Capital or Knowhow:

The Role of Foreign Multinationals in Sino-Foreign Joint Ventures

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Abstract

China's success in attracting foreign direct investment has been cast in doubt as mainly a transfer of capital, not knowhow, because its financial system is incapable of allocating domestic savings and hard-earned foreign reserves to domestic enterprises. To shed light on this debate, we examine the determinants of equity sharing in Sino-foreign joint ventures with the premise that the roles of foreign direct investment (in transferring capital or knowhow) should be reflected in equity sharing between multinational firms and local firms. Our empirical analysis offers strong evidence for foreign direct investment as a transfer of knowhow, but limited support for foreign direct investment as a transfer of capital, which points to the need for further reform in China's financial system.

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1. Introduction

China's transition from a centrally planned economy to a market economy in the last thirty years has been anchored on two policies: opening its door to foreign trade and investment (the "open-door" policy or *Kaifang in Chinese*) and reforming its state-owned enterprises (the "reform" policy or *Gaige in Chinese*). Between 1979 and 2005, China attracted more than US $1.285 trillion foreign direct investment (or FDI) involving over 552,000 projects (China Statistical Yearbook, 2006). China was the second largest exporter and third largest importer in the world in 2007 (The World Factbook, 2007). On reforming its state-owned enterprises, however, China has taken a gradual and selective approach (e.g., Cao, Qian, and Weingast, 1999; Bai, Li, Tao and Wang, 2000; Bai, Lu and Tao, 2006a and 2009), with state ownership still accounting for 35% of China's GDP (CAI JING Magazine, 2007). Thus the open-door policy is more dramatic in scale and scope, and arguably more instrumental in China's transition toward a market economy than the reform policy.

In view of China's impressive record in opening to foreign trade and investment, attention has been shifted toward the roles played by FDI in China's economic transition.[1] On one extreme is the benign view that FDI supplied by multinationals has

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[1] The impacts of China's success in foreign trade are equally worth investigating, as evidenced by the extensive debates on the proper value of China's currency. As foreign-invested enterprises have been a

brought China much-needed knowhow, a term we broadly define to include advanced technologies, modern management practices, and access to international markets. On the other extreme is the critical view that China's huge influx of FDI is in fact a reflection of its inefficient and discriminating financial system, under which less privileged domestic enterprises such as China's private enterprises face difficulties in access to external finance and are forced to sell their companies for capital (Huang, 2003). Debate on the roles of FDI in China's economic transition has become increasingly widespread and contentious, given that China has maintained a huge trade surplus invested in ever-depreciating U.S. treasury bonds yet continues to rely on FDI for economic development.

In this paper, we attempt to shed light on the debate by empirically investigating the roles of FDI in China. Our approach is to examine the determinants for equity sharing in international joint ventures located in China, with the premise that the roles of FDI (in transferring capital or knowhow) should be reflected in equity sharing between multinational firms and local firms. We find strong evidence for FDI as a transfer of knowhow, but limited support for FDI as a transfer of capital. The support for the benign view of FDI (as a transfer of knowhow) is reassuring, but results found related to the negative view of FDI (as a transfer of capital) point to the need for further reform in China's financial system.

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driving force behind China's exports and imports (Lu, Lu and Tao, 2009), we focus on the roles of foreign direct investment in this paper.

Our data set covers 5,217 international joint ventures in 29 manufacturing industries between local firms of 28 China's regions[2] and multinational firms of 51 countries. The need for capital varies across industries and projects, and so does the capital-labor endowment across source countries of multinationals, which allows us to explore the role of FDI in transfer of capital. Meanwhile, the relative contributions of local firms and foreign multinationals vary across industries, China's regions, and source countries of multinationals, which afford us to test the role of FDI in transferring knowhow as well.

This paper builds upon a large literature on the determinants of equity sharing in joint ventures, such as Gomes-Casseres (1989), Nakamura and Xie (1998), Asiedu and Esfahani (2001), Barbosa and Louri (2002). We contribute to this literature by developing determinants of equity sharing that reflect local partners' abilities in operating in less perfect business environments. Specifically, we find that local partners have more contributions and hence obtain higher equity shares in regions/industries with a higher degree of state ownership, and in regions with more serious bureaucracy. More importantly, in an important departure from the existing literature, we emphasize on differentiating the role of FDI as a transfer of knowhow from that as a transfer of capital, which has implications for both government policies and multinational strategies.

The plan of the paper is as follows. In section 2, we develop testable hypotheses regarding the role of FDI as a transfer of knowhow and those for FDI as a transfer of

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[2] Region here refers to 22 provinces, 4 province-level municipalities, and 5 minority autonomous regions in China.

capital. Data and variables are described in section 3, and econometric analysis is presented in section 4. The paper concludes with Section 5.

2. Hypotheses

2.1. FDI as a transfer of knowhow

The equity joint venture is arguably the most often used organization for multinationals when they make direct investment in developing and transition economies.[3] This is because, even though foreign multinationals may have advanced technologies, latest management practices, and access to international markets (collectively referred to as "knowhow" in this paper), they still need help from local partners in order to make their direct investment successful. Local firms know how to operate in less-than-perfect environments and organize low-cost production for multinationals, and they also have expertise of marketing the products and services of the multinationals in local markets. Under these circumstances, the equity joint venture is an ideal organizational structure for FDI, as equity sharing can be adjusted to motivate both foreign multinationals and local firms as well as achieve a high degree of complementarity and cooperation between the two parties.

By drawing insights from the team production theory and the theory of the firm, we can develop hypotheses regarding the determinants of equity sharing in equity joint ventures where foreign multinationals bring knowhow and local partners provide complementary skills. The team production theory developed by Holmstrom (1982) captures some

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[3] 183,015 among 304,821 approved FDI projects between 1979 and 1997 were equity joint ventures; in the same period, 51% of the total value of FDI was invested in equity joint ventures (according to the statistics provided by China's Ministry of Foreign Trade and Economic Cooperation).

essential features of cooperation between foreign multinationals and local partners, and in this theory, optimal revenue sharing is determined by the relative importance of efforts by different team members.

The property rights theory of the firm (Grossman and Hart, 1986; Hart and Moore, 1990; and Hart, 1995) emphasizes the importance of residual rights of control when ex ante contracts are incomplete, and its predictions regarding whether foreign multinationals should own local firms or vice versa depend on the relative importance of the partners' relationship-specific investments. Dasgupta and Tao (1998) extend the property-rights theory of the firm to incorporate partial ownership as in the case of equity joint ventures, and establish the optimality of equity joint ventures over wholly-owned subsidiaries (either foreign multinationals owning local firms, or vice versa) in the setting of contractual incompleteness. Antràs and Helpman (2004) incorporate the property rights theory of the firm into a North-South model of international trade and investment, and investigate conditions under which headquarters, located in the North, goes about making direct investment in the South.

Inspired by some stylized facts of international joint ventures located in China, Bai, Tao and Wu (2004) construct a model of equity joint ventures in the spirit of both the team production theory and the property rights theory of the firm. They consider the conflicts of interest between the parent companies of an equity joint venture, and the implications for their ex post decisions and ex ante incentives. The focus of their paper is on how the conflicts of interest can be mitigated by properly designed control and revenue-sharing

arrangements, which are in turn determined by the relative importance of investments made by the joint venture partners.

For an equity joint venture to be successful, the partners need to cooperate in various stages of the operation, ranging from input procurement, production processes up through final sales or provision of services. The relative contribution of the partners varies from one stage to another. It is generally agreed that foreign multinationals (foreign partners of equity joint ventures) are strong in technologies while local firms (local partners of equity joint ventures) have expertise in sales and services in their local market. It follows that, in industries that require higher R&D expenses relative to sales (called *R&D intensity*) the contributions made by the foreign partners become more important, and hence higher shares for the foreign partners. Similarly, in industries with higher marketing expenses to sales ratios (called *advertising intensity*), the contributions made by the local partners are more important and hence higher shares for the local partners. Thus we have:

Hypothesis 1: The equity shares of foreign partners increase with industry R&D intensity.
Hypothesis 2: The equity shares of foreign partners decrease with industry advertising intensity.

The above two hypotheses merit qualification and further elaboration. Take Hypothesis 1 for an example. Even in a given industry, multinationals coming from different countries may have different levels of technological capabilities and hence different contributions to the success of the equity joint ventures. To capture these variations in the relative

importance of the partners' contributions, we construct a variable called revealed comparative advantage (or *RCA*). It is the ratio between the share of country i's total export contributed by industry j and the share of China's total export contributed by the same industry j. The higher the revealed comparative advantage of a country in an industry relative to China, the more competitive the multinational firms from that country in that industry ought to be. Clearly, the RCA index measures the competitiveness of multinationals of a given country in a given industry, relative to China. It could be due to their advanced technologies, excellent management practices, or superior access to international markets. Regardless of the source, in a given industry, multinationals from a country with a higher RCA are expected to have more important contributions to the equity joint ventures and hence should have higher equity shares.

Hypothesis 3: The equity shares of foreign partners increase with the revealed comparative advantage of their countries of origin in the concerned industries.

Hypothesis 2 is based on the assumption that local partners generally contribute to the sales and services of joint venture output only in their home markets. In practice, FDI in China could be both vertical (China as the "world's factory") and horizontal (China as a huge domestic market). Correspondingly, the contribution of local partners in the sales and services of joint venture output varies from horizontal FDI (significant) to vertical FDI (not significant). As a result, the relation between the equity shares of the foreign partners and the importance of marketing (represented by advertising intensity) could be ambiguous.

While local partners traditionally help joint ventures market output in their local economies, an arguably more important role in the emerging economies is navigating the joint ventures through an imperfect market environment. For example, local partners can help joint ventures steer through various regulatory procedures and get their businesses going. In the case of China, the degree of bureaucracy varies from region to region, despite the fact that it is a unitary state with the same set of universal laws and regulations. Following Djankov et al (2002), we construct an index of bureaucracy for various regions of China, using data on the average time needed for the registration of joint ventures after signing joint venture contracts.[4] It is expected that, in regions with more serious bureaucracy, the contributions made by the local partners are more important and hence higher equity shares for them. To summarize, we have:

Hypothesis 4: The equity shares of the local partners are higher in regions with more serous bureaucracy.

What differentiates the Chinese economy from other transition economies is its gradual reform approach and the resulting dominance of state ownership (e.g., Cao, Qian, and Weingast, 1999; Bai, Li, Tao and Wang, 2000; Bai, Lu and Tao, 2006 and 2009). State-

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[4] The following paragraph from Rosen (1999, page 43) illustrates the important roles played by local partners. "While approval or rejection by the examining authorities seems monolithic to many foreign investors, the internal processes are often complex and contentious. The tumult of internal decision making is, in fact, what makes partners so important. The failure of seemingly good projects to survive the vetting process results in part from ministerial anxieties that industries they oversee will suffer as a result of foreign competition. The success of high-technology firms in getting approved can be explained not just by their inherent attractions but by the absence of domestic "clients" to oppose their application. All other things being equal, FIEs will lose these battles in China because they lack sophisticated knowledge of bureaucratic politics. With patrons of their own to provide them with domestic standing, they have a far better chance of success."

owned enterprises have objectives (such as social stability) completely separate from profit maximization and therefore their ways of doing business could be different from those firms with a primary purpose of maximizing profits. The local Chinese partners of equity joint ventures, often state-owned, have advantages over their foreign partners in dealing with state-owned suppliers, customers, and even other competitors. Such advantages are expected to be amplified the greater the degree of state ownership in a region and/or an industry. Thus, we have:

Hypothesis 5: The equity shares of the local partners are higher in regions and/or industries with higher degrees of state ownership.

2.2. FDI as a transfer of capital

Generally speaking, developing countries suffer from a lack of capital for economic development, and therefore many adopt favorable policies towards attracting capital from multinationals.

Conventional wisdom says that, by investing in more capital-constrained countries or industries, multinationals are able to increase their bargaining power and obtain a higher share in their joint ventures with local firms. However, it is not clear why the transfer of capital should be carried out through FDI as opposed to private debt flows. As FDI imposes negative incentive effects on the capital-receiving parties, it is less efficient than private debt flows, so long as the latter does not lead to severe bankruptcy risks.

Recent studies show that in the presence of asymmetric information and moral hazard problems involved with investment in the developing countries (see Chapter 6 of Obstfeld and Rogoff, 1996), international capital markets become less efficient, and then it could be optimal to have the transfer of capital in the form of FDI. Razin, Sadka, and Yuen (1998) argue that, compared with foreign portfolio equity investment and foreign portfolio debt investment, FDI confers control and management rights. In the presence of asymmetric information about the value of future investments, these rights associated with FDI ensure a return from the investment. Aghion and Bolton (1992) offer an alternative explanation for why lenders may want to have equity control in the borrowing entities when faced with the existence of moral hazard problems. They consider a general setting of an entrepreneur and a wealthy investor where the entrepreneur may have objectives other than profit maximization, and may therefore take actions that are not in the best interests of the investor. In this case, if the transfer of capital is in the form of private debt flows, it could be too late for the creditor to take any action by the time the entrepreneur has difficulties in meeting the loan obligations. And it may become optimal for the wealthy investor to have control in the project while it is still viable, i.e., engineering a transfer of capital through FDI. Regardless of the sources of market imperfection (asymmetric information or moral hazard or both), FDI as a transfer of capital is a second-best solution, and foreign equity investment should be kept as low as possible so as to minimize its negative incentive effects on the capital-receiving parties.

The case of China stands out among developing countries due to the fact that it has attracted a substantial amount of FDI in the form of equity joint ventures, even though China has simultaneously accumulated a vast quantity of foreign reserves invested mostly in low-yield U.S. treasury bonds. So the question arises as to whether China is really in need of foreign capital, especially in the later years of economic reform.

One possible explanation is that China's financial system is inefficient and incapable of channeling hard-earned foreign reserves and huge domestic savings to local firms in need of capital. In particular, China's financial system consists of mostly state-owned banks and state-controlled stock markets which, unsurprisingly, favor state-owned enterprises (Huang, 2003). As a result, China's private enterprises, including both those privatized from state-owned enterprises and indigenous private enterprises, lack access to external finance (see Bai, Lu and Tao (2006b) on bank loans, and Du and Xu (2008) on listing in the stock market), and they must sell their equity shares to foreign multinationals for needed capital (Huang, 2003).

In testing the role of FDI as a transfer of capital, we then search for proxies for the need of capital. *The industry capital-labor ratio* captures the variations across industries in the need for capital, and *size of project investment* captures possible variations within industries in the need for capital. It is expected that foreign multinationals have greater bargaining powers and hence more equity shares in more capital intensive industries and in those projects of larger investment size. Hence we have the following two hypotheses.

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Hypothesis 6: The equity shares of foreign partners increase with the industry capital-labor ratios.

Hypothesis 7: The equity shares of foreign partners increase with the size of the project investment.

Meanwhile, *the industry average profit margin* is indicative of how quickly foreign multinationals can recoup their investments. So long as the investment returns are high, foreign multinationals would still seek those investments, no matter how high the industry capital-labor ratios or how large the project investment. Hence it is expected that foreign multinationals have lower bargaining powers in those industries with higher industry average profit margins.[5] Thus, we have:

Hypothesis 8: The equity shares of foreign partners are lower in those industries with higher profit margins.

Finally, different source countries of foreign multinationals have different capital-labor endowments. It is expected that multinationals from more capital-endowed countries have greater bargaining power in negotiating with local firms in China, and they have even more leverage against the local firms in those industries of higher capital-labor ratios. Hence we have the following two hypotheses.

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[5] One may argue that industries with high profit margins are often protected industries and foreign equity investments are restricted. In the case of China, however, there is no upper limit on foreign ownership except in a few resource-based industries. In our empirical study, the observations in those resource-based industries are excluded to make sure that there are unambiguous interpretations of our results.

Hypothesis 9: Equity shares are higher for those multinationals from more capital-endowed countries.

Hypothesis 10: The positive impact of capital endowment of FDI source countries on foreign equity share is greater in industries with higher capital labor ratios.

3. Data and Variables

3.1. Data

Our data comes from *the Almanac of Foreign Economic Relations and Trade of China* (or *AFERTC*), which is compiled annually by the Ministry of Foreign Trade and Economic Cooperation of China. It contains information on 7,449 joint ventures approved between 1985 and 1996.[6]

For each joint venture, the Almanac is supposed to provide information on the location of the joint venture, the industries involved, the amount of investment, countries of origin of the foreign partners, the identities of the Chinese partners, and the equity sharing arrangement between the foreign and Chinese partners, which are important to our study. However, due to various reasons, several adjustments are made to the sample of 7,449 joint ventures.

(I). 549 joint ventures are deleted from the sample because of missing information about the countries of origins of the foreign partners, industries involved, or the equity sharing arrangement between the foreign partners and the Chinese partners.

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[6] The joint ventures formed between 1979 and 1984 were quite limited in number, and were covered in the 1984 edition of the Almanac. Meanwhile, the coverage of joint ventures by the Almanac was discontinued starting from 1997, presumably because the number of joint ventures approved every year became too large for the Almanac to cover.

(II). 113 joint ventures are deleted from the sample, as the countries of origin of the foreign partners are tax havens such as Bermuda, British Cayman Islands, and British Virgin Islands, and their actual countries of origin are difficult to find out.

(III). 542 joint ventures are deleted as they are involved in more than one industry, which would cause difficulties for the construction of industry-level variables.

(IV). 823 joint ventures in the service industries, mostly formed in the latter half of the sample period after the lifting of the restrictions on foreign investment in those industries, are deleted because data availability for some of the explanatory variables has been more of a problem for the service industries as compared with the manufacturing industries.

(V). 205 joint ventures in the mining and construction industries are excluded, as there have been policies restricting foreign ownership in these industries. The final sample contains 5,217 joint ventures, with foreign investors coming from 51 countries.

Table 1a shows the distribution of the joint venture sample by the year of approval. The number of joint ventures in the manufacturing industries increased steadily from 352 in 1985 to 433 in 1990 and 1991, followed by a dramatic decrease to 195 in 1992, reflecting the lack of foreign investment after the political turmoil in 1989. It then resumed its growth pattern until 1995, when there was a significant shift toward making direct investment in China's service industries. Table 1b illustrates the distribution of the joint venture sample by the 29 two-digit manufacturing industries, with Nonmetal Mineral Products having the highest number of joint ventures (465) followed by Textile Industry (423) and Raw Chemical Materials & Chemical Products (409). From Table 1c, we see

that the sample covers 28 out of 31 China's regions, with Guangdong having the highest

number of joint ventures (973), and followed by Jiangsu (744) and Shandong (584).

To test the hypotheses laid out in Section 2, we need to supplement the Almanac data

with the industry-level data, region-level data, and data that capture the difference

attributes of multinationals from different countries. In the Appendix, we list the sources

of data for all the variables used in the study.

3.2. Variables

The dependent variable in this study is the equity share held by the foreign partners in an

equity joint venture, denoted by *Foreign Share*.[7] Foreign Share ranges from 25% to 95%,

with a mean value of 48.4%.

From the Almanac data, we have information on the amount of investment involved in

each joint venture project (denoted by *Project Investment*), which was reported in US

dollars. The investment varies from $80,000 to $79.1 million, with a mean of $10.12

million. Independent variables at the industry level include *R&D intensity*, *advertising

intensity*, *profit margin*, *capital-labor ratio*, and *degree of state ownership by industry*.

R&D intensity and advertising intensity are, respectively, the percentages of industry

R&D expenditures and advertising expenditures relative to total industry sales.[8] R&D

intensity ranges from 0.1% to 7.1% with a mean value of 2.51%, while advertising

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[7] It is the aggregate share of all foreign partners if more than one partner is involved in an equity joint
venture.
[8] The information needed to compute these two variables is taken from WorldScope and referred to 1993 or
the closest year for which the information is available. We thank Beata Javorcik at Oxford University for
generously providing us data on these two variables (Javorcik, 2006).

intensity varies from 11.8% to 36.3% with a mean value of 21.2%. Capital-labor ratio is the amount of all the capital used in an industry divided by the total employment in the industry, and the profit margin is the total profit (or loss) of an industry divided by the industry total sales. The information needed for calculating these two variables come from Industrial Statistical Yearbook of China (1988-1995). Capital-labor ratio has a minimum of 6,000 Yuan (Chinese currency) per worker and a maximum of 515,000 Yuan per worker, with a mean value of 62,000 Yuan per worker. Profit (loss) margin ranges from – 19.2% to 15.9%, with a mean value of 3.1%. The degree of state ownership in an industry (denoted by *Share of SOE by industry*) is the percentage of output contributed by the state-owned enterprises in the industry. Information used to calculate this variable comes from statistical reports compiled by the Development Research Center of China's State Council. *Share of SOE by industry* varies from 3.3% in Garment & Other Fiber Products Industry in 1996 to 98.5% in Tobacco Processing Industry in 1986, with a mean value of 46.1%.

Independent variables at the regional level include degree of state ownership by region (denoted by *Share of SOE by region*) and an index of bureaucracy (denoted by *Bureaucracy*). The degree of state ownership in a region is the percentage of output contributed to by state-owned enterprises located in the region. Information used for calculating this variable is readily available from China Statistical Yearbook. Share of SOE by region has a minimum of 10.7% in Zhejiang in 1996 and a maximum of 87.5% in Gansu in 1986, and its mean value is 44.3%. From a national census of foreign-invested enterprises in China conducted in 2001, we can calculate the average time it

took for joint ventures to get registered after signing the joint venture contracts for each of China's regions. It varies from a minimum of 5.5 days in Shanghai in 1995 to a maximum of 112 days in Anhui in 1987, though the time for registration has declined substantially over the years across all regions. Following Djankov et al (2002), we interpret the average time for the registration of joint ventures in a region from 1985 to 1996 as a proxy for the degree of bureaucracy in the region.

There are two independent variables concerning the countries of origin of the foreign partners:[9] revealed comparative advantage (denoted by RCA) and home country capital and labor endowment. The index of revealed comparative advantage is constructed to capture the relative strength in export of any country vis-à-vis China in a given industry. It is defined as the share of country *i*'s total export contributed by industry j divided by the corresponding share of China's total export by the same industry j. For a given country and in a given industry, if the RCA is greater than (less than) one, the country is said to have a revealed comparative advantage (disadvantage) over China in that industry. Export data is obtained from the World Trade Analyzer, which is compiled and distributed by the *Statistical Canada*, and conversion is made from trade in SITC (standard international trade classification) codes to trade in ISIC (international standard industry classification) codes, and finally, to trade in CSIC (Chinese standard industry classification) codes. We get from Hall and Jones (1999) the logarithm of home country capital-labor endowment. It captures possible variations across multinationals of different countries in getting access to external capital, which is expected to influence their

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[9] The country of origin is that of the largest foreign partner if more than one foreign partner is involved in an equity joint venture.

bargaining power in negotiating with local partners in China and hence affect the foreign shares in the joint venture.

Descriptive statistics of all variables and their correlations are reported in Table 2.

4. Empirical Results

Since the dependent variable (*Foreign Share*) has values between 25% and 95%, the TOBIT model is used in the regression analysis. Among the independent variables discussed in Section 3, quite a few (including *Share of SOE by industry*, profit margin, capital-labor ratio, *Share of SOE by region*, and revealed comparative advantage) are time-varying. In explaining foreign equity share of a joint venture approved in year T, the values of these time-varying variables in year T-1 are used as the independent variables.

Hypotheses 1-5 regarding FDI as a transfer of knowhow are first tested, and the results are shown in column 1 of Table 3. Both R&D intensity and *RCA* (revealed comparative advantage) have positive coefficients with 1% statistical significance, which imply that foreign equity shares are higher in industries with higher R&D intensity and for multinationals whose countries of origin have higher revealed comparative advantages in the concerned industries. Meanwhile, *Bureaucracy*, *Share of SOE by region*, and *Share of SOE by industry* all have negative coefficients with 1% statistical significance. These results suggest that equity shares of the local partners are higher in poorer business

environments, namely those characterized by higher degrees of state ownership and higher degrees of bureaucracy.

The coefficient of advertising intensity turns out to be negative but not statistically significant. This result is quite expected, as advertising intensity measures the contribution of the local partners only when multinationals set up joint ventures with the expressed purpose of capturing local markets (i.e., horizontal FDI). In reality, much of FDI made by multinationals is to take advantage of the low-cost production available in China as a part of global production chains. Nonetheless, the negative coefficient of advertising intensity implies that foreign direct investment in China is more likely to be horizontal than vertical.

Taken together, the regression results summarized in column 1 of Table 3 lend strong support to the hypotheses on FDI as a transfer of knowhow as a whole and to hypotheses 1, 3, 4, and 5 in particular. The equity sharing between the multinationals and the local firms depends on the relative contributions in input procurement, production processes, and sales of output. Our results on R&D intensity and advertising intensity are largely consistent with the results reported in the literature focusing on industry-level variations in the relative contributions of multinationals vis-à-vis local firms. Our result related to revealed comparative statics, however, introduces a novel way of measuring within-industry variations in the relative contribution of multinationals vis-à-vis local firms. More importantly, our findings on state ownership and bureaucracy highlight the

importance of local partners in poor institutional environments, which are characteristic of developing and transition economies.

Next, hypotheses 6-10 on FDI as a transfer of capital are tested, and the results are summarized in column 2 of Table 3. *Project investment* has a positive coefficient with 1% statistical significance, while *industry capital labor ratio* has a positive coefficient with 5% statistical significance. These results suggest that multinationals enjoy more bargaining power and hence obtain higher equity shares in those industries that require more capital per labor and in projects of larger investment, lending support to hypotheses 6 and 7. *Profit margin* has a negative coefficient with 10% statistical significance, suggesting that in those industries with higher profit margins, local partners enjoy more bargaining powers, presumably by their ability to attract more potential multinationals (hypothesis 8). Finally, home country capital labor endowment has a positive and statistically significant impact on foreign equity share, while its interaction term with industry capital labor ratio is positive, though statistically insignificant. These results suggest that multinationals coming from more capital endowed countries probably enjoy better access to external finance and hence more bargaining power in negotiating with the local partners (hypothesis 9).

Thus the results summarized in column 2 of Table 3 are supportive of the four out of five hypotheses related to FDI as a transfer of capital. Recall that the transfer of capital in the form of FDI has adverse effects on capital-receiving parties. Hence our results could be interpreted as showing that there exist severe information asymmetry and moral hazard

problems, under which FDI may emerge as a second-best form for the transfer of capital. It is also indicative of inefficiencies in China's financial system, resulting in under-privileged enterprises having to sell their equity for much needed capital (Huang, 2003).

Finally, both the hypotheses on FDI as a transfer of knowhow and those on FDI as a transfer of capital are tested simultaneously and the results are summarized in column 3 of Table 3. Our early results regarding FDI as a transfer of knowhow remain robust, with the coefficients of all variables except that of advertising intensity having the same signs and level of significance as before. Specifically, equity shares held by foreign partners increase in R&D intensity and revealed comparative statics, but decrease in the degree of bureaucracy (by region) and degrees of state ownership (by industry and by region). The results for the role of FDI as a transfer of capital, however, are less robust. While foreign equity shares still increase in industry capital labor ratio and in the size of project investment (support for both hypotheses 6 and 7), the impact of profit margin has become statistically insignificant, though still negative as predicted (no support for hypothesis 8). The impact of home country capital labor endowment becomes statistically insignificant; however, its interaction term with industry capital labor ratio becomes statistically significant. In other words, multinationals from countries with more capital endowment enjoy more bargaining powers and hence obtain higher equity shares only in those industries that require more capital per labor. Overall, our results are robust, offering strong support for FDI as a transfer of knowhow but limited support for FDI as a transfer of capital.

5. Conclusion

China has attracted a great deal of foreign direct investment in the last thirty years due to its open-door policy to foreign trade and investment. While the first waves of inward foreign direct investment were generally applauded in China, its role has become increasingly and hotly debated in more recent years. Those in support of FDI argue that it brings much needed knowhow, including advanced technologies, management practices, and access to international markets. However, the opposite camp argues that the huge amount of inward FDI is mainly a transfer of capital, due to the incapacity of China's inefficient financial system to allocate its ever increasing domestic savings and hard-earned foreign reserves to domestic enterprises, especially those privately-owned enterprises.

In this paper, using a data set of 5,217 equity joint ventures formed between multinationals and Chinese local firms between 1985 and 1996, we empirically investigate the roles of FDI by examining the determinants of equity sharing in these ventures. We develop hypotheses on the determinants of equity sharing in joint ventures for FDI as a transfer of knowhow, and those for FDI as a transfer of capital. Our empirical analysis offers strong evidence for FDI as a transfer of knowhow, but also lends limited support for FDI as a transfer of capital.

The support for FDI as a transfer of knowhow is reassuring for China's open-door policy, but the limited support for FDI as a transfer of capital points to the need for further reforms in China's financial system. Indeed, due to the poor protection of property rights

as well as state ownership of financial institutions including banks and stock exchanges, privately owned enterprises have had difficulties in accessing external finance (Bai, Lu and Tao, 2006b; Du and Xu, 2008), and as a result they have to sell their equity shares to multinationals for capital (Huang, 2003). Our study thus calls for improvements in China's economic institutions including property rights protection and contract enforcement, which would further unleash the competitiveness of the Chinese economy. As China further reforms its economy, including its financial system, those equity joint ventures formed mainly for the transfer of capital will inevitably experience some instability, including eventual termination, whereas those formed as a way of transferring knowhow will have more sustainable development.

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Table 1a: Sample Distribution by the year of approval

Year	Number of Joint Ventures
1985	352
1986	382
1987	397
1988	424
1989	411
1990	433
1991	433
1992	195
1993	674
1994	613
1995	476
1996	427
Total	**5217**

Table 1b: Sample Distribution by manufacturing industry

Industry	Number of Joint Ventures
Food Processing	190
Food Production	143
Beverage Production	127
Tobacco Processing	3
Textile Industry	423
Garments & Other Fiber Products	275
Leather, Furs, Down & Related Products	134
Timber Processing, Bamboo, Cane, Palm Fiber & Straw Products	114
Furniture Manufacturing	41
Papermaking & Paper Products	129
Printing & Record Pressing	54
Stationery, Educational & Sports Goods	70
Petroleum Processing, Coking Products, & Gas Production & Supply	26
Raw Chemical Materials & Chemical Products	409
Medical & Pharmaceutical Products	122
Chemical Fibers	82
Rubber Products	111
Plastic Products	393
Nonmetal Mineral Products	465
Smelting of Metals	67
Pressing of Metals	28
Metal Products	372
Machinery & Equipment Manufacturing	200
Special Equipment Manufacturing	133
Transportation Equipment Manufacturing	164
Electric Equipment & Machinery	339
Electronic & Telecommunications	368
Instruments, Meters, Cultural & Official Machinery	92
Other Manufacturing	143
Total	**5217**

Table 1c: Sample Distribution by region

Region	Number of Joint Ventures
Anhui	71
Beijing	281
Fujian	319
Gansu	5
Guangdong	973
Guangxi	66
Guizhou	17
Hebei	233
Heilongjiang	111
Henan	125
Hubei	74
Hunan	144
Inner Mongolia	23
Jiangsu	744
Jiangxi	111
Jilin	98
Liaoning	274
Ningxia	4
Qinghai	3
Shan1xi	30
Shan3xi	46
Shandong	584
Shanghai	353
Sichuan	71
Tianjin	168
Xingjiang	10
Yunnan	20
Zhejiang	259
Total	**5217**

Table 2: Descriptive statistics and correlations

	Variables	Mean	STD.	2	3	4	5	6	7	8	9	10	11
1	Foreign equity	48.43	21.43										
2	R&D intensity	2.51	1.73	0.102									
3	Advertising intensity	21.23	4.74	-0.021	0.388								
4	Revealed comparative advantage	5.96	15.96	0.019	-0.122	-0.210							
5	Bureaucracy (days)	28.61	11.04	-0.366	-0.041	0.115	0.182						
6	Share of SOE by region	44.25	16.89	-0.341	-0.037	0.080	0.105	0.377					
7	Share of SOE by industry	46.13	21.42	-0.179	0.282	0.180	-0.081	0.308	0.235				
8	Project investment (million Yuan)	10.12	21.69	0.191	0.058	-0.084	-0.055	-0.308	-0.210	-0.062			
9	Industry profit margin	3.06	3.08	0.035	0.158	0.139	-0.040	-0.036	-0.163	0.064	0.026		
10	Industry capital labor ratio (10 thousand Yuan)	6.23	3.72	0.044	0.388	0.205	-0.050	-0.014	-0.070	0.370	0.060	0.314	
11	Home country capital labor endowment	10.56	0.52	0.050	0.089	0.073	0.052	-0.074	0.008	0.013	0.048	0.062	0.005

Note: All correlations $\geq |0.026|$ are significant at 0.05 level (two-tailed).

Table 3: Regression results

	(1)	(2)	(3)
R&D intensity	0.0809 ***		0.0715 ***
	(0.0100)		(0.0112)
Advertising intensity	-0.0005		0.0011
	(0.0036)		(0.0038)
Revealed comparative advantage	0.0067 ***		0.0092 ***
	(0.0010)		(0.0013)
Bureaucracy	-0.0225 ***		-0.0195 ***
	(0.0017)		(0.0019)
Share of SOE by region	-0.0096 ***		-0.0097 ***
	(0.0010)		(0.0011)
Share of SOE by industry	-0.0045 ***		-0.0049 ***
	(0.0008)		(0.0005)
Project investment		0.0077 ***	0.0037 ***
		(0.0011)	(0.0008)
Industry profit margin		-0.0088 *	-0.0034
		(0.0051)	(0.0053)
Industry capital-labor ratio		0.0094 **	0.0097 **
		(0.0042)	(0.0048)
Home country capital-labor endowment		0.0720 **	0.0268
		(0.0285)	(0.0296)
Industry capital-labor ratio * Home country capital-labor endowment		0.0097	0.0221 ***
		(0.0082)	(0.0084)
Number of observations	5217	5217	5217
Adjusted R-square	0.1424	0.0309	0.1617

Note: *, **, and *** indicate p<0.10, p<0.05, and p<0.01, respectively.

Appendix: Data sources of all variables

Variables	Sources
Foreign equity	The Almanac of Foreign Economic Relations and Trade of China, 1986-1997
R&D intensity	Javorcik, 2006
Advertising intensity	Javorcik, 2006
Revealed comparative advantage	World Trade Analyzer, 2000
Bureaucracy	2001 National Census of Foreign Invested Enterprises, calculated by authors
Share of SOE by region	China Statistical Yearbook, 1986-1997
Share of SOE by industry	Development Research Center, The State Council of P.R. China, 1986-1997
Project investment	The Almanac of Foreign Economic Relations and Trade of China, 1986-1997
Industry profit margin	Industrial Statistical Yearbook of China, 1988-1995, for years on and before 1987, we use data from the Yearbook 1988, and for years on and after 1994, we use data from the Yearbook 1995, since the Industrial Statistical Yearbook of China was not published for year before 1988 and year 1996 and 1997
Industry capital-labor ratio	Industrial Statistical Yearbook of China, 1988-1995, for years on and before 1987, we use data from the Yearbook 1988, and for years on and after 1994, we use data from the Yearbook 1995, since the Industrial Statistical Yearbook of China was not published for year before 1988 and year 1996 and 1997
Home country capital-labor endowment	Hall and Jones, 1999