

Memories of Colonial Law: The Inheritance of Human Capital and the Location of Joint Ventures in Early-Reform China^{*}

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Abstract

Using a unique data set of Chinese FDI contracts from the 1980s and 1990s, we explore mechanisms of historical persistence in the context of China's unique colonial experience. Using difference-in-difference estimations, we show that there was a tendency for foreign investors to form joint ventures in Chinese cities where their home country had a colonial presence in the 19th century. Using a difference-in-difference-in-difference approach we provide empirical evidence in support of the human-capital channel for explaining the historically persistent impact of colonial experience. Specifically, the most parsimonious explanation for our results is that legal human capital inherited from colonial times affected economic decisions in the reform era. Alternative explanations for long-term persistence are not supported. The study thus contributes to the research on history's long-lasting influence by highlighting the importance of one particular mechanism of persistence—historical memory of institutions, or simply legal human capital.

Keywords: historical persistence, colonial influence, FDI location, China, human capital

JEL Classifications: K00, N95, O10

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1. Introduction

As Nunn (2014: 347) remarks, "In recent years, a new dynamic literature has emerged empirically examining whether historical events are important determinants of current economic performance." This literature has made great progress in documenting the lasting impact of many apparently idiosyncratic historical events. After early work focusing on the effects of European colonization,¹ the subsequent literature has branched in many directions, for example, the rise of Europe (Acemoglu et al. 2005, Voigtlander and Voth 2013), the consequences of the slave trade for African development (Nunn and Puga 2012, Nunn and Wantchekon 2011), and the current effects of pre-colonial African institutions (Gennaioli and Rainer 2007).²

Most of these studies focus on historical persistence, aiming to disentangle the effects of the historical event per se from the more prosaic hypothesis that geography or some other persistent, but omitted, variable had effects both in historical times and today. Huillery (2009) provides a fascinating example, showing that regional and functional patterns in colonial government spending in West Africa match current patterns. She provides convincing evidence that the adventitious features of colonial policy are important determinants of spending today. But when searching for mechanisms that might explain why history has such persistent effects, Huillery (2009: 206) stops at a conclusion similar to that of many papers, "I do not have a clear explanation for the persistence of public investments."

This is exactly the point that Nunn (2014: 395) stresses when examining future directions for research: "Moving forward, the second major task for the literature to tackle is to better understand channels of causality. In the past decade, we have made significant progress empirically testing whether historical events have lasting impacts....What is less clear is exactly why it matters." In other words, the mechanisms by which history affects the present are much less understood than persistence itself. The central goal of this paper is to contribute to Nunn's second task, to understand the mechanisms of persistence in one historical case.

Our example is provided by regional patterns of joint ventures (JVs) in early post-reform China. China's history offers two distinctive features that allow us to generate insights from these patterns. First, as we document in Section 2, in the 19th and early 20th centuries many cities in China were colonized by western powers.³ The colonists established their own institutions in the colonial cities, following their own domestic models. These institutions varied significantly across Chinese colonial cities and were far different from indigenous Chinese institutions, which held sway in a majority of cities. Second, virtually all formal institutions were destroyed during

¹ See, for example, Acemoglu, Johnson, and Robinson, 2001, 2002; Engerman and Sokoloff, 2002; La Porta, Lopez-de-Silanes, Shleifer, and Vishny, 1997, 1998; North, 2009.

² And the effects of many other historical events. See for example, Acemoglu and Johnson, 2005; Banerjee and Iyer, 2005; Becker and Woessmann, 2009; Dell, 2010; Feyrer and Sacerdote, 2009; Iyer, 2010; Nunn, 2008; Nunn and Qian, 2011; Nunn and Wantchekon, 2011.

³ We use the adjective 'western' in its colloquial sense, that is, non-Chinese. Among the colonial powers were developed countries in North America and Europe, but also Japan and Russia.

the convulsive first eight decades of the twentieth century. The post-1978 reform years saw no efforts to revive those old institutions.

Remarkably, when China opened up to foreign investment in 1978, after three decades of minimal contact with foreigners, firms from former colonial powers had a strong affinity for the former colonial cities of their country. In Section 5, we establish this affinity, examining JV location choices across 205 Chinese cities. To accomplish this, we use a unique data set on all JVs established in China between 1979 and 1996, which we describe in Section 3, along with details of all other variables used in the analysis. We apply these data to a conditional logit model that captures the choices of western firms as they consider in which Chinese cities to invest.⁴ The formal structure of that model is described in Section 4.

Section 6 introduces hypotheses on the mechanisms by which past colonial experience might influence the location of modern JVs and provides preliminary estimates of their strength by examining their individual effects on JV location. Section 7 provides more rigorous estimates by examining which are significant when the various effects compete with one another to explain JV location. The empirical results of Sections 6 and 7 are quite consistent. Throughout the empirical work we use both differences-in-differences and differences-in-differences-in-differences methodologies. The former isolates the preference for a country's old colonial cities compared to otherwise similar Chinese cities; the latter shows how the strength of this preference varies with characteristics of cities and countries.

We follow Nunn (2009, 2014) in identifying the broad categories of mechanisms of persistence as path dependence in selection among multiple equilibria, domestic institutions, human capital, and culture. We examine the hypothesis of selection among multiple equilibria by using the fact that the colonial powers not only had colonial cities but also divided the complete territory of China into spheres of influence. The defining characteristic of a sphere of influence (outside the colonial cities) was the assumption by China and most of the western powers that a specific country was to be favored in any economic activities that involved foreigners. We find no evidence that historical patterns in sphere of influence match current patterns in JV location and therefore reject the multiple-equilibrium hypothesis.⁵

The hypothesis that the patterns of JV location can be explained by persistence in formal economic institutions can be quickly dismissed. Colonial institutions were completely eradicated more than three decades before the beginning of reforms. The set of formal economic institutions at the beginning of reforms—when colonial effects on JV location are already present—was based on a non-market model that hardly could have reflected any element of the

⁴ Although we model the firm's choice in choosing in which Chinese city to form a JV, the model implicitly assumes that Chinese cities could also benefit from investment partially prompted by a colonial tie.

⁵ However, our version of this hypothesis is narrow because we assume that any long-lasting effects of the colonial powers on domestic institutions, human capital, or culture are categorized as changes in fundamentals. The dividing line between what are really fundamentals and what are the permanent products of history must always be fuzzy.

old colonial institutions.⁶ We therefore look towards human capital and culture to provide the explanation for the effects of the colonial past.⁷

JV location would be affected by relative transaction costs in different locations.⁸ One factor affecting such costs is a complementarity between human capital in the Chinese city and the firm's human capital. Thus, for example, if some memories of legal matters survived in the city from the colonial era, then it could affect the stance of city officials in a manner that is recognizable to western firms from the city's former colonial power. We examine this hypothesis in three ways. First, we divide city-country colonial pairs into those that had civil-law colonial legal institutions and those that had common-law colonial legal institutions. We hypothesize that civil-law legal human capital would be more likely to survive than common-law legal human capital because it would fit better into China's civil-law regime (under both the Guomindang and the PRC). Consistent with this, the effect of a colonial tie is larger for civil-law city-country pairs than for common-law ones.

Second, we examine whether this human-capital complementarity occurs when there was no direct colonial tie between city and the firm's country, but the legal type of the colonial institutions of the city matches the legal type of the firm's country. We call these non-colonial legal ties and we find evidence for such complementarity—firms from civil-law countries have an affinity for cities that had civil-law colonial regimes implanted by some other western power.⁹ The analogous effect is not present for common law.

Third, we examine whether this complementarity between the human capital of city and firm is more important in those sectors where transaction-cost problems loom large, and therefore where legal-institutional, human-capital complementarities are more important. Such sectors are those in which a contract-intensity index is high and those with a greater need for external financing (Rajan and Zingales 1998 and Nunn 2007). We find that colonial ties and non-colonial legal ties are especially important in these sectors, confirming that legal complementarity between firm and city is crucial.

We also examine the interaction between colonial ties and the nature of the JV's output by examining differential effects for three product types, services, differentiated goods, and standardized goods. We find that the colonial tie effect is strongest in the service sector, which is plausible given that a service sector JV is most likely to have a large proportion of sales in the city of its location. Then, there are two possible hypotheses. First, there could be local cultural

⁶ Additionally, western-style market-oriented economic institutions—which did have the possibility of imitating the old colonial institutions—were created very slowly, really existing only after the end of the period covered by our data.

⁷ We reserve the term 'human capital' for skills applicable in professional or business activities and 'culture' for tastes or preferences in the general population, while acknowledging that this is somewhat arbitrary since some definitions of the concept of culture would include inherited human capital.

⁸ JV location will also be affected by fundamentals such as geographical characteristics, regional levels of economic activity, etc.. These are included in our empirics but are not the focus of this paper.

⁹ Note that this cannot be explained by an affinity for colonies *per se* because we include city fixed effects in the estimations, which would absorb any city-specific affinity for colonies.

affinity for products associated with an old colony. Second, there might be human-capital complementarity between the firm and the potential buyers of the service. Crucially, the service-product effect is found for both colonial and non-colonial legal ties. Since only the human-capital hypothesis—and not the cultural one—is applicable in the case of non-colonial ties, these results cannot be explained by general cultural affinity alone. Inherited human capital must be one of the mechanisms of historical persistence.

We also examine whether there is any effect from the complementarities between city and firm in skills not related to the law. Chinese cities vary in spoken dialects, with which colonizers probably developed expertise. If preserved through the generations, this human capital would be useful in conducting negotiations. We find that western firms have a higher propensity to establish JVs in cities that their country did not colonize but which have a dialect that is the same as in a city that the country did colonize. Moreover, these effects are weaker for dialect ties that are in Mandarin, the country's lingua franca. Because all countries are likely to have expertise in Mandarin, this strengthens our interpretation that the effect of a dialect tie is due to inherited human capital in a specialized dialect.

Finally, we examine the influence of general cultural familiarity, using data on the size of each western country's presence in the colonial cities at the beginning of the twentieth century. The effect of colonial population is consistently statistically significant but rather unimportant economically. Had these results shown colonial population to be of large importance in addition to the colonial tie effect, then we would have been forced to conclude that general cultural affinity is important. But this is not the case. Thus, the results on the size of the colonial presence serve to bolster our emphasis on the effect of inherited human capital.¹⁰ Thus, the principal conclusion of our paper is that inherited human capital is the major pathway explaining the colonial-tie effect.

Our paper also contributes to a growing literature on Chinese history that highlights persistence itself. Jia (2014) shows that the old Chinese treaty-port system has had long term impacts on economic development to this day. Chen, Wang, and Yan (2014) provide empirical evidence that the spread of Protestantism in the early twentieth century generated significant positive effects on long-term economic growth, educational development, and health care outcomes. And, Yi and Tao (2009) find that the degree of family control of a business is significantly correlated with whether the region was administered by Great Britain in the late Qing Dynasty.

¹⁰ In Section 6, we also examine the effect of the size of the Chinese population within the colony and find that this effect is quite large. However, a colonial city's Chinese population does not vary across observations on firms considering that city for a JV. Hence, the specifications in which colonial Chinese population is included cannot also include city fixed effects, meaning that Chinese colonial population could be simply proxying time-invariant properties of the modern Chinese city, such as current population. Thus, the interpretation of the colonial Chinese population effect is ambiguous. Note also, that even if one were willing to conclude that the estimate truly reflects the effect of the colonial Chinese population, this is still consistent with our emphasis on inherited human capital, since the quantity of legal-institutional human capital could be proportional to the size of general population, although it is also consistent with the possibility of a colonial-tie impact through culture in the general population.

As those papers do not identify the specific mechanisms through which persistence occurs, our results can add insights to their findings. For example, since there is a considerable degree of overlap between the cities that had treaty ports and those that were colonies, our results could provide the mechanism that produces the results emphasized by Jia (2014). Similarly, given that we find that the importance of inherited human capital is higher in industries that are contract intensive, our results could provide justification for the methodology of Yi and Tao (2009), who use a dummy variable for cities administered by Great Britain as an instrumental variable for contract enforcement. Finally, Chen, Wang, and Yan (2014) argue that Protestantism has lasting effects through improvements in education and health care outcomes, which are certainly sectors where the inheritance of human capital skills could be important.

2. Pertinent Colonial and Legal History

The modern colonization of parts of China began in 1842 with the Treaty of Nanking, imposed by the British at the end of the first Opium War.¹¹ Among the terms of this treaty was one that opened up five Chinese cities to the British for foreign trade and the residence of foreigners. Over the next eighty years treaties with other foreign powers opened up many more cities in the same way. Not all of these *treaty ports* became colonies proper, since in treaty ports foreign authorities were not necessarily officially in charge of administration and legal matters.

Many of the treaty ports experienced influxes of population because of their lively commerce. This created pressures on the foreign powers to provide stronger administrative arrangements and protection for their own citizens, that is to convert some treaty ports into true colonies. Thus, the Chinese authorities were forced to lease in perpetuity enclaves of the cities in which some treaty ports were located. The resultant concessions (sometimes called settlements) became self-governing foreign colonies. The concessions raised their own taxes, provided their own (foreign-controlled) government, and applied their own administrative and legal arrangements. Chinese law was not applicable in the concessions.¹²

Towards the end of the 19th century, several similar leaseholds were awarded to foreigners after diplomatic or military pressure. Zones of foreign control were also granted along the routes of new railway lines to facilitate the building and the management of the lines. These leaseholds and railway zones were also de facto colonies—self-governing foreign enclaves. Some were in existing treaty ports, but others were not. Thus, the colonies were of three types, concessions, leased territories, and railway zones. In all, there were 55 colonies under the control of 12 foreign powers. These were distributed across 29 cities.¹³ We refer to them as colonial cities in

¹¹ See, for example, Fairbank (1978), Feuerwerker (1978), and Tai (1918) on the relevant history.

¹² Fairbank (1978) describes the growth of a Shanghai concession in the following way: "Thus was created a traders' republic with authority to tax and to police the foreign settlement under the treaty-based jurisdiction of the foreign consuls and with the acquiescence of the Chinese government. Aggressive foreigners at Shanghai could create new institutions when the imperial officials were weak and local Chinese interests not yet entrenched."

¹³ We exclude Hong Kong and Macau from this accounting since in period covered by our data these two cities were still controlled by foreign powers. The sample used in the data analysis covers 28 colonial cities. Since there was no FDI in Hailaer

the following. Table 1 lists the colonizing powers and the cities in which they had colonies, while Figure 1 shows the location of the cities.

The degree to which a Chinese citizen would become familiar with foreign institutions naturally varied across jurisdictions, and with the intensity of Western influence.¹⁴ From the earliest days of China's forced opening, a major principle had been that of extraterritoriality, that is, any citizens of the foreign power anywhere in China were subject to the laws of the foreign power and not those of China. If a matter involving a citizen of the foreign power required a court, then the hearing was to be before a colonial court, usually with a consular official as judge and jury. This applied all over China but was particularly important in the treaty ports, where foreigners were allowed to do business and reside. Extraterritoriality was finally abandoned in 1943 and Chinese laws and courts became relevant to all residing on Chinese territory.

Within the colonial cities, foreigners were allowed to own property, they made the rules and regulations, and they provided security forces. Importantly, in the colonies, foreign law applied to all residents, even Chinese citizens. The law of the colonial power was so important that in some later-established colonies the principle of extraterritoriality did not even apply: for example, a British citizen committing a crime in Qingdao would be subject to German law. Institutional connections to the colonial power were often strong, with governing laws for the colonies made in the foreign capitals. Most of the foreign powers that had courts in China allowed appeal of the decisions of these courts to the foreign higher courts (H.M.S.O. 1926, pp. 116-140). Although law and administration were dominated by foreigners, the number of Chinese residents in the colonies outnumbered foreigners by an order of magnitude. Therefore, these were areas where a considerable number of Chinese had reason to become deeply acquainted with foreign institutions.

Outside the colonies, legal reforms began only in the waning years of the Qing dynasty and were of little significance. They then proceeded at a slow pace under the Republic, often lacking a commitment to implementation.¹⁵ For example, only half of China had reformed courts by the mid-1930's. The Guomindang produced a new German-style Civil Code in 1930, but in the midst of civil war and international conflict, this had limited effect. In the last ten years of its rule, the Guomindang took firm control of both legal education and the judiciary, emphasizing commitment to the party and thus weakening the independence of lawyers and judges. Tiffert (2011) states that "By the late 1940s, the Guomindang had effectively redefined the identity of the Chinese judiciary. The idealized Chinese judge shifted from a latter-day scholar-official worthy of the ethical burdens of judicial independence to a seasoned, technically competent cadre dutiful to the state and the ideology of its ruling party." Not surprisingly, in 1949, the new

from 1979 to 1996, that city does not satisfy our criteria as one considered by potential foreign investors. It therefore does not enter into our data analysis.

¹⁴ In addition to the references cited earlier in this section, see Huang (2001), Zimmerman (2014), and Report of the Commission on Extraterritoriality in China (1926).

¹⁵ See Tiffert (2011) on the development of the courts under the Guomindang.

Chinese government abolished all the Guomindang's legal measures and removed the existing judiciary. The size of the judiciary in the 1940's was less than 2% of what it is now in mainland China.

In the period from 1949 to 1976, all remnants of Western-style market-capitalist law were removed and, to the extent there was any substitute, replaced with Soviet-style law. Over this time, gradually the whole legal system was decimated by successive political convulsions. In the 1950s, law was converted into a set of principles for conducting class struggle, and for converting a feudal society into a utopian communist one. These general principles saw little embodiment in precise laws, so that by the beginning of Deng's reforms there was little in the statute books on which to rely. Courts and the legal profession saw a similar demise.¹⁶ During the anti-rightist movement of the late 1950s, the legal profession and the Ministry of Justice were abolished: those advocating modern legal reforms were regarded as class enemies. The Cultural Revolution completed the eradication of those legal reforms that had occurred in the PRC's early days, with law schools and law books destroyed, and legal scholars banished. By the end of the cultural revolution, no lawyers had been trained in China for 20 years. A legal system and legal profession that would be recognizable anywhere in the rest of the world, even in the Soviet Union of Stalin's time, simply did not exist in China in 1979.

Legal reforms were not the first priority for the post-1978 changes even though the absence of a functioning legal system was one factor deemed responsible for the excesses of the previous years (Clarke et al. 2008). In the first stage of economic reforms, the focus was on incentives in the rural sector and the measures were administrative, not legal. The Economic Contract Law of 1981 viewed contracts through the lens of planning and was relevant only to state entities. A contract law covering individuals was passed only in 1986. The first market-economy oriented contract law was implemented in 1999, already beyond the time-period of our data set.

One significant exception to this characterization was the passage of the Law on Sino-Foreign Equity Joint Ventures in 1979.¹⁷ The JV law restricted the Chinese partners to state-owned enterprises. Multiple levels of the bureaucracy had a formal role in the process of approving, setting up, and monitoring the JVs. Vague in many of its pronouncements, this law was more a general set of principles. And one of the principles was to create a special regime for JV contracts, separate from domestic law. The 1979 law was clarified somewhat in regulations promulgated in 1983, amendments passed in 1990, and in the Foreign Economic Contract Law of 1985.¹⁸ Notably, while the 1985 law allowed many transacting partners to contract around Chinese domestic law, the 1983 regulations ruled out this possibility specifically for JVs.

¹⁶ See Conner (2010) on the rise, decline, and rise of the legal profession in modern China.

¹⁷ "The Law of the People's Republic of China on Joint Venture using Chinese and Foreign Investment" July 1, 1979. On the law and subsequent developments, see Brickley (1988), Potter (1993), and Zhang and McLean (1987).

¹⁸ Amendments to the Law of the People's Republic of China on Chinese-Foreign Equity Joint Ventures, Apr. 4, 1990; People's Republic of China Foreign Economic Contract Law, 6 Int'l Tax & Bus. Law. 50 (1988); "Regulations for the Implementation of the Law of the People's Republic of China on Chinese-Foreign Equity Joint Ventures" 1983-09-20.

Parties to a JV contract could name an arbitration panel in either China or the country of the foreign partner, but Chinese domestic law was to be the governing law. If the favored Chinese alternative of mediation, that is supervised direct negotiation between the parties, and then arbitration failed to resolve disputes, then the parties could file suit in a Chinese court and would be subject to Chinese legal procedures as well as Chinese law.

In sum, the legal regime surrounding Chinese JVs in the first two decades of reforms was hardly specific enough nor so certain in its operation to characterize JVs as entities whose behaviors were determined by the shadow of the law. Moreover, to the extent that law did play a role, it was not law that had persisted from before communist times, but law that had been created anew as economic reforms proceeded. The persistence of formal institutions certainly could not be the mechanism that explains the patterns that we find in our data.

3. A Conditional Logit Model

We now describe a specific estimation model. In the early reform years, only state-owned enterprises (SOEs) and a small number of collective firms existed in China. Governments at different levels, through their planning commissions, played the determining role in all enterprise-related decisions. Thus, in the early stages of reforms, the decisions of the SOEs were under the purview of local officials, including decisions to form joint-ventures with foreigners. Thus, when given the task of attracting foreign direct investment, local governments automatically took it upon themselves to select the most appropriate SOE as the domestic partner and to search for any foreign firm that was brave enough to enter into a JV in China, which was then still an unknown entity to most of the rest of the world. As a result, we view Western firms as considering signing agreements with SOEs from Chinese cities, where they choose between different cities rather than different enterprises.¹⁹

We refer to a particular firm f coming from a Western country, w , in year t as f_{wt} and the set of firms coming from w in year t as $F(wt)$. We further refer to a particular Chinese city as c . The utility of firm f_{wt} in year t when investing in a JV with an SOE from Chinese city c is:

$$U_{f_{wt}ct} = \alpha Z_{f_{wt}} + \beta X_{ct} + \gamma V_{f_{wt}ct} + \eta_{f_{wt}ct} \text{ for } f_{wt} \in F(wt), c = 1, \dots, C_t, \text{ and } t = 1, \dots, T,$$

where C_t is the number of Chinese cities considered in year t and T is the total number of time periods under study; the α , β , and γ are parameter vectors; $Z_{f_{wt}}$ is a vector of variables that vary across firms (and therefore across time and countries), but not across cities; X_{ct} is a vector of variables that vary only across time and cities, but not across firms (and therefore not across countries); $V_{f_{wt}ct}$ is a vector of variables that are interaction effects of the characteristics of firms and cities, and therefore in general vary across foreign firms (and thus countries), cities, and time; $\eta_{f_{wt}ct}$ is the error term.

¹⁹ Given the multiple authorities involved in approving foreign direct investment projects in China's early reform years, Chinese enterprises were in no position to negotiate joint ventures with foreign partners unless supported by local governments. Thus, we assume the choices by foreign investors to be among Chinese cities rather than Chinese enterprises.

Given that culture is to be one of the factors that we investigate, we make no presumption that decisions are made only on the basis of profit. In particular, cultural factors can be easily captured in either X_{ct} or V_{fwtct} or both. Also note that although we focus on the utility of the Western firm, this does not exclude Chinese cities finding some benefit from particular types of firms. In fact, we assume that competition for JVs means that such benefits will accrue to both parties and therefore partly appear in the utility of the Western firm.

As the focus in estimation is on the choices made by the firms, this is a natural application of conditional logit (McFadden 1974). Assume that any given firm chooses the single city that gives it the highest utility and that the error term η_{fwtct} has a type I extreme-value distribution.

Then the probability of city g being chosen is given by: $\frac{e^{\alpha Z_{fwt} + \beta X_{gt} + \gamma V_{fwtgt}}}{\sum_c e^{\alpha Z_{fwt} + \beta X_{ct} + \gamma V_{fwtct}}}$. Note that the Z_{fwt} terms in the numerator and denominator cancel in the above expression, so that the effects of firm-specific (and hence country-specific) variables that are constant across cities will not be identified.²⁰

Using data on X_{ct} , V_{fwtct} , and the choices made by firms, one can then estimate the above model using maximum likelihood (McFadden 1974). Our prime interest is in the V_{fwtct} , which capture the particular affinity between enterprises from a specific country and specific cities. The simplest of these variables, which drives our initial data analysis, is *colonial tie*, a dummy variable equal to 1 if the firm's country had a colony in the city that the firm is considering as a host of its joint venture, and 0 otherwise.

In contrast, the results relevant to the X_{ct} do not provide much information to guide the main inquiry of this paper. Nevertheless, it is important to include the X_{ct} in the conditional logit regressions in order to counter possible omitted variable bias. First, and most important, X_{ct} contains city fixed-effects. Second, it captures the time varying characteristics of cities in the sample. We choose the specific variables in X_{ct} on the basis of the existing literature on FDI (see in particular Blonigen and Piger 2014). These variables are discussed in the next section, which also describes the data we use for this study.

4. Data Description

Before describing the data, we first explain the geographical concept that is referred to as a "city" in our study, because it is the unit that identifies for us the colonial tie of the foreign firm considering a JV. If the country of the foreign firm had maintained a colony in a certain Chinese city, then we consider the firm as having a colonial tie with the city. We use the 3-digit level, prefectural, postal zone of the Chinese postal code system in 1996 to define a city, which gives us 271 prefectural-level cities.²¹ We chose the prefectural level because this was the

²⁰ Thus implicitly, the model contains firm fixed effects and therefore country and time fixed effects.

²¹ Note that the prefectural level postal zones are not completely identical to prefectural level cities defined within the administrative classification system, but they largely overlap in a very high percentage of cases. Since the old colonial areas are

administrative level used to define the cities that were open to foreign investment in China's early reform era.

The geographical areas of the colonies of 19th and 20th century China were usually quite limited, much smaller than the corresponding prefectural level city in modern China. For example, the Jiaozhou Bay concession was a German leased territory in Imperial China from 1898 to 1914, located in the coastal area of Qingdao. It covered 552 square kilometers in 1914, while in 2000 the land area of Qingdao covered 10,456 square kilometers. Thus, today, the old colonial areas are to be found in the center of the current cities. Note that in some cities, there was more than one colonial area. For example, in the Hankou district of Wuhan, there were concessions granted to Great Britain, France, Russia, Germany, and Japan. In these cases, we allow the potential impacts of all such concessions by setting the colonial-tie dummy variable equal to one for all pertinent country-city pairs.

Our data come from multiple sources, the most important being the FDI contract database from the Ministry of Foreign Trade and Economic Cooperation (MOFTEC).²² Between 1978 and 1996, the MOFTEC published information on each JV contract agreed upon and carried out by the related parties, including the identities of the investors, industry, location, amount of contractual investment by both parties, and duration of the contract. Thus, for 1978-1996, the MOFTEC data set provides information on the whole population of JV contracts in China. After 1996, due to the substantial increase in the number of JV contracts, MOFTEC decided to publish data on only those projects above a certain threshold value of investment. Between 1978 and 1996, there were 8,505 JV contracts that were implemented. After dropping observations with missing values, there are 7,836 observations. The investment projects were made in 205 Chinese cities, targeting 63 two-digit US SIC_87 industries and involving 56 different source countries and regions.

A well-known deficiency of the conditional logit model is that it assumes the independence of irrelevant alternatives: the odds of choosing alternative i relative to choosing alternative k are not affected by the inclusion of alternatives other than i or k . In the literature, the most common way to investigate whether this assumption is critical is to provide estimates for different samples and examine whether the results are robust (see, for example, Head, Ries, and Swenson (1995), and Blonigen, Ellis, and Fausten (2005)). Thus, in all cases we provide estimates for three different data sets. In dataset 1, the set of alternative cities in each year includes only those that had concluded joint ventures in that year. In dataset 2, the set of alternative cities includes those that had concluded joint ventures at any time during 1978-1996 (205 alternative cities in each year). In dataset 3, the set of alternative cities includes those in data set 1 plus all cities that were

all located in the center of the cities (defined using the postal code in 1996), and never located on the border between two cities, our results are not impacted by this definition of prefectural level city.

²² In 2003, MOFTEC went through a re-organization to become the Ministry of Commerce, during which the ministry also incorporated the former State Economic and Trade Commission (SETC) and the State Development Planning Commission (SDPC).

both officially designated as 'open' in the year and had hosted a JV at any time during 1978-1996. An open city is one that had been named by the central authorities as allowed to enjoy preferential policies in the conduct of international interactions.

When examining persistence and mechanisms of persistence in the determinants of JV location, the variables of principal interest reflect three main items of information that we use intensively in the empirical exercises: the city in which the potential Chinese partner is based, which is where the potential JV would be sited; the country from which the Western partner originates; and the sector of the JV's main area of production. We use combinations of these variables, with additional data, to construct the explanatory variables for our analysis. In particular, the Chinese city allows us to identify whether a colony was present in the city, which colonial powers had colonies in the city, and the main dialect spoken in the city. The Western country allows us to identify whether the firm emanates from a country that had a colony in a particular city, and the type of legal system relevant to a colony and/or country, i.e., a common-law or civil-law legal system. Finally, the sector of the JV allows us to use standard data sources to characterize the nature of the JV, for example, the degree to which firms in the sector of a JV rely on external financing.

Table 2 provides definitions of all variables, Table 3 provides summary statistics, and Table 4 lists sources of data. While readers can refer to those tables for precise information on the variables, we include some discussion here on the principal variables we use in order to provide context for the empirical analysis that follows. We begin with the set of variables that identify the influence of foreign powers on Chinese cities, which are of chief interest. *Colonial tie* is a dummy variable equal to 1 if the city hosting the JV was a colony of the country from which the foreign firm comes. *Colonial tie (civil law)* and *colonial tie (common law)* identify whether the *colonial tie* was with a civil-law country or a common-law country.

If one believes that countries sharing the same legal tradition (say, civil law) have many things in common, then one may want to explore whether a firm from a civil-law country would have some kind of affinity with a Chinese city that used to be a colony of a different civil-law country. We construct a pair of variables, *non-colonial civil-law tie* and *non-colonial common-law tie* to study such a possibility, where the former takes the value of 1 if the potential host city of the JV was a colony of a civil-law country, and the foreign firm comes from a different civil-law country, and 0 otherwise. The latter is defined analogously.

Since China has a mixture of dialects, which when spoken may be unintelligible to those who can only speak a different dialect, the heritage of a country's experience with dialects might be important in facilitating communications with post-reform officials. We define a variable to capture such potential impact, *dialect tie*, which takes the value 1 if the foreign firm comes from a country that had a colonial city with a dialect that is the same as the one in the city that the foreign firm is now considering for a joint venture. In the estimations, we use the variable *dialect tie minus colonial tie* to focus upon those effects that arise from dialect complementarities apart from those that arise directly from colonization. We also differentiate between effects in

mandarin- and non-mandarin-speaking areas, since a country's experience in a non-mandarin dialect is much more likely to give it a special comparative advantage than experience in a mandarin dialect.

An alternative way of measuring historical foreign influence on China is to use *sphere of influence*, an indicator equal to 1 if the city that is a potential host of the JV was in the sphere of influence of the country from which the foreign firm comes. *Sphere of influence* was a form of imperialism in which the imperial power claimed exclusive investment or trading privileges over a specific region of China. Five foreign powers exerted their respective influence on 18 provinces in China (MacMurray, 1921).²³ Figure 2 maps the sphere of influence of the five foreign powers in China, while Table 5 lists the specific regions in China under the influence of each power. A comparison between Figures 1 and 2 shows that there is a considerable difference between *sphere of influence* and colonial cities, with sphere of influence covering much larger areas and neither classification fully nested within the other.

Additional variables that provide information on the degree of foreign influence on Chinese colonial cities are the *colonial firms*, the number of firms from a country in a colonial city between 1891 and 1921, and *colonial population*, the number of citizens of the country present in the colonial city in the same years.

Implicitly, the above discussion already defines several variables at the country and city level, which we interact in various combinations to be described when the results are presented. Such variables include *colonizer*, which is equal to 1 if the home country of a foreign firm was formerly a colonizer of any Chinese colony city (and 0 otherwise), as well as *civil-law country* and *common-law country*, which indicates whether the country of a foreign firm is a civil law or common law country. Similarly, *colonized* indicates that the potential host city of the JV was a former colony, *mandarin* that the city has a dialect of mandarin as its official dialect), *civil-law colonial city* that the city was colonized by a civil law country and analogously *common-law colonial city*.

We also make use of several sectoral level characteristics. The first is *contract intensity*, which is the degree to which a firm (in this case, the JV) relies on transaction-cost-reducing mechanisms in order to construct workable relationships with its input suppliers. The second is external financing, which measures the degree to which the production of a good relies on external financing. Note that *contract intensity* and *external financing* do not vary across cities given a specific Western firm, and therefore the estimation of the effects of these variables is not possible within the conditional logit framework. However, one can examine the effects of the interaction of these variables and the various colonial-tie variables.

There are three dummy variables that define the sector of output of the JV, whether it is in services, or produces a standard or differentiated product. Again, these variables characterizing

²³ Our classification of provinces into spheres of influence uses the treaties reported in MacMurray (1921). The treaties were signed over the period 1898-1915, with most being concluded in 1898.

the output of the JV do not vary across cities, precluding their use in the regressions without interacting them with other variables.

Finally, using the literature on FDI location (see in particular Blonigen and Piger 2014), we include as control variables characteristics of cities in the sample that either vary over time or vary across the countries of potential JV partners. Specifically, we include in our baseline model the *GDP* of the foreign firm's home country and the *GDP* of the Chinese host city's province (both in logarithms), the *distance* between the Chinese city and the capital of the foreign country (in logarithms), as well as *open city* (taking the value of 1 for Chinese cities that were assigned certain preferential policies in foreign interactions),²⁴ and *agglomeration by country* and *agglomeration by industry*. To control for infrastructure quality, human capital level, and productivity level, we include *roads per capita*, the logarithm of total road length per capita in the city's province in year t , *graduates*, the logarithm of the number of college graduates per capita in the city's province in year t , and *average wage*, the logarithm of the average wage in the city's province in year t .

We also include *economic distance*, which is an index of a city's closeness to centers of economic activities in China (or the distance to Chinese markets). For city c belonging to province k , the economic distance equals the sum over all other provinces of the ratio between provincial level GDP and the square of the distance between c and the provincial capital. Thus, $Economic\ Distance_{ct} = \sum_{j \neq k} (\frac{GDP_{jt}}{Distance_{cj}^2})$, where $Distance_{cj}$ represents the distance from Chinese city c to the capital city of province j and GDP_{jt} is the GDP of province j in year t .

5. Colonial ties and their effects over time

Our first results appear in Table 6. There we present the estimates of a conditional logit model that includes the main variable of interest, *colonial tie*, plus the additional controls discussed in Sections 3 and 4 (the terms in X_{ct}). Note that all regressions contain city fixed effects, unless otherwise noted. Moreover, since the estimation is driven by the differential attractiveness of cities for a given western firm in a specific year, the estimates implicitly contain firm, country, and time fixed effects (the terms in Z_{fwt}). All standard errors are clustered at the country level. The results are presented for all three data sets described in Section 4.

To facilitate interpretation, estimates are presented as odds ratios, i.e., the coefficients reported in Table 6 are estimates of the e^β and e^γ terms of Section 3. Therefore, the numerical value of the colonial tie coefficient in Table 6 can be approximately interpreted as the ratio of the probability that a western firm picks a city with a colonial tie to the probability that the firm

²⁴ The preferential policies were on tariffs, entry and exit of aliens, import and export of raw materials and products, land sales and leases, and financial and monetary policies. During the 1980s, China designated many "open zones" in several stages, ranging from the initial special economic zones and open coastal cities and areas, to additional inland and coastal economic and technology development zones. The variable $open\ city_{ct} = 1$ if one or more open zones or areas were designated in city c in year t .

picks an otherwise comparable city that does not have a colonial tie.²⁵ Thus, all test statistics are for the null hypothesis that odds ratios equal one.

The estimates of the colonial-tie odds ratios are all significantly different from 1 at the 1% level. Moreover, the colonial ties are economically important. The probability of a firm picking a city with a colonial tie for its joint venture is approximately 1.4 times the probability of picking a city with no colonial tie and otherwise similar characteristics. The economic importance of this effect can be placed in context by comparing the size of the colonial tie effect to the effect of being an open city. Open cities have enjoyed preferential policies that have facilitated and encouraged international interactions. Yet, the results of Table 6 suggest that the colonial link was at least as important as the central-government preferential treatment given to open cities, the colonial-tie odds ratio being higher than that for open cities for two of the three data sets.

The results for the control variables are all in line with the expectations derived from both theory and the results in previous papers. Moreover, most of the coefficients for these variables are significant at the 1% level, which backs the interpretation of our regression as capturing the motives of western firms as they choose between the economic advantages of different Chinese cities. Given that the results on these control variables are not of intrinsic interest for this paper and given that these results are consistent across all our regressions, we only present estimates for control variables in Table 6, and not in any subsequent tables. Nevertheless, we emphasize that these variables are included in all regressions reported in this paper.

The estimates of the odds ratios are consistent across data sets in the sense that no substantive conclusions would be altered by focusing on the results from one data set rather than another. This is also the case for the results presented in subsequent tables. Hence, our use of the independence of irrelevant alternatives assumption appears not to be a problem.

We also investigate how the colonial tie effect changes over time. The pertinent results appear in Table 7. *Time trend of colonial tie* is the colonial tie dummy multiplied by a time trend (the year of the JV contract minus 1978). The odds ratio of the colonial tie time trend is statistically significantly below 1, meaning that the colonial-tie effect diminishes over time. At the beginning of our sample period, the probability of a firm picking a city with a colonial tie is approximately 2.35 times the probability of picking a city with no colonial tie and otherwise similar characteristics. This ratio falls to 1.15 by the end of our sample period. An alternative approach to estimating the time trend is to include dummy variables for each year.²⁶ The resultant estimates, with their confidence intervals, are depicted in Figure 3, which provides a picture consistent with the results of Table 7. The colonial-tie effect is large and significant in the early years of reform and declines almost monotonically.

²⁵ This is an approximation that is more accurate the greater the set of alternatives faced by the firm is, i.e., the greater the number of cities in the data set. Since the number of cities for data set 2 is 205 in every year, the approximation is very close for that data set. Furthermore, we find that the results for all three data sets are consistent throughout the paper.

²⁶ As there were few joint ventures in 1979, a single dummy variable is used for 1979 and 1980.

Exactly how such a time trend should be explained will depend on the specific mechanisms through which the colonial tie has effected its long-lasting impact. As various aspects of the Chinese economy and society have all evolved substantially since the beginning of the country's reform era, multiple interpretations will be consistent with the declining effect of the colonial relationship. For example, on one hand, at the beginning of our sample period formal institutions for a market regime were virtually non-existent, but by 1996 these institutions were beginning to develop. This may suggest that whatever benefit a colonial tie conferred was being eroded by the development of formal institutions, implying that colonial ties are a substitute for formal institutions. On the other hand, while few western firms had interacted with Chinese companies in the two decades prior to the late 1970s, a large number of westerners had accumulated experience in the Chinese market and many Chinese had developed ties with foreigners in the following decade and a half. The increasing familiarity of western firms and Chinese companies with each other and the resultant transfer of human capital and cultural values may also explain the declining impact of colonial ties. Hence, colonial ties could be facilitating transactions through their lingering effect on human capital or culture. We investigate which of these mechanisms is most important in the next section.

6. Exploring the Mechanisms of the Colonial-Tie Effect

We now consider the possible mechanisms that produced the remarkable continuity between China's colonial past and its patterns of JV location in the first years of reform. We consider each mechanism separately, introducing each in a partial analysis that builds on the empirical specification of Table 6. Section 7 considers all mechanisms together, analyzing which survive in a competition to explain the location. As it happens, Section 7 is supportive of all the conclusions we reach in this section's partial analysis.

The broader theoretical context of the current investigation is summarized succinctly by Redding et al. (2011): "A central prediction of a large class of theoretical models is that industry location is not necessarily uniquely determined by fundamentals... These models predict ranges of parameter values where there are several steady state spatial distributions of economic activity. Which of these steady states is selected depends on either initial conditions and the history of shocks or agents' expectations." Thus, our fundamentals are all the explanatory variables in Table 6, except for colonial tie, while colonial tie reflects the peculiar 'shock' of colonialism in China and the expectations that arose from it.

There arises the immediate question of whether that colonial tie effect could be proxying some omitted fundamentals. Of course, colonial cities did have fundamental economic advantages relative to other cities.²⁷ The biggest colonial city, Shanghai, after all, has a superb location for commerce. But our empirical strategy ensures that colonial effects do not proxy such city fundamentals that are constant both over time and across different partner firms. Our results on colonial ties reflect only city-country matches: the regressions implicitly control for country

²⁷ See Jia (2014) for examples on the location of treaty ports.

fixed effects and explicitly for city fixed effects. Therefore, the colonial tie effects cannot be proxying any special features of cities that apply to all countries, or of countries that apply to all cities.

Hence, for fundamentals to explain our results, one would have to tell a story of country-city interactions proxying economic fundamentals that are independent of colonial history. As an illustration, one would have to argue that the British set up their concession in Amoy (Xiamen) in Imperial China in 1878 because of some peculiar economic advantages of that city that were relevant only to the British, not to the Germans, for example, and these advantages were not to be found by the British in other places, for example, Qingdao, which in turn had an economic attraction specific to Germans. Moreover, those pre-colonial fundamentals that made Amoy particularly attractive to the British would have to have survived from Imperial China and be present in modernizing China, having lasted 100 years, through the fall of the Qing Empire, the warlord era, Guomindang rule, Japanese occupation, civil war, the profound early economic ambitions of the PRC, which revolutionized industry and agriculture and led to autarky, and the enormous changes in the world economy over the same time period. This seems unlikely for any variable other than city-country distance, which we directly control for in our regressions.²⁸

More importantly, historical examples suggest that the location of particular colonies had much to do with the specificities of 19th century international relations, warfare, and politics, and less to do with fundamentals relevant to modern economics. For example, Amoy was a small port that had been known to the Portuguese as much as to the British before the Treaty of Nanking, and was convenient for opium trade. The growth of Shanghai in contrast to Ningbo was primarily due to the lack of previous development in Shanghai, so that local officials were weak, whereas Ningbo had been a flourishing center of trade from early on (Fairbank 1978). Later, when leaseholds were obtained, the absence of existing activities was as much an advantage as their presence. Qingdao was a small fishing village before it was garrisoned with Chinese troops making it an obvious target for the Germans who at first had military, not commercial objectives.

Thus, we can dismiss the notion that the colonial-tie effect somehow proxies the persistent economic fundamentals of city-country matches. Instead, this effect reflects the history of shocks or agents' expectations resulting from those shocks, which arose from the idiosyncrasies of colonial location. We now turn to investigate which mechanisms could have produced the colonial-tie effect.

6.1 Beliefs about the natural location of foreign activities

It is possible that memories of colonial history, passed on from older generations, encouraged government officials, say planners in Beijing, and managers of firms to believe that somehow the British belonged in Amoy and the Germans belonged in Qingdao, etc. Could the

²⁸ We also examined the effect of the difference in average temperature between the Chinese city and the western country, the difference in latitude, and the difference in annual rainfall. None of these variables were statistically significant and their addition did not change the colonial-tie coefficient appreciably.

effect of colonial ties have arisen simply because people came to believe that these city-country pairs were, in some sense, natural, without anything deeper underlying those effects? We are able to investigate this hypothesis in two ways. In the following subsections, we find that only some city-country pairs, with theoretically plausible institutional and economic characteristics, evidence a colonial effect. In this subsection, we rely on features of China's history relevant outside the colonies, demonstrating that the colonial tie effect cannot have arisen because of some belief about the natural location of foreign firms.

Although the western powers had their greatest effects in small parts of China, towards the end of the 19th century nearly the whole territory of China was regarded as being in the sphere of influence of one specified western power or another. This did not imply any form of direct colonization but gave a country priority in investment or trading activities in its own sphere of influence.²⁹ Therefore, each western power would have had more historical ties in its own sphere of influence than in other parts of China. However, outside colonial cities, the western powers undertook little institutional development. Indeed, the principle of extra-territoriality meant that outside the colonial cities, sphere of influence implied nothing about institutional arrangements. For example, within the British, Russian, and French spheres of influence, Italy had consular courts that adjudicated cases that could involve Chinese citizens (H.M.S.O., 1926). Similarly, over one-half of British Consulates—the local administrators of English law—were located outside the British sphere of influence (Coates 1988, pp. 488-9). Hence, Chinese citizens within a country's sphere of influence who were not residents of or doing business in colonial cities would not know more about that country's institutions than about some other country's. Thus, if there is any effect of spheres of influence, it would have to have arisen purely from a belief that these spheres were natural domains of operation for firms from the respective western countries.

The *sphere of influence* variable captures whether the Chinese city being considered by a western firm for a joint-venture (JV) lies in the region that was once the sphere of influence of the firm's country. The results appear in Table 8. The odds ratios on the colonial-tie effect barely change from those in Table 6 and the odds ratios on sphere of influence are below 1 and insignificant, indicating that there is no detectable effect arising from expectations that firms from western countries belong in specific areas of China. Thus, we dismiss the notion that our colonial-tie effect is based simply on expectations of natural location. This indicates that the mechanism underlying the colonial-tie effect does not lie in the mere persistence of one of multiple equilibrium outcomes that resulted from some historical event: the effect lies more deeply in the institutional or cultural influence that the western powers had within their colonies.

²⁹ According to Prichard (1942), "The powers claimed and were given first opportunity in the development of specific geographical areas or spheres of influence and were granted leaseholds and railway and mining concessions, which once given to one power it was physically impossible to grant to some other power or for other powers to claim them under the most-favored-nation clause. Concessions like these automatically destroyed equal investment opportunities and were potentially capable of destroying equal trading rights."

6.2 The persistence of formal institutions

We analyze the possibility of an institutional mechanism of persistence from a purely theoretical and factual perspective, by using the information already presented in Section 2. No formal colonial institutions outlasted the end of the colonial period (1943) and the formal Chinese legal institutions that existed before 1949 did not survive the first two decades of the People's Republic of China (PRC). One theoretically possible scenario is that features of the colonial institutions were absorbed into local institutions in the first half of the 20th century, which were then carried over into local formal institutions in the 1950s, and then spontaneously revived in 1978 when reforms began. This is implausible. China is a unitary country, with the same formal institutions in all jurisdictions. Moreover, in the first two decades of the PRC there was little that resembled the institutions of a capitalist market economy to be found anywhere: all pre-existing legal institutions were abolished to be refashioned completely following the Soviet model.³⁰ The legal institutions relevant to FDI did not spontaneously surface in 1979 relying on local initiatives, but were rather a product of a specific central government initiative, one which aimed at separating the regime for FDI from other aspects of China's legal institutions (Clarke et al. 2008). We thus dismiss any possibility that the persistence of formal institutions can explain the colonial-tie effect.

6.3 Human capital relevant to institutions 1: city-country effects

A related hypothesis—but one that does not rely upon the persistence of institutions—is that the colonial experience imparted legal human capital in the Chinese community of a city and this affected—via cultural inheritance—the cognitive processes of officials dealing with FDI decisions.³¹ Whatever the formal nature of the institutions, law-related processes in the modern city might have the hue of the legal system present in the old colony. This could affect the productivity of a relationship between the city and firms from the former colonial power in two ways. First, city officials are able, perhaps unconsciously, to understand better what such firms desire when constructing agreements. Second, such foreign firms might recognize features of legal processes that are complementary to their own modes of functioning. Both would reduce the transaction costs of reaching decisions.

The key to examining this theory is the recognition that its essence is that each side of a potential transaction recognizes something complementary about the way in which the other side transacts and that the resultant reduction in transaction costs might vary across city-country pairs. One source of this variation could be the type of legal system present in the colonies, whether it was civil law or common law. Importantly, legal knowledge in the colonial cities would have depreciated at different rates for these two systems. Chinese legal developments (especially the importation of civil law under the Guomindang) would have reinforced the civil-law legal characteristics of civil-law cities and weakened the common-law characteristics of common-law

³⁰ See Ye (2014), for example.

³¹ For example, Lee (2012) comments that some lawyers who had been educated and trained in the era when the colonies still existed survived to participate in the legal reforms of the 1980's.

cities. Lee (2012) points out that Shanghai, while having an enormous British and American presence, had one law school teaching common law and six teaching civil law. Moreover, the centralized and codified civil law resonated with both China's experience under imperial rule and China's efforts to recentralize in the 1920s and 1930s. The ideas underlying the common-law system, relying on more decentralized, less hierarchical processes, would have been much less influential in China's far-flung colonial cities. For example, juries were used in a very limited way and consular officials acted as investigators and judges, looking more like civil-law judges than common-law jurists.

To examine these ideas, we create two variables from the original colonial-tie variable: *colonial tie (civil law)* is *colonial-tie* times a dummy variable equal to 1 if the colonizing country was a civil law country and *colonial tie (common law)* is defined analogously. (To make language less convoluted in the following, we will refer, somewhat inaccurately, to common-law and civil-law cities, denoting the legal type of the city's colonial regime.) These two new variables now replace colonial tie in Table 6's specification. The results appear in Table 9. As predicted, the effect of a civil-law colonial tie is larger than the effect of the common-law tie, with the latter having an odds ratio not significantly different from one.

It is possible to go further with this analysis. If indeed there is inherited, legal-system-dependent human capital that reduces transaction costs, then the effect of this capital should not be confined simply to those city-country pairs that had a direct colonial relationship. It should also contribute to reducing the costs of relationships when a firm from any civil-law country was considering investing in any civil-law city. To test this we use *non-colonial civil-law tie*, a dummy variable equal to 1 when a firm from a civil-law country is considering investing in a civil-law city that was not a colony of the country. *Non-colonial common-law tie* is defined analogously.

The results appear in Table 10. Notice that a colonial-tie variable would reflect two effects, direct knowledge within the specific city and country about each other and complementarities between city and country resulting from a shared history of the same type of legal-system. Non-colonial ties would reflect only the second of these. Our predictions are therefore that civil-law ties are more important than common-law ties and that direct colonial ties are more important than non-colonial ties. These predictions are borne out in the regression results.

The results for civil law give decisive evidence that inherited, legal human capital has had an effect on the location of FDI within China. The effect of a non-colonial civil-law tie is greater than the effect of a colonial common-law tie, suggesting that familiarity of legal-styles is more important than country-city familiarity. Consider the result on non-colonial civil law ties. That estimate implies, for example, that a company from a civil-law country that did not have a colony in China, for example Denmark, is 44% more likely to start a joint venture in a city that was colonized by some other civil-law power, say Germany in Qingdao, than in a city that was not colonized by a civil-law power. In contrast, the negative coefficient on *non-colonial common-law tie* suggests that it is counter-productive for city and firm to share human capital

reflecting a legal approach different from the one prevailing in China today. Perhaps, this is because the legal human capital thus obtained may interfere rather than assist in the firm-city investment transactions as a result of the inconsistencies between common-law and current Chinese law.

6.4 Human capital relevant to institutions 2: sector-input effects

An alternative approach to testing whether the colonial-tie effects could derive from inherited legal human capital is to examine whether the effects are larger in sectors where the transaction costs of FDI contracts would be particularly sensitive to the presence human capital. We view a JV as having two partners who each contribute inputs to the JV's production. Hence, it is natural to use information on the nature of the inputs. We have no direct knowledge of the inputs of particular JVs, but we do know the sector of the JV's product, so that implementation of the general Rajan and Zingales (1998) methodology is feasible.

We first examine contract intensity (Nunn 2007), which measures the degree to which a purchasing firm would have to rely upon transaction-cost reducing mechanisms in order to construct workable relationships with input suppliers. We build on the specification of Table 10, adding four variables that interact contract intensity with the four colonial/legal-system dummy variables. The results appear in Table 11.

The results for the variables already included in Table 10 change little, but the results on the contract intensity variable add a new dimension of interpretation. While none of the odds-ratios for contract-intensity interacted with the civil law variables are significantly different from one, the corresponding coefficients for common law are significant and economically meaningful. The results for non-colonial common-law ties are perhaps the most interesting. Recall that such ties were counter-productive in the results for Table 10. Indeed, the same result appears in Table 11 on average, given that the mean of contract intensity is approximately zero in the observations used in the regressions of Table 11. A non-colonial, common-law tie would become productive in a sector only when contract intensity is above 0.54. However, the maximum value of contract intensity in the data used for Table 11 is 0.35. This implies that while the negative effects of non-colonial common-law ties diminish with contract intensity, they are negative for all city-firm matches in our data set.

JV contracts also involve financing considerations. We construct an exactly comparable set of results using a measure of the degree to which production of a good requires external financing, from Ciccone and Papaioannou (2009).³² The results appear in Table 12, which has an structure exactly analogous to Table 11. The conclusions are also similar. Non-colonial common-law ties are on average counterproductive since the mean of the external-financing variable is zero. A non-colonial common law tie would become productive in a sector where external financing is equal to 0.78, but the maximum value of external financing in our data set is

³² This is an update of Rajan and Zingales' (1998) measure of industry reliance on external finance, which is defined as 1 minus industry cash flow over industry investment. Our measure is normalized to have mean zero.

0.55. This implies that while the negative effects of non-colonial common-law ties diminish with the need for external-financing, they are still counter-productive for all city-firm matches in our data set.

The overall message from these results is that a civil-law heritage is generally productive, not especially pertinent in industries that are particularly dependent on workable transaction-cost reducing mechanisms. In contrast, the effect of the common law heritage is quite industry specific, with industries that rely more on transaction-cost-reducing mechanisms more likely to benefit from such a heritage.

It is worth emphasizing that these results must be reflective of inherited human capital. Consider an example of the implications of the *non-colonial civil-law tie*, which is statistically significantly different from one. Firms from Denmark, say, a perfectly innocent country not having had past designs on Chinese cities, have an affinity for setting up joint ventures specifically in cities that were colonies of, say, Spain or Italy, rather than cities that were colonies of say, the USA or the UK, or indeed cities that were not colonies at all. It is difficult to see what the Danes might find in those civil-law colonial cities apart from knowledge of civil-law procedures.

6.5 Human capital not directly relevant to institutions

One important way in which the cities of China vary is in spoken dialects. Colonizers probably developed expertise in the dialect of their colonial city. This human capital could be preserved through the generations and might have been useful in the first stages of reform, especially after a two-decade period in which Chinese city officials were discouraged from developing any cosmopolitan skills. For example, the British presence in Xiamen (the old Amoy) would have given the British experience in Min dialects, which could have given them advantages in the major city of Quanzhou where a Min dialect is also spoken, but which was never colonized.

The variable *dialect tie* is a dummy variable equal to one if the firm's country had a colony in any city that has the same dialect as the city in which the firm is considering investing. The variable *dialect tie minus colonial tie* captures those dialect ties that did not arise directly from colonization of the particular city being considered for a JV.

Not all Chinese dialects are equal. Mandarin is the country's lingua franca and its dialects are the official ones in more than half of the cities in our FDI sample. Human capital derived from colonial experience with Mandarin would presumably be much less important because there is widespread expertise in this dialect in most Western countries. Thus we treat ties for Mandarin and non-Mandarin dialects separately by using interactions with the variable *Mandarin*, a dummy variable that equals one if the city's dialect is part of the Mandarin group. We also interact *colonial tie* with this variable, to examine whether the colonial-tie effect itself is mediated through dialect ties.

The results appear in Table 13. The odds ratio of *dialect tie minus colonial tie* for the non-Mandarin ties is large and statistically significantly greater than one, whereas it is very close to one and non-significant for the Mandarin ties. The size of the effect of *colonial tie* is independent of the dialect grouping of the colonial city.

6.6 *Cognizance in the general population: cultural affinity or inherited human capital?*

As the immediately preceding results suggest, cultural memories might be relevant for a larger population rather than being specifically confined to inheritance of human capital. The general populace of the city might be relevant because the products of the JV have to be sold. The effect of characteristics of the general populace on the formation of JVs will vary according to the nature of the product to be produced by the JV. We divide the products into three types, services, differentiated goods, and standardized goods. These product types have different customer bases. The service sector will have sales that are primarily local, relying on personal contact. Standardized goods will have broader regional or even national markets. These are the types of goods for which specialized transactional arrangements are not required. Differentiated goods can also be sold across the country, but require specialized transactional arrangements.

We therefore use three new dummy variables indicating the type of output of the potential JV. For example, *differentiated product* is a dummy variable equal to one if the JV produces a good that is classified as a differentiated one based on an existing classification (Giannetti, Burkart, and Ellingsen 2011). The other two are defined analogously. These variables are interacted with the colonial-tie and non-colonial tie dummy variables. The results appear in Tables 14-16.

The large contrast is between the results for services and those for the two types of goods. The colonial-tie effect is present for services but not for the other two. And the effect for services is strong: for example, the odds ratio for civil-law colonial tie for a firm in the service sector is 4.42. Note that the extra colonial-tie effect in the service sector could occur for two reasons. First, since the output of that sector is sold locally, it might simply show some local cultural affinity for products that can be associated with the old colony. Second, also since the output is sold locally, the initiators of the JV might have predicted that it would be easier to sell the output of a JV with a colonial tie, since there would be more complementary human capital among the potential buyers of the output for such JVs than among potential buyers for JVs without colonial ties. Neither of these reasons apply to the two other product types because their sales would not be concentrated in the local market.³³

³³ One might ask how this argument could explain an odds ratio on *standardized products*non-colonial common law tie* that is significantly below 1. This would follow from comparative advantage reasoning in an environment where, for whatever reason, there is competition between western firms wanting to sign a JV contract in a particular city. Contrast two firms that are identical except for the sector in which their proposed JV will operate: A is in the service sector and has city ties (either colonial or non-colonial); B is in the standardized-goods sector and has the same type of city ties. Then A could offer better terms to the city than B because A would see that the culture or the human capital of the city would aid it in selling the products of the JV, whereas B would not see such advantages because its sales are nationwide. B would suffer a comparative disadvantage in the competition to seal JV contracts in that city.

Importantly, the first of these arguments does not apply to the results on *service products* interacted with non-colonial legal ties. By definition, the local populace is not especially acquainted with a country having a non-colonial tie. It is only the second of these arguments that can apply. For example, a foreign firm from a civil-law country that is considering forming a JV would recognize in a civil-law colonial city a group of potential customers for service products who have some knowledge of civil-law procedures. Therefore, the firm would predict less difficulty in selling the JV's output. This is a crucial observation for the general conclusions of this paper: inherited human capital is consistent with the results Tables 14-16. They cannot be explained simply by cultural affinity.

6.7 *Culture, possibly human capital*

Attitudes to foreigners can affect interactions independent of complementarities arising from inherited human capital (Guiso et al. 2009). There are several mechanisms by which this could have occurred in the case of colonial ties. Chinese officials might have a preference for interacting with businesses from an old colonizer because of cultural references to the colonizer within the city or stories about the colonizer inherited from ancestors. An analogous preference could exist on the western side: perhaps the firm or its officials, or their ancestors, had past experience in the colony. One example is AIG's returning to China in 1992 as the country's first foreign life insurance company. Morris Greenberg, its then president, even asked to move back to the same building in Shanghai where AIG's precursor AIA was first founded. This is a pure preference effect arising from culture.

Most models of the replicator dynamics of culture stress the size of the interacting populations as determining the speed and extent of the spread of culture. The more adherents to different cultures there are, the more likely there will be cultural interchange and learning. Thus to examine the possible influence of cultural familiarity, we use data on the size of each western country's presence in the colonial cities in the early twentieth century.

The population and firm data are from a source that focused upon treaty ports, reporting foreign population by country, the number of foreign firms by country, and the Chinese population within the treaty port.³⁴ The area of a treaty port was always much smaller than the area of the current Chinese city. Sometimes there were two or three treaty ports in one city in which the citizens of a specific western country could be living. Thus, we sum over all treaty ports in a single city for both the population and the number of firms from any specific Western country. Because the data on population and firms are on treaty ports and not on colonies, and because there are gaps in these data even for treaty ports, there are considerable differences in the cities included in the regressions appearing above and the cities included in the current analysis.³⁵

³⁴ See Mao, J., et al. (2001). This source reports on inhabitants and firms in the years 1891, 1901, 1911, and 1921. We use the maximum values over the four reporting years.

³⁵ From 1843 to 1930, there were 110 treaty ports, distributed across 77 cities (using the 1996 definitions). Only 62 of these 77 cities are included in the cities used in our empirical exercises. (Fifteen of the original 77 cities are either not in modern-day

Table 17 provides the results when we examine the effect on FDI location of the number of firms from a western country operating in the city in the early twentieth century and the number of people from the western country residing in the city at the same time. Fixed effects ensure that the results do not reflect current city or country size. As we include colonial tie itself in the regression, the estimated effects of firms and population are effects over and above the colonial-tie effect. Although the odds ratios are significantly different from one, the economic effect of the firms and population is only large in the upper-end of the distribution of our observations on these variables. For example, consider a city with a number of firms from a specific country that is at the 95th percentile of the distribution of numbers of firms in the sample of country-city pairs with a foreign presence. That city would only have a probability of being chosen by the firm that is 13% more than the probability for a city that had no foreign firms in colonial times.³⁶ The analogous figure for foreign population is 9%.

There is another population relevant to cultural transmission, which is the Chinese population that lived within the limits of the treaty port or colonial territory. Note that this was a small subset of the population of the whole Chinese city, since the treaty port areas or the lands under colonial administration were only narrowly subscribed portions of much larger cities. This narrow segment of the overall Chinese population is what is reported in the historical data, and it is this population that would have naturally interacted with the foreigners. To include this Chinese population in the regressions, we must remove city fixed effects. This means that the results in Table 18 can only be suggestive of the effect of the historical Chinese population, since now there are undoubtedly omitted-variable biases. Again, although the odds ratios are significantly different from one, the economic effect of the Chinese population is only large in the upper-end of the distribution of our observations on the Chinese population variable. For

China or had no FDI in the relevant time period.) We have historical (1891-1921) data on population and firms for 37 of these 62 cities. These 37 cities are by far the most important of the 62. Of the 25 cities included in our sample of FDI cities that contained treaty-ports and on which we do not have population and firm data, we included 19 in the regressions, assuming foreign firms and populations were zero, because in these 19 cities, foreign influence was likely to have been limited. (6 were cities that were opened voluntarily by the Chinese government, without foreign influence; 6 were treaty port cities only after 1921; 7 were in areas of China that were underdeveloped and less populated in the first decades of the 20th century, that is, in Xinjiang and in provinces north of the Great Wall.) We dropped the remaining six of those 25 cities from the regression analysis, because they were important enough that it would be inappropriate to assume that the foreign firms and population in these cities could have been insignificant. (These cities are Zhanjiang, Shenyang, Siping, Tieling, Changchun, and Qiqihaer.) There are also four cities that are included in our sample of FDI cities that were not treaty port cities—and therefore on which we have no firm and population data—and which were important enough to have a significant foreign presence. Thus, we treat the population and firm data as missing for these cities and omit them from the regressions that include the population and firm variables. (These cities are Beijing, Fushun, Anshan, and Benxi.) Finally, we do include the cities of Yantai and Dalian in the sample for the current set of regressions even though we have no firm and population data on their colonies, Weihaiwei and Lüshunkou, which basically served as naval or military bases. The reason for this is that we do have data on foreign firms and population in the port of Dalian (Dairen), which we use as a proxy for Dalian's historical firm and population data, and we do have data on Yantai's two former treaty ports (Lungkow, Chefoo), which we use the total of populations and firms in these two treaty ports as proxies for Yantai's historical firm and population data.

³⁶ To emphasize, this is at the 95th percentile of the distribution of the set of observations where there was any presence in treaty-port times of people from the country from which the firm considering the JV comes. This is a much smaller sample than used for the regressions and by definition includes only observations in which the population variable is positive.

example, a city with the Chinese population that is at the 95th percentile of the distribution of Chinese population in the sample of city-country pairs with a foreign presence would have a probability of being chosen by the firm that is 72% more than the probability for a city that had no Chinese population in colonial times.

7. The Mechanisms Considered Together

For ease of exposition, we introduced a variety of mechanisms of persistence in succession and analyzed each separately. In this section, we use the rigorous procedure of including all different mechanisms in a single regression, so that we are able to have a clear picture of how different mechanisms work together as the determinants of FDI location choice. Tables 19-21 include all mechanisms and their constituent variables, with the only exception being beliefs about the natural location of foreign activities, since sphere of influence had no effect in Section 6. We group the variables into five conceptual categories that correspond to the broad theoretical mechanisms previously identified. In the following, we focus only on the results for dataset 1 in Table 19, since the results for the two other datasets are similar in all ways. Moreover in the discussion, we focus mainly on comparing the results in Table 19 with the corresponding ones in Section 6 since that section already provided interpretation. As it happens, none of the central conclusions reached so far need any modification.

Column 1 of Table 19 uses the set of observations that includes most of the variables previously discussed in Section 6. Then, columns 2-4 successively add variables that are not available for all observations in this data set, thereby successively reducing sample size. Column 1 includes variables on colonial ties, the legal system, dialect tie, and industry product type. Column 2 introduces variables characterizing the input requirements of the JVs, necessitating the loss of service-sector observations since the contract intensity and external financing variables are not available for this sector. Columns 3 and 4 repeat 1 and 2 except for the addition of the firm and population variables, which requires a further loss of observations.

The coefficient of colonial tie (common law) increases relative to Section 6 and gains significance,³⁷ but it is still smaller than the coefficient of colonial tie (civil law). Note, however, that now the overall effect of legal and colonial ties are a composite. For example, in column 1, the effect of colonial tie (civil law) is the direct effect plus the effect via interactions with the differentiated goods and service sector dummy variables. Calculating these effects at the means of these dummy variables, the composite odds ratio on colonial tie (common law) is 1.57 and the analogous value for colonial tie (civil law) is 2.23. The corresponding composite odds ratios for non-colonial ties are 1.50 for civil law and for 0.85 for common law. This pattern is repeated in all columns of Table 19, reinforcing the conclusions made in subsection 6.3 that civil-law ties are

³⁷ In general, the odds ratios for the direct colonial tie effects are larger in Table 19 than in Section 6. This is purely a feature of the way in which we have analyzed the data. First, in Section 6, the colonial-tie, country-city matches are compared to a set of observations that include matches with dialect ties, which are themselves productive. Once one controls for dialect ties, the estimated effect of colonial ties increases. Second, for common-law ties the compound effects—discussed in the ensuing sentences—are less than the direct effects, and it is these compound effects that are more nearly comparable to the single-variable estimates of Section 6.

more important than common-law ties and that direct colonial ties are more important than non-colonial ties. Importantly, the odds ratios on the compound effects indicate that there is little difference in importance between a non-colonial civil-law tie and a colonial common-law tie.³⁸

For variables related to the product sector, the results are robust, except that the coefficient of the interaction between contract intensity and non-colonial common law tie decreases in magnitude and significance. But this reinforces the previous conclusion that non-colonial common-law ties are never productive. Given the results in column 2, a non-colonial, common-law tie would become productive in a sector where contract intensity is equal to 1.47. However, the maximum value of contract intensity in our data set is 0.354, implying that while the negative effects of non-colonial common-law ties diminish with contract intensity, they are still counter-productive for all city-firm matches that we observe. The results in column 2 and 4 reinforce the previous conclusion that the civil law heritage is a general one, not especially pertinent in industries that are particularly dependent on workable transaction-cost-reducing mechanisms. In contrast, the effect of common-law heritage is quite industry specific, with industries that rely more on transaction-cost-reducing mechanisms less likely to be comparatively disadvantaged from such a heritage.

The coefficients of the two dialect variables are approximately the same as in subsection 6.5. The odds ratio of dialect tie minus colonial tie for the non-Mandarin ties is large and statistically significantly greater than one, whereas it is very close to one for the Mandarin ties.

One set of results does seem inconsistent with those from Section 6, when comparing columns 1 and 3 to columns 2 and 4 (and also comparing to the analogous results in Section 6). But this is more apparent than real. These are the results on the interaction between differentiated products and common-law ties. For example, in column 1 the odds ratio of the interaction between differentiated product and colonial tie (common law) is above unity, whereas in column 2 it is significantly less than unity. This is purely an artefact: differentiated products exhibit high levels of contract intensity and greater needs for external financing. The addition of the latter two variables in column 2, which have odds ratios greater than one for common-law ties, accounts for the change in the estimates related to differentiated products. For example, one can use column 2 to calculate a compound effect resulting from a change in industry from standardized product to differentiated product. This compound effect is the direct effect of the differentiated product industry plus the effect of the higher rates of contract intensity and external financing in differentiated product industries times the effect on location choice of the higher rates of contract intensity and external financing.³⁹ The ratio between the odds ratio of the compound effect of differentiated product when a colonial tie (common law) is present and the odds ratio when it is not present is 2.86, thereby confirming standard results in the literature on

³⁸ The odds ratios on non-colonial civil law ties are approximately 10% lower than those on colonial common-law ties.

³⁹ In our calculations, the higher rates of contract intensity and external financing in differentiated product industries are found as the difference between the mean rates of those variables in differentiated product industries and the mean rates of those variables in standardized product industries.

the greater significance of transaction-cost reducing mechanisms—in our case colonial ties—in differentiated product industries (Rauch 1999).

For variables reflecting the sizes of colonial firms and population, the effect of firms is weaker after we add other mechanisms into the regression, especially when the non-colonial tie variables are included.⁴⁰ However, the coefficient of colonial population is robust. Using column 3 as an example, the coefficient of colonial population is 1.14, implying that a city having a value of the colonial population from a country that is at the 95th percentile of the distribution of colonial population would only have a probability of being chosen by the firm that is 7.9 % more than the probability for a city that had no colonial foreign population. The corresponding estimate in Section 6 is 9%.

Comparing columns 1 and 2 of Table 19 to columns 3 and 4, the addition of the population variables do not cause any change in the previous interpretation of the results. For example, the odds ratios on the interactions of external financing and colonial tie (common law) and of contract intensity and colonial tie (common law) change in magnitude considerably between columns 2 and 4, but both odds ratios are significantly greater than unity in both specifications.⁴¹

In sum, our conclusions from Section 6 remain intact when examining the various mechanisms within a single estimation framework. This in itself is a test of the robustness of results in the face of variations in specification and datasets, thereby increasing the confidence in those results.

8. Conclusion

Using a unique data set on China's foreign direct investment contracts signed in its early years of economic reform, we demonstrate that that foreign firms have an affinity for those Chinese cities where the investors' countries used to have a colonial presence, although such a pattern weakened over time. While these findings are consistent with the results in the existing literature that show the persistence of historical events' impact on current economic performance, the more important element of our study is the investigation of which specific mechanisms lead to the historical persistence.

Following Nunn (2009, 2014), we explore the following mechanisms of historical persistence: path dependence in the selection among multiple equilibria, domestic institutions, human capital, and culture. Among these mechanisms, we find by-far the strongest evidence in support of the human-capital channel, while a broader cultural affinity is consistent with some of

⁴⁰ We do not include the historical Chinese population of the city in the regressions because the estimated coefficient on that variable could well be biased, for example by proxying the current Chinese population, because city fixed effects cannot be included in a regression that contains a variable that characterizes a city and does not vary either across time or across countries. In regressions not reported here, we amend the specifications of columns 3 and 4 of Tables 19-21 by dropping the fixed effects and including the historical Chinese population. The magnitude of the coefficients on Chinese population were similar to those in Tables 19-21 and the estimates of the coefficients of all other variables were very similar to those in Tables 19-21.

⁴¹ In fact, this difference seems to be due to the change in the sample rather than in addition of the population variables. When running the regressions analogous to those in columns 1 and 2 with the reduced sample and then adding colonial firm and colonial population into the regression, the results change little.

results it cannot explain many of the significant effects we uncover in our conditional-logit regressions. We fail to find any evidence in support of the hypothesis of selection from multiple equilibria, whereas the channel of persistence of domestic institutions can easily be dismissed based on the history of these institutions.

These findings shed light on the specific channels for explaining long-term impacts of historical events, thereby contributing to the literature that has focused on the presence of historical persistence. For example, our results suggest why China had long-lasting effects from the old Chinese treaty-port system (Jia 2014) and from Protestantism (Chen, Wang, and Yan 2014).

Thus, we highlight the importance of inherited human capital in accounting for the persistent influence of historical events. However, additional research is needed to ascertain whether the channel of human capital is important in explaining persistence throughout the world or its prominent role is only limited to China, a country where education has been highly valued throughout history.

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