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Foreign VCs and venture success: Evidence from China ☆

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ABSTRACT

This paper analyzes the role of foreign VCs in driving venture success in emerging markets. We analyze a comprehensive data set of 4753 portfolio companies from China. We test whether the presence of a foreign VC increases the likelihood that a portfolio company is successfully exited. We find that the presence of a foreign VC does not per se significantly increase the likelihood of a successful exit. However, the likelihood of a successful exit increases if the foreign VC collaborates with a joint venture (JV) partner. Further, the impact of foreign VC backing depends on the nature of the VC, with foreign VCs tending to perform better when investing in late-stage companies and when they are diversified across industries. If a foreign VC successfully exits an investment, then, compared with a domestic-VC, it prefers to exit via a M&A or secondary-buyout than via an IPO, reflecting the significant lock-up periods associated with VC-backed IPOs in China, the difficulty of achieving a foreign listing, and the difficulty listing a start-up on Chinese markets.

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1. Introduction

This paper examines whether foreign venture capitalists (VCs) increase the likelihood of venture success. VC has traditionally been geographically locally concentrated (Chen et al., 2010; Cumming and Dai, 2010a,b; Sorensen and Stuart, 2001). However, VC and private equity (PE) investment have become increasingly internationalized (Dai et al., 2011; Wang and Wang, 2011, 2012b). China is one emerging market that has seen significant interest from foreign VCs. VC investment in China has increased from USD 1.2 billion (in 1999) to USD 31.4 billion (in 2010). While foreign VCs might bring some advantages, such as connections and size, they are geographically distant and might face difficulties monitoring portfolio companies, especially in emerging markets.

A limited number of studies have examined foreign VCs in emerging markets, although many suffer from relatively small samples and often use a multi-country sample to ameliorate sample-size issues. Small sample sizes might raise concerns about sample-selection bias, and the typical solution, the use of a cross-country sample that span several legal regimes, raises concerns about heterogeneity.[2] Wang and Wang (2011) and Dai et al. (2011) examine investments in 243 and 418 portfolio companies in China respectively. These samples are relatively small compared with the sample of 4753 VC-backed companies that we examine. Wang and Wang (2012b) aim to address these sample size constraints by examining a sample of 6025 VC investments; however,

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[2] Specifically, prior studies show that legal regimes can influence VC investment (Cumming and Walz, 2010; Cumming et al., 2010). Thus, including multiple legal regimes introduces additional heterogeneity. Using a single-study sample can ameliorate this by directly controlling for country-level effects.

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these are spread across 35 countries. These small samples raise concerns that the sample is not representative of all VC investments, especially given the documented misreporting of returns by some alternative asset funds (Cumming and Dai, 2010a,b). The use of international samples to over-come small sample sizes does not eliminate the potential for selection bias within the constituent countries and raises concerns about the impact of country-level heterogeneity. This suggests that a useful alternative approach is to hold constant the country-of-investment and to focus on a comprehensive set of companies within that country.

We overcome the small-sample problem by examining a new sample of 4753 portfolio companies in China that receive VC investments between 1988 and 2011. We use this sample to investigate whether foreign VCs can improve the likelihood of venture success, the impact of syndication on venture success and the exit-preferences of foreign VCs. The large sample and long time-period provides some confidence that the results are not artifacts of a small sample bias. The long time-period also enables us to examine trends over time; and thus, to assess the impact of regulatory changes.

We make several key findings. First, we find that foreign VCs do not per se increase the likelihood of venture success. Second, the impact of foreign VCs on venture success depends on the characteristics of the VC fund and the nature of the portfolio company, with foreign VCs being more successful when investing in late-stage companies. This result is consistent with the idea that foreign VCs' main contributions come from providing capital and expertise to relatively large companies than from nurturing start-ups. Third, domestic VCs do increase the likelihood of venture success (as compared with other types of VC). Fourth, there is some evidence that a foreign VC benefits from collaborating with a joint venture (JV) fund, whom the foreign VC might be able to use to build local knowledge and networks (consistent with Javorcik and Wei, 2009). Fifth, we find that foreign VCs tend to prefer to exit investments via M&As and secondary buyouts than via IPOs (when compared with domestic VCs). This result might reflect the disproportionate concerns that a foreign financial institution might have about the governance and quality of Chinese financial markets. Further, restrictions on foreign ownership of listed companies might pose issues in the context of the significant lock-up periods after a VC lists a venture-backed company. It could also reflect the discretionary 'merits review' process by which listings can occur, which would bias against a foreign institution who might lack local connections with regulators.

These results enable us to make a significant contribution to both the VC and PE and law and finance literature. We highlight the use of a comparatively under-used comprehensive database of Chinese VC investments. We use this database to draw insights about the role of foreign VCs in venture success. These findings complement and enhance the findings in studies that are otherwise limited by small sample-sizes. By showing the usefulness of a JV-partner to a foreign VC, we also support the general findings in Hochberg et al. (2007) and in Ewens and Rhodes-Kropf (2012), who argue that a VC syndicate might be 'greater than the sum of its parts' (Ewens and Rhodes-Kropf, 2012). We also contribute to the law-and-finance literature by showing that VC-backed IPO-activity changes over time, reflecting changes in the Chinese legal environment.

The structure of this paper is as follows. Section 2 provides a background of the VC market in China. Section 3 presents the hypotheses. Section 4 contains the data and sample description. Section 5 presents the results, and Section 6 concludes.

2. Institutional background

This section details the Chinese institutional background. For brevity, we discuss only factors related to the VC market, and discuss factors related to exiting investments when relevant to the hypotheses.

The Chinese VC environment has experienced significant growth. The impetus for a VC market was in the 1980s, when the government aimed to stimulate high-tech investment (Xiao, 2002). However, a lack of market-supporting institutions hampered VC growth during the 1980s and early 1990s. A small amount of expansion occurred when the Chinese government established "China Direct Investment Funds" (CDIFs) (Pukthuanthong and Walker, 2007). The CDIFs were investment vehicles that were listed in Hong Kong, London, and Dublin. They focused on government-owned or state-level enterprises and did not invest in private businesses (Bruton and Ahlstrom, 2003; Bruton et al., 1999). This arguably induced poor performance within early VC investments.

China's VC market expanded in 1999 and 2000. Several factors contributed to the expansion, including strong global equity markets, and the proposal in 2000 by the Shenzhen Stock Exchange to launch a NASDAQ-like venture board in support of start-up and high-tech companies. Much of the accelerating investment focused on high-tech investments tied to the internet bubble (Lu et al., 2011).

Between 2000 and 2005, the Chinese VC market slowed in general, although in 2003 there was an expansion of foreign-backed VC investments. In 2002, the Chinese government shelved the venture board plan. This hampered investment as it made it increasingly difficult to exit start-up companies. However, in 2003, the Chinese government waived the approval for domestic private enterprises to be listed overseas. This gave foreign VCs a comparative advantage over domestic VCs as they had more familiarity and connections with their home capital markets.

Since 2004, the environment has become more VC-friendly. In 2004, China established the Small and Medium Enterprise Board (SME Board), which provided an additional venue for VCs to exit investments. However, overseas listings became more difficult as the government tightened regulations on overseas listings of Chinese companies. In 2006, the government passed regulations stating that a company could list overseas only if the Chinese Securities and Regulatory Commission (CSRC) approved the listing. The CSRCA has adopted a restrictive approach to allow foreign listings. In 2007 the government relaxed restrictions on VC investments by investment banks and securities firms, facilitating an expansion of IB-affiliated VC funds. In 2009, the government introduced a venture board. This has facilitated the listing of relatively small companies in China. However, VCs must still be cognizant of barriers to listings, which we will be discussing below.

The required lock-up period has also changed during the sample-period. Prior to 2008, a three-year lock-up period was applied to VC/PE backed IPOs; however, in 2008, China reduced the lock-up period to one-year (Poddar, 2008; Tao, 2008). This change could influence the attractiveness of China's VC sector to foreign investors, and increasing the desirability of an IPO-exit.

A consistent trait throughout the whole period has been the importance of local connections. Lu et al. (2011) argue that the evolvement of the VC industry in China was not driven by the opportunity of financing high-tech entrepreneurial firms but by the creation and removal of institutional rents. Further, much investment in China is reported to be facilitated by connections with other domestic investors or parties (Bian, 1994; Chua et al., 2009; Farh et al., 1998; Tan, 2006). The importance of such connections could foreseeably influence the approach process for an IPO (Huang, 2011). Subsequently, through the whole period, foreign VCs have faced significant implicit barriers to entering the Chinese market, particularly if they lack a domestic Chinese partner.

The foregoing discussion indicates that the institutional background in China has changed during our sample period. The changes are relatively frequent and are likely to influence the success of VC-backed companies and the mode-of-exit. We discuss the specific ways in which the changes might influence exit-activity below. In our empirical tests, we control for time-changing institutional-characteristics by including year fixed effects in all models.

3. Hypotheses

The goal of this paper is to examine the impact of foreign funds on venture success. We then analyze how exit preferences might change over time, reflecting changes in the Chinese market.

3.1. Foreign funds and exit-likelihood

We first examine the impact of foreign VC firms on exit likelihood. We develop hypotheses about the success of foreign VCs in general, the potential impact of having a domestic partner in a foreign-VC-backed deal, and the role of investment and fund-level characteristics in deal success.

3.1.1. Foreign VCs in general

We expect that foreign VCs reduce the likelihood of a successful exit, or at best do not reduce the likelihood of a successful exit. This is for at least two reasons.

The first reason relates to the foreign VC's ability to contribute to the management of the company. Distance between corporate controllers and the corporation can hamper their ability to gather information, convey information, and manage an enterprise (Masulis et al., 2012). Thus, there is evidence that the proximity between the VC fund and its portfolio company can influence venture financing (Lutz et al., in press). Further, there is complementary evidence that the quality of securities regulation/disclosure is positively associated with VC supply and performance around the world (Cumming and Knill, 2012). Subsequently, impact of distance should be especially felt in China, where social connections are important to business success and information-gathering (Bian, 1994; Chua et al., 2009; Farh et al., 1998; Tan, 2006). Therefore, foreign VCs are less likely to have the information and social-connections that would otherwise enable them to successfully exit an investment.

The second reason relates to the general process of exiting an investment in China, especially in the domestic market. The exit process often requires some form of state approval; for example, issuing an IPO requires that the issuer satisfy the requirements that the CSRC imposes.[3] In practice, this leads to a merits review of the IPO (Huang, 2011). This can (beneficially) lead to the selection of well-governed companies for an IPO (see e.g. Humphery-Jenner, 2012 b). However, navigating this process can sometimes rely on the issuer's (or their intermediary's) connections with the regulator (Huang, 2011). A foreign VC is less likely to have these connections and thus it is less likely to be able to rapidly instigate an exit.

Hypothesis 1. Foreign VC backing does not per se increase the likelihood of a successful exit.

3.1.2. Collaborating with JVs and domestic partners

We expect that the presence of a domestic partner (or a fund that is a JV between foreign and domestic firms) will significantly increase the likelihood of venture success in deals backed by foreign VCs. Syndication can improve venture-outcomes (Das et al., 2011; Ferrary, 2010; Meuleman and Wright, 2011; Tian, 2012). Syndication should be even more important for foreign VCs in emerging markets, such as China. The main rationale is that investment in China reportedly relies on connections and networking (Bian, 1994; Chua et al., 2009; Farh et al., 1998; Tan, 2006). A foreign VC is likely to have relatively few domestic connections when compared with a domestic VC. Subsequently, we expect that a foreign VC will benefit from collaborating with a domestic VC by increasing its access to networks. Further, China is a relatively highly regulated market that conveys a degree of political risk. Such political risk and regulation might ordinarily deter VC investment and hamper venture outcomes (Cumming and Zambelli, 2010, in press). However, there is some evidence (in the project finance literature) that appropriate syndication can help to ameliorate the impact of political risks (Hainz and Kleimeier, 2012). Thus, we expect that for funds backed by foreign VCs, collaborations with other domestic VCs and/or with JVs will increase the likelihood of success.

[3] PRC Securities Law Article 13.

Hypothesis 2. For investments backed by a foreign VC, a collaboration with a domestic VC or a JV will increase the likelihood of venture success.

3.1.3. Fund-level and investment-level characteristics

The success of foreign VCs is likely to depend on the characteristics of both the fund and the company that they back. We make several predictions.

3.1.3.1. Investment stage. We expect that foreign VCs will be more successful with late-stage investments than with start-up investments. We expect that foreign VCs are likely to be larger, to have better international networks, and to have more capital. The traits are especially important when investing in relatively large late-stage companies, which have progressed past the start-up stage and need additional capital and guidance to continue their growth. By contrast, a start-up-type company needs significant input and nurturing from a VC in order to grow. Such input might be difficult for a foreign VC due to information asymmetries arising from geographic distance. Subsequently, we expect that foreign VCs are more likely to be more successful when investing in late-stage companies.

Hypothesis 3a. Foreign VCs are more likely to contribute to venture success in late-stage companies than in start-up companies.

3.1.3.2. Diversification. Foreign VCs should be more able to contribute to venture success if they have gained skills from investing across a range of industries (and possibly) regions in China. There is some prior evidence that VC/PE companies can gain skills from investing across industries and/or regions, which they can then use to improve outcomes in their portfolio companies (Humphery-Jenner, in press). Further, because the main contributions of foreign VCs include their connections, we also expect that foreign VCs will be more successful when they have established more connections by investing across multiple industries and companies. Subsequently, there should be a strong benefit from having invested across multiple industries. There might be similar benefits to investing across multiple regions in China. However, these benefits would be weaker and less-obvious because of the significant issues of information asymmetry and monitoring in emerging markets. Indeed, the resource-constraints imposed by having to monitor companies across multiple regions might create a 'limited attention' problem whereby the VC/PE fund is unable to devote sufficient attention to each individual portfolio company.

Hypothesis 3b. Foreign funds who invest across a larger number of industries will be more likely to be successful.

3.1.3.3. Fund size. The size of the foreign fund might influence the likelihood of venture success. Arguably, larger funds might perform better when investing in emerging markets due to their larger resources and (potentially) greater international connections. Prior literature documents significant diseconomies of scale in the VC/PE industry (Cumming and Dai, 2011; Humphery-Jenner, 2012a). Part of the explanation for the diseconomies of scale is the inability of large funds to monitor all of their investments (called the 'limited attention' problem). This limited attention problem might be more severe for investments in emerging markets, such as China, where monitoring is especially important. Thus, we would expect that larger foreign funds might perform slightly less well.

Hypothesis 3c. Larger foreign funds might be less likely to increase venture success, owing to diseconomies of scale in VC/PE.

3.1.3.4. Experience. We expect that funds who are more experienced will be more likely to exit their investments. One argued benefit of foreign VC/PE funds is that they bring experience and connections. Major international funds often use the argued benefits of connections/experience as a sales-point.[4] Subsequently, we expect that funds who have undertaken more investments, and have exited more investments, will be more likely to exit the present investment.

Hypothesis 3d. Funds who have undertaken more investments and/or have exited more investments are more likely to exit the present investment.

3.1.3.5. Syndication. Syndication could influence the likelihood of venture success. It is possible that syndication can improve venture success by giving access to more connections (as per Hochberg et al., 2010, 2007). However, syndication might not automatically lead to improved outcomes, due potentially to free-rider problems that can arise in syndicates and/or potential conflicts between syndicate-members (Chahine et al., 2012; Zhang and Zhang, 2009; Zhou and Zhang, 2009). The issues monitoring syndicates are most likely to increase with the possibilities of information asymmetries between syndicate-partners. Given that foreign VC/PE funds likely face greater information asymmetries, we would expect that the benefits from syndication would be lower for foreign VC/PEs than for domestic ones.

[4] For example, Blackstone states that "We strive to create value by investing in great businesses where our capital, strategic insight, *global relationships* and operational support can drive transformation and realize the company's potential. [emphasis added]" (Blackstone, 2012). KKR's website states "When you partner with KKR, you benefit from decades of financial and operational experience, broad industry knowledge, and a powerful network of global relationships" (KKR, 2012).

Hypothesis 3e. Foreign VC/PE funds gain less from syndication than do domestic funds. That is, the benefits of having more investors in a company are lower for foreign VC/PE funds.

3.2. Overseas funds and exit types

We predict that foreign VCs will be less likely to exit an investment via IPO than will domestic VCs. This is for several reasons. First, Cumming et al. (2006) indicate that IPOs are less likely in a country that has weaker regulation and governance. Cumming and Johan (2008) and Cumming et al. (2011) indicate that trading rules are comparatively weak in China.[5] This implies that VCs would prefer to exit via a M&A/trade sale rather than through an IPO. Foreign VCs are likely to have an even stronger preference for M&A/trade sales as they are more accustomed to stronger trading rules; and thus, are more concerned about the comparative dearth of securities regulation.

Second, Schwienbacher (2008) indicates that entrepreneurs in start-ups attempt to manipulate innovation strategies in order to obtain an IPO (over a trade sale); and thus, to increase the likelihood of remaining independent. We hypothesize that foreign VCs prefer to invest in late stage investments. Thus, they are less exposed to manipulation of the firm's innovation strategy, which suggests that they would be more likely to exit via a M&A.

Third, the listing requirements in China's equity markets have traditionally excluded many small firms as they are often unable to meet the requirements. A company can list on a domestic (Chinese) stock market only if the company satisfies the following requirements:

1. Market capitalization: The market must have a capitalization of at least RMB 30m (Securities Law, Article 50(2)).
2. Percentage of shares listed: If the market capitalization is less than RMB 0.4b, then at least 25% of the shares must be listed. If the market capitalization is more than RMB 0.5b, then at least 10% of the shares must be listed (Securities Law Article 50(3)).
3. Financial ability: The company must be able to "[make] profits continuously" and have "a sound financial status" (Securities Law Article 13(2)). It must also have a "complete and well-operated organization" (Securities Law Article 13(1)).
4. Accounting quality: The company must have no 'major irregularity' in the last 3 years and have no 'false record' in its financial statements (Securities Law Articles, 13(3), 50(4)).
5. Stock exchange requirements: The company must meet any additional requirements as that the stock exchange imposes (Securities Law Article 50).
6. CSRC requirements: The CSRC retains residual discretion to approve an issue (Securities Law Articles 12, 13(4), 48, 50(1)).

A limited history might prevent small companies from showing that they can 'make profits continuously' (under Article 13(2)). Further, small VC-backed companies might not meet the RMB 30m capitalization requirement (under Article 50(2)). Another issue is that the CSRC and the stock exchanges have a residual discretion to impose additional listing requirements. The CSRC has the widest discretion and has scope to exercise this arbitrarily. Some commentators assert that this discretion lacks transparency and can cause significant delays in listing securities (see Zhang et al., 2007). While the minimum capitalization requirements affect both domestic and foreign VCs, the discretionary aspects of the listing decision may impact the exit preferences of foreign VCs, who lack political connection (compared with domestic VCs). In addition, the opening of the SME Board in 2004 provided an exit mechanism to domestic but not foreign VCs.

Fourth, China's VC and IPO laws have changed over time, and this particularly affects foreign VCs. Cheung et al. (2009a) argue that there have been significant changes in the regulation of China's IPO market. These have mostly improved access to the IPO market by (inter alia) relaxing constraints such as listing requirements. However, other factors have cooled the IPO market. For example, the suspension in 2002 of the planned venture board that was announced in 2000. Given that VCs often target a particular type of exit when they make an investment, this legal uncertainty could deter VCs from targeting an IPO; and thus, could reduce the likelihood that a foreign VC targets an IPO listing. Overall, this induces the following hypothesis:

Hypothesis 4. Compared with domestic VCs, foreign VCs prefer to exit investments via M&As and trade sales than through IPOs.

3.3. Exit preferences over time

We hypothesize that exit preferences will change over time, and there is an increase in the proportion of IPOs (especially in mainland China) over time. This should apply both to foreign-backed and to domestic-backed companies. We expect that the proportion of IPOs will increase for several reasons.

First, the quality of China's financial markets has changed over time. China's regulation has improved through increasingly strong restrictions on market manipulation and accounting misstatements.[6] This might make China's financial markets more

[5] An example of this is the availability of securities class actions designed to address false statements that manipulate stock prices. Here, the law is being comparatively strong and principled; however, litigation is subject to regulatory approval, and a dearth of regulation makes such securities class actions inaccessible and difficult to pursue (Chen et al., 2005).

[6] China has increasingly strong regulations vis-à-vis securities fraud; these are at least as strong as those in most Western countries (Huang, 2007, 2011; Jia et al., 2009).

attractive; and thus, increase the likelihood of an IPO exit. To the extent that a foreign VC/PE fund might improve the portfolio company's governance, the improved standards of the Chinese IPO-market would attract foreign VC/PEs to list companies there.

Second, there have been some financial market regulation biases in favor of a Chinese listing as opposed to a foreign listing. Between 2003 and 2005, a foreign listing was comparatively easy because China waived the need for government approval for a foreign listing. However, in 2005, the State Administration of Foreign Exchange (SAFE) issued Circular 11 and Circular 29, which tightened regulations on overseas listings, and in 2006 China reinstated the need for government approval for overseas listings. This approval process could particularly hinder listings by foreign-backed firms as the foreign backers might lack political/institutional connections.

Third, the introduction of the SME and venture board has created listed exit opportunities for VC backed firms. Therefore, we predict that the proportion of listings that occur in China increases over time, and this holds for companies either with or without foreign backing.

Fourth, China has gradually relaxed restrictions on the process for pricing IPOs in mainland China. Significant restrictions on IPO pricing effectively required significant levels of underpricing (Chan et al., 2004; Chen et al., 2004; Mok and Hui, 1998). The relaxation of these restrictions has allowed a reduction in underpricing (Cheung et al., 2009b). This reduction in underpricing (and associated increase in listing prices) makes mainland IPOs more attractive. This would apply to both domestic VC/PEs and foreign VC/PEs. However, to the extent that foreign VC/PEs might be more accustomed to listing practices in other markets, the relaxation in underpricing restrictions might especially attract them.

Fifth, China has gradually relaxed the lock-up period involved in VC-backed companies. In 2008, China reduced the lock-up period (for VC-backed IPOs) from three years to one year. A three-year lock-up imposes more risk on foreign VCs than on domestic VCs because foreign VCs are more exposed to international financial factors. Subsequently, the reduction in the lock-up period is likely to increase the attractiveness of an IPO exit over time. This would especially apply to foreign VC/PEs (especially those in the US) where VC/PE funds often try to circumvent lock-up periods by repatriating their shares to the LPs.[7]

Despite the improvements in China's financial-markets, there might still be some deterrents to foreign VC/PE funds from listing companies in China. China's financial-markets still lag many developed markets in terms of market-efficiency and regulation (Allen et al., 2012; Cumming et al., 2011, Table 2). Firms with government connections and state-owned-enterprises also arguably enjoy commercial advantages (Chen et al., 2011). Subsequently, there is evidence that politically connected firms enjoy better post-IPO returns in China (Liu et al., 2012). This could deter foreign VC/PEs from listing companies on a Chinese stock market as opposed to listing companies overseas or selling them to an incumbent. Further, it is still more difficult to list stocks on the Chinese financial markets than it is to list companies elsewhere. Thus, the improvements might still not be sufficient to encourage foreign VC/PEs to increase the amount of IPOs they pursue.

Hypothesis 5. The proportion of exits that occurs via IPO increases over time, both for companies with and without a foreign VC/PE backer.

4. Data and sample description

The aim of this study is to examine whether foreign VCs influence the likelihood of a successful exit. We obtain data from ChinaVenture on portfolio companies and VC/PE funds. The sample contains 4753 portfolio companies that receive capital between 1988 and 2011 and that have the necessary data. The portfolio companies are from mainland China and Hong Kong. There are only 116 observations from Hong Kong and in robustness tests, we ensure that the portfolio companies in this region do not drive the results. The unit-of-analysis is at the portfolio company level with each portfolio company representing one observation. In the data, each observation is a portfolio company. We compute variables that are related to foreign backing and exits, and obtain other fund-level and company-level variables. Table 1 summarizes the variables.

4.1. Foreign backing variables

The data allows us to define a fund as 'foreign', a joint venture ('JV'), or 'domestic'. We define a foreign fund as one that obtains all its funding from overseas sources; a JV as one that obtains both foreign and domestic funding; and, a domestic fund as one that obtains all its fund from domestic sources. We use this data to compute several sets of variables:

- I(Only Foreign Funds), I(Only JVs), and I(Only Domestic Funds) are indicators that equal one if the company only receives backing from overseas funds, JVs, or domestic funds, respectively.
- Prop(Foreign Funds), Prop(JVs), and Prop(Domestic Funds) represent the proportion of funds invested in the company who are foreign, JVs, or domestic, respectively.
- I(At least one foreign fund), I(At least one JV) and I(At least one domestic fund) equal one if there is at least one foreign fund, JV, or domestic fund invested in the company, respectively.

[7] This works by the VC/PE fund making an in-kind distribution to LPs. One technique is that the VC/PEs distribute their shares to the LPs after the lock-in period ends. The LPs must then pay the VC/PEs, often at a price above the prevailing market price. This essentially enables the VC/PE funds to circumvent the lock-in period (Morgan et al., 2012; Primack, 2011). VC/PE funds could also attempt to undertake a secondary offering to circumvent some of the disadvantages of lock-up periods. Such techniques would be harder to undertake in an emerging market such as China.

Table 1
Variable definitions.

Variable	Definition
General variables	
I(At least one foreign VC)	An indicator that equals one if at least one foreign GP invested in the company. We code a GP as foreign if it sourced its capital from overseas markets.
I(Some Foreign/JV)	An indicator that equals one if at least one foreign GP and/or at least one JV invested in the company. We code a GP as foreign if it sources its capital from overseas markets. We code a GP as a JV if it obtains its capital from both overseas and domestic markets (as a purely foreign fund would not be able to accomplish this).
Prop(Foreign)	The proportion of investors in the company that are foreign.
Prop(Foreign/JV)	The proportion of investors in the company that are foreign or that are JVs.
I(Only Foreign)	An indicator that equals one if the only investors are foreign investors.
I(Only Foreign/JV)	An indicator that equals one if only foreign investors or JVs invest in the company.
Num Rounds	The total number of investment rounds in which the company received funding. Source: ChinaVenture.
Total Num Investors	The total number of unique GPs that invested in the company. Source: ChinaVenture.
I(Startup)	An indicator that equals one if ChinaVenture codes the company as a startup. This variable is static throughout the life of the investment.
I(Late)	An indicator that equals one if ChinaVenture codes the company as a late stage investment. This variable is static throughout the life of the investment.
Total Disclosed Stake	The total percentage state of all GPs in the company.
ln(Total Invested Amount)	The natural log of the total amount of money that all GPs invested in the company (in USDm).
Exit specific variables	
I(Successful)	An indicator that equals one if the company is successfully 'exited' (i.e. via an IPO, M&A, or trade sale)
I(M&A|Successful)	An indicator that equals one if the exit is via a M&A (conditional on the company being exited)
I(IPO|Successful)	An indicator that equals one if the exit is via a IPO (conditional on the company being exited)
I(Trade Sale|Successful)	An indicator that equals one if the exit is via a trade sale (conditional on the company being exited)
ln(Maximum Fund Size)	The natural log of the size of the largest fund that invested in the company (in USDm)
ln(Maximum Average Fund Investment Size)	The natural log of the maximum average fund investment size (across all companies). The average investment size is the average size of investments that the fund makes in any company. We compute this for all funds that invest in the company. We then take the natural log of the maximum of this value.
Max Fund Exits	The maximum number of exits achieved by one of the funds that invests in the company. This variable refers to the Chinese market and is as reported in ChinaVenture.
Max Num Fund Investments	The maximum number of investments made by one of the funds that invests in the company. This variable refers to the Chinese market and is as reported in ChinaVenture.
Max Num Fund Regions	The maximum number of regions (i.e. Chinese provinces) in which a fund (that invests in the company) has invested. This variable refers to the Chinese market and is as reported in ChinaVenture.
Max Num Industries	The maximum number of industries in which a fund (that invests in the company) has invested. This variable refers to the Chinese market and is as reported in ChinaVenture.

4.2. Exit variables

We collect data on whether the company exited via M&A, secondary buyout, or IPO, or is not yet exited. We do not claim that the 'not yet exited' companies are failed. We take this approach because VCs have an incentive to conceal (and thus not report) failed investment (Cumming and Dai, 2010a,b), which makes it difficult to disentangle the reason for which a company is not yet exited. Nonetheless, we do estimate hazard models to examine the probability that a company does experience a successful exit. Further, we have data on the location of any buyer (of the portfolio company) or the location of the IPO (of the portfolio company) for those companies that do achieve a successful exit.

We acknowledge that not all M&As or secondary-sales represent 'successes'. In some cases a VC/PE manager might be nearing the end of its life-cycle and may need to liquidate its remaining assets. In this case, it is possible that the VC/PE fund might need to engage in a fire sale, resulting in a lower price than would be desired (Cumming and MacIntosh, 2003a,b).

4.3. Other independent variables

We also control for other firm-level, investment-level, and fund-level characteristics that might influence exit-outcomes.[8]

- Investment stage: We control for whether the company is a startup company ('I(Startup)') or is in late-stage ('I(Late Stage)'). We also examine the interaction between these variables and our VC-fund location variables, described above. We include these variables because prior evidence suggests that startup investments, in particular, are risky and have a high failure risk (Cochrane, 2005). Further, given that startups face significant difficulties listing on Chinese financial markets, we expect that investment-stage might influence investment-outcomes. These variables are static throughout the life of the investment.
- Fund size: The literature suggests that large funds tend to under-perform small funds (Cumming and Dai, 2011; Humphery-Jenner, 2012a). Subsequently, we control for the log of the size of the largest VC-fund that backs the company ('ln(Max Fund Size)').

[8] Note that our dataset does not have all variables that might influence venture success. For example, we do not have data on the contracts between VC funds and their portfolio companies.

- The VC backer's average investment size: The average investment size of the company's backers might influence the likelihood of success. The literature shows that investments in relatively large companies are less likely to fail, reflecting the likelihood that such companies are likely to be older and more stable (Humphery-Jenner, 2012a). Further, funds with a larger average investment size are likely to invest in fewer investments so are less likely to suffer from the 'limited attention' problem arising from undertaking too many simultaneous investments (Cumming and Dai, 2011; see Cumming, 2006). To capture this, for each VC-backer we obtain the average investment size. When then identify the backer with the largest average investment size and take the log of this investment size, denoted 'ln(Max Invest Size)'.
- The fund's success: We expect that there will be performance persistence in VC-investments, whereby funds with a strong track-record are likely to continue that record (Cumming et al., 2012; Gompers et al., 2010; Kaplan and Schoar, 2005; Krishnan et al., 2011; Phalippou, 2010).[9] Given that we expect that the most experienced fund will contribute its expertise and experience from prior investments, we control for the maximum number of successful exits undertaken by one of the VC backers in the Chinese market (as indicated by ChinaVenture).
- Number of investments: Increasing the number of investments within a venture portfolio might enable the VC backer to take more risks by virtue of being more diversified; and thus, might improve venture outcomes (Humphery-Jenner, in press). Alternatively, excessively high numbers of simultaneous investments can reduce the attention that a fund can pay to each individual investment and can reduce returns (Cumming and Dai, 2011). Subsequently, we capture this by controlling for the maximum number of investments made by one of the company's VC backers ('Max Num Investments') in the Chinese market (as indicated in ChinaVenture).
- Regional diversification: Diversification across regions can improve venture outcomes, as it might enable the VC-backer to gain additional skills and networks (Humphery-Jenner, in press). However, it could also harm performance if it forces the VC fund to divert its attention across too many regions and reduce the attention it can give to any particular region. Subsequently, we control for the greatest number of Chinese provinces invested in by one of the VC backers ('Max Num Regions') as reported in ChinaVenture.
- Industry diversification: Diversification across industries tends to create value in VC and PE investment, as it enables the VC backer to both diversify risk and gain additional knowledge that it might impart into the present investment (Humphery-Jenner, in press Knill, 2009). Subsequently, we control for the maximum number of industries across which any VC backer of the firm has invested ('Max Num Industries'). This variable is for the Chinese market and is as is reported in ChinaVenture.
- Number of investment rounds: Firms that receive more rounds of capital are less likely to achieve a successful exit. This reflects the fact that the need to continually inject more money into the company likely reflects the company's inability to achieve success. Subsequently, we control for the number of investment rounds the company has had ('Num Rounds').
- Number of investors: VCs often form investment-syndicates, being motivated by factors such as risk-aversion, investment-risk, and capital-pooling (Wang and Wang, 2012a). We have mixed predictions about the impact of the number of investors on venture success. Increasing the number of backers might help to increase venture success by enabling the backers to utilize their different networks and leverage each-others experience (Ewens and Rhodes-Kropf, 2012; Hochberg et al., 2007, 2010). However, not all syndicates are beneficial, and the success relies largely on the skill of the members of the syndicate (Gompers et al., 2012). Subsequently, there is some evidence that diversity in the VC syndicate can lead to higher earnings management and lower post-IPO performance (Chahine et al., 2012), possibly arising because syndication can induce a free-rider problem whereby syndicate members reduce their monitoring and contribution on the assumption that the other syndicate members will fill the gap.

5. Analysis

We first undertake a general analysis of the companies in which foreign VCs invest. This provides a background to our analysis of exit-trends. We then analyze the impact of foreign VCs on exit success. Finally, we examine foreign VCs' exit preferences and their role in the internationalization of their portfolio companies.

5.1. General investments by foreign VCs

We analyze the investment decisions of foreign VCs (and JVs) at the portfolio company level. Here, we examine a cross-sectional data set where the unit-of-analysis is at the portfolio company level (with one observation for each portfolio company). The univariate statistics are in Table 2. The main results are that foreign VCs prefer to invest in larger companies, and companies that have many other investors suggest a role for syndication. Interestingly, foreign VCs are more likely to invest in both late-stage companies and start-ups. It is unsurprising that they are more likely to invest in late-stage companies, as these companies are most likely to benefit from the fund's expertise and financial backing. However, they also are more likely to invest in start-ups than are other types of funds, possibly reflecting an attempt to invest in high-tech internet start-ups in China (following Lu et al., 2011). There are significant differences in the investments that attract foreign backing compared to those that do not attract foreign backing, suggesting that a multivariate framework is necessary to analyze the data.

[9] However, we note that there is some evidence that performance-persistence is relatively short-lived and that excessive growth, induced by past-performance, can hamper future performance (Chung, 2012).

Table 2
Univariate 'investment' statistics. This table contains univariate statistics by company and by round. The figures are sample means or differences therein. Superscripts ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

Sample	All	At least one foreign	No foreign	Difference	At least one JV	No JV	Difference	At least one domestic	No domestic	Difference
Column	[1]	[2]	[3]	[4]=[2]−[3]	[5]	[6]	[7]=[5]−[6]	[8]	[9]	[10]−[8]−[9]
I(Start up)	0.177	0.203	0.160	0.044***	0.210	0.161	0.050***	0.162	0.192	−0.030***
I(Late Stage)	0.129	0.159	0.110	0.049***	0.087	0.148	−0.061***	0.114	0.145	−0.030***
ln(Maximum Fund Size)	6.436	7.165	5.979	1.186***	7.510	5.932	1.578***	6.093	6.813	−0.721***
ln(Maximum Ave Fund Investment Size)	2.243	2.943	1.805	1.138***	2.347	2.194	0.153***	1.941	2.576	−0.634***
Max Fund Exits	13.007	13.569	12.655	0.913*	21.581	8.988	12.593***	12.274	13.815	−1.541***
Max Num Fund Investments	63.687	62.526	64.413	−1.887	108.728	42.571	66.157***	58.757	69.115	−10.359***
Max Num Fund Regions	10.474	11.569	9.788	1.782***	14.653	8.515	6.138***	9.245	11.826	−2.581***
Max Num Fund Industries	20.108	21.879	19.000	2.879***	29.973	15.484	14.489***	17.652	22.813	−5.162***
Num Rounds	1.321	1.571	1.165	0.406***	1.558	1.210	0.347***	1.318	1.324	−0.006
Total Num Investors	1.654	2.176	1.327	0.849***	2.174	1.410	0.764***	1.712	1.591	0.121***

The company level regressions are in Table 3. The models are logit models that predict investment by foreign VCs, domestic VCs, or JVs and tobit models that analyze the proportion of investment that is provided by foreign investors/JVs. We only include explanatory variables that would be exogenous to the decision by a foreign VC to invest in the company. The main results are as follows: First, foreign investment is more likely if the company is in late-stage (but is significantly less likely if it is a start-up), as seen in Columns 1, 4, and 7. Second, there are some strong industry-effects: foreign VCs tend to avoid companies in the resources industry, and medical/biotech industry. The resources-result likely reflects foreigners' limited access to strategically/nationally important industries. The biotech result might reflect the significant issues of monitoring and information asymmetry in that industry. Third, foreign VCs are significantly more likely to invest in companies that are based in a major city (i.e. Shanghai, Beijing, Hong Kong) as opposed to one in a regional area. This is consistent with the idea that it would be easier for a foreign VC to monitor a company that is based in a major city, where the foreign VC is more likely to have a branch office and is more likely to be able to meet with the portfolio company.

Overall, these results suggest that: (1) foreign VCs prefer to invest in late stage investments, consistent with an aversion to information asymmetry and a desire to invest in comparatively established projects. (2) When coupled with the result that foreign VCs prefer to invest in companies that have other investors, this implies that foreign VCs utilize their size and connections to create value in larger companies, and prefer not to have to rely on mentoring start-ups. This is consistent with larger funds

Table 3
Analyzing foreign investment with only exogenous variables. This table contains the results of models that model the factors that encourage foreign investment and that exclude arguably endogenous variables. The column title states the dependent variable. Columns 1–3 and 7–8 are logit models. Columns 4–6 are tobit models with a lower bound of 0 and an upper bound of 1. All models include year, industry, and region dummies, and use robust standard errors. Brackets contain p-values and superscripts ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

Dependent variable	I(At least one foreign)	I(At least one foreign/JV)	I(At least one domestic)	Prop(Foreign)	Prop(Foreign/JV)	Prop(Domestic)	I(Only Foreign)	I(Only Foreign/JV)	I(Only Domestic)
	All	All		All	All		All	All	
Column	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
I(Start-up)	−0.141	0.151*	0.053	−0.298***	0.138	0.207	−0.383***	0.113	0.162*
	[0.121]	[0.080]	[0.546]	[0.004]	[0.121]	[0.176]	[0.000]	[0.327]	[0.076]
I(Late Stage)	0.535***	−0.525***	−0.346***	0.771***	−0.533***	−0.441***	0.715***	−0.445***	−0.116
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.009]	[0.000]	[0.001]	[0.223]
Ind: Resources	−0.881**	−0.283	1.160***	−1.003**	−0.417	1.577***	−0.735*	−1.089*	0.699**
	[0.029]	[0.414]	[0.002]	[0.031]	[0.210]	[0.002]	[0.098]	[0.075]	[0.026]
Ind: Tech	0.382**	0.370**	−0.25	0.228	0.267	−0.563*	−0.119	0.054	−0.304
	[0.049]	[0.040]	[0.166]	[0.284]	[0.144]	[0.073]	[0.612]	[0.809]	[0.113]
Ind: Media/ communications	0.13	0.353***	−0.372***	0.081	0.418***	−0.765***	0.017	0.491***	−0.510***
	[0.337]	[0.007]	[0.007]	[0.595]	[0.002]	[0.001]	[0.909]	[0.002]	[0.001]
Ind: Medical/biotech	−0.329***	0.115	0.074	−0.352**	0.179	0.126	−0.287**	0.282**	0.048
	[0.009]	[0.304]	[0.518]	[0.015]	[0.131]	[0.518]	[0.039]	[0.033]	[0.678]
Ind: Financials	0.410**	−0.486**	0.057	0.548**	−0.499**	−0.111	0.466**	−0.582*	−0.213
	[0.048]	[0.029]	[0.781]	[0.022]	[0.024]	[0.742]	[0.026]	[0.071]	[0.326]
Region: City	1.184***	0.300***	−1.035***	1.361***	0.217***	−1.984***	0.934***	−0.004	−1.112***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.002]	[0.000]	[0.000]	[0.960]	[0.000]
Constant	−1.845***	−1.109***	0.871***	−2.088***	−0.966***	1.848***	−2.078***	−1.291***	0.563***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Observations	4746	4751	4751	4753	4753	4753	4751	4746	4733
Pseudo R-squared	13.40%	2.40%	8.80%	9.00%	1.40%	7.50%	8.90%	2.40%	9.90%

Table 4
Exit-based univariate statistics. This table contains univariate statistics for deal exits sorted by whether the investment has foreign backing. Panel A contains sample proportions, and Panel B contains sample observations. The column title states the exit type and the row title states the sample. Superscripts ***, **, and * denote significance using t tests or two-sample t tests as appropriate.

Sample	All	At least one foreign	No foreign	Difference	At least one JV	No JV	Difference	At least one domestic	No domestic	Difference
	[1]	[2]	[3]	[4]=[2]−[3]	[5]	[6]	[7]=[5]−[6]	[8]	[9]	[10]=[8]−[9]
Sample proportions										
Exited by any means	0.189	0.240	0.157	0.083***	0.216	0.176	0.040***	0.191	0.186	0.006
IPO exit	0.142	0.164	0.129	0.035***	0.166	0.131	0.035***	0.156	0.127	0.029***
M&A exit	0.040	0.064	0.024	0.040***	0.039	0.040	−0.001	0.029	0.052	−0.024***
Secondary exit	0.007	0.011	0.003	0.008***	0.011	0.004	0.007***	0.007	0.006	0.001
Observations										
Exited by any means	897	439	458		328	569		477	420	
IPO exit	677	300	377		252	425		389	288	
M&A exit	189	118	71		59	130		71	118	
Secondary exit	31	21	10		17	14		17	14	

(which are more likely to be international VCs in China) having a comparative advantage in syndication and financing, which mostly benefits larger late-stage companies.

5.2. Foreign VCs and exit likelihood

We first analyze whether foreign VCs increase the likelihood of an exit. In subsequent sections, we examine the type of exit. The predictions are: (a) foreign VCs do not per se improve the likelihood of an exit, (b) for foreign-VC-backed companies, investing with another domestic VC or a JV will increase the likelihood of a successful exit, and (c) the success of a foreign VC will depend on the nature of the company, the fund, and the investment.

5.2.1. Univariate analysis

The univariate results are shown in Table 4. The table summarizes the nature of exits sorted by whether or not the portfolio company has a foreign VC backer. This analysis is at the portfolio-company level. IPO-exits are more likely than M&A-exits whether or not the portfolio company has a foreign backer. However, if there is a foreign backer, then a M&A exit is more likely than if there is no foreign backer (see Column 4) whereas if there is a domestic backer, then a M&A exit is less likely than if there is no domestic backer (See Column 10). This would suggest that foreign backers have a disproportionate tendency towards M&A-exits. Indeed 26.7% (=0.164/0.240) of all successfully exited companies with a foreign backer are exited via M&A compared with 15.2% (=0.029/0.191) of companies with a domestic backer. While the presence of each type of backer increases the likelihood of an IPO-exit (implying that having a mix of backers in a syndicate helps to facilitate an IPO), the proportion of successfully exited companies that are exited via an IPO is higher for domestic-backed companies (82%=0.156/0.191) compared with foreign-backed companies (68.3%=0.164/0.240). Overall, these results suggest that foreign backed companies are more likely to be exited via a M&A than are domestic backed companies. Table 5 presents sample statistics for the sub-sample of exited deals. The figures are sample means. The results suggest some differences in the characteristics of investors and investments between exit types.

5.2.2. Multivariate analysis of the likelihood of an exit

We assess the foreign VCs' contributions to exit-success by using a Cox hazard model in Table 6. We implement the Cox hazard model at the company-level (i.e. there is one observation per company) and assess whether/when a company is exited. The time variable is the time (in years) between the first investment year and either (a) the exit year if the investment is exited, or (b) 2011 if the investment is not exited. The 'ending' variable is an indicator that equals one if the investment is successfully exited. Thus, a positive coefficient in the hazard model suggests that the variable increases the likelihood of a successful exit.[10]

The main finding is that the coefficients on I(Only Foreign), Prop(Only Foreign) I(At least one foreign) are negative and significant, implying that the presence of an overseas fund reduces the likelihood of a successful exit. By contrast, the variables I(Only Domestic), Prop(Domestic), and I(At least one domestic) are positive and significant, suggesting that the presence of a domestic VC significantly increases the likelihood of an exit. These results are consistent with the prediction that informational asymmetries make it more difficult for an overseas fund to develop the portfolio company enough for it to be exit-able.

[10] We acknowledge one possible criticism of this model is that VCs can sometimes stage investment over several rounds in order to incentivize/monitor venture companies and avoid enabling the portfolio company to over-invest (Dai, 2011; Krohmer et al., 2009; Tian, 2011), retain an abandonment option by not investing all capital upfront (Dahiya and Ray, 2012), or potentially to retain the ability to dilute entrepreneurs through financing rounds (Broughman and Fried, 2012) query. However, by focusing on length of time between the initial investment and the exit (or 2011, if there is no exit) we can avoid the potential sample-selection bias that would arise from under-reporting of failed investments.

Table 5
Sample statistics for exit models. This table contains summary statistics for VC/PE exits. The figures are sample means. The Column title denotes the subsample under analysis. For example, Column 2 contains statistics for the sub-sample of deals that have an IPO exit.

Sample	All exited	IPO exit	M&A exit	Secondary exit	Not exited
Column	[1]	[2]	[3]	[4]	[5]
I(Only Foreign)	0.236	0.204	0.354	0.226	0.238
I(Only JV)	0.088	0.089	0.095	0.032	0.176
I(Only Domestic)	0.348	0.375	0.270	0.226	0.421
I(At least one foreign)	0.489	0.443	0.624	0.677	0.361
I(At least one JV)	0.366	0.372	0.312	0.548	0.308
I(At least one domestic)	0.532	0.575	0.376	0.548	0.522
Prop (Foreign)	0.376	0.336	0.505	0.470	0.301
Prop(JV)	0.195	0.197	0.181	0.227	0.234
Prop(Domestic)	0.434	0.473	0.314	0.303	0.468
I(Start up)	0.134	0.074	0.302	0.419	0.186
I(Late Stage)	0.126	0.137	0.095	0.065	0.129
ln(Maximum Fund Size)	6.959	6.940	6.819	8.219	6.314
ln(Maximum Ave Fund Investment Size)	2.550	2.535	2.535	2.973	2.172
Max Fund Exits	16.507	16.437	16.042	20.871	12.193
Max Num Fund Investments	68.824	67.353	70.481	90.839	62.491
Max Num Fund Regions	11.415	11.579	10.534	13.194	10.255
Max Num Fund Industries	21.108	20.987	20.937	24.806	19.876
Num Rounds	1.657	1.681	1.418	2.581	1.243
Total Num Investors	2.293	2.329	1.899	3.903	1.505

The control variables yield some interesting findings. Unsurprisingly, startups are less likely to be exited successfully, consistent with the idea that startups have a high chance of failure. A larger number of successful prior exits increase the likelihood of a successful exit (a positive and significant coefficient on 'Max Fund Exits'). The likelihood of a successful exit decreases with the number of investments that the company's backers have made. This is consistent with the idea that investing in more companies might reduce the attention that a fund can pay to an individual investment and might worsen deal-outcomes (see e.g. Cumming and Dai, 2011). The results on industry/regional diversification are opposite. While industry-based diversification reduces the likelihood of a successful exit, geographic-diversification improves it. The results vis-à-vis geographic-diversification are consistent with those of the prior literature, which suggests that diversification can improve funds' returns (Humphery-Jenner, in press). The results vis-à-vis industry-based diversification differ from the finding that in developed countries industry-based diversification can improve fund performance (Humphery-Jenner, in press; see e.g. Knill, 2009). A possible explanation is the presence of performance clustering in Chinese industries; that is, only a sub-set of industries are competitive, so diversifying out of those industries might be disadvantageous.[11] The total number of investors who invest in the company is positively related to exit-success, consistent with the idea that syndication can be beneficial.

5.2.3. Exit likelihood and collaborations between foreign funds, domestic funds, and JVs

The results indicate that a foreign-backed company partnering with a JV increases the likelihood of a successful exit. Table 7 contains Cox hazard models for various sub-samples of foreign-backed, domestic-backed, and JV-backed companies. The goal is to examine whether collaborating with a JV or a domestic fund improves venture success for foreign-backed companies. The main finding (in Column 3) is that if the portfolio company has a foreign backer, then collaborations with JVs increase the likelihood of success. A possible explanation is that the cultural difference between foreign investors and JVs is less than between foreign and domestic investors, thereby leading to a more successful syndication.[12] By contrast, collaborations with domestic funds do not significantly increase the likelihood of a successful exit (see Column 4). This result suggests that JVs (which obtain capital from both domestic and foreign sources) are able to bridge the gap between foreign funds and the local environment, and can do that better than domestic funds (which only obtain capital from domestic sources). Interestingly, if the company is backed by a JV, then a collaboration with a domestic fund (but not a foreign fund) increases the likelihood of success, suggesting that the domestic fund can incrementally improve the JV's connections and local knowledge. The way to reconcile these results is as follows: Columns 3 and 4 ask the question: if there is a foreign backer, what else increases the likelihood of success. Columns 5 and 6 ask the question: if there is a JV backer, what else increases the likelihood of success. Thus, if a company has a foreign backer, then the likelihood of success will increase if the company also obtains a JV backer. If the company has a JV backer, then the likelihood of success will increase if there is also a domestic backer.

[11] In untabulated figures, we also find some differences in the industries in which foreign and domestic funds invest. However, the industry-preferences of foreign and domestic funds appear to follow similar trends over time, implying that they similarly target 'hot' industries.

[12] Consistent with this, there is some evidence that cultural differences can influence the success of international business relationships (Barkema and Vermeulen, 1997; Reus and Lamont, 2009) and can influence the mode-of-entry of foreign investors (Kogut and Singh, 1988; Tihanyi et al., 2005).

Table 6
Cox hazard models. This table contains the Cox hazard models. First, we compute a 'survival' time in years, which is either (a) the time between the first investment date until the deal is exited, or (b) is 2011 (the last year in our data) less the year of the first investment. We code an 'ending' indicator that equals one if the firm is exited and equals zero otherwise. Thus, the coefficients in the Cox model represent whether a given variable accelerates the exit-process. For example, the negative coefficient on I(Start up) means that startups are less likely to be exited. The variable definitions are in Table 1. Brackets contain p-values and superscripts ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

Sample	All								
Column	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
I(Only Foreign)	−0.346***								
	[0.000]								
I(Only JV)		−0.088							
		[0.475]							
I(Only Domestic)			0.287***						
			[0.001]						
Prop (Foreign)				−0.459***					
				[0.000]					
Prop(JV)					0.116				
					[0.293]				
Prop(Domestic)						0.331***			
						[0.000]			
I(At least one foreign)							−0.423***		
							[0.000]		
I(At least one JV)								0.161**	
								[0.046]	
I(At least one domestic)									0.227***
									[0.002]
I(Start up)	−1.102***	−1.110***	−1.104***	−1.097***	−1.118***	−1.088***	−1.107***	−1.120***	−1.084***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
I(Late Stage)	−0.039	−0.054	−0.051	−0.034	−0.054	−0.043	−0.045	−0.051	−0.045
	[0.716]	[0.611]	[0.629]	[0.747]	[0.612]	[0.686]	[0.672]	[0.634]	[0.675]
ln(Maximum Fund Size)	−0.002	−0.003	−0.002	0	−0.002	−0.003	0	−0.002	−0.003
	[0.887]	[0.810]	[0.874]	[0.975]	[0.866]	[0.853]	[0.973]	[0.863]	[0.834]
ln(Maximum Ave Fund Investment Size)	0.01	−0.028	0.006	0.034	−0.024	0.013	0.04	−0.023	−0.001
	[0.751]	[0.381]	[0.861]	[0.311]	[0.449]	[0.692]	[0.239]	[0.467]	[0.981]
Max Fund Exits	0.062***	0.061***	0.061***	0.063***	0.062***	0.061***	0.063***	0.062***	0.061***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Max Num Fund Investments	−0.012***	−0.012***	−0.012***	−0.012***	−0.012***	−0.012***	−0.012***	−0.012***	−0.012***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Max Num Fund Regions	0.036***	0.033***	0.035***	0.033***	0.032***	0.034***	0.032***	0.032***	0.034***
	[0.001]	[0.004]	[0.001]	[0.003]	[0.004]	[0.002]	[0.003]	[0.005]	[0.002]
Max Num Fund Industries	−0.030***	−0.028***	−0.027***	−0.028***	−0.029***	−0.026***	−0.028***	−0.030***	−0.028***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Num Rounds	0.008	0.028	0.029	0.02	0.028	0.025	0.021	0.026	0.014
	[0.871]	[0.546]	[0.525]	[0.663]	[0.548]	[0.592]	[0.652]	[0.571]	[0.760]
Total Num Investors	0.127***	0.140***	0.148***	0.148***	0.145***	0.140***	0.165***	0.133***	0.134***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Observations	4298	4298	4298	4298	4298	4298	4298	4298	4298
Pseudo R-squared	2.90%	2.70%	2.80%	2.90%	2.70%	2.90%	2.90%	2.80%	2.80%

5.2.4. Exit likelihood and fund-level and company-level characteristics

The results indicate that fund-level and company-level characteristics can influence the likelihood of success for foreign-backed companies. The results are in Table 8. The results in Column 1 and Column 4 indicate that foreign VCs are significantly more successful at exiting late-stage investments (especially as compared with domestic VCs, as indicated in negative coefficient on the 'Late Stage' interaction in Columns 3 and 6). This result is consistent with the idea that foreign VCs can contribute to portfolio companies through their connections and capital.

The results suggest that the nature of the company and the fund can influence the success of foreign-backed companies. The results are also mostly consistent with Hypotheses 3a–3e. In unreported tests we also examine whether the impact of foreign/JV backing varies across industry or region. However, we find no evidence that it does, likely reflecting the clustering of foreign/JV backers into particular regions and locations (and the subsequent correlation between foreign/JV backing and region/industry characteristics). The main results are as follows.

First, consistent with Hypothesis 3a, foreign VC/PE funds do better when making late-stage investments (as indicated by the positive, significant coefficient on 'VC/PE Variable × I(Late Stage)' in Columns 1 and 4). This is consistent with the idea that foreign VC/PE funds do better when investing in companies that have lower levels of information asymmetry.

Second, there is some evidence that is consistent with Hypothesis 3b. Diversification across industries appears to increase the successfulness of foreign VC/PE funds (viz 'VC/PE Variable × Max Num Fund Industries') but diversification across regions does not do so (viz 'VC/PE Variable × Max Num Fund Regions'). The industry-diversification result is consistent with prior evidence that knowledge-sharing from diversification across industries can improve funds' returns (see e.g. Humphery-Jenner, in press). The

Table 7
Cox hazard models for sub-samples. This table contains Cox hazard models that examine the impact of foreign, JV, or domestic VC/PE backing in sub-samples of funds that are backed by a domestic fund (Columns 1 and 2), a foreign fund (Columns 3 and 4) or a JV (Columns 5 and 6). We set-up the hazard models as follows. First, we compute a 'survival' time in years, which is either (a) the time between the first investment date until the deal is exited, or (b) is 2011 (the last year in our data) less the year of the first investment. We code an 'ending' indicator that equals one if the firm is exited and equals zero otherwise. Thus, the coefficients in the Cox model represent whether a given variable accelerates the exit-process. For example, the negative coefficient on I(Start up) means that startups are less likely to be exited. The variable definitions are in Table 1. Brackets contain p-values and superscripts ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

Sample	Has at least one domestic fund		Has at least one foreign fund		Has at least one JV	
Column	[1]	[2]	[3]	[4]	[5]	[6]
I(At least one foreign)	−0.802***					−0.177
	[0.000]					[0.234]
I(At least one JV)		0.183	0.376***			
		[0.175]	[0.002]			
I(At least one domestic)				−0.037	0.324**	
				[0.774]	[0.013]	
I(Start up)	−1.260***	−1.255***	−0.967***	−0.965***	−0.993***	−1.037***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
I(Late Stage)	−0.371**	−0.388**	0.357***	0.333**	0.231	0.206
	[0.047]	[0.037]	[0.007]	[0.011]	[0.233]	[0.287]
ln(Maximum Fund Size)	0.028	0.025	−0.031	−0.027	−0.001	0.006
	[0.168]	[0.230]	[0.120]	[0.163]	[0.965]	[0.867]
ln(Maximum Ave Fund Investment Size)	0.034	−0.056	0.095**	0.085**	0.065	0.064
	[0.506]	[0.245]	[0.027]	[0.047]	[0.244]	[0.275]
Max Fund Exits	0.068***	0.064***	0.041***	0.040***	0.030***	0.031***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.004]	[0.004]
Max Num Fund Investments	−0.014***	−0.013***	−0.008***	−0.007***	−0.008***	−0.008***
	[0.000]	[0.000]	[0.000]	[0.001]	[0.000]	[0.000]
Max Num Fund Regions	0.064***	0.073***	−0.038**	−0.042**	0.017	0.023
	[0.000]	[0.000]	[0.026]	[0.015]	[0.421]	[0.274]
Max Num Fund Industries	−0.036***	−0.047***	0	0.003	0.008	0.006
	[0.002]	[0.000]	[0.998]	[0.721]	[0.459]	[0.546]
Num Rounds	−0.037	−0.057	0.038	0.048	−0.069	−0.048
	[0.540]	[0.344]	[0.518]	[0.416]	[0.321]	[0.483]
Total Num Investors	0.200***	0.133***	0.101***	0.129***	0.105***	0.137***
	[0.000]	[0.000]	[0.003]	[0.000]	[0.003]	[0.000]
Observations	2208	2208	1736	1736	1399	1399
Pseudo R-squared	4.10%	3.80%	2.60%	2.50%	3.90%	3.80%

regional-diversification result might suggest that there are significant costs involved with managing multiple companies in geographically disparate areas, perhaps inducing a limited-attention problem.

Third, there is a weak evidence of diseconomies of scale in investments by foreign VC/PE funds (the coefficient on 'VC/PE Variable × ln(Maximum Fund Size)' is negative in Columns 1 and 4 and weakly significant in Column 1). This is consistent with prior evidence on the diseconomies of scale in VC/PE investments (Cumming and Dai, 2011; Humphery-Jenner, 2012a).

Fourth, foreign VC/PE funds might gain from their experience by making more investments, but the evidence is weak. The coefficient on 'VC/PE Variable × Max Num Fund Investments' is positive and significant in Column 1 but is negative and weakly significant in Column 4. One possible reason for the mixed results is that while doing more investments can increase the fund-manager's experience, it can also risk creating a 'limited attention' problem, whereby the VC/PE fund does not devote enough attention to each portfolio company (see Cumming and Dai, 2011).

Fifth, syndication may not especially benefit foreign VC/PE funds. While the coefficient on 'Total Num Investors' is positive and significant in all models, the interaction term on 'I(At least one foreign fund) × Total Num Investors' is negative and significant in Column 1. This implies that foreign VC/PE funds gain less from having more investors (but cf. the coefficient in Column 4). When read together with the positive coefficient in Column 4, the result suggest that foreign VCs might not gain very much when the number of foreign and domestic VC/PEs increases, possibly owing to the increase in monitoring costs in the syndicate, but might slightly gain when increasing the number of foreign VCs.

Overall, these results suggest that while the presence of a foreign VC/PE fund can influence exit-outcomes, the impact depends in part on the characteristics of the fund and of the portfolio company.

5.3. Exit preferences of foreign VCs

We hypothesize that foreign VC funds prefer M&As/trade sales. This is for several reasons including, (a) the stock market in China has a reputation for insider trading and market manipulation, (b) the limits on the listing of small firms in China, and (c) the regulation of IPO underpricing coupled with the general dearth of strong regulation of financial misconduct.

The multivariate results indicate that foreign VCs prefer M&A exits. Table 9 contains logit and probit models that predict the exit type given that the deal is successful. In this table, we limit the sample to comprise only firms that are successfully exited. The

Table 8
Hazard models examining interaction models. This table contains Cox hazard models that examine the interaction of VC/PE backing with various investment and fund-level characteristics. The column header states the VC/PE variable (which we term 'VC/PE Variable' in the left hand column). We set-up the hazard models as follows. First, we compute a 'survival' time in years, which is either (a) the time between the first investment date until the deal is exited, or (b) is 2011 (the last year in our data) less the year of the first investment. We code an 'ending' indicator that equals one if the firm is exited and equals zero otherwise. Thus, the coefficients in the Cox model represent whether a given variable accelerates the exit-process. For example, the negative coefficient on I(Start up) means that startups are less likely to be exited. The variable definitions are in Table 1. Brackets contain p-values and superscripts ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

VC/PE Variable	I(At least one foreign fund)	I(At least one JV)	I(At least one domestic fund)	I(Only Foreign)	I(Only JVs)	I(Only Domestic)
Column	[1]	[2]	[3]	[4]	[5]	[6]
VC/PE Variable	0.14	−0.651**	0.332	−0.137	−0.901	−0.051
	[0.525]	[0.016]	[0.101]	[0.565]	[0.138]	[0.822]
VC/PE Variable × I(Start up)	0.370*	0.245	−0.381*	0.148	0.285	−0.328
	[0.074]	[0.236]	[0.067]	[0.558]	[0.398]	[0.143]
VC/PE Variable × I(Late Stage)	0.944***	0.258	−0.534**	0.461**	−0.716	−0.724***
	[0.000]	[0.264]	[0.020]	[0.037]	[0.120]	[0.010]
VC/PE Variable × ln(Maximum Fund Size)	−0.050*	0.014	0.053*	−0.041	−0.006	0.039
	[0.081]	[0.707]	[0.061]	[0.171]	[0.922]	[0.180]
VC/PE Variable × ln(Maximum Ave Fund Investment Size)	−0.016	0.107	−0.134**	0.033	0.422***	0.094
	[0.834]	[0.124]	[0.045]	[0.671]	[0.007]	[0.272]
VC/PE Variable × Max Fund Exits	−0.044***	−0.061***	0.001	0.028	−0.006	0.096***
	[0.003]	[0.000]	[0.924]	[0.146]	[0.839]	[0.000]
VC/PE Variable × Max Num Fund Investments	0.011***	0.010**	−0.001	−0.012*	−0.005	−0.017***
	[0.001]	[0.010]	[0.795]	[0.071]	[0.394]	[0.001]
VC/PE Variable × Max Num Fund Regions	−0.113***	−0.033	0.102***	−0.091***	0.018	0.129***
	[0.000]	[0.186]	[0.000]	[0.003]	[0.715]	[0.000]
VC/PE Variable × Max Num Fund Industries	0.048***	0.060***	−0.045***	0.033*	0.035	−0.107***
	[0.001]	[0.000]	[0.003]	[0.078]	[0.153]	[0.000]
VC/PE Variable × Num Rounds	0.091	−0.091	−0.182*	0.233	−0.208	0.121
	[0.344]	[0.340]	[0.068]	[0.105]	[0.559]	[0.290]
VC/PE Variable × Total Num Investors	−0.156***	−0.033	0.053	0.033	−0.309	0.099
	[0.003]	[0.568]	[0.345]	[0.728]	[0.500]	[0.201]
I(Start up)	−1.294***	−1.212***	−0.921***	−1.130***	−1.131***	−1.017***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
I(Late Stage)	−0.642***	−0.122	0.172	−0.224	0.005	0.168
	[0.002]	[0.348]	[0.203]	[0.115]	[0.962]	[0.162]
ln(Maximum Fund Size)	0.025	−0.001	−0.029	0.013	−0.002	−0.011
	[0.218]	[0.945]	[0.124]	[0.461]	[0.898]	[0.567]
ln(Maximum Ave Fund Investment Size)	0.099	−0.067	0.068	−0.004	−0.034	0.019
	[0.115]	[0.112]	[0.145]	[0.917]	[0.298]	[0.622]
Max Fund Exits	0.086***	0.095***	0.060***	0.051***	0.060***	0.044***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Max Num Fund Investments	−0.018***	−0.018***	−0.012***	−0.011***	−0.010***	−0.009***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Max Num Fund Regions	0.076***	0.063***	−0.025	0.063***	0.033***	−0.015
	[0.000]	[0.000]	[0.177]	[0.000]	[0.005]	[0.286]
Max Num Fund Industries	−0.048***	−0.060***	−0.001	−0.035***	−0.034***	0.005
	[0.000]	[0.000]	[0.929]	[0.000]	[0.000]	[0.535]
Num Rounds	−0.042	0.053	0.117	−0.038	0.036	−0.004
	[0.580]	[0.426]	[0.143]	[0.454]	[0.441]	[0.937]
Total Num Investors	0.285***	0.148***	0.096**	0.125***	0.144***	0.142***
	[0.000]	[0.002]	[0.029]	[0.000]	[0.000]	[0.000]
Observations	4298	4298	4298	4298	4298	4298
Pseudo R-squared	3.60%	3.10%	3.10%	3.10%	2.90%	3.60%

main results from Table 9 are that foreign funds prefer to exit via M&A and prefer not to exit via IPO, as suggested by the negative and significant coefficients on I(At least one foreign fund) and Prop(Foreign Funds).

The coefficients on the control variables also yield some interesting results. Startups appear to be exited via M&A rather than via IPO (as indicated by the negative coefficient on I(Start-up)). Initially, this appears inconsistent with Schwienbacher (2008), who predicts that entrepreneurs prefer IPOs in order to retain a greater stake in the company. The likely explanation is that the stock market in China is relatively inefficient; and thus, VCs and entrepreneurs might fear they will obtain an inadequate price for an innovative company. This is coupled with the regulation of IPO underpricing, which worsens the ability to obtain an adequate price for young innovative companies.

Additional results are that an IPO exit is more likely (and a M&A less likely) if the company had more investment rounds. This result might reflect the likelihood that an IPO requires the company to be relatively stable with a clear path to growth and (in especially China) to have a degree of profitability, which might necessitate more funding rounds.

Table 9
Predicting deal exits. This table contains logit models that examine the probability an IPO exit given that the firm is successfully exited. Table 1 contains the variable definitions. The models are logit models that include year dummies, industry dummies, region dummies, and use robust standard errors. Brackets contain p-values and superscripts ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

Dependent	I(IPO exit)					
Sample	All successfully exited investments					
Column	[1]	[2]	[3]	[4]	[5]	[6]
I(At least one foreign fund)	−0.765***					
	[0.010]					
I(At least one JV)		0.372				
		[0.194]				
I(At least one domestic fund)			0.07			
			[0.785]			
Prop(Foreign Funds)				−0.744**		
				[0.027]		
Prop(JVs)					0.554	
					[0.194]	
Prop(Domestic Funds)						0.394
						[0.195]
I(Start up)	−1.608***	−1.644***	−1.625***	−1.592***	−1.647***	−1.603***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
I(Late Stage)	0.422	0.31	0.32	0.418	0.316	0.361
	[0.258]	[0.405]	[0.393]	[0.266]	[0.397]	[0.333]
ln(Maximum Fund Size)	−0.026	−0.016	−0.018	−0.023	−0.015	−0.021
	[0.559]	[0.722]	[0.685]	[0.611]	[0.731]	[0.631]
ln(Maximum Ave Fund Investment Size)	−0.128	−0.230**	−0.233**	−0.151	−0.228**	−0.200*
	[0.250]	[0.027]	[0.030]	[0.188]	[0.029]	[0.065]
Max Fund Exits	0.039*	0.038*	0.035	0.037*	0.039*	0.034
	[0.088]	[0.090]	[0.112]	[0.094]	[0.081]	[0.125]
Max Num Fund Investments	−0.009*	−0.008	−0.008	−0.009*	−0.008	−0.008
	[0.098]	[0.110]	[0.131]	[0.098]	[0.102]	[0.133]
Max Num Fund Regions	0.070*	0.072**	0.071**	0.072**	0.070**	0.073**
	[0.057]	[0.044]	[0.043]	[0.050]	[0.048]	[0.042]
Max Num Fund Industries	−0.025	−0.031	−0.025	−0.027	−0.031	−0.022
	[0.219]	[0.147]	[0.223]	[0.178]	[0.149]	[0.275]
Num Rounds	0.708***	0.723***	0.721***	0.708***	0.726***	0.714***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Total Num Investors	0.015	−0.048	−0.031	−0.015	−0.015	−0.03
	[0.852]	[0.550]	[0.700]	[0.854]	[0.852]	[0.705]
Constant	3.011**	3.157**	3.084**	3.149**	3.064**	2.788**
	[0.028]	[0.020]	[0.021]	[0.024]	[0.025]	[0.039]
Observations	829	829	829	829	829	829
Pseudo R-squared	25.00%	24.30%	24.10%	24.80%	24.40%	24.30%

The likelihood of an IPO-exit increases if the VC-backers have exited more investments in the past but decreases with the number of investments (per se) that the VC-backer has made (although the relevant coefficients are weakly significant and are not statistically significant in all models). Given that an IPO-exit is generally preferable to a M&A-exit, this might suggest that a track-record of successful investments (rather than just a track-record of investments per se) helps to facilitate more successful investments. If the fund is more diversified across regions, then it is weakly significantly more likely to exit via an IPO, suggesting a possible positive impact of diversification. Further, this prior-exit-experience might suggest that the VC-backer has more experience dealing with the regulator (the CSRC) and thus may be more able to navigate the relatively complex regulation surrounding IPOs.

The key finding from these models is that overseas funds prefer to exit deals via a M&A/trade sale and prefer not to exit them via an IPO. This is consistent with the idea that concerns over the efficiency and regulation of the Chinese market might deter an IPO.

5.4. Exit preferences over time

We predict that exit preferences change over time. We hypothesize that the proportion of deals exited via IPO increases over time (due to continual changes in regulation). We anticipate that this holds both for companies with and without foreign VC backing.

The summary statistics in Table 10 support the idea of increases in IPOs over time. We focus on the data after 1998 due to sample size restrictions in prior years. The data shows a general increase in the proportion of deals exited via IPO. However, there is a reduction in the proportion of IPOs immediately after 1999, possibly reflecting both the end of the tech boom and the Asian financial crisis. The data in Fig. 1 supports this, showing a clear increase in the proportion of companies that are exited via IPO.

Table 10
Listing preferences over time. This table contains the listing preferences of VC backers by year of investment. The statistics are sample proportions. Note that no deals were exited in our sample before 1994 (although VCs made some investments before 1994).

Sample	Full sample	Foreign backed	Sample	Full sample	Foreign backed
Exit year	Prop(IPO|Exited)		Investment year	Prop(IPO|Exited)	
1994	0.000	0.000	1994	0.667	1.000
1995	0.000	0.000	1995	0.400	0.250
1996	0.000	0.000	1996	0.429	0.500
1998	0.000	0.000	1997	0.714	0.714
1999	0.667	1.000	1998	0.667	0.667
2000	0.500	0.500	1999	0.379	0.333
2001	0.400	0.500	2000	0.580	0.500
2002	0.444	0.429	2001	0.700	0.625
2003	0.563	0.375	2002	0.613	0.500
2004	0.697	0.650	2003	0.700	0.667
2005	0.528	0.586	2004	0.532	0.568
2006	0.629	0.646	2005	0.727	0.773
2007	0.755	0.781	2006	0.778	0.747
2008	0.563	0.484	2007	0.884	0.770
2009	0.748	0.630	2008	0.832	0.745
2010	0.863	0.789	2009	0.886	0.833
2011	0.866	0.700	2010	0.868	0.889
Average	0.484	0.475	Average	0.668	0.652

The multivariate models support these univariate statistics. We assess whether there is an increase in IPOs by including a time/trend variable in logit models that predict the likelihood of an IPO exit given that the deal is exited (in Table 11). We use two trend variables: one based on investment years and one based on exit years. The trend variable is a counter that starts at the year of the first observations (i.e. 1988 is the year of the first investment and 1996 is the year of the first exit for which we have data) and adds one for each year afterwards. A positive (significant) coefficient on this variable implies an increase in IPOs over time. The results show that there is a significant increase in the likelihood of an IPO exit over time. This holds for both the full sample of VC backed companies, and for the sub-sample of companies with foreign backing (see Columns 5–8 of Table 11). The control variable results are largely consistent with those reported in the above models.

Overall, these results support the hypothesis that there is variation over time in the likelihood of an IPO exit, or a listing in mainland China (Hypothesis 5). Specifically, the results suggest that there is an increase in the likelihood of an IPO. This could reflect both improvements in market access (the SME and venture board) and quality.

5.5. Robustness tests

This section contains relevant robustness tests. For brevity, the results are available by request.

First, we use a two-stage approach to ameliorate endogeneity-concerns. The relationship between VC/PE backing and venture-success might reflect selection (i.e. cherry picking) rather than influence (i.e. the fund improving exit-likelihood). We address this by using a two-stage approach. Here we estimate predicted values for each of the VC/PE variables and use the

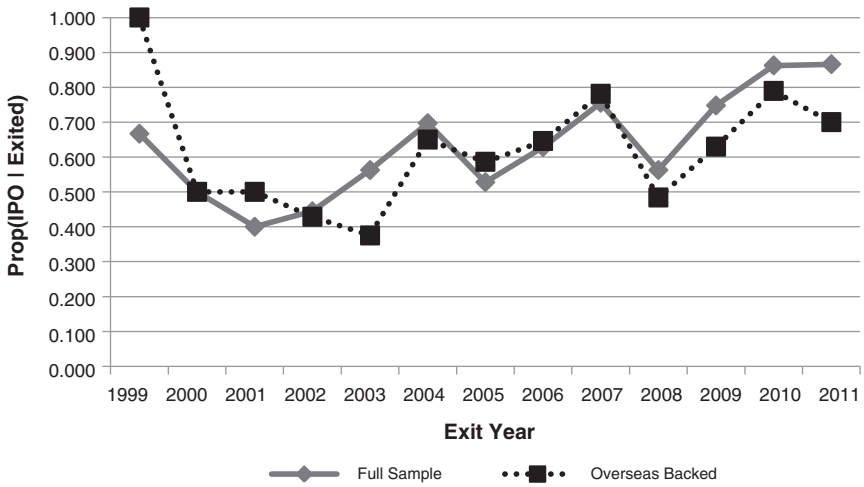


Fig. 1. Proportion of exits that are by IPO. This figure plots the proportion of exited deals that are exited via IPO by year of exit and by foreign backing. A foreign backed deal is one that has at least one foreign VC backer.

Table 11
Likelihood of an IPO exit with year trend. This table contains logit models that examine the likelihood of an IPO exit over time. The dependent variable is an indicator that equals one if the deal is exited and the exit is by IPO. Table 1 contains the variable definitions. The models include region dummies and industry dummies and use robust standard errors. Brackets contain p-values and superscripts ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

Dependent	I(IPO exit)											
Sample	All successfully exited investments						Exited; at least one foreign		Exited; at least one JV		Exited; at least one domestic	
Column	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
I(At least one foreign fund)	— 0.860*** [0.002]			— 0.733** [0.010]								
I(At least one JV)		0.305 [0.281]			0.368 [0.199]							
I(At least one domestic fund)			0.232 [0.329]			0.121 [0.624]						
Investment Year Trend	0.126*** [0.000]	0.130*** [0.000]	0.128*** [0.000]				0.165*** [0.007]		0.119 [0.149]		0.180*** [0.009]	
Exit Year Trend				0.147*** [0.000]	0.169*** [0.000]	0.162*** [0.000]		0.07 [0.306]		0.157** [0.039]		0.398*** [0.000]
I(Start up)	— 1.631*** [0.000]	— 1.643*** [0.000]	— 1.611*** [0.000]	— 1.794*** [0.000]	— 1.797*** [0.000]	— 1.778*** [0.000]	— 1.823*** [0.000]	— 2.042*** [0.000]	— 1.464*** [0.003]	— 1.635*** [0.000]	— 2.255*** [0.000]	— 2.781*** [0.000]
I(Late Stage)	0.389 [0.240]	0.247 [0.445]	0.281 [0.390]	0.506 [0.136]	0.398 [0.234]	0.404 [0.231]	0.854* [0.057]	1.003** [0.025]	0.041 [0.953]	0.153 [0.828]	−0.088 [0.910]	0.258 [0.787]
ln(Maximum Fund Size)	−0.037 [0.401]	−0.023 [0.603]	−0.028 [0.524]	−0.035 [0.429]	−0.022 [0.611]	−0.025 [0.556]	0.056 [0.366]	0.047 [0.453]	0.085 [0.417]	0.07 [0.521]	−0.155 [0.141]	−0.168 [0.122]
ln(Maximum Ave Fund Investment Size)	−0.147 [0.159]	— 0.276*** [0.004]	— 0.258** [0.011]	−0.161 [0.128]	— 0.266*** [0.006]	— 0.262*** [0.010]	−0.244* [0.080]	−0.259* [0.060]	— 0.395** [0.043]	−0.387* [0.052]	— 0.531*** [0.001]	— 0.538*** [0.002]
Max Fund Exits	0.031 [0.152]	0.03 [0.156]	0.028 [0.195]	0.03 [0.156]	0.031 [0.150]	0.028 [0.188]	0.062* [0.079]	0.061* [0.077]	0.103** [0.026]	0.103** [0.032]	−0.022 [0.622]	−0.029 [0.519]
Max Num Fund Investments	−0.008 [0.127]	−0.007 [0.149]	−0.007 [0.176]	−0.007 [0.137]	−0.007 [0.152]	−0.007 [0.183]	−0.013* [0.092]	−0.014* [0.071]	— 0.024** [0.019]	— 0.024** [0.025]	0.005 [0.681]	0.01 [0.411]
Max Num Fund Regions	0.073** [0.043]	0.073** [0.036]	0.074** [0.033]	0.077** [0.037]	0.078** [0.030]	0.078** [0.029]	0.056 [0.361]	0.028 [0.643]	−0.039 [0.626]	−0.042 [0.610]	0.137*** [0.010]	0.168*** [0.004]
Max Num Fund Industries	−0.02 [0.300]	−0.025 [0.215]	−0.02 [0.304]	−0.023 [0.233]	−0.03 [0.144]	−0.024 [0.223]	−0.041 [0.194]	−0.031 [0.303]	0.044 [0.233]	0.043 [0.262]	−0.021 [0.582]	−0.045 [0.235]
Num Rounds	0.628*** [0.000]	0.632*** [0.000]	0.629*** [0.000]	0.529*** [0.000]	0.525*** [0.000]	0.524*** [0.000]	0.898*** [0.000]	0.816*** [0.000]	0.952*** [0.001]	0.865*** [0.002]	0.804*** [0.001]	0.838*** [0.001]
Total Num Investors	0.05 [0.539]	−0.01 [0.902]	−0.009 [0.911]	0.064 [0.443]	0.005 [0.947]	0.018 [0.828]	0.109 [0.364]	0.124 [0.301]	−0.159 [0.182]	−0.147 [0.252]	−0.079 [0.520]	−0.094 [0.465]
Constant	0.441 [0.736]	0.453 [0.730]	0.262 [0.839]	1.093 [0.356]	0.935 [0.428]	0.878 [0.447]	−2.841 [0.182]	−0.396 [0.839]	−1.39 [0.493]	−1.218 [0.497]	0.031 [0.987]	−1.106 [0.489]
Observations	830	830	830	830	830	830	364	364	228	228	365	365
Pseudo R-squared	22.80%	21.80%	21.80%	22.80%	22.20%	22.00%	29.10%	27.40%	21.30%	22.00%	27.70%	33.30%

predicted values in the second stage model. The first-stage prediction model uses the logit models from Table 3 with the additional instruments of the number of companies in the subject-company's industry and province who received backing from a foreign fund or a JV (i.e. two instruments). We also use as instruments the ranking of the portfolio company's region (in the year the company first received financing in terms of total deposits at financial institutions, loans to financial institutions, loans to industrial companies, loans to commercial institutions, loans to agricultural institutions, and total fixed assets (all from China Data Online)). The results are robust to omitting any of these instruments. We then re-run the models in Table 6 by using these predicted values. These instruments are likely to satisfy the 'relevance' condition because of the potential for herding in the VC/PE sector (i.e. VC/PE funds could invest in 'hot' industries) and because a region that has more investment is more likely to have the financial background necessary to attract a VC/PE fund. This logic is similar in nature to the logic behind the use of the proportion of people who are high-net-worth-individuals (HNWIs) in a given state in Becker et al. (2011). The instruments likely satisfy the exclusion condition because the mere presence of other companies who have received funding is not likely to increase the likelihood of a successful exit. Indeed, it could count against success-likelihood as an increased number of funded-competitors might increase competition and decrease the subject-company's profitability. We report the second stage models in Table 12. The results are qualitatively similar to those in Table 6 and suggest that endogeneity concerns probably do not drive the results.

Second, we ensure that the results are robust to various fixed effects. The main results include year dummies, industry dummies and region dummies. For the models that do not rely on dummies to analyze regions or industries, we check robustness.

Table 12
Two-stage results. This table reports the second stage of a two-stage regression process designed to mitigate endogeneity concerns. In the first stage, we run a prediction model for the VC/PE variables by using the models in Table 3 with the additional instruments of the average number of companies in the subject-company's region and industry who received backing from a foreign fund or from a JV (for two instruments), and the ranking of the portfolio company's region in terms of total deposits at financial institutions, loans to financial institutions, loans to industrial companies, loans to commercial companies, loans to agricultural companies, and the amount of fixed assets. Table 1 contains the variable definitions. Brackets contain p-values and superscripts ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

Column	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
I(Only Foreign)	−0.764***								
	[0.000]								
I(Only JV)		0.902**							
		[0.038]							
I(Only Domestic)			0.487***						
			[0.000]						
Prop (Foreign)				−0.105***					
				[0.000]					
Prop(JV)					0.061				
					[0.156]				
Prop(Domestic)						0.070***			
						[0.000]			
I(At least one foreign)							−0.820***		
							[0.000]		
I(At least one JV)								−0.610**	
								[0.011]	
I(At least one domestic)									0.636***
									[0.000]
I(Start up)	−1.134***	−1.162***	−1.130***	−1.119***	−1.132***	−1.094***	−1.112***	−1.077***	−1.079***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
I(Late Stage)	0.06	−0.008	−0.052	0.03	−0.006	−0.009	0.022	−0.076	0.008
	[0.590]	[0.946]	[0.636]	[0.790]	[0.960]	[0.932]	[0.845]	[0.500]	[0.942]
ln(Maximum Fund Size)	−0.003	−0.004	−0.006	−0.004	−0.005	−0.004	−0.004	−0.005	−0.004
	[0.815]	[0.797]	[0.701]	[0.764]	[0.756]	[0.772]	[0.798]	[0.721]	[0.761]
ln(Maximum Ave Fund Investment Size)	0.007	−0.035	0.012	0.017	−0.028	0.015	0.033	−0.011	0.019
	[0.823]	[0.283]	[0.723]	[0.604]	[0.391]	[0.656]	[0.322]	[0.730]	[0.575]
Max Fund Exits	0.058***	0.059***	0.057***	0.059***	0.060***	0.060***	0.058***	0.060***	0.059***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Max Num Fund Investments	−0.011***	−0.012***	−0.011***	−0.012***	−0.012***	−0.012***	−0.012***	−0.012***	−0.011***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Max Num Fund Regions	0.038***	0.038***	0.042***	0.037***	0.034***	0.035***	0.037***	0.032***	0.035***
	[0.001]	[0.001]	[0.000]	[0.001]	[0.003]	[0.002]	[0.001]	[0.004]	[0.002]
Max Num Fund Industries	−0.027***	−0.029***	−0.030***	−0.026***	−0.028***	−0.026***	−0.026***	−0.026***	−0.026***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Num Rounds	0.016	0.039	0.016	0.019	0.026	0.021	0.033	0.025	0.021
	[0.732]	[0.412]	[0.742]	[0.682]	[0.581]	[0.659]	[0.486]	[0.597]	[0.657]
Total Num Investors	0.136***	0.132***	0.143***	0.141***	0.137***	0.143***	0.137***	0.144***	0.142***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Observations	4198	4193	4181	4200	4200	4200	4193	4198	4198
Pseudo R-squared	2.90%	2.80%	3.00%	3.00%	2.80%	2.90%	3.20%	2.80%	3.00%

The results are qualitatively the same if we replace the industry dummies with the broader industry sectors (that we use to examine the regional preferences of foreign VC funds). The results are also robust to excluding the dummies.

Third, the results are robust to focusing on recent deals. One concern is that the sample comprises relatively few deals before 2000. It may be possible that funds only reported information on successful deals during this period. This may induce sample selection bias. Thus, we ensure that the results are robust to excluding deals before 2000.

Fourth, the results are robust to various types of clustering. The results are qualitatively the same if we cluster standard errors by industry, year, and/or province. We also cluster standard errors by the 'lead' fund, which we define as the fund that invests the most money in the company. The results are also robust to omitting any particular portfolio-company-region from the analysis.

Fifth, the results are robust to controlling for non-randomness in the companies that receive foreign VC backing. An issue is that non-randomness in the types of companies that receive foreign VC backing might bias the results in Sections 5.2–5.4. We address this in two ways:

1. We use a weighting approach (following Busso et al., 2011). We use the regressions in Table 3 Column 1 and Column 2 to estimate a first stage probability that a firm receives foreign VC backing or JV backing (as appropriate). Next, we calculate a 'weighting' score, defined as: Weight = I[Overseas VC Backing] + (1 − I[Overseas VC Backing]) × Prob(Overseas VC Backing)/(1 − Prob(Overseas VC Backing)), where Prob(Overseas VC Backing) refers to the propensity score obtained from the first-stage regression. Then, for all the models that are not restricted to the sub-sample of overseas-backed companies, we weigh the covariance matrix by this weighting factor. The results are qualitatively the same in these models.

2. We use a propensity score approach. We use the first stage regressions in Table 3 Column 1 and Column 2 to calculate the probability that a firm receives overseas VC backing or JV backing. Next, for the set of firms that do receive such backing, we compute a 'range' of propensity scores, and identify the propensity scores that mark the 5% upper and lower tails of this distribution. Then, for the companies that do not receive overseas backing, we omit all companies whose propensity score is in the upper or lower 5% tail. The idea here is that we remove all firms whose characteristics render them unlikely to receive VC backing. The results are robust to omitting these firms from the sample.

6. Conclusion

This paper analyzes whether foreign VCs increase the likelihood of venture success. Foreign VCs are typically larger and might be better connected. These connections could arguably enable foreign VCs to facilitate exits. However, foreign VCs lack local connections, which might pose a significant disadvantage in emerging markets. We use a large database of VC investments in 4753 portfolio companies in China between 1988 and 2011. We examine whether foreign VCs increase the likelihood of a portfolio company being successfully exited.

We make several important findings. (1) Foreign VCs do not per se increase the likelihood of a successful exit. (2) For companies backed by a foreign VC, the presence of a joint venture partner increases the likelihood of venture success, supporting the idea that syndication can facilitate networking and success. (3) Foreign VCs are generally less likely to exit via IPO than are domestic VCs. Foreign VCs are likely to be deterred from exiting via an IPO due to restrictions on foreign ownership of companies on Chinese markets, significant post-IPO lock-up periods, concerns over market quality, barriers to listing startups in China, and regulatory issues over matters such as underpricing. Further, foreign VCs are less likely to have the connections necessary to navigate some of the more discretionary parts of the IPO regulatory process. (4) The impact of foreign VCs on venture success depends on the characteristics of the investment and of the fund. (5) IPOs have become more popular over time, both with domestic and foreign VCs, reflecting improvements in the quality of China's stock markets.

The main implications from these findings are that foreign investment does not per se increase the likelihood of investment success, although this depends on the nature of the fund, and that the exit-preferences of foreign investors reflect changing market conditions and regulations. These results suggest that future research could focus on whether foreign VCs can provide other value-added benefits, such as increased internationalization, even if they are not per se associated with venture success.

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