

Familiar Strangers: Overseas Chinese, Lineage Connection and Foreign Investments in China

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Abstract

This paper studies the importance of international lineage network in facilitating the entry of foreign firms in developing countries where immature market environment deters foreign investments. We build a unique dataset on the universe of foreign firms in China that are controlled by Huaren (overseas Chinese) whose surnames are used to infer their lineage group. To identify the causal effects of lineage connection, we implement a Triple Difference-in-Difference (DID) design exploiting variations from both the staggered timings of opening shocks during the Reform Era (1981-1996) and differential surname distributions across prefectures, which allows us to control for unobserved factors at various levels. We find that, following the prefecture-level opening shocks, lineage connection facilitates the entry of Huaren foreign firms, through reducing information frictions and strengthening contract enforcement. Such effects are not likely to be driven by selective entry of more able Huaren entrepreneurs, and are robust to various robustness checks. We also find that the lineage-driven FDI during early development stages functions as industrial seeds and led to persistently more foreign investments in the long run.

Key Words: International Migration, Lineage Network, Foreign Direct Investment, China

JEL Codes: F22, F23, L14

1 Introduction

Despite the broad positive spillovers associated with foreign direct investments (FDIs) (Harrison and Rodríguez-Clare, 2010), developing countries often face difficulties in competing for foreign capital from global markets. According to the statistics from OECD, usually more than 70% of annual world FDI flow to OCED countries rather than the vast developing world¹. For example, the United States has been the most popular FDI destination for the last several decades. The immature market environment in developing countries, such as information frictions and incomplete institution building, is often thought to account for these differences. These innate weaknesses prohibit a developing country's from utilizing constructive forces from global markets, let alone kicking start the virtuous cycle and pulling itself out of the poverty trap.

The case of China is, however, exceptional in this regard. Ever since China's dramatic Reform and Opening-Up in 1978, it has quickly ascended from a closed state to one of the hubs for attracting multinationals and foreign firms, even before its formal accession to WTO in 2002. This fact challenges the conventional wisdom. Many anecdotes attribute this achievement to overseas Chinese or Huaren², who though as emigrants are believed to have strong lineage connection with their ancestral hometowns³. They pioneered in an immature Chinese market where policies and institutions were uncertain and insecure, used informal networks to overcome entry barriers, as well as planted the seed investment for later industrial growth of China (Vogel, 1990). Yet no study so far, to the best of our knowledge, has ever systematically documented the importance of Huaren investments,

¹<https://data.oecd.org/fdi/fdi-flows.htm>

²Huaren is the Mandarin pronunciation for the Chinese word “华人” referring to overseas Chinese. Throughout this paper, Huaren is defined as ethnic Chinese that hold citizenship of foreign countries or Hongkong, Macau, and Taiwan. Huaren and overseas Chinese are interchangeably used thereafter.

³In China, lineage refers to the group of descendants of one common patrilineal ancestor across multiple generations who share the same surname. For thousands of years in China, lineages have provided local public goods and promoted reciprocal cooperation within the lineage group, as an informal institution that is parallel to the formal institution such as state (Greif and Tabellini, 2017). Traditional activities including compiling genealogy books and worshiping ancestors at lineage temple during family reunions last even to date (Clark, 2015). Many accounts suggest that the same practices are still honored by overseas Chinese even if they emigrated and settled down in a foreign country (Kuhn, 2008).

not to mention empirically examined the causal relationship between Huaren's lineage connection and foreign investments in China.

We contribute to a better understanding of the role played by Huaren in facilitating foreign investments into China, during a period even before China's formal accession to WTO, usually referred to as the Reform Era (1981-1996). We choose the Reform Era as our research period because the market environment was largely under-developed, and this period witnessed Huaren investment as the dominant form of all foreign investments. Focusing on the Reform Era enables us to fully uncover the effects of lineage connection on the entry of foreign firms, and to explore the underlying mechanisms. Furthermore, while there might be concerns that foreign investments can be ephemeral, and reliance on use of informal institution could potentially crowd out local development, we provide evidence that these lineage-driven Huaren investments are actually persistent and conducive to the local development in the long run.

The analysis proceeds in several steps. In the first step, we introduce the new dataset that we assemble for this research. We start with firm registration data provided by the State Administration of Industry and Commerce of China (SAIC) on the entry and exit information for the universe of firms ever registered in China. Then we screen out all the foreign firms according to the official ownership classification assigned by the SAIC. We next determine from the surname and the ID of the foreign firm's legal representative whether a foreign firm is controlled by Huaren. The above procedure leads to our final sample of Huaren foreign firms. Then we can use the observed surnames of the Huaren legal representatives and link them to the geographic distributions of surnames constructed from population census to measure each Huaren foreign firm's lineage connection with different prefectures of China.

Second, we describe and implement our main empirical design to identify the effect of lineage connection. As is obvious, unobserved factors at surname level, prefecture level or even surname-prefecture level may simultaneously affect lineage connection and the

entry of connected Huaren foreign firms, creating a spurious correlation. For example, in southeastern China, where most Huaren originated from, has natural advantages for attracting foreign firms because of their proximity to the sea and desirable place-based policies such as *Special Economic Zones* (SEZ thereafter) (Wang, 2013). Moreover, entrepreneurial culture and tacit knowledge for conducting international business can be passed from generation to generation within certain lineage groups. To overcome these concerns, we adopt a Triple DID strategy that exploits variations from both China's staggered opening to foreign capital and predetermined surname distributions across prefectures. With this framework, we are able to control for fixed effects at surname-prefecture, surname-year, and prefecture-year level to guard us against a wide range of confounding factors and arrive at causal estimates of the effects of lineage connection.

We find large positive effects of lineage connection following local opening shocks on the entry of Huaren foreign firms at surname-prefecture-cohort level, measured by the following variables: the number of entrants, the survival-adjusted number of entrants and the number of survived firms in 2014. We perform a formal event study to show that our empirical design satisfies the common trend assumption. Besides, our findings remain robust to various checks such as examining the extensive margin of firm entry, using alternative lineage connection measures, clustering standard errors at a different level, excluding FDI-intensive prefectures or emigration-intensive provinces. We also conduct a permutation test by reshuffling the lineage connection measures within and across prefectures, and a placebo test using China's WTO accession (the formalization of institution) as the opening shock. As expected, we find no effects of lineage connection in both cases.

However, if Huaren entrepreneurs with higher latent ability can better take advantage of their inherent lineage connections, our results might suffer from positive selection bias. To mitigate this concern, we check if lineage connection contributes to the survival ratio and average survived registered capital in 2014 of Huaren entrants conditional on their entry. These two outcomes are believed to indicate long-term firm growth and are af-

affected by the latent entrepreneurial ability of Huaren entrepreneurs. We do not find any significant effect of lineage connection on these two outcomes, therefore we conclude that the selection on entrepreneurial ability are unlikely to bias our results. The results also suggest that lineage connections are more salient on reducing entry barriers, rather than firm's later growth.

The third step sheds light on the mechanisms through which lineage connection helps overcome the entry barriers for Huaren foreign firms. We find that the effects of lineage connection are stronger in prefectures with higher social fragmentation or better telecommunication infrastructure. We also find that Huaren investors with higher lineage connection are more likely to start a business as an imitator of existing industries, a headquarter firm (relative to a branch firm) and in labor-intensive and supplier-intensive industries. These findings reveal the role of lineage connection as a type of social network in facilitating information access and strengthening contract enforcement (Rauch, 2001).

The final question is whether the lineage-driven FDI that came along with Huaren entrants during the early stage of China's opening-up has a persistent effect on present-day economic development. We implement a strategy similar to Sequeira, Nunn and Qian (2020) to isolate lineage-driven FDI across prefectures that is independent of various confounding factors. We find large long-term effects of these lineage-driven FDI on the presence of foreign firms by not only Huaren but also non-Huaren in terms of both counts and registered capital in 2014. This suggests that the benefits of introducing FDI as industrial seeds seem to outweigh its costs during the take-off stage of China and might account for policy makers' enthusiasm toward promoting inward FDI in world-wide developing countries.

Existing Literature. Our paper adds to a large literature on the role of social affinities in facilitating trade and investment flows across countries and regions pioneered by Rauch (2001). Following works have considered ethnic ties (Rauch and Trindade, 2002), bilateral trust (Guiso, Sapienza and Zingales, 2009), linguistic proximity (Melitz and Toubal,

2014), migrant network (Javorcik et al., 2011; Parsons and Vézina, 2018) and even Facebook relationships (Kuchler et al., 2020). We contribute to this literature by quantifying the causal effect of a new type of social affinity that functions between a location and a surname in China—the lineage connection which is sustained and carved into the second-nature of Chinese (Greif, 1993). The paper closest to ours is Burchardi, Chaney and Hassan (2019) and Ma (2018). Burchardi, Chaney and Hassan (2019) identifies the causal effect of ancestry compositions on the present-day FDI inflows into U.S. counties. Ma (2018) presents evidence on the effect of cultural similarity on attracting FDI, employing the geographical borders of Chinese linguistic dialect zones. Our paper, for the first time in this literature, studies surname-based lineage connection. Furthermore, we incorporate both short- and long-run effects and uncover the underlying mechanism, using a new research design.

This paper also complements the literature on the long term implications of international migration. Existing research primarily focus on examining the effect of immigration on the developed countries (see for example, Sequeira, Nunn and Qian (2020)). But research studying the effect of emigration on the origin (usually developing) countries are pretty scarce. Nanda and Khanna (2010) is one of the few exceptions using a surveyed sample of firms in a particular industry while we draw upon the universe of Huaren foreign firms in China. Overseas Chinese networks are believed to be vital to the development of China while empirical evidences are scant if not absent. We show that an unexpected benefit of emigration is to facilitate foreign investments through migrant networks that provide seed investments for long-term development of the home country. In addition, our usage of surnames to uncover the ancestral origins of Huaren investors advances a literature on the informational content of names (Abramitzky, Boustan and Eriksson, 2020; Bazzi, Fiszbein and Gerresilasse, 2020). Unlike precedents that mainly draw implications from given names, we extract the information of surname in the context of Chinese lineage groups.

A narrower literature related to ours has looked at the determinants and spillovers of inward FDI in China. China’s swift absorption of FDI following its opening-up challenges the conventional wisdom that the poor market environment in developing countries would deter foreign investments. Therefore, understanding the case of China has direct policy implications for the vast developing world and helps answer the inquiry of [Lucas \(1990\)](#): “Why doesn’t capital flow to developing countries?”. Prior studies have primarily focus on common factors such as market access ([Amiti and Javorcik, 2008](#)), infrastructure and industrial policies ([Cheng and Kwan, 2000](#)) and institutional quality ([Du, Lu and Tao, 2008](#)). However, a notable feature of China’s FDI policies is to make use of the overseas Chinese business network ([Vogel, 1990](#)). Few studies have offered a quantitative description perhaps due to data limitation. We make progress in this strand of literature in three aspects. First, we paint a systematic picture of Huaren foreign firms across Chinese prefectures and document that a substantial portion of foreign firms in China founded since the 1980s are run by overseas Chinese. Moreover, we identify the causal effect of lineage connection on Huaren foreign firms and uncover the underlying mechanisms. Last, we provide evidence in support of the seeding effects of lineage-driven Huaren FDI on long-term presence of foreign firms in China. These findings establish the importance of Huaren in China’s development process and have profound policy implications for the other developing countries.

Finally, our research advances an emerging literature using firm registration data of China. Among many others, [Dai et al. \(2019\)](#) and [Bai et al. \(2020\)](#) explore the role of community networks and state power underlying the rapid growth of China’s private sector. While most existing studies pay attention to the private domestic firms, we focus on foreign firms, a nowadays relatively small but historically large part of the Chinese economy that this line of literature has not yet touched on.

The rest of the paper is organized as following. Section 2 introduces the historical background on overseas Chinese and China’s gradual opening-up. Section 3 describes our

data. Section 4 elaborates our identification strategy and presents the empirical findings. Section 5 then explores the underlying mechanisms which could account for our findings. Section 6 further estimates the long-run effects of early lineage-driven Huaren FDI on future foreign investments. Section 7 concludes.

2 Historical Background

Ever since its dramatic turn toward market economy in 1978, China has swiftly transformed from a completely closed state to a hub for foreign firms. After 1978, when Deng Xiaoping initiated the great Reform and Opening-up, China started to gradually open its regions to international trade and foreign investments (Branstetter and Lardy, 2006). Table 1 summarizes the staggered opening process during the Reform Era. In 1979, the *Law on Joint Ventures* was passed. It provided for the first time in thirty years a legal framework under which foreign firms were allowed to operate in mainland China. In the following year 1980, four SEZs including Shenzhen, Zhuhai, Shantou and Xiamen were established where foreign corporations enjoyed broad autonomy and preferential tax treatment. In 1984, additional 14 cities were granted the status of *Open Coastal City* for attracting FDI. Then Yingkou, Weihai and Hainan province were also added to the list of open regions in 1985, 1987 and 1988 respectively. Although the economic and political crisis in 1989 temporarily brought considerable uncertainties to China's transition, Deng's visit to the southern China in 1992 restored people's confidence in China's resolution to embrace market economy and globalization. At the same time, the visit also marked the start of China's comprehensive reform and national opening to foreign capital.

The impacts of the stepwise rolling out of opening policies are vividly illustrated by Figure 1, which plots the entry and survival of foreign companies in mainland China by entry cohort using firm registration data from SAIC database. We can see that the number (and the survival-adjusted number) of foreign entrants rose steadily from 1980 to 1991 along

Table 1: China’s Opening Process during the Reform Era

Year	Open Policy	Open Regions
1980	Special Economic Zone	Shenzhen, Zhuhai, Shantou, Xiamen
1984	Open Coastal City	Dalian, Qinhuangdao, Tianjin, Yantai, Qingdao, Lianyungang, Nantong, Shanghai, Ningbo, Wenzhou, Fuzhou, Guangzhou, Zhanjiang, Beihai
1985	Open Coastal City	Yingkou
1987	Open Coastal City	Weihai
1988	Special Economic Zone	Hainan Province
1990	Special Economic Zone	Shanghai Pudong District
1992	Deng Xiaoping’s South Tour	All other regions

Source: https://en.wikipedia.org/wiki/Chinese_economic_reform

with the opening of SEZs and *Open Coastal Cities*. And then in 1992, Deng Xiaoping’s southern tour resolved the uncertainties that once intimidated the foreign investors, and sparked the enthusiasm for entry into Chinese market. This is reflected in the dramatic spike in the number of foreign entrants in 1992 and 1993 as shown in Figure 1. Another historic event is China’s formal accession to WTO in the early 2000s, which has been widely documented and believed to finalize the pro-market institutions of China toward foreign capitals (Branstetter and Lardy, 2006). The re-surge of foreign entrants during 2000-2005 in Figure 1 echoes this major historical event in China’s great economic reform.

We noticed that the entry of foreign firms was already very active even before China joined WTO. By 1999, China had already become one of the most popular destinations for FDI flows, only second to the United States (Huang, 2003). This achievement is unusual as it challenges the conventional wisdom that the commonly observed barriers such as information frictions and poor institutional environment in developing countries would deter foreign investments. Moreover, the opening policies cannot fully explain this fact as those policies are commonly practiced by other developing countries who however often

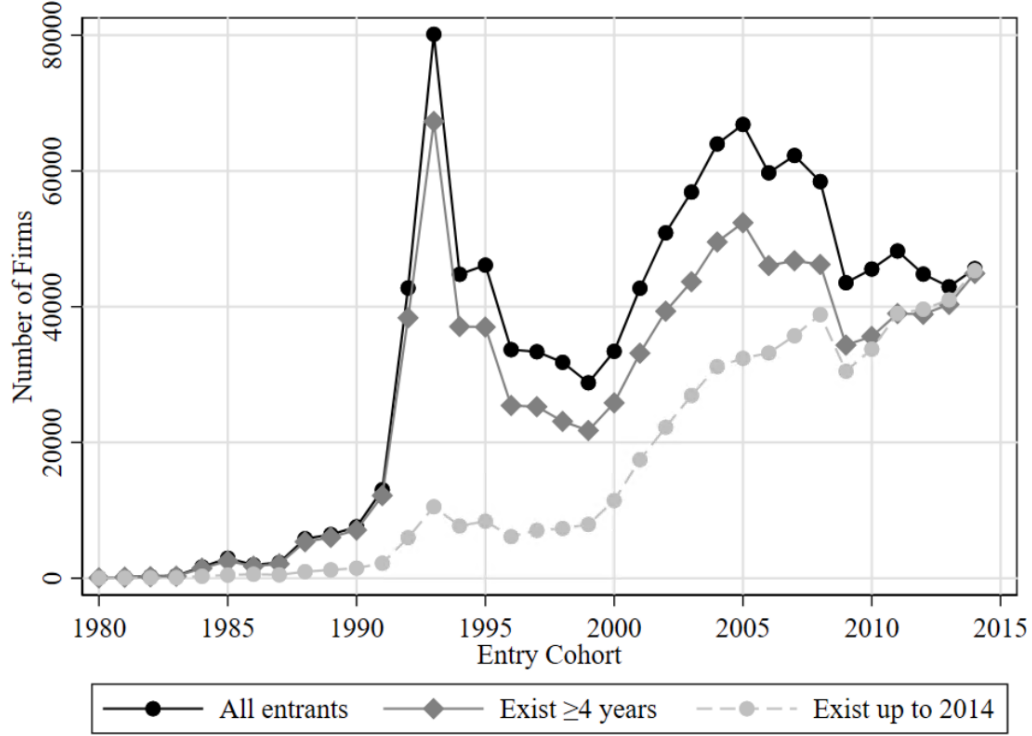


Figure 1: Entry and Survival of Foreign Firms by Entry Cohort

failed to attract foreign investments. Some other complementary factors must have been in play.

Peering into the early stage of China’s development before joining WTO, we claim that China’s widespread networks with overseas Chinese must have been critical for the entry of foreign firms. To provide a descriptive evidence in support of our proposition, Figure 2 decomposes foreign entrants into Huaren ones and Non-Huaren ones. From 1980 to 2014, the share of Huaren entrants remained higher than 60% but declined gradually from above 90% in 1980s to about 60% in 2010s. These two observations together reveal: first, the dominant role of Huaren investments among all foreign investments throughout China’s economic development process; and second, Huaren investment’s relative importance during the early periods of opening-up. In other words, lineage connection could be the the complementary factor we seek for to understand why open policies were effective in China even before the market environment matured.

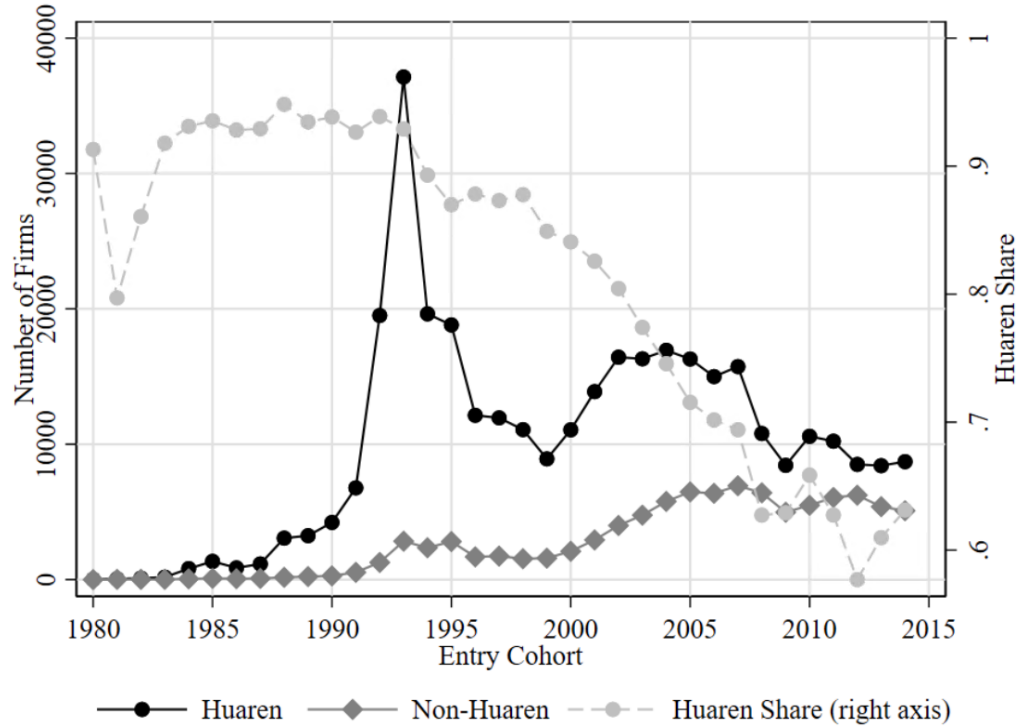


Figure 2: Decomposition of Foreign Entrants: Huaren versus Non-Huaren

China has a extremely long history of emigration which can be dated back to at least 1300s A.D. (Kuhn, 2008). According to the Global Migrant Origin Database, the stock of overseas Chinese has reached 5.8 million in 2007, making China the world’s 6th largest country in exporting migrants⁴. Among the vast number of overseas Chinese, many of them have become successful entrepreneurs in the host countries. According to the estimate by *The Economist* in 2019, more than three quarters of the wealth owned by the South East Asian billionaire are controlled by Huaren⁵. And despite 30 years’ seal-off since 1949 when China turned closed, the bond between overseas Chinese and their ancestral hometowns has never been truly cut off. The overseas Chinese, though physically abroad, are emotionally attached to their ancestral hometowns. Many anecdotal facts demonstrate that overseas Chinese remained socially in touch with their lineage group members, through sending mails and remittance to their hometowns (Tan, 2006). These

⁴www.sussex.ac.uk/Units/SCMR/drc/about/index.html

⁵“Chinese Diaspora Inc: High-Wire Act”, *The Economist*, May 30th, 2020

pro-social behaviors, as [Greif and Tabellini \(2017\)](#) illustrated, reflect some persistent and fundamental values that are rooted in the Chinese culture. For centuries, Chinese people from the same lineage group exchange information, smooth contract enforcement, and weather the crises by helping each other out.

Therefore, when China reopened its door in 1978 and strove to attract foreign investments, the pervasive networks with overseas Chinese across China became a kind of social “endowments”. Local governments in the opened regions realized the complementarity between the opening reforms and the local lineage connection with overseas Chinese. They hence enacted policies and coordinated through specialized organizations to encourage Huaren entrepreneurs to invest back in their ancestral hometowns in pursuit of capital, technological capacity and export channels ([Huang, 2003](#)). Having been isolated from the world market for three decades, China was at a huge disadvantage to engage in international trade. However, these transitional policies can mobilize the local lineage network which remains active even during China’s thirty years’ disconnection from the world market. With the help of the international ethnic ties, China was able to overcome common barriers that deter foreign investments in other under-developed countries and raise its share in international trade and FDI inflows substantially even before its accession to WTO. Furthermore, these pioneering foreign entrants, induced by lineage connection with their ancestral hometowns, are believed to have planted the seed investments for China’s later industrial growth and brought about a myriad of economic benefits in the long run.

3 Data Description

This section describes the data used for empirical examinations. First, we introduce the data sources. Second, we lay out the procedures and discuss the methodology to identify foreign firms that are controlled by Huaren from firm registration data. Third, we propose our measure of lineage connection. Last but not least, we combine datasets aggregated

from multiple sources to obtain our working sample and provide summary statistics.

3.1 Data Sources

The main micro dataset we use is firm registration data maintained by SAIC and tracks the universe of firms ever registered in China up until 2014. For each firm, we observe its entry date, exit date (left blank if the firm still survives in 2014), latest-reported registered capital by the end of 2014, 4-digit industry, county-level location, ownership and a complete list of immediate shareholders and registered personnel including usually board members and senior executives.

The second micro dataset we use is the 2005 population Census which reports individual surnames of a 0.2% representative sample, from which we recover the geographic distributions of surnames across prefectures. We then leverage the geographic variation of surnames to construct our measure of lineage connection for each surname-prefecture pair and social fragmentation index for each prefecture.

Outcome variables on economic development at prefecture level are retrieved from CS-MAR database and various China City Statistical Yearbooks. These variables include GDP per capita, number of registered patents, average wage, export and import. We get the capacity of telephone exchange at province-year level from China Compendium of Statistics (2009). Sector-level capital intensity (capital to labor ratio) is constructed based on manufacturing samples in the 2004 Industrial Census while the contract intensity measure we use is calculated based on 2002 Input-Output Table of China following the methodology of [Levchenko \(2007\)](#).

3.2 Identifying Huaren Firm

We aim to understand the role played by surname-based lineage connection in facilitating the entry of foreign firms. To realize this goal, our focus is on foreign firms controlled by

Huaren whose surnames are used to infer their lineage groups. In this section, we describe how we take steps to get the universe of Huaren firms.

By our definition, Huaren firms have to be foreign firms in the first place. To construct the universe of all foreign firms in China from firm registration database, we need to have a consistent definition of foreign firms. Two approaches coexist in literature to define foreign firms. One approach uses the administrative ownership code of firms assigned by government agencies while the other approach uses shareholder information. In this paper we opt for using the administrative ownership code. It is often the case that a firm’s immediate shareholder structure does not coincide with its structure of ultimate control. For example, investors can exert control over a firm through holding shells (Bai et al., 2020). Then if we use the shareholder information to determine the foreign firm status, we have to decide which shareholders from those investors have direct or indirect control over the firm. The relationship between controlling rights over the firm and the shareholder structure of the firm is not the focus of this paper. We therefore wish to avoid this irrelevant complexity and take the conservative approach by using administrative ownership code readily available in the dataset and independent with our research design. One might be concerned that ownership of a firm may change as a result of privatization that took place during the late 1990s. However, privatization in China mostly took the form of Management Buy-Outs (MBO) rather than being sold to foreigners. Moreover, any change of ownership will trigger a change in firm identifier as well, creating a new legal entity (Chen et al., 2020). Thus it is unlikely that the potential change of ownership type would affect our identification of foreign firms. Therefore we conclude it is better to select foreign firms according to the administrative ownership code that the SAIC assigns to each firm. This process gives us a comprehensive database on the universe of foreign firms in China.

With the universe of foreign firms in China at hand, we proceed to identify Huaren firm. To achieve this goal, the most natural choice is to make use of the shareholder information

and define a Huaren firm as a firm with a Huaren controlling shareholder. Unluckily, most of the shareholders of foreign firms are unsurprisingly foreign entities registered outside China and we can not trace the shareholders of those foreign entities (Bai et al., 2020). Hence we turn to use the information of legal representative of the firm. According to the corporate law in China, legal representative takes the major legal responsibility of the firm as legal entity. Then legal representative is highly likely to be the one with controlling right over the firm (Dai et al., 2019). The key advantage of using SAIC database is that we are able to observe names of each firm’s registered personnel and their ID types reported to the SAIC. We develop an algorithm as described in Appendix A to extract the surnames of each foreign firm’s registered personnel and identify whether they are ethnic Chinese. If we observe one personnel as ethnic Chinese and the personnel also holds a non-mainland Chinese ID⁶, he or she is defined as a ”Huaren”, i.e. overseas Chinese. And Huaren firms are then identified as foreign firms whose legal representatives are Huaren⁷

Our sample for empirical analysis consists of all foreign firms that are represented by an overseas Chinese. There are several caveats to make. First, our sample would exclude all the foreign firms that are represented by individuals from mainland China. Such firms may be related to what Huang (2003) calls “roundtrip FDI”. This type of FDI refers to capital that a domestic firm firstly exports to overseas places (majorly Hongkong) and then imports back into mainland China as a new legal entity. Since the founding of such foreign firms was most likely to be motivated by the tax breaks and preferential treatment granted

⁶Non-mainland ID can be either passport of a foreign country or travel permit for Hongkong, Macau, Taiwan (HMT) residents

⁷Having worked through the list of the personnel and shareholders of foreign firms, we arrive at several findings to support our choice of legal representative among all the registered personnel to represent the firm. Firstly, we show in Appendix B, that 97% of all foreign firms have unique legal representative within the firm while they might have none or multiple directors, CEOs or top-ranked executives. Secondly, we do not observe the surnames of most shareholders of foreign firms as 92% of immediate shareholders hold equity stakes of foreign firms through legal persons rather than natural persons. Even a backing-out through ownership chain to identify each foreign firm’s ultimate owners who will natural persons will not work because the SAIC does not have information on the owners of foreign legal entities that are registered abroad (Bai et al., 2020). Thirdly, Appendix B reports that the chance a legal representative overlaps with a top-ranked executive within a foreign firm is 93%. This means that a legal representative is highly likely to be the person in charge of the foreign firm.

toward foreign firms during the Reform Era, taking this group of firms into account would enormously exaggerate the presence of Huaren firms in China and potentially bias our estimates in empirical analysis⁸. Moreover, our main dataset also excludes foreign firms represented by non-Huaren since we want to keep our sample as comparable as possible⁹. Lastly, since the legal representative is not necessarily the major shareholder of the firm, it is possible that a company classified as Huaren firm is actually not owned by Huaren. However, the choice of appointing Huaren legal representative still reveals the motive of the foreign firm to take advantage of lineage connection.

3.3 Measuring Lineage Connection.

For each Huaren firm, we also identify the legal representative’s surname, which can be used to infer the lineage connection endowed with the firm. Then we can leverage the geographic distributions of surnames from 2005 population Census to measure the strength of lineage connections between Huaren firms of different surnames and different locations. Specifically, we define the lineage connection m_{sp} between a surname s and prefecture p ¹⁰ as following:

$$m_{sp} = \frac{E_{sp}}{\sum_p E_{sp}} \quad (1)$$

where E_{sp} denotes the size of population with surname s in prefecture p . To be noticed that our measure of lineage connection is size-free in the sense that populous surnames will not

⁸We cannot, however, rule out the possibility that foreign citizens delegate the firm control rights to citizens in mainland China. But delegating a firm to a local person does not undermine the value of lineage connection. Moreover, we show that our main findings are robust to including foreign firms that are legally represented by citizens in mainland China. See Section 4.4.

⁹Including non-Huaren foreign firms would mechanically increase the size of the control group with no lineage connection. Yet, our findings are also robust to including non-Huaren foreign firms.

¹⁰There are three reasons that we choose prefecture as the geographic unit for our empirical analysis. First, measurement noises in lineage connection for rare surnames are large at small counties. Second, administrative boundaries of counties may change over time in China, while those of prefectures remain fairly stable. Third, we have more variations in our measure of lineage connection across prefectures than across provinces.

be associated with universally higher connection with all prefectures¹¹. So we explicitly rule out the impact of surname size in determining surname’s lineage connections with prefectures across all our specifications.

The novelty of our approach lies in the usage of surnames instead of migration patterns to proxy lineage connections. The reasons are twofold. First, while there are relatively rich data on immigration into developed countries such as US (Burchardi, Chaney and Hassan, 2019; Sequeira, Nunn and Qian, 2020), so far the data on emigration, especially at sub-national level from developing countries like China, are extremely rare to our knowledge. Our surname-based measure makes best use of the fact that lineage groups in China are usually operating within surnames (Clark, 2015). Secondly, the surname-based measure we construct is predetermined and time-invariant while emigration flows if available are endogenously determined in equilibrium over time. Adopting our measure therefore significantly mitigates potential endogeneity concerns.

Figure 3 visualizes the geographic distributions of the 20 most populous surnames in China. We draw the distributions separately for emigration-intensive provinces (including Guangdong, Fujian and Zhejiang), other provinces and all legal representatives of Huaren firms registered from 1980 to 2014. Informative disparities and similarities emerge from comparison among the three distributions. Overall, the surname distribution over legal representatives of Huaren firms are closer to that over the population of emigration-intensive provinces than the population of other provinces. For example, “陈” (“Chen”, “Chan”, “Tan”)¹² is the most common surname both among Huaren legal repre-

¹¹If we instead use E_{sp} as measure of lineage connection, we expect spurious correlation between lineage connection and the entry of Huaren firm even without the functioning of lineage connection, because populous surnames like “陈” (“Chen”, “Chan”, “Tan”) can be dominant both domestically and abroad. So that Huaren firms of populous surnames could mechanically have more presence in everywhere. Moreover, Appendix C indicates that our lineage connection is actually mildly negatively correlated with prefecture population at surname-prefecture level

¹²Due to Chinese-English translation, there could be more than one English spellings for the same Chinese surname. Figure 6 illustrates the complexity of spelling-character mapping between the two languages, using “陈”—the most common Huaren surnames written in Chinese characters, and “Tan”—the most common English spelling for “陈”, as an example. In this study, we aggregate the Huaren surnames to the Chinese character level with some probabilistic assignments in case when we cannot uniquely identify the Chinese

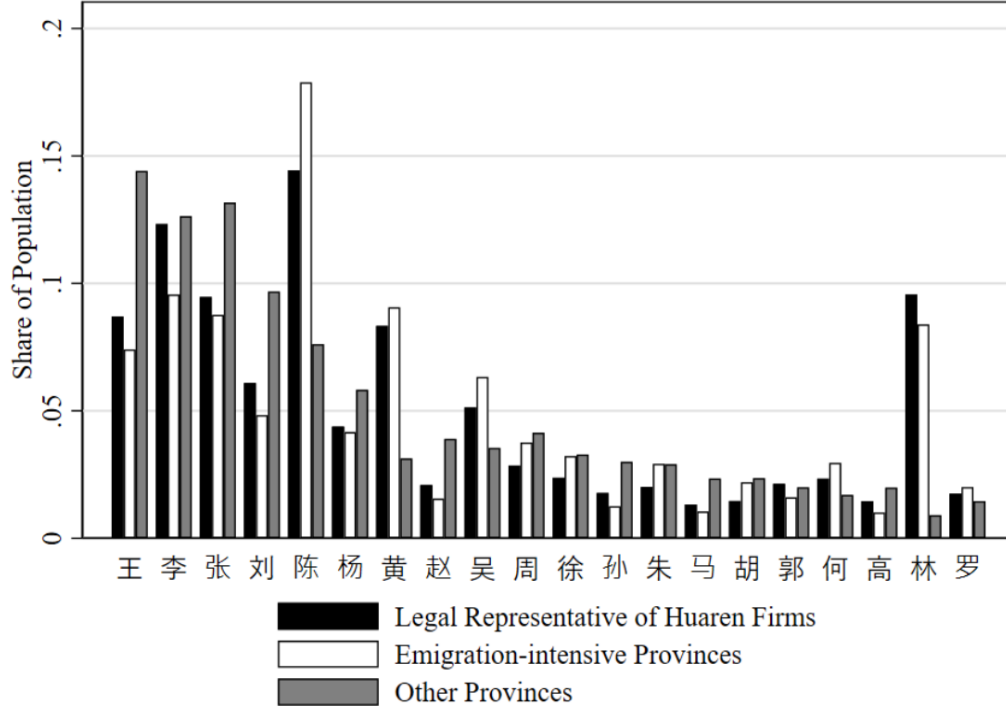


Figure 3: Surname Distributions in Different Population

sentatives and in emigration-intensive provinces but ranks only fifth in the total population and has a modest share in the population of other provinces. This simple comparison suggests that the variations of surname distribution across regions indeed reflect historical emigration and can be used as predetermined variation for identifying the effects of lineage connection.

In our empirical analysis, we treat our lineage connection measure as time-invariant and predetermined, assuming that the geographic distributions of surnames are relatively stable over time¹³. While this assumption may seem arguable at first glance, we find strong support for it from both the economics and history literature. [Clark \(2015\)](#) documents that geographic distribution of certain elite surnames is rather stable throughout history

character from the English spelling. See Appendix A for details.

¹³Internal migration might threaten the stability of surname distributions. From 1949 to 1978, however, there is almost no internal migration due to stringent Hukou restriction. Even after China gradually loosened its grip on internal migration since 1984, it only formalized free mobility of internal migrants until early 2000s ([Tombe and Zhu, 2019](#)).

even after warfare and revolutions. [Bai \(2020\)](#) compares the distribution of surnames across prefectures using 2005 population Census with using Harvard’s China Biographical Database (CBDB) and confirms that the two distributions are highly correlated.

3.4 Summary Statistics

We restrict our attention to the period from 1981 to 1996, known as the Reform Era when China was constantly adopting gradual reforms to transition from planned economy to market economy. This Reform Era also saw the Huaren firms represent a dominant share of all foreign firms (see [Figure 2](#)). Utilizing the entry and exit information in the SAIC, we construct three measures of Huaren firm entry at surname-prefecture-year level: number of new entrants, survival-adjusted number of entrants (defined as those lasting for more than 4 years) and the long-term survived number of entrants at the end of 2014. We exclude four provinces including Xinjiang, Tibet, Ningxia and Inner Mongolia where majority of population are ethnic minority since surname-based lineage mostly operate among ethnic Han Chinese. We further exclude four mega cities in China including Beijing, Shanghai, Guangzhou and Shenzhen because their outlying economic performance massively attract internal migrants and could potential confound our results by driving up simultaneously our lineage connection measure and foreign firm entry and survival.

[Table 2](#) presents the summary statistics for all the variables used for empirical analyses. Panel A shows that the variation of the presence of Huaren firms is mostly accounted by the extensive margin. Only 5.2% of surname-prefecture-year triples have Huaren firm entry while the magnitude is even smaller (0.9%) for Huaren firm survival rate in 2014. Panel B suggests our lineage connection measure varies widely with a mean of 0.005 and a standard deviation of 0.011. In Panel E, we can also find that Huaren entrants tend to be headquarter firms rather than branch firms, labor-intensive rather than capital-intensive and followers rather than leaders in new industries¹⁴. These characteristics are largely in

¹⁴A pioneer firm is defined as a first-ever foreign entrant of a 2-digit industry in a prefecture. A firm is

line with the anecdotal descriptions on Huaren firms (Huang, 2003). Besides, only 57.8% of Huaren firms during this period originated from HMT, suggesting that HMT entrants may fail to serve as a precise proxy for Huaren entrants as in the literature¹⁵.

4 Lineage Connection and the Huaren Firm Entry

4.1 Identification Strategy

To identify the causal effect of lineage connection on the entry of Huaren foreign firms, we employ the following baseline specification:

$$Y_{spc} = \eta_{sp} + \eta_{sc} + \eta_{pc} + \beta \times Open_{pc} \times m_{sp} + \lambda \times S_{spc} + \epsilon_{spc} \quad (2)$$

where s denotes surname, p denotes prefecture, and c denotes entry cohort. Y_{spc} represents the outcome variables. We are primarily interested in how lineage connection affects the number of Huaren foreign entrants. Nevertheless, entrants were heterogeneous in their latent quality and the welfare implication of firm entry might be undermined if firms of low quality selectively entered. Therefore, we supplement another two measures to answer this concern: the survival-adjusted number of entrants (defined as number of entrants that lasted for more than 4 years following the convention by Kerr and Nanda (2009)) and the number of survived firms by 2014. The usage of the latter measure makes sure that our results are not driven by cherry-picking the duration threshold.

Under all specifications, we control for surname-prefecture fixed effects η_{sp} , surname-cohort fixed effects η_{sc} and prefecture-cohort fixed effects η_{pc} . The broad set of fixed effects

labor intensive if its capital/labor ratio is below the median level across all 2-digit manufacturing industries in 2004 Industrial Census. A firm is supplier-intensive if the contract intensity measure, proposed by Levchenko (2007) and calculated using Chinese Input-Output Table in 2002, is above the median level across all 2-digit industries.

¹⁵Appendix E discusses the strengths of our dataset relative to those used by prior literature and cross-validates our dataset with other official data sources.

Table 2: Summary Statistics

	N	Mean	Std.Dev.	Min	Max
	(1)	(2)	(3)	(4)	(5)
Panel A: Surname-Prefecture-Cohort					
At Least One Entrant	1,345,024	0.021	0.142	0	1
At Least One Survived Firm	1,345,024	0.005	0.03	0	1
Number of Entrants	1,345,024	0.060	1.437	0	1,006
Survival-adjusted Number of Entrants	1,345,024	0.052	1.234	0	795
Number of Survived Firms in 2014	1,345,024	0.009	0.181	0	32
Survived Registered Capital ($10^4 CNY$)	1,345,024	27.017	940.778	0	161,000
Survival Ratio Conditional on Entry	27,846	0.168	0.338	0	1
Average Registered capital in 2014 Conditional On Entry	27,846	806.588	3967.006	0	98643
Panel B: Surname-Prefecture					
Lineage Connection (2005 Census)	48,179	0.005	0.011	0	0.450
Lineage Connection (SAIC Subsample)	57,802	0.005	0.012	0	0.452
Panel C: Province-Year					
Telephone Exchange Capacity (10^4)	270	61.527	107.107	1.030	1007.100
Panel D: Prefecture					
Social Fragmentation (2005 Census)	314	0.980	0.032	0.174	1
GDP per capita (1996; $10^4 CNY$)	261	0.717	0.775	0.074	9.190
GDP per capita (2014; $10^4 CNY$)	282	4.935	2.877	1.017	20.015
Avg. Wage (2014; $10^4 CNY$)	273	4.823	0.989	2.721	10.340
Non-Huaren FDI (2014; $10^4 CNY$)	277	25.307	82.916	0	898.088
Number of Patents (2014; 10^4)	282	0.403	0.880	0.002	7.247
Import (2017; $10^4 CNY$)	280	80.967	333.801	0	3160.789
Export (2017; $10^4 CNY$)	280	85.991	279.868	0.001	2443.579
Panel E: Huaren Firm					
Pioneer Firm	157,875	0.155	0.362	0	1
Branch Firm	157,875	0.131	0.337	0	1
HMT Firm	157,875	0.578	0.494	0	1
Labor Intensive	92,951	0.685	0.465	0	1
Supplier-Intensive	138,925	0.684	0.465	0	1

Note: In panel B, the measures of lineage connection constructed SAIC is calculated based on the surnames of registered personnel working in domestic firms established prior to 1992. The data source of panel C is *China Compendium of Statistics* (2009). Variables in panel D are retrieved from official documents or CSMAR database except for social fragmentation which we construct with 2005 census following [Padró i Miquel, Qian and Yao \(2012\)](#) and non-Huaren FDI which we sum up registered capital in 2014 of non-Huaren foreign firm using SAIC database.

help us guard against a wide range of confounding factors including geographic advantages, place-based policies and surname-specific expertise. It is noticeable that since all possible cohort fixed effects have been controlled, all differential probabilities to exit by entry cohorts have been accounted for. We also include S_{spc} indicating the number of incumbent firms one year prior to the entry cohort in order to capture potential agglomeration spillovers from incumbent firms.

The main independent variable is the interaction term $Open_{pc} \times m_{sp}$. $Open_{pc}$ is a time-variant measure of prefecture's opening status to foreign capital that varies across regions and time. $Open_{pc}$ equals 1 if the prefecture p had been open since year c , and it equals 0 otherwise¹⁶. m_{sp} is the measure of lineage connection between surname s and prefecture p and is defined by Equation 1. We mainly use the 2005 population census of China to construct this measure, but we also show that our main results are robust even if we use alternative data source to construct the measure¹⁷. The error term ϵ_{spc} captures all the idiosyncratic disturbances. Standard errors are clustered at surname-prefecture level.

The coefficient of interest is β which captures the heterogeneous effects of lineage connection across surnames following the staggered opening of Chinese prefectures to foreign capital during the Reform Era. Our empirical design is therefore essentially a staggered Triple DID strategy with differential treatment intensity across surnames. We are, in effect, performing the following three-fold comparisons: (1) surnames within prefecture before and after the opening of prefecture; (2) differential trends across opened and closed prefectures; (3) double differences across surnames with different strengths of lineage connections, to get our Triple DID estimates. Therefore the identification assumption for the causal interpretation of our estimates should be the following: there exists no differential pre-trends in the number of entrants at surname-prefecture-cohort level with different lineage connections before the opening shocks. We argue that this identification assump-

¹⁶See Table 1 for a full depiction of the stepwise opening of Chinese prefectures to foreign capital during the Reform Era.

¹⁷See Section 4.4.

tion is highly likely to hold for three reasons. First, our measure of lineage connection has been shown to be predetermined (Bai, 2020). Secondly, the timing of the opening of prefectures during the Reform Era comes largely as shocks since foreign capital inflows were almost prohibited before then. Third, a vast set of fixed effects have been controlled to eliminate various factors that could contaminate our causal estimates.

To provide further evidence to corroborate the validity of our identification strategy, we employ an event-study framework as following:

$$Y_{spc} = \eta_{sp} + \eta_{sc} + \eta_{pc} + \sum_{\tau=-4}^4 \beta^{\tau} \times Open_{pc}^{\tau} \times m_{sp} + \lambda \times S_{spc} + \epsilon_{spc} \quad (3)$$

where $\tau = c - c_p$ references the time window relative to the opening shock of the prefecture p . By employing this specification, we can examine both the dynamic effects of lineage connection four years before and after the local opening shocks. $Open_{pc}^{\tau}$ equals 1 if year c is τ years after the opening of prefecture p and 0 otherwise. The omitted benchmark group is $\tau = -1$. Hence all estimates of β^{τ} should be interpreted as relative to one year prior to the opening shock. For our identification assumption not to be violated, we expect β^{τ} for all $\tau < 0$ to be statistically insignificant.

To shed light on the underlying mechanisms, we follow Kerr and Nanda (2009) and further disaggregate Huaren entrant counts at prefecture-surname-cohort-type level where type indicates a fourth dimension. This helps tease out underlying channels through which lineage connection works on foreign firm entry from differential responses to the lineage connection along the additional dimension. In analogy to Equation 2, we estimate

$$Y_{spc} = \eta_{sp} + \eta_{sc} + \eta_{pc} + \eta_x + \beta_1 \times Open_{pc} \times m_{sp} + \beta_2 \times Open_{pc} \times m_{sp} \times type_x + \lambda \times S_{spc} + \epsilon_{spc} \quad (4)$$

where $type_x$ is a dummy variable for firm type x . The sign of the estimate of β_2 determines

whether the characteristic of type x entrants complements or substitutes the effects of lineage connection.

4.2 Baseline Results

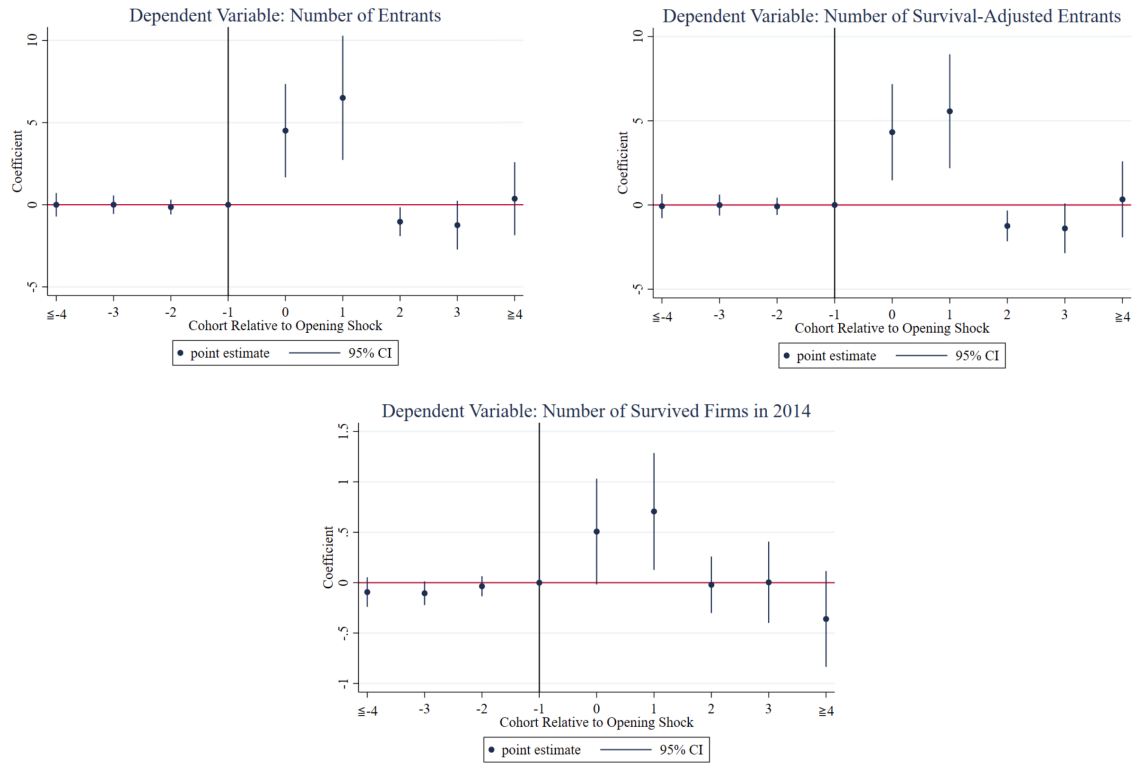
We first estimate Equation 2 to evaluate how lineage connection affects the entry of Huaren firms following the prefecture-level opening shocks. Results are presented in Table 3. Across all columns, we control for surname-prefecture, surname-cohort and prefecture-cohort fixed effects as well as the number of incumbent firms at surname-prefecture-cohort level. In column (1), result suggests that a surname with 0.1 higher lineage connection m_{sp} can get induce 0.1767 more Huaren entrants in one year than other surnames following the opening shocks of prefecture p . And this effect is economically large since 0.1767 is approximately three times of the mean number of Huaren entrants across all surname-prefecture-cohort triplets. Column (2) confirms that not all entrants are short-lived by estimating a slightly smaller yet still significant effect of lineage connection with number of survival-adjusted entrants as outcome. Even if we use survived number of entrants in 2014 as outcome we still arrive at significant estimates in column (3), though the magnitude becomes much smaller. Columns (1) to (3) altogether suggest that lineage connection facilitates the entry of Huaren foreign firms even if we consider the heterogeneous quality of the entrants by survival.

As a crucial test for the identification assumption, we also estimate an event study specification in Equation 3 and show in Figure 4 that the entry and survival of Huaren foreign firms across surnames and prefectures had similar trends prior to the prefecture-level opening shocks. This results supports our identification strategy and causal interpretation of the results. The time-varying effects shown in Figure 4 also suggest that lineage connection facilitates the entry of Huaren foreign firms only in the short run.

Table 3: Lineage Connection and Entry and Survival of Huaren Foreign Firms

	Number of Entrants	Survival-adjusted Number of Entrants	Number of Survived Firms in 2014
	(1)	(2)	(3)
Mean of Dep. Var.	0.060	0.052	0.009
Open \times Lineage Connection	1.767*** (0.574)	1.517*** (0.527)	0.218* (0.399)
Adj. R^2	0.570	0.555	0.399
N	1,344,421	1,344,421	1,344,421
Number of Incumbent Firms	Y	Y	Y
Surname-Prefecture FE	Y	Y	Y
Surname-Cohort FE	Y	Y	Y
Prefecture-Cohort FE	Y	Y	Y

Note: ***, **, * denote significance level at 1%, 5%, and 10% respectively. Standard errors are clustered at surname-prefecture level. Survival-adjusted Number of Entrants is the number of entrants that survive for more than 4 years (included).

**Figure 4:** Event Study

4.3 Selection on Firm Quality

If only firms of high quality can take advantage of the lineage connection, the sorting of more capable Huaren entrepreneurs into surname-prefecture pair with high lineage connection could possibly be conducive to both entry and survival, leading to an overestimation of the effects of lineage connection. To rule out this plausible explanation, Table 4 further looks at the effect of lineage connection on survival ratio and average registered capital of Huaren entrants in 2014 conditional on entry, which are used to proxy the inherent quality reflected in later survival and firm growth. Although we find effects of lineage connection on the number of survived firms in Table 3, we did not discover any benefit of lineage connection on survival probability and registered capital in 2014 of Huaren firms conditional on their entry.

Table 4: Lineage Connection and Entry and Survival of Huaren Foreign Firms

	Survival Ratio in 2014 Conditional on Entry	Average Registered Capital in 2014 Conditional on Entry
	(1)	(2)
Open \times Lineage Connection	-0.333 (0.825)	-7040.914 (7984.062)
Adj. R^2	0.364	0.054
N	20,633	20633
Number of Incumbent Firms	Y	Y
Surname-Prefecture FE	Y	Y
Surname-Cohort FE	Y	Y
Prefecture-Cohort FE	Y	Y

Note: ***, **, * denote significance level at 1%, 5%, and 10% respectively. Standard errors are clustered at surname-prefecture level.

This result not only mitigates the concern of overestimating the effect of lineage connection on the entry of foreign firms but also, together with the dynamic effects identified in Figure 4, suggests that the mechanism through which lineage takes effect is mainly by lowering entry barriers rather than contributing to survival or long-term growth for firms. At this stage, we interpret the role played by lineage connection as lowering entry barriers.

ers in the short run regardless of Huaren firm’s latent quality¹⁸. Selection is not a major concern for our identification strategy.

4.4 Robustness Checks

There still remains many concerns on our findings. In this section, We would like, by taking full advantage of our unique dataset, to test our findings to a wealth of robustness checks.

Alternative Dependent Variables. We notice that the entry and survival of Huaren foreign firms are pretty scarce at surname-prefecture-cohort level (see Table 2). Therefore we want to at first make sure our results still hold if we consider only the extensive margin at surname-prefecture-cohort level. We then replace our firm count measures with dummies indicating whether there is at least one entrant in a surname-prefecture-cohort triplet. Columns (1) to (3) of Table 5 show our findings that lineage connection significantly increases the entry and survival-adjusted entry of Huaren foreign firms at the extensive margin as well. We are also interested in the stability of our findings in cases where the measure of firm entry is adjusted by firm size and quality. Column (4) provides a test by regressing the inverse hyperbolic sine of total survived registered capital in 2014 as dependent variable, and still arrives at economically and statistically significant estimates.

Alternative Lineage Connection Measure. The second potential challenge to our results is the measurement errors in our lineage connection. 2005 population Census is the only data source where we could observe nationally representative distributions of sur-

¹⁸In stylized industrial equilibrium models such as Melitz (2003), lowering fixed cost of entry would select entrants with lower productivity. However, survival and growth of firm are not necessarily monotone in productivity. Then the lowered entry barrier won’t imply a lower average survival probability nor average registered capital in 2014. In fact, survival and registered capital in 2014 are more related to firm growth which is rooted in unobserved firm quality (Guzman and Stern, 2020). And our results indicates that the operation of lineage in affecting foreign firm entry is independent with firm growth measured by survival and average registered capital in 2014, or in another word, latent quality of entrants. We could further conduct a test on selection of low productivity firm if we have a productivity measure upon entry of the firm in the data. However, what we have is registered capital of firms in 2014 which is still better understood as proxy for firm growth instead of static productivity. So unfortunately, we cannot examine whether the static selection emphasized in trade literature takes place here and this is not our focus either.

Table 5: Robustness Checks I: Alternative Dependent Variables

	At Least One Entrant	At Least One Survived Entrant in 4 Years	At Least One Survived Entrant in 2014	Arcsinh (Survived Registered Capital in 2014)
	(1)	(2)	(3)	(4)
Open \times Lineage Connection	0.766*** (0.112)	0.672*** (0.102)	0.165*** (0.053)	1.229*** (0.422)
Adj. R^2	0.383	0.373	0.255	0.271
N	1,344,421	1,344,421	1,344,421	1,344,421
Number of Incumbent Firms	Y	Y	Y	Y
Surname-Prefecture FE	Y	Y	Y	Y
Surname-Cohort FE	Y	Y	Y	Y
Prefecture-Cohort FE	Y	Y	Y	Y

Note: ***, **, * denote significance level at 1%, 5%, and 10% respectively. Standard errors are clustered at surname-prefecture level.

names across prefectures. Since our sample period starts from 1981, it is possible that the internal migration between 1981 and 2005 could lead to changes in the spatial distribution of surnames and Huaren entrants at the same time. However, as we argued before, past literature has shown that the spatial distribution of surnames remains fairly stable throughout the history even after warfare and revolutions (Clark, 2015) and recent work by Bai (2020) confirms the stability of spatial distribution of surnames by comparing the surname distributions constructed from 2005 population Census and the Harvard China Biographical Database (CBDB). We provide additional checks on our results by taking advantage of the surname information available in our SAIC database. We construct from the SAIC database an alternative lineage connection measure using surnames of registered personnel who have worked in *domestic firms* established before 1992 to mitigate concerns on internal migration.

The results on firm entry using this alternative lineage measure are presented in column (1) of Table 6. We still get significant estimates for our outcome variables as before and they remain economically large relative to the mean. Notice that our alternative lineage connection measure is constructed based on a non-representative sample of the population (entrepreneurs and managers in domestic firms). So we should put more faith in

Table 6: Robustness Checks II: Alternative Setups

	Open \times Lineage Connection			
	Alternative Lineage Connection Measure	Alternative Standard Error	Include Roundtrip Huaren Entrants	WTO Accession Placebo Test
	(1)	(2)	(3)	(4)
Number of Entrants	2.874*** (0.946)	1.767*** (0.493)	3.821*** (0.820)	0.980 (0.842)
Survival-Adjusted Number of Entrants	2.511*** (0.903)	1.517*** (0.456)	3.253*** (0.743)	0.739 (0.726)
Number of Incumbent Firms	Y	Y	Y	Y
Surname-Prefecture FE	Y	Y	Y	Y
Surname-Cohort FE	Y	Y	Y	Y
Prefecture-Cohort FE	Y	Y	Y	Y

Note: ***, **, * denote significance level at 1%, 5%, and 10% respectively. Standard errors are clustered at surname-prefecture level except in column (2). Survival-adjusted Number of Entrants is the number of entrants that survive for more than 4 years (included). Potential roundtrip Huaren entrants are defined as entered foreign firms represented by citizens of People's republic of China. Column (4) uses *Open* status before 1992 as treatment while the WTO accession in 2002 as shock for our placebo test.

our original estimates relative to the new ones using the alternative measure of lineage connection. We can, however, still reach the same conclusion as before that lineage connection exerts positive impacts on the entry of Huaren foreign firms with and without adjustment by survival.

Alternative Standard Error. Our baseline results come from regressions which cluster standard errors at surname-prefecture level to account for serial heteroskedasticity within surname-prefecture pair. However, the error terms could be correlated at a higher level. The results in column (2) of Table 6 show that the significance of our estimates does not change by much even if we cluster our results at prefecture level.

Including Roundtrip Huaren Entrants. To construct our baseline sample, we adopt a conservative definition for a Huaren foreign firm, that is, a firm represented by an ethnic Chinese with foreign passports or travel permits for HMT residents. In this way, we hope to eliminate the potential influence of the prevalent "roundtrip" foreign firms who were virtually domestic firms motivated by tax benefits during the Reform Era to our results. To show robustness, we include back those foreign firms whose representatives

hold an ID card of People’s Republic of China into our sample and show in column (3) of Table 5 that our estimates expand a lot. This, to some degree, supports our baseline sample construction since these potentially roundtrip foreign firms would dramatically exaggerate the presence of Huaren foreign firms and therefore drive up the estimated effects of lineage connection on the entry of foreign firms.

WTO Accession Placebo Test: The main goal of this paper is to demonstrate the importance of international lineage networks in facilitating the entry of foreign firms in face of an immature market environment. A natural placebo test is see how the effects of lineage connection would change when the institutional environment has been formalized—China’s accession to WTO in 2002 is the most ideal event for such a test, since China had spent decades to improve its market institutions in order to be accepted as a member of WTO. As expected, column (4) of Table 5 shows that there are no significant effects of lineage connection on number of entrants and survival-adjusted number of entrants between the pre-1992 opened prefectures and closed ones, before and after the 2002 WTO accession.

Permutation Tests. To check whether our results are influenced by any other errors in our lineage connection measure, we perform two permutation tests by randomly shuffling our lineage connection measures within and across prefectures. The left panel of Figure 5 plots the distributions of the estimates for our two main outcome variables from 100 simulations using reshuffled lineage connections across surnames within same prefecture. The right panel plots distributions of estimated coefficients from 100 simulations where lineage connections are reshuffled across prefectures within same surname. We see that all distributions are centered around zero and the actual estimates tend to lie at the far right end of the distributions. Taken together, these results suggest that the positive and significant effects of the lineage connection on the entry of Huaren foreign firms are not driven by unobserved measurement noises in lineage connection.

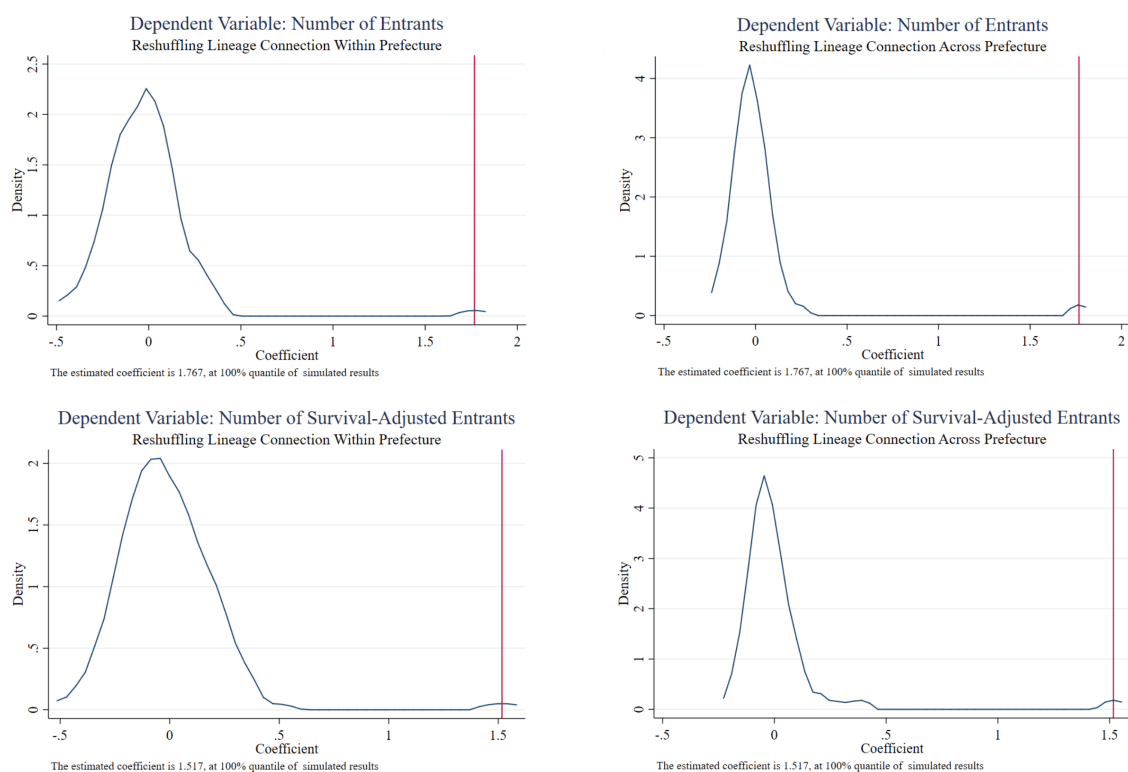


Figure 5: Permutation Tests

Table 7: Robustness Checks III: Subsample Regressions

	Open \times Lineage Connection			
	Excluding Emigration- intensive Provinces (1)	Excluding Emigration- intensive Surnames (2)	Within Emigration- intensive Provinces (3)	Excluding FDI- intensive Prefectures (4)
Number of Entrants	0.642*** (0.233)	1.733*** (0.332)	6.001*** (2.476)	1.534*** (0.440)
Survival-Adjusted Number of Entrants	0.482*** (0.167)	1.480*** (0.292)	5.152*** (2.186)	1.308*** (0.380)
Number of Incumbent Firms	Y	Y	Y	Y
Surname-Prefecture FE	Y	Y	Y	Y
Surname-Cohort FE	Y	Y	Y	Y
Prefecture-Cohort FE	Y	Y	Y	Y

Note: ***, **, * denote significance level at 1%, 5%, and 10% respectively. Standard errors are clustered at surname-prefecture level except in column (2). Survival-adjusted Number of Entrants is the number of entrants that survive for more than 4 years (included). Emigration-intensive provinces include Guangdong, Fujian, Zhejiang. Emigration-intensive surnames refer to the 20 most populous surnames among all Huaren legal representatives from 1981 to 2014. FDI-intensive prefectures are those whose cumulative number of hosted foreign firms rank top 20 among all prefectures during 1981 to 2014.

Subsample Regressions. Another challenge to the interpretation of our results is the possibility that variations from certain regions or surnames could largely drive our findings. For example, emigration-intensive provinces like Guangdong, Fujian and Zhejiang disproportionately exported more emigrants and attracted more foreign firms at the same time than other regions. And some surnames, whose population historically resided in emigration-intensive provinces, have persistently higher presence in both FDI-intensive regions and among Huaren entrepreneurs due to surname-specific expertise. Although these concerns do not qualify as an identification issue, it certainly challenges the generality of our findings. The coefficients for number of entrants and survival-adjusted number of entrants remain positive and statistically significant in columns of Table 6 where we use different subsample regressions to test the robustness of our baseline findings. Column (1) and Column (3) together suggest that lineage connection takes effects not only within but also outside of emigration-intensive provinces, though unsurprisingly the magnitude of the coefficients within emigration-intensive provinces are indeed much larger. Likewise, column (2) verifies the robustness of our results to the exclusion of emigration-intensive surnames. And finally column (4) overrules the possibility that FDI-intensive prefectures as outliers in our sample drive all our observed patterns by excluding them from our regression sample.

5 Mechanisms

Until last section, we have documented, for the first time in literature, a large causal effect of surname-base lineage connection on foreign investments in terms of firm entry. We now turn to explore the underlying mechanisms through which the lineage connection exerts the observed effects on the entry of Huaren foreign firms.

In general, social ties can work plausibly through demand side and supply side to benefit movement of economic factors between the two nodes of the tie. On the demand side,

as argued by [Burchardi, Chaney and Hassan \(2019\)](#), lineage connection could facilitate the entry of Huaren foreign firms as tastes could persist over generations and Huaren entrepreneurs might just work abroad in industries catering the demand of their ancestral hometown. However, compared to [Burchardi, Chaney and Hassan \(2019\)](#) where variation is at origin country level, we compare surnames within prefectures and tastes by different surname groups are extremely unlikely to vary so much within prefecture to rationalize our results. On the supply side, as summarized by [Rauch \(2001\)](#), any kind of social networks in business plays two possible major roles: sharing information and enforcing contracts. So better lineage connection could either provide information advantage or social collateral for enforcing contracts for Huaren entrepreneurs. We discover evidence in support of both of them in the following empirical analysis testing auxiliary predictions of the two distinct mechanisms.

5.1 Overcoming Information Frictions

The information frictions must be a critical barrier since barely any foreign investors are allowed to pay business visits let alone invest in mainland China before 1979, making China a vacuum of business information to outsiders for 30 years. Huaren investors, however, remain socially in touch with their lineage members. Anecdotal narratives reveal that they communicated via specially authorized telephones and mails even during the time when communication infrastructure in China was in its infancy ([Tan, 2006](#)). Lineage connection is inherently a kind of social tie and local information can be transmitted from the local lineage members through the social tie to the Huaren entrepreneurs abroad. Hence lineage connection could mitigate the information frictions and creates an information advantage for Huaren entrepreneurs with better lineage connection than the others. However, information transmission requires conditions which were met in various degrees at different locations. So we test the information channel through looking at heterogeneous effects of lineage connection across places with different predetermined conditions.

Table 8: Overcoming Information Frictions

	Number of Entrants	Survival-adjusted Number of Entrants
	(1)	(2)
Panel A: Communication Infrastructure		
Open \times Lineage Connection	-2.507 (1.908)	-1.814 (1.846)
Open \times Lineage Connection \times Telephone Exchange Capacity	1.074*** (0.409)	0.868** (0.386)
Adj. R^2	0.454	0.437
N	666,397	666,397
Panel B: Social Fragmentation		
Open \times Lineage Connection	-9.356*** (2.936)	-7.201*** (2.899)
Open \times Lineage Connection \times Surname Fragmentation	11.963*** (3.336)	9.365*** (2.899)
Adj. R^2	0.409	0.395
N	1,186,664	1,186,664
Panel C: Pioneer Firm		
Open \times Lineage Connection	7.424** (3.063)	6.390** (2.712)
Open \times Lineage Connection \times Pioneer Firm	-13.080** (5.650)	-11.263** (4.974)
Adj. R^2	0.465	0.458
N	2,690,048	2,690,048
Number of Incumbent Firms	Y	Y
Surname-Prefecture FEs	Y	Y
Surname-Cohort FEs	Y	Y
Prefecture-Cohort FES	Y	Y
Additional Controls	Y	Y

Note: ***, **, * denote significance level at 1%, 5%, and 10%, respectively. Standard errors are clustered at surname-prefecture level. Survival-adjusted entrants are the subset of entrants that survive for more than 4 years (included). Regressions are conducted at surname-prefecture-cohort-type level and additional controls refer to a dummy for pioneering firm (first foreign entrant in a 2-digit industry in a prefecture) in Panel C.

First, if Huaren entrepreneurs with higher lineage connection have better information access than others, those information in places with superior communication infrastructure would be more efficiently transmitted to Huaren entrepreneurs. In another word, we conjecture that the effect of lineage connection on Huaren firm entry would be higher in places of lower information transmission cost if lineage connection increases the supply of information to Huaren entrepreneurs. To empirically test this auxiliary prediction of information channel, we examine the heterogeneous effects of lineage connection on the entry of Huaren foreign firms across province-years with differential pre-determined telephone exchange capacity. Back in the 1980s and 1990s, the telephone exchange capacity determined whether Huaren entrepreneurs could communicate easily with local people they were connected to. To formally test, we include an additional term in our baseline regression which interacts our main independent variable with telephone exchange capacity at province-year level. Panel A of Table 8 show our results. The coefficients of the new interaction terms remain positive and significant for the number of entrants and survival-adjusted number of entrants. These findings are in line with the expectation that communication infrastructure are complementary with lineage connection since Huaren can use the communication infrastructure to access the more information supplied by Huaren entrepreneurs' local contacts following the local opening reform.

Second, in places with higher social fragmentation, information search cost could be larger according to [Padró i Miquel, Qian and Yao \(2012\)](#) as information sources are fragmented. Then for less connected Huaren entrepreneurs, searching for local information would be harder in such places. Therefore lineage connection would have higher effects on Huaren entrants in places with higher social fragmentation. In another word, higher social capital brought by lineage connection could lower the cost of searching in environment with more fragmented information sources. Consistent with this prediction, in Panel B of Table 8 we discover stronger effects of lineage connection in prefectures with higher social fragmentation as measured by one minus the Herfindahl-Hirschman Index (HHI) of

surname concentration. This result corroborates the information channel for explaining the large causal effects of lineage connection we identified on Huaren foreign firm entry.

Last, for entrepreneurs, local information would be more abundant and informative if there had already been entrants in the same industry at that location. In another word, it would be harder for a pioneering firm, defined as the the first-ever foreign entrant in a 2-digit industry in a prefecture, to access useful market information through their lineage connection. To test this prediction, we further decompose our data to distinguish pioneering firms from imitating firms when conducting aggregation at surname-prefecture-cohort-type level as Equation 4 in which type is referred to pioneering firm dummy. Panel C of Table 8 demonstrates that Huaren firms of stronger lineage connection tend to enter into existing industries as imitators rather than new industries as pioneers following the local opening reform. This suggests that information on proven business opportunities could pass through lineage group. Since we focus on a period when most industries in China just began to take root, i.e. the Reform Era, our findings are consistent with observations that entry of imitators is most exuberant during early stage of an industry life cycle (Gort and Klepper, 1982). It should be noticed that, the effect of lineage connection on pioneering firms is actually negative. That's to say higher lineage connection even redistribute Huaren entrepreneurs from being pioneering to imitating. However, this does not mean lineage connection does not help motivate the entry of pioneers. Most of the pioneering foreign firms are Huaren firms as seen in Figure 2, and as pioneers induce imitators, these early pioneering Huaren entrants could have long-term benefits on local economic development, which we will discuss in later section.

5.2 Strengthening Contract Enforcement

Weak contracting enforcement has also been seen as key barrier to deter foreign investments from flowing into developing countries. And in the context of China, informal institution such as lineage groups, as argued by Greif (1993) and Greif and Tabellini (2017),

could be useful for strengthen contract enforcement under such circumstances. We conjecture that the effect of lineage connection would be higher in circumstances where demand for contract enforcement is higher. In the following discussion, we present how we test this auxiliary prediction from three aspects and show the results which all support the contracting channel in Table 9.

When a foreign entrepreneur consider entering China, he or she faces a decision as whether to setup the firm as a new headquarter firm or a branch of the existing headquarter firm. The former choice requires stronger commitment than the latter since the relative autonomy of a headquarter firms is associated with higher administrative and monitoring costs, which demands better contracting environment. There we conjecture that lineage connection would have larger effect on the entry of Huaren foreign firms as headquarter firms. Panel A of Table 9 finds that Huaren foreign firms with higher lineage connection are less likely to enter and survive as a branch firm. This results is consistent with the auxiliary prediction and suggests that lineage connection indeed helps strengthen contract enforcement.

Doing overseas business also involves negotiating over two major kinds of contracts: one is with local employees and the other with local suppliers. If a foreign entrepreneur needs to hire a large group of local employees or sign contracts with many local suppliers, the demand for better contract enforcement would be very high. We hypothesize that lineage connection would be more valuable for Huaren entrants in industries with either higher labor intensity or intermediate good intensity. To formally test the hypothesis, we further breakdown entrants into labor-intensive industries and non-labor-intensive industries (for the subsample of manufacturing industries only), supplier-intensive industries and non-supplier-intensive industries. Results in Panel B and Panel C indicate that Huaren foreign firms with stronger lineage connection tend to enter into labor-intensive and supplier-intensive industries. These results suggest that lineage connection helps mediate access to labor and intermediate inputs through strengthened contract enforcement.

Table 9: Strengthening Contract Enforcement

	Number of Entrants	Survival-adjusted Number of Entrants
	(1)	(2)
Panel A: Branch Firm		
Open \times Lineage Connection	8.795*** (3.363)	7.633** (2.997)
Open \times Lineage Connection \times Branch Firm	-15.823*** (6.255)	-13.749*** (5.547)
Adj. R^2	0.452	0.444
N	2,690,048	2,690,048
Panel B: Labor Intensive		
Open \times Lineage Connection	-1.864* (1.043)	-1.650* (0.928)
Open \times Lineage Connection \times Labor Intensive	4.990** (2.466)	4.433** (2.226)
Adj. R^2	0.665	0.645
N	2,690,048	2,690,048
Panel C: Supplier Intensive		
Open \times Lineage Connection	-2.331* (1.156)	-2.030** (1.010)
Open \times Lineage Connection \times Supplier Intensive	6.196** (2.736)	5.397** (2.427)
Adj. R^2	0.688	0.673
N	2,690,048	2,690,048
Number of Incumbent Firms	Y	Y
Surname-Prefecture FEs	Y	Y
Surname-Cohort FEs	Y	Y
Prefecture-Cohort FES	Y	Y
Additional Controls	Y	Y

Note: ***, **, * denote significance level at 1%, 5%, and 10%, respectively. Standard errors are clustered at surname-prefecture level. Survival-adjusted entrants are the subset of entrants that survive for more than 4 years (included). Regressions are all conducted at surname-prefecture-cohort-type level and additional controls refer to a dummy for each specific type in each panel. Labor-intensive industries are those whose capital to labor ratio lies below the median level across all two-digit manufacturing industries according to 2004 Industrial Census. Supplier-intensive industries are those whose sector-level HHI of input values from all upstream sectors according to Input-Output Table of China in 2002 is below the median level, following the methodology of [Levchenko \(2007\)](#).

6 Seeding Effect on Long Run Foreign Investments

We have estimated the causal effects of lineage connection on the entry of Huaren foreign firms during the take-off stage of Chinese economy. However, the short-run surge of firm entry during the Reform Era may or may not have meaningful impacts on Chinese economy. This section, taking one step further, asks whether those industrial “seeds” planted by the early Huaren FDI had long-lasting effects on local economic development. To achieve this goal, we use the lineage-driven FDI predicted by our baseline regression as instruments for the early Huaren FDI and therefore are able to evaluate the persistent effects of early Huaren FDI on future foreign investments.

6.1 Isolating Lineage-driven FDI

Motivated by a new strategy in [Sequeira, Nunn and Qian \(2020\)](#), we draw results from our baseline regression in Equation 2 (the “zero stage regression”) and isolate lineage-driven FDI that arose from the interaction of surname distribution and the gradual opening of Chinese prefectures during the Reform Era as instruments for the presence of Huaren FDI in 1996. The benefit of combining the two sources of variation is that the interaction between the two produces variation that is unlikely to affect our contemporary outcomes of interest through channels other than early Huaren FDI inflows to the prefecture. So the exclusion restriction for using lineage-driven FDI as instrument for early Huaren FDI would be very likely to hold.

The strategy proposed by [Sequeira, Nunn and Qian \(2020\)](#) has three stages. In the “zero stage”, we estimate our baseline regression in Equation 2 with number of entrants as outcome and get the point estimate of the coefficient $\hat{\beta}$. With the estimated coefficient, we are able to get the predicted value $\hat{\beta} \times Opening_{pc} \times m_{sp}$ —the lineage-driven FDI at surname-prefecture-cohort level. We then aggregate them over all surnames and entry cohorts to get a predicted value at prefecture level:

$$FDI_p^l = \sum_s \sum_{c=1981}^{1996} \hat{\beta} \times Opening_{pc} \times m_{sp} \quad (5)$$

which represents the cumulative lineage-driven FDI for each prefecture in year 1996. We also have observed stock of Huaren entrants for each prefecture in year 1996. Then the first stage regression where we use lineage-driven FDI as the IV for observed Huaren FDI in 1996 can be estimated as following:

$$FDI_p = \alpha + \theta \times FDI_p^l + \lambda \times X_p + \epsilon_p \quad (6)$$

where FDI_p is the observed number of Huaren entrants in prefecture p in 1996. X_p denotes a set of controls at prefecture level. And with predicted prefecture-level number of Huaren entrants from this first-stage regression, we can perform the second stage of estimation as follows:

$$\pi_p = \alpha + \gamma \times \hat{FDI}_p + \lambda \times X_p + \epsilon_p \quad (7)$$

where π_p is our long-term outcome of interest.

Compared with past literature on identifying FDI spillovers in China, our paper makes several significant contributions. First, we extend the research periods to the early 1980s when the spillover effects of early FDI in China (we call the “industrial seeds”) tend to be the strongest. In contrast, most existed studies only focus on late 1990s to mid 2000s due to data limitations. Secondly, our paper draws upon the most comprehensive dataset on FDI covering all sectors while past literature mainly use the above-scale manufacturers¹⁹. Last but not the least, our paper establishes the causal link between early Huaren FDI and future foreign investments in the long run. This fills the gap between anecdotal narratives and formal empirical examination on the importance of overseas Chinese in China’s rapid

¹⁹See Appendix E for a detailed discussion.

rise as a hub for multinationals and foreign firms during the process of China's Reform and Opening-Up.

6.2 Identifying Long Run Effects on Foreign Investments

As FDI literature has pointed out, FDI inflows into developing countries do not necessarily promise economic gains in the long run. Indeed, FDI has been found to be successful in generating growths, importing technology, creating jobs and raising wages. But FDI also adds to the competition faced by the domestic firms and thus may discourage the growth of domestic sectors (Harrison and Rodríguez-Clare, 2010; Lu, Tao and Zhu, 2017). In this subsection, we examine whether the lineage-driven FDI, which is the dominant form of inward FDI during the period when China's market economy was largely immature, has any long term effect on the future foreign investments.

To identify the long run effects of lineage-driven FDI, we implement the methodology described in Section 6.1. First, we obtain our instrumental variable from the predicted number of entrants calculated based on previous results of baseline regression. We then sum up the number of Huaren foreign firms survived in 1996 to construct lineage-driven FDI at the prefecture level $F\hat{D}I_p$ and use it as dependent variable in the first stage (Equation 6). And then we perform second-stage regressions for a series of long-run measures of foreign investments including non-Huaren foreign firm stocks, all foreign firm stocks and these survived firms' total registered capital in 2014. In all specifications, we additionally control for initial economic development measured by GDP per capita in 1996, years since the Reform and Opening-Up, distance to sea, social fragmentation index, SEZ dummy, *Open Coastal City* dummy and province fixed effects.

The results are presented in Table 10. We find that prefectures with more historical lineage-driven FDI today has higher foreign investments from both non-Huaren and Huaren in terms of both survived number of firms and registered capital in 2014. We

Table 10: Seeding Effect of Huaren Entry on Future Foreign Investment

	Non-Huaren Firm Stocks in 2014	All Foreign Firm Stocks in 2014	Registered Capital of Non-Huaren Firms in 2014 (10 ⁶ CNY)	Registered Capital of All Foreign Firms in 2014 (10 ⁶ CNY)
	(1)	(2)	(3)	(4)
Panel A: Foreign Investment in 2014				
Huaren Firm Stocks in 1996	0.696*** (0.273)	2.593*** (0.915)	15.276*** (6.239)	63.256*** (25.460)
N	231	231	231	231
Panel B: First Stage Dependent Variable: Huaren Firm Stocks in 1996				
Lineage Driven Huaren Firm Stocks in 1996			30.953*** (14.391)	
Log(GDP) in 1996	Y	Y	Y	Y
Years since Opening	Y	Y	Y	Y
Distance to Sea	Y	Y	Y	Y
Social Fragmentation	Y	Y	Y	Y
SEZ dummy	Y	Y	Y	Y
Open Coastal City dummy	Y	Y	Y	Y
Province Fixed Effects	Y	Y	Y	Y

Note: ***, **, * denote significance level at 1%, 5%, and 10%, respectively. Standard errors are clustered at surname-prefecture level.

call these findings the “seeding” effect of early Huaren FDI on future foreign investments. These findings support the persistent influence of overseas Chinese in attracting foreign investment not only during the early stage of China’s Reform and Opening-Up, but also over the long run. We further decompose the seeding effect into two margins: spillover effects on Huaren and non-Huaren foreign investments. As expected, the estimates of spillover effects on non-Huaren in column (1) and (3) are always smaller than the estimates of effects on Huaren in column (2) and (4) of Panel A. The significant positive spillover effect on non-Huaren foreign investments in 2014 is especially surprising as we tend to think of Huaren foreign investments as speculators who sought short-term rents and inferior in quality to non-Huaren counterparts during China’s transition to market economy. One plausible explanation is that the business information acquired by Huaren foreign firms spillover to the non-Huaren foreign firms in the broad international market, and the regions that had received more Huaren investments develop better contract

environment through frequent interactions with Huaren foreign firms.

7 Conclusions

The lineage connections between Huaren foreign firms and their ancestral hometowns are believed to be one of the important drivers for China's remarkable industrial growth over the last forty years. Our paper, for the first time in the literature, empirically documents the prevalence of Huaren foreign firms during the take-off period of Chinese economy and causally identifies the effect of lineage connection on the entry of foreign firms, leveraging a unique dataset containing the universe of Huaren foreign firms and the surnames of their legal representatives. We show that the effects are primarily driven by reduction information frictions and strengthening contracting enforcement, thus lowering the entry barriers for Huaren foreign firms with stronger lineage connection.

This paper contributes to an improved understanding of the FDI policy for the developing countries. While opening-up has numerous potential benefits for developing countries, it is often hard for them to kick start the virtuous cycle. Plagued with information frictions and poor contracting environment, developing countries often struggle with setting up exporting channels, attracting foreign direct investments, let alone fully enjoy the benefits of opening. Findings of this paper may provide a practical solution: mobilize the diaspora networks to overcome the frictions in information access and imperfections of market institution during the early stage of development. We illustrate this point using the case of China. Many local governments in China indeed realized the value of the region's lineage connection with overseas Chinese. They enacted policies and coordinated through specialized organizations to encourage overseas Chinese businessmen to invest back in their ancestral hometowns. With the help of these international ethnic ties, China's share in international trade volumes and FDI inflows rocket up from literally zero to the world-leading level, even before the accession to WTO.

We also find that these early lineage-driven FDI exerts positive spillovers on non-Huaren investments in the long run, which suggests that the local business environment keeps improving as a result of frequent contacts with Huaren foreign firms. Although the sign and magnitude of FDI spillovers are generally inconclusive in different contexts, our empirical evidence suggest that the benefits of introducing FDI as industrial seeds seem to outweigh its costs during the take-off stage of an developing economy.

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Appendix

A Algorithm to Identify Huaren and Their Surnames

This section introduces the algorithm we use to identify Huaren and their Chinese surnames among the personnel working in foreign companies. We extract from SAIC database all the registered personnel working in foreign firms according to the firm’s ownership code, with following variables available for each person: names, ID types, registry address, executive position, a dummy for the legal representative status.

Before formally executing our algorithm, we perform a preparatory cleaning procedure to leave out all symbols (such as comma, periods, semicolon) and word content that is unrelated to names (such as titles, “Mr.”, “Dr.”, “appointed by the parent company”), since many name entries are unstructured in the raw data we acquire. This step breaks down the raw variable “name” into strings of pure Chinese or English characters. Thus name strings can be further categorized into three kinds: names written in pure Chinese (李小龙), names written in pure English (Bruce Lee), and names written in both Chinese and English (李小龙 Bruce Lee).

It is fairly straightforward to identify the Chinese surnames for name strings written in pure Chinese and in both Chinese and English, because both groups contain Chinese content of names. But it is relatively hard to identify surnames for the names written in English because English spellings of Chinese surnames unnecessarily map one-to-one into Chinese characters. See Figure 6 for an example. To lessen this issue, we construct an English-Chinese mapping based on the third group of strings, the names written in both Chinese and English. We then break down each English spelling into Chinese surnames in proportion to its relative presence in mixed entries. For example, a “TAN” is equivalent to 0.927 “陈”, 0.062 “谭” and 0.011 “谈” as in Figure 6.

Below we provide detailed introductions to the algorithm we execute to identify Huaren

and their surnames for each types of strings.

Names Written in Pure Chinese. In the subgroup of name strings that are written in pure Chinese, what is noticeable is that foreigners, typically Japanese and Korean, are also possible to register their names using Chinese characters. Also, some westerners also use transliterated names, which further complicates the analysis. In light of these concerns, we apply the following procedures to identify ethnic Chinese and their surnames:

1. For each string of name entry: if the length of the string is greater than 4 Chinese characters, we tag the string as non-ethnic Chinese, since usual (ethnic Han) Chinese names hardly contain more than 4 Chinese characters; If the length of the string is exactly 4 Chinese characters, we check whether the first two characters of string matches with double-character Chinese surnames (such as 欧阳, 司马). If the match is successful, we tag the name as ethnic Chinese, otherwise non-ethnic Chinese; If the length of the string is less than 4 Chinese characters, we match the first Chinese character with the Chinese surname dictionary. If the match is successful, we tag name as ethnic Chinese. Otherwise non-ethnic Chinese; This step produces a tag of ethnic Chinese status.
2. For each string of name entry, we match the first one/two/three Chinese characters with the most common 1000 Japanese surnames obtained from Wikipedia. If the following three conditions are satisfied simultaneously, we tag the string as Japanese, otherwise non-Japanese: the match with Japanese surname dictionary is successful, the ID type of the personnel is foreign passport, and the registry address starts with typical locations in Japan; This step produces a tag of Japanese status.
3. For each string of name entry, we match the first Chinese characters with the most common 100 Korean surnames obtained from Wikipedia. If the following three conditions are satisfied simultaneously, we tag the string as Korean, otherwise non-Korean: the match with Korean surname dictionary is successful, the ID type of the

personnel is foreign passport, and the registry address starts with typical locations in South Korea; This step produces a tag of Korean status.

4. For each name entry, if every string is tagged ethnic Chinese, non-Japanese, and non-Korean, we deem the person an ethnic Chinese.
5. If a person is deemed an ethnic Chinese, we extract the leftmost character of the first string as the surname for the ethnic Chinese, if the length of first string of name entry less than 4; we extract leftmost two characters of the first string as the surname for the ethnic Chinese, if the length of first string of name entry is 4.

Names Written in Pure English. In the subgroup of name strings that are written in pure English, what is noticeable is that surnames can be placed in either the leftmost string or rightmost string. And some irregular entries that fail to insert blank space between surnames and given names disable us to match name strings directly with Chinese surname dictionary. In light of these concerns, we apply the following procedures to identify ethnic Chinese and their surnames:

1. Divide the name entries into two groups: one with multiple strings (with blank space in the name entry), and another with single string (without blank space in the name entry).
2. For the group with multiple strings, we match the leftmost and rightmost character with the Chinese surname dictionary. If the match is successful for either the left character or the right character, we tag the name as ethnic Chinese. If only one of them is matched, the successfully-matched surname is chosen to be the surname of the ethnic Chinese. If both characters are successfully matched, we keep the leftmost character as surname by default (in our database, surnames are more likely to be identified at the leftmost position). Otherwise, a name entry is deemed non-ethnic Chinese.

3. For the group with single string, we manually determine ethnic Chinese status and surnames.
4. We break down each English-spelt surnames into Chinese characters in proportion to its relative presence in the mixed entries.

Names Written in Both Chinese and English. The group of names written in both Chinese and English serve as a “bridge” between English spellings and Chinese characters. We construct a English-Chinese mapping based on the group of names written in both Chinese and English, which enables us to break down each English-spelt Chinese surnames into Chinese characters proportionately.

1. We break down the name into two groups: the part of Chinese strings, and the part of English strings.
2. For the part of Chinese strings, we apply the same procedure as for the names written in pure Chinese. This step produces a temporary ethnic Chinese tag and extracts surname of ethnic Chinese written in Chinese character.
3. For the part of English strings, we apply the same procedure as for names written in pure English. This step produces another temporary ethnic Chinese tag and extract leftest and rightest English string.
4. If temporary ethnic Chinese tags from both parts are negative, we tag the person as non-ethnic Chinese. If not, we continue the followings: We match sequentially the leftest and rightest English string with the identified Chinese character from Chinese strings, according to the Chinese surname dictionary. If either match is successful, we tag this person ethnic Chinese, deem the identified Chinese character as ethnic Chinese’s surname, and the matched English string as the legitimate spelling for the Chinese character for this surname. If both matches are successful, we keep the leftest spelling as default.

5. This procedure produces not only the surnames for each ethnic Chinese, but also an English-Chinese mapping that can be used to break down English-spelt surnames into Chinese characters.

Determining Huaren. The previous steps identify whether a person is ethnic Chinese or not. We further separate mainlanders and Huaren according to the ID type associated with each personnel. A Huaren is an ethnic Chinese that holds a non-mainland Chinese ID—including passport of a foreign country, travel permit for Hongkong, Macau, Taiwan (HMT) residents.

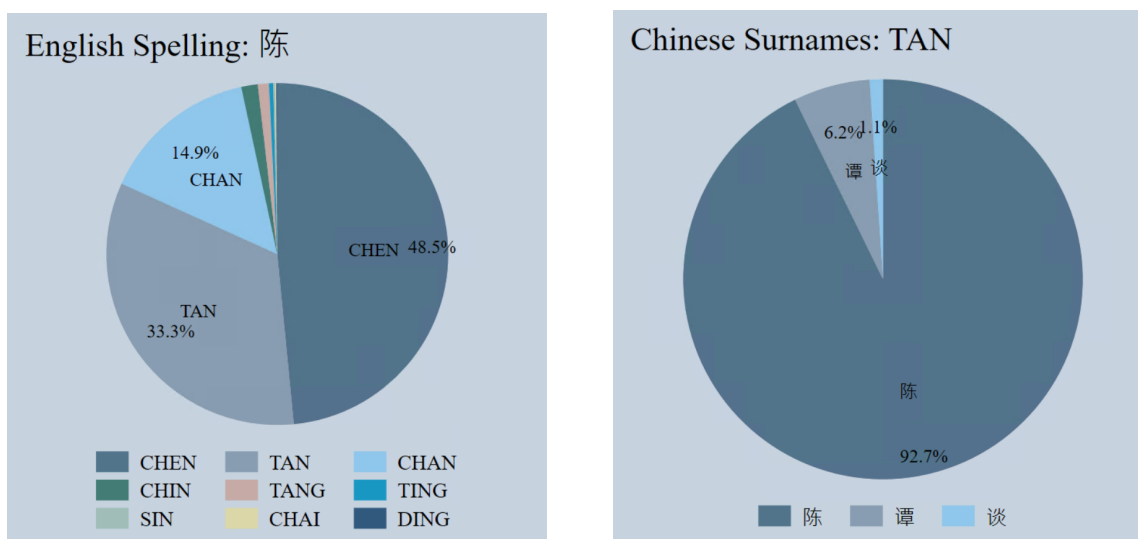


Figure 6: An Example of Spelling-Character Mapping between English and Chinese

B Legal Representative and Executive Position

Table 11: Legal Representative v.s. Top Executive Position in Foreign Firms

	Top Executive	Not Top Executive	Total
Legal Representative	1334367	94956	1429323
Not Legal Representative	458908	1065118	1524026
Total	1793275	1160074	2953349

Note: The samples are all registered personnel working in foreign firms ever existed from 1985 to 2014. Conditional on being a legal representative, a person has 93.35%(=1334367/1429323) chance of holding a top executive position within a foreign firm. Conversely, the chance is reduced to 74.41%(=1334367/1793275) for one's being a legal representative given that he or she holds a top executive position.

Table 12: Personnel Structures of Foreign Firms

	Percentage
Has a legal representative	96.84%
Has a chairman on the board	23.90%
Has a CEO	20.57%
Has more than one legal representative	1.35%
Has more than one chairman	4.78%
Has more than one CEO	1.24%

Note: The samples are all registered personnel working in foreign firms ever existed from 1985 to 2014.

C Lineage Connection vs. Population Size

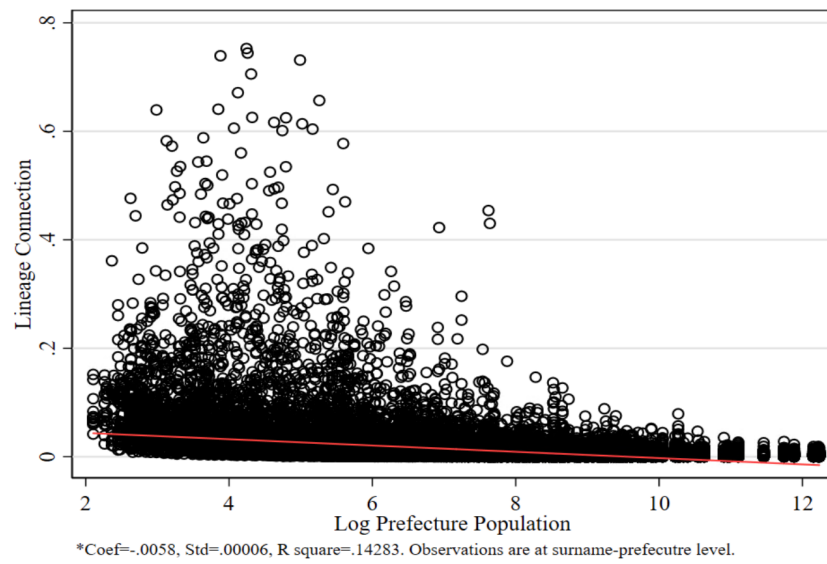


Figure 7: Lineage Connection Measure vs. Population Size

D Registered Capital vs. Other Economic Outcomes

Table 13: Registered Capital vs. Other Economic Outcomes

	Log Registered Capital	
	(1)	(2)
Log Employment	0.025*** (0.003)	0.018*** (0.004)
Log Assets	0.976*** (0.003)	0.416*** (0.004)
Log Sales	-0.124*** (0.003)	-0.005 (0.003)
R^2	0.710	0.946
N	15065	124964
Year Fixed Effects	Y	Y
Industry Fixed Effects	Y	N
Firm Fixed Effects	N	Y

Note: Samples are foreign firms according to ownership code from Annual Survey of Industrial Firms (ASIF) ,1998-2007. Industry is at 2-digit level. ***, **, * denote significance level at 1%, 5%, and 10%, respectively. Standard errors are clustered at firm level and shown in parenthesis.

E Comparison with Other Data Sources

In this section, we illustrate the advantage of our comprehensive foreign firm dataset and cross-validate our data with other data sources.

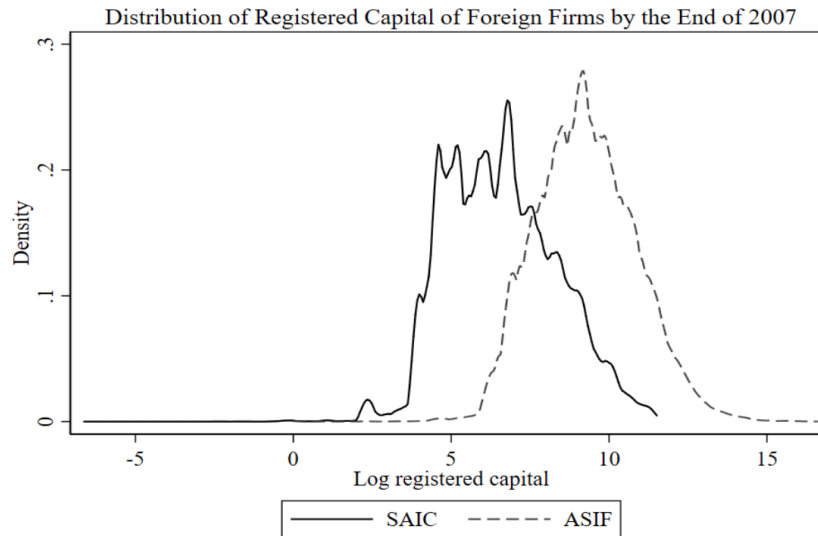


Figure 8: SAIC v.s. ASIF: Firm Size

Foreign firms covered by ASIF vs. by SAIC. Another frequently-used firm-level dataset is the Annual Survey of Industrial Firms (ASIF). We show with empirical evidence that our SAIC database offers additional strengths to study foreign firms in China, compared with ASIF. First, the SAIC database is representative for foreign firms of all sizes while ASIF only covers large firms with sales volume above 5 million CNY. Figure 8 plots the distribution of registered capital of foreign firms by the end of 2007, constructed by SAIC and ASIF respectively. It is clear that SAIC has better representation for smaller firms. Second, Figure 9 also depicts that while 98% of firms included in ASIF are manufacturing firms our full-sample SAIC database suggests that manufacturing firms only account for 41.3% of the population of foreign firms. Third, the two biases of ASIF in sample coverage result in the large discrepancy between the two databases in terms of the number of entrants over time, as shown in Figure 10.

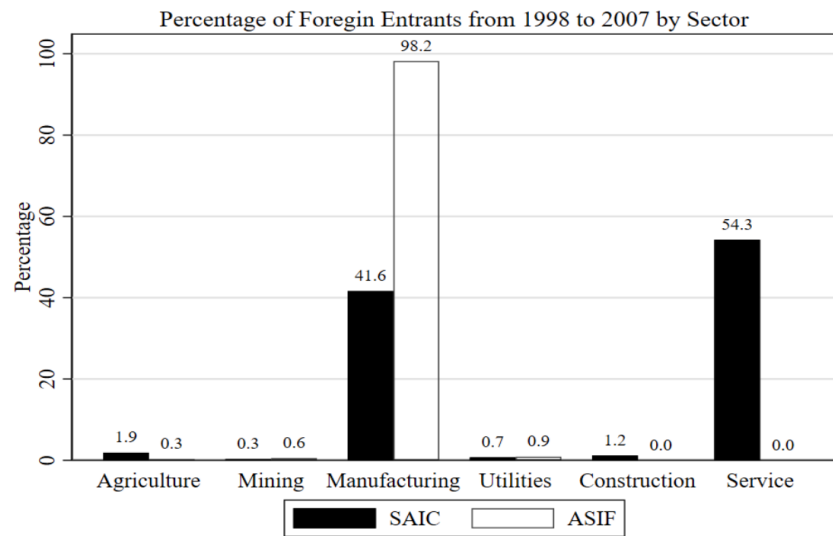


Figure 9: SAIC v.s. ASIF: Sector

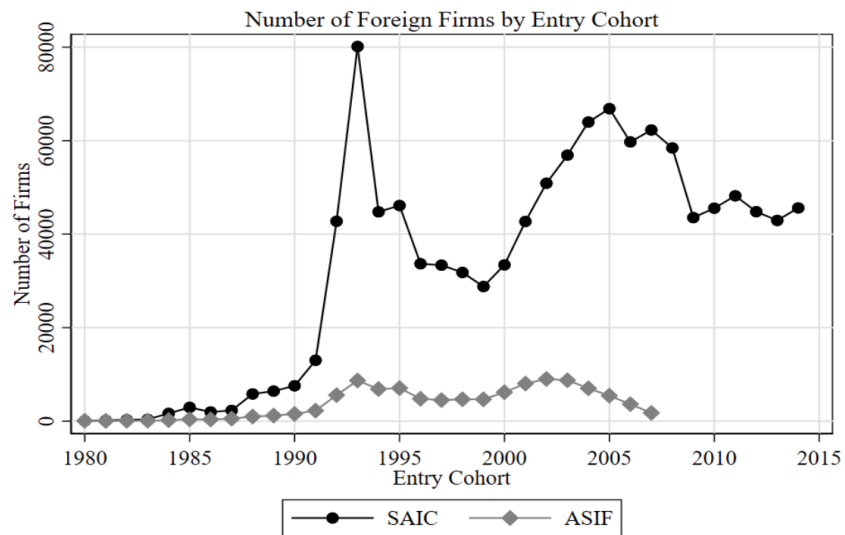


Figure 10: SAIC v.s. ASIF: Counts of Entrant

Huaren foreign firms vs. HMT firms.. Due to data limitation, prior literature often rely on HMT firms to proxy Huaren foreign firms (Lin, Liu and Zhang, 2009; Huang, Jin and Qian, 2013). There are at least two biases for such approach. First, a lot of Europe-based and America-based multinationals invested in mainland China through Hong Kong as a conduit; Second, residents in HMT only make up a fraction of total overseas Chinese. As can be seen from Figure 11, our estimated number of Huaren foreign entrants are always greater than HMT firms over time in terms of both JV and non-JV. And the difference seems to widen during the process of China's gradual accession to WTO from 1995 to 2007. This is consistent with the declining importance of Hongkong.

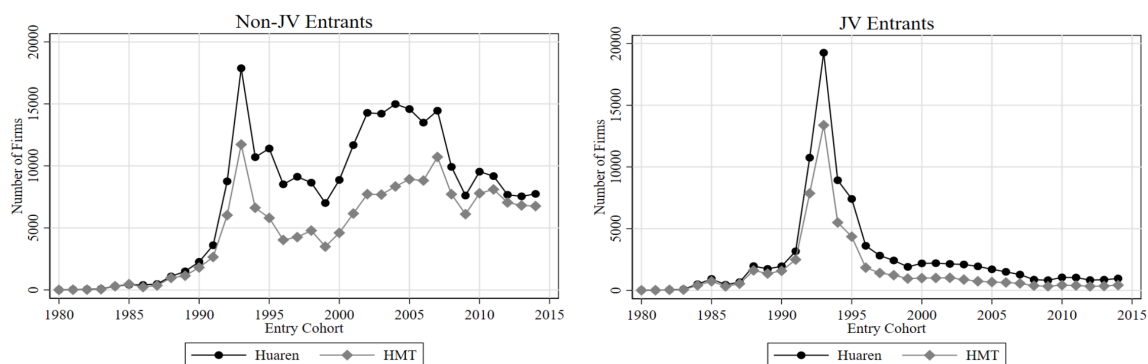


Figure 11: Huaren Foreign Firms vs. HMT firms

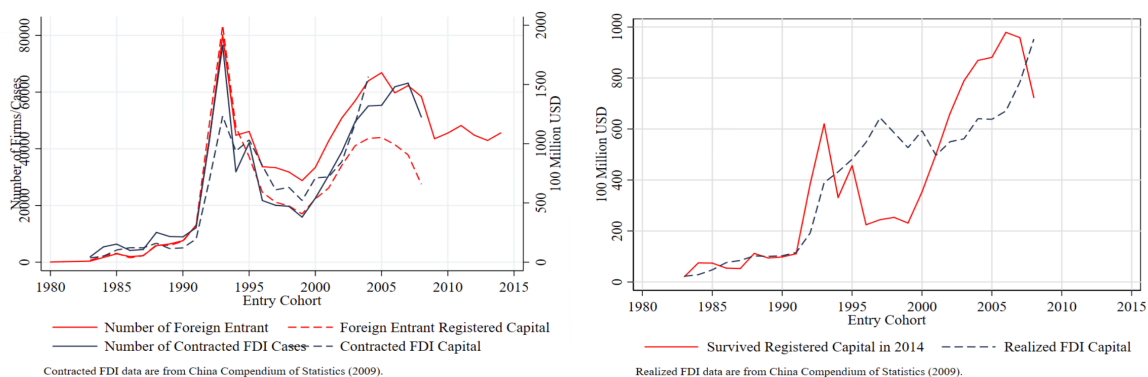


Figure 12: Foreign firms vs. official statistics of FDI inflows

Foreign firms vs. FDI. The notion of foreign firm is related to, but not perfectly comparable to foreign direct investment (FDI). To be exact, FDI is a monetary concept.

Besides, FDI includes both the initial and follow-up investment from a foreign-owned entity. We do, however, cross-validate our estimates of foreign firms both in counts and volumes with official FDI data supplied by the Ministry of Commerce of China. Figure 12 suggests that the contracted FDI, measured in number of cases or USD, is highly correlated with our measure of foreign firm entry. And the realized FDI measured in USD is highly correlated with our measure of survived registered capital of foreign firms by 2014.

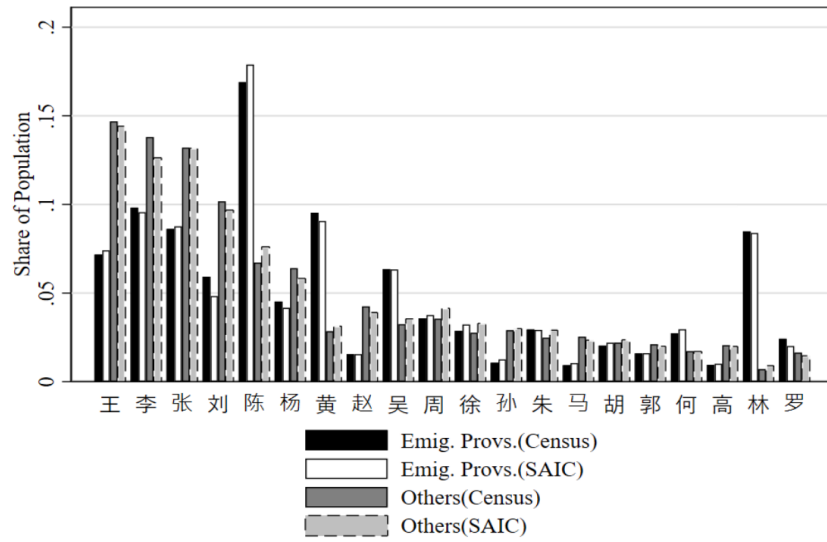


Figure 13: Surname Distribution: Census vs. SAIC

Lineage Connection measures based on 2005 Census vs. based on SAIC. We construct an alternative lineage connection measure from the list of registered personnel that worked in a firm established before 1992²⁰ using the SAIC database. The distribution for top 20 surnames constructed from two data sources are very similar. And overall there is significant correlation between the two measures (see Figure 14).

²⁰Xu and Zhang (2009) documents that there was almost no internal migration before the early 1990s in China. Private firms are rather scarce then. Most employees and managers worked in township-village enterprises (TVEs) and have lived in the same community for generations.

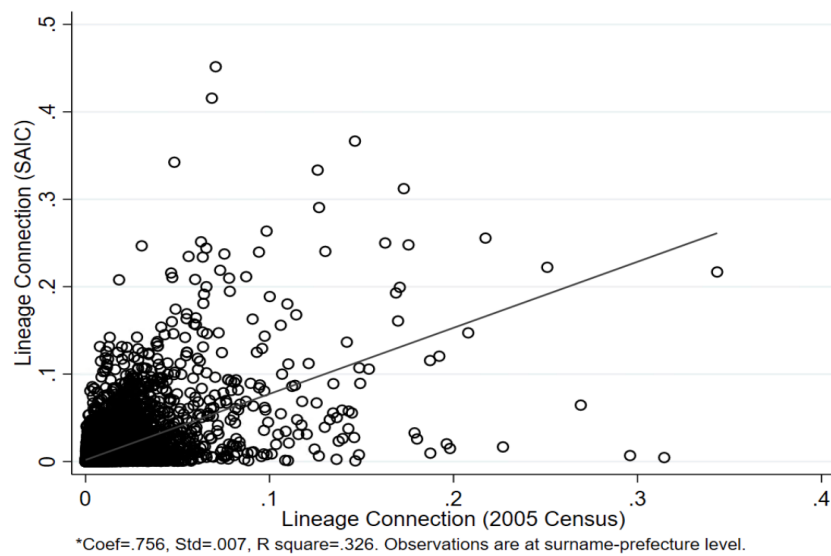


Figure 14: Lineage Connection Measures: 2005 Census vs. SAIC