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Bilateral trade of films, religion, and democracy (2002–2015)

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Abstract
Some studies have already expressed the importance of cultural traits as key determinants of international trade in cultural goods. However, since a film is a cultural good and an important tool to promote cultural influence by soft power, we investigate whether the lack of democracy and different religions can be viewed as barriers to international trade. Religions, similar to autocracies, do not have good eyes for some types of behaviors that film consumption can instigate. Thus, focusing on conditional correlations between bilateral trade of films, religion, and democracy level, we employ a gravity framework using data between 2002 and 2015. As far as we are aware, this study signifies the pioneering effort to comprehensively examine these potential barriers collectively. Results indicate that democracy levels and different religions are potential barriers to film international trade.

Keywords Cultural goods · Films · Gravity model · Democracy · Religion · Trade barriers

JEL Classification F1 · F14 · F5 · F50

1 Introduction

The gravity equation is widely used in economics to successfully demonstrate that several variables function as barriers to bilateral trade flows. Barriers to trade can be natural, historical, political, or cultural [1–3].

Given the significant influence wielded by films, we utilize a gravity framework to investigate whether autocratic regimes and diverse religious affiliations observed between 2000 and 2015 may serve as barriers to film trade. Our hypothesis posits that the absence of democracy and the presence of various religious beliefs could impede the importation of films. Our decision to investigate the impact of democracy and religion on film trade is based on a robust body of evidence demonstrating the relationship between Christianity and democratic systems [4], as well as the insights provided by Audi [5] that highlight how autocratic regimes tend to limit religious freedoms. These sources emphasize the strong links between the absence of democracy and the imposition of restrictions on religious freedom, with religions sometimes becoming alternative sources of power in autocratic societies. It is worth noting that, as of now, there has been no previous study that comprehensively assesses the combined influence of democracy and religion on the dynamics of film trade.

From an economic standpoint, however, films play a pivotal role as a source of foreign income, particularly for major exporting nations such as the United States and India, both of which boast iconic film industries, recognized as Hollywood

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and Bollywood, respectively, according to Statista. Consequently, our argument highlights that while film, a cultural good and entertainment, adheres to the conventional economic principles of bilateral trade and are subject to typical barriers (economic and more usual cultural determinants) as outlined by Disdier et al. [6], their export volumes may diminish when the importing country has a diverse religious landscape and a lower level of democracy.

The reasoning for the diverse religion and diverse levels of democracies work as barriers is that films serve as conduits for the perspectives of their creators, facilitating the exportation of soft power, as proposed by Nye [7, 8]. Consequently, non-democratic nations and those with differing religious beliefs may seek to restrict the inflow of foreign films to prevent the transmission of the embedded messages within these cinematic products.

Furthermore, as we further explore the economic dynamics governing film trade, which typically align with the principles of increased trade among larger economies and neighboring nations, our findings reveal a robust and compelling narrative. We observe a substantial and positive correlation between film trade and the level of democracy in both importing and exporting countries, as well as a similarly positive connection between film trade and shared religious affiliations. Notably, these correlations are meticulously adjusted for the customary cultural determinants of cultural trade, as outlined by Disdier et al. [6], alongside various demographic covariates, all while accounting for the fixed effects attributable to importers and exporters.

In light of these insights, it becomes evident that the realm of film trade may encounter potential barriers, stemming from considerations related to their profound soft power influence or concerns surrounding the preservation of freedom of expression. This intricate interplay persists even within the overarching framework of economic logic.

Besides this introduction, the second section reports the background and a review of the key literature. The third section brings data and methods, followed by the fourth with results and discussion. Finally, the fifth section summarizes the main findings.

2 Literature

This section delineates the study's objective, drawing from existing literature. Our primary aim is to ascertain whether autocratic regimes and diverse religious affiliations can serve as impediments to the film trade. Firstly, we underscore the remarkable influence of films, transcending their role as mere entertainment to become powerful instruments for shaping national identity and wielding cultural influence. Secondly, we introduce the gravity model, a pivotal analytical framework enabling us to delve into trade barriers and economic dynamics in the intricate domain of film trade. Thirdly, we briefly outline the global landscape of the international cinema market. Lastly, we delve into the significance of democracy and religion as potential barriers to film trade, substantiating our exploration with reference to prior research in the field.

2.1 Film influence

From a political point of view, films are known as a source to build national identity and a tool to exercise cultural dominance, according to the country's position and how its relations with other countries operate [9]. National identity is commonly defined as the collection of institutions that bring together the members of a particular society, as stated by Cleveland [10], or as a combination of characteristics that enable a society to be recognized as distinct, as noted by Lafer [11]. The film industry has long been a vital instrument for shaping public perception and is inherently intertwined with its political influence, as underscored by Farani [12].

Nye [7, 8, 13] elaborates on the concept of soft power, incorporating films as a potent source of this influence. This is because the creation of films involves the crafting of images and messages that extol a nation's values, subsequently exerting significant effects on the political landscape. Fraser [14] cites an interesting historical perspective, noting that in 1923, the newspaper Morning Posted asserted that, thanks to cinema, even if the United States were to cease all international relations and activities, its citizens, issues, and cities would be familiar to even the most remote corners of the world. This underscores the far-reaching impact of film production.

Several studies have demonstrated that films were effectively utilized as tools to win over the hearts and minds of citizens in foreign nations during the Cold War, as evidenced by Shaw and Youngblood [15]. Sen [16] delves into the idea that viewing an American film signifies a symbol of elevated social status in developing nations, a phenomenon intricately linked with Hollywood's monopolistic strategies and the allure it holds for residents of those regions.

The movie market as a tool to promote soft power goes beyond Hollywood [17]. Thussu [18] and Mehta and Pandharipande [19] demonstrate that the emerging Indian cinema industry, called Bollywood, helps build the Indian image

Table 1 Values of the greatest film industries in 2018. Source: Statista

Values of 2018	United States	China	India
Number of tickets worldwide	1.75 billion	1.21 billion	1.98 billion
Worldwide box office revenues in U.S. dollars	$11.4 billions	$9.3 billions	$1.6 billion
Ticket mean price in U.S. dollars	$6.52	$7.71	$0.81
Population	0.327 billion	1.393 billion	1.353 billion

worldwide. The image was shaped to be attractive and exotic to incentivize tourism and investments, becoming an asset of soft power for the Indian state. On a small scale, the same can be said about the Nigerian cinema, Nollywood, which besides being not well known outside of the African continent, has succeeded in disseminating its culture locally [20].

The Chinese government has also shown great interest in incentivizing, protecting, and promoting the expansion abroad of its national cinema industry, aiming to limit the cultural influence of the U.S. over its population and expand its cultural impact on other countries but its level of internationalization is still low [21]. However, according to Keane [22] and Chu [23], political propaganda and censorship in films and restriction of artistic freedom tend to undermine the success of Chinese soft power projects and strategies via the film industry in foreign markets. On the other hand, the American (Hollywood) and Indian (Bollywood) industries are more internationalized, exporting their films to many countries.

2.2 Gravity and barriers

Anderson and Van Wincoop [1, 2] and Anderson [24] provide an extensive examination of how trade barriers can be incorporated into a gravity model framework. Their studies delve into the ways various impediments to international trade, which inflate the overall costs of cross-border commerce, can be accommodated within this framework. These trade barriers encompass transportation costs, import tariffs and taxes, non-tariff hurdles such as regulatory and standard disparities, challenges related to information and language diversity, cultural and legal distinctions, as well as factors associated with time, distance, and the volatility of exchange rates. Additionally, their research underscores the significance of political and economic instability, along with import quotas, as significant obstacles to international trade. Thus, almost all determinants of a gravity model can be seen as potential barriers.

On the other hand, the gravity trade model is firmly rooted in fundamental economic principles, driven by several key factors. Firstly, a larger GDP signifies a more extensive market size and heightened purchasing power, making countries with larger GDPs exceptionally appealing as trading partners. This appeal arises from the expanded economic opportunities that such markets offer. Secondly, shorter distances often translate into reduced transportation costs, thereby enhancing the economic viability of trade. The cost savings associated with geographic proximity play a significant role in shaping trade dynamics. Moreover, the presence of a common currency assumes a pivotal role in this economic framework. When countries share a common currency, it acts as a catalyst for facilitating trade. This is achieved by mitigating transaction costs and minimizing uncertainties associated with exchange rates. Essentially, the need for currency conversion and the associated expenses are eliminated, streamlining cross-border transactions and making them more accessible and cost-effective for businesses. In contrast, other trade barriers represent costs, which reinforces the importance of these factors aligning seamlessly with economic rationale. Consequently, these factors are widely embraced in trade analysis to elucidate trade patterns between countries [25].

2.3 Worldwide film market

Given the increasing returns of scale and the volatility that affects the films' demand, the industry has grown internationally and become globalized. A rising film trade among countries and increased joint production generating global companies were observed [26]. However, this globalization process is not recent, and the U.S. financial dominance is discussed by Silver and Arrighi [27].

Table 1 shows the three greatest film industries in 2018, measured by films exhibited at theaters. China's film industry, ranking as the second-largest in terms of box office revenues, is primarily oriented toward exporting its films within its regional sphere of influence. However, the country's extensive population and per capita income levels make it an exceptionally attractive market for foreign film producers. The majority of its film production is consumed domestically.

2.4 Film trade and cultural determinants (religion barrier)

In a gravity framework, Disdier et al. [6] investigate the factors influencing bilateral trade in aggregated cultural goods. Their study also subdivides these goods into various categories, including books, visual arts, audiovisual media, and more, though notably, it does not isolate a specific category for films. They approach the analysis by incorporating traditional cultural determinants, such as shared language, colonial ties, and the exchange of cultural heritage goods, as control variables. Their findings reveal a significant and positive correlation between the trade of cultural goods and these cultural determinants in the context of overall bilateral trade.

Cultural goods, according to UNESCO's definition from 2005, encompasses the exchange of both tangible and intangible goods or services that carry cultural content, essential for the creation, distribution, and promotion of such content. This definition also includes ancillary services, even if they only possess partial cultural attributes [28]. Films are included in the category of cultural trade as posted by UNESCO.

Research exclusively focused on the trade of films also underscores a compelling connection with cultural attributes. In Chung's [29] investigation, film trade is analyzed using web networking analysis applied to annual data from 1996 to 2004, revealing a noteworthy positive relationship between film trade and the presence of a shared language. Further insight comes from Holloway's [30] findings, which suggest that film quality plays a pivotal role in boosting exports. However, when dealing with film genres sensitive to cultural nuances, cultural proximity emerges as a fundamental factor. In these instances, the influence of culture is perceived to have a more substantial impact than the inherent quality of the films themselves.

When it comes to religion, our cultural barrier of interest, previous studies have delved into its impact on international trade dynamics. For instance, Helble [31] has investigated the influence of religion on bilateral international trade and unearthed intriguing findings. His research identifies a positive effect of Judaism and Islam, whereas other religions exhibit either negative or statistically insignificant effects on international trade. Helble posits that religion holds a pivotal role in shaping individual choices, given the daily rules and routines it imposes on its adherents. He concludes that shared religious beliefs tend to reduce trade costs and foster trust among trading partners, particularly in sectors reliant on trust, such as the film industry.

Similarly, Lewer and Van Den Berg [32] have identified that sharing the same religious affiliation provides an incentive for trade and contributes to a network of trade relationships, as each religion may have distinct stances regarding trade.

On the flip side, Marvasti and Canterbery [33] draw attention to religion materializing as a barrier to international trade. For instance, they highlight how Saudi Arabia, an Islamic nation, restricts the entry of American films, citing religious reasons. The authors conduct a comprehensive analysis of various protectionist measures, including quotas, tariffs, and subsidies to domestic industries. They conclude that cultural variables, such as language, education, and religion, serve as significant tools of protectionism against American cinematic imports. This dynamic persists despite the film industry's consistent growth driven by economies of scale.

2.5 Trade and democracy

Many studies have pointed out a correlation between international trade goods and democracy degree [34, 35]. Grimm [36] and Vlassis [21] argue that autocratic societies are less tolerant of free speech. Thus, they usually avoid such types of consumption or censor its information, as the Chinese censorship policies and quotas for films, for instance.

According to Roser [37], democracy is a political system where institutions allow citizens to express their political preferences, are restricted to executive power, and deliver individual freedom of civil rights. On the other hand, autocracy does not allow expressions of political preference nor guarantees personal civil liberties and free speech.

Using a gravity framework, Lopez-Cordova and Meissner [35, 38] summarize the general view that there is a double causality between international trade and the level of democracy and calculate a positive correlation. Decker and Lim [39] figure that democracy positively relates to trade flows, but only after controlling for trade pair heterogeneity. Yu [40] concludes that democracy fosters trade. Similar to Yu [40], Erikson et al. [55] investigate whether democratic countries trade more in general (all products) with other democracies using cross-section data of observations and dyads and find a positive correlation for the first models. Acemoglu and Robinson [41] have a seminal study posting that trade openness is connected to democratization processes depending on each country's relative factor endowment.

The film industry's evident importance in economics, politics, culture, and international relations explains the governments' interest in controlling the market in democratic countries and its access to non-democratic or less democratic

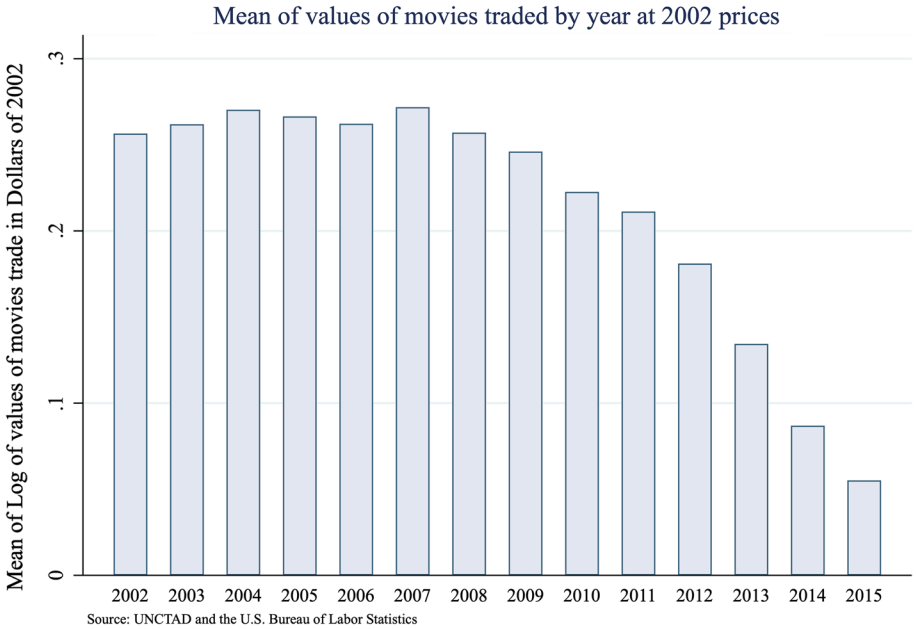

Fig. 1 Evolution of movies values traded between 2002 and 2015

countries. Crane [42] argues that the central policies have been to finance national productions, policies of quotation (to demand a minimum of national content), control of contents, and barriers to imported films adopted by China and South Korea. The author also calls attention to the importance of avoiding global cultural homogenization, the United States' dominance, and preserving local cultures. This scenery opens the necessity of investigating whether the level of democracy matters to the film trade.

3 Data and methodological strategy

3.1 Data

For the investigation, we built an annual dataset of 208 countries' dyads observed between 2002 and 2015 from the United Nations Conference on Trade and Development (UNCTAD), the CEPII Research and Expertise on World Economy, and the Our World in Data to use in a gravity framework. We merged the data of film trade from the United Nations Conference on Trade and Development (UNCTAD)[1] with geographic and macroeconomic data from the CEPII Research and Expertise on World Economy[2] and data on a countries' level of democracy from the Our World in Data research project.[3] This variable ranges from − 10, if the country is a perfect autocracy, to 10, if a perfect democracy, and varies in unities. The resulting dataset encompasses 208 countries observed in dyads between 2002 and 2015 (see Table 1). All monetary values were deflated using the Consumer Index Price (CPI) from the U.S. Bureau of Labor Statistics [45]

The film Industry belongs to the audiovisual segment that includes TV content and videos on demand (VOD), which are videos exhibited through the Internet by companies like Netflix, Youtube, Hulu, Disney Plus, etc.). According to UNCTAD [46], the audiovisual segment is classified as creative economics, which also includes goods and services produced in the segments of handicrafts, design, new media, performing arts, publications, and visual arts. We focus on film trade, which is considered one of the most important goods of the cultural industry.

Films are classified according to the Harmonized System of Description and Codification of Commodity (HS). As our primary dependent variable, we use the film trade revenues that have reduced a lot in the recent years of our sample (see Fig. 1). Data about film trade is challenging to obtain and use because of the current impact of the massive evolution in the Information and Communication Technology (ICT) that has transformed traditional physical films on the film stock,

[1] See UN Comtrade [43].
[2] See Head and Mayer [44].
[3] Ibid.

into digital formats easily transferred by the Internet [47]. These digital transformations create difficulties in measuring the actual amount of movies traded internationally [47–49].

In this sense, we use the fluxes of film traded and observed in the usual datasets of international trade under the assumption that they represent a homogeneous relative reduction of sales to all the countries as a proportion of the total trade of films. See Fig. 1 to observe a reduced volume of films traded in our dataset, retrieved from the United Nations Conference on Trade and Development (UNCTAD). This hypothesis allows us to focus strictly on film consumption since other data from UNCTAD includes different goods.

We prioritize the film trade over other cultural industries like TV series, computer games, books, or music for several reasons. Films have a rich cultural history as one of the earliest visual media forms, setting them apart from newer cultural goods like computer games. TV series, while similar, often require more time to convey ideas. Films also have a global appeal, using subtitles and dubbing to overcome language barriers, making them effective in conveying cultural narratives. They excel in providing immersive cultural portrayals, forging emotional connections with audiences. In contrast, music may be less effective as a soft power tool compared to films due to the latter's ability to convey more nuanced cultural and political messages. Books align more closely with music, relying on text and illustrations, while films offer a multisensory and immersive experience. Nevertheless, the effectiveness of each medium can fluctuate depending on context and audience preferences. Our exclusive focus on films enables us to delve deeply into the characteristics of this market.

According to a grade of punctuation, data about democracy classifies a political regime, Polity IV, also called "Democracy Score," which ranges from 10 when the country is a full democracy and − 10 when it is classified as a total autocracy. The Consumer Index Price (CPI) deflates all monetary values available at the U.S. Bureau of Labor Statistics to prices of 2002. The religion variable is an index of religious proximity [50] that considers Catholics, Protestants, and Muslims in exporter and importer countries. This variable ranges from 0 to 1 when the countries have the same religion adopted by most populations. Table 3 summarizes our data and sources.

3.2 Methodological strategy

According to Nye [13], the soft power concept is an attractive value that must be empirically investigated to define who is attracted and who is repelled, and films reflect the culture and the views of free speech of its producers since they are considered soft power tools [7, 8]. Thus, the most attractive film exporters are supposed to trade more, and the less attractive are to trade less. However, since this attractivity is political power, countries not attracted are supposed to avoid importing films. Using political and cultural influence, a country can exercise dominance over other countries through soft power [17]. In this sense, it is expected that democracies attract democracies and repel non-democracies, while a religion attracts the same or similar religion and repels different religions.

We adopt a gravity model framework, building upon established literature [29, 30, 51–53], to explore the interplay between democracy levels and film trade [39], as well as between film trade and religion [31, 32]. These determinants are examined as potential trade barriers [1, 2]. In our gravity model, we incorporate crucial control variables, including GDP, geographical distance between countries, and cultural and population-related factors. These variables assume central roles in our analysis, enabling us to assess the impact of democracy levels in both exporting and importing countries, representing their political systems, and the percentage of shared main religion, acting as a proxy for religious commonality, on film trade volumes. Our methodology aligns with established research on controls for cultural goods trade in the realm of international trade [6, 33].

Like Disdier et al. [6], we use Krugman's [54] monopolistic competition-CES demand-Iceberg trade costs model, under the country's monopolist producing different films, Eq. 1. Where $\emptyset_{ijt}$ measures the bilateral freedom of trade between countries i and j in the year t, a_{ijt} reflects the preference utility function of consumers in j for varieties produced in i; n_{it} and p_{it} describing, respectively, the number of varieties and prices in country i in time t; and Y_{jt} and P_{jt} representing, respectively, the importer's expenditure and price index in t.

$$ln\, x_{ijt} = ln\left(n_{it}p_{it}^{1-\sigma}\right) + ln\, \emptyset_{ijt} + (\sigma - 1) ln\, a_{ijt} + ln\left(Y_{ij}P_{jt}^{\sigma-1}\right). \quad (1)$$

Following the methodologies outlined by Erikson et al. [55], we estimated fixed-effects models as described by gravity Eq. (1). This approach enables us to accounts for unobservable differences among countries that remain constant over time, as well as their interactions with various years to capture potential changes in the global landscape. As noted by Baier and Bergstrand [56], the incorporation of fixed effects in gravity models helps mitigate the issue of unobserved

multilateral resistance terms (MRTs), which can introduce biases due to omitted variables. We consider four model specifications: (A) represents a model without fixed effect controls, (B) extends (A) by introducing fixed effects for both exporter and importer countries, (C) builds upon (B) by including fixed effects for importers interacted with year dummies, and finally, (D) encompasses all the features of (C) while adding fixed effects for exporters crossed with year dummies. Our preferred specification is (D) as it accounts for a more comprehensive range of fixed characteristics that could potentially impact film trade. Note that we partially control for the multilateral resistance terms (MRTs) since fully controlling for MRTs would absorb our variables of religion and democracy [56].

In our specifications, we proxy $n_{it}p_{it}^{1-\sigma}$ and $Y_{ij}P_{jt}^{\sigma-1}$ by the log of GDP of the importer and exporter countries and their population. $\emptyset_{ijt}$ was proxied by the regular barriers, like bilateral distance, common border, common currency, official common language, countries belonging to the GATTI agreement, and colonial history. In addition, we also include our interest variables, or democracy level of importers and exporters and common religion as additional barriers. At the same time, a_{ijt} is proxied by cultural values like common official language and colonial history. Our dependent variable lnx_{ijt} is the logarithm of film revenues resulting from trade among bilateral. In this sense, we control for cultural influence determinants using the common official language and a variable that accounts for the same colonial past [6, 29]. To control for economic effects, besides the traditional economic variables of gravity models—GDP of importers, GDP of exporters, we also include variables to describe if the importer and exporter belong to GATTI and if they have a common currency [6].

4 Results and discussion

Table 2 presents the estimated results of our gravity model, starting with the model without fixed effects (Model A), followed by the inclusion of fixed effects for both importers and exporters (Model B). We then enhance Model B by introducing importer fixed effects crossed with year dummies (Model C), and finally, we extend Model C by adding exporter fixed effects crossed with year dummies (Model D). The coefficients of our variables of interest are displayed at the top of the table, while other covariates are listed below.

The positive coefficients associated with importer democracies in Models A, B, and C suggest that autocratic societies act as barriers to film trade. Additionally, a positive coefficient for the variable representing common religion indicates that different religious affiliations may indeed serve as a barrier to film trade.

Our favored specification, Model D, incorporates a broader array of controls, effectively mitigating potential biases. Within this model, we discern that film trade exhibits greater significance in democratic importer countries and among nations that share a significant portion of the same religion. Most notably, in Model D, the degree of democracy in exporter countries no longer exerts a significant influence on film trade. This particular observation underscores the critical role of comprehensive control variables, as we transition from Model A to Model D. As a consequence, we witness an amplified coefficient for importer democracy, while the exporter's democracy coefficient becomes non-significant. The absence of significance regarding democracy in exporting countries suggests that film can serve as a soft power tool irrespective of the political regime in place.

Turning our attention to the other covariates presented in Table 2, it's noteworthy that film trade adheres to the expected economic patterns typically observed in gravity models for conventional goods. Specifically, larger GDPs correspond to higher trade values, while greater geographic distances tend to decrease trade. The results for distance are reinforced by the contiguity, which has a positive and significant coefficient. However, an interesting exception emerges with a statistically significant negative coefficient of 10% for the presence of a common currency in the specification (D). This finding may indicate that the United States, being a major exporter in dollars, conducts trade with European countries using euros and with countries like China that do not use the dollar, thus explaining this phenomenon. Additionally, the logarithm of the exporter country's GDP does not exhibit significance in specification (D), suggesting that even smaller economies, such as those in the Nollywood industry, can effectively produce and export films. To belong to GATTI is not a relevant variable both for exporters and importers of films, this may reflect the major part of the countries belonging to GATTI in our sample.

An intriguing finding, particularly in relation to the size of economies, is the magnitude of the coefficients associated with the GDPs of the importing countries. In models with fewer controls (A) and (B), these coefficients hover around 0.2, indicating a very low-income elasticity for both selling and buying films. However, in our preferred specification (D),

Table 2 Estimates of gravity models for films

Variables	Dependent variable: Log. of the values of commercialized films			
	(A)	(B)	(C)	(D)
Interest variables				
Level of democracy of the exporter	0.0247*** (0.001)	0.0105*** (0.001)	0.0248*** (0.001)	ns
Level of democracy of the importer	0.0128*** (0.001)	0.0102*** (0.001)	0.1189*** (0.031)	0.1187*** (0.027)
Common religion	ns	0.1654*** (0.035)	0.0893** (0.038)	0.1650*** (0.036)
Other covariates				
Log. GDP of the exporter	0.2012*** (0.007)	0.2441*** (0.013)	0.2007*** (0.007)	ns
Log. GDP of the importer	0.1422*** (0.006)	0.2051*** (0.015)	0.9016*** (0.221)	0.9005*** (0.191)
Log. of distance	−0.1706*** (0.017)	−0.3010*** (0.019)	−0.1980*** (0.017)	−0.3009*** (0.019)
Common official language	0.3933*** (0.036)	0.2903*** (0.034)	0.3968*** (0.036)	0.2900*** (0.034)
Log. population of exporter	−0.0513*** (0.005)	0.4370*** (0.038)	−0.0514*** (0.005)	ns
Log. population of importer	−0.0168*** (0.006)	0.3107*** (0.041)	ns	ns
Colonial links	1.0331*** (0.205)	0.3410* (0.206)	0.9590*** (0.209)	0.3415* (0.207)
Have common borders (contiguity)	0.9615*** (0.166)	0.9053*** (0.148)	0.9590*** (0.209)	0.9057*** (0.149)
Share the same currency	ns	−0.2044* (0.110)	ns	−0.1998* (0.112)
Exporter belong to GATTI	−0.0806*** (0.011)	0.0760*** (0.014)	−0.0804*** (0.011)	ns
Importer belong to GATTI	ns	ns	ns	ns
Year dummies	Yes	Yes	Yes	Yes
Fixed effect of exporter countries	No	Yes	Yes	Yes
Fixed effect of importer countries	No	Yes	Yes	Yes
Fixed effect of exporter countries crossed with year dummies	No	No	No	Yes
Fixed effect of importer countries crossed with year dummies	No	No	Yes	Yes
Observations	383,794	383,794	383,794	383,794
R-squared	0.154	0.281	0.172	0.307

Robust clustered errors in parentheses

ns not statistically significant

***p < 0.01, **p < 0.05, *p < 0.1

which includes more controls, this coefficient increases and approaches a value close to 1. This is in line with the typical estimation of income elasticity for aggregated trade [40].

To further substantiate the robustness of the results presented in Table 2, we conducted a comprehensive analysis of the correlations among the explanatory variables. This detailed examination is outlined in Table 4 in Appendix and reveals that there are no significant patterns of multicollinearity among these variables. This robustness strengthens the credibility of our findings. It's worth mentioning that we applied clustering to all error models by considering the distance between countries within each dyad, as recommended by Erikson et al. [55]. This approach helps account for potential spatial dependencies in our data.

To explore the possibility of a non-linear relationship between film importers and exporters in relation to the shared religion variable, inspired by Guo [57], we generated a dummy variable for developed countries. This dummy variable takes on a value of 1 if the income per capita falls within the highest quintile and 0 otherwise. We then incorporated this dummy variable as an interaction term with the religion variable in our analysis. Nevertheless, the non-significance of this variable suggests that the relationship remains linear, with no discernible non-linear patterns associated with shared religion in our model.

In the realm of cultural determinants, our findings are in harmony with the research conducted by Disdier et al. [6], which encompassed a comprehensive analysis of various cultural goods. Notably, the coefficients associated with the presence of a common official language and shared colonial history act as facilitators rather than barriers to film trade. This aligns with the economic rationale and is particularly intriguing given that our sample represents a reduced number

of traded films, measured through the conventional channel for trade goods due to the digitalization revolution [48]. These results highlight the enduring influence of language and historical ties in fostering the film trade.

In summary, across all models (A–D), our key coefficients exhibit a consistent pattern. The significant and positive coefficients related to the level of democracy in the importing countries suggest that autocratic nations tend to import fewer films compared to more developed democracies. This finding aligns with the research of Yu [40], who also observed similar effects and sizes in the film trade. However, in contrast to Yu's findings, our analysis reveals a non-significant effect on the degree of democracy among film-exporting countries, implying that being an autocracy is not a barrier to exporting films. This observation is further supported by the non-significance of the GDP of film-exporting countries, indicating that a robust economy is not a prerequisite for film exports. On the other hand, democracies exhibit a higher propensity to import films, with an income elasticity for films close to 1, and their population is more open to potential influence coming from films.

In the realm of religion, the positive correlation between countries sharing the same religion remains robust even after controlling for fixed effects in our preferred specification (Model D). This suggests that nations with a shared religion tend to engage in more significant film trade than those with diverse religious affiliations. Notably, our findings concerning different religions serving as a barrier to international trade are consistent with prior research conducted by Helble [31], Lewer and Van Den Berg [32], and Marvasti and Canterbery [33].

Taken together, these findings provide robust support for the notion that film trade follows a typical pattern as expected from cultural goods, driven by its entertainment value. However, this trade is notably constrained by autocratic regimes and differences in religious affiliations. Non-democratic countries and those with diverse religious affiliations tend to limit their consumption of foreign films as a strategy to mitigate the potential influence of these cinematic soft power tools. As articulated by Nye [13], soft power tools can have the dual effect of attracting certain groups while repelling others. In this context, the presence of different religious backgrounds can either attract or deter films.

Jayakar and Waterman [58] find evidence that Hollywood dominance is lower in countries with high domestic expenditure and film production. Thus, to overcome a potential reduction of economic opportunities due to barriers to film trade, maybe a solution for the countries with these barriers is to invest domestically in film production.

To illustrate these findings, let's consider the case of China, a significant consumer of films measured by its large GDP, but with tight regulations on foreign film consumption. China often enforces content changes that can impact the dissemination of governmental ideas or even lead to complete censorship [42]. While Hollywood frequently adapts its content to access the Chinese market, economic considerations must be balanced against the potential costs associated with frequent content alterations. In this dynamic, economic factors often take precedence, but the expense of frequent content changes can limit the volume of film trade. It's worth noting that China is also a major player in film production and ranks as the second-largest producer, which also reduces Hollywood's dominance and works as production to substitute the films imported.

Regarding religion, an illustration is the mentioned case of Saudi Arabia, which restricts the entry of American films, citing religious reasons [33], and that is also an autocracy, as posted by Audi [5].

Since we do not explore explicit methods to control the endogeneity between these variables, we are limited to discussing correlations and not causality. However, results can shed light on the possible avoidance of foreign film consumption by weak democracies and autocracies to prevent political influence due to its cultural goods access, as detailed in the soft power concept.

5 Conclusion

We apply a gravity framework to study whether political/cultural issues such as religious diversity and autocracies are potential barriers to international film trade using data from 2002 to 2015, a more recent sample than previous studies. Also, unlike previous studies, we use exclusively film trade and not audiovisual media, which is a broader category of goods.

The study reveals that film trade follows the anticipated patterns for cultural goods, primarily driven by its entertainment value. However, it is significantly constrained by autocratic regimes and religious diversity. Non-democratic nations and those with varying religious backgrounds tend to limit their consumption of foreign films to mitigate the potential influence of these cinematic soft power tools, as suggested by Nye. While economic considerations are important, frequent content adjustments can restrict the volume of film trade. These findings, even though they do not demonstrate

causality due to endogeneity concerns, illuminate how weak democracies and autocracies may avoid foreign film consumption to prevent political influence through cultural goods, in line with the soft power concept.

On the other hand, it's worth noting that autocracies may have a vested interest in using the soft power of films to their advantage. The study's results do not indicate any significant barriers to film exportation based on the exporting country's level of democracy. In fact, non-democratic countries do not seem to face impediments in exporting their films.

Author contributions MGOC main idea of investigation, data work, data analysis, literature review writing MN main idea of investigation, design and data analysis, writing AS revision of the manuscript, discussion of ideas EAP Revision of the film market, literature review.

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Data availability Our dataset is included in the related files on the site submission.

Declarations

Competing interests The authors declare no competing interests.

Appendix

See Tables 3, 4.

Table 3 Variables and sources

Variable	Obs	Mean	Std. Dev.	Min	Max	Source
Dependent variable						
Log. of the values of commercialized films in Dollars	605,682	0.2132	1.3843	0	18.904	UNCTAD/BULS
Traditional covariates of gravity models						
Log. GDP of the exporter	529,626	23.1215	2.4475	15.966	29.660	CEPII
Log. GDP of the importer	530,400	23.1243	2.4537	15.966	29.660	CEPII
Log. distance	599,872	8.8079	0.8069	0.691	9.893	CEPII
Variables of interest						
Level of democracy of the exporter	605,682	2.7567	5.7597	−10	10	OWID
Level of democracy of the importer	448,305	3.8797	6.3412	−10	10	OWID
Cultural determinants and other covariates						
Common religion	521,472	0.1696	0.2444	0	1	CEPII
Common official language	599,872	0.1737	0.3788	0	1	CEPII
Log. population of the exporter	575,976	1.3707	2.4317	−5.406	7.223	CEPII
Log. population of the importer	575,744	1.3922	2.4130	−5.406	7.223	CEPII
Have common borders	599,872	0.0128	0.1123	0	1	CEPII
Share colonial past	599,872	0.0106	0.1026	0	1	CEPII
Share the same currency	599,872	0.0183	0.1340	0	1	CEPII
Exporter is a GATT member	599,872	0.6995	0.4585	0	1	CEPII
Importer is a GATT member	599,872	0.7063	0.4555	0	1	CEPII

CEPII—Centre Études Prospectives et Informations Internationales, Gravity database (2020)

UNCTAD Stat—United Nations Conference on Trade and Development, database (2020)

OWID—Our World in Data—http://ourworldindata.org/democracy—database (2020)

BULS—The U.S. Bureau of Labor Statistics

Table 4 Matrix of correlations of explicative variables

	Log. GDP of the exporter	Log. GDP of the importer	Log. of distance	Common religion	Level of democracy of the exporter	Level of democracy of the importer	Common official language	Log. population of exporter	Log. population of importer	Have common borders (contiguity)	Colonial links	Share the same currency	Exporter belong to GATTI	Importer belong to GATTI
Log. GDP of the exporter	1													
Log. GDP of the importer	0.017	1												
Log. of distance	−0.100	−0.00	1											
Common religion	−0.00	0.276	−0.11	1										
Level of democracy of the exporter	0.121	0.241	−0.05	0.307	1									
Level of democracy of the importer	−0.00	0.458	−0.03	0.346	0.297	1								
Common official language	−0.090	−0.07	−0.10	0.067	−0.02	0.001	1							
Log. population of exporter	0.771	0.005	−0.09	−0.03	0.069	−0.000	−0.07	1						
Log. population of importer	0.005	0.68	0.042	−0.01	0.014	0.144	−0.02	0.002	1					
Have common borders (contiguity)	0.049	0.025	−0.34	0.045	0.019	−0.01	0.117	0.07	0.046	1				

Table 4 (continued)

	Log. GDP of the exporter	Log. GDP of the importer	Log. of distance	Common religion	Level of democracy of the exporter	Level of democracy of the importer	Common official language	Log. population of exporter	Log. population of importer	Have common borders (contiguity)	Colonial links	Share the same currency	Exporter belong to GATTI	Importer belong to GATTI
Colonial links	0.073	0.095	− 0.06	0.083	0.048	0.098	0.150	0.048	0.062	0.099	1			
Share the same currency	0.031	0.013	− 0.37	0.149	0.12	0.076	0.091	0.018	− 0.020	0.141	0.005	1		
Exporter belong to GATTI	0.312	0.01	− 0.01	0.014	0.138	− 0.000	0.012	0.249	0.003	0.006	0.012	0.041	1	
Importer belong to GATTI	0.008	0.181	0.039	0.098	0.082	0.134	0.042	0.003	0.070	− 0.010	0.014	0.029	0.006	1

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