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ABSTRACT

Most of the economic analyses of the overseas-Chinese network focus on trade and investment flows at the country level. In this paper, we analyze the effects of the ethnic Chinese network at the firm level. Contrary to the conventional wisdom, we find that ethnic-Chinese FDI firms in China in fact underperform non-ethnic-Chinese FDI firms. We also find that the performance of ethnic-Chinese firms deteriorates over time. We present evidence consistent with the hypothesis that ethnic-Chinese firms under-invest in those firm attributes that may enhance long-term performance, such as human capital and technology. Our findings raise both empirical and normative implications of ethnic ties.

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1. Introduction

One of the most important—and most studied—ethnic networks in the world is that of the overseas Chinese. In this paper, we add to the large and important collection of literature on the subject by studying the performance of overseas-Chinese firms that have invested and maintained operations in China. The existing literature on the economics of overseas-Chinese networks focuses on the aggregate volume of trade or foreign direct investment (FDI) at the country level. These studies, although revealing important insights, may miss important dynamics at the firm level.

Our paper studies the economic effects of ethnic-Chinese networks at the firm level. We take advantage of a large dataset—between 20,000 and 50,000 firms per year, depending on the year, over a period of eight years—broken down by two types of FDI in China: that by ethnic-Chinese foreign investors and that by non-ethnic-Chinese foreign investors. Our paper contributes to the literature by presenting a far more disaggregated treatment of the topic and by explicitly comparing performance across ethnic- and non-ethnic-Chinese networks. Compared with country-level studies, this disaggregated approach has the additional advantage of eliminating the effects of country-level dynamics, such as the macroeconomic environment, economic policies, legal institutions, and international relations, that may confound some of the findings generated on the basis of cross-country datasets.

Another contribution of our paper is that its findings help to resolve some of the ongoing debates in the literature. The majority of economists who have studied this topic have a positive view of the economic effects of ethnicity. Ethnic ties help to bridge the information gap and they contribute to contract enforcement in environments where legal institutions are underdeveloped.

However, there is also an emerging view that argues that ethnic ties—by privileging insiders at the expense of outsiders—may reduce economic efficiency, at least under certain conditions. Our findings are largely supportive of this second—and less positive—view of the economic effects of ethnicity.

For the purposes of this paper, and following the classification in our dataset, we define overseas-Chinese investors as those originating in three ethnically Chinese economies (ECEs)—Hong Kong, Macau, and Taiwan (HMT). Even though this definition does not cover the entire universe of overseas-Chinese investors, it is sufficiently encompassing because these three ECEs account for the absolute lion's share of overseas-Chinese investments in China. In 1997, for example, firms based in HMT invested US$24.3 billion in China, compared with investments totaling only US$3.4 billion from Singapore, Thailand, Indonesia, Malaysia, and the Philippines, five Southeast Asian countries with large overseas-Chinese populations. These three ECEs have also been the single largest source of FDI in China. Between 1978 and 1999, the ECEs supplied 59 percent of China's entire stock of FDI. Not only is the absolute volume of ECE FDI large, ECE investments are present across a wide range of industries and geographic regions. According to one detailed study of FDI patterns in China, ECE investments are present in more Chinese industries and are more important to China's export production than similar ECE past investments in Taiwan (Huang 2003). Thus, in addition to the theoretical objective of demonstrating ethnic effects on firm performance, it is empirically important to explore the sources and variances in firm performance based on ethnic ties.

Conventional wisdom holds that ECE firms possess superior cultural knowledge about China and this cultural advantage confers on ECE firms an enduring competitive advantage over their non-ECE rivals. This claim, often assumed than explicitly demonstrated, posits that ECE firms *on average* should outperform non-ECE firms in China, all else being equal. We do not find much empirical evidence in support of this ethnic-advantage hypothesis. In fact, in our baseline regressions we sometimes find that ECE firms *on average* in China weakly underperform non-ECE firms after controlling for a large number of firm characteristics. Such performance differences, it should be noted, are not always robust or statistically significant. We also find evidence that in those situations in which the initial performance is similar between ECE and non-ECE firms, the performance of ECE firms deteriorates relative to non-ECE firms over time. .

There are a number of potential explanations for our findings. One possibility is that ECE firms exhibit a "hometown bias"—favoring ancestral locations rather than locations with commercial promise. This points to a potential selection bias—ECE firms that enter China are not necessarily as profit-driven as non-ECE firms. We do not find that this drives our results. There is no difference in terms of the ECE effect between the two most likely ancestral provinces for overseas-Chinese investors—Fujian and Guangdong—and the other Chinese provinces.

Another possibility is a related selection bias—that ECE firms face a lower investment threshold as compared with non-ECE firms. This might be because the superior cultural knowledge in ECE firms attracts entry of firms with greater heterogeneous capabilities, whereas only the strongest non-ECE firms choose to enter China (possibly to compensate for their lack of cultural knowledge). In this scenario, ECE firms *on average* might underperform precisely because of ethnicity,

but the effect of ethnicity is due to systematic differences in the entry propensity of ECE and non-ECE firms, not due to any post-entry detrimental effect of ethnicity on operating performance. We cannot completely rule out the effect of this selection bias because we do not have data on the pre-entry distribution of performance of parent ECE and non-ECE firms. However, we are able to show that our findings are at least partially robust to this selection bias. From another source, we obtained data on Korean and Taiwanese firms in the electronics and related industries. Our findings on the lack of an ECE operating advantage hold in a comparison between ECE firms (i.e., from Taiwan) and non-ECE firms (i.e., from Korea). We chose the electronics and related industries because Taiwan is home to several world-class electronics firms. The likes of Acer and Foxconn are on a par with the best Korean electronics firms (such as Samsung and LG). Thus, it would be difficult to attribute the underperformance of Taiwanese electronics firms entirely to this pre-entry selection bias.[1]

A third possibility is that ECE firms may not value those attributes that enhance long-term performance. For example, they may recruit employees on the basis of family and kinship ties rather than on the basis of technical and managerial skills. We find evidence consistent with this possibility. After controlling for a variety of firm characteristics, we find that ECE firms lag behind non-ECE firms in our measures of technology and human capital.

We hypothesize that this under-investment in technology and human capital may explain yet another pattern revealed in our analysis: ECE firms, to the extent that they start with performance that is equivalent to that of non-ECE firms, tend to underperform against non-ECE firms over time.

[1] We additionally consider other ways to mitigate the selection bias problem. W will elaborate on these later in the paper.

Additionally, once ECE and non-ECE firms are matched in terms of their technology and human capital, ECE firms no longer exhibit a dynamic disadvantage vis-à-vis non-ECE firms. These findings are significant both statistically and economically, and they are robust to various specification checks.

To the extent possible with our data, we also test other potential sources of performance variances between ECE and non-ECE firms, such as transfer pricing and earnings management. Our findings are also robust to these tests.

The remainder of the paper is organized as follows. Section 2 presents the existing literature and the theoretical framework that guides our empirical exploration. Section 3 introduces our unique and detailed dataset, the China Industry Census (CIC). Section 4 presents the models, empirical results, and a variety of robustness checks. Section 5 concludes the paper.

2. Literature and Theoretical Framework

Does ethnicity pay? Specifically, do overseas-Chinese FDI firms in China outperform non-ethnic-Chinese FDI firms based on conventional measures of performance? In this section, we first discuss the theoretical frameworks that guide our empirical exploration. Our paper is related to two strands in the academic literature. The first strand focuses on the specific economic and business effects and the functions of what are known as "pre-existing relationships," including, although not limited to, ethnic ties. These effects or functions refer to trust enhancement, provision of information, matching of buyers and sellers, and acquisition or diffusion of new knowledge. The

outcome of interest in this strand of the literature is very similar to our interest—performance by firms or individuals.

The second strand in the literature deals with what might be called "institutional" functions of ethnic ties. These functions, such as contract enforcement or dispute resolution, proximate those performed by a political or economic system. These institutional functions of ethnic ties arise particularly in those environments that normally lack well-developed legal institutions. Although our paper is close to this strand of the literature in terms of our empirical interest, this strand focuses on economic phenomena of a fairly aggregate nature (country-level FDI and trade flows). Our paper is thus a synthesis of these two strands of the literature.

Common ethnic ties have been found to facilitate trade credit extensions in developing countries (Fisman and Love 2003) as well as the more productive forms of financial transactions, such as the use of longer-term contracts over arm's-length contracts—checks rather than cash (Guiso, Sapienza, and Zingales 2004). Ethnic networks are also found to facilitate flows and transaction-specific information but also diffusions of "complex knowledge" (such as science). Ethnic scientific communities play an important role in international technology diffusion (Kerr 2008) and in the global activities of U.S. firms (Foley and Kerr 2011). Kalnins and Chung (2006) provide evidence from the U.S. lodging industry that Gujarati immigrant entrepreneurs benefit from their ethnic group's social capital when already-successful members are co-located in the same industry.

Informational asymmetries are particularly acute when it comes to transactions across different geographic and political boundaries. For this reason, international trade economists have

studied how ethnic ties may affect international trade and capital flows.[2] Ethnic networks consisting of immigrants and overseas residents serve to match foreign/domestic buyers with domestic/foreign sellers. Ethnicity pays in the sense that ethnic members better understand the characteristics of both the home and the foreign markets than non-ethnic members and they are more capable of spotting profit opportunities. The matching function of co-ethnic ties is at the heart of the theoretical model developed by Casella and Rauch (2002). Rauch and Trindade (2002) developed a test for this informational function of co-ethnic networks. They found that an ethnic-Chinese network exerts a particularly strong effect on trade in differentiated product space. Because differentiated products do not have a ready reference price point, information requirements are particularly acute in this product segment. And the fact that the ethnic effects are large in this product space is evidence of the informational advantage of ethnic ties. Tong (2005) extends this framework to FDI and shows that ethnic effects are still present in developed countries with well-developed institutions. She thus concludes that the information functions of ethnic ties are more important than the contract enforcement functions.

The institutional functions of ethnic ties encompass contract enforcement and dispute resolution. In essence, they proximate those functions performed by government. The institutional functions of a relationship arise in environments that lack well-developed legal institutions, and it has been argued that relationships can serve as a substitute for formal legal institutions.[3] (This

[2] For a comprehensive literature review, see Rauch (2001).

[3] There is also a vast literature on how legal origins and legal institutions in general affect economic activities and growth. See, for example, the survey paper by La Porta, Lopez-de-Silanes, and Shleifer (2008). The literatures on the impacts of formal and informal institutional arrangements are complementary.

feature of the literature may be particularly relevant to our paper as it is well known that China lacks well-developed legal institutions.) Guiso, Sapienza, and Zingales (2004) exploit social capital differences in Italy. They find that in high-social-capital areas, households are more likely to use checks, to invest in stocks over cash, to have greater access to institutional credit, and to make less use of informal credit. The effect of social capital is stronger among less-educated people and in places where legal enforcement is weak. Allen, et al. (2005) observe that financing channels and corporate governance mechanisms based on reputation and relationships are an important alternative to a formal legal and financial system in supporting the growth of the private sector in China.

Works by Greif (1989, 1993) represent the most explicit efforts to model the institutional functions of ethnic ties. He finds that ethnic ties sustain trade agency relationships—among Maghribi traders—through a collective punishment mechanism. In his model, although information shortages plagued long-distance trade during the medieval era, they did not cripple the agency arrangement. This is because Maghribi traders relied on a collective punishment mechanism that excluded an opportunistic agent from future dealings with all members of the trading network. The crucial ingredient in this story is the ethnic homogeneity of the Maghribi traders. Greif provides documentary evidence to show that Maghribi traders, who had the most developed form of a collective punishment mechanism, thrived more than other traders.

Although many studies stress the positive effects of ethnic ties to facilitate trade and investment flows, a number of studies have sounded a more cautionary note—that under certain circumstances ethnic ties may actually be inefficient. We will briefly summarize this literature and

suggest that these somewhat ambiguous predictions about the economic effects of ethnicity call for an empirical investigation into the balance between both the positive and the negative effects of ethnicity. This is the main purpose of our paper.

A key feature of a co-ethnic network is the idea of privilege—insider knowledge and preferential information enjoyed by the members of the network to the exclusion of the non-members (Casella and Rauch 2002). To draw the empirical implications of ethnic ties we need to explicitly consider both the inclusive and exclusive nature of co-ethnic ties.

There are two ways to think about this issue. One is the possibility that the gains accruing to members of the network are achieved at the expense of non-members. In their model, Casella and Rauch (2002) theorize that transacting through ethnic networks entails distributional implications. Anonymous and formal markets remain underdeveloped when a large share of economic transactions occurs among related agents in a network. The specific mechanism in their model is human capital allocation. Casella and Rauch call this "a lemon effect." Ethnic groups tie up a disproportionate share of productive human capital, leaving the rest of society with less productive human capital.[4]

The above reasoning raises questions about the economy-wide implications of ethnic ties, however there are also firm-level and efficiency implications. It is theoretically possible that ethnic ties can lead to less optimal outcomes for members of the network as well. Casella and Rauch hint at this imperfection, even though their model does not explicitly explore this possibility. A quote from their paper is highly suggestive: "Li Ka-shing calls the boys before he calls the brokers." (Li Ka-

[4] They also use this reasoning to explain why mainstream society may bear grudges against ethnic minorities.

shing is a well-known Hong Kong tycoon.) One interpretation is that Li Ka-shing may be ill-advised by "the boys"—his friends and relatives rather than those brokers who possess true business expertise. This exclusive effect of a network—based on ethnic or family ties— has also been noted—mostly unfavorably—by other economists in the context of family firms (Bertrand, Mehta, and Mullainathan 2002, Bae, Kang, and Kim 2002, Chang 2003, Coff 1999, and Baek, Kang, and Lee 2006), and especially family firms in the emerging economies (La Porta, Lopez-de-Silanes, Shleifer, and Vishny 2000).

Some economists, although noting the positive information effects, argue that ethnic networks can lead to dynamic inefficiencies. Greif (1994) argues that there is an efficiency loss due to the mechanism adopted by the Maghribi traders to curb opportunism. The ethnic networks have an inward bias in that it is cheaper for insiders to trade among themselves than it is to trade with outsiders. So theoretically there is a potential that ethnic networks will divert trade rather than creating trade. The efficiency loss due to a tightly-knit network has long been recognized by non-economists. In his famous paper, sociologist Granovetter (1973) shows that loose networks, as compared with tight networks, are more efficient in generating useful information on job searches. The reason is that tight networks are less likely to produce truly new and useful information. By definition, ethnic networks are tight and thus may be plagued by this problem.

3. Dataset and Variables

In this section we introduce our unique dataset, explain the construction of the variables we will use in our statistical analysis, and present the summary statistics.

3.1. Data Description

To test the null hypothesis that ECE firms do not outperform non-ECE firms in China ideally one would conduct a randomized experiment for these two types of FDI in China. In such an experiment, the treatment would consist of FDI by ethnic-Chinese investors that is randomly assigned to companies in China. The remaining companies would adopt FDI by other foreign investors (i.e., non-ethnic Chinese). The experiment would then follow up on these two groups of companies over time, and several years post-FDI entry it would compare their mean performance.

Similar to most economic research questions, we can at best approach this subject matter with observational studies instead of randomized experiments. We will use a very comprehensive dataset known as the China Industry Census (CIC), covering 1998 to 2005, to carry out our analysis. The CIC was compiled by the National Bureau of Statistics (NBS) in China and it includes the *entire* population of Chinese industrial firms that have sales in excess of five million yuan (roughly US$600,000) for each of the census years. Because FDI firms typically are among the largest firms in China, the CIC is likely to include all industrial FDI firms. (There is no similar dataset comparable to the CIC for service firms.) To our knowledge, the CIC is the most detailed database on Chinese industrial firms.

The CIC contains detailed information about each company's identity, address, industry classification, year of incorporation, employment, hierarchical level to which the company reports (regional, provincial, or town, etc.), registration type (ECE, non-ECE, domestic, foreign, joint venture, or joint cooperative), three main products in order of relative importance, and production capacities for each of these three products. The dataset also includes information on assets, both the

year-end level and the change within the year, ownership rights, contractual and actual investments, sales, profits, and exports. In addition, there are detailed records of the breakdown of contractual and actual equity capital among the investment sources, such as investments from domestic firms and investments from foreign investors. Each company's intangible assets, total capital, and capital depreciation are also recorded.

The detailed company information and panel structure allow us to properly handle a number of empirical complications. For example, ECE investments may be endogenous to a firm's own productivity. The best we can do then is to control for crucial company characteristics (such as the number of years since incorporation, firm size, leverage, and capital-intensiveness) in the regression models. In particular, these variables help capture the observed and correlated latent company experience and productivity advantages or disadvantages. The detailed information provided in the CIC allows for some extensive controls of firm characteristics.

Another endogeneity issue has to do with industry characteristics. Certain industries are more productive and may disproportionally attract more ECE investors than non-ECE investors because the former possess more innate knowledge about these industries. This correlation between the productivity of the industry and whether or not the company accepts ECE FDI might cause an upward bias in the coefficient estimate of the ECE-FDI treatment variable.

The CIC has disaggregated industry codes at the four-digit level. At this level, we are able to distinguish, for example, a firm producing leather shoes from a firm producing sneakers. Such a level of disaggregation goes far beyond many studies of the Chinese economy that typically use databases with industrial classifications at a two-digit level. In all our regressions, we mitigate the

industry-endogeneity bias by controlling for these detailed industry characteristics. Our empirical implementation minimizes the inter-industry and intra-industry differences in technology and other characteristics, as well as the correlations between these characteristics and the ethnic characteristics of the investors.

Another substantial advantage of this dataset is that each firm is assigned a unique firm identifier—known as the "legal person code." Using this firm identifier we are able to link the majority of FDI firms across different years. The panel structure helps eliminate any time-invariant firm-specific effects. However, because not all FDI firms are present for each year, our panel structure is unbalanced (but our empirical strategy takes this into account). Although the CIC was carefully conducted, the dataset does contain errors. For instance, some industry codes contain less than four digits, oftentimes because the first digit—frequently zero—is omitted. Apparently, there are also reporting errors; to correct this, we manually matched these companies' main products, as reported in the dataset, with the industry codes. Similarly, some of the province codes are mistyped or missing, but, to the extent possible, we corrected them manually. That said, there may still be remaining errors and omissions in the dataset, the impact of which we hope to minimize through our extensive robustness analyses.

3.2. Definition of ECEs

The CIC divides FDI into two geographic categories: that originating from three ethnic-Chinese economies—Hong Kong, Macau, and Taiwan (HMT hereafter) as a *single* category—and that originating from all other foreign countries and regions. In this paper, we define ECE firms as those firms funded by FDI originating in HMT. Under Chinese law, a firm is classified as an FDI

firm if a single foreign investor holds a minimum of 25% equity. The firm is classified as an HMT firm if the foreign investor—or the dominant foreign investor in the case of multiple foreign investors—is from HMT.[5]

There are two issues related to this definition. First, to what extent should investments from Hong Kong and Macau be properly classified as "FDI?" Second, how accurate is this definition in terms of matching with the "overseas-Chineseness" of foreign investors?

China reclaimed sovereignty over Hong Kong in 1997 and over Macau in 1999. However, both in international and Chinese statistical classifications, investments in China from Hong Kong and Macau are still classified as FDI. This is consistent with international norms of classifying FDI according to economic criteria—such as a separate currency and separate monetary and customs policies—rather than according to political sovereignty. As an illustration, investments by Hong Kong firms in Britain before 1997 were classified as FDI in British statistics. Thus there is nothing unusual about our approach of treating investments from Hong Kong and Macau as FDI.

However, there are potential downward biases in our definition of ECE. Other than HMT, the CIC does not have further breakdowns of the country origins of the FDI. For this reason, investments from Southeast Asian countries, which also have large Chinese populations, are treated as non-ECE FDI. An ideal definition would classify the ECE-ness of a firm according to the

[5] One can argue that in the case of joint ECE and non-ECE investments in an FDI firm our measure overstates the "ECE-ness" of the firm since a portion of its investment comes from a non-ECE source. But this is unlikely to affect our analysis in part because it is unlikely that there are many joint ECE and non-ECE investments in our dataset. Also, we can assume that ECE investors, because of their majority equity stakes, would have more operating control and this should be reflected in the resulting FDI firm and should exhibit ECE characteristics similar to firms with a single ECE investor.

Chinese population share in the firm's home country. This is not feasible given our data limitations. However, as noted above, the amount of FDI from Southeast Asia is dwarfed by the amount from HMT, thus hopefully this is not a crippling bias.

There is also a potential upward bias due to our ECE definition. It is possible that investments from Hong Kong contain investments with non-ECE origins. This is because Hong Kong is sometimes used as a conduit for investment activities in China by American and European firms. Our ECE definition thus includes some non-ECE investments of unknown magnitude; the extent of this bias depends on the size of these non-ECE investments.

There are two reasons why this bias is unlikely to undermine our findings. One is that only Hong Kong is a known conduit for Western investments in China. Investments from Macau and Taiwan unquestionably come from overseas Chinese. Second, it is widely believed that Taiwan, rather than any Western country, is the largest investor in China through Hong Kong. The reason is that there are political sensitivities, more so earlier than presently, with respect to investments coming directly from Taiwan. Thus the conduit function of Hong Kong is unlikely to introduce a sizable bias in our ECE definition.

We are able to construct a more precise definition of ECE for firms from the electronic and related industries in Taiwan and Korea. We obtained a dataset that contains Taiwanese and Korean firm identifiers. We matched the Taiwanese and Korean firm identifiers with the firm identifiers provided in the CIC and repeated all the regression runs. The results are qualitatively consistent with the results generated from the HMT-based definition of ECEs. This gives us confidence in our findings. (We also used the Taiwanese and Korean sub-sample to conduct sensitivity checks of our

main results that are robust to a potential selection bias—that the technologically weaker ECE firms have a higher propensity to enter China than the typical non-ECE firms, and that the prevalence of such "marginal firms" in ECE FDI might explain our finding that there is no ECE performance advantage.)

To test our null hypothesis as sharply as we can, in our empirical analysis we stress findings for a particular type of ECE firms—ECE firms that are joint ventures with Chinese investors. The matching function posited by Rauch and Trindade (2002) should be especially pronounced in joint ventures (JVs) where foreign and domestic partners co-manage the enterprise and coordinate actions on a frequent basis, as compared with FDI firms operated solely by foreign investors. If the ethnic ties lead to a better matching of capabilities and knowledge between ethnic-Chinese investors and non-Chinese investors, ECE firms should outperform non-ECE firms, especially in coordination-intensive JVs as compared with non-JVs. Again, the CIC contains valuable and relevant information. It provides detailed information on the registration type of the FDI firms along JV and non-JV lines. The JV sample consists of 153,588 observations, more than half of the entire FDI sample.

3.3. Variable Definitions

The key in our empirical analysis is to select appropriate performance measures and to control the covariates. Since the majority of the observations in our dataset are non-listed firms, we do not have information about the market value of their equity or assets and we cannot rely on stock market-based performance measures. We focus instead on conventional operating performance measures to study whether ECE firms outperform non-ECE firms: returns on assets (Desai, Foley, and Hines 2004c, Joh 2003), returns on equity (Desai, Foley, and Hines 2004b, Nissim and Ziv

2001), and net margins (Joh 2003, Lambkin 1988, Lu and Beamish 2001).These are the total profits normalized by total assets, total equity ownership rights, and total sales, respectively. To be specific, we define returns on assets (ROA) as profits divided by the beginning-of-year assets. Since we do not have the beginning-of-year assets directly, we compute them as the end-of-year assets minus the profits (which we implicitly assume to accrue as assets for the next year). We define returns on equity (ROE) as the ratio between profits and equity ownership rights, and we define net margins as the ratio between profits and sales.

We further adjusted our performance measures to account for the possibility that managers might engage in earnings management to hide the true performance of their firms, and that ECE firms and non-ECE firms might engage in systematically different levels of earnings management activities.[6] We report the empirical results using these adjusted measures of firm performance. In unreported tests, we confirm that the results are qualitatively similar when we use performance measures that are not adjusted for the earnings management possibility.

Since the results obtained from using the three performance measures are qualitatively similar, in the main results reported below we will focus on ROA. But it should be noted that we repeated all of the tests on the two other performance measures as well and the results were qualitatively consistent across all three performance measures. Furthermore, because the distributions of the ratio variables are conducive to outliers, following the standard empirical finance

[6] To be specific, earnings management is a strategy used by company management to deliberately manipulate earnings so as to disguise the company's true profitability; see, for example, Teoh, Welch, and Wong (1998). Following the large literature on earnings management, we calculated the discretionary accrual of a firm and adjusted the earnings numbers accordingly, thus generating a performance measure that is robust to the possibility of earnings management. The detailed procedure for adjusting for the discretionary accrual may be obtained from the authors.

and accounting literature on the treatment of outliers, such as Brav and Lehavy (2003) and Durnev and Kim (2005), we winsorized the data at the 1% and 99% levels.[7] Our results are robust to whether or not we perform such winsorisation.

Following the literature, we included a company's leverage, age, and the natural log of its total assets as the main control variables, together with the set of firm, industry, and province dummy controls. We used the log of total assets because it better approximates a normal distribution. Given that China is capital-constrained, in the regression model we additionally controlled for the capital-intensiveness of the firm. We measured capital-intensiveness by paid-in capital divided by the number of workers. This can be a useful control if ECE and non-ECE firms differ in terms of the capital intensity of their production.

We calculated a company's leverage by subtracting the equity ownership rights from the end-of-year assets and dividing this difference by the end-of-year assets.[8] The age of a company is defined as the number of years it has been in operation in China, and it is measured by the census year (e.g., 1998) minus the year when the firm was incorporated in China (e.g., 1992). This variable helps to capture the variations in production and management experience as well as potential differences in the life-cycle stage of the firms that can be crucial determinants of performance. The

[7] Winsorising is a transformation of extreme values in the statistical data to certain boundary values. The distribution of many statistics can be heavily influenced by outliers. A typical strategy is to set all outliers to a specified percentile of the data. For example, a 95% Winsorisation would see all data below the 5th percentile set to the 5th percentile, and all data above the 95th percentile set to the 95th percentile. Winsorising usually results in estimators that are more robust to outliers than their more standard forms.

[8] Essentially, we tried to measure Debt/Total_Asset by (Total_Asset – Equity)/Total_Asset.

long-term survival of a company in the market can also act as a selection control for productive companies. One particular dynamic that this variable controls for is the so-called "first-mover advantage." To the extent that ECE investors entered China earlier than non-ECE investors, there might be a potential correlation between ECE and first-mover advantage. In our empirical implementation, the company age effect is independent of the ECE effect.

Although not included in the benchmark model, we have compiled an exhaustive list of other covariates to better control for the potential confounding effects on performance. The standard measure of size is the log of total assets, but because we include total assets in calculating the ROA, we also tried the alternative measure for the size of companies as given in the CIC. The CIC divides all firms into large, medium, and small categories. Our findings are robust to control for this alternative measure of firm size. The influence a foreign investor exerts on managerial decisions is usually proportional to her proportion of ownership. We measure foreign ownership by the percentage of foreign equity—whether ECE or non-ECE—in total equity. In many studies, exports are also used as a proxy measure of firm-level productivity (Qian 2007). We use export values as a share of total sales to control for the company-specific productivity level.

Exports might also act as a control for the propensity for transfer pricing. Transfer pricing may affect the reported performance of ECE and non-ECE firms differently. By its covert nature, transfer pricing intrinsically is difficult to detect and measure, but some researchers have used the value of foreign trade as a proxy for transfer-pricing dynamics (Desai, Foley, and Hines 2004a). We follow the same procedure here. For this purpose, we generated two variables: the ratio of exports to total sales and, for the sub-sample from 1998 to 2001, the sum of exports and imports as a

fraction of total sales. (Import data are only available for this sub-period.) In order to control for any potential differences in how ECE and non-ECE firms are regulated, we generated a dummy variable, POLHCHY, which is the position of Chinese joint-venture partners in the Chinese political hierarchy. Chinese firms are regulated by nine different levels of government, e.g., the central government, provincial government, city and county governments, and so forth. We created this variable with the idea that ECE and non-ECE investors may systematically differ in terms of their levels in the regulatory hierarchy. In our empirical implementation, we added a control on POLHCHY and experimented with different cut-off values for POLHCHY. Our empirical findings are unaffected by these specification checks.

3.4. Summary Statistics

Our source dataset consists of between 20,000 and 50,000 FDI firms for each year. Not all the firms are present in the CIC for each year during the 1998-2005 period. We deleted those observations with missing data as well as those that failed some basic error checks. The final dataset thus has about 270,000 observations. In Table 1, we present the summary statistics of the main variables used in the regression analysis.

The dataset covers firms in all Chinese provinces from 1998 to 2005. The average employment level is 313 headcounts in the ECE group, compared with 308 headcounts in the non-ECE group. In the ECE group, the average wage for employees is 13,990 yuan (or US$1,695 based on the average exchange rate during the sample period) per capita and the average fringe benefits are 1,324 yuan (US$162) per capita, compared with an average wage of 17,560 yuan (US$2,128) and average fringe benefits of 2,067 yuan (US$252) for the non-ECE group. Firms in the CIC are

relatively young in terms of age, with a mean age of approximately 6.3 years for the ECE group and 5.5 years for the non-ECE group. On average, ECE firms in the CIC hold 75.1 million yuan (US$9.1 million) in total assets and 33.8 million yuan (US$4.1 million) in equity, whereas non-ECE firms have assets of 125.9 million yuan (US$15.2 million) and equity of 585 million yuan (US$71.0 million). The debt-to-asset ratios are about 0.5 in both groups. Mean profits of ECE firms are 3.6 million yuan (US$0.45 million), compared with 8.33 million yuan (US$1.01 million) in the non-ECE group. The average sales value is 57.3 million yuan (US$8.2 million) in the ECE group, and 80.9 million yuan (US$9.8 million) in the non-ECE group. On average one-third of sales are exported in both the ECE and the non-ECE groups.

ECE and non-ECE firms do not differ in our measures of earnings management and leverage. Nor do they differ in terms of their export/sales ratio (which we will use later in the paper to control for transfer pricing). The Kolmogrove-Smirnov test does not show significant differences between ECE and non-ECE firms in terms of industry distribution. We also plot the distribution of ECE against non-ECE firms across industries to visually verify that the distribution patterns are similar for the two groups; we did this for two equal sub-periods to make sure that the comparison is steady over time.

[Insert Table 1 around here.]

[Insert Figure 1 around here.]

4. Empirical Models and Results

In this section we present our empirical models and results. We start with models that compare the performance of ECE firms with the performance of non-ECE firms at a given point in time, i.e., the static effects of ethnicity. We then present findings that track the changes in ECE firms relative to non-ECE firms over time, i.e., the dynamic effects of ethnicity. Our main finding is that ECE firms weakly underperformed against non-ECE firms statically and significantly underperformed against non-ECE firms dynamically. The factors best explaining the deterioration in performance over time on the part of ECE firms are those variables related to technology and human capital. We present our findings that that show that ECE firms significantly under-invested in technology and human capital as compared with non-ECE firms.

There are a number of complications that may confound our findings, such as selection biases, transfer pricing, hometown effects, and so forth. Here we will discuss these issues and in the Web Appendix we will present additional robustness checks. By and large, our main findings are invariant to alternative distribution assumptions and estimation models. Sensitivity analyses (following Rosenbaum 2002 and Qian 2007) show that an omitted confounding variable, if it exists, has to be unrealistically strong in order to change our main conclusions.

4.1. Testing the Static Effects of ECE firms

Our benchmark model is a year-, company-, and province-fixed effects regression model carried out on the samples of joint-venture (JV) companies and non-JV companies separately:

$$ROA_{it} = \beta_0 * ECE_{it} + \beta_1 * logassets_{it} + \beta_2 * leverage_{it} + \beta_3 * capital\text{-}intensiveness_{it} + \beta_4 * age_{it} + \beta_5 * ProvDum_i + \beta_6 * FirmDum_i + \beta_7 * YearDum_t + \varepsilon_{it} \quad (1)$$ [9]

where ε_{it} is the regression residual, and β's are the coefficients on the respective covariates. The main parameter of interest is β_0.

Before presenting our main results, we ran the two following regressions on two simpler models to obtain a brief view of the ECE effect: one is the model with only ECE and other fixed effects; the other is the model with all the variables, excluding ECE, compared to our baseline model. The results show a significant negative effect of ECE (Table 2).

[Insert Table 2 around here]

The ECE status is invariant along time for every firm. Therefore, unlike a normal panel study, we cannot obtain any information on the ECE effect on performance from the within-groups estimator. One simple way to estimate the effect of a time-invariant variable therefore would be to use a random-effects model and FGLS. However, a Hausman test rejects a random-effects model for our dataset, so instead the following fixed-effects model is employed:

$$ROA_{it} = \gamma Z_i + \beta X_{it} + \alpha_i + \varepsilon_{it} \quad (2)$$

where Z_i=(ECE_i, other time-invariant firm characteristics) is a vector comprised of the ECE variable and a set of other time-invariant firm characteristics. X_{it} is a vector of the time-variant individual

[9] Firm-fixed effects are specific to each firm only, whereas the province dummies capture the time-invariant region factors. In Stata, which is the software we use to estimate these regressions, the province fixed-effects are not dropped, instead repeated measures of ANOVA are performed. The coefficients on the province dummies compare FDI firms across regions.

firm characteristics, and α_i is the fixed effect for firm i. In our basic model, in addition to ECE, Z_i includes the province dummy variables to control for the province-specific effect. X_{it} includes five major components: log assets, leverage, capital-intensiveness, age, and finally, a time trend for each year from 1998 to 2005. All these control variables follow the finance literature. In addition, we assume that ε_{it} are i.i.d white noise for firm i at time t.

As suggested by Neter et al. (1996), we perform a regression analysis with corrections to the unbalanced panel to estimate the static effect of being characterized as ECE using a fixed-effects nested design model. The estimation can be divided into the following two steps:

First, we consistently estimate β using the within-groups estimator (the regular fixed-effects estimator). The within-groups estimator is based on the differences of the time-variant variables within each firm, therefore Z_i and α_i do not affect our estimation.

Second, the residual obtained from the above is comprised of a constant, a first level ECE-group effect, a second level firm effect, and ε_{it}. This structure coincides with a nested two factor design model, whereas the ECE effect is nested in the individual effect. As suggested by Neter et al. (1996), we perform ANOVA analysis with corrections to the unbalanced panel to estimate the static effect of being characterized as ECE. The coefficient on ECE is the estimated average outcome differences between the ECE and non-ECE groups controlling for the observables and the time-invariant unobservables. This is exactly what we are interested in studying. The rest of the time-invariant effects can be estimated by repeating the above ANOVA estimation process.

The results are reported in Columns 1 and 2 of Table 3. There are negative and mostly insignificants or marginally significant, coefficients on the ECE. This implies that after controlling

for the company and province effects and the set of traditional covariates, there is no robust or significantly positive relation between ECE investments and a company's performance. If anything, there seems to be a negative association between ECE status and firm performance, especially for the non-JV sample. This finding provides some initial evidence that contradicts conventional wisdom that, based on the informational and cultural advantages of co-ethnic networks, ECE firms should outperform their non-ECE counterparts.

The marginally significant estimated ECE effect is -1.4% in the JV sample and -2.2% in the non-JV sample. Compared to the average return on assets in the JV sample, i.e., 34.6%, and that in the non-JV sample, i.e., 34.7%, the disadvantages of ECE firms are relatively small in both samples. However, in both the JV and non-JV samples, the differences of the ROA in the ECE and in the non-ECE groups, which are -1.9% and -1.8% respectively, are due mostly to our estimated ECE effect. This suggests that the ECE effect accounts for most of the differences in the ROA between the ECE and non-ECE groups, compared with the effect of the other control variables.

The coefficients on capital-intensiveness are positive and significant at the 1% level for the JV sample, but less significant (although still positive) for the non-JV sample. The coefficient on age is insignificant for the JV sample and negative and marginally significant for the non-JV sample, and the log assets are positive and significant for the JV sample but negative and mostly significant for the non-JV sample. The "leverage" variable takes on positive coefficients that are significant at the 1% level for both the JV and non-JV samples.

[Insert Table 3 around here]

4.2. Testing the Dynamic Effects of ECE Firms

So far we have shown that ECE firms, on average, do not outperform non-ECE firms, and in some situations even underperform non-ECE firms. In the remainder of this section we examine whether this underperformance by ECE firms persists over time. To examine the dynamic effects of ECE investments on firm performance, we add an interaction term between the ECE indicator and firm age (ECE*Age).

$$ROA_{it} = \beta_0 * ECE_{it} * Age_{it} + \beta_1 * logassets_{it} + \beta_2 * leverage_{it} + \beta_3 * capital\text{-}intensiveness_{it} + \beta_4 * age_{it} + \beta_5 * YearDum_t + \alpha_i + \varepsilon_{it} \quad (2)$$

ECE*age is time-variant. Hence, the relative dynamic effect between the ECE and non-ECE groups, β_0, can be estimated directly via a *within-group* estimation (the standard fixed-effects estimator) without performing ANOVA analysis. A positive and significant coefficient on β_0 would indicate that ECE firms enjoy an increasing operational advantage over time. Conversely, a negative and significant coefficient on the interaction term would indicate that over time, compared to the non-ECE firms, the performance of ECE firms deteriorates. The age variable is mean-centered (i.e., de-meaned and normalized by the standard deviation of the age distribution in the sample) before it is interacted with the ECE dummy. This is to make our results easier to interpret. The regression results for the above tests are shown in Columns 3 and 4 of Table 3.

The results do indeed show negative β_0's that are statistically significant at the 1% level (Row 3 of Table 3). The size of β_0 appears to be substantial in some specifications. For example, in the regression reported in Table 3 for the joint-venture sample, the coefficient on the ECE*age

interaction term is -0.024, with a t-statistics of -3.87, and the coefficient on the ECE dummy is -0.0103, with a t-statistics of -1.37 in the regression. This implies that when comparing JV companies of the same age, the ROA of ECE firms is, on average, 0.024 less than that of their non-ECE counterparts. The ROA of a typical JV ECE firm drops by 0.024 from the company age of 6.36 (mean age value in the sample) to the age of 11.41 (i.e., 6.36+5.05; equivalent to the mean-centered age changing from 0 to 1). The overall average ECE effect on the JV sample is -0.03 (i.e., -0.01-0.02). This suggests that ECE firms may initially start with a small and statistically insignificant disadvantage in performance, but this disadvantage increases over time. These results hold when we ran our regressions with age quartile dummies (including their interaction terms with the ECE dummy as well as the first order terms). This approach allows a more flexible relationship between firm age and our profitability outcome variables.

4.3. Testing Alternative Hypotheses on the ECE Effects

There are a number of potential confounding factors. We will discuss several key ones here. To save space, we have also performed a large number of tests that are available in the Web Appendix or upon request.[10] In this section we focus on three potential confounding factors. The

[10] For example, we explored whether or not government policies might differ between ECE and non-ECE firms, but we failed to find any evidence for policy differences during our sample period. We found that ECE firms incurred higher leverage; thus we examined whether different levels of leverage might explain our finding. They did not. We tested the idea that ECE and non-ECE firms may differ not only in their mean performance measures but also in the variances of their performance measures to see whether or not the lower performance of ECE firms may be justified by their correspondingly lower risk. There is no difference between the variances of their performance. We repeated

first is a selection bias—that ECE firms with heterogeneous capabilities tended to select themselves into investing in China as compared with non-ECE firms. In this scenario, non-ECE firms would cluster at the higher end of the profitability distribution than ECE firms.[11] Another related selection bias is that ECE firms favor investment locations based on ancestral ties rather than on commercial promise. A third potential confounding factor is transfer pricing. The idea here is that ECE firms have a higher propensity to engage in transfer pricing compared with non-ECE firms (due, perhaps, to the ease of doing so through the porous controls between China and HMT). If transfer pricing is pervasive among ECE firms, then they may show paper losses even though in reality they are profitable. We examined these three issues and found that they do not change our qualitative conclusion that ECE firms do not outperform non-ECE firms.

First, it should be noted that the pre-entry selection bias does not explain one significant finding in our paper—that the performance of ECE firms deteriorates over time. Second, we conducted a battery of tests to address this "fat-tails" concern, i.e., excessive entry at one end of the profitability distribution. The panel quintile and Huber regressions do not change our findings qualitatively. Third, we also omitted those firms we define as new entries (i.e., they entered China after 2000). Again all our main findings hold. (In fact, the statistical significance of the ECE*Age

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many tests on the largest ECE firms to see whether the operations of ECE firms may be used by their parent firms as experimental "loss-makers." There is no evidence for this effect.

[11] We are grateful to one referee who provided the following illustration of this selection bias: Imagine that there are currently two firms with profitability 1 and one firm with profitability 2. The average profitability is 4/3. But now the market is flooded with 300 entrants, all with profitability 1. The average profitability falls to (1*300 + 2*2 + 3*1)/303= 307/303. In the paper, we address this concern about "excessive" entry of low-profitability ECE firms in a variety of ways.

coefficients increased, although the estimated ECE and ECE*Age effect sizes were similar to those under the full sample.)[12]

However, to completely rule out the pre-entry selection bias—that ECE firms tend to be "marginal"— requires controlling for the characteristics of the parent firms of the ECE and non-ECE firms operating in China. Given the huge number of FDI firms in our dataset and the likelihood that many of them are not subsidiaries of listed firms, it is not feasible to link these firms to any existing international firm databases (such as CRSP, COMPUSTAT, or WORLDSCOPE). Fortunately, we obtained a dataset that contains unique firm identifiers in the electronics and related industries for two groups of FDI firms operating in China—firms funded by Taiwanese investors and firms funded by Korean investors.[13] We are able to link these two datasets using these unique firm identifiers.

In the following regressions we benchmarked the performance of Taiwanese firms against the performance of Korean firms in the electronics and related industries. (The industries we include are from 4000 to 4200 in the Chinese Industry Classification Codes. They include, respectively, machinery manufacturing, electronics, and equipment production.) We selected these industries in part because of data availability but also for a substantive reason: Taiwanese firms in these industries are among the best in the world. As an example, Acer, a Taiwanese computer manufacturer, is the second largest in the world in terms of global market share. (HP is the largest.) A detailed analysis by three technology experts (Linden, Kraemer, and Dedrick 2009) reveals the competitive edge of Taiwanese firms in the electronics industry. These experts traced the country origins of the twenty

[12] The results are available from the authors upon request.

[13] We thank Professor Heiwai Tang for generously providing us with this dataset.

most expensive component suppliers to an iPod product manufactured in China and they reported that 13% of the component value was captured by Taiwanese firms, compared with 68.9% by Japanese firms, and 16% by American firms. Only one Korean firm, Samsung, made it to the top 20 suppliers (compared with three firms from Taiwan) and it accounted for 1.6% of the component value. As another indication, in the 2006-2007 World Economic Forum's "Global Innovation Ranking," Taiwan is ranked 9th in the world; Korea is ranked 20th. It is thus unlikely that Taiwanese firms operating in China are afflicted by a systematic selection bias that causes them to be "marginal firms" as compared with Korean firms.

In total, there are 25,179 observations for the Taiwan-Korea sub-sample of electronics and related firms. Of these, 9,652 are JVs and 15,527 are non-JVs. Table 4 presents the regression results. On average, Taiwanese firms, proxying for ECE firms here, substantially underperformed against the non-ECE Korean firms in the JV sample. There is no statistically significant difference in the non-JV sample.[14] The results are robust to the inclusion of the squared terms. These findings are entirely consistent with the findings generated on the basis of all FDI firms and on the HMT-based definition of ECEs.

[Insert Table 4 around here]

Another confounding factor, which is also a selection bias, can be described as a "hometown effect." Field research reveals evidence that ECE firms invest heavily in their own home regions

[14] Anticipating the regression runs on the dynamic effects of ethnicity described next, we also ran interaction terms between a Taiwan ECE dummy with firm age. Taiwanese firms again underperformed against Korean firms over time, in both the JV and the non-JV samples.

with the explicit purpose of benefiting the local economies and the local residents.[15] Overseas Chinese investors often donate to schools and hospitals in their home regions. These "altruistic" investment motivations, although perfectly aligned with the particular utility functions of the overseas-Chinese investors, may not lead to profit-maximizing behavior. If this is the reason for the observed inferior performance by ECE FDI, one can argue that the "hometown investments" by ECE firms have a lower "hurdle rate"—i.e., the required returns before making the investment—and ECE firms would then exhibit a lower return on their investments. We tested this "hometown effect" by conducting regression runs on two separate sub-samples, one including firms in Guangdong and Fujian provinces and the other excluding them. (Guangdong and Fujian are the ancestral provinces of the vast majority of overseas Chinese.) There is no evidence that the ECE effect—both static and dynamic—is systematically different between these two sub-samples, as shown in Table 5.

[Insert Table 5 around here]

A third confounding factor is transfer pricing. Transfer pricing refers to the practice of controlling shareholders to covertly move profits from one location to another location by engaging in related transactions of export and import businesses. For example, a subsidiary in China can transfer profits to its overseas headquarters by either under-invoicing its exports to the overseas headquarters and/or by over-invoicing its imports from the overseas headquarters. One possibility is

[15] Evidence reported by Ezra Vogel in his research on China's Guangdong province shows that many Hong Kong firms return to do business in their ancestral home regions. He notes that in the late 1980s half of the export-processing contracts in the Dongguan region of Guangdong were with former Dongguan residents living in Hong Kong (Vogel 1989, p. 176).

that ECE firms engage in transfer-pricing activities more than their non-ECE counterparts, thereby leading to lower—but fictitious—accounting profits on the part of ECE firms.

Given its covert nature, it is difficult to measure transfer pricing precisely. We can only indirectly estimate its effect. One suggestive piece of evidence that transfer pricing is unlikely to explain the entire ECE effect is provided by the findings on the non-JV sample in Table 3. Transfer pricing is often used by the controlling shareholders to enrich themselves at the expense of the less-informed minority shareholders. By this logic, transfer pricing is likely to be most serious in JVs with a joint shareholding structure between HMT investors and Chinese investors and is likely to be less serious among firms wholly owned by HMT investors. As shown in Table 3, ECE firms underperformed against non-ECE firms in both the JV and non-JV samples. The ECE underperformance is by no means only limited to JVs.

However, transfer pricing is used not only to tunnel profits at the expense of minority shareholders but also to reduce tax liabilities in the operating country. For this reason, we need to find a direct way to control for transfer pricing. One feasible solution is to control for the firms' foreign trade activities. Since foreign trade is the conduit for transfer pricing, it might be reasonable to assume that transfer pricing is correlated with foreign trade.

Since transfer pricing is achieved by underreporting exports, we define the first proxy as the exports as a ratio of total sales. (We conducted the same tests on a sub-sample of firms for which we have both export and import data and the results are qualitatively similar.)[16] Our regression shows

[16] Ideally, we would want to also include controls to address imports, but our full dataset does not give the import levels. Thus for the main results reported in this paper, we use export/total sales as our proxy for transfer pricing. For the 1998-2001 sub-sample, we do have import data. We thus re-did our transfer-pricing tests for those years

that this transfer-pricing proxy does not correlate with ECE significantly, after controlling for the set of relevant covariates in the JV sample. Adding this transfer-pricing proxy does not change the economic and statistical significances of the coefficients on the ECE indicator from those reported in Table 3.

It is possible that ECE firms focus on export markets, whereas non-ECE firms focus on domestic markets. To rule out the possibility that the difference in performance might be attributed to the fact that ECE and non-ECE firms differ in their foreign/domestic market orientations, we stratified the dataset into five groups: a group that targets only the domestic market and four quartiles of firms based on the values of their export-sales ratio. Within each stratum, we repeated the regression analysis. These analyses yielded negative and statistically insignificant coefficients on the ECE indicator. Thus there is no evidence that our findings are driven by either transfer pricing—at least in the way that it is measured here—or by the export orientation of ECE firms. These results are presented in Table 6.

[Insert Table 6 around here]

4.4. Exploring the Mechanism for the Dynamic Effects of ECE Firms

Our literature review suggests a number of potential limitations of ethnic ties, such as valuing kinship and relationships at the expense of skills. It is possible that these limitations explain why the supposed superior cultural knowledge on the part of ECE firms fails to translate into any

by proxying the transfer pricing as the ratio of the sum of exports and imports to total sales. The results are qualitatively similar.

operating advantages. We are able to directly test some of these underlying mechanisms posited in the literature.

One potential explanation for our findings is that ECE investors may under-invest in those capabilities that would enhance their long-term performance. We propose using the following two variables to measure these capabilities. One is the intangible assets held by the firm. Intangible assets, as defined in the CIC and under Chinese accounting rules, are quite similar to accounting treatments in the United States, including patented and non-patented technology and know-how, brand names and trademarks, royalties, various types of licensed rights and franchise rights, and goodwill. (Chinese accounting standards also use an amortization rule similar to that in the United States.) The other measure is average wage per employee. The average wage is widely used by labor economists to measure skills and productivity levels.

We conduct a regression analysis on the intangible assets or average wage level by regressing them on a variety of firm characteristics and an ECE dummy. The intangibles exhibit positive and significant time trends over the census years for the non-ECE firms, netting out the firm- and province-fixed effects, indicating that on average non-ECE firms are spending heavily to build up their intangible assets over time. By contrast, as shown in Table 7, the ECE firms in our sample seem to significantly under-invest in intangible assets and human capital compared with the non-ECE firms, controlling for other firm characteristics.

[Insert Table 7 around here]

We further demonstrate how the differences in intangibles and human capital between the ECE and non-ECE investors may affect performance. We show that the "dynamic disadvantage

effect" of ethnicity disappears once we non-parametrically control for intangible investments or investments in human capital (proxied by the wages). We first stratified the dataset into six sub-samples by the value of the intangibles: the first sub-sample contains firms that have zero intangibles and the five other sub-samples contain firms based on the quintiles of intangibles to which these firms belong. The first sub-sample consists of slightly more than 40 percent of the companies, with an almost even split between ECE and non-ECE firms. The latter five sub-samples account for about 60 percent of the sample, with 22,252 ECE and 39,495 non-ECE firms, respectively, roughly evenly distributed among the five quintiles. For each stratum of intangible assets, we regress our usual performance measure on the ECE indicator variable, ECE and age interaction term, firm age, and a variety of the control variables used in Table 3, controlling for the province, industry, and year dummies.

Table 8 presents the summary of the regression coefficients on the ECE*age interaction terms and the corresponding t-statistics. As can be seen, for each of the strata of the data where firms have relatively similar levels of intangible assets, the ECE*age coefficients become statistically insignificant. In fact, they become positive for lower levels of the intangible assets. This contrasts with the earlier evidence that, when regressing intangibles on ECE*age and the set of usual controls in the whole sample, ECE*age is negative and statistically significant at the 1% level. The new results present strong evidence that the intangibles may be the underlying mechanism (or at least an important factor) contributing to the acceleration of the ECE disadvantages documented earlier. These results hold, qualitatively, when we substituted intangible assets with average employee wage—a proxy for skilled human capital—in our regression runs.

[Insert Table 8 around here.]

5. Conclusion

In this paper we explored the question whether "ethnicity" pays, specifically, whether ethnic Chinese FDI firms have a systematic operating advantage over non-ethnic-Chinese FDI firms in China. Economic theories, although not without some ambiguities, are largely positive regarding the economic contributions of ethnic ties. At a micro level, ethnic ties are believed to facilitate information provision and to enhance trust. At a more macro level, ethnic ties are believed to facilitate cross-country trade and investment flows.

Our descriptive data support the view that ethnic ties facilitate investment flows. By 1999, 59 percent of China's FDI stock came from three regions: Hong Kong, Macau, and Taiwan. More than half of the FDI firm observations in the CIC are ECE FDI firms. Ethnicity clearly has a substantial effect on the *volume* of cross-border transactions.

However, our findings, generated on the basis of an extensive battery of statistical tests, do not show that ethnicity has a substantial positive effect on the performance of cross-border transactions. Ethnicity does not seem to pay. ECE FDI firms either failed to outperform or actually underperformed non-ECE FDI firms in China. The ECE "penalty" is especially pronounced when we measured performance over time. This dynamic ECE effect seems to resonate with the criticism of ethnic ties by Greif (1994) in his otherwise positive appraisal of the economic effects of ethnic ties. Greif argues that the advantage of Maghribi traders is short term as they may have neglected to

build up institutions and practices that expanded trade in the long run.[17] We reveal a similar dynamic here. ECE firms seem to have under-invested in technology and human capital. They may, as hypothesized by Casella and Rauch (2002), more heavily value kinship and ethnic ties. This might be a potential downside to organizing economic and business activities through an ethnic network.

It should be noted that our study focuses only on data from China and thus is not a demonstration of a *prevalence* of underperformance of ethnically-linked economic activities. That said, our findings cast some doubt on the simple or simplistic notion that ethnic ties are always beneficial in economics and business. To the extent that a substantial portion of the FDI in many countries, particularly in the developing economies, is comprised of ethnic FDI, our results shed useful light on the overall patterns of—and limitations with—ethnically-linked activities. We hope that this paper, by anchoring our findings on a very detailed empirical investigation, will contribute to the general economics literature on ethnicity and to an understanding of this important phenomenon in the global economy.

[17] We thank one referee for identifying the link between Greif (1994) and our findings.

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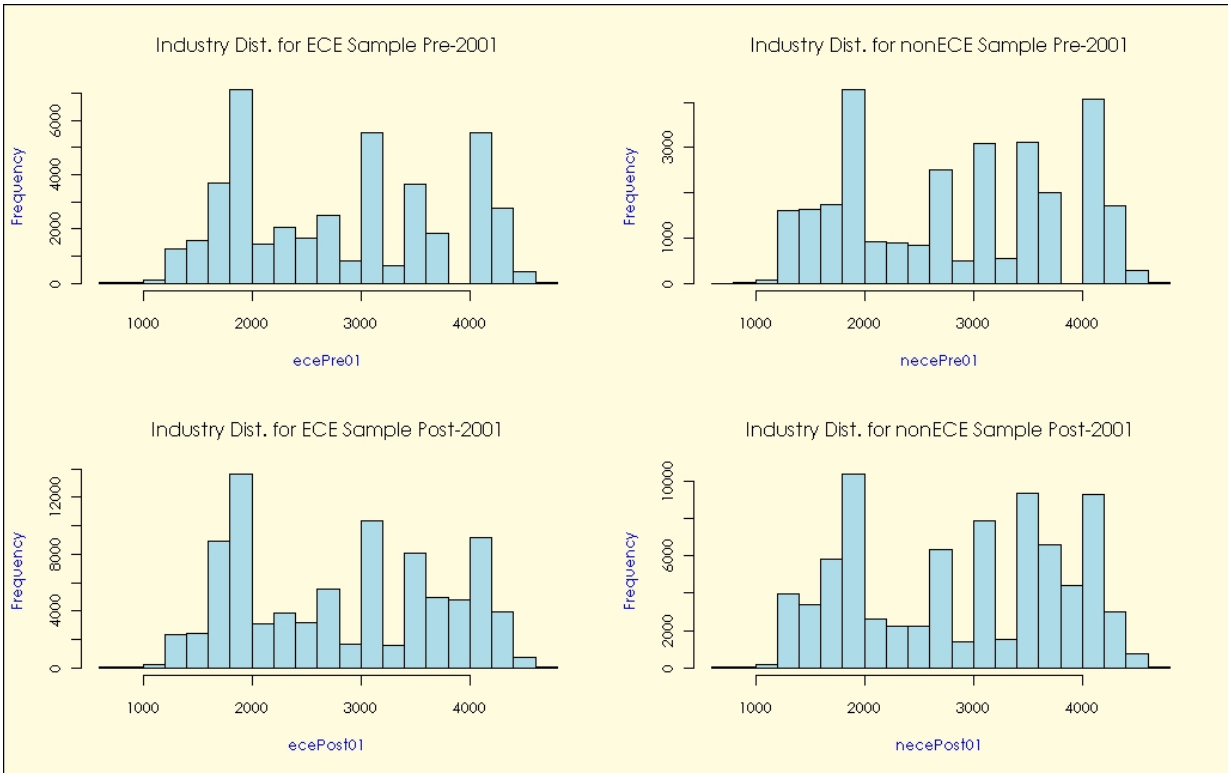
Figure 1: The distribution of ECE and non-ECE FDI across industries, over the 1998-2001 and 2002-2005 periods.



Note: The horizontal axis is the four-digit industry codes used in the data. The vertical axis is the number of total counts in each bin. We divide the sample into two equal-length sub-periods to check the stability of the patterns over time.

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Table 1: Summary Statistics for Variables Across the ECE and Non-ECE Subsamples (measured in USD)

	non-ECE				ECE			
Variable	Number of Observations	Mean	Median	Std. Dev	Number of Observations	Mean	Median	Std. Dev
Net Margin	122826	0.33	0.12	0.51	147784	0.32	0.10	0.52
ROA	122826	0.36	0.16	0.49	147784	0.34	0.13	0.50
ROE	122826	0.38	0.30	0.58	147784	0.36	0.28	0.60
ECE	122826	0.00	0.00	0.00	147784	1.00	1.00	0.00
Discretionary Acc	122826	0.00	0.00	0.02	147784	0.00	0.00	0.03
Log(assets)	122826	8.27	8.12	1.44	147784	8.00	7.86	1.27
Age	122826	5.51	5.00	3.75	147784	6.31	6.00	3.87
Capital Intensiven	122826	0.02	0.01	0.03	147784	0.01	0.01	0.02
Leverage	122826	0.49	0.50	0.24	147784	0.50	0.51	0.24
Export/sales ratio	122826	0.44	0.27	0.56	147784	0.47	0.31	0.62
JV	122826	0.60	1.00	0.49	147784	0.54	1.00	0.50
Relationship	122826	71.63	90.00	23.52	147784	73.90	90.00	20.47
Export	122826	3049	722	5659	147784	2622	679	4961
Sales	122826	9803	3334	17290	147784	6946	2724	12750
Total Assets	122826	15258	3347	76839	147784	9098	2598	47560
Worker	122826	308	140	753	147784	313	150	646
Equity	122826	7097	1588	38979	147784	4103	1181	23149
Intangibles	122826	305.45	0.37	734.60	147784	167.48	0.00	505.84
Average Wage	122826	2.13	1.64	1.61	147784	1.69	1.38	1.27
Total Profit	122826	1007.98	82.01	11381.84	147784	447.41	43.70	4895.19
Average Benefit	122826	0.25	0.12	0.62	147784	0.16	0.08	1.28
Year	122826	2002.38	2003.00	2.26	147784	2002.03	2002.00	2.29

Note: The political hierarchy level of a firm refers to the political level to which the firm reports. This variable takes on value 10 if the firm reports to the central government, 20 if it reports to the provincial level, 40 to the regional level, 50 to the county-level, 61 to the street-level, 62 to the town-level, 63 to the village level, 71 to theresidential association level, 72 to the village association level, and 90 otherwise. The employment variable refers the number of persons employed in a firm. Export, capital, intangibles, total assets, equity, sales, profits, and wage are all variables as recorded in the original database. We generated the age variable by subtracting the firm's incorporation year from the year of the data. We calculated net margin by profits divided by sales netting out discretionary accrual * assets / sales. ROA is return on assets, defined as profits divided by the difference between total assets and profits, netting out discretionary accrual * assets / (assets - profits). ROE is return on equity, defined as profits divided by equity, discretionary accrual*assets/equity. Capital intensiveness is the capital/labor ratio. The leverage variable is defined as total assets subtract shareholder equity and then divided by total assets. Joint venture dummy takes value of one if the firm is a joint venture corporation, and zero otherwise. In the database, the variable "registration type" identifies the firm’s ownership. Foreign-affiliated firms have register type values of between 200 and 340, with ECEs between 200 and 240 and joint ventures between 210 and 310. Transfer pricing is defined as (exports-imports)/(total outputs). All measures of value are in USD with the base unit=1000.

Review of Economics and Statistics Just Accepted MS.
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Table 2: ECE Dummy and ROA

	dependent variable			
	Joint Venture Sample		Non-Joint Venture Sample	
	Regression with only ECE and Fixed effects	Regression with all controlled variables but ECE	Regression with only ECE and Fixed effects	Regression with all controlled variables but ECE
	ROA	ROA	ROA	ROA
ECE Dummy	-0.02		-0.02	
	-2.09		-2.12	
Log(assets)		0.01		-0.03
		2.62		-5.11
Firm Age		0.00		-0.01
		-0.07		-2.16
Capital Intensiveness		0.08		0.07
		4.37		2.90
Leverage		0.37		0.39
		26.95		26.13
Year Fixed Effects?	Y	Y	Y	Y
Firm Fixed Effects?	Y	Y	Y	Y
Province Fixed Effects	Y	Y	Y	Y
Adjusted R-squared	0.3928	0.4024	0.3041	0.3158
Number of Observation	153,588	153,588	116,987	116,987

Note: T-statistics based on standard errors clustered at the firm level are below the coefficient estimates. For JV and non-JV samples, estimates of the model only contains regressors of ECE and other fixed effects are listed in the left column, and estimates of the model contains regressors of all controlled variables and fixed effects but ECE are listed in the right column.

Review of Economics and Statistics Just Accepted MS.
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Table 3: ECE Dummy and ROA

	Joint Venture Sample	Non-Joint-Venture Sample	Joint Venture Sample	Non-Joint-Venture Sample
	(1)	(2)	(3)	(4)
	ROA	ROA	ROA	ROA
ECE Dummy	-0.0140	-0.0217	-0.0103	-0.0233
	-1.91	-2.12	-1.37	-2.29
ECE*Age			-0.0239	-0.0322
(age is mean-centered)			-3.87	-3.83
Log(assets)	0.0131	-0.0299	0.0126	-0.0306
	2.62	-5.13	2.53	-5.26
Firm Age	-0.0001	-0.0052	0.0024	-0.0014
	-0.06	-2.16	1.47	-0.52
Capital Intensiveness	0.0001	0.0001	0.0001	0.0001
	4.37	2.9	4.41	3.01
Leverage	0.3701	0.3938	0.3704	0.3958
	26.95	26.13	26.98	26.25
Year Fixed Effects?	Y	Y	Y	Y
Firm Fixed Effects?	Y	Y	Y	Y
Province Fixed Effects	Y	Y	Y	Y
Adjusted R-squared	0.4024	0.3159	0.4025	0.3161
Number of Observations	153,588	116,987	153,588	116,987

Note: T-statistics based on standard errors clustered at the firm level are below the coefficient estimates. Estimates for the joint-venture-sample are included in the left-land column, and estimates for the non-joint-venture sample are included in the right-land column.

Review of Economics and Statistics Just Accepted MS.
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Table 4: ECE Dummy and ROA: Taiwan and Korea Subsample in Electronic and Related Industries

	Joint Venture Sample	Non-Joint-Venture Sample	Joint Venture Sample	Non-Joint-Venture Sample
	ROA	ROA	ROA	ROA
ECE*Age			-0.06	-0.03
(age is mean-centered)			-2.21	-1.70
ECE Dummy	-0.06	0.01	-0.03	0.01
	-2.36	0.36	-1.40	0.42
Log(assets)	0.00	-0.02	0.00	-0.02
	-0.11	-1.41	-0.14	-1.46
Firm Age	0.01	-0.01	0.01	0.00
	0.96	-1.25	1.51	-0.50
Capital Intensiveness	0.18	-0.01	0.19	-0.01
	2.43	-0.19	2.48	-0.17
Leverage	0.36	0.37	0.36	0.37
	7.54	10.72	7.56	10.73
Year Fixed Effects?	Y	Y	Y	Y
Firm Fixed Effects?	Y	Y	Y	Y
Province Fixed Effects	Y	Y	Y	Y
Industry*Year FE	Y	Y	Y	Y
Adjusted R-squared	0.3281	0.28	0.3281	0.28
Number of Observation	9652	15527	9652	15527

Note: The ECE dummy takes the value of 1 if it is a Taiwanese firm and 0 if it is a Korean firm. T-statistics based on standard errors clustered at the firm level are below the coefficient estimates. Estimates for the joint-venture sample are included in the left-hand column, and the estimates for the non-joint-venture sample are included in the right-hand column.

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Table 5: ECE Dummy and ROA: Guangdong & Fujian vs the Rest of the Country

	Joint Venture Sample		Non-Joint Venture		Joint Venture Sample		Non-Joint Venture	
	Guangdong/Fujian	rest of the country	Guangdong/Fujian	rest of the country	Guangdong/Fujian	rest of the country	Guangdong/Fujian	rest of the country
	ROA	ROA	ROA	ROA	ROA	ROA	ROA	ROA
ECE dummy*Firm Age					-0.04	-0.02	-0.03	-0.06
					-2.81	-2.85	-2.13	-4.64
ECE dummy	-0.02	-0.01	-0.02	-0.02	0.00	-0.01	-0.02	-0.04
	-1.39	-0.93	-1.50	-1.41	-0.31	-0.82	-1.30	-2.36
Log(assets)	0.01	0.02	-0.03	-0.03	0.01	0.02	-0.03	-0.03
	1.20	2.56	-3.71	-3.67	1.16	2.50	-3.75	-3.65
Firm Age	0.00	0.00	-0.01	0.00	0.00	0.00	0.00	0.00
	-0.38	0.12	-1.87	-0.96	1.07	1.16	-0.48	0.45
Capital Intensivenes	0.00	0.08	0.00	0.04	0.00	0.11	0.00	0.04
	1.27	4.37	3.20	0.98	1.30	4.52	3.21	1.16
Leverage	0.36	0.38	0.40	0.39	0.36	0.38	0.40	0.39
	15.68	22.03	20.83	16.01	15.69	22.06	20.86	16.10
Year Fixed Effects?	Y	Y	Y	Y	Y	Y	Y	Y
Firm Fixed Effects?	Y	Y	Y	Y	Y	Y	Y	Y
Province Fixed Effe	Y	Y	Y	Y	Y	Y	Y	Y
Adjusted R-squared	0.4024	0.4118	0.3159	0.3242	0.4025	0.4119	0.3161	0.3249
Number of observati	43741	109881	60060	56933	43741	109881	60060	56933

Note: T-statistics based on standard errors clustered at the firm level are below the coefficient estimates. For Jont Venure sample and non-Joint Venture sample, estimates for the Guangdong/Fujian subsample are included in the left column, and the estimates for the complement(the rest of the country) are in the right column.

Review of Economics and Statistics Just Accepted MS.
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Table 6: ECE Dummy, Transfer Pricing, and ROA

	Dependent Variable						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Transfer Pricing	ROA					
Sample Selection Criterion	full JV sample	full JV sample	JV firms with zero exports	quartile 1 export/sales ratio	quartile 2 export/sales ratio	quartile 3 export/sales ratio	quartile 4 export/sales ratio
ECE Dummy	-0.01	-0.01	0.00	-0.01	-0.01	-0.01	-0.01
	-0.34	-1.92	-0.08	-1.60	-1.40	-1.09	-1.47
Export/Sales		-0.01		0.23	0.01	0.06	0.00
		-0.86		5.51	0.33	1.41	0.23
Log(assets)	-0.01	0.01	0.01	0.03	-0.02	-0.04	-0.03
	-0.46	2.64	1.54	5.56	-6.80	-16.17	-5.42
Firm Age	0.00	0.00	0.00	-0.02	-0.02	-0.03	-0.03
	0.92	-0.08	-0.95	-17.41	-22.37	-32.60	-17.04
	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Capital Intensiveness	-0.81	4.39	3.35	-5.97	-2.32	1.40	-0.57
Leverage	0.00	0.37	0.37	0.04	0.04	0.13	0.09
	0.10	26.94	15.30	2.42	3.18	11.95	3.97
Hierarchy Fixed Effects	Y	Y	Y	Y	Y	Y	Y
Year Fixed Effects?	Y	Y	Y	Y	Y	Y	Y
Firm Fixed Effects?	Y	Y	Y	Y	Y	Y	Y
Province Fixed Effects	Y	Y	Y	Y	Y	Y	Y
Adjusted R-squared	0.4527	0.4026	0.4192	0.2905	0.3182	0.3127	0.3396
Number of Observations	153,588	153,588	69,376	20,393	21,444	33,008	9,367

Note: The dependent variables are the exports as a ratio of total outputs, in column (1), and ROA in other columns. Columns 1 and 2 are regressions for the whole sample, and columns 3 through 7 are regressions for the five subsamples according to the export/sales levels (zero exports and quartiles 1 to 4 for positive export/sales levels). T-statistics based on standard errors clustered at the firm level are below the coefficient estimates.

Review of Economics and Statistics Just Accepted MS.
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Table 7: ECE Dummy, Intangibles, and Average Wage

	Dependent Variable			
	(1)	(2)	(3)	(4)
	Intangibles		Average Wage	
	JV sample	Non-JV sample	JV sample	Non-JV sample
ECE Dummy	-511.07	-166.40	-1.54	-2.32
	-8.72	-4.04	-9.57	-12.41
Log(assets)	1824.04	1636.84	1.44	0.87
	18.32	20.26	13.9	12.5
Capital Intensiveness	3.91	2.75	0.01	0.02
	13.04	11.1	18.08	25.9
Leverage	-526.19	-308.37	-0.20	2.46
	-5.82	-4.78	-0.77	14.85
Firm Age	-72.86	-18.08	0.17	0.16
	-11.84	-2.95	8.27	14.19
Year Fixed Effects?	Y	Y	Y	Y
Firm Fixed Effects?	Y	Y	Y	Y
Province Fixed Effects	Y	Y	Y	Y
Adjusted R-squared	0.3547	0.3203	0.3129	0.2926
Number of Observation	153,588	116,987	153,588	116,987

Note: The dependent variables are the intangibles and average wage. T-statistics based on standard errors clustered at the firm level are below the coefficient estimates.

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Table 8: Summary of Regression Coefficients of ECE*Age Term, for Various Intangible Quintiles

	Panel A: JV Sample	Panel B: Non-JV Sample
Intangible Quintile	ROA	ROA
Intangible = 0	0.0066	0.0204
	1.7	3.51
Intangible Quintile = 1	0.0051	0.0310
	0.43	2.17
Intangible Quintile = 2	0.0027	0.0264
	0.27	1.83
Intangible Quintile = 3	-0.0026	0.0137
	-0.24	1.28
Intangible Quintile = 4	-0.0043	0.0007
	-0.47	-0.07
Intangible Quintile = 5	-0.0168	-0.0017
	-1.48	-0.14

Note: T-statistics based on clustered standard errors are below the coefficient estimates. Regressions control for year, industry, and province fixed effects.