CENTRE FOR QUANTITATIVE HISTORY

HKU Business School

HK Institute for the Humanities and Social Sciences

Centre for Quantitative History
量化歷史研究中心

CQH Working Paper Series

No. 0001 2025

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March 2025

Abstract

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1. Introduction

What drove the trade globalization in modern times that fundamentally transformed international economic geography? The extant literature has largely focused on trade-barrier factors for an answer, including the improvement of transport technology (Pascali, 2017), the introduction of the gold standard (López-Córdova and Meissner, 2003), and colonial powers (Mitchener and Weidenmier, 2008). However, indirect barriers such as information friction, or the relaxation thereof, must also have had an impact (Anderson and van Wincoop, 2004; Steinwender, 2018), but little is known about how such indirect factors affected historical trade flows. It remains unknown how early traders, in the absence of modern transport and communication technology, overcame cross-society information barriers and conducted trade successfully in unfamiliar foreign lands.

In this paper, we demonstrate that Christian missionaries unintentionally acted as informational intermediaries, creating familiarity and hence facilitating the expansion of overseas trade in both directions. Driven by religious devotion, the missionaries entered and explored remote societies before the traders.[1] To proselytize effectively, the missionaries learned the local languages, surveyed the local environment, especially its geography, transportation, culture, and customs, transmitted their new knowledge back home, and at the same time cultivated local social capital and nurtured trust by making acquaintances in and outside their church. Specifically, such information and knowledge diffused to Western traders through the missionaries' letters to their sponsoring home church, accounts of their work published in Europe, sermons, and word-of-mouth means (Mungello, 1985). In these ways, the missionaries acted as informational intermediaries between Europeans and far-away markets. We thus hypothesize that international trade was likely to expand more in regions with longer missionary presence.

Historical China provides a unique setting to examine the effect of Christian missionaries on trade. First, China remained a largely autarkic economy from 1371 to 1842, the year in which China was opened by the British to foreign trade. This opening up attracted many Western traders to come and explore the largest (but unfamiliar)

[1] There was no direct trade between Western Europe and the Far East during the Middle Ages as the routes to East Asia, both overland and maritime, were controlled by Muslim societies in West Asia, except for the brief period of the Mongol conquests from the middle thirteenth to the middle fourteenth centuries during which Europeans such as Marco Polo and his father and uncle made trade journeys to China (Lach and Van Kley, 1965a). Following the collapse of the Mongol Empire in 1368 and the maritime trade ban imposed by the founding emperor of the Ming dynasty (1368-1644), direct trade came to a halt from 1371 until the Portuguese found their way to the East around 1515 (Garrett, 2010). Still, as explained in the text to follow, direct East-West trade was quite limited before 1842.

market in the world. Second, before the opening, Christian missionaries had entered China from 1580 onward and had penetrated over one-third of Chinese prefectures by 1842. They arrived in China to preach the gospel rather than to trade, but their long presence in China not only exposed the locals to foreign things and people, but also incidentally provided subsequent foreign traders with valuable information about Chinese localities, information not necessarily trade-specific but more fundamental about local culture and characteristics. This sequence of events – two and a half centuries of missionary work in some prefectures but not in others, followed by a period of relatively free trade after 1842 – offers an ideal context within which to identify the impact of the missionaries on trade, net of the feedback effect of trade on missionary distribution.

Using the trade records of the Chinese Maritime Customs (CMC), we measure the value and diversity of imports to 172 prefectures (i.e., those with relatively complete data) of China Proper between 1876 and 1892. Dominated by industrial products from the West, the imported goods were mostly new to the Chinese. For exports, we make use of another source, the *Native Products Catalogue of Postal Areas* compiled in 1936, to track the value and diversity of local products sold overseas from the 235 prefectures of China Proper.

To quantify the regional influence of Christian missionaries, we explore the historical records of six Catholic missions that were active between 1580 and 1842, that is, the Jesuits, Lazarists, Paris Foreign Missions Society or MEP, Franciscans, Dominicans, and Augustinians.[2] Two measures of missionary influence are considered: the duration (number of years) of missionary presence, and the number of missionary visits (person-years), in each prefecture during 1580-1842.

To separate the missionary effect from that of factors that may confound both missionary and trade expansion, we control for the following prefectural characteristics. The first is a group of geographic factors that might have affected the costs of both trade and mission, including each prefecture's shortest distance to CMC customs ports, to transport infrastructure (navigable rivers and courier routes), to the coast, and to political centers, as well as its terrain ruggedness index. Note that regions with foreign trade exposure prior to the arrival of the missionaries might have been more receptive to both foreign missionaries and trade. To rule out this possibility, we control for the distribution of historical trade ports that operated between the 2nd century BCE and 1580 CE. The third is the initial economic condition, for which we use a prefecture's population density in 1851 as a proxy. Lastly, we control for the distribution of

[2] The Protestant missions entered China in 1807 but only preached in three coastal cities (Guangzhou, Fuzhou, and Ningbo) before 1842. These cities were treaty ports (with customs offices) and are excluded from our regression analyses as we focus on the non-port prefectures.

telegraph, railway, and post offices introduced to China in the late 19th century, as they might have competed with the information effect of the missionaries on trade. Caution should be applied here because certain confounding factors are hard to control for, and there may be missing variables that are important. For example, we cannot measure aspects of local culture that might have affected its entry costs for foreigners, particularly its degree of openness or conservatism.

To further examine whether the trade effect of the missionaries is causal, we employ an instrumental variable (IV) for the missionary distribution. Given its autarkic principles and Confucian orthodoxy, China initially did not allow, or simply made it difficult for, Western missionaries to enter. But, the Jesuit pioneer, Matteo Ricci (1552-1610), managed to overcome that by cultivating friendship with the Chinese elite (the scholar-officials). His friends, especially those in government, then provided help and protection to Ricci's and succeeding priests' missionary efforts. As a result, the early missionary expansion in China was largely driven by Ricci and the missionaries were more likely to penetrate regions governed by Ricci's Chinese friends. We thus use the number of Ricci's friends in each prefecture as the IV to predict missionary distribution. Since Ricci's friends' appointments were made by the emperors directly under the centralized personnel system and based on political rather than trade considerations, the geographic distribution of his friends has little to do with the presence of foreign trade. Moreover, they were not assigned to govern their respective native-home prefectures, given the native-home avoidance principle for imperial appointments, and thus their appointment locations do not capture any confounding effect of their hometown culture (e.g., openness) on foreign trade. Furthermore, we use their places of appointment after they met Ricci to attenuate the potential effect of Ricci's places of visit, in the sense that Ricci was more likely to visit, and make friends in, the more inclusive regions.

Our regression analyses indicate that the impact of missionaries on a prefecture's foreign trade, both import and export, is positive and significant. The missionaries not only facilitated trade expansion spatially, as regions where they preached prior to 1842 entered international trade earlier (the extensive margin), but also increased the value and diversity of trade goods (the intensive margin). According to our IV regression results, a 10% increase in *Missionary Duration* increased a prefecture's total import value by approximately 12% and export value by 20%. The missionaries also increased the diversity of foreign trade goods, as evidenced by a 3.3% increase in the number of product types of import and a 3.5% increase in the number of product types of export (when evaluated by the mean) in response to a 10% increase in *Missionary Duration*.

The missionaries' informational role in international trade is supported by historical evidence, which we introduce in Section 2. In a nutshell, the missionaries

increased Europeans' knowledge of Chinese localities by introducing many unfamiliar interior regions through publications back home as well as other informal means. To document this information channel approximately, we examine the *Lettres Édifiantes et Curieuses, Écrites des Missions Étrangères,* or Jesuits' Letters, published during 1702-1776 (Le Gobien et al., 2005 [1819]). These letters were sent by Jesuit missionaries in China (and elsewhere) to Europe and are well-known for their extensive description of local Chinese society and economic conditions (Lach and Van Kley, 1965b). Given the Jesuits' dominance in the China missions and the diffusion of knowledge, the Jesuits' Letters is a representative collection for tracking the information flow from China to the West. We look for the name of each Chinese prefecture (and its counties) mentioned in the Letters to measure the regional variation in exposure to a Western audience. For each prefecture mentioned, we also classify and count the types of information described in the Letters, including local history of foreign trade or communications, native products, local customs, transport, natural environment, urban life, and government administration, which we deem as useful knowledge for foreign traders. We find that a Chinese prefecture was more likely to be introduced in the Letters if it had had a missionary presence. Moreover, being introduced in these publications brought more imports and exports to the region.

The information channel illustrated in this study showcases the important contributions by the missionaries to the historical rise of foreign trade in China, much before the country became an international trade powerhouse in the 21st century, as Matteo Ricci and his fellow Jesuits paved the foundation for later missionary efforts, a finding consistent with the fact that the Jesuits played a major role in the exchange of scientific knowledge between China and the West between 1580 and 1800 (Ma, 2021). Of course, we do not exclude other potential channels that may have facilitated the influence of missionaries on the historical emergence and growth of China's foreign trade. For example, the missionaries may have, in some cases, acted as 'middlemen' introducing foreign traders to local Chinese merchants and members of the elite, or as translators mitigating the language barrier and other frictions between foreign and local traders. Without detailed data, we are unable to design tests to separate these channels' effects in this paper.

Our results contribute to the literature that examines the role of information in trade development (see Rauch and Trindade (2002), Allen (2014), Chaney (2016), and Steinwender (2018) for summaries of this literature). Most existing studies examine how new information technologies facilitated trade. Our paper focuses on how the missionaries-facilitated flow of information before the advent of modern technology overcame the distance, cultural, and language barriers of overseas trade. For European readers back home, the missionaries performed the unique role of 'inestimable

informants'—to borrow the term used by the French foreign ministry at the time. Our findings point out that both the value and diversity of foreign trade were strongly affected by their work. These findings also add fresh evidence to the broader literature that explains the overseas trade boom after 1500 (e.g., Findlay and O'Rourke, 2007; Pascali, 2017; Flückiger, et al., 2022), and in particular on the importance of trade costs reduction during this process (e.g., Krugman et al., 1995; O'Rourke and Williamson, 1999; Estevadeordal et al., 2003; Jacks et al., 2008; Juhász and Steinwender, 2018).

This study also contributes to the literature on the economic legacies of Christian missionaries (see Valencia Caicedo (2019) and Becker et al. (2021) for reviews, and Bai and Kung (2015) and Chen et al. (2022) for the case of China). The foregoing studies focus on the missionaries' effects on human capital, health, gender equality, institutional change, and economic modernization, among others. Our study suggests that the missionaries played a pivotal role in the formation of early international trade networks and globalization. In this connection, our study speaks to the literature on the relationship between religion and trade (see, Chanda (2007), Iyer (2016), and Becker et al. (2021) for surveys). Existing studies have examined the religious outcomes of trade, for instance, in which trade connections alleviated Hindu-Muslim intolerance (Jha, 2013) or facilitated the spread of Islam (Michalopoulos et al., 2017) and Protestantism (Becker et al., 2020). Our findings go in the reverse direction: the spread of religion facilitated trade expansion.

The paper is structured as follows. The next section reviews the history of missionaries and foreign trade in China. Section 3 introduces the data and variables used for empirical analysis. Section 4 presents our main empirical results. Section 5 delves into the information mechanism underlying the missionaries' impact on foreign trade. Concluding remarks are offered in Section 6.

2. Historical Background

2.1. China's foreign trade

Foreign trade in China started at least as early as the Han dynasty (206 BC–220) and experienced a major boom in the Tang, Song, and Yuan dynasties (618-1368) (Yu, 1967; Chen et al., 2025), though those early trade relations were mainly with economies in the Western Pacific and Indian Ocean and not directly with Western Europe. However, soon after the founding of the Ming dynasty in 1368, the new emperor ordered in 1371 a ban on maritime international trade by private Chinese enterprises and individuals, effectively turning China into a closed society between 1371 and 1842,

despite some emperors occasionally relaxing the ban for certain ports and for short periods of time.[3] During these centuries of autarkic isolation, the country did have foreign trade but it was strictly regulated by its limiting tributary system—a diplomatic-cum-luxury trade system to control the neighboring states and maintain China's hegemony (Wakeman, 1978). It was during this time period that European traders, first the Portuguese in the 16th century, the Dutch in the 17th century and then the British in the 18th century, attempted and eventually failed to crack open China's door for international trade, which in the end led to the Opium War (1839-1842) with Great Britain.

Upon defeat in the Opium War in 1842, China was forced to concede and open the country to free trade through designated treaty ports. From then on, its foreign trade regime transitioned from the traditional tributary system to one based on treaties. That marked a historical turning point after which European and American traders could legally engage in trade with and investment in China. From 1842 to 1936, up to 110 free ports were established for overseas trade where goods and foreign traders could come and go freely (Wu et al., 2006). Foreign goods penetrated the Chinese interior through these treaty ports, with the value of imports increasing about ninefold from 1871 to 1936 (Yan, 1955). Likewise, China's native products also gained unprecedented access to global markets. About 35% of Chinese prefectures exported local products by 1936, and the total value of exports increased about sevenfold after 1871 (Directorate General of Posts, 1936; Yan, 1955).[4]

The fact that legally permitted trade with the West was negligible prior to 1842 but took off thereafter offers a suitable historical 'natural experiment' to examine the role played by the Christian missionaries in the emergence and rise of foreign trade in post-1842 China. The large cross-regional variation in foreign trade in subsequent decades enables us to investigate whether the variation was caused by regions' diverse early missionary presence and the channels through which such effects were manifested.

2.2. The missionary history in China

The Catholic Church embarked on its Asian missions during the Age of Discovery.[5] The Portuguese occupation of Macau in 1557 provided Christian missionaries with the

[3] For example, Guangzhou was opened as the only port for foreign trade from 1757 in the Qing dynasty. But it was under strict regulation. Only the designated trade factories (hongs) were allowed to trade with foreigners in Guangzhou. Foreign merchants were not allowed to leave the special trade zone of Guangzhou city or communicate with the local Chinese (Cranmer-Byng and Wills, 2010).

[4] See also Keller and Shiue (2022) for an overview of China's foreign trade after 1842 and Jia (2014) for the economic legacy of the post-1842 trade opening.

[5] There were sporadic cases of Christian presence in China before 1580. The Tang dynasty (618-907) witnessed Christianity perhaps the earliest, namely Nestorianism from the Near East. It disappeared

momentum to enter China—a different, oriental society that the Catholic Church tried to proselytize. At the time, the Ming dynasty government had in place a 'maritime trade ban' policy that forbade the Chinese from engaging in foreign trade or in communication with foreigners. Nonetheless, the Jesuits at Macau were finally permitted to enter the country with the consent of a Cantonese governor. In 1601, Matteo Ricci successfully met the Chinese emperor and received permission to reside and even build a church in the imperial capital, Peking, after which the Catholic missionaries had *de facto* approval to preach in China. Thanks to the help of their elite friends, the Jesuits gradually opened branches in other Chinese cities. The Jesuits' success also encouraged other Catholic orders, especially the Dominicans, Franciscans, Lazarists, Paris Foreign Missions, and Augustinians, to work in China. By 1700, about 140 European missionaries were proselytizing in 100 Chinese prefectures (Standaert, 2001).

The Catholic missions declined after 1700 because the Chinese rites controversy led to the emperors banning Catholicism and expelling most missionaries by the end of the 18th century.[6] However, the missionaries gradually returned to the country in the early 19th century when the ban was loosened. Christian missions experienced new growth following China's forced opening in 1842. This time, Protestantism came and spread rapidly. By 1900, there were 98 Protestant missionary societies with more than 3,000 missionaries proselytizing across China (Tiedemann, 2010). Meanwhile, Catholic missionaries continued to maintain a significant presence, with 27 missions and about 900 priests stationed across the country by 1900 (Young, 2013).

2.3. Narratives on the missionaries' information role

Previously, China, especially its vast interior, remained largely unknown to the West because of both the prohibitive physical and cultural distance and the strict autarkic policy imposed by the authorities after 1371. The missionaries thus became the primary, if not the only, intermediary between the West and China before 1842. Their contribution to diffusing information and knowledge about China in Europe was manifested in the following ways. First, the missionaries broadened the geographic scope of Western knowledge about China. It is true that their European predecessors,

after the imperial edict of 845 proscribing all foreign religions. Christianity was later re-introduced to China by a tribe of Nestorian creed from Central Asia, but its spread was halted with the fall of the Yuan dynasty (1279-1368). The Nestorians did not settle down and develop their communities in China (Standaert, 2001). European missionaries did not approach China until the 16th century.

[6] The rites controversy occurred between the Popes and the Qing emperors over whether Chinese Catholics should be allowed to retain ancestor worship and related traditional Chinese rituals. It started from 1645 and became intensified after Clement XI banned Chinese rites in 1704.

such as Marco Polo, had introduced certain large cities of China to the West, but the Catholic missionaries went to, and evangelized, a number of hinterland localities, vastly broadening the depth of coverage.

The second pertains to the depth of knowledge. To successfully convince and convert local Chinese to Christianity, the missionaries devoted themselves to both studying Chinese culture and languages and acquiring other concrete knowledge. They recorded such deep learning in their writings, some of which were published back home. They also translated Chinese works into European languages for their home audience. Henri Cordier's (1924) *Bibliotheca Sinica* shows the rise of Western publications about China after Christian missionaries entered China in 1580, of which the majority were written by the missionaries. In particular, the Jesuits contributed the most publications on China in Europe before the mid-19th century (Walravens, 2013), in addition to their successful translations of many European science and other books into Chinese to benefit China's development (Ma, 2021). For instance, in the Jesuits' Letters published between 1702 and 1776, there were not only records of missionary affairs but also detailed descriptions of the geography, customs, history, and produces of local Chinese communities.[7] These types of information were transmitted, cited, and widely circulated in Europe (Landry-Deron, 2005).

Historical anecdotes suggest that China's trade growth benefited from the work of missionaries. For example, they were regarded as 'inestimable informants' in a French foreign ministry memorandum of 1906 (Young, 2013). Knowledge of China allowed Western traders to be aware of subtle customs and norms of behavior that were important to the regions and peoples with whom they would do business. The missionaries also provided considerable primary information about each locality's trade potential, and these information may be reproduced and diffused to the 19th-century traders even if they might not directly read the Jesuit letters. For instance, British sinologist Thomas Percy (1729-1811) cited the Jesuits' description of the production areas of tea and porcelain—two popular Chinese exports to Europe—in his book, *Hau Kiou Choaan* (Pleasing History) in 1761 (Kitson, 2013). Similarly, in *A Sketch of Chinese History, Ancient and Modern, Comprising a Retrospect of the Foreign Intercourse and Trade with China,* published in 1834, German Protestant missionary Karl Gützlaff (1803-1851) introduced the Jesuits' maps of China's interior, Fujian's

[7] In the *Novus Atlas Sinensis* (New Atlas of China) made by Jesuit Martino Martini (1614-1661) in 1655, there are 34 pages of maps and 171 pages of text illustrations on Chinese provinces. These maps were recognized as the most valuable European work on Chinese geography before the mid-eighteenth century (Mungello, 1985). Also, Jesuit François-Xavier d'Entrecolles (1664-1741) referred to the local gazetteer of Jingdezhen when introducing the production of white porcelain—a Chinese product popular in Europe (Le Gobien et al., 2005 [1819]). More details about the Jesuits' records of Chinese localities are introduced in Section 5 of this paper.

black tea and Zhejiang's silk weaving. This book was dedicated to the chairman of the British East India Company, Charles Grant (1746-1823), for trade with China (Lutz, 2008). These sources of information were highly important to European traders as they extended the scope and depth of information, hence lowering both business uncertainty and transaction costs.

Besides their informant role, some missionaries acted as middlemen or translators between traveling foreign merchants and local Chinese. Karl Gützlaff, for example, served as the interpreter on the ships of the British trading company, Jardine-Matheson, for its trade business with China in the 1830s. Likewise, Justus Doolittle (1824-1880), a missionary in Fuzhou in the 1850s, accompanied his American business friend to visit the local tea plantation and later helped Augustine Head & Co. with its tea business in China during 1870–1871 (Lin, 2006).

3. Data and Variables

3.1. Missionaries

To capture the extent of missionary influence in each prefecture and hence its exposure to foreign things, our primary measure is the number of years of missionary presence in the prefecture during 1580-1842 (hereafter, *Missionary Duration*), under the assumption that a region would be cultivated more deeply with longer durations of preaching. We manually collect information on each missionary's tour locations and duration in China from historical sources for different missions, which include Dehergne (1973) on the Jesuits, Brandt (1936) on the Lazarists, Moussay and Appavou (2004) on MEP, and Dehergne (1973) and Cui (2006) on the Franciscans, Dominicans, and Augustinians. They are introduced in details in Online Appendix 2.

To further gauge the intensive margin of the missionary effect, we also construct an additional measure by using the total number of missionary man-years presence for each prefecture, denoted by *Missionary Visits*.[8] The data are obtained from the same sources as those for *Missionary Duration*. However, biographies for approximately 20% of the individual missionaries, in particular Franciscans, Dominicans, and Augustinians, are missing (Standaert, 2001). Since we have the biographies for the remaining 80% of individual missionaries, we use *Missionary Visits* to check the robustness of our primary measure of missionary influence, *Missionary Duration*, while acknowledging the possible bias in *Missionary Visits* resulting from the measurement error. Online

[8] For example, suppose that during 1580-1842, only missionaries A and B proselytized Changsha prefecture, respectively for 5 and 10 years; then Changsha has a value of 15 years for *Missionary Visits* even if A and B's stays overlapped.

Appendix 2 provides more details of the data sources and construction of variables for missionary influence.

3.2. Foreign trade

We capture each prefecture's access to foreign markets separately using its imports and exports. For imports, we employ the total value, and the number of types, of foreign goods shipped into a Chinese prefecture from all Chinese Maritime Customs ports as our primary measures, using data manually collected from each port's annual trade reports in *Zhongguo Jiuhaiguan Shiliao* (The Historical Archives of Chinese Maritime Customs) edited by Mao et al. (2001) and the microfilm collection by Harvard-Yenching Library (China Imperial Maritime Customs Statistical Department, 1860-1941).[9] The key pieces of information extracted from these reports include the inland destination prefectures, values, and descriptions of the foreign goods shipped inward from each customs port. There are 403 types of foreign goods shipped into China between 1876 and 1892 (see Online Appendix Figure A2 for a full list of imports).

Our analyses focus on the sample period of 1876 - 1892 for the following reasons. First, the customs ports did not adopt a uniform currency standard, with many ports using their local silver taels, until 1876. Second, the prefectural-level customs statistics were no longer reported after 1898, though the provincial trade data continued.[10] Third, the statistics for five specific years (1876, 1878, 1880, 1881, and 1892) are used in our study because the prefectural-level data for these years is the most complete in terms of geographic coverage. Moreover, we exclude 85 hinterland prefectures for which the transit trade data are missing (because their transit trade system was not yet established during our sample period). Consequently, there are 172 prefectures included in our import sample, of which 72% had imports of foreign goods (see Online Appendix 3 for a detailed description of the data sources and variable construction).

For exports, the CMC records do not provide systematic records at the prefectural level. Instead, we employ another source, namely *Zhongguo Tongyou Difang Wuzhi Zhi* (Native Products Catalogue of Postal Areas) published by the Directorate General of Posts of the Republic of China in 1936. The Catalogue records the Chinese native goods produced in each prefecture and sold to overseas markets. We use the

[9] In the context of China, Keller et al. (2011) and Mitchener and Yan (2014) explored the Chinese Maritime Customs (CMC) records to analyze how foreign trade was shaped by the opening of treaty ports and the First World War. Unlike them, we expanded the data on Chinese foreign trade to the vast inland cities and linked it to the missionary history.

[10] This is allegedly due to the rapidly increasing trade volume that led to a hard-to-handle rise in both work load and the cost of collecting and publishing statistics (Wu and Fang, 2005). The province-level data cannot provide sufficient geographical variation for our analysis as there were only 18 provinces covered by the CMC trade reports in those years.

value and the number of types of these native goods as the measures of exports. This dataset covers 235 Chinese prefectures, of which 28% had at least one type of native good exported (more details of the data and construction of export variables are in Online Appendix 4).

Figure 1 shows the distributions of CMC customs ports alongside *Missionary Duration* before 1842, across all the 269 prefectures of China Proper. *Missionary Duration* shows significant regional variation outside the customs ports; 166 prefectures had no missionaries until 1842, whereas the other prefectures vary from one to 243 years in terms of the duration of missionary presence. Figure 2 demonstrates that prefectures with a missionary presence are associated with a significantly higher value and greater diversity of imports and exports. On average, the value of imports or exports in the missionary prefectures is more than three or four times that of the non-missionary prefectures. Also, missionary prefectures have more than twice the number of types of trade goods.

3.3. Control Variables

Geographic factors. Geography and location affect both trade and missionary efforts. We thus control for the natural logarithm of each prefecture's terrain ruggedness index as it affects transport costs, and several distance measures – a prefecture's distance to the coast, distance to the nearest navigable river, distance to the nearest courier route, and distance to the nearest political center (imperial or provincial capital), each of which either directly affects trade access and transportation costs or is a proxy for a region's social openness to foreigners, or both. In particular, we also control for the distance to the nearest CMC port that connected China hinterland to foreign markets, simply because the distance to the ports directly shaped foreign trade opportunities and costs for inland prefectures.

Pre-1580 foreign trade. Another possible confounding factor is a prefecture's initial trade openness and experience with foreign trade before the missionaries came to China in 1580. As missionaries were more likely to follow known trade routes (e.g., Michalopoulos et al. (2017)), it is possible that the missionary effect on trade may simply be picking up the persistent impact of these earlier historical trade routes. To control for this possible influence, we include a prefecture's distance to the nearest pre-1580 trade sites. These historical trade sites include the overland Silk Road cities since the 2nd century BCE and the maritime ports for foreign trade from circa the 2nd century BCE to 1580 CE, based on the Esri GeoInquiries Collection for World History (2017) and Fang (2015), respectively. In addition, we also control for the distance to Chinese

cities that were mentioned in *The Travels of Marco Polo*, in the sense that these places had been introduced to Europeans long before Christian missions to China.

Economic development. Both missionaries and trade might naturally flow to prosperous and highly populated regions, such as urban centers. We use a prefecture's population density in 1851 as a proxy for its initial economic development, based on the prefectural population estimates by Cao (2001).

Modern communications infrastructure. In addition to the traditional transport (rivers and courier routes), we control for the effects of modern telegraph, postal offices, and railways that were introduced to China in the late 19th century, in the sense that these modern communications may have changed the geography of information and logistic flows in China and thus affected the distribution of foreign trade. Specifically, for each prefecture, we include its number of telegraph stations, number of postal offices, and number of railway stations that had been constructed by 1892 (for the import sample) or by 1936 (for the export sample). We normalize these numbers by the prefectural population in 1851 and 1910, respectively for the import and the export samples. Online Appendix 1 provides the summary statistics and data sources for all the variables.

4. The Effect of Christian Missionaries on Foreign Trade

4.1. Baseline Results

We estimate the impact of the pre-1842 missionaries on foreign trade during 1876-1936 at the prefectural level, using the following specification:

$$Trade_i = \alpha + \beta\, Mission_i + \gamma\, \mathbf{X}_i + \epsilon_i, \tag{1}$$

where $Trade_i$ takes three different forms. First, to investigate the entry effect, we start with a check on the extensive margin by setting $Trade_i$ to a value of 1 if prefectures i imported foreign goods during 1876-1892 (for the import sample) or exported local products in 1936 (for the export sample), and 0 otherwise. Second, to examine the intensive margin, we look at the trade value effect of the missionaries by letting $Trade_i$ be prefecture *i's* average annual import value (in Haikwan silver taels) during 1876-1892 or export value (in *yuan*) in 1936. Third, we examine the trade diversity effect by setting $Trade_i$ as prefecture *i's* number of types of import and export goods, respectively for the import and the export samples. The explanatory variable of interest, $Mission_i$, is prefecture *i's Missionary Duration* or *Missionary Visits* during 1580 and

1842. In this case, we omit the missionaries who entered China after 1842, to avoid the reverse impact of trade on missionary distribution.[11] $\mathbf{X}_i$ is a vector of prefectural controls as introduced in Section 3. We exclude the prefectures with CMC customs ports from the sample because these regions were administratively chosen to be trade centers dealing with transit trade, and they also differ substantially from other Chinese prefectures in institutions.

In Table 1, we examine the effect of Christian missionaries on import trade. The results in Panel A show a significantly positive effect of pre-1842 *Missionary Duration* on a prefecture's import trade during the later years. First, the maximum-likelihood Probit estimation shows that foreign goods are more likely to be imported to prefectures where the missionaries had cultivated for a longer period of time prior to 1842, whether or not a full set of prefectural characteristics is controlled for (columns (1) and (2)). According to column (3), a 10% increase in *Missionary Duration* is associated with nearly 8% higher import value, after the effect of the other prefectural factors is controlled for. To account for the potential bias induced by the zero values for import (29% of the observations), we employ the Tobit estimation in column (4) and the results are consistent. Columns (5) and (6) confirm that *Missionary Duration* affects the diversity of import goods positively. Doubling *Missionary Duration* would increase the number of types of import goods by more than five (column (5)), which is substantial given the outcome variable's sample mean of 27. Given that the number of import goods types is a count variable, we further test the missionary effect by using a Poisson model in column (6), which results in a consistently positive and significant estimate for the *Missionary Duration* coefficient.

Similarly, we find consistent results when employing a prefecture's *Missionary Visits* as the alternative explanatory variable (Panel B of Table 1). The coefficient for *Missionary Visits* is positive and statistically significant, with or without controls in the alternative estimations.

The CMC data on import does not cover all prefectures of China Proper because of the missing Transit Trade records for some ports. To check whether the import data from the remaining ports are representative, we employ an alternative measure of import that covers all 269 prefectures of China Proper, i.e., the number of stores selling foreign goods in each prefecture in 1936, with the data obtained from the Native Products Catalogue of Postal Areas, which is the same source as for our export sample.

[11] To reduce skewness in the import/export values and missionary duration/visits, we express them as natural logarithms after taking zero values into account, i.e., log (1 + X). Given the large values of these variables (see Online Appendix Table A1), adding one to the values would not cause a substantial change in their variations and thus the interpretation of percentage change as concerned in Chen and Roth (2024). For robustness, we also used the inverse hyperbolic function of the import and export values and found the missionary effects robust (not reported).

In this case, the missionary effect remains robust when this alternative outcome is used (Table A2 in Online Appendix 3). In sum, our results indicate that more pre-1842 interactions with European missionaries made the locals more receptive to foreign goods.

Next, we study the missionary effect on export trade in Table 2, where regions with a longer missionary history are found to be more likely to engage in exporting local products overseas (columns (1) and (2), Panel A). Moreover, both the export value and product diversity in these regions are significantly higher. Specifically, a 10% increase in *Missionary Duration* is associated with an 8.16% increase in export value (column (3)); furthermore, doubling *Missionary Duration* would increase the number of export goods types by 0.433 (column (5) of Panel A), which is large given the sample mean of 1.06. We also find a consistently positive effect of *Missionary Visits* on the likelihood, value, and diversity of export trade in Panel B of Table 2. This result remains robust under alternative estimations, such as the Tobit and Poisson models in columns (4) and (6), respectively.

To allay concerns about possible spatial correlation (especially between neighboring prefectures), we report the spatial standard errors clustered within a radius of 136 kilometers based on the method of Colella et al. (2023). This cutoff distance is the average distance between any two adjacent prefectural centroids in China Proper, which allows us to account for potential spatial correlations. Doing so does not diminish the missionary effect (see Online Appendix 5).

4.2. Matteo Ricci and the Missionary Expansion: Instrumented Results

With the robustness of the missionary effect confirmed, one concern remains that the estimates may still be biased by unobserved prefectural characteristics affecting their access to missionaries and foreign trade. For instance, prefectures that were more receptive to foreign or new cultures would be more likely to welcome both missionaries and international trade; but, unfortunately, such regional cultural traits are hard to measure. To address this concern, we employ an instrumental variable (IV) to estimate the exogenous effect of the missionaries on foreign trade, with the IV constructed from the early missionary efforts by Jesuit pioneer Matteo Ricci.

4.2.1. Matteo Ricci's leadership and personal network

Matteo Ricci effectively influenced the geography of Christian missionaries in China. He was the first missionary who successfully resided in the country. The missionaries could not succeed in proselytizing a closed society structured according to

Confucianism without the support of the local Confucian elite. For this reason, he adopted an elite-focused strategy, pursuing influential mandarins and maintaining close personal connections with them using his distinct charisma, social skills, and profound knowledge of both Western science and Chinese classics (Dunne, 1962).

Ricci was able to cultivate deep personal ties with powerful officials who then allowed Catholic missionaries to operate and at the same time protected Catholicism in China. Ming official, Wang Honghui (1542-1615), is a good example. He met Ricci in Shaozhou (of Guangdong Province) in 1592 and became fascinated by Ricci's knowledge of European cosmology and astronomy. They developed a lasting friendship. Later, when Wang was reassigned to govern in the second capital of the dynasty, Nanjing, he helped Ricci to relocate and introduced him to other officials there, among whom was Ye Xianggao, who became the Grand Secretary of the Imperial Court in Beijing in 1607 and who supported and protected the missionaries in his official capacity throughout his eighteen-year tenure (1607-1624) (Dunne, 1962). To a certain extent, Ricci's role was analogous to that of Martin Luther (1483-1546) who launched the Protestant Reformation, as a cultural entrepreneur propagating a new religion through a personal network (Becker et al., 2020).

We thus use the number of Ricci's Chinese friends in each prefecture, during 1583-1630, as the IV for the pre-1842 missionary distribution. We have identified 92 friends of his from Ricci's own texts (Ricci, 2018 [1913]; Gallagher and Ricci, 1983 [1615; 1953]) and historians' works (Lin, 1996).[12] Then, we track these friends in the China Biographical Database (CBDB) to identify the places where they served after becoming Ricci's friends. These friends were later appointed to governing positions in 39 prefectures. Figure 3 shows that in regions with more of Ricci's friends, missionaries entered earlier and stayed longer than in other regions. This is further evidenced by the first-stage results: a prefecture's number of Ricci's friends in its government predicts missionary duration and visits during 1580-1842 positively, with or without the prefectural confounding factors being controlled for (Table 3, columns (1)-(4)).

The prefectural distribution of Ricci friends' assignments should not affect foreign trade directly after 1842, given that their positions of power and locations of service were centrally appointed by the emperor based on political and administrative considerations rather than trade and that the maritime trade ban was in effect when

[12] Lin (1996) collected the biographies of Chinese officials who were approached by Matteo Ricci, with information of the years of their first contacts and their official posts at that time. We complemented Lin's list from *China in the Sixteenth Century: The Journals of Mathew Ricci* by Louis J. Gallagher and Matteo Ricci (1983 [1615;1953]), and *Le lettere dalla Cina* by Matteo Ricci (2018 [1913]) (the Chinese translation).

they were in power prior to 1842. Moreover, because of the native-place avoidance rule, they could only be appointed to governing positions outside their home prefecture (Fang, 2008), which attenuates the concern that some local cultural characteristics (e.g., openness) of these friends' hometowns may have affected foreign trade. In addition, we remove prefectures where Ricci first met these friends, assuming these prefectures were more inclusive and open to strangers. Consequently, the distribution of Ricci's friends is orthogonal to the determinants of foreign trade distribution.

Indeed, Table 3 illustrates that the distribution of Ricci's friends has no correlation with a host of prefectural factors relating to foreign trade or trade potential. These factors include a prefecture's proximity to historical trade ports (ports either before or after the missionaries entered China in 1580), proximity to major producing areas of popular Chinese exports (tea, silk, and sugar), and proximity to commercial centers before 1842. The distribution of Ricci's friends also has little to do with prefectural population density at the time of missionary entry (1580) and the eve of trade opening (1820), indicating that the IV does not pick up the impact of economic prosperity on foreign trade.[13]

However, the prefectural distribution of Ricci's friends does positively predict each prefecture's foreign trade volume after China's opening in 1842 (columns (5)-(8) of Table 3). Against the irrelevance between Ricci's friends and trade potentials before 1842, these results imply the exclusion restriction of the IV, that is, Ricci's Chinese friends had a long-lasting positive impact on foreign trade by hosting more missionaries in their places of office.

4.2.2. The IV results

Table 4 presents the IV results: when instrumented by the distribution of Ricci's friends, both *Missionary Duration* and *Missionary Visits* exert a positive and statistically significant impact on the likelihood, value, and diversity of import. In terms of the magnitude of the missionary effect, doubling a prefecture's *Missionary Duration* would increase its import value by 117% and its number of import goods by 8.8 (columns (2) and (4)), which are respectively 49% and 62% greater than the marginal effects under the OLS estimations. To address the zero-censored data for the

[13] The correlations in Table 3 are conditional on the geographic factors (distance to the coast, distance to navigable river, distance to political centers, and terrain ruggedness), since Ricci's friends are more likely to distribute in geographically favourable areas, in particular the coastal prefectures or political centers, possibly because these friends were mostly high-rank mandarins and thus were less likely to be appointed to remote areas. We also control the distances to coastline and political centers in the following 2SLS estimations.

import value and the number of import goods, we use the IV-Tobit and IV-Poisson estimations, respectively, and obtain consistent results in columns (3) and (5).

Similarly, we find a positive and statistically significant missionary effect on export trade (columns (6) to (10) of Table 4). Missionary influence is associated with an increase in both the value and number of exported goods across the missionary measures. Still taking *Missionary Duration* as an example, doubling a prefecture's years of missionary presence would triple its export value, while increasing its number of exported goods by 0.4. The missionary effect remains robust under the IV-Tobit and Poisson estimations. And the high F-statistic values suggest that the number of Ricci's friends is a strong instrumental variable.

5. Christian Missionaries and the Information Channel

The above analyses empirically establish a long-term positive effect on foreign trade of Christian missionaries in 1580-1842. This section turns to the information channel through which the effect manifested. To this end, we employ two strategies. First, we compare the pre-1842 missionaries and their post-1842 successors in terms of their impact on foreign trade, in order to separate the information legacy of the pre-1842 missionaries from the other channels underlying the missionary effect on trade. Second, we measure the information exposure of Chinese localities in the missionaries' Western publications directly.

5.1. Comparing Historical and Contemporary Missionary Effects

Given China's ban on Christianity after 1720 and its opening to both foreign trade and Christianity in 1842, we can make use of the two waves of Christian missions to China, and compare their impacts on trade. The rationale is that the missionaries in 1580-1842 who had died or been expelled from China by the time of trade opening could only affect China's subsequent foreign trade through their information legacy, whereas the missionaries who came to China after 1842 could affect trade through multiple channels in addition to information (for example, commercial intermediaries, political connections, and Western-style education). Controlling for post-1842 missionaries can thus approximately isolate the information effect of the pre-1842 missionaries on foreign trade.

We exploit the variation in the distribution of the post-1842 Christian missionaries during the same periods as for the import and export data, respectively. Specifically, we calculate a prefecture's *Post-1842 Missionary Duration* as the number of years from the missionaries' first post-1842 entry to the prefecture to 1892 (for the

import sample) or to 1920 (for the export). It excludes the missionary presence, if any, before 1842. The entry time of Protestant missionaries is obtained from Stauffer (1922), and that of the Catholic missionaries is based on Bureau Sinologique de Zi-ka-wei (1935). Given the lack of individual records for many Catholic missionaries who entered China after 1842, we are unable to obtain each prefecture's post-1842 number of missionary visits.

There is a positive correlation between the pre- and post-1842 missionary distributions across Chinese prefectures, as the post-1842 missionaries probably found it easier to re-enter regions that had been explored by their Catholic pioneers before the ban of 1720.[14] Still, the geographic distributions of the missionaries differ significantly between the two waves of missions. The pre-1842 missionaries were distributed in 103 prefectures, whereas the post-1842 missionaries covered 245 (by 1920) among the 269 prefectures in China Proper. Moreover, the missionary-duration distribution also varies between the two waves. We make use of these variations between the two missionary waves to contrast their effects on trade, while acknowledging the potential bias caused by the correlation between the waves and their endogenous distributions.

The results are presented in Table 5. *Pre-1842 Missionary Duration* maintains a significant and positive impact on both import and export after taking into account the post-1842 missionary influence. Moreover, the effect of *Pre-1842 Missionary Duration* on the import trade is more significant than that of *Post-1842 Missionary Duration*, suggesting that the earlier missionaries' knowledge and information diffusion had already penetrated both China and Europe so widely and deeply that it became harder for the later missionaries to achieve additional impact immediately. Nonetheless, the post-1842 missionaries affected foreign trade positively, although their impact did not become statistically significant until 1936, a time when the missionaries' religious and secular influence had penetrated China deeply (Bai and Kung, 2015).[15]

5.2. Measuring Information Flow via Missionary Publications

We now turn to examining directly the information channel through which the missionaries facilitated foreign trade. As discussed earlier, their intermediary role must

[14] For instance, the correlation coefficient is 0.22 and significant at the 1% level between the pre- and post-1842 missionary presence across the 269 sample prefectures.

[15] Further, we compare the effects of the six Catholic orders in China on foreign trade and find that the Jesuit effect dominates (Online Appendix 6). This coincides with the dominant role of the Jesuits in knowledge exchange between China and Europe at the time. The Jesuits published over half of the missionary publications on China before 1842 (Walravens, 2013). They also had the reputation of being more receptive to local beliefs and customs than other orders.

have cultivated connections between European and Chinese traders through more and better-quality information, something critical for long-distance trade, and reduced information costs for both sides. It is not possible to capture all the information channels provided by the missionaries based on the historical records available to us, but their published writings since the late 16th century provide a source to gauge the scale of information flow. In particular, we rely on textual tools to quantify the information about Chinese localities embedded in the missionaries' publications.

Our source for textual analysis is the Jesuits' Letters published in Europe between 1702 and 1776 and later re-compiled by Le Gobien, et al. (2005 [1819]).[16] The Jesuits played a dominant role in Sino-Western interactions before the 19th century. Their letters introduced to Europeans a wide range of knowledge about China, including but not limited to geography, transport, population, native products, local customs, and government administration. By comparison with other missionary writings, the Jesuits' Letters are more complete and systematic records and cover almost all areas that the Jesuits went to over a long time span. For these reasons, the Letters were deemed one of the most influential missionary publications of the time about China (Lach and Van Kley, 1965a). They were later translated into three Chinese volumes, allowing us to identify the Chinese prefecture names.

To capture the regional variations in exposure in the missionary publications, we count the number of occurrences in which a prefecture or county name was mentioned in the above Letters and then aggregate the count at the prefecture level. Based on the Qing dynasty map of 1820, there were 269 prefectures in China Proper that administered 1,547 counties (CHGIS, 2016). In total, 83 prefectures within our sample were clearly mentioned in this source.

The number of mentions of a place name in the Jesuits' Letters reflects that place's degree of exposure, but it may not necessarily capture the abundance of information useful for trade. To address this concern, we construct an additional measure, namely *Information abundance*, computed as the number of types of information about each prefecture in the Letters. The number of information types captures the quality and depth of information about a place. Specifically, for each prefecture or county mentioned in the Letters, we manually identify its context of mention and then the types of information described in this context.[17] Among them,

[16] The first volume of these letters was originally published in Paris in 1702. The next thirty-three volumes were published regularly in the subsequent seventy-four years and with translations into other languages and wide distribution (Lach and Van Kley, 1965b; Le Gobien et al., 2005 [1819]). See Figure A9 in Online Appendix 7 for sample pages of the Jesuits' Letters.

[17] See an illustration in Figure A9 of Online Appendix 7. Given that the text of the Letters is not sorted by Chinese place names, we can only approximately define the context related to each place rather than counting the (key)words delineating a specific place. Therefore, the estimates on the effect of the

eight types of information are potentially relevant for foreign trade (Table A5). The first type is directly on local history of foreign trade or communications, whereas the other seven types pertain to information and knowledge helpful to foreigners who do business in China, ranging from transport, native products, natural environment, local customs, urban life, government administration, and political connections. Of the 83 prefectures mentioned in the Letters, 62 were covered with such trade-related information, with their number (frequency) of information types ranging from 1 to 184. To gauge the information abundance fully, we consider the frequency of each type of information mentioned about a prefecture in the Letters.

Figure 4 depicts the spatial distribution of prefecture-level appearance frequency and information abundance, demonstrating that prefectures with longer missionary history were reported by the missionaries more frequently and with higher coverage quality. To confirm the above visual impression, we regress each prefecture's count of place names mentioned in the Letters and its information abundance against missionary influence. We control for the same sets of geographic and economic controls as those in the baseline regressions of Table 1, and instrument the variables of missionary influence using the number of Ricci's friends.

The results are reported in Table 6. Prefectures with longer missionary presence and/or more missionary visits were mentioned more frequently and with higher-quality information. Taking the number of mentions as an example, doubling a prefecture's *Missionary Duration* would increase its frequency of exposure in missionary publications by 46.9%, and *Missionary Visits* produces a similar effect (columns (1) and (3)). We further examine the importance of missionary information for trade in Table 7, while acknowledging possible underestimation of the information effect due to the fact that the Jesuits' Letters do not capture all the information channels. The results demonstrate that a prefecture's higher media exposure significantly predicts more foreign trade. For example, doubling a prefecture's number of mentions in missionary publications is associated with an 83.5% increase in import value and a doubling in export value (columns (2) and (5) in Panel A).

6. Conclusion

By constructing new data for historical foreign trade, Christian missionaries and their publications, we find that the missionaries facilitated trade expansion to and from hinterland Chinese prefectures. This arose because the missionaries introduced these unfamiliar regions to the West through their letters and publications, from which the

information abundance may be confounded by measurement errors and should be interpreted with caution.

accumulated knowledge for Europeans helped reduce the information costs for long-distance trade. These findings shed new light not only on the contribution to trade globalization by the missionaries but also on how they contributed. It is their action as informational intermediaries that expanded the limits of early globalization and helped pave the foundation for China to become the world's powerhouse in international trade in the 21st century. In this process, the European missionaries also promoted East-West interactions and at the same time prepared China for its subsequent path to modernization.

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Figures and Tables

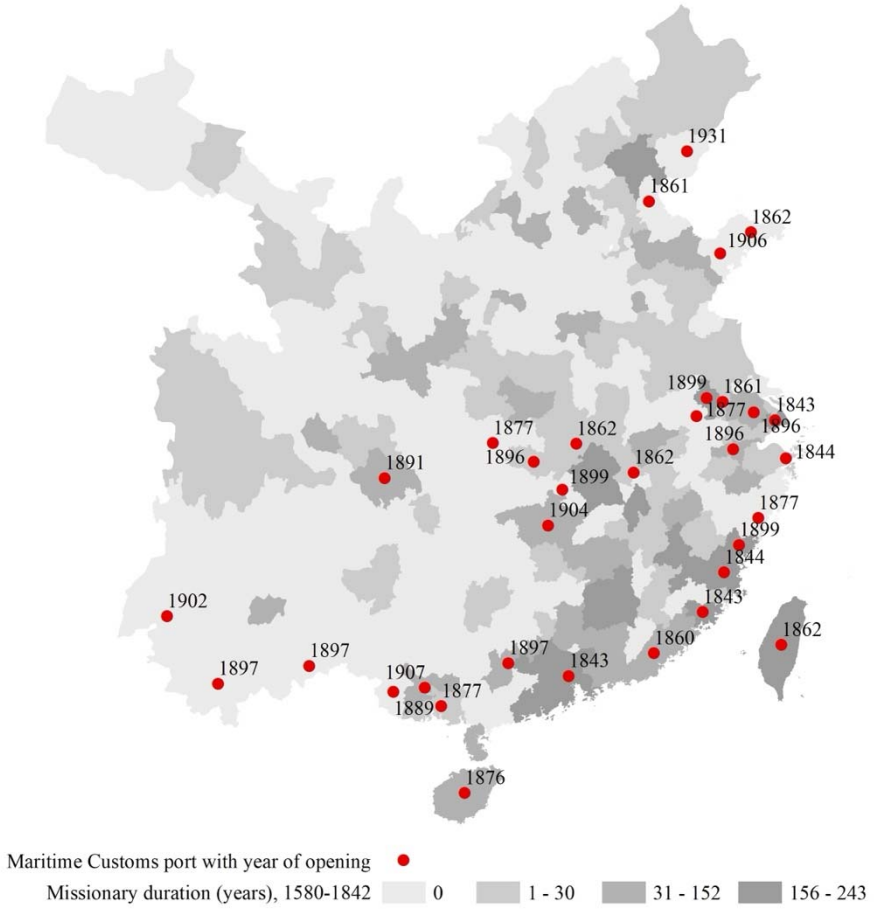


Figure 1. Distribution of Missionaries before Trade Opening in the Sample Prefectures

Notes: The map shows the 269 sample prefectures in 'China proper' of the Qing dynasty in 1820, based on the prefectural base map in CHGIS (2016). Chinese Maritime Customs ports (labeled by the years of opening) are based on Yan (1955) and Chen and Sun (2002).

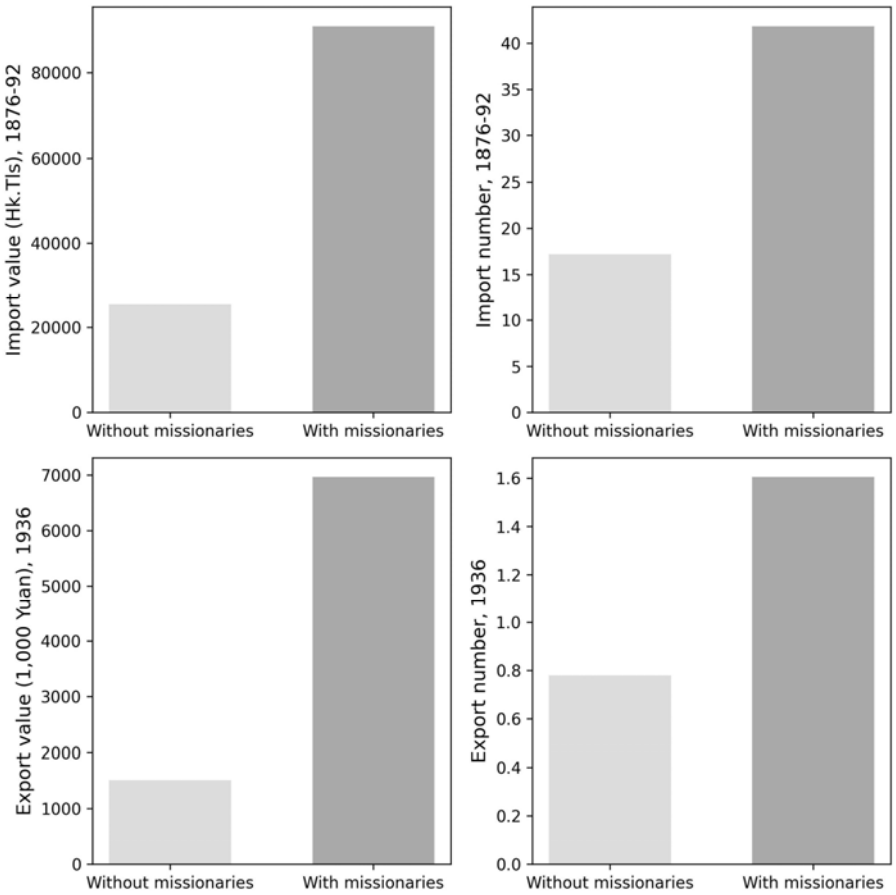


Figure 2. Missionary Presence (1580-1842) and Foreign Trade Volume (1876-1936)

Notes: The bars compare the foreign trade volume after 1842 in prefectures where there were missionaries before 1842 to that of prefectures where there were no missionaries. Trade volume is measured by the annual average value (in Haikwan Taels) or number of import goods to each Chinese prefecture in the years 1876, 1878, 1880, 1881, and 1892, or by the annual average value (in *yuan*) and number of export goods from each Chinese prefecture in 1936. The import sample contains 64 prefectures with missionaries and 108 without. The export sample contains 81 prefectures with missionaries and 154 without.

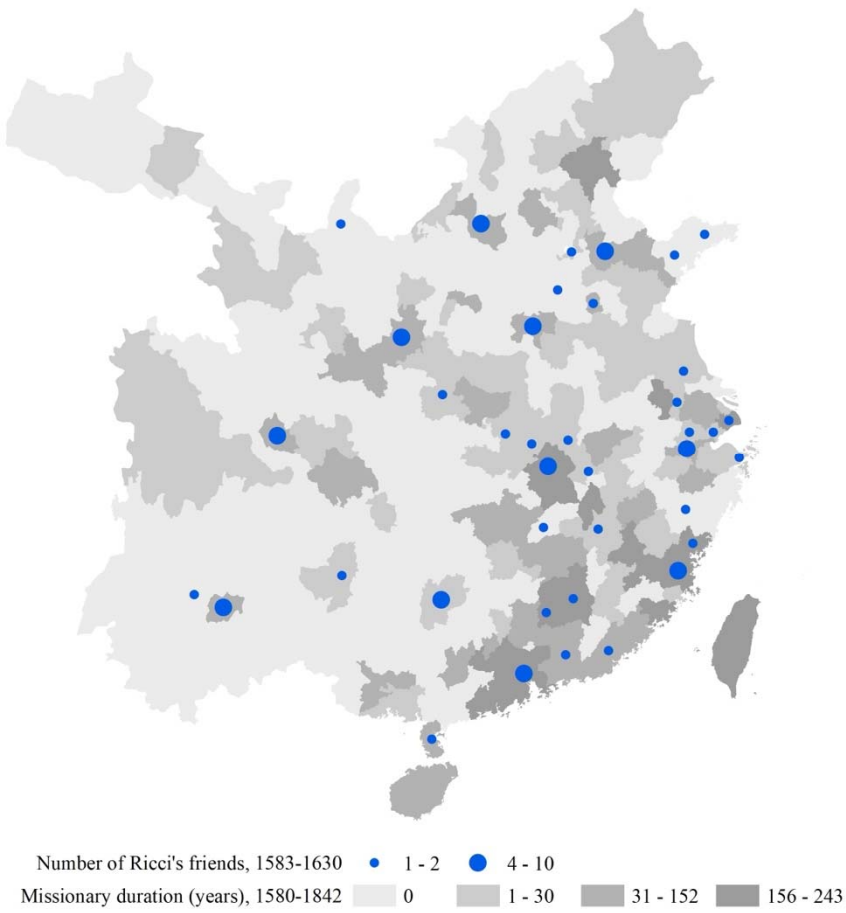
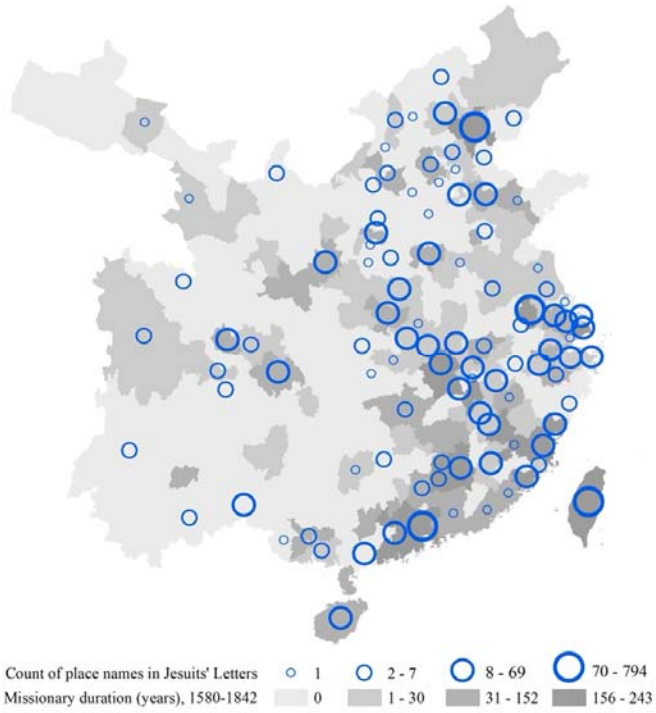
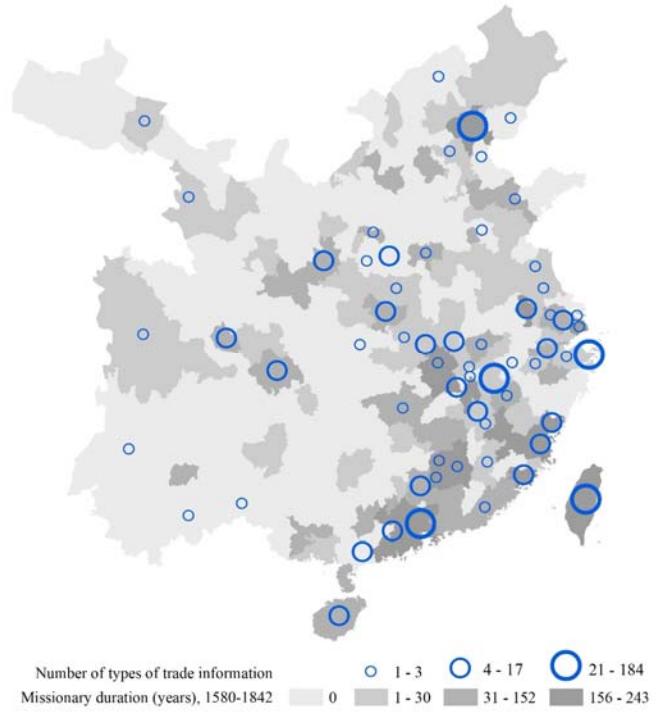


Figure 3. Matteo Ricci's Social Network and the Missionary Distribution

Notes: As the pioneer of the Catholic mission to China, Ricci cultivated about 92 Chinese friends in the officialdom. These friends helped Ricci to establish the early missions and thus shaped the subsequent distribution of missions in China. This map shows the distribution of Ricci's Chinese friends who were appointed by the emperors in different prefectures after they met Ricci, based on biographical records of Ricci compiled by Gallagher and Ricci (1983 [1615; 1953]), Ricci (2018 [1913]), and Lin (1996) and the Chinese Biographical Database (CBDB).



(a) Count of place names



(b) Information abundance

Figure 4. Chinese Regions Introduced in Jesuits' Letters (1702-1776)

Notes: Figure (a) shows the prefectural distribution of the frequency of Chinese prefecture and county names mentioned in the Jesuits' Letters published from 1702 to 1776. In Figure (b), information abundance is measured by the number of trade information types mentioned for each prefecture in the Letters. There are eight types of information: foreign trade/communications, transportation, native products, natural environment, local custom, urban life, government administration, and political connections.

Table 1. The Effect of Christian Missionaries on Import

	Having imports	Having imports	Import value	Import value	Number of import goods	Number of import goods
	Probit	Probit	OLS	Tobit	OLS	Poisson
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A						
Missionary duration	0.300***	0.304***	0.786***	0.944***	5.424***	0.155***
	(0.086)	(0.091)	(0.172)	(0.223)	(1.750)	(0.051)
Observations	172	172	172	172	172	172
R-squared			0.347		0.287	
Panel B						
Missionary visits	0.291***	0.272**	0.720***	0.874***	6.559***	0.175***
	(0.090)	(0.117)	(0.213)	(0.276)	(2.151)	(0.056)
Observations	165	165	165	165	165	165
R-squared			0.328		0.297	
Controls in each panel						
Distance to the customs port	No	Yes	Yes	Yes	Yes	Yes
Distance to the political center	No	Yes	Yes	Yes	Yes	Yes
Distance to the navigable river	No	Yes	Yes	Yes	Yes	Yes
Distance to the courier route	No	Yes	Yes	Yes	Yes	Yes
Distance to the coast	No	Yes	Yes	Yes	Yes	Yes
Terrain ruggedness index	No	Yes	Yes	Yes	Yes	Yes
Population density in 1851	No	Yes	Yes	Yes	Yes	Yes
Distance to pre-1580 trade site	No	Yes	Yes	Yes	Yes	Yes
Distance to Marco Polo places	No	Yes	Yes	Yes	Yes	Yes
Density of post offices in 1892	No	Yes	Yes	Yes	Yes	Yes
Density of telegraph stations in 1892	No	Yes	Yes	Yes	Yes	Yes

Notes: Having imports is a dummy that equals one if a prefecture had foreign imports in 1876-1892, and zero otherwise. The import value (in Haikwan Taels) is the average value of the import goods of the years 1876, 1878, 1880, 1881, and 1892 in each prefecture. The number of import goods refers to the number of types of foreign goods imported to each prefecture between 1876 and 1892. The missionary duration refers to the years of missionary presence in each prefecture between 1580 and 1842. Missionary visits refer to the aggregate of all the missionaries' years of presence in each prefecture between 1580 and 1842. The import value and the missionary measures are in natural logarithm, i.e., log (1 + X). The pre-1580 trade site refers to the maritime trade ports that existed between 202 BCE and 1580 CE and the cities along the Silk Road prospering from the 2nd century BCE to the mid-15th century. Robust standard errors are reported in parentheses. *, **, *** indicate the significance level at 10%, 5%, and 1% respectively.

Table 2. The Effect of Christian Missionaries on Export

	Having exports	Having exports	Export value	Export value	Number of export goods	Number of export goods
	Probit	Probit	OLS	Tobit	OLS	Poisson
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A						
Missionary duration	0.187***	0.155***	0.816***	2.070***	0.433**	0.309***
	(0.051)	(0.056)	(0.270)	(0.664)	(0.202)	(0.080)
Observations	235	235	235	235	235	235
R-squared			0.200		0.183	
Panel B						
Missionary visits	0.221***	0.197***	1.003***	2.480***	0.408*	0.298***
	(0.057)	(0.064)	(0.283)	(0.695)	(0.211)	(0.075)
Observations	227	227	227	227	227	227
R-squared			0.208		0.183	
Controls in each panel						
Distance to the customs port	No	Yes	Yes	Yes	Yes	Yes
Distance to the political center	No	Yes	Yes	Yes	Yes	Yes
Distance to the navigable river	No	Yes	Yes	Yes	Yes	Yes
Distance to the courier route	No	Yes	Yes	Yes	Yes	Yes
Distance to the coast	No	Yes	Yes	Yes	Yes	Yes
Terrain ruggedness index	No	Yes	Yes	Yes	Yes	Yes
Population density in 1910	No	Yes	Yes	Yes	Yes	Yes
Distance to pre-1580 trade site	No	Yes	Yes	Yes	Yes	Yes
Distance to Marco Polo place	No	Yes	Yes	Yes	Yes	Yes
Density of post offices in 1936	No	Yes	Yes	Yes	Yes	Yes
Density of telegraph stations in 1936	No	Yes	Yes	Yes	Yes	Yes
Density of railway stations in 1936	No	Yes	Yes	Yes	Yes	Yes

Notes: Having exports is a dummy that equals one if a prefecture had exports to overseas markets in 1936, and zero otherwise. The export value (in *yuan*) is the total sales value of export goods in each prefecture in 1936 (in log (1 + X)). The number of export goods refers to the number of native goods sold overseas from each prefecture in 1936. Missionary duration and visits are the same as those of Table 1. Robust standard errors are reported in parentheses. *, **, *** indicate the significance level at 10%, 5%, and 1% respectively.

Table 3. Testing the Validity of the Instrumental Variable: Number of Matteo Ricci's Chinese Friends

	First-stage on missionary distribution 1580-1842				Reduced-form on foreign trade 1876-1936			
	Missionary duration	Missionary duration	Missionary visits	Missionary visits	Import value	Number of import goods	Export value	Number of export goods
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Number of Ricci's friends	0.601***	0.501***	0.662***	0.566***	0.570**	4.265*	1.227***	0.225**
	(0.062)	(0.065)	(0.051)	(0.057)	(0.287)	(2.486)	(0.339)	(0.104)
Controls	No	Yes	No	Yes	Yes	Yes	Yes	Yes
Observations	269	269	258	258	172	172	235	235
R-squared	0.192	0.323	0.284	0.388	0.304	0.248	0.207	0.140
	Exclusion restriction: Dependent variables are measures for trade potential							
	Distance to pre-1580 trade site	Distance to trade port, 1580-1842	Population density, 1580 (log)	Population density, 1820 (log)	Distance to commercial center, 1368-1842	Distance to tea center, 1368-1842	Distance to silk center, 1368-1842	Sugarcane soil suitability
	(9)	(10)	(11)	(12)	(13)	(15)	(15)	(16)
Number of Ricci's friends	-7.070	9.593	0.018	0.035	9.193	11.460	8.879	0.635
	(8.237)	(10.186)	(0.032)	(0.024)	(13.543)	(14.842)	(12.948)	(0.499)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	269	269	269	269	269	269	269	269
R-squared	0.367	0.647	0.524	0.524	0.426	0.425	0.364	0.372

Notes: Ricci's friends refer to the Chinese scholar-officials whom Ricci cultivated from 1580 to 1610 and were appointed by the emperors to different prefectures after they were cultivated by Ricci. All columns report OLS estimates. Missionary and trade variables are the same as those in Tables 1 and 2. Columns (2) and (4) include the same sets of controls as those of Table 1 but exclude the distance to the customs port, postal offices, and telegraph stations that go beyond the sample period. The controls in columns (5)-(8) are the same as those in Table 1 (for import) and Table 2 (for export), respectively. Columns (9)-(16) show that Ricci's friends are not correlated with prefectural factors of trade potential. The controls include the log distance to navigable river, log distance to the coast, log terrain ruggedness index, the distance to the nearest political center, and the log distance to Marco Polo-mentioned place. Robust standard errors are given in parentheses. *, **, ***, indicate the significance level at 10%, 5%, and 1% respectively.

Table 4. The Effect of Christian Missionaries on Foreign Trade: Instrumented Evidence

	Having imports	Import value	Import value	Number of import goods	Number of import goods	Having exports	Export value	Export value	Number of export goods	Number of export goods
	IV-Probit	2SLS	IV-Tobit	2SLS	IV-Poisson	IV-Probit	2SLS	IV-Tobit	2SLS	IV-Poisson
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A										
Missionary duration	0.619***	1.173**	1.470*	8.775*	0.314*	0.425***	2.037***	5.154***	0.373**	0.344**
	(0.148)	(0.543)	(0.757)	(4.608)	(0.186)	(0.106)	(0.553)	(1.223)	(0.164)	(0.139)
F-statistics		37.153		37.153			68.414		68.414	
R-squared		0.332		0.264			0.106		0.182	
Observations	172	172	172	172	172	235	235	235	235	235
Panel B										
Missionary visits	0.660***	1.033**	1.308*	7.679*	0.243*	0.413***	1.868***	4.743***	0.238**	0.245**
	(0.163)	(0.498)	(0.706)	(4.055)	(0.131)	(0.114)	(0.497)	(1.140)	(0.118)	(0.099)
F-statistics		48.562		48.562			89.014		89.014	
R-squared		0.321		0.295			0.170		0.175	
Observations	165	165	165	165	165	227	227	227	227	227
Controls in each panel	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The table reports the 2nd-stage estimates of the missionary effect that is instrumented by the number of Ricci's friends in each prefecture in 1583-1630. The variables are the same as those in Table 1 (for import) and Table 2 (for export). All columns include the same sets of controls as in Tables 1 and 2. Robust standard errors are given in parentheses. *, **, *** indicate the significance level at 10%, 5%, and 1% respectively.

Table 5. Comparing the Historical and Contemporary Missionary Effects

	Having imports	Import value	Number of import goods	Having exports	Export value	Number of export goods
	Probit	Tobit	Poisson	Probit	Tobit	Poisson
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A						
Pre-1842 missionary presence	0.804***	3.489***	0.411**	0.338*	4.883*	0.686**
	(0.301)	(0.949)	(0.204)	(0.202)	(2.632)	(0.316)
Post-1842 missionary presence	0.553*	1.364	0.436**	1.129**	16.208**	1.893**
	(0.323)	(0.897)	(0.202)	(0.467)	(6.569)	(0.824)
Observations		172	172		235	235
Panel B						
Pre-1842 missionary duration	0.250***	0.846***	0.141***	0.173***	2.270***	0.345***
	(0.094)	(0.230)	(0.050)	(0.058)	(0.671)	(0.079)
Post-1842 missionary duration	0.165*	0.367	0.057	0.265***	3.654***	0.410**
	(0.091)	(0.252)	(0.050)	(0.093)	(1.210)	(0.184)
Observations	172	172	172	235	235	235
Controls in each panel	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Post-1842 missionary duration is based on the establishment of a Catholic Apostolic Prefecture/Vicariate in China and the entry of the first Protestant missionary into a prefecture. The controls are the same as those in Table 1 (for import) and Table 2 (for export). The OLS estimates, which are consistent with the Tobit/Poisson's, are omitted to save space. Robust standard errors are reported in parentheses. *, **, *** indicate the significance level at 10%, 5%, and 1%, respectively.

Table 6. The Effect of Christian Missionaries on Information Flow

	Count of place names	Count of place names	Count of place names	Count of place names	Information abundance	Information abundance	Information abundance	Information abundance
	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Missionary duration	0.469***	0.722***			0.318***	0.433***		
	(0.063)	(0.162)			(0.050)	(0.152)		
Missionary visits			0.500***	0.650***			0.345***	0.389***
			(0.060)	(0.129)			(0.052)	(0.124)
F-statistics		69.591		83.982		69.591		83.982
R-squared	0.407	0.341	0.430	0.407	0.385	0.355	0.414	0.410
Observations	269	269	258	258	269	269	258	258
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The count of place names refers to the frequency of Chinese prefecture and county names that were mentioned in the renowned missionary publication, Jesuits' Letters, from 1702 to 1776 (in log (1 + X)). We aggregated the frequency of the place names at the prefectural level. Information abundance refers to the number of types of trade-related information assembled in each prefecture in the Jesuits' Letters. The missionary duration and visits count only the pre-1702 variations to avoid the feedback effect of the Jesuits' Letters. The controls are the same as those in Table 1 but exclude the distance to the customs port, population density, postal offices, and telegraph stations that go beyond the sample period, and include population density in 1680 instead. Robust standard errors are reported in parentheses. *, **, *** indicate the significance level at 10%, 5%, and 1% respectively.

Table 7. The Impact of Missionary Information on Foreign Trade

	Having imports	Import value	Number of import goods	Having exports	Export value	Number of export goods
	OLS	OLS	OLS	OLS	OLS	OLS
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A						
Count of place names	0.043*	0.835***	7.882***	0.061*	1.097**	0.739**
	(0.023)	(0.258)	(2.783)	(0.032)	(0.456)	(0.369)
R-squared	0.250	0.311	0.274	0.154	0.186	0.187
Observations	172	172	172	235	235	235
Panel B						
Information abundance	0.052	1.106**	12.707**	0.071	1.249*	1.165*
	(0.040)	(0.442)	(5.058)	(0.049)	(0.738)	(0.672)
R-squared	0.247	0.302	0.271	0.147	0.173	0.189
Observations	172	172	172	235	235	235
Controls in each panel	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The controls are the same as those in Table 1 (for import) and Table 2 (for export). Robust standard errors are reported in parentheses. *, **, *** indicate the significance level at 10%, 5%, and 1% respectively.