements (*rta*). Control variables in the gravity model (GDP, distance, common language, colonial ties, contiguity, and trade agreements) are selected in line with standard trade gravity literature (Anderson & Van Wincoop, 2003; Egger & Tarlea, 2015) and ensure comparability with existing work on energy trade determinants. Furthermore, time-varying fixed effects for countries  $i$  and  $j$  (and) pair-fixed effects are included to account for multilateral and bilateral resistance factors. To address the issue of zero-trade observations, we apply the Poisson pseudo-maximum likelihood (PPML) estimator. This approach is now widely recommended in gravity models for trade due to its robustness to heteroskedasticity and ability to handle zero trade flows, which are common in bilateral energy trade data (Silva & Tenreyro, 2006). Following Egger and Tarlea (2015), we present the estimation results using multi-level clustering. Our dataset consists of 32,526 observations covering 88 countries from 1996 to 2019<sup>1</sup>. All control variables are sourced from the CEPII database. A detailed statistical description of these variables is provided in Table 1. The study period is constrained by the availability of high-quality bilateral energy trade data from the BACI-CEPII database, which is harmonized using detailed product classifications. Additionally, the religiosity data are drawn from multiple rounds of the World Values Survey (WVS) that span this timeframe. The period 1996–2019 thus offers the longest and most consistent panel available for examining cross-country religious dynamics and energy trade patterns. Additionally, Figure 1 illustrates the distribution of the averages of  $ETrade$

<sup>1</sup> The data that support the findings of this study are available from the corresponding author upon reasonable request.



and *ReligiosityP* across countries and over time. From 1996 to 2005, *ETrade* exhibited steady growth, followed by significant fluctuations between 2006 and 2015, and then stabilized after 2015. In contrast, religiosity proximity maintained a consistent trend throughout the World Values Surveys (WVS) rounds.

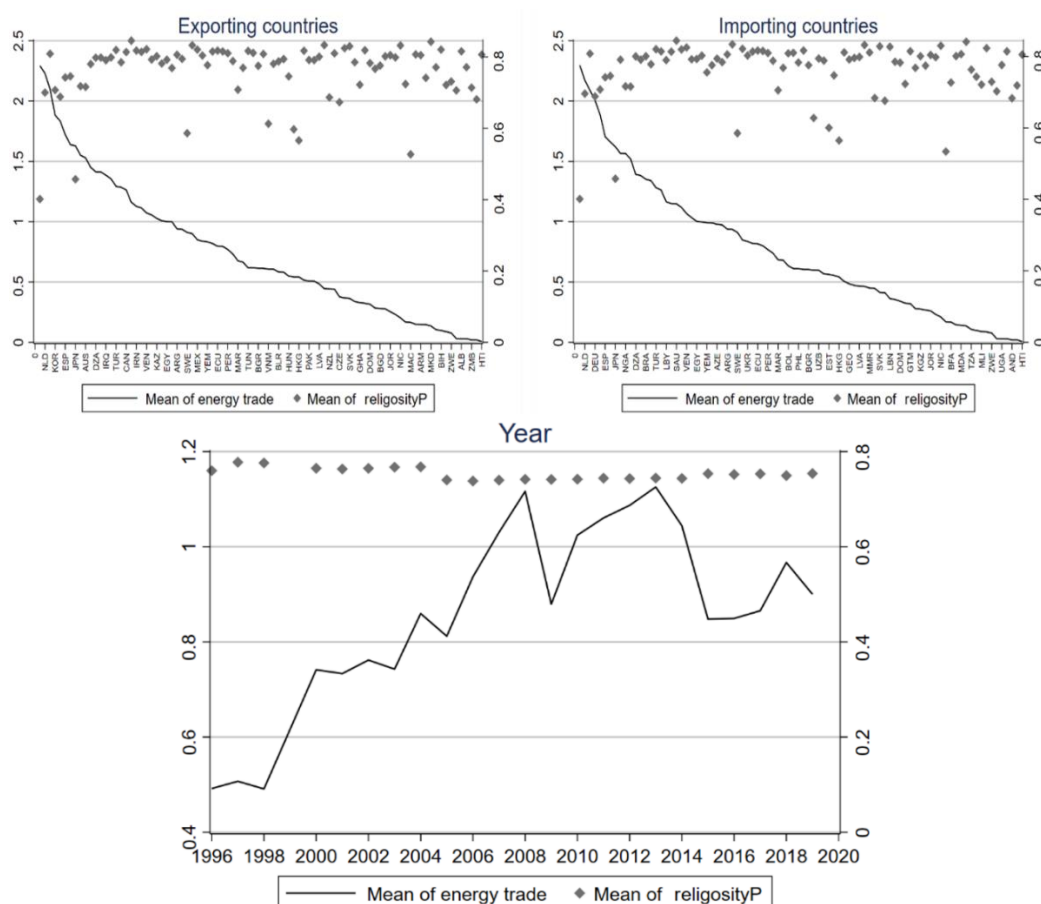
#### 4. ECONOMETRIC RESULTS

Empirical results are described in Table 2. Particularly, we first estimate the effect of *ETrade* on *ReligiosityP* and present the results in column (1). It can be seen that all confounding variables except *rta* are omitted when a full set of fixed effects is incorporated. This reveals that country pairs with greater religious proximity are less likely to trade energy products. To analyze the impact of each religious aspect, we estimate the effect of *ETrade* on each element of religiosity and display the findings in columns (3)–(5). While all components are significant, the effect of the importance of religion becomes more pronounced.

The empirical findings elucidated in the inquiry underscore the correlation between religiosity and trade, with a particular emphasis on energy commodities and environmentally sustainable products. The analysis posits that dyads of nations exhibiting greater religious affinity are often hesitant to engage in the trade of energy commodities, which is consistent with empirical evidence indicating that religiosity may correlate with elevated levels of energy deprivation, particularly within developing nations and rural regions (Ampofo & Mabefam, 2021). This hesitation may be attributed to diminished trust and discontent associated with religiosity, as indicated by the preliminary analysis presented in the investigation concerning energy deprivation (Ampofo & Mabefam, 2021). Moreover, the significance of religious beliefs emerges as a crucial determinant influencing the exchange of environmental goods, as nations characterized by religious closeness are statistically more inclined to participate in such trade (Doan & Ha, 2023). This observation indicates that although religiosity may obstruct energy-related commerce, it might concurrently promote the trade of environmental commodities, potentially attributable to shared ethical principles and mutual trust among nations with religious affiliations. The overarching influence of religion on global trade is consistent with theoretical frameworks positing that cultural and religious affinity can enhance trade by bolstering trust and mitigating uncertainty (Kazantseva & Nepp, 2023). Empirical evidence from Moroccan foreign direct investment further corroborates this perspective, suggesting that religious affinity may positively affect investment choices by reducing transaction costs and facilitating cross-border commercial interactions (Ait Soussane, Mansouri, & Mansouri, 2022). Nonetheless, religiosity seems to exert a negligible effect on income stabilization within enterprises, indicating that while it influences trade and investment behaviors, it may not directly affect corporate financial performance (Wibowo & Sukma, 2022). Collectively, these findings underscore the complex role of religiosity in economic endeavors functioning as both a catalyst and an impediment, contingent upon contextual circumstances and particular facets of religious expression.

The examination of control variables in the context of energy trade reveals significant insights into the factors that facilitate or resist trade. By turning off the pair-fixed effects, the analysis in column (2) of Table 2 highlights that variables such as common official language (*comlang\_off*), colonizer post-1945 (*comcol*), contiguity (*contig*), and regional trade agreements (*rta*) act as facilitators of energy trade. These variables likely enhance trade by reducing communication barriers, leveraging historical ties, and promoting regional cooperation, which aligns with findings that capital controls can mitigate adverse effects of exchange rate and interest rate volatilities, thereby supporting international trade (Zehri, 2022). Conversely, bilateral distance is identified as a trade resistance factor, which is consistent with the notion that physical distance can increase transportation costs and logistical complexities, thereby hindering trade. This resistance is akin to the challenges faced by capital controls in insulating private capital accounts, as seen in developing countries where such controls have not been effective (Johnston & Ryan, 1994). The asymmetric impact of capital controls on international trade further underscores the importance of considering the cyclical behavior of these controls and the level of financial development, suggesting that long-lasting controls are more effective than episodic ones (Zehri, 2022). Additionally, the historical context of price

controls, which temporarily held down inflation but ultimately failed due to the return of profit margins to their no-controls level, illustrates the complexity of implementing controls that have lasting positive effects (Ndubuisi, 2020). The analysis of energy trade over time, as suggested by Figure 1, indicates a nuanced relationship between religious proximity and energy trade, particularly when the data is divided into three sub-samples: 1996-2005, 2006-2015, and 2015-2019. The findings in Table 3 highlight that during the 2006-2015 period, religious proximity notably hindered energy trade, with religious attendance being a significant factor. This aligns with the broader understanding that religiosity can influence economic and policy decisions, as seen in the reluctance of religious individuals to support government investment in alternative energy sources (Urbatsch & Wang, 2021). The period from 2006 to 2015 was marked by significant technological advancements in energy production, such as hydraulic fracturing and horizontal drilling, which transformed the U.S. energy sector and reduced energy imports (Hakkio & Nie, 2014). However, the interplay between religiosity and energy trade is complex. For instance, the negative relationship between religiosity and innovativeness, as seen in the reduced number of patents per capita, suggests that religious beliefs can impede scientific and economic development, potentially affecting energy trade dynamics (Bénabou, Ticchi, & Vindigni, 2022). Additionally, the positive correlation between religiosity and energy poverty, particularly in developing regions, underscores how religious practices can exacerbate energy access issues, further complicating trade relationships (Ampofo & Mabefam, 2021). The geopolitical implications of renewable energy technology trade also play a role, as the shift towards renewables has historically been associated with increased trade conflicts, although this trend reversed after 2017, indicating a potential reduction in conflict (Apergi, Zimmermann, Weko, & Lilliestam, 2023). Thus, the period-specific impact of religious proximity on energy trade during 2006-2015 can be attributed to a confluence of technological, economic, and religious factors, highlighting the intricate relationship between these elements over time.



**Figure 1.** Distribution of average ETrade and Religiosity over countries and years.

**Note:** The mean value of ETrade is on the left-right scale, and the mean value of ReligiosityP is on the right-hand scale.

Table 1. Statistical summary.

Variables	Count	Mean	Sd	Min	Max
<i>ETrade</i>	32526	0.90	1.80	0.00	9.96
<i>ReligiosityP</i>	32526	0.75	0.20	0.18	1.00
<i>MemberP</i>	32526	0.77	0.19	0.24	1.00
<i>ImportanceP</i>	32526	0.75	0.21	0.17	1.00
<i>AttendanceP</i>	32526	0.60	0.26	0.04	1.00
<i>GDP</i>	32526	3.76	1.90	-3.11	8.52
<i>D</i>	32526	8.68	0.92	4.20	9.89
<i>comlang_off</i>	32526	0.10	0.30	0.00	1.00
<i>comcol</i>	32526	0.04	0.20	0.00	1.00
<i>contig</i>	32526	0.04	0.19	0.00	1.00
<i>rta</i>	32526	0.17	0.38	0.00	1.00

Table 2. Estimation results.

Variables	(1)	(2)	(3)	(4)	(5)
	ETrade	ETrade	ETrade	ETrade	ETrade
<i>ReligiosityP</i>	-0.54** (0.218)	-0.87*** (0.061)			
<i>MemberP</i>			-0.44** (0.174)		
<i>ImportanceP</i>				-0.60*** (0.218)	
<i>AttendanceP</i>					-0.32*** (0.114)
<i>rta</i>	0.14*** (0.050)	0.24*** (0.028)	0.14*** (0.050)	0.14*** (0.050)	0.15*** (0.050)
<i>D</i>		-0.61*** (0.016)			
<i>comlang_off</i>		0.17*** (0.035)			
<i>comcol</i>		0.28*** (0.067)			
<i>contig</i>		0.26*** (0.038)			
Constant	1.33*** (0.156)	6.10*** (0.157)	1.27*** (0.130)	1.36*** (0.154)	1.13*** (0.069)
Observations	25,368	32,386	25,368	25,368	25,368
Pair FE	Yes	No	Yes	Yes	Yes
Country-year FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes

**Note:** Standard errors are clustered at (and may be correlated within) base groups (importer, exporter, and year), as well as every combination of the three.

\*\*\* p<0.01, \*\* p<0.05.

In column (2), LnGDP is dropped due to collinearity.

In column (1), (3) – (5): GDP, D, comlang\_off, comcol, contig, and ReligiosityP was dropped due to collinearity.

Table 3. Estimation results: Subsample by year.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	1996-2005				2006-2015			
	ETrade	ETrade	ETrade	ETrade	ETrade	ETrade	ETrade	ETrade
<i>rta</i>	0.23 (0.177)	0.25 (0.178)	0.25 (0.177)	0.24 (0.177)	0.15** (0.076)	0.16** (0.076)	0.15** (0.076)	0.15** (0.076)
<i>ReligiosityP</i>	0.74 (0.695)				-0.93*** (0.458)			
<i>MemberP</i>		-0.01 (0.583)				-0.25 (0.355)		
<i>ImportanceP</i>			0.28 (0.686)				-0.59 (0.394)	
<i>AttendanceP</i>				0.50 (0.353)				-0.43** (0.196)
Constant	0.35 (0.510)	0.90** (0.442)	0.69 (0.492)	0.58** (0.225)	1.66*** (0.321)	1.20*** (0.265)	1.42*** (0.274)	1.25*** (0.112)
Observations	5,503	5,503	5,503	5,503	13,069	13,069	13,069	13,069
Pair FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Standard errors are clustered at (And may be correlated within) base groups (Importer, exporter, and year), as well as every combination of the three.

**Note:** \*\*\* p<0.01, \*\* p<0.05.

GDP, D, comlang\_off, comcol, contig, and ReligiosityP was dropped due to collinearity in the period 2016-2019.



## 5. CONCLUSION

This study investigates the relationship between religious proximity and energy trade, focusing on 88 nations over the period from 1996 to 2019. Using a Grubel-Lloyd index to measure religious proximity across three dimensions: religious membership, religious importance, and religious service attendance, we find a significant inverse relationship between religious proximity and energy trade. Specifically, countries that share closer religious ties are less likely to engage in energy trade, suggesting that religious alignment may act as a barrier rather than a facilitator in the exchange of energy commodities such as coal, oil, and gas. This relationship varies over time, with the influence of different components of religiosity shifting throughout the study period.

The findings of our research contribute significantly to the comprehensive understanding of how cultural and religious elements influence international trade, particularly within the energy sector. While earlier investigations have elucidated the impact of religion in fostering general trade relations, our results emphasize that, specifically regarding energy trade, religious proximity may present distinctive challenges. These observations indicate that religious and cultural dimensions should be integrated into energy trade frameworks, which have traditionally prioritized economic, geographical, and political factors.

The implications of this research are particularly relevant for policymakers, especially in nations where religion significantly influences public affairs. Initially, governments and international trade organizations should recognize the potential obstacles that religious proximity may pose to energy trade discussions. Policymakers in countries with similar religious ideologies may need to address the underlying social and cultural dynamics that hinder trade collaborations, even when economic opportunities exist. Diplomatic initiatives could involve promoting enhanced inter-religious dialogue and fostering an understanding of diverse religious perspectives to mitigate the cultural challenges affecting energy trade.

Furthermore, to bolster energy security and diminish energy poverty, particularly in regions characterized by religious homogeneity, policymakers should contemplate the formulation of trade agreements that consider both economic and cultural factors. Such agreements might include incentives for nations exhibiting high religious proximity to participate in energy trade, potentially counterbalancing the hesitance linked to religious alignment.

Finally, as the global energy framework evolves toward more sustainable sources, it is imperative to recognize the influence that religion and culture may exert on the formulation of energy policies. Governments may need to devise strategies that not only facilitate energy trade but also resonate with religious and cultural principles, thereby promoting broader acceptance and collaboration.

Anticipating future developments, our investigation paves the way for numerous research trajectories. Academics may explore the influence of religious beliefs on the renewable energy market, the mediating role of secular institutions, or the repercussions of shifts in religious conversion rates on long-term trade adjustments. We also advocate for studies at the subnational level, where variations in religious affiliations within nations could significantly influence domestic energy policies and international collaborations in various ways.

**Funding:** This research is supported by Banking Academy of Vietnam (Grant number: NCM.01/2023)

**Institutional Review Board Statement:** Not applicable.

**Transparency:** The author states that the manuscript is honest, truthful, and transparent, that no key aspects of the investigation have been omitted, and that any differences from the study as planned have been clarified. This study followed all writing ethics.

**Competing Interests:** The author declares that there are no conflicts of interests regarding the publication of this paper.

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