Cultural origin and international trade

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ABSTRACT

Employing merged Chinese listed firm data, Chinese custom data, and the prefecture-level clan culture data, we find a clear pattern that chairpersons who originate from a prefecture-level city with a stronger clan culture lead firms to engage in less international trade. This finding is robust to a variety of checks including using the shortest distance from the chairperson's prefecture of origin to the nearest historical Neo-Confucian Academy and the number of southward-migrating clans during the Jianyan Reign (1127–1130) in the origin prefecture as instruments. The patterns in the data highlight the importance of cultural origin in shaping individuals' attitudes towards international trade.

1. Introduction

The importance of informal institutions, including networks, cultural beliefs, repeated interactions, etc., in explaining significant differences in international trade among firms and across regions has gained wide acceptance in the literature (e.g., Gould, 1994; Ding et al., 2018; Turco and Maggioni, 2018; Cheng et al., 2020; Korovkin and Makarin, 2023). In this article, we provide new insight into mechanisms through which informal institutions affect international trade. Specifically, we empirically examine whether firm leaders who lived through different clan cultures during the formative period differ in their economic preferences and beliefs, and hence differ in their corporate decisions towards international trade.

Clans are patrilineal kin groups with one common ancestor, and their members typically live together. In pre-modern China, clans played key roles in commercial and financial matters (Fei, 1946; Xu and Yao, 2015; Zhang, 2020; Cao et al., 2022), thus having a significant effect on the intra-city cooperation patterns and behavioral norms. Moreover, the self-sufficient agricultural economic structure and the high costs of transport and communication led individuals to live in a relatively closed social environment, which resulted in the accumulation and solidification of regional differences in societal norms and cooperation patterns. Since the Chinese government's attitudes towards clans have changed, the role of clans in grassroots governance and financial support has been

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continuously weakened. Nevertheless, the inseparable ties between clan organizations and societal behavioral norms have ensured their continued cultural significance (Greif and Tabellini, 2017). On the one hand, regional clan strength might improve trade by providing internal resources (e.g., Cao et al., 2022; Chen et al., 2022b) such as financial support, which is very important for trade (Manova and Yu, 2016). On the other hand, as customary beliefs and values with clan characteristics, regional clan cultures may have an impact on international trade through the transmission of societal norms across generations. We make progress towards understanding the negative effects of clan culture on international trade through the latter channel.

Many studies have documented the long-lasting effects of exposure to particular early-life experiences, including parents' economic incentives, regional culture, ideological imprints, etc., on individuals' behavior and economic performance (e.g., Fernández and Fogli, 2006; Lindbeck and Nyberg, 2006; Alesina and Fuchs-Schündeln, 2007; Alesina and Giuliano, 2015; Zhang et al., 2023). Within this framework, the cultural environment in which individuals grow up shapes their economic preferences and beliefs that do not change due to subsequent experiences, even if they leave their upbringing environments or change their initial religions (Guiso et al., 2004; Algan and Cahuc, 2010; Marquis and Tilcsik, 2013). Therefore, it can be assumed that clan culture in individuals' places of origin affects their attitudes towards international trade during formative periods, and these impacts will play a crucial role in their decisions throughout their lives. Such impacts also persist in the samples of firm leaders and policymakers. Additionally, leaders' preferences and styles have pervasive effects on corporate decision-making (e.g., Bertrand and Schoar, 2003; Sraer and Thesmar, 2007; Bernile et al., 2017; Marquis and Qiao, 2020), and chairpersons are arguably the most influential corporate decision-makers in China (Chen et al., 2022a; Fisman et al., 2023). Under the above-mentioned conditions, we confirm two fundamentally important channels that explain how clan strength in a chairperson's prefecture-level city (henceforth, "prefecture") of origin adversely affects firm trade: the decrease in willingness to trust other people in general and to take risks.

To test for the long-term impacts of the regional clan culture on international trade, we combine domestically listed Chinese (A-share) firm-level data for the years 2000–2016 with clan culture data through chairpersons' prefecture of origin. Since we infer chairpersons' early-life experiences based on genealogy density in their prefectures of origin, our approach is derived from the birthplace-based studies that examine the effects of early-life experiences, such as having lived in a place with more famine (Guo et al., 2024). The clan variable in our identification strategy is time-varying, allowing us to use firm fixed effects regressions and thus rely on within-firm variation across chairpersons. This statistical approach rules out the impact of time-invariant firm-level heterogeneity and unobserved regional permanent differences in firm location on causal identification. Additionally, we include controls for a set of time-varying observable firm-level characteristics, chairpersons' characteristics, and other fixed effects, thus contributing to the establishment of causal relationships. In particular, once we control for firm-level characteristics, the possibility that the impact of clan strength on firm trade works through changes in business operating conditions and financing constraints can be ruled out. Our findings show that the clan strength in a chairperson's prefecture of origin adversely affects the firm's international trade. The estimated effect is economically sizable. According to our baseline estimate, a one standard deviation increase in clan strength is associated with a 2.97 % standard deviation decrease in firm trade.

A challenge for our findings is that prefecture-of-origin characteristics correlated with clan strength may shape chairpersons' attitudes towards international trade through the socialization process. We pursue two strategies to determine whether the correlations between clan strength and firm trade are, in fact, causal. Our first strategy is to control for several geographic and historical correlates in the chairpersons' prefecture of origin, including geographical features, the distance to the nearest major navigable river in history, historical rice suitability, the strength of historical societal organizations, historical economic prosperity, and historical openness. If the estimating equation does not control for these potential confounding factors, we may falsely attribute their effects to clan strength. Nonetheless, we find that controlling for these observable characteristics has little impact on the estimated effect of clan strength on firm trade.

Our second strategy employs two instruments for clan strength based on historical features: the shortest distance from the chairperson's prefecture of origin to the nearest historical Neo-Confucian Academy and the number of southward-migrating clans during the Jianyan Reign (1127–1130) in the origin prefecture. We investigate the exclusion restriction of our instruments by using the overidentification test developed by Acemoglu et al. (2001). The results suggest that neither of the two instruments has any direct effect on firm trade besides the channel of clan strength. The clan effect estimated with the two instruments is about twice that of the estimate obtained using the OLS method, which gives confidence in the robustness of the initial OLS estimates.

After establishing that clan strength adversely affected firm trade, we now turn to the tasks of corroborating the channels of causality and discussing the potential existence of alternative confounding channels. The two channels in our conceptual framework are the chairperson's decrease in general trust and in risk-taking caused by the regional clan culture. We provide a rich set of empirical evidence to support these two channels. First, we perform three exercises to test the trust channel. In the first exercise, using CGSS (China General Social Survey)[2] data, we find that individuals who settle in a prefecture with a stronger clan culture have a lower level of general trust. Following the approach proposed by Rauch (1999), we divide tradable goods into differentiated and non-differentiated goods. In the second exercise, we further test for the trust channel by examining the heterogeneous effects of clan strength on firm trade in different goods. The estimated results suggest that the negative effects of clan strength on firm trade for differentiated products are greater than those for non-differentiated products. Since differentiated goods rely more on trust, our empirical analysis confirms the claim that clan strength, which decreases intergroup trust, can lead chairpersons to express a lower willingness to trade with others. Furthermore, we substitute clan strength with a distrust variable at the prefecture level in the

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[2] Data sampling is done by random selection, which is more representative. Therefore, we can infer that chairpersons raised in the stronger clan culture have a lower level of general trust.

above-mentioned heterogeneous analysis to enhance the explanation of the trust channel.

Second, we provide abundant evidence to support the risk-taking channel. Based on data from the China Household Finance Survey (CHFS), we find that the regional clan strength has a significant impact on individuals' willingness to take risks, considering the chairperson as a subset of the local residents. Next, we introduce the interaction between the contract-sparse industry dummy and clan strength into our specifications. Additionally, we strengthen the risk-taking channel by constructing a triple-interaction term, formed by adding a partner county-level legal environment indicator to the previous interaction. We find that firms whose chairpersons were raised in prefectures with a stronger clan culture have an additional decrease in international trade for both industries with lower contract density and partner countries with underdeveloped legal systems.

Third, we perform additional exercises to discuss potential confounding channels. One plausible alternative channel is that an increase in a chairperson's risk aversion, caused by clan culture, decreases the firm's Total Factor Productivity (TFP) and subsequently negatively impacts the firm's trade. Another alternative channel is that chairpersons born into a region with a stronger clan culture may tend to appoint more management personnel with political connections, which could therefore adversely affect firm trade. We examine how the estimated effect of clan strength changes when further controlling for the firm's TFP and political connections in the baseline specification. After doing so, the estimated coefficients of clan strength remain robust, showing that these negative effects cannot be explained by these two alternative channels.

Furthermore, we extend our analysis to shed more light on the causal heterogeneity related to a firm's financial constraints. We lay out additional statistical exercises by adding the interaction terms of clan strength with the industry-level external finance dependence and the firm-level financial constraints indicator into the baseline specification. Our estimated results show that the overall effects of clan strength on trade remain negative, even though chairpersons can alleviate financing constraints by seeking funding assistance from clan-based informal finance in their places of origin.

Our study thus contributes to the relevant literature in the following aspects. First, our results complement studies on the effects of informal institutions on international trade. A large body of literature documents, both theoretically and empirically, that bilateral trade can rise as informal institutions, including repeated interactions, networks, cultural proximity, etc., can help to mitigate informational barriers and accumulate knowledge capital (e.g., Rauch and Trindade, 2002; Melitz, 2008; Chaney, 2014; Murat, 2014; Egger and Lassmann, 2015; Turco and Maggioni, 2018; Cheng et al., 2020; Monarch and Schmidt-Eisenlohr, 2023). Several works examine the roles of informal institutions in the formation of individuals' preferences towards international trade (Guiso et al., 2009; Felbermayr and Toubal, 2010; Rohner et al., 2013; Korovkin and Makarin, 2023). Compared with previous studies, which have focused on the affinity or hostility towards a specific country that emerged from interactions or cultural differences between two countries (Che et al., 2015; Gokmen, 2017; Hu et al., 2023), we concentrate more on the individual trade preference heterogeneity caused by endogenous regional cultural differences within a country.[3] More importantly, to the best of our knowledge, our work is the first to systematically study how an informal institution affects leaders' economic preferences and beliefs, and thus international trade. Our approach can also apply to studying the short- or long-term effects of other dimensions of leaders' heterogeneity on international trade.

Second, our work also adds to the literature on how personal early-life experiences play a role in the formation of individuals' preferences and beliefs, and hence impact economic performance. For example, personal early-life experiences of natural disasters and macroeconomic shocks have often been found to have a causal impact on individuals' willingness to take risks (Malmendier and Nagel, 2011; Bernile et al., 2017). The imprinting theory suggests that early-life experience effects can be lifelong, even if individuals leave their upbringing environment (Marquis and Tilcsik, 2013). Such effects are also widespread among leaders, including policymakers, politicians and firm leaders. Exposure to a particular early-life experience shapes leaders' economic and managerial attitudes that persist throughout their adult life, and hence affects the performance of the real economy and individual welfare (e.g., Malmendier et al., 2011; Marquis and Qiao, 2020, 2021; Guo et al., 2024). Our analysis contributes more to the literature that examines how firm performance relates to firm leaders' early-life experiences such as exposure to disaster experiences (e.g., Bernile et al., 2017; O'Sullivan et al., 2021) and communist ideological imprinting (Marquis and Qiao, 2020). Most of the existing literature demonstrates that exposure to a particular early-life experience has a long-term effect on a CEO's risk-taking propensity and hence on firm performance. In contrast, our paper focuses on the economic consequences of a new mechanism, concentrating on how the chairpersons' exposure to the clan culture environment during their early life affects both general trust and specific risk-taking towards international trade.

Third, we also contribute to the growing literature on the economic effects of clans, an informal institution that holds significance not only for China but also for other Asian regions, such as Korea (Yang, 2019). While financing constraints, industry structure, economic growth, cooperation, local public goods, and other factors have received much attention in previous studies (e.g., Xu and Yao, 2015; Zhang, 2020; Chen et al., 2022b; Fan et al., 2023), scholars have a limited understanding of the trade effects associated with clan culture. Simultaneously, the majority of the existing literature discusses the capital attributes of clans (Xu and Yao, 2015; Zhang, 2020; Cao et al., 2022), whereas we are more concerned with the roles of clan strength in the formation of individuals' economic attitudes (Greif and Tabellini, 2017; Enke, 2019). Specifically, our work provides micro-evidence to link a causal relationship between regional clan strength and individuals' willingness to trust other people in general and to take risks.

Finally, our study relates to the literature about how local social norms and regional cultures impact the heterogeneity in individuals' values and preferences (Gentzkow and Shapiro, 2004; Gneezy et al., 2016; Siddique and Vlassopoulos, 2020). Unlike the majority of the literature, we emphasize the combination of microdata from firms and individuals.

The remainder of this paper is organized as follows. Section 2 outlines the historical background and conceptual framework.

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[3] The differences in individual trade preferences affect Chinese firms' international trade towards all countries, and the scope and extent of such impact may be much greater than the impact generated by the affinity and hostility towards specific countries.

Section 3 describes the data used in this study. In Section 4, we formalize our empirical strategy and present the baseline findings. In Section 5, we delve into addressing the central concern regarding the causal interpretation. Section 6 discusses the potential channels. Section 7 presents a further discussion. Section 8 concludes.

2. Historical background and conceptual framework

2.1. Historical background

Chinese clans were the basic units of cooperation and thus played a major role in local governance and socioeconomic affairs in pre-modern China (Fei, 1946; Watson, 1982). Clans are kinship-based groups composed of patrilineal descendants from a common ancestor, who is at the apex of the genealogy by which the lineage membership is determined (Greif and Tabellini, 2017). As products of ancestral worship, clans have a history of over 3000 years in China. The origin of clans can be traced back to the Western Zhou Dynasty, when they were influenced by the feudal enfeoffment system and the clan-based patriarchal system (Peng, 2010), and were initially exclusive to the nobility. Clan organizations, which have experienced several instances of destruction and redevelopment, still retain enduring vitality and exert a significant impact on the economic preferences of residents in modern society. First, during the Warring States period (480–222 BC), the collapse of the pre-Qin patriarchal clan social structure marked the disintegration of the clans. Under Confucianism, the Han Dynasty (206 BC-AD 221) entered a period of clan reconstruction. Clans then began to penetrate all strata of society. Second, clan organizations underwent radical changes and accelerated development during the Song Dynasty (AD 960-1279), as a political arrangement for rebuilding the grassroots order in response to social changes (Feng, 2013). Third, after flourishing in the Qing Dynasty (1636-1911), clans were almost eliminated by the state authority during the thirty years of Mao's era. Especially during the Cultural Revolution, clan activities were banned, and many genealogies and ancestral halls were destroyed (Fei and Liu, 1982). However, clans have been revitalized and flourished with the advent of the Reform and Opening-up of the People's Republic of China (PRC), with typical empirical evidence being the high correlation between the number of genealogy books compiled before 1950 and those compiled after 1980 (Zhang, 2020).

The Southern Song period (1127–1279) was the most important period for the development of clans. The hallmark of the highly developed clan organizations in the Song Dynasty was the widespread adoption of genealogy and ancestral halls from the nobility to the grassroots level (Liu, 1959). The conflict[4] that abruptly ended the Northern Song (960–1127) resulted in the last and largest southward migration in Chinese history (Bai, 2022), with approximately five million people fleeing from the north to the south during the Jianyan Reign (1127–1130) (Wu, 1997). Faced with these highly uncertain or complex social environments, the migrant clans had to strengthen internal connections among members to avoid harassment by locals, while the native clans heightened their collective consciousness to safeguard their interests against potential damage from the southward-migrating clans. Therefore, migration-destination prefectures have developed stronger clan culture relative to others.

The reinforcement of clan strength during the Song Dynasty was not only naturally occurring due to the southward migration, but also a result of active promotion by Neo-Confucian[5] scholars. Accordingly, the clan could also be referred to as a "Confucian clan" (Chen et al., 2022b). Figures such as Zhu Xi and Lu Jiuyuan both played important roles in the historical development of clan organizations in China (e.g., Xu, 1995). Zhu Xi was highly regarded by emperors. Specifically, his political views were promoted and adopted to varying degrees by the emperors in the Yuan, Ming, and Qing dynasties, especially by the founding emperor of the Ming Dynasty who adopted Zhu Xi's clan design as the imperial model. Moreover, he was the only non-direct descendant and non-disciple of Confucius enshrined in the Confucius Temple[6] because of his contributions to the annotation and diffusion of Confucian classics about state governance and family management. His books were required reading materials for the Civil Service Examination (keju[7]). Meanwhile, Lu Jiuyuan was another fervent advocate for clan organizations. He not only persistently taught rules and rituals that help promote the sound operation of clans in the academy, but also actively practiced these rules with his brothers, earning appreciation from the emperor of the Southern Song Dynasty. In pre-modern China, the academy was the primary platform for disseminating ideas and knowledge, as it functioned as the main educational institution in a city. Given the high costs of transport and communication at this time, regions close to the Zhu Xi and Lu Jiuyuan academies probably developed stronger clan culture compared with more distant regions. Overall, the two aforementioned factors helped to diffuse the ideology of clans and promote the secularization of clans, which was crucial in shaping stronger regional clan strength. In addition, the clan density, which we use as a proxy for regional clan strength, has consistently been the highest in the southern and eastern provinces of China, such as Fujian, Guangdong, Hunan, Jiangxi, and Zhejiang, from the late Song dynasty to the present day (Cao et al., 2022).

The Qing dynasty of China largely delegated local governance authority to clans and grassroots associations (Cohen et al., 1981), making the clans the actual enforcers of civil rules in the prefectures (unless disputes led to killings). Clans filled the void of under-developed formal institutions in pre-modern China by providing protections against invasions, enhancing public goods provision, collecting taxes, promoting risk sharing, settling conflicts, administering justice locally, and other services that should have been

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[4] The Jurchen, a northern ethnic group affiliated with the Khitan Liao dynasty, conquered the capital of Song and ended the Northern Song.

[5] Neo-Confucianism, also known as Song-Ming Neo-Confucian rationalism, is a significant development stage of Confucianism that emerged during the Song and Ming dynasties in China.

[6] The Confucius Temple, also known as the 孔庙 (Kǒng Miào) in Chinese, is a temple built to worship Confucius, who was a renowned philosopher, educator, and political figure in ancient China. The Kangxi Emperor of Qing ordered Zhu Xi to be enshrined in the Confucius Temple.

[7] Keju (Civil service exam) was a kind of examination system in ancient times, through which officials were examined and selected.

provided by the formal institutions (Fei, 1946; Fei et al., 1992; Tsai, 2007; Xu and Yao, 2015; Zhang, 2020). Since the Qing Dynasty Code had only 31 sections (out of a total of 2354) devoted to commercial matters, clans had substantial discretion in local economic issues. Under these conditions, the stronger the regional clan strength is, the more significant the role clan rules play in local governance. More importantly, regional clan strength has a significant impact on the development of formal institutions. For example, Chen et al. (2022b) reported that there were fewer modern banks in regions with stronger clan strength. Due to their emphasis on intra-clan benefits, clans can fight against public interventions, potentially hindering the development of specific government policies (Cao et al., 2022).

The stronger the regional clan strength is, the more significant its role becomes in grassroots governance in pre-modern China, and such effects have a great impact on the intra-city cooperation patterns and behavioural norms. The theory on social identity (social identity theory, or SIT), originally developed by Tajfel and Turner (Tajfel, 1978, 1982; Tajfel et al., 1971; Turner et al., 1979), provides consistent predictions: due to the predominant role of clan organizations in regional discourse power, even when local residents are not members of these clans, the preferences and values of individual residents are inevitably inclined to align with the values and behavioral norms advocated by the clan organizations within their respective living areas. In pre-modern China, the poor public transportation infrastructure and the stringent household registration systems limited the economic exchange and diffusion of ideas across cities, thus contributing to the accumulation and solidification of the regional differences in cultural values. As the central government of modern China gradually alters its attitudes toward clan organizations, the legal enforcement role of clans in local governance and economic affairs has steadily diminished. However, the impacts of clan culture on residents' behavioral norms continue to be transmitted across generations (Dohmen et al., 2012; Alesina and Giuliano, 2015). Within this framework, societal norms influenced by clan culture can be perpetuated across generations and presumably to the present day, helping explain regional differences in the economic preferences and beliefs of modern Chinese residents. Scholars have already provided micro evidence to support this claim. Specifically, Greif and Tabellini (2017) find that since pre-modern China relies more on clan-based informal institutions than Western countries, individuals in China report a higher level of trust towards their relatives and a lower level towards strangers. Chen et al. (2022b) show that in prefectures with historically stronger clans, individuals express greater trust towards relatives and distrust outsiders more.

2.2. Conceptual framework

In addition to factor endowments, a country's comparative advantage could also be shaped by production costs, industry agglomeration and specialization, institutions, etc. (e.g., Nunn, 2007; Guiso et al., 2009; Yilmazkuday, 2011, 2021a; Nunn and Trefler, 2013). Of these, the role played by institutions is particularly significant. Our notion of clan culture as a unique informal institution is considered a unilateral factor in trade flows. On the one hand, the impact of clan culture on trade is distinct from the bilateral cultural ties, such as common language, common currencies, ethnic ties, common legal origins, and common religion (e.g., Rauch and Trindade, 2002; Rose and Stanley, 2005; Felbermayr and Toubal, 2010; Melitz and Toubal, 2014; Turco and Maggioni, 2018), as well as dyadic preferences (Hou et al., 2023). On the other hand, our study also differs from the literature that explores how the actions of a specific state alter the attitudes of residents in another country towards trading with the aforementioned state. For instance, conflicts or friendly interactions between two countries could affect current trade by creating long-term affinity or hostility (Che et al., 2015; Hu et al., 2023). We fall into the area where endogenous regional cultural differences within a country affect trade through individual preference heterogeneity when we discuss the effects of clan culture in firm leaders' places of origin on bilateral trade.

Imprinting theory suggests that during a brief period of susceptibility, a focal entity develops characteristics that reflect prominent features of an environment, and these characteristics persist despite significant environmental changes in subsequent periods (Marquis and Tilcsik, 2013). The age range of 5 to 15 years for individuals is a typical period of susceptibility when they have not yet shaped a complete set of values and are sensitive to their regional cultural exposure and experiences. Particularly, parents can transmit their experience-based heuristics and beliefs to their children through economic incentives, significantly affecting their children's lifetime decisions and economic success (Lindbeck and Nyberg, 2006). Moreover, the psychological literature also argues that personal experiences play a more significant role in individual decisions than statistical summary information in books or via school education (Nisbett and Ross, 1980; Hertwig et al., 2004).

Within the framework mentioned above, the regional clan culture of individuals' places of origin instills specific values that do not continually change with their experiences throughout their lifetimes, even if they leave their initial upbringing environments. Such impacts also persist in samples of chairpersons, CEOs, and policymakers. The stable traits of leaders formed from their background, often called their styles, exert a significant impact on corporate decision-making and hence affect firm behavior and economic performance (e.g., Bertrand and Schoar, 2003; Malmendier et al., 2011; Flabbi et al., 2019). The upper echelons theory and managerial discretion research also provide the same predictions (Hambrick and Mason, 1984; Hambrick, 1987, 2007). The chairperson's decision-making is more vital to the firm in China than that of CEOs (Chen, et al., 2022a; Fisman et al., 2023). Personal preferences and beliefs determine the heterogeneity in individuals' attitudes towards international trade with specific countries (Felbermayr and Toubal, 2010; Michaels and Zhi, 2010). Under the aforementioned conditions, we can assume that differences in the values of corporate top managers ultimately lead to differences in firms' international trade. Nevertheless, the aforementioned theoretical framework is insufficient to predict the magnitude and the positive or negative nature of the chairperson's clan culture imprint effect. We now turn to outline below in detail two fundamentally important channels explaining how regional clan strength affects international trade: the decrease in a chairperson's willingness to trust others in general and to take risks.

The first channel is the chairperson's reduced trust towards others, which is caused by clan culture. In pre-modern China, the clan organization was the basic unit of cooperation, and traditional clan rules encouraged the principle of cooperating with clan members

but competing with outsiders because intra-group moral commitment reduced enforcement costs (Liu, 1959; Greif and Tabellini, 2010, 2017). Meanwhile, faced with the underdeveloped legal system in pre-modern China, the intra-clan cooperation patterns leveraged the stability of morality-based interpersonal resource pooling and sharing, making it less risky than free-will-based market exchange. Under these conditions, in prefectures where clan strength is stronger in pre-modern China, intra-city cooperation patterns are more dependent on intra-clan cooperation than on generalized cooperation among a larger and more heterogeneous set of individuals. This logic is consistent with the distinction between intra-city "generalized" versus "limited" morality stressed by Platteau (2000) and Tabellini (2010). The intra-city principle of limited cooperation patterns, which is instilled in individuals settling there, directly leads to the short-radius trust attitude (Greif and Tabellini, 2010). The norms of short-radius trust can be passed down through generations and hence presumably to the present day, thus decreasing the level of general trust among everyone settling there. This logic closely relates to standard cultural evolution models, which posit that the intergenerational transmission of norms is subject to a natural-selection-like process (Boyd and Richerson, 1988). In such a model, if local residents in areas with strong clan cultures realize that a limited cooperation model is more beneficial for children, they will gradually instill attitudes of short-radius trust in the children. Trust rooted in culture is an important determinant of economic exchanges (Melitz and Toubal, 2014; Che et al., 2015; Hu et al., 2023). Specifically, trust plays a more important role in the trade of goods whose quality can differ more (Guiso et al., 2009; Turco and Maggioni, 2018). Therefore, chairpersons with lower general trust tend to make decisions that reduce a firm's international trade. It should be noted that our work emphasizes how clan culture cultivates general mistrust towards others, rather than individuals' affinities towards a specific country.

Another channel is the increase in a chairperson's risk aversion. Clan-based informal institutions positively affect the diffusion of Confucian classics through word of mouth in family education, temple associations, and support for taking the civil service exam.[8] Given the extreme emphasis of Confucianism on the status quo and stability, this diffusion of Confucian classics can increase individuals' risk aversion (Landes, 2006). Meanwhile, clan tradition also emphasizes reputation, which feeds into a Chinese "shame culture" where clan members can undergo great condemnation if they violate moral rules in ways that are seen to hurt the clan (Watson, 1982; Peng, 2004). Since clan strength causes long-lasting effects on local cooperation patterns and discourse power, this "shame culture" exhibits significant differences at the regional level. Individuals will reject high-risk projects to avoid the high risk of failure that might damage their reputation. Additionally, clan culture emphasizes the maintenance of the common interests of the clan network (Peng, 2004). The clan-based societal organizations tend to encourage individuals to choose a low level of risk-taking to protect the group's profits. Overall, under a stronger clan culture, individuals are more likely to increase their risk aversion because of responsibility and reputation, and these impacts also persist in samples of chairpersons. Meanwhile, in contrast to Western cultures that are rooted in contracts and regulations, Chinese clan culture consistently emphasizes morality (Greif and Tabellini, 2017). In particular, individuals raised in prefectures with stronger clan cultures tend to assume lower contractual risks because engaging in litigation is generally considered shameful. Compared with domestic trade, international trade activities are generally considered to have poor enforcement of international contracts, primarily due to different behavioral norms, legal frameworks, and institutional qualities among trading countries. Therefore, firms with chairpersons originating from prefectures with a stronger clan culture prefer less cross-border trade, as international trade has more contractual risks than domestic trade.

3. Data

3.1. International trade of Chinese enterprises

We combine two core data sources to examine the impact of clan strength in a chairperson's prefecture of origin on firms' international trade. The first data source is the China Stock Market & Accounting Research (CSMAR) database for all Chinese A-share listed firms,[9] including the Figure Characteristic Database, Financial Statements Database, Basic Information Database, and Corporate Governance Database. Following conventional sample cleaning procedures, we also exclude any firms receiving "special treatment". Furthermore, we restrict our sample to nonfinancial firms with positive assets and non-missing biographical information about their chairpersons. The second source is the Chinese customs data collected by the Chinese General Administration of Customs (GACC). The customs trade data was classified at the HS 8-digit product level, covering the universe of import and export transactions by Chinese firms from 2000 to 2016. To maintain consistency in product categorization over time, we use the concordance table from the UN Comtrade to convert all HS-8 codes into HS 1996 codes at the 6-digit level. We further aggregate our data to the unified HS-6-digit level. The trade data is organized at the firm-partner-product-year level.[10] Since our specifications need various forms of industry-level fixed effects, we merge our HS-6 code data with the 3-digit level ISIC Rev.3 codes by using the conversion table provided by the World Integrated Trade Solution (WITS).

We merge the aforementioned databases by manually matching firm names and years. Our final estimation sample is an unbalanced panel of 1187 A-share listed firms that engaged in trade with 237 countries over the period 2000–2016. For each firm included in our sample, we have relatively complete information about its basic conditions, particularly the chairperson's prefecture of origin.

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[8] The contents of the civil service exam in ancient China during 605-1905 were dominated by the Confucian texts. If individuals were successful in the final-stage civil service exam, they could become bureaucrats in ancient China's empire.

[9] We select listed firms because they are more comprehensive in disclosing chairperson information compared to other firms. Additionally, their regular requirement to publish financial reports and other relevant information offers us a rich and detailed source of data.

[10] "partner" indicates the partner country.

Moreover, since our sample excludes firms that do not engage in trade, we do not need to consider the issue of zero trade value. Subsequently, we take the natural logarithm of trade values.

3.2. The clan strength

Another key variable in our empirical analysis is clan strength in a chairperson's prefecture of origin. Based on our theoretical framework, regional clan strength affects the local cooperation patterns and societal behavioural norms by fostering a stronger clan culture. Chairpersons' exposure to clan culture in their early years shapes their economic preferences and beliefs, and such impacts play a major role in their decision-making throughout their lives. To construct this variable, we measure the strength of the clan in a prefecture. Following Greif and Tabellini (2010, 2017) and Chen et al. (2022b), we use the genealogy book data from Shanghai Library's 2009 comprehensive catalogue on Chinese genealogy (Zhongguo jiapu zongmu). It consists of 52,306 Chinese genealogies, including those from more than 283 prefectures in China. The genealogies are very important to the clan. They not only record the capital attributes of the clan's economic assistance or labor sharing, but also include the moral norm attributes of internal behavioral standards that must be adhered to, detailing "carrots" for conformity and "sticks" for deviation. We use genealogy books compiled from 1368 to 1950, excluding incomplete records and records outside Mainland China, as our primary measure of clan strength. We calculate genealogy density as the ratio of the number of genealogies compiled in a prefecture before 1950 to its population size from China's first national population census in 1953. This genealogy density indicates the number of genealogy books per 10,000 people in the prefecture. To mitigate bias from outliers, our main measure is the natural logarithm of genealogy density (plus 1).

The primary reason for selecting genealogy books compiled before 1950 is as follows: First, 95 % of chairpersons were born between 1950 and 1980. This setup helps to avoid measurement bias caused by the impact of political policies during the Mao era (1950–1976) on the survival patterns of genealogies. Second, the study focuses on the cumulative impact of regional clan culture on the intergenerational transmission of the chairpersons' behavioral preferences. Even if genealogical compilation activities are temporarily suspended, clan culture influences the behavioral preferences and values of residents through family education. Furthermore, Fig. 1 shows a strong correlation between the number of genealogies for prefectures from 1368 to 1950 and the total number of genealogies for the entire period, consistent with the claim that clans have coevolved with deeply held moral norms (Greif and Tabellini, 2017). In addition, Zhang (2020) has demonstrated the correlation between the number of genealogies written or updated before 1950 and those after 1980.

Next, we obtain biographical information from the CSMAR's Figure Characteristic Database to identify chairpersons' prefecture of origin. By manually tracking chairpersons' curricula vitae based on both the firm's and the chairpersons' names, we compensate for missing information, including their prefecture of origin and other individual-level variables. We then merge the prefecture-level clan strength data with the chairpersons' prefecture of origin. The chairpersons from Beijing, Shanghai, Shenzhen, or Guangzhou are excluded from the sample, because there are some special factors affecting clans in these cities.

The primary reason for selecting chairpersons rather than CEOs relates to the significant differences in corporate governance structures between China and more developed markets. In China, chairpersons generally have a greater impact on their firm's business decisions compared to CEOs (Chen et al., 2022a; Fisman et al., 2023). CEOs, by contrast, are primarily responsible for managing daily
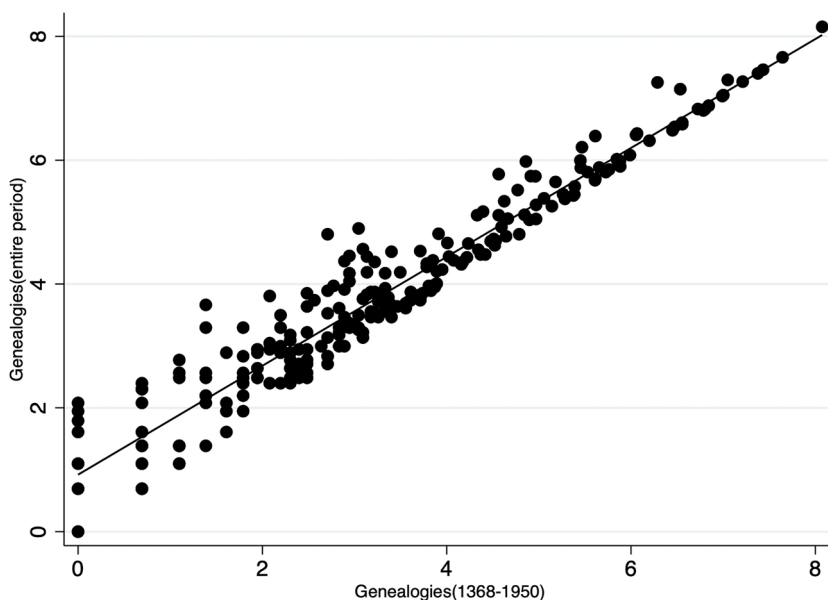

Fig. 1. Persistence of clans.
Note: The number of genealogies is on a logarithmic scale.

business operations.

3.3. Control variables

In the baseline specification, we control for the following individual-level and firm-level characteristics. First, we consider demographic characteristics of chairpersons, including age, age squared, a gender indicator variable, education indicator variables, and overseas background indicator variables. The data come from the CSMAR's Figure Characteristic Database. To address individual-level missing values, we supplement our data with information from the Chinese Research Data Services (CNRDS) or conduct manual searches.

Second, we control for firm-level covariates to capture the effects of firms' business operations and corporate governance on firm trade. The covariate variables reflecting business operation activities include firm size (the logarithm of total assets), age, returns on assets (ROA), leverage (total liabilities/total assets), Tobin's Q, and profit margin, sourced from the CSMAR Financial Statements Database and Basic Information Database. The covariate variables that reflect firms' corporate governance include board size (the logarithm of the number of board directors) and board independence (the share of independent directors), sourced from the CSMAR Corporate Governance Database. The summary statistics for all variables used in our empirical analysis are reported in Online Appendix A, Table A1.

4. Estimating equations and empirical results

4.1. Estimating equations

To empirically examine the causal effects of clan strength in a chairperson's prefecture of origin on firm trade, we estimate the following baseline specification:

$$LnTrade_{i,j,k,l,m,n,p,t} = \alpha + \beta Clan_{j,k,t} + \textbf{\textit{Control}}'_{i,t}\boldsymbol{\gamma} + \textbf{\textit{Control}}'_{j,t}\boldsymbol{\delta} + \varphi_i + \eta_{m,p} + \mu_{l,n} + \theta_{l,t} + \tau_{m,n,t} + \varepsilon_{i,j,k,l,m,n,p,t} \tag{1}$$

Where i indexes firms, j chairpersons, k chairpersons' prefectures of origin, l products (HS-6 digit), m industries, n firms' trade partner countries, p provinces of firms' locations, and t years. The dependent variable $LnTrade_{i,j,k,l,m,n,p,t}$ represents the firm i's log trade value of product l to partner country n in year t, where firm i is under the leadership of chairperson j, belongs to industry m, and is located in the province p. The variable $Clan_{j,k,t}$ denotes clan strength in a chairperson j's prefecture of origin k. The vector $Control'_{i,t}$ denotes a set of firm-level observable time-varying covariates, which include the firm's size, age, ROA, leverage, Tobin's Q, profit margin, board size, and board independence. The vector $Control'_{j,t}$ consists of five variables designed to capture the effects of the chairperson's individual-level covariates, which include age, age squared, a gender indicator variable, education indicator variables, and overseas background indicator variables. The remaining terms in Eq. (1) are several sets of fixed effects, including firm fixed effects (φ_i), product-year interaction fixed effects ($\theta_{l,t}$), product-partner country interaction fixed effects ($\mu_{l,n}$), industry-firm province interaction fixed effects ($\eta_{m,p}$), and partner country-year-industry triple interaction fixed effects ($\tau_{m,n,t}$).

Our estimated coefficient of interest is β, which captures the impacts regional clan culture on the heterogeneity of chairpersons' decisions towards international trade. A negative and statistically significant coefficient for clan strength ($\beta < 0$) means that when chairpersons hail from a prefecture with a stronger clan culture, their firms are less likely to engage in firm trade. We accounted for various controls in our benchmark specification to correct for other potential effects and rule out other potential channels.

First and foremost, one may be concerned that this correlation is explained by some firm-level unobserved heterogeneity. For example, firms located in areas with a stronger clan culture may select individuals who were born into a place with a similar clan culture environment to be their chairpersons, on the one hand, and may be less likely to engage in firm trade, on the other hand. To address this potential omitted variable bias, we include firm fixed effects (φ_i) in the regression and rely on within-firm variation across chairpersons for the identification.

Second, despite having controlled for the impact of time-invariant unobservable variables at the city level, one may be concerned that our results reflect the effects of the specific industry endowment of firm location and the trade-related fiscal subsidies from the local government on international trade.[11] To address this concern, and to further establish the causality, we control for the industry-province (firm location) fixed effects ($\eta_{m,p}$) in our specification.

Third, we also include product-partner country interaction fixed effects ($\mu_{l,n}$), product-year interaction fixed effects ($\theta_{l,t}$), and partner country-year-industry triple interaction fixed effects ($\tau_{m,n,t}$). Product-partner country fixed effects capture the effect of time-invariant characteristics that determine the level of international trade, including secular productivity and endowment differences that can determine the specialization in trade patterns. Product-year fixed effects control for time-varying product-specific demand and supply shocks that affect all firms. Partner country-year-industry fixed effects account for country-specific shocks common to all firms, including partner country-specific macroeconomic conditions. Overall, these aforementioned three fixed effects capture the impacts of both time-invariant and time-varying determinants of sales and consumption within specific industries of partner countries,

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[11] Since chairpersons would work in the origin province to use their connections and social capital from the family of origin, there might be multicollinearity between the province where the firm is located and the province of its chairpersons of origin, which rarely occurs at the prefecture level.

for example, gravity variables, exchange rates, free trade agreements(FTA), and transport costs being accounted for in our sample.

Finally, we account for the chairperson's individual-level and time-varying firm-level covariates in our benchmark specification. Chairpersons' characteristics are included to capture their impacts on the chairpersons' willingness to trust others and to take risks. The firm-level controls, on the one hand, capture the effects of the firm's operating conditions on firm trade. On the other hand, once we control for firm size and assets, the effects of clan strength on firm trade via financial support can be considered (Fan et al., 2022).[12]

4.2. Baseline estimates

The baseline regression results derived from Eq. (1) are reported in Table 1, and we gradually include the controls in our regression. Because the distribution of the international trade value of Chinese enterprises is highly left-skewed, we report estimates using the natural log of trade. As shown in Table 1, we gradually incorporate the above-mentioned baseline controls into our regressions in order to correct for other effects and rule out other channels. For column (1), we control for a set of fixed effects, which includes firm fixed effects, product-partner fixed effects, product-year fixed effects, province (firm location)-industry fixed effects, and partner-industry-year fixed effects. For column (2), we add the chairperson's individual-level controls to take into account the impacts of demographic characteristics. For column (3), we include firm-level control variables. The estimated coefficient for clan strength is negative and statistically significant. This is consistent with the hypothesis that chairpersons who grow up in a place with a stronger clan culture express are less willing to trust others and take risks, and hence make their corporate decisions to engage in less trade.

Not only are the negative coefficient estimates in Table 1 statistically significant, but they are also economically meaningful. To assess the magnitude of the estimated effect of clan strength on firm trade, first note that the standard deviation of clan strength in the chairperson's prefecture of origin at our baseline is 0.582. Also, the standard deviation of the log trade value is 3.078. The estimated coefficients reported in all columns exhibit similar magnitudes and significance levels. For example, the point estimate of interest reported in column (3) is −0.162, which shows that a one standard deviation increase in clan strength results in an approximately 3.06 % standard deviation decrease in firm trade. To get a sense of this estimation from another perspective, we discuss the result as follows. In our sample, the chairperson's prefecture of origin at the 75th percentile in terms of clan strength is Shaoyang, Hunan province, while the prefecture at the 25th percentile is Xiaogan, Hubei province. Our estimates imply that firms with chairpersons originating from Xiaogan would trade 0.124 less than firms whose chairpersons originate from Shaoyang. The average of our dependent variable, the natural log of trade, is 9.604. A comparison of this clan effect to the average firm trade suggests that the differential of 0.124 is a large number.

Robustness - In this section, we perform several additional empirical exercises to examine whether our baseline estimates are robust to alternative modeling choices regarding the selection of the control variable set, the sample selection, and the standard error adjustment. The estimated coefficients are presented in Tables 2–4.

As is shown in Table 2. First, despite controlling for firm fixed effects and industry-province (firm location) fixed effects to capture the time-invariant effects of regional clan culture at the firm's location on the firm trade, one may still be concerned that our results reflect changes in the local cultural environment in the firm's location rather than the differences in chairpersons' trade preferences.[13] To address this concern, we account for (firm-located) province-time fixed effects in the baseline specification and further alter the sample by removing instances where the chairperson's prefecture of origin is the same as the firm's location. The estimated clan effects have slightly increased, suggesting that these negative effects are not explained by the culture of the firm's location. For rigorous control and to further establish the causality, we include province-time fixed effects in the subsequent estimating equations.

Second, one could be concerned that the heterogeneity in the firm ownership structure plays a role in the chairperson's power, on the one hand, and affects corporate decisions towards international trade, on the other hand. To rule out this possibility, we re-estimate the relationship between clan strength and firm trade by additionally controlling for the ownership percentage of large shareholders and the state-owned ownership percentage. Third, in order to further capture the impact of firm financial constraints on firm trade, our specification also includes the KZ index first developed by Kaplan and Zingales (1997). Fourth, we substitute the standard errors of the baseline regression with clustered robust standard errors at the partner-sector-year level and the prefecture-of-origin-birthyear level. The results from these robust strategies are reported in Table 2. The estimated coefficients reported there exhibit magnitudes and significance levels similar to those reported in Table 1.

Moreover, due to the southward shift of the economic center that began during the Song Dynasty and the demand-responsive characteristics of clan formation, genealogical density in Eastern Chinese provinces is significantly higher than in other Chinese provinces. Firms located in coastal or relatively developed areas tend to be more favorably disposed to international trade. To further rule out the confounding effect of cultural values at the firm's location on causal relationship identification, our final robustness check involves limiting the sample to the subgroup of firms located in the southern provinces, the Huadong provinces, the coastal provinces, and the relatively developed southern provinces.[14] The results are presented in columns (1)-(4) of Table 3. The estimated clan effect is slightly greater than that in Table 1.

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[12] In China, firm size and assets represent the magnitude of financing constraints faced by enterprises.

[13] According to Fig. 1, we find that it is difficult to change regional clan culture in a short period of time.

[14] All these provinces are in mainland China. The southern provinces include Jiangsu, Shanghai, Zhejiang, Fujian, Guangdong, Anhui, Guangxi, Hainan, Yunnan, Guizhou, Sichuan, Chongqing, Hunan, and Hubei. The Huadong provinces include Jiangsu, Shanghai, Zhejiang, Fujian, Jiangxi, Anhui, and Shandong. The coastal provinces include Jiangsu, Shanghai, Zhejiang, Fujian, Guangdong, Anhui, Liaoning, Hebei, Tianjin, Shandong, Guangxi, and Hainan. The relatively developed southern provinces include Jiangsu, Shanghai, Zhejiang, Fujian, Guangdong, and Anhui.

Table 1

Clan and international trade.

	LnTrade		
	(1)	(2)	(3)
Clan	−0.129***	−0.155***	−0.162***
	(0.029)	(0.029)	(0.029)
firm level controls	No	No	Yes
individual level controls	No	Yes	Yes
firm FE	Yes	Yes	Yes
Product × year FE	Yes	Yes	Yes
product × partner FE	Yes	Yes	Yes
firm province × industry FE	Yes	Yes	Yes
partner × industry × year FE	Yes	Yes	Yes
Observations	753,739	753,739	753,739
R-squared	0. 622	0. 622	0.622

Notes: This table reports the estimation results from the baseline specification. All regressions included a constant term, as well as firm, product-year, product-partner, industry-firm province, and industry-partner-year fixed effects. Robust standard errors are in parentheses. Robust standard errors are reported in parentheses and are clustered at the industry-partner-year level. *** indicates significance at the 1 % level.

Table 2

Robustness checks.

	LnTrade				
	(1) firm province-year FE	(2) delete same city	(3) control for largest holder rate and state_ownership	(4) control for KZ index	(5) two cluster
Clan	−0.174***	−0.160***	−0.175***	−0.168***	−0.161***
	(0.038)	(0.050)	(0.042)	(0.042)	(0.060)
firm province × year FE	Yes	Yes	Yes	Yes	Yes
Baseline controls	Yes	Yes	Yes	Yes	Yes
Baseline FEs	Yes	Yes	Yes	Yes	Yes
Observations	753,739	531,924	698,621	676,487	751,591
R-squared	0.624	0.643	0.628	0.634	0.624

Notes: The state ownership dummy is obtained from CSMAR's China Listed Firm's Equity of Nature Research Database. The state-owned stock share is from CSMAR's Corporate Governance Research Database. Baseline controls include all firm- and individual-level controls. Baseline FEs include product-year, product-partner, firm province-year, firm province-industry, partner-industry-year and firm fixed effects. Robust standard errors are reported in parentheses and are clustered at the industry-partner-year level. *** indicates significance at the 1 % level.

Table 3

Robustness checks by regional specification.

	LnTrade			
	(1) Southern provinces	(2) Huadong provinces	(3) Coastal provinces	(4) relatively developed southern provinces
Clan	−0.173***	−0.184***	−0.202***	−0.194***
	(0.054)	(0.047)	(0.046)	(0.052)
Baseline controls	Yes	Yes	Yes	Yes
FEs	Yes	Yes	Yes	Yes
Observations	378,394	479,497	589,192	417,952
R-squared	0.663	0.632	0.624	0.632

Notes. This table reports the estimation results from the regional specification. Baseline controls include all firm-level controls and individual-level controls. FEs include Baseline FEs and firm province-year FE. Baseline FEs include product-year, product-partner, firm province-year, firm province-industry, partner-industry-year, and firm fixed effects. We discuss the performance of firms located in the southern provinces, the huadong provinces, the coastal provinces and the relatively developed southern provinces, respectively. Robust standard errors are reported in parentheses and are clustered at the industry-partner-year level. *** indicates the significance at the 1 % level.

Finally, we also use two alternative measures of the dependent variable, including log total export volume and log total import volume. Table 4 presents the robustness checks. Columns (1)-(3) show the estimates from the import perspective, while columns (4)-(6) report the export results. The estimated coefficients reported in Table 4 exhibit magnitudes and significance levels similar to those reported in Table 1.

Table 4
Robustness checks using alternative dependent variables.

	LnImport			LnExport		
	(1)	(2)	(3)	(4)	(5)	(6)
Clan	−0.138***	−0.134***	−0.116***	−0.139***	−0.150***	−0.159***
	(0.037)	(0.039)	(0.040)	(0.041)	(0.044)	(0.044)
firm level controls	No	No	Yes	No	No	Yes
individual level controls	No	Yes	Yes	No	Yes	Yes
firm FE	Yes	Yes	Yes	Yes	Yes	Yes
product × year FE	Yes	Yes	Yes	Yes	Yes	Yes
product × partner FE	Yes	Yes	Yes	Yes	Yes	Yes
firm province × industry FE	Yes	Yes	Yes	Yes	Yes	Yes
partner × industry × year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	245,353	242,672	239,219	510,106	504,814	497,328
R-squared	0.603	0.603	0.604	0.710	0.711	0.713

Notes: This table reports the estimation results from the import and export specification. Baseline controls include all firm- and individual-level controls. Baseline FEs include product-year, product-partner, firm province-year, firm province-industry, partner-industry-year and firm fixed effects. Robust standard errors are reported in parentheses and are clustered at the industry-partner-year level. *** indicates significance at the 1 % level.

5. Identifying causal relationships

The negative correlation between clan strength in a chairperson's prefecture of origin and firm trade, as documented in the previous section, is consistent with our hypotheses that clan culture results in lower imports and exports of Chinese enterprises. However, this correlation could also be explained by omitted variables that correlate with both clan strength and subsequent firm trade. In this section, we pursue two strategies to assess whether the correlations documented to this point are causal. First, we control for some geographic and historical characteristics of chairpersons' prefectures of origin that may be correlated with clan strength and differences in their attitudes towards international trade. Then, we use the prefecture's shortest distance to the nearest Neo-Confucian (Zhu Xi and Lu Jiuyuan) Academy in the twelfth century and the number of clans that migrated from the north to the south during the Jianyan period of the Song Dynasty (1127–1130) as instruments for clan strength.

5.1. Controlling for observables

Geography. The geographical features in a chairperson's prefecture of origin may be key factors in the formation of both the clan and individual trade behaviours. Due to the undeveloped public transportation facilities in pre-modern China, the heterogeneity in geographical features had a significant impact on the cost of transportation and communication. Such impacts largely determined the scope of functions delegated by the government of core cities to clans and grassroots associations. We add several key geography control variables, including Distance to the coast, Slope, and Terrain ruggedness. Prefectures located closer to the coastline historically are likely to have been exposed early to international trade and to have a trade history, shaping the formation of individual trade preferences. We measure the *Distance to the coast* as its closest distance from the centroid to the coast. *Slope* and *Terrain ruggedness* hindered trade through their direct impact or interaction with key historical events (Nunn and Puga, 2012). We calculate the average uphill slope of the prefecture's surface area using data from the GEBCO Compilation Group.[15] In order to construct *terrain ruggedness,* we employ the prefecture-level relief degree of land surface from the Global Change Research Data Publishing & Repository.[16]

River distance (*Distance to the Nearest Navigable River in History*). In pre-modern China, canals not only benefited adjacent regions by facilitating regional trade and providing job opportunities, but they also contributed to nearby core prefecture-level governments administering neighboring county-level governments more efficiently (Cao and Chen, 2022). Therefore, the distance from prefectures to canals may affect the role of clans in grassroots governance, on the one hand, and may be crucial in the formation of the heterogeneity in chairpersons' attitudes towards international trade, on the other hand. We construct this distance variable using the great-circle distance from the prefecture's centroid to the nearest major navigable river in history (Chen et al., 2020). The GIS data for historical major inland rivers is sourced from Harvard GHGIS identified by Matsuura (2009).

Rice suitability. Since the period from 1368 to 1950 in China was an era dominated by an agrarian economy, the societal framework and cultural practices of that period were greatly shaped by agricultural activities. Particularly, the history of rice cultivation has instilled strong cultural norms of cooperativeness (Talhelm et al., 2014) in local residents, leading them to become more interdependent and to form closer relationships (Galor and Özak, 2016; Zhou et al., 2023). The pattern of cooperation is important for trust attitudes, which link clan strength to international trade. Therefore, it is necessary to control for the rice suitability index to capture any potential effects of non-clan strength on long-term trust. We construct the wetland rice suitability index in a chairperson's prefecture of origin by using its potential rice productivity based on the Caloric Suitability Index.[17]

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[15] https://www.gebco.net/data_and_products/gridded_bathymetry_data/
[16] https://www.geodoi.ac.cn/WebCn/doi.aspx?Id=887
[17] This index is developed by Galor and Özak (2016).

Societal organization strength. Organizations other than clan organizations could also enhance the intra-city connections through social networks (Satyanath et al., 2017). The greater the number of organizations in a chairperson's prefecture of origin, the easier it becomes to form strong connections beyond the clan. If these organizations could also affect the chairpersons' economic preferences and beliefs and hence lead them to make decisions that favor increasing domestic trade over international trade, our estimates would be biased upward. We measure the *societal organization strength* through social organization[18] during the Republican period using data from a census survey of social organizations (Chen et al., 2020).

Economic prosperity in history. The historical economic prosperity of a prefecture is also likely to lead to larger-scale and more frequent clan ceremonies, and to provide relatively abundant funds for the compilation and revision of genealogies. Therefore, we can expect that regional clan strength would be stronger in more prosperous prefectures. If the prefecture that was more prosperous is also more likely to develop a preference for trading with others today, our estimates will be biased. To control for the effect of this potential confounder, we include a series of variables reflecting historical economic prosperity, such as the *Historical commercial center* dummy, *Shortest distance to the historical commercial centers, Prefecture population size in 1920, Historical capitals* dummy, and *Huadong* dummy.[19]

Openness. The open social environment may not only correlate with clan strength but also profoundly affect individuals' economic preferences and beliefs. We add two variables, *Protestant Christianity* and *Treaty ports*. The dissemination of Protestantism has facilitated the exchange and integration of ideas between the East and West, reshaping the economic preferences and beliefs of individuals (McCleary and Barro, 2006; Campante and Yanagizawa-Drott, 2015), and its churches have disrupted kinship-based social networking (Schulz et al., 2019). In addition to introducing a new religion to China, Protestant missionaries also instilled "useful knowledge" of economic operations in local residents (Bai and Kai-sing Kung, 2015). The more entrenched clan culture is, the more challenging it becomes for local residents to embrace Protestant Christian beliefs. The negative impact of clan culture on firm trade may be confused with the positive effects of Protestantism. Thus, we capture the effects of Protestantism using the prefecture-of-origin density of Protestant missionaries, calculated as the number of Protestant missionaries per 10,000 people in 1920 (Chen et al., 2022b). The forced open treaty ports generate long-term persistence in individual behavior and economic performance after they were opened to foreign trade and Western institutions (Jia, 2014). An open environment can affect the accessibility of treaty ports to trade, which may play a significant role in the endogenous formation of trade preferences among local residents. We identify the "treaty ports" by consulting the treaties between the late Qing dynasty of China and Western countries. If a chairperson's prefecture of origin, or part of it, has been forced open, the treaty ports dummy variable equals 1.

As shown in Table 5, we gradually include the above-mentioned controls into our regressions to capture any potential effects of non-clan strength in a chairperson's prefecture of origin on firm trade. Specifically, column (1) controls for geographical features, which include *Distance to the coast, Slope,* and *Terrain ruggedness.* Column (2) further controls for *River distance.* Column (3) includes *Rice suitability.* Column (4) adds *Societal organization strength.* Column (5) further includes historical economic prosperity variables, including *Historical commercial center* dummy, *Distance to the historical commercial centers, Prefecture population in 1920, Historical capitals* dummy, and *Huadong* dummy. Column (6) further adds open variables: *Protestant Christianity* and *Treaty ports.*

The results confirm the baseline claim that clan strength of a chairperson's prefecture of origin adversely affects firm trade. In all six columns, the estimated coefficient of interest remains negative and highly significant. After controlling for all covariates, the effect of interest in Table 5 is slightly greater than that of the clan effect in Table 2, suggesting that the clan effect may be underestimated without adjusting for the many potential confounding effects.

5.2. Instrumental variable estimates

Despite our attempts to control for observable prefecture-of-origin factors, the estimates reported in Table 5 may still be biased by unobservable factors correlated with regional clan strength and subsequent international trade. For example, since some genealogy books may have disappeared or been destroyed before 2009, the genealogy sample in the Shanghai Library's catalog may exhibit survivorship bias. This survivorship bias may underestimate the real effect of clan strength on trade because genealogical records were more likely to survive in prefectures that historically had more clans. Our final identification strategy is to take the instrumental variable (IV) regression approach, which can help address the remaining omitted variable bias and measurement errors in our OLS model. By reviewing previous literature on clan influence (e.g., Chen et al., 2022b; Fan et al., 2022), we identify two important historical variables as instrumental variables that are crucial to the origin of clan culture: the shortest distance from the chairperson's prefecture of origin to the nearest historical Neo-Confucian Academy and the number of southward-migrating clans during the Jianyan Reign (1127–1130) of the Song Dynasty. These two instrumental variables should have an impact on clan culture in the chairperson's prefecture of origin, but are uncorrelated with any characteristics of the other cultures that may affect the prefecture values and preferences. Based on the literature from previous studies, it seems that the two instrumental variables satisfy the assumptions of

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[18] The societal organizations include labour unions, chambers of commerce, women's associations, farmers' associations, religious associations, educational and student bodies, and other non-profit organizations.

[19] *Historical commercial center* dummy equals 1 if the prefecture was a commercial center before 1950. *The distance to the historical commercial centers* is the shortest distance from chairpersons' prefectures of origin to the nearest historical commercial center, raised to the natural log. Overall, we construct these two variables according to Chen et al. (2020). The *Prefecture population size in 1920* is obtained from Cao (2017) and has been converted to the natural logarithm (plus 1). *Historical capitals* dummy equals 1 if the prefecture is a historical capital of ancient China. The *Huadong* dummy variable equals 1 if a prefecture is located in the Huadong region. Prefectures within this region have been known for being more prosperous than other areas in China.

Table 5
With additional controls.

	LnTrade					
	(1)	(2)	(3)	(4)	(5)	(6)
Clan	−0.203***	−0.288***	−0.243***	−0.241***	−0.262***	−0.247***
	(0.040)	(0.054)	(0.058)	(0.060)	(0.066)	(0.067)
geographic controls	Yes	Yes	Yes	Yes	Yes	Yes
river distance	No	Yes	Yes	Yes	Yes	Yes
rice suitability	No	No	Yes	Yes	Yes	Yes
connection	No	No	No	Yes	Yes	Yes
historical prosperity	No	No	No	No	Yes	Yes
openness	No	No	No	No	No	Yes
Baseline controls	Yes	Yes	Yes	Yes	Yes	Yes
FEs	Yes	Yes	Yes	Yes	Yes	Yes
Observations	753,739	753,739	753,739	753,739	753,739	753,739
R-squared	0.624	0.624	0.624	0.624	0.624	0.624

Notes. This table reports the estimation results from the causal specification. Baseline controls include all firm-level controls and individual-level controls. FEs include Baseline FEs and firm province-year FE. Baseline FEs include product-year, product-partner, firm province-year, firm province-industry, partner-industry-year, and firm fixed effects. We gradually introduce the causal variables into the regressions. Robust standard errors are reported in parentheses and are clustered at the industry-partner-year level. *** indicates the significance at the 1 % level.

exogeneity and exclusion restriction for instrumental variables. Furthermore, we can investigate the exclusion restriction of our instrumental variables by using overidentification tests developed by Acemoglu et al. (2001), a method increasingly used by scholars to assess the validity of their instrumental variables (e.g., Acemoglu et al., 2014; Bai and Jia, 2016).

Instrument I: the shortest distance to the nearest Zhu Xi and Lu Jiuyuan academy

Before the Song Dynasty, genealogy and ancestral halls were exclusive privileges of the aristocratic class. However, starting in the late Song Dynasty, both practices were popularized at the grassroots level, and Zhu Xi and Lu Jiuyuan played a crucial role in spreading the Confucian way of life among the common people. As representative figures of Neo-Confucianism, Zhu Xi and Lu Jiuyuan have provided theoretical guidance for several aspects of clan culture, such as family ethics, family education, and family governance through their ideological concepts. Therefore, clans can also be called Confucian clans. Their thoughts have been of great significance to the inheritance and development of clan culture through generations. As mentioned in the background, Zhu Xi was one of the most important philosophers and educators for inheriting and carrying forward Confucianism. Being a fervent advocate of clans, he completed most of his classical texts, including *Zhu Xi's Family Institutions*[20] and *Rituals of the Family*[21] during his lecturing period. He focused on clan values, filial piety, and loyalty, promoting moral character development through education. Meanwhile, Lu Jiuyuan was born into a family with high moral standing and esteemed reputation in society. He incorporated the rules and rituals of the Confucian clan into the maintenance of his large-scale family, earning appreciation from the emperor of the Southern Song Dynasty, with the title *Lushi Yimen*. He emphasized inner cultivation and moral practice, contributing positively to the moral development of the clan members and the passing down of clan spirit. Undoubtedly, the Confucian clan ideas of both Zhu Xi and Lu Jiuyuan are highly relevant to the moral attributes of the clan that our paper emphasizes.

In ancient China, the academy was the primary platform for disseminating ideas and knowledge, as it functioned as the main educational institution in a city. The clan ideas were disseminated mainly through lectures at Neo-Confucianism Academies. Zhu Xi built the Hanquan Academy, the first Zhu Xi academy, which was located in Jianning, Fujian Province, while he was guarding his mother's tomb. From then on, he dedicated himself to the educational cause, lecturing successively at 41 academies and spreading the ideas of the clan (Shu, 2003). The two most prestigious academies are the Bailudong Academy and the Yuelu Academy. Like Zhu Xi, Lu Jiuyuan also dedicated himself to the spread of the clan. He summarized his family practices regarding the clan and taught the rituals at Xiangshan Academy (Lu Jiuyuan Academy) located in his hometown. In addition, both Zhu Xi and Lu Jiuyuan not only spread their thoughts about the clan through lecturing at their academies but also recruited students to spread their teachings across adjacent prefectures. In order to construct our first instrumental variable, we selected four Neo-Confucianism Academies that were most important in spreading clan culture. We calculate the log distance from the centroid of each prefecture to the nearest Neo-Confucian academy as our IV.

Due to the difficulties of transport and the high cost of information dissemination, areas closer to these academies were more profoundly influenced by clan teachings earlier and therefore developed a stronger clan culture compared to more distant regions. Chen et al. (2022b) found that clan density was higher in these regions closer to Zhu Xi academies compared with more distant regions in the post-Zhu Xi era, but no such relation existed in the pre-Zhu Xi era. We also test the impact of Neo-Confucian academies on the

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[20] *Zhu Xi's Family institutions* is a set of moral guidelines and principles for personal conduct and family life. It fully elaborates Benevolence (ren), Righteousness (yi), Propriety (li), Wisdom (zhi), Trustworthiness (xin), and advocates for family harmony, interpersonal harmony, and moral self-cultivation.

[21] *Rituals of the Family* is a work that studies rituals, which can be divided into five parts: general rituals (tongli), capping (guan, coming of age), wedding (hun), mourning (sang), and sacrifice (ji) rituals.

characteristics of regional distribution in Confucian clan dissemination by regressing clan strength on a dummy variable for prefectures' distance to Neo-Confucian academies during 1368–1950. The distance dummy is divided into 15 parts of 100 km, using the prefectures' distance to the closest academies. Fig. 2 shows that clan strength is significantly affected by proximity to Neo-Confucian academies, declining as the distance from these academies increases. These effects disappear at substantial distances.

Meanwhile, the selection of locations for these Neo-Confucian academies can satisfy the exclusion restriction of our instrumental variables. On the one hand, exogenous forces played a role in selecting these academies' locations. Zhu Xi built the Hanquan Academy at the location where his mother was buried. He rebuilt the Bailudong Academy in Jiujiang, Jiangxi, and the Yuelu Academy in Changsha, Hunan, while serving as a governor appointed by the government in these places. Lu Jiuyuan chose the Xiangshan Academy close to his home in Fuzhou, Jiangxi. On the other hand, the academies were located in neither economic centers nor backward regions. Chen et al. (2022b) demonstrated that the locations of the three Zhu Xi Academies were neither prosperous nor backward. Upon reviewing the relevant geographical and historical materials, we find that the location of the Xiangshan Academy shares similar characteristics with the three Zhu Xi Academies.

Instrument II: the number of the southward-migrating clans during the Jianyan period of the song dynasty (1127–1130)

Our second instrument stems from the historical roots of the massive migration from the north to the south. The scale and scope of the migration triggered by the Jingkang Incident[22] were of unprecedented magnitude, exerting a long-term impact on regional differences in the population size and class structure of Chinese society. As a large number of people moved from the north to the south, they laid the foundation for the flourishing of clan culture. In order to construct this variable, we manually collect the number of migrating clans at the migration destinations during the Jianyan period of the Song Dynasty by using the data from the Chinese Migration History.[23] Next, we take the natural logarithm of (1 plus) this number as an instrument for clan strength.

The southern migration of the northern clans was a forced relocation caused by war, rather than a voluntary choice by the northerners. Upon relocating to the south, the clans found it necessary to amend their genealogies, ensuring that their descendants could remember the origins of the earliest ancestors. Meanwhile, the compilation and revision of genealogies also became a key method for the clans to strengthen connections and hence compete for resources and political influence after migration. The landless northern clans that settled in the south turned to commerce for survival and development. This commercial engagement frequently made them targets of banditry, compelling the clan members to unite in defense against these external threats. At the same time, the native clans also increased their collective consciousness to avoid competing for resources with the southward-migrated clans. Overall, this large-scale southward migration can be considered a key exogenous factor in the reshaping of clan strength in prefectures.

Estimation results from two instruments

We perform the instrument variable estimations. The first-stage and second-stage estimations are as follows:

$$Clan_{j,k,t} = \alpha + \sigma_1 Distance_{j,k} + \sigma_2 Migration_{j,k} + \mathbf{Control}'_{i,t}\boldsymbol{\gamma} + \mathbf{Control}'_{j,t}\boldsymbol{\delta} + \varphi_i + \rho_{p,t} + \eta_{m,p} + \mu_{l,n} + \theta_{l,t} + \tau_{m,n,t} + \varepsilon_{j,k,t} \tag{2}$$

and

$$LnTrade_{i,j,k,l,m,n,p,t} = \alpha + \beta \widehat{Clan}_{j,k,t} + \mathbf{Control}'_{i,t}\boldsymbol{\gamma} + \mathbf{Control}'_{j,t}\boldsymbol{\delta} + \varphi_i + \rho_{p,t} + \eta_{m,p} + \mu_{l,n} + \theta_{l,t} + \tau_{m,n,t} + \varepsilon_{i,j,k,l,m,n,p,t} \tag{3}$$

We present our IV estimates derived from the above-mentioned equations in Table 6. Before presenting the results using both instruments, columns (1)–(3) report the results using the first instrument, the shortest distance to the nearest Neo-Confucian academy. Column (1) reports the reduced-form estimated result and shows that this instrument is significantly positively correlated with international trade of Chinese firms. We control for the impacts of both the baseline controls and the variables used in the causality (geography controls, river distance, rice suitability, historical prosperity, connection, and open). Column (3) reports the IV estimate (−1.831) and includes the second instrument as a control regressor. The first-stage estimates show that the shortest distance from the chairperson's prefecture of origin to the nearest Neo-Confucian academy is negatively correlated with clan strength. The second-stage estimates are around −1.8, reporting a negative and highly significant effect of clan strength on firm trade. The insignificant effect of the second instrument suggests that it does not have any direct effect on firm trade besides the channel of clan strength—this method can be regarded as an easy-to-interpret version of the over-identification test developed by Acemoglu et al. (2001). The first-stage F-statistics are in excess of 50, showing that this instrument is not weak (Lee et al., 2022). Similarly, columns (4)–(6) report the corresponding results using the second instrument, the numbers of the southward migrating clans during the Jianyan period of the Song Dynasty (1127–1130). The estimates from the instrument are around −0.492.

Columns (7)–(8) combine the two instruments. Column (7) reports the reduced-form estimated result while column (8) presents the IV estimate. Consistent with the tests in columns (3) and (6), the p-value of the over-identification test is around 0.12, suggesting that they pass the over-identification tests. The estimate using the two instruments is about twice that of the estimate using the OLS method.

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[22] The Jingkang Incident, also known as the Humiliation of Jingkang, was a pivotal event that occurred in 1127 during the Song Dynasty. The Northern Song capital, Bianjing city (present-day Kaifeng), was invaded by the Jurchen forces of the Jin dynasty, and the Song Emperor was kidnapped. This event marked the end of the Northern Song era and the establishment of the Southern Song Dynasty with its new capital in Lin'an (present-day Hangzhou).

[23] The Chinese Migration History documents the history of Chinese migration from the Shang Dynasty to modern times, consisting of six volumes. We use the data from the second part of the fourth volume.
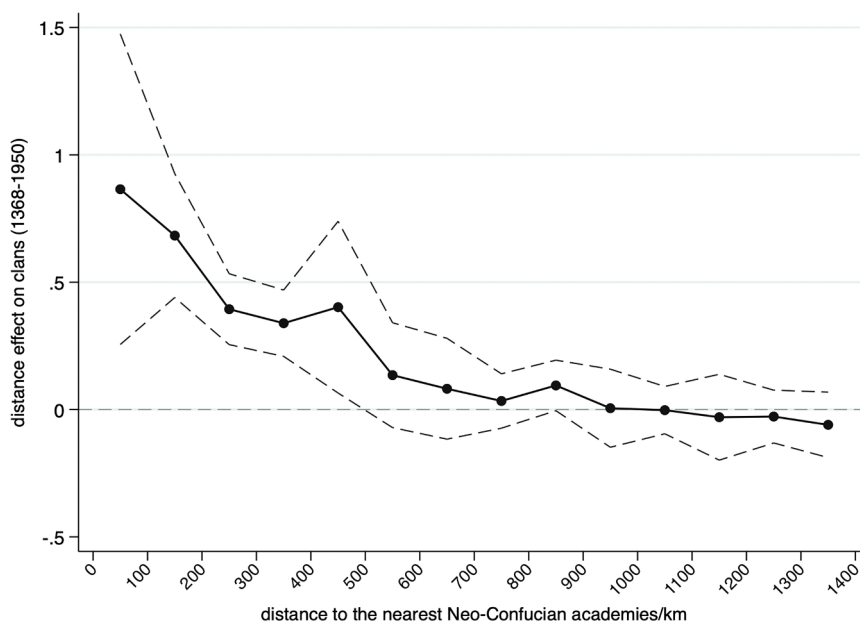
Fig. 2. Impacts of distance to Neo-Confucian academies on clans.
Notes: This shows the reduced-form effect of distance to the nearest Neo-Confucian academies on clan strength between 1368 and 1950. All regressions control for province fixed effects.

Table 6
IV estimates.

	IV1			IV2			Both	
	Reduced Form (1)	IV (2)	IV (3)	Reduced Form (4)	IV (5)	IV (6)	Reduced Form (7)	IV (8)
Clan		−2.319*	−1.831*		−0.458**	−0.484**		−0.546**
		(1.323)	(0.936)		(0.225)	(0.220)		(0.215)
Distance (logged)	0.084*					0.067	0.091**	
	(0.046)					(0.047)	(0.046)	
Migration (logged)			0.204	−0.068**			−0.073**	
			(0.145)	(0.033)			(0.033)	
		First Stage			First Stage		First Stage	
Distance (logged)		−0.036***	−0.050***			−0.050***		−0.050***
		(0.007)	(0.007)			(0.007)		(0.007)
Migration (logged)			0.151***		0.148***	0.151***		0.151***
			(0.005)		(0.005)	(0.005)		(0.005)
Causal controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Baseline controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	753,262	753,262	753,262	753,262	753,262	753,262	753,262	753,262
F-statistics		26.666	58.422		785.554	832.42		435.347
p-value of the over-id test								0.118

Notes. This table tests the validity of instrumental variables. Causal controls encompass controls from six aspects: geography, river distance, rice suitability, openness, societal organizations strength, and historical prosperity. Baseline controls include all firm- and individual-level controls. FEs include Baseline FEs and firm province-year FE. Baseline FEs include product-year, product-partner, firm province-year, firm province-industry, partner-industry-year, and firm fixed effects. Columns (3) and (6) indicate that the effects of one instrument are not significant once the other is employed, suggesting that the instrument did not influence firms to trade beyond the quota channel. Column (9) also confirms this by the p-value of the over-id test. Robust standard errors are reported in parentheses and are clustered at the industry-partner-year level. *** and ** indicate the significance at the 1 % and 5 % level, respectively.

This estimated difference implies that the OLS regressions may underestimate the effect of clan imprints on firm trade, potentially driven by the omitted prefectural unobservable factors and the measurement error (survivorship bias of genealogies). Naturally, another explanation for the difference is that the IV estimates provide local average treatment effects specific to the two instruments. The magnitude of the estimated difference is not large, which gives confidence to the robustness of the initial OLS estimates.

Remark.   In this section, we delve into the central concern that the correlation could also be explained by omitted variables that are correlated with the formation of powerful clans and with individuals' attitudes towards international trade. We adopt two independent approaches to address this inherently challenging problem. First, we control for observable characteristics of prefectures that may be correlated with clan strength and chairpersons' attitudes towards international trade. After including the full set of above-mentioned controls, the clan effect is almost numerically identical to the initial OLS estimate. Second, after controlling for various effects and ruling out several channels, our estimated impact of the clan imprint on international trade may still be biased due to unobserved chairpersons' prefectural factors of origin. To address these possible concerns, we additionally use each prefecture's shortest distance to the nearest Neo-Confucian Academy in the twelfth century and the number of southward-migrating clans during the Jianyan Reign (1127–1130) in the prefecture as instruments. The IV estimated impact of clan strength on firm trade is greater than that of the OLS regression: the magnitude of the effect increases by about 120 %. The magnitude of the estimated difference is not large. Taken together, the consistency of the estimated results from the two identification strategies gives us sufficient confidence to interpret the differences in chairpersons' attitudes towards international trade as a causal effect of the clan imprints in the origin prefectures.

6. Transmission channels

In the previous sections, we have established a causal relationship between clan strength in a chairperson's prefecture of origin and the international trade of the A-share firms. In this section, we perform several additional empirical exercises to corroborate and refine the plausible channels of our main results, and discuss the potential existence of alternative confounding channels. In our conceptual framework, we have provided two plausible channels to explain how clan strength in a chairperson's prefecture of origin affects firm trade: a decrease in general trust and an increase in risk aversion.

6.1. Trust

The first potential channel of causality that we are concerned with is a decrease in chairpersons' willingness to trust others in general. The clan culture in a chairperson's prefecture of origin can lead to a decrease in their general trust towards others through socialization during their early years (5–15). Subsequently, such impacts will serve as an information filter (England, 1967; Jost et al., 2003) that limits the set of possible economic choices when corporate leaders explore before making decisions throughout their lives (Hambrick and Mason, 1984). To test this channel, we perform three empirical exercises. The first exercise aims to test whether clan strength in a chairperson's prefecture of origin leads to a decrease in general trust among residents, with the chairperson once being a subset of the local population. Essentially, clan culture establishes the principle of intra-city limited cooperation patterns, thus causing heuristics of greater mistrust to develop. By conducting tests using data from a representative year general trust survey from the 2010 China General Social Survey (CGSS) , we establish a causal relationship between regional clan strength and the level of distrust among modern residents. This sampling was conducted at the household level and designed to be representative at both the national and prefecture levels. Details of the database, key variable construction, and identification strategy are in Appendix B. We match the CGSS household-level data with the clan strength of the prefecture to provide micro-level evidence for our research, and estimate an equation that takes the following form:

$$distrust_{r,k} = \alpha + \vartheta Clan_k + \boldsymbol{Control}'_r \omega + \boldsymbol{Control}'_k \pi + \epsilon_{r,k} \tag{4}$$

Where r indexes an individual, and k indexes the individual's prefecture of origin. The dependent variable $distrust_{r,k}$ is the individual r's distrust indicator.

The estimation results are reported in Table 7. For column (1), we control for a set of individual-level covariates in our benchmark specifications. For column (2), we additionally include historical and geographical variables at the prefecture level. For columns (3)-

Table 7
Casual relationship between clan strength and general distrust.

	general distrust			
	(1) OLS	(2) OLS	(3) 2SLS	(4) 2SLS
Clan	0.050***	0.051***	0.062***	0.067*
	(0.013)	(0.019)	(0.020)	(0.037)
individual controls	Yes	Yes	Yes	Yes
region average income	No	Yes	No	Yes
per capita GDP	No	Yes	No	Yes
Causal controls	No	Yes	No	Yes
Observations	7602	7602	7602	7602
R-squared	0.063	0.073	0.004	0.014

Notes. This table reports the estimation results from additional checks on an individual's distrust. The dependent variable is distrust, which represents the degree of an individual's distrust level, and Clan represents the clan strength in the individual's prefecture of origin. Robust standard errors are Heteroskedasticity robust standard errors. *** and ** indicate the significance at the 1 % and 5 % level, respectively.

(4), we report the IV estimation results, whose instrumental variables here are consistent with the previous instruments. The estimated coefficients are not only statistically significant, but also economically meaningful. Conditional on controlling for all covariates in a fixed effects OLS model, the estimated coefficient of interest is 0.051, which suggests that a one standard deviation increase in clan strength implies about a 2.03 % standard deviation increase in the level of individual distrust. These findings confirm the claim that regional clan strength correlates with a lower level of general trust among each resident settled in this prefecture.

The second exercise aims to test whether differences in the chairpersons' trust attitudes can play a vital role in firms' trading patterns. To examine this statement, we follow Guiso et al. (2009) and conduct a causal heterogeneous analysis based on the trust intensity index of tradable goods. This trust intensity index was first developed by Rauch (1999). Following his method, we classify products into two categories, differentiated products and non-differentiated products. Trust is particularly important for differentiated products, as the information asymmetry in international trade for differentiated products is greater than for non-differentiated products (Melitz and Toubal, 2014). In our conceptual framework, it is assumed that clan culture increases intergroup mistrust and hence decreases the transactions of trust-intensive goods. Using the differentiated products dummy, we estimate a variant of our baseline equation, but allow for differential impacts by products:

$$LnTrade_{i,j,k,l,m,n,p,t} = \alpha + \beta_1 Clan_{j,k,t} + \beta_2 Clan_{j,k,t} \times difference_m + \textbf{Control}'_{i,t}\gamma + \textbf{Control}'_{j,t}\delta + \varphi_i + \rho_{p,t} + \eta_{m,p} + \mu_{l,n} + \theta_{l,t} + \tau_{m,n,t} + \varepsilon_{i,j,k,l,m,n,p,t}$$
(5)

The coefficient of interest is β_2, which is the coefficient on the interaction of regional clan strength and the indicator for the differentiated products. The estimated coefficient β_1 captures the effect of clan culture in a chairperson's prefecture of origin on firm trade for non-differentiated products. The total treatment effects for differentiated products can be calculated by adding up the coefficients for the two terms. As shown in columns (1)-(4) of Table 8, our results suggest that the negative effects of clan strength on firm trade for differentiated products are greater than for non-differentiated products. Specifically, the point estimate reported in column (1) is -0.107, which means that for differentiated products (relative to non-differentiated products), a one standard deviation increase in clan strength implies an additional 2.1 % standard deviation decrease in firm trade. The estimated coefficients of interest reported in columns (2)-(4) exhibit magnitudes and significance levels similar to those reported in column (1). Therefore, it can be observed that clan strength in a chairperson's prefecture of origin has a more pronounced negative effect on the trade for trust-sensitive products, due to its influence on trust. The two exercises mentioned above construct a complete logical chain, confirming the trust channels.

Our final exercise further examines the trust channel by combining insights from the previous two exercises. Based on Guiso et al. (2009) and Kong et al. (2021), we construct a distrust variable at the prefecture level to substitute for the clan strength variable in the above specifications. Since the results of the first exercise indicate that regional clan culture leads to a decrease in the level of general trust among all individual residents, the differences in the average general trust at the prefecture level can serve as a proxy for the differences in the chairperson's level of general trust.[24] The distrust variable is a regional general distrust index[25] using the individual's general trust index from CGSS. The estimated coefficient β_1 corresponding to the estimating Eq. (5) is omitted, as we control for the prefecture-of-origin city fixed effects. As shown in columns (5) and (6) of Table 8, the negative effect of the distrust at the prefecture level on firm trade is more pronounced for trust-intensive goods, providing sufficient quantitative evidence for the existence of the trust channel.

6.2. Risk-taking

The second potential channel is that chairpersons' exposure to a stronger clan culture environment during their early life results in an aversion to taking risks and contracting disputes. Whenever engaging in international trade, firms are subject to specific risks: risks of contract disputes and institutional risks that are unfavorable to foreign investors from the partner country. Based on the conceptual framework, chairpersons who were born into a prefecture with a stronger clan culture exhibit heightened sensitivity to the above-mentioned trade risks, thus leading to their decision to decrease the firm's international trade. If the risk-taking channel is established, we need empirical evidence from two aspects: first, the regional clan strength should positively correlate with a lower level of risk-taking among the individuals residing in this prefecture, with the chairperson once being a subset of the local population. Second, chairpersons raised in a region with a stronger clan culture should have an additional reduction in international trade for both sectors characterized by lower-contract-density industries and jurisdictions in the partner country with comparatively underdeveloped legal systems, both of which possess a higher risk of contractual disputes.

First, we estimate the relationship between the clan strength of a prefecture and an individual's current levels of investment risk preferences using data from the China Household Finance Survey (CHFS, see https://chfs.swufe.edu.cn/). The details of data sources, key variable construction, and identification strategy are reported in the online Appendix C. The model specification takes the following form:

$$norisk_{r,k} = \alpha + \zeta Clan_k + \textbf{Control}'_{r,t}\vartheta + \textbf{Control}'_{k,t}\nu_1 + \textbf{Control}'_k\nu_2 + \varrho_t + \epsilon_{r,k,t}$$
(6)

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[24] After controlling for the above-mentioned prefecture-level confounding variables in our empirical strategy, the heterogeneity in the individuals' general trust across different prefectures can be attributed to the regional differences in clan culture.

[25] To obtain the regional general distrust index, we calculate the average of individual regional general distrust indices and then standardize the result.

Table 8

Channel: the decrease in willingness to trust other people in general.

	LnTrade					
	Clan × Difference				Distrust × Difference	
	(1)	(2)	(3)	(4)	(5)	(6)
Clan	−0.097**	−0.091	−0.082			
	(0.049)	(0.075)	(0.111)			
Clan × Difference	−0.107***	−0.109***	−0.103**	−0.111***		
	(0.035)	(0.035)	(0.047)	(0.036)		
Distrust × Difference					−0.349**	−0.481***
					(0.137)	(0.177)
Other interactions	No	No	Yes	No	No	Yes
Chairperson's prefecture FE	No	No	No	Yes	Yes	Yes
Causal controls	No	Yes	Yes	No	No	No
Baseline controls	Yes	Yes	Yes	Yes	Yes	Yes
Prefecture of origin FE	No	No	No	Yes	Yes	Yes
FEs	Yes	Yes	Yes	Yes	Yes	Yes
Observations	620,346	620,346	620,346	618,484	618,484	618,484
R-squared	0.634	0.634	0.635	0.635	0.635	0.635

Notes. This table reports the estimation results from trust channels. Causal controls encompass controls from six aspects: geography, river distance, rice suitability, societal organizations strength, historical prosperity, and openness. Baseline controls include all firm-level controls and individual-level controls. FEs include Baseline FEs and firm province-year FE. Baseline FEs include product-year, product-partner, firm province-year, firm province-industry, partner-industry-year, and firm fixed effects. The variable difference represents the degree of the differentiated products, which is a dummy variable. The variable trust represents the distrust in a chairperson's prefecture of origin. Column (1) only controls all the baseline controls. Column (2) includes the causal control variables. Column (3) includes the other interactions. Column (4) includes fixed effects of a chairperson's prefecture of origin. Column (5) substitutes the Clan with the general trust and controls for the fixed effects of a chairperson's prefecture of origin. Column (6) controls for the interaction of the causal controls and the difference variable. We do not present several interactions' coefficients, as these coefficients are not significant. Robust standard errors are reported in parentheses and are clustered at the industry-partner-year level. *** and ** indicate the significance at the 1 % and 5 % level, respectively.

Where r indexes an individual, k indexes the individual's prefecture of origin, and t indexes the survey's year. The dependent variable "$norisk_{r,k}$" denotes one of our measures of individual r's risk-taking in year t. The higher the value, the lower the level of risk-taking. The variable "$Clan_k$" denotes clan strength in an individual r's prefecture of origin k. The estimation results are reported in Table 9. For columns (1)-(3), we use the risk-taking value, while columns (4)-(6) use the risk-taking dummy as the dependent variable. In all six columns, the estimated coefficient of interest is positive and highly significant, which suggests that the clan culture of a prefecture results in an increase in residents' risk aversion. Specifically, conditional on controlling for all covariates in a fixed effects model, the estimated coefficient of interest reported in Table 9 is 0.072, which suggests that a one standard deviation increase in clan strength results in approximately a 2.77 % standard deviation increase in risk aversion. Moreover, the IV estimate gives confidence in the robustness of the initial OLS estimate.

Second, to further examine whether our baseline results are also driven by the risk-taking channel, we include the interaction of the contract-sparse industries dummy with clan strength in a chairperson's prefecture of origin in the specification. This is because, compared to industries with more contracts and partner countries with stronger legal systems, those industries with fewer contracts and countries with weaker legal environments face a greater risk of nonpayment for exporters and the risk of receiving an inappropriate shipment for importers (Berkowitz et al., 2006). Our new estimating equation is as follows:

$$LnTrade_{i,j,k,l,m,n,p,t} = \alpha + \beta_1 Clan_{j,k,t} + \beta_2 Clan_{j,k,t} \times contract_m + \mathbf{Control}'_{i,t}\gamma + \mathbf{Control}'_{j,t}\delta + \varphi_i + \rho_{p,t} + \eta_{m,p} + \mu_{l,n} + \theta_{l,t} + \tau_{m,n,t} + \varepsilon_{i,j,k,l,m,n,p,t}$$

(7)

Where $contract_m$ is an indicator variable that equals one if the contract intensity is less than the mean contract intensity. The classification criteria refer to the contract intensity constructed by the method proposed by Nunn (2007). The coefficient of interest is β_2, which is the coefficient on the interaction of regional clan strength and the indicator for the contract intensity. The estimated coefficient β_1 captures the effect of clan culture in a chairperson's prefecture of origin on firm trade for contract-sparse industries. The overall effects for contract-intensive industries can be calculated by adding up the coefficients for the above-mentioned two terms. Table 10 presents the results. The negative effects of clan strength on firm trade for contract-sparse industries are greater than for contract-intensive industries. Specifically, in columns (1)-(3), the estimated coefficients of the interaction term are about −0.05, which shows that for contract-sparse industries (relative to contract-intensive industries), a one standard deviation increase in clan strength implies an additional 0.97 % standard deviation decrease in firm trade. One might be concerned that the risk channel and the trust channel could be confused, as the contract density variable and the differentiated products variable exhibit a certain degree of multicollinearity. To address this concern, we additionally include the interaction term ($Clan_{j,k,t} \times difference_m$) in columns (4)-(5). The estimated coefficient of interest remains negative and statistically significant.

Finally, to strengthen the risk-taking channel, we include a triple-interaction, $Clan_{j,k,t} \times contract_m \times legal_{n,t}$. The variable "$legal$",

Table 9
Casual relationship between clan strength and *norisk* variable.

	Norisk value			Norisk dummy		
	(1) OLS	(2) OLS	(3) 2SLS	(4) OLS	(5) OLS	(6) 2SLS
Clan	0.035*	0.072***	0.128***	0.023***	0.032***	0.036*
	(0.019)	(0.024)	(0.045)	(0.008)	(0.010)	(0.018)
individual controls	Yes	Yes	Yes	Yes	Yes	Yes
region average income	Yes	Yes	Yes	Yes	Yes	Yes
per capita GDP	Yes	Yes	Yes	Yes	Yes	Yes
Causal controls	No	Yes	Yes	No	Yes	Yes
year F.E.	Yes	Yes	Yes	Yes	Yes	Yes
Observations	17,548	17,548	17,548	17,548	17,548	17,548
R-squared	0.123	0.126	0.123	0.111	0.113	0.110

Notes. This table reports the estimation results from additional checks on an individual's risk taking. norisk represents the degree of an individual's risk-taking level and Clan represents clan strength in the individual's prefecture of origin. Robust standard errors are Heteroskedasticity robust standard errors. ***, ** and * indicate the significance at the 1 %, 5 % and 10 % level, respectively.

Table 10
Channel: the decrease in willingness to take risks.

	LnTrade					
	Contract			Contract&difference		
	(1)	(2)	(3)	(4)	(5)	(6)
Clan	−0.125***	−0.189**		−0.008	−0.022	
	(0.041)	(0.068)		(0.080)	(0.085)	
Clan × Contract	−0.048*	−0.049*	−0.051*	−0.073**	−0.074**	0.002
	(0.028)	(0.028)	(0.029)	(0.032)	(0.032)	(0.036)
Clan × Contract × Legal						−0.163*
						(0.087)
Clan × Difference				−0.052**	−0.055**	
				(0.025)	(0.025)	
Other interactions	No	No	No	No	Yes	Yes
Chairperson prefecture FE	No	No	Yes	No	No	Yes
Chairperson prefecture × country FE	No	No	No	Yes	Yes	No
Causal controls	No	Yes	Yes	No	No	No
Baseline controls	Yes	Yes	Yes	Yes	Yes	Yes
FEs	Yes	Yes	Yes	Yes	Yes	Yes
Observations	722,775	722,775	722,775	605,146	605,146	699,758
R-squared	0.619	0.619	0.630	0. 630	0. 630	0.646

Notes. This table reports the estimation results from risk-taking channels. Causal controls encompass controls from six aspects: geography, river distance, rice suitability, societal organizations strength, historical prosperity, and openness. Baseline controls include all firm-level controls and individual-level controls. FEs include Baseline FEs and firm province-year FE. Baseline FEs include product-year, product-partner, firm province-year, firm province-industry, partner-industry-year, and firm fixed effects. Variable contract represents is a dummy variable, equals to 1 if the product is classified as a contract intensive industry. Variable legal represents the legal environment in a chairperson's prefecture of origin. Column (1) only control all the baseline controls and the causal control variables. Column (2) includes the fixed effects of chairperson's prefecture of origin. Column (3) includes the triple interaction, Clan*contract*legal, as well as include the interaction fixed effects of chairperson's prefecture of origin and partner countries, which might omit several controls and interactions, such as prefecture level history controls and Clan × contact. Column (4) includes the interaction of Clan*difference based on column (1). We do not present several interactions' coefficient, as these coefficients are not significant. Robust standard errors are reported in parentheses and are clustered at the industry-partner-year level. ***, ** and * indicate the significance at the 1 %, 5 % and 10 % level, respectively.

sourced from the World Bank's World Development Indicators database,[26] is an estimate of the Rule of Law (Estimate, RL.EST) .[27] It measures the legal environment's effectiveness, focusing on contract enforcement quality. The coefficient of the triple interaction in column (4) is −0.163, which confirms the claim that chairpersons raised in a region with a stronger clan culture have an additional reduction in international trade for industries with lower contract density and for partner countries with underdeveloped legal systems.

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[26] https://databank.worldbank.org/source/world-development-indicators#
[27] Rule of Law captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence. The estimate gives the country's score on the aggregate indicator, in units of a standard normal distribution, i.e., ranging from approximately −2.5 to 2.5.

6.3. Discussion on other potential channels

We now discuss potential alternative channels through which clan strength in a chairperson's prefecture of origin decreases firm trade. A potential alternative channel is that an increase in the chairperson's risk aversion, caused by regional clan culture, decreases the Total Factor Productivity (TFP) of the firm. The differences in the chairperson's risk preferences, caused by clan culture, may strongly correlate with a concentration in the firm's shareholding structure, managerial inefficiency, and the firm's risk-taking, among other factors. The economic consequences mentioned above, caused by their chairperson's decisions, may ultimately have an impact on TFP and thus on firm trade performance.[28]

A chairperson born into a city with a stronger clan culture has a more extensive social capital network (Cao et al., 2022). Another potential alternative channel is that a chairperson born in a city with a stronger clan culture may tend to appoint management personnel with more political connections, and subsequently adversely affect the firm's trade. Firms with more political connections have an adverse effect on firm exports due to managerial inefficiency, although they have comparative advantages in corporate tax incentives and obtaining local government financial subsidies (Ding et al., 2018). In addition, the preferences for having more political connections might lead the firm to be more inclined to engage in domestic trade rather than international trade.

Here, we lay out two additional exercises that are helpful for evaluating all the above-mentioned alternative channels. The first exercise is designed to test whether a decrease in the firm's TFP, caused by clan culture, has a negative impact on firm trade. We calculate TFP using five methods, including Output Perturbation (OP), Linear Programming (LP), OLS, FE, and GMM methods, and respectively include each of them respectively in our specification (Olley and Pakes, 1996; Blundell and Bond, 1998; Levinsohn and Petrin, 2003). In columns (1)-(5) of Table 11, we observe that the coefficients of our variable of interest are nearly numerically identical to the initial OLS estimate in column (6) of Table 5 (−0.247), although coefficients of the TFP variable are positive and statistically significant at the 1 % level. Therefore, the negative effects of clan strength on firm trade cannot be explained by a decrease in the firm's TFP caused by clan culture.

To test this channel of political connections, we re-estimate the relationship between clan strength and firm trade by additionally controlling for political connections in the second exercise. Following Ding et al. (2018), we construct a measure of connectedness at the firm level. We are able to identify whether a top management team (TMT) or a board member belongs to the Chinese People's Congress (CPC) or the Chinese People's Political Consultative Conference (CPPCC) from the "Profile of Directors and Senior Managers" in the CSMAR database. We normalize the measure of the degree of political connectedness by the size of the TMT and board members, with only national connections, only local connections, and both types of connections. We also construct connection dummies that equal one if a firm's TMT or board members belong to the CPC or CPPCC at the national level only, local level only, and both levels simultaneously.

We add the variable of connection strength to the baseline specification and report our regression results in columns (1)-(3) of Table 12. The results are shown in columns (4)-(6) when using political connection dummies. The effects of interest remain negative and highly significant, and the maximum extent of their magnitudes decreases by approximately 10 % when the political connections variable is included, suggesting that the majority of the negative impact of clan strength on firm trade cannot be explained by political connections. These findings favorably support our hypothesis.

7. Further discussion

In previous sections, we have provided substantial evidence suggesting that a decrease in the chairperson's general trust and risk-taking can serve as the two plausible channels explaining the negative effects of clan strength in a chairperson's prefecture of origin on firm trade. In this section, we attempt to further investigate whether the negative effect exhibits heterogeneity depending on the financial constraints of the firms. The reason is that chairpersons could leverage the social capital network of their origin prefecture to expand informal financial funding to promote trade if they were born into a region with a stronger clan culture.[29]

We examine this causal heterogeneity from two perspectives. First, we study the impact of clan strength on firm trade to determine whether it exhibits heterogeneity when a firm's industry faces high or low levels of external finance dependence (EFD). Considering that the technological parameters of Chinese A-share listed firms are likely to be different from those of large U.S. firms, we use the methodology developed by Rajan and Zingales (1998) for U.S. firms to construct an industry-level measure of external finance dependence for Chinese firms, based on data from the six cities with the most developed financial markets: Beijing, Shanghai, Guangzhou, Shenzhen, Hangzhou, and Wenzhou, as referenced in Huang et al. (2020).[30] Next, we construct the external finance dependence index by using the median value of external finance dependence for each ISIC 3-digit sector (Manova, 2013). Based on the EFD index, the EFD dummy equals one if the EFD index exceeds the mean EFD index, and zero otherwise. In our specification, we introduce a new interaction term (clan × EFD dummy) into the baseline specification. Regression results can be found in columns

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[28] The differences in firm's international trade can be largely explained by differences in their TFP (Baglan and Yilmazkuday, 2018). This therefore provides insights into what we're worried about. So it's necessary to rule out the TFP channel.

[29] Clans act as a kind of informal internal financial market. Based on individuals' soft information, local clan organizations can provide financial support to those who were raised there.

[30] Huang et al. (2020) selected four cities, including Beijing, Shanghai, Hangzhou, and Wenzhou. Moreover, we add Guangzhou and Shenzhen, which have developed financial markets due to their level of economic development and policy advantages, thus increasing the number of representative firms engaging in international trade for the index calculation.

Table 11
Alternative channel: TFP.

	LnTrade				
	(1)	(2)	(3)	(4)	(5)
Clan	−0.241**	−0.280***	−0.278***	−0.277***	−0.273***
	(0.105)	(0.077)	(0.077)	(0.077)	(0.077)
TFP_OP	0.286***				
	(0.039)				
TFP_LP		0.213***			
		(0.031)			
TFP_OLS			0.239***		
			(0.034)		
TFP_FE				0.232***	
				(0.034)	
TFP_GMM					0.141***
					(0.023)
Causal controls	Yes	Yes	Yes	Yes	Yes
Baseline controls	Yes	Yes	Yes	Yes	Yes
FEs	Yes	Yes	Yes	Yes	Yes
Observations	637,626	637,626	637,626	637,626	637,566
R-squared	0.652	0.637	0.637	0.637	0.637

Notes: This table reports the estimation results from alternative channels. Causal controls encompass controls from six aspects: geography, river distance, rice suitability, connection, historical prosperity, and openness. Baseline controls include all firm-level controls and individual-level controls. FEs include Baseline FEs and firm province-year FE. Baseline FEs include product-year, product-partner, firm province-year, firm province-industry, partner-industry-year, and firm fixed effects. The variable difference represents the degree of the differentiated products, which is a dummy variable. The variable trust represents the distrust in a chairperson's prefecture of origin. Column (1) only controls the TFP calculated by the OP method. Column (2) includes the TFP calculated by the LP method. Columns (3)-(5) include the TFP calculated by OLS, FE and GMM method, respectively. Robust standard errors are reported in parentheses and are clustered at the industry-partner-year level. *** and ** indicate the significance at the 1 % and 5 % level, respectively.

Table 12
Alternative channel: connection.

	LnTrade					
	connection strength			connection dummy		
	(1)	(2)	(3)	(4)	(5)	(6)
Clan	−0.251***	−0.251***	−0.239***	−0.248***	−0.248***	−0.255***
	(0.068)	(0.068)	(0.068)	(0.068)	(0.068)	(0.067)
National connection	−1.805***	−1.819***		−0.173***	−0.173***	
	(0.461)	(0.463)		(0.035)	(0.035)	
Local connection		0.178			0.013	
		(0.465)			(0.028)	
Connection			−0.921***			−0.103***
			(0.311)			(0.025)
Causal controls	Yes	Yes	Yes	Yes	Yes	Yes
Baseline controls	Yes	Yes	Yes	Yes	Yes	Yes
FEs	Yes	Yes	Yes	Yes	Yes	Yes
Observations	730,125	730,125	730,125	730,125	730,125	730,125
R-squared	0.628	0.628	0.628	0.628	0.628	0.625

Notes: This table reports the estimation results from alternative channels. Causal controls encompass controls from six aspects: geography, river distance, rice suitability, societal organizations strength, historical prosperity, and openness. Baseline controls include all firm-level controls and individual-level controls. FEs include Baseline Fes and firm province-year FE. Baseline FEs include product-year, product-partner, firm province-year, firm province-industry, partner-industry-year, and firm fixed effects. The variable difference represents the degree of the differentiated products, which is a dummy variable. The variable trust represents the distrust in a chairperson's prefecture of origin. The political connection variables in columns (1)-(4) are proportion, as well as dummy in columns (5)-(8). Robust standard errors are reported in parentheses and are clustered at the industry-partner-year level. *** and ** indicate the significance at the 1 % and 5 % level, respectively.

(1)-(2) of Table 13. Conditional on controlling for all covariates, the estimated coefficient, which captures the effect of clan culture in a chairperson's prefecture of origin on trade in firms with low external financing dependency, is −0.262. The total effect of clan strength on trade for constrained firms is explicitly negative because the estimated effect of the interaction variable is positive, and only approximately 1/3 of the effect of the clan effects for unconstrained firms.[31]

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[31] The coefficient that captures the total effect of clan strength on firm trade for the financing constrained firms is −0.127.

Table 13
Further discussion.

	LnTrade			
	industry EFD		firm FCs	
	(1)	(2)	(3)	(4)
Clan	−0.160***	−0.262***	−0.167***	−0.273***
	(0.039)	(0.067)	(0.040)	(0.067)
Clan × EFD	0.071**	0.074**		
	(0.036)	(0.036)		
Clan × FCs			0.059**	0.069**
			(0.029)	(0.029)
FCs			−0.065**	−0.073***
			(0.027)	(0.027)
Causal controls	No	Yes	No	Yes
individual level controls	Yes	Yes	Yes	Yes
FEs	Yes	Yes	Yes	Yes
Observations	739,836	739,836	742,507	742,507
R-squared	0.623	0.623	0.625	0.625

Notes: This table reports the estimation results from further discussion. Causal controls encompass controls from six aspects: geography, river distance, rice suitability, societal organizations strength, historical prosperity, and openness. FEs include Baseline FEs and firm province-year FE. Baseline controls include all firm-level controls and individual-level controls. Baseline FEs include product-year, product-partner, firm province-year, firm province-industry, partner-industry-year, and firm fixed effects. Variable EFD is a dummy variable, equal to 1 if the firm belongs to an external financially dependent industry. Variable FCs represents whether a firm face financial constraints. Columns (1)-(3) include the interaction of Clan and EFD, while the EFD is omitted by the fixed effects. Columns (4)-(6) include the FCs, and the interaction of Clan and FCs. Robust standard errors are reported in parentheses and are clustered at the industry-partner-year level. *** and ** indicate the significance at the 1 % and 5 % level, respectively.

Second, we investigate the impact of clan strength on firm trade to determine whether it exhibits heterogeneity when a firm faces high or low levels of financial constraints (FCs). Referring to Bartram et al. (2022), we construct the financial constraints (FCs) index by combining six alternative measures of financial constraints, including the firm size, payout, the KZ index, the SA index, the FC index, and the WW index. All these six proxies are collected from the CSMAR's Financial Distress Research Database. Based on these average rankings, firms are categorized as facing financial constraints if they are below the median for firm size and payout, and if they are above the median for the KZ, SA, FC, and WW. For the composite indicator of financial constraints, a firm is categorized as constrained if the majority of the six proxies classify the firm as being constrained; otherwise, the firm is unconstrained. We obtain this FCS index and construct an interaction with the clan strength variable. The result is presented in columns (3)-(4), demonstrating that the coefficient of the interaction is significantly positive. However, the total effects for the financially constrained firms can be calculated by adding up the coefficients for the two terms, and they remain negative, as the absolute value of the coefficient of the interaction is only approximately 1/3 of the coefficient of the clan effects for unconstrained firms.

Overall, the above-mentioned empirical evidence suggests that chairpersons born in areas with a strong clan culture will take measures to alleviate financial constraints by leveraging their social network, thereby leading to an increase in trade. However, this does not alter the total effect of regional clan strength on firm trade.

8. Conclusions

In this paper, we examine the link between clan culture and firm trade of Chinese A-share listed firms. Employing merged Chinese A-share listed firm data and Chinese customs data for the years 2000 to 2016, we present plausible causal evidence that clan strength in a chairperson's prefecture of origin adversely affects a firm's trade. Furthermore, we provide a set of robust evidence supporting the two channels that explain the negative effect of clan strength on international trade: a decrease in general trust towards others and an increase in risk aversion.

These findings provide some insight into the growing literature on better understanding the role that informal institutional constraints play in international trade. More specifically, our work documents, both theoretically and empirically, the importance of informal institutions in corporate leaders' places of origin in determining international trade. Our mechanism is that clan culture has exerted a significant impact on chairpersons' attitudes towards international trade through socialization during their early years (5–15), and hence limits the set of possible economic choices they explore before making decisions throughout their lives. Even though clan culture is unique to Asia, our approach could also be well-suited to examining the impacts of heterogeneity in economic and managerial attitudes of CEOs and policymakers on international trade. More interestingly, our work is the first to empirically study the impact of experience-based heterogeneity of leaders on international trade.

We also shed new light on the long-term impact of clan culture on the Chinese economy. Cultural values and religious beliefs are associated with "good" versus "bad" economic attitudes, where "good" economic attitudes are generally defined as conducive to economic prosperity, and "bad" economic attitudes are just the opposite (Guiso et al., 2003). The existence of these "bad" economic attitudes can also aid in understanding the missing trade issue (e.g., Trefler, 1995; Yilmazkuday, 2021b). Our work examines the roles of clan culture in the formation of individuals' economic and managerial attitudes, empirically documenting a significant negative impact of regional clan strength on individuals' willingness to trust other people in general and to take risks. Clearly, China's growth

journey has depended on a number of factors, such as the surge in international trade and the improvement of international relations that have occurred since China joined the WTO. Because of economic prosperity at this stage, scholars have rarely focused on the role that the "bad" economic attitudes have played in trade and economic development. However, these "bad" economic attitudes might be a root obstacle to continued trade growth and economic success, and might have a greater adverse effect on economic growth during a recession. Policymakers could use formal institutions to correct the effects of these "bad" economic attitudes derived from informal institutions. When selecting top managers, firms should consider the endogenous motivations and economic preferences of their executives, such as risk preferences and general trust. Furthermore, enhancing corporate governance is crucial, as effective governance can supervise the chairperson's discretionary authority to some extent, thereby mitigating the excessive influence of top leaders' risk preferences on firm performance. This study takes an important step towards governance for developing countries.

Declaration of competing interest

We declare that we have no financial or personal relationship with other people or organizations that can inappropriately influence our work. There is no professional or other personal interest of any nature or kind in any product, service, and company that could be construed as influencing the position presented in, or the review of, the manuscript entitled "Cultural Origin and International Trade".

Acknowledgment

Appendix A. Summary statistics

1. Trade variable

LnTrade is the logarithm of the trade value in dollars of the listed firms between 2000 and 2016. *Source:* combine the data from GACC and the CSMAR by manually matching firm names.

2. Prefecture-of-origin-level variables

Clan is the logarithm of the number of (1 plus) genealogy books between 1368 and 1950 per 10,000 members of China's first national population census in the prefecture. *Source*: Shanghai Library's Comprehensive Catalogue of Chinese Genealogies, the First National Population Census in China, and authors' calculation.

Distance to the nearest Neo-Confucian academy (logged) is the log distance from the centroid of each prefecture to the nearest Neo-Confucian academy. *Source*: Gaode Map and authors' calculation.

The southward migration during Jianyan Reign (1127–1130) is the logarithm of (1 plus) the number of migrating clans during Jianyan period (1127–1130) of the Song Dynasty in the migration destinations from Chinese Migration History. *Source*: Chinese Migration History (part of the fourth volume) and authors' calculation.

Slope is the average uphill slope of the prefecture's surface area. *Source:* GEBCO Compilation Group.

Terrain ruggedness is the prefecture-level relief degree of land surface. *Source:* Global Change Research Data Publishing &Repository.

River distance (km,logged) is the logarithm of the shortest circle distance from the prefecture's centroid to the nearest major navigable rivers in history. *Source:* Gaode Map, the historical major inland rivers' GIS data in Harvard GHGIS, and authors' calculation.

Rice suitability is the prefecture-level historical rice suitability index by using potential rice productivity based on the Caloric Suitability Index developed by Galor and Özak (2016). *Source:*https://ozak.github.io/Caloric-Suitability-Index/.

Societal organizations strength is the logarithm of the number of prefecture-level societal organizations strength during the Republican period. The societal organizations include labour unions, chambers of commerce, women's associations, farmers' associations, religious associations, educational and student bodies and other non-profit organizations. *Source:* Minguo Renmin Tuanti Diaocha Lu (Survey on Social Organizations in the Republic of China) and authors' calculation.

Historical commercial center is a dummy variable that equals 1 if the prefecture is a commercial center before 1950. Source: authors collect this variable by consulting history books manually.

Distance to the historical commercial centers (km,logged) is the distance from the prefecture to the nearest historical commercial and center, converted to the natural log. *Source:* Gaode Map and authors' calculation.

Prefecture population size in 1920 is the logarithm of the prefecture population size in 1920. *Source:* collected by Cao (2017).

Historical capitals is a dummy variable that equals 1 if the prefecture is a historical capital of ancient China. *Source:* authors collect this variable by consulting history books manually.

Huadong is a dummy variable that equals 1 if the prefecture is located in the Huadong region. Source: Gaode Map and authors' collection.

Protestant Christianity is the number of Protestant missionaries per 10,000 people in 1920. *Source:* The Christian Occupation of China (1901–1920) and authors' calculation.

Treaty ports is a dummy variable that equals 1 if the prefecture or part of the prefecture has been forced open in history. *Source:* the authors collect this variable by consulting manually.

3. Firm-level variables

Firm size is the logarithm of the listed firm's total assets. *Source:* CSMAR.

Firm age is the logarithm of the number of years a firm has been established. *Source:* CSMAR.

ROA is return on assets. Source: CSMAR.

Leverage is the ratio of total liabilities to total assets. *Source*: CSMAR.

Tobin's Q is the ratio of the market value to book value of assets. *Source*: CSMAR.

Profit margin is the ratio of total operating profit to sales revenue. *Source*: CSMAR.

Board size is the logarithm of the number of board directors. *Source*: CSMAR.

Board Independence is the share of independent directors in board members. Source: CSMAR.

State ownership is a dummy variable equal to one if more than 50 % of the firm's shares are held by the state and zero otherwise. *Source*: CSMAR.

4. Individual-level variables

Age is the age of the chairperson. *Source*: CSMAR and authors' collection.

Age squared is the squared age of the chairperson. *Source*: CSMAR and authors' calculation.

Gender is a dummy variable equal to 1 if the chairperson is male. *Source*: CSMAR and authors' collection.

Education is education indicator variables. *Source*: CSMAR and authors' collection.

Overseas background is indicator variables. *Source*: CSMAR and authors' collection.

Table A1
Summary statistics.

Variable	N	Mean	SD	Min	Max
A. Trade					
LnTrade	753,739	9.604	3.078	0	22.200
B. Prefecture-of-origin level					
Clan	254	0.321	0.482	0.003	2.727
Distance (km,logged)	254	6.324	0.922	0.375	7.776
Migration (logged, plus 1)	254	0.394	0.854	0	4.277
Distance to coast (km,logged)	254	430.100	359.300	1.673	1854
Slope	254	10.220	5.430	1.592	27.140
Terrain ruggedness	254	0.599	0.733	0.001	4.011
River distance (km,logged)	254	1.744	0.344	0	2.119
Rice suitability	254	11.450	10.880	0	45.210
Societal organizations strength	254	3.330	0.605	0	4.206
Historical commercial Center	254	0.169	0.376	0	1
Distance to the historical Commercial centers (km,logged)	254	9.838	4.841	0	14.150
Prefecture population in 1920 (logged)	254	5.126	0.970	1.426	8.363
Historical capitals	254	0.154	0.361	0	1
Huadong	254	0.232	0.423	0	1
Protestant Christianity	254	2.488	3.245	0	28.470
Treaty ports	254	0.142	0.349	0	1
C. Firm level					
Size	6757	21.670	1.167	19.100	27.960
Firm age	6757	12.860	5.250	2	48
ROA	6757	0.045	0.056	−0.694	0.390
Leverage	6757	0.407	0.208	0.008	4.276
Tobin's Q	6757	1.901	1.157	0.768	19.110
Profit margin	6757	0.075	0.167	−5.626	1.455
Board size	6757	2.267	0.223	1.386	3.219
Board Independence	6757	0.359	0.098	0	0.800
State ownership	6757	0.125	0.217	0	0.837
D. Individual level					
Age	6757	51.324	7.531	27	84
Age squared	6757	2691	792.600	729	7056
Gender	6757	0.953	0.211	0	1
Education	6757	5.947	1.259	1	8
Overseas background	6757	3.857	0.734	0	4

Notes: Summary statistics of LnTrade are obtained from the firm-partner-product-year data, Clan are obtained from the prefecture-level city, and those firm- and individual-level data are obtained from the firm-year level.

Appendix B. An analysis of Clans and individuals' trust

First, we supplement detailed information about the database source and the construction of key variables. The data about individuals' current levels of general trust are sourced from the China General Social Survey (CGSS), which is available at http://cgss.ruc.edu.cn/. CGSS is a household survey conducted biennially by the Renmin University of China. The sampling was done at the household level and designed to be representative at both the national and prefecture levels, which scholars have used to study residents' individual behavioral preferences. We focus on the subjective survey question on general trust, which the CGSS translates as, "Overall, do you agree that the vast majority of people can be trusted in this society?". Respondents are graded on a scale of 1–5, where 5 denotes complete trust and 1 denotes complete distrust. Specifically, we construct a distrust indicator that equals one if the respondent chose option 1–3 and zero otherwise. Because it is necessary to construct the general trust at the prefecture level to test the trust channel, we use the year 2010 as a representative year to examine the impact of clan strength in a prefecture on individual trust among residents according to Chen (2022b).

Next, we present the details of the causal relationship identification between clan strength and individuals' current levels of mistrust. We pursue two strategies to identify this causal relationship. First, our specification includes individual-level characteristics and prefecture-of-origin characteristics. The individual-level covariates include the individual's age, age squared, income, gender indicator variable, and education indicator variables. The prefecture-of-origin covariates consist of several variables designed to capture the effects of the prefecture's historical and geographical variables, which might influence the effect of clan strength on an individual's distrust, such as *Distance to the coast, Slope, Terrain ruggedness, River distance, Rice suitability, Societal organizations strength, Historical commercial center, Distance to the historical commercial centers, Prefecture population size in 1920, Historical capitals, Huadong, Protestant Christianity* and *Treaty ports.* Our second identification strategy is to take the IV regression approach, which can help address the remaining omitted variables bias in our fixed effects model. In keeping with the previous text, we use the prefecture's shortest distance to the Neo-Confucian (Zhu Xi and Lu Jiuyuan) Academy in the twelfth century and the number of clans that migrated from the north to the south during the Jianyan period of the Song Dynasty (1127–1130) as instruments for clan strength.

Appendix C. An analysis of Clans and individuals' risk-taking

First, we supplement detailed information about the database source and the construction of key variables. We measure individuals' current levels of investment risk preferences using data from the China Household Finance Survey (CHFS, see https://chfs.swufe.edu.cn/), a national survey aimed at collecting micro-level information about household income, expenses, assets, liabilities, insurance, securities, etc. Scholars have used CHFS to study the asset allocation of individual residents and the underlying mechanisms. The sampling was conducted at the household level and designed to be representative at both the national and prefecture levels. We use all publicly available waves of the CHFS, which include 2013, 2015, 2017, and 2019. The CHFS contains a question about the individuals' investment risk preferences, which the CHFS translates as "What is your choice among combinations of risk and return?". This variable, "*norisk*", is constructed through a response on a five-point scale ranging from 1 (high risk, high return) to 5 (unwilling to take any risk).

Next, we provide more details about estimating Eq. (6) in the following text, which wasn't covered extensively in the main content. We pursue two strategies to assess whether the correlation between clan strength and an individual's risk-taking is causal. First, we include all potential confounding factors in our specifications. The vector $Control'_{r,t}$ includes age, age squared, a gender indicator variable, and income. The vector $Control'_{k,t}$ consists of two variables, regional average income and per capita GDP, which might strongly correlate with individuals' income and subsequently affect risk preferences. The vector $Control'_k$ is designed to capture the effects of the prefecture's historical and geographical variables, which might influence the effect of clan strength on an individual's risk-taking, such as *Distance to coast, Slope, Terrain ruggedness, Distance to the Nearest Navigable River in History, Rice suitability, Societal organizations strength, Historical commercial center, Distance to the historical commercial centers, Prefecture population in 1920, Historical capitals, Huadong, Protestant Christianity*, and *Treaty ports.* ϱ_t is the year fixed effects. Our second identification strategy is to take the instrumental variable (IV) regression approach, which can help address the remaining omitted variables bias in our previous fixed effects model. In keeping with the previous text, we use the prefecture's shortest distance to the Neo-Confucian (Zhu Xi and Lu Jiuyuan) Academy in the twelfth century and the number of clans that migrated from the north to the south during the Jianyan period of the Song Dynasty (1127–1130) as instruments for the clan strength.

Data availability

Data will be made available on request.

References

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