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Do local and international venture capitalists play well together? The complementarity of local and international venture capitalists☆

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ABSTRACT

We find that entrepreneurial firms in emerging nations backed by syndicates composed of international and local venture capitalists have more successful exits and higher post-IPO operating performance than those backed by syndicates of purely international or purely local venture capitalists. We control for the potential endogenous participation and syndication by international VCs using instrumental variables analyses and a natural experiment and find a causal effect of international VC participation on successful outcomes. International VCs face disadvantages in their investments due to the lack of proximity to the entrepreneurial firm. Using air service agreements between countries as an exogenous change in effective proximity, we find that entrepreneurial firms backed by international VCs are more successful when travel becomes easier between the two countries. Overall, our results indicate that the greater venture capital expertise of international venture capitalists and the superior local knowledge and lower monitoring costs of local venture capitalists are both important in obtaining successful investment outcomes.

Executive summary

In recent years, venture capital (VC) investments across national borders have seen a significant increasing trend. Such cross-border investment in venture capital markets has increased from 10% of all venture capital investments in 1991 to 22% in 2008 (based on number of venture capital investments). An important driver of this increase is the significant upward trend in international venture capital investments in emerging nations over this time period. At the same time, there has a significant development of local VC industries in many emerging as well as developed countries around the world. In this paper, we study

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international investments by VCs and analyze the benefits of international VCs forming syndicates with local VCs to invest in entrepreneurial firms in various countries around the world.

Compared to local VCs, VCs choosing to invest in foreign markets ("international VCs") may face significantly higher costs of screening potential investee firms and monitoring these firms after investment due to their lack of proximity to these firms. Such VCs may also face significant differences in context, culture, and institutional environment between their home country and the country of the entrepreneurial firm (Li et al., 2014; Guler and Guillen, 2010). Syndication with local VCs may be a mechanism through which international VCs may be able to overcome such disadvantages. On the positive side, international VCs are likely to have considerably greater expertise relative to local VCs in helping entrepreneurial firms to become successful. We therefore examine whether investments by syndicates of international and local VCs are indeed more successful in helping entrepreneurial firms succeed (rather than syndicates of each type of VC alone), and attempt to understand how cross-border syndication by international VCs with local VCs allow them to take advantage of their complementarities with local VCs.

Using a sample of cross-border VC investments, we find evidence that firms backed by syndicates consisting of both international and local VCs are indeed the most likely to exit successfully and have better post-IPO operating performance. Further, using instrumental variable analyses and a natural experiment, we show that including international VCs in the investing syndicate indeed has a positive and causal effect on exit.

We next analyze a channel through which geographic proximity may affect cross-national syndication and venture success. We conjecture that the international VCs' proximity disadvantage may arise from scarce human assets (the general partners of VCs), as opposed to physical assets such as offices (Giroud, 2013; Bernstein et al., 2016). In particular, lack of proximity may make it harder for international VC general partners to monitor the progress of their portfolio firm by attending board meetings, giving advice, and supporting the ongoing business operations of the firm: in other words, lack of proximity may create obstacles to effective monitoring of portfolio firms by international VCs.

Our findings are consistent with the above conjecture. We find that portfolio firms in a foreign country in which international VCs have already invested have a higher likelihood of successful exit, once there is a subsequent (and exogenous) increase in the availability of easier air travel options between the VCs' country and the portfolio firm's country (due to the establishment of an air services agreement (ASA) between these two countries). Moreover, this effect is primarily driven by international VCs who do not syndicate with a local VC. In other words, we are able to show that firms backed by a syndicate consisting only of international VCs (whose general partners face a significant proximity disadvantage with respect to their portfolio firms), perform better after the ease of travel between the international VCs' home country and a portfolio firm's country has increased, thus effectively overcoming the international VCs' proximity disadvantage.

1. Introduction

In recent years, venture capital (VC) investments across national borders have started to trend upwards (Wright et al., 2005; Aizenman and Kendall, 2012). Foreign or cross-border investment in venture capital markets has increased from 10% of all venture capital investments in 1991 to 22.7% in 2008 (based on number of venture capital investments). An important driver of this increase is the significant upward trend in international venture capital investments in emerging nations over this time period.[1]

Prior literature in this area has analyzed how cultural, legal, and institutional distances between the country of the VC and that of the entrepreneurial firm can impact investment strategies, investment success, and syndication strategies (Li et al., 2014; Dai et al., 2012; Guler and Guillen, 2010; Hazarika et al., 2013). With certain exceptions (including Dai et al., 2012 and Cumming et al., 2014), there has been little research on the effectiveness of international versus local venture capitalists in adding value to entrepreneurial firms and on the determinants of collaboration between the two types of venture capitalists. We add to these studies by providing causal evidence on the contribution of international investors to VC-backed firm success, and by suggesting a mechanism through which physical proximity may impact VC syndication, namely through the effective time required to travel.[2] We also provide evidence on the impact of local and international VC syndication on the post-IPO performance of exited VC-backed firms.

International venture capitalists have considerable expertise in helping entrepreneurial firms to become successful through better deal structure, providing product market support, professionalizing firm management, setting effective incentive schemes, and through monitoring firm management (Hellmann and Puri, 2000, 2002; Chemmanur et al., 2011). This expertise effect is likely to be stronger for investments in emerging nations, where local VCs are likely to have less experience in such investments. In contrast, local venture capitalists may enjoy a significant advantage in their home markets in terms of their information about local market conditions and investment opportunities (Makela and Maula, 2008). Further, local venture capitalists may be able to monitor their investments more easily because of proximity.[3] International venture capitalists can overcome their disadvantages in these respects by syndicating with local VCs and taking advantage of their complementary skills (consistent with Lerner, 1994; Brander et al., 2002).[4]

[1] For instance, in 2011, Accel closed two funds totaling $1.3 Billion for investing in China and Bessemer Venture Partners closed a $1.6 Billion fund which will invest in early stage companies across the world.

[2] Note that, by international VCs, we refer to cross-border VC investors from both the U.S. and other countries, both of which are present in our sample.

[3] Note that we use VC fund location to define whether or not the investing venture capitalist is local or international through the paper.

[4] The difficulties in monitoring international investments by venture capitalists have been commented upon in the popular press. See, e.g., "Redpoint and BV Capital form Brazilian V.C. Firm," New York Times Dealbook, March 5, 2012. To quote, "For the last couple of years, Redpoint partners have frequently travelled to Brazil, often visiting for a full week each trip, saying the lack of direct flights from San Francisco to Brazil makes a weeklong stay the only efficient way to conduct business there." The news article goes on to quote U.S. venture capitalists as seeking to ease difficulties such as the need for excessive travel by teaming up with local venture capitalists.

Using a sample of cross-border VC investments, we find that the probability of successful exit is higher when the syndicate consists of both local and international venture capitalists than when the syndicate consists of purely international or purely local venture capitalists. Our results are particularly strong for entrepreneurial firms located in emerging nations. We pay special attention to the endogeneity of international VC investments in our analyses. Our results are robust to controlling for the potential endogeneity that may arise from international venture capitalists selecting higher quality firms to invest in or the type of syndication to choose. We control for such potential endogeneity using an instrumental variables (IV) approach and also a natural experiment using terrorist attacks in various cities in India during our sample period. We thus show that international venture capitalists and local-international VC syndicates have a positive causal impact on the exit rates of the firms that they back. We also find that investment by local and international venture capitalists in an entrepreneurial firm has a positive association with the firm's post-IPO operating performance. These results are consistent with the idea that the knowledge-base and skill-sets of international and local VCs are complements and that the combination of local and international VCs can help international VCs overcome their disadvantages relative to local VCs.

We conjecture that the international VCs proximity disadvantage arises from scarce human assets, as opposed to physical assets such as offices (Giroud, 2013; Bernstein et al., 2016).[5] We use the signing of air service agreements (ASAs) between the country of the international venture capitalist and that of the entrepreneurial firm as a natural experiment to provide exogenous variation in effective proximity. We find that international VC investments made in countries which subsequently sign an ASA with the international venture capitalist's country perform better than those international VC investments where there is no ASA between the respective countries. Since ASAs make travel easier between countries exogenously (thus reducing international VCs' disadvantage due to lack of proximity), we interpret these results as supporting the idea that international venture capitalists' lack of proximity is an important impediment to their success. In additional tests, we find that the probability of exit is lower when international venture capitalists are farther away from the country of the entrepreneurial firm receiving venture capital financing, controlling for cultural, institutional, and legal distance. The negative association between the distance of an international VC from the entrepreneurial firm and the probability of exit is mitigated by syndication with local VCs.

Our paper contributes to the existing literature in various ways. First, we add to the literature that relates international VC ownership to investment success (Dai et al., 2012), and relates this effect to proximity, while controlling for cultural, legal, and institutional distances. Importantly, we provide evidence for a channel through which geographic distance may affect cross-national syndication and venture success, namely through the ease of travel access to the location of the entrepreneurial firm. This provides a clearer understanding of the monitoring difficulty that international VCs have in cross-border investments. Second, our paper provides significant evidence on the causal impact of international VC investing on exit through an instrumental variable analysis as well as through the use of a natural experiment. Finally, this paper is the first to relate local syndication of international VCs to the post-IPO operating performance of entrepreneurial firms.[6]

2. Hypotheses development and related literature

The existing literature discusses in great detail the antecedents of VC syndication and the subsequent outcomes of such syndication. See, e.g., Jaaskelainen (2012), for a detailed review of this literature. VCs enhance the value of entrepreneurial firms by screening and selecting higher quality firms (Brander et al., 2002; Gorman and Sahlman, 1989; Shepherd, 1999) and monitoring their investments and providing advice (Gompers, 1995; Bygrave and Timmons, 1992; Hellmann and Puri, 2000, 2002; Stuart et al., 1999; Ewens and Rhodes-Kropf, 2015; Chemmanur et al., 2011; Kerr et al., 2014; and Hsu, 2004).[7] The literature has also analyzed the increasing extent of internationalization of VC backed firms (Jeng and Wells, 2000; Wright et al., 2005; Aizenman and Kendall, 2012).[8]

Papers in the international VC area have analyzed how cultural, legal, and institutional distances between the country of the VC and that of the entrepreneurial firm can impact investment, success, and syndication strategies (Li et al., 2014; Dai et al., 2012; Guler and Guillen, 2010; Hazarika et al., 2013). Others have considered the role of geographic distance (Sorenson and Stuart, 2001; Dai et al., 2012; Cumming and Dai, 2010; Makela and Maula, 2008; Sorenson and Stuart, 2001; Tian, 2011). Studies have also analyzed how factors such as risk sharing and portfolio diversification are important in VC syndication outside the US (Manigart et al., 2006). We add to these studies by providing causal evidence on the contribution of international VCs to entrepreneurial firm success, and by relating the effective time required for travel by international venture capitalists to firm success.

[5] The venture capital industry is extremely sensitive to human capital and the skill of the venture capitalist. Consequently, even if VCs have local branch offices, frictions arising from lack of proximity will continue to exist as long as the VC general partners are located farther away from their portfolio firms.

[6] Cumming et al. (2014) is a contemporaneous working paper that looks at some aspects of international syndication similar to our paper. However, unlike our paper, they do not eliminate unobservable heterogeneity as a potential alternative explanation of their results. Further, unlike us, they do not analyze syndication propensities. Moreover, their tests do not incorporate post-IPO operating performance. Finally, unlike us, they do not explore the travel based channel through which geographic distance may affect monitoring of cross-border VC investments.

[7] Our paper is also related to the literature on the contracting of private equity deals in various countries (e.g., Bengtsson and Ravid, 2009; Kaplan et al., 2007; Lerner and Schoar, 2005; and Bottazzi et al., 2009).

[8] Our paper is also related to the broader literature on venture capital such as the literature on venture capital syndication (Lerner, 1994; Brander et al., 2002); venture capital staging (Gompers, 1995; Tian, 2011); the economics of entrepreneurship in the international context (Ghani et al., 2011); value addition by VCs and other private financiers (e.g., Fulghieri and Sevilir, 2009) and the effect of the availability of private financing to a firm on its going public decision and innovative activities (e.g., Spiegel and Tookes, 2008).

International VCs may have greater expertise in venture capital investing (particularly relative to local VCs in emerging nations). This may be due to their having greater experience in selecting high quality ventures to invest in (selection) as well as in helping such ventures to bring their projects to fruition (value-addition). In particular, venture capital requires significant input of the human capital of venture capitalists to select investments as well as to enhance the value of portfolio firms, and international VCs may have a greater stock of such human capital compared to local VCs.

During the selection stage, the expertise of the general partners of international VC firms may be in the form of greater experience in due-diligence process of early stage firms; a better understanding of the contractual terms that are appropriate for the level of development of a startup firm; a stronger ability to assess management teams of ventures in terms of their ability to start the firm, take their product or service to market, and to scale their business; and domain-specific or industry-specific expertise (e.g., high technology, biotechnology, and financial technology) which helps them assess the viability of the underlying product and business model.

During the post-investment monitoring, general partners of international VC firms may have expertise in terms of providing operational support (many VC partners are usually experienced entrepreneurs themselves) as well as access to networks that can be crucial in acquiring customers and suppliers. After investing, international VC firm general partners may engage in continuous monitoring by sitting on the board of the ventures that they back by providing feedback during board meetings and shareholder updates, evaluating and assessing the need to improve the management team at different stages of firm development, and providing operational improvements such as installing executive compensation systems that provide adequate incentives for management.

Lack of proximity, which makes it harder for international venture capitalists to reach the location of their portfolio firm, may, however, reduce the effectiveness of international VCs in selecting and monitoring their portfolio firms (Dai et al., 2012). In particular, it may make it harder for such VCs to monitor progress by attending board meetings, giving advice, and supporting the ongoing business operations of the firm (thus creating obstacles to effective monitoring). It may also make it harder for the general partners of the international VC firms to perform effective due-diligence, to assess management team capabilities, and to assess the viability of the business (thus creating obstacles to effective screening).

We note that there may be alternative mechanisms that may impact the performance of international VC backed ventures. For instance, cultural, legal, and institutional differences between the country of the VC and that of the entrepreneurial firm may also negatively impact the investment success of international VC backed firms (Li et al., 2014; Dai et al., 2012; Guler and Guillen, 2010; Hazarika et al., 2013). Our hypothesis H2 below will speak more to the actual mechanism that we test in our paper.

International VCs can overcome this proximity disadvantage by syndicating with local VCs who are more easily able to monitor their investments because they are closer to the portfolio firm. Moreover, local VCs are likely to be more knowledgeable about their local markets (Makela and Maula, 2008), institutions, and culture, and syndicating with them can help international VCs gain additional information. We expect entrepreneurial firms backed by syndicates of both international and local VCs to be the most successful, because they combine the proximity advantage of local VCs with the expertise advantage of international VCs. This would have a positive effect of successful outcomes of such investments in terms of exit likelihood. Furthermore, syndication strategies can impact firm value in the long run, which may be reflected in the performance of firms. Studies have found that the impact of VC backing can last beyond exit (Megginson and Weiss, 1991). If there is indeed a positive impact of local and international VC syndication in overcoming the proximity disadvantage of international VCs, then it will be reflected in post-IPO operating performance as well. Thus, we formulate the following hypothesis.

H1. *Entrepreneurial firms backed by syndicates of both international and local VCs are more successful than those backed by syndicates consisting of purely international VCs or purely local VCs, both in terms of exit likelihood and post-IPO operating performance.*

Giroud (2013) and Bernstein et al. (2016) find that travel time between location of the investing entity and that of the entity receiving investment can significantly impact investment strategy and performance. In particular, we conjecture that the primary effect of lack of proximity is in making it more difficult for international VCs to move scarce human assets (i.e., skilled venture capital partners), essential for screening and monitoring, to the location of the entrepreneurial firm. Thus, the availability of easier travel options mitigates the need of international VCs to syndicate with a local VC, and should increase the likelihood of success when international VCs invest on their own. Note, however, that cultural, legal, and institutional distances are not mitigated by ease of travel. As a result, our H2 speaks directly to the effect of geographic proximity on international VC investment success.

H2. *The availability of easier travel options impacts the likelihood of successful exit by firms backed by purely international VC syndicates more than those backed by syndicates consisting of local and international VCs.*

3. Data, sample selection, and construction of variables

We draw our original sample of venture capital backed firms from the VentureXpert database over the twenty year period from 1989 to 2008.[9] Prior to this period, there was almost no cross-border venture capital investment in emerging nations. We exclude buyouts and private equity investments from our sample. The VentureXpert database contains information about the nation of the VC as well as the nation of the entrepreneurial firm receiving venture financing which allows us to classify the VC as

[9] We end our sample in 2008 to leave sufficient time for firms to exit.

local or international. We exclude entrepreneurial firm nations with fewer than 10 venture capital backed entrepreneurial firms over the entire sample period in order to exclude outlier nations. The final sample includes 30,071 venture backed firms from 41 countries.

3.1. Summary statistics and description of variables

Panel A of Table 1 reports the country distribution of entrepreneurial firms based on the emerging nation classification of the country. Note that we exclude U.S. portfolio firms from our analyses as this market is considerably different and much more mature than that of other nations.[10] Moreover, expertise effect of international VCs, that we focus on in our study, is more likely to be important in nations that do not already have a strong VC industry like the U.S. Nations are classified as emerging or developed using the World Bank classification of high income nations. The World Bank classifies economies according to the GNI per capita, calculated using the World Bank Atlas method. According to this definition, high income nations are those that had a 2008 GNI per capita of $11,906 or more. We classify all high income nations (as defined above) as developed nations and non-high income nations as emerging nations.

Not surprisingly, the BRIC countries (Brazil, Russia, India, and China) constitute the largest share of venture capital backed entrepreneurial firms in emerging nations. India and China have the highest levels of venture capital investment with roughly 48% and 18% of the total emerging nation venture capital investments, respectively. Other emerging nations with significant venture capital investments are Poland, Thailand, and Malaysia. Among non-U.S. developed nations, the UK is the largest venture capital market having 17.89% of developed nation venture capital investments, South Korea (15.76%), France (9.04%), Canada (8.84%), and Australia (6.73%).

Panel B of Table 1 reports the summary statistics for our sample of venture capital backed firms. The *Local VC dummy* is one if only local VCs invest in the entrepreneurial firm in all rounds, and zero otherwise. A VC fund investing in an entrepreneurial firm is considered to be local if the office of the VC fund is located in the country of the entrepreneurial firm. A VC fund investing in an entrepreneurial firm is considered to be international if the fund's office is not located in the same country as the entrepreneurial firm. Thus, *Local and international VC dummy* is one if at least one local and one international VC invest in the entrepreneurial firm, and zero otherwise. The table indicates that local-international combination syndicates are more common for venture capital investments in developed nations, suggesting that investments by purely international VCs is more common in emerging nations (since purely international venture capital investment is the complement of the sum of the local and local-international dummies). This is consistent with the idea that emerging markets may not have many local investors with sufficient experience in venture capital investing, potentially since venture capital investing requires providing extra-financial support to the entrepreneurial firm such as management support, board monitoring, and development of relationships with customers and suppliers (e.g., Hellmann and Puri (2000) and Chemmanur et al. (2011)). *US VC dummy* and *UK VC dummy* are variables that are one if there is a US or a UK VC, respectively, investing in the entrepreneurial firm, and zero otherwise. We find that US and UK VCs are more likely to invest in entrepreneurial firms located in developed nations than those in emerging nations.

Panel B of Table 1 also provides data on *VC investment amount*, which is the total amount of venture capital financing received by a firm; *Number of VCs* which is the number of VCs investing in the firm; *VC age*, which is the average age of all VCs investing in the firm; and the *Number of rounds*, which is the number of venture capital financing rounds the firm obtains. *VC experience*, which is the average of the total number of prior VC investment rounds that venture capitalists investing in the portfolio firm have participated in. We find that, at the median, venture capital backed entrepreneurial firms in emerging nations get similar investment amounts, receive investments from similar number of VCs and younger VCs, and have similar number of investment rounds as venture capital backed firms in developed nations.

Given that our database is obtained from a North American company, a potential concern is whether our sample is representative of venture-backed firms in non-US countries, particularly emerging nations. We therefore compare the distribution of our sample relative to prior studies in the international venture capital and private equity literature. For instance, we compare the distribution of the number of emerging nation venture-backed firms in our sample to that reported in Lerner and Schoar (2005) (over the same set of countries and over a similar sample period as their sample). We find that the correlation between our distribution and theirs is 64%, which is statistically significant at the 5% level. In terms of developed nations, we compare our distribution of the dollar value of investments with that reported in Jeng and Wells (2000) and find a correlation of 72% which is statistically significant at the 1% level. These statistics suggest that our data does not undersample non-US developed and emerging nation VC-backed firms, thus mitigating concerns of potential sample selection biases in our data.[11]

Another concern may be that, due to more severe reporting biases in non-US countries, our sample of international investments has more successful investments in emerging nations than those in developed nations, particularly the US. However, sample statistics indicate that the average success rate for investments in emerging nations is the lowest (21.47%), followed by non-US developed nations (24.46%), and the US (35.37%). Thus, it is unlikely that our results are biased due to more successful

[10] In robustness checks, we have conducted our analyses for developed nations including U.S.-based entrepreneurial firms; and find qualitatively similar results as those reported here.

[11] In addition, we obtain the number of VC investments made between 2004 and 2008 in India from a database of Indian venture-backed firms called TSJ Venture Intelligence. Our sample of VentureXpert VC-backed firms from India over the same time period (i.e., 2004 to 2008) constitutes 82% of the number of Indian venture backed firms from TSJ Venture Intelligence. This provides additional support that our sample for emerging markets is representative (particularly for Indian VC-backed firms).

Table 1
Venture capital investments in emerging and developed nations.
Panel A of this table reports the distribution of venture capital financed firms by the entrepreneurial firm's nation. The frequencies and respective percentages are tabulated separately for emerging and developed nations. We categorize emerging nations as all non-high income nations and developed nations as all high income nations, as classified by the World Bank. Panel B reports summary statistics of important variables.

Panel A: country distribution of vc-backed firms

Emerging nations	Frequency	Percentage	Developed nations	Frequency	Percentage
Argentina	15	0.85	Australia	598	6.73
Brazil	152	8.65	Austria	70	0.79
China	324	18.44	Belgium	175	1.97
India	844	48.04	Canada	786	8.84
Indonesia	22	1.25	Czech Republic	30	0.34
Malaysia	77	4.38	Denmark	148	1.66
Nigeria	12	0.57	Finland	166	1.87
Philippines	20	1.14	France	804	9.04
Poland	80	4.55	Germany	530	5.96
Romania	34	1.94	Hong Kong	135	1.52
Russia	54	3.07	Hungary	58	0.65
South Africa	39	2.22	Iceland	13	0.15
Thailand	74	4.21	Ireland	182	2.05
Vietnam	12	0.68	Israel	383	4.31
			Italy	103	1.16
			Japan	425	4.78
			Luxembourg	18	0.2
			Netherlands	139	1.56
			New Zealand	72	0.81
			Norway	100	1.12
			Portugal	86	0.97
			Singapore	165	1.86
			South Korea	1401	15.76
			Spain	267	3
			Sweden	313	3.52
			Switzerland	133	1.5
			United Kingdom	1590	17.89

Panel B: summary statistics

		Emerging nations	Developed nations	Difference
Local VC dummy	Mean	0.498	0.477	0.021
Local and international VC dummy	Mean	0.161	0.307	−0.146***
US VC dummy	Mean	0.367	0.444	−0.077***
UK VC dummy	Mean	0.037	0.207	−0.170***
VC investment amount (thousands US$)	Mean	12,191.95	10,190.85	2001.10*
	Median	2179.00	2000.00	179.00
Number of VCs	Mean	1.596	2.064	−0.468***
	Median	1.000	1.000	0.000
VC age	Mean	6.537	7.722	−1.186***
	Median	5.333	7.000	−1.667***
VC experience	Mean	94.168	105.514	−11.346
	Median	14.500	19.000	4.500
Number of rounds	Mean	1.495	1.748	−0.253***
	Median	1.000	1.000	0.000
	Observations	1757	8890	

*** Represents statistical significance at the 1% level.
** Represents statistical significance at the 5% level.
* Represents statistical significance at the 10% level.

investments being over-represented in non-US countries, particularly in emerging nations. Rather, the rate of success in each country category is what one would expect given the sophistication of VC markets in those groups.

Finally, we consider the possibility that the VentureXpert database does not correctly record the investments of the VC from emerging nations, thereby biasing our syndicate classification towards "purely international." This can happen either by neglecting the investments of VCs from emerging markets, thereby misrepresenting the syndicate composition, or by neglecting investments in ventures by other types of investors that may not confirm to the U.S. definition of a venture capitalist. To deal with this possibility, we obtain similar data from a second data source, namely Capital IQ. In particular, for our sample period, and the set of countries in our sample, we obtain VC-backed investments from Capital IQ, and categorize investments as "local VC backed" if they have at least one local VC investor, as defined by Capital IQ. Capital IQ is a widely used database supported by Standard and Poors (S&P), which is a multi-national data and financial analytics firm. We then analyze which portfolio firm countries in the Capital IQ sample have significantly greater proportions of local VC backing compared to our sample. We then conduct our

baseline analyses excluding such potentially problematic countries.[12] We find that our results are similar to those reported here even after excluding these countries. Thus, we find that our results are not driven by the presence of such biases.[13]

3.2. Cultural, legal, and institutional distance measures

Prior literature (Li et al., 2014; Dai et al., 2012; Hazarika et al., 2013) find that cultural, legal, and institutional differences are important frictions in cross-border venture capital investments. However, these distance measures may have different effects than geographic distance. For instance, Dai et al. (2012) find that cultural distance is negatively related to the propensity of local-international VC syndication and attribute this to cultural differences making it harder to form partnerships. Similarly, while lack of local market knowledge and difficulty of monitoring because of lack of proximity can be overcome with local syndication, institutional differences as well as legal differences may be harder to overcome through syndication with local VCs. For instance, there may be a limit on the extent to which VCs are willing to give up control of the legal contracting to their local partners to take advantage of their knowledge of their own legal systems. Further, methods and protocols that international VCs may have devised over their years of experience may be specific to certain institutional system. Nevertheless, the question of whether these variables have an impact is ultimately an empirical one, which we test in our analyses.

We use *International VC cultural distance* as our proxy for cultural distance between the country of the entrepreneurial firm and that of the international VC. This measure, based on Hofstede (1980), uses four dimensions of cultural differences between countries; namely, power distance, individualism, masculinity, and uncertainty avoidance.[14] The cultural distance measure is then calculated as:

Cultural distance $= \frac{\sqrt{\sum_{i=1}^{4}(C_{VC,i}-C_{firm,i})^2}}{4}$, where

$C_{VC,i}$ is the cultural score on dimension i for the VC's country, and $C_{Firm,i}$ is the cultural score on dimension i for the entrepreneurial firm's country. The *International VC cultural distance* is thus measured as the average cultural distance of all international VCs investing in the firm.

Using data on legal origin from the CIA World Factbook, we define the *Legal distance* variable as a dummy variable that equals one if the legal origin (i.e., civil vs. common law) is different for the entrepreneurial firm's country from the country of at least one international VC that backs the firm. We provide two measures of institutional differences based on difference in market conditions. To measure institutional distance, we calculate *Difference in market cap to GDP*, which is the absolute difference in prior 5-year average stock market valuation to GDP between each of the international VC's home country and that of the entrepreneurial firm's home country. We also use another measure of institutional distance, *Difference in SD of market cap*, which is the absolute difference in the prior 5-year volatility of stock market valuation to GDP between each of the international VC's home country and that of the entrepreneurial firm's home country. If there are multiple international venture capitalists that invest in a particular entrepreneurial firm, then we use the average value of the above distance measures across all international VCs.[15]

3.3. Additional control variables

We also control our regressions for *Firm country prior VC investments*, which is the total number of prior VC investment rounds that have occurred in the country of the entrepreneurial firm; and for *VC Experience*, which is average of the total number of prior VC investment rounds that venture capitalists investing in the portfolio firm have participated in. In addition to the variables described in Table 1, we also control our regressions for the *Firm country GDP*, which is the GDP of the nation of the entrepreneurial firm obtaining venture capital financing; *Stock market development*, which is the stock market capitalization of the nation of the firm receiving venture capital financing; entrepreneurial firm country fixed effects to control for country specific characteristics such as legal structure (see, e.g., La Porta et al. (1997, 1998)); year of first round of venture capital financing fixed effects; industry fixed effects using VentureXpert industry classifications; and fixed effects for the firm development stage at the time of the first round of venture capital financing (i.e., early, late, startup/seed, expansion, or other).[16] We also include dummies for VCs being from US and UK, since VCs from these countries have the largest fraction of venture capital investments in the world, and may be better at adding value to their investments because of their significant experience.

[12] We define a country in our VentureXpert sample as a potential outlier (in the context of having too few local VCs) if the difference between our sample and the Capital IQ sample is more than 20%. Based on this definition, VC backed firms in Argentina, Philippines, Thailand, and South Africa are excluded in the robustness check analyses.

[13] We thank an anonymous referee for this suggestion.

[14] This measure has been used in the Management, International Business, and Psychology literatures extensively (see, e.g., Kirkman et al. (2006) and Chakrabarti et al. (2009)). Researchers have used the Hofstede measures to calibrate the different dimensions of a society's culture and then used the difference in these measures to capture the idea of "cultural distance."

[15] Various institutional aspects of a country such as the rule of law, political and social stability, regulatory quality, etc., will finally be reflected in the development of markets in a country. Further, this measure is of direct interest to VCs, since they only profit when they are able to exit their investments. Li et al. (2014) use an alternative definition of institutional difference using data from the World Governance Index. We also conduct our baseline analysis controlling for this variable. We find that our results continue to hold with this measure as a control variable as well.

[16] Data on stock market capitalization is obtained from Beck et al. (2000) and Beck et al. (2009). We are grateful to the authors for making this data available.

4. Empirical results

4.1. Syndication between local and international VCs, investment success, and performance

We conduct logit regressions to analyze the exit probability of venture capital backed firms through initial public offerings (IPOs) and acquisitions. In our analysis, we include all cross-border VC investments in our sample, regardless of syndicate structure type and exit status. Venture capital exit is the common metric of success used in the venture capital literature. Successful exits of portfolio firms are the primary value generator for VCs since, in most cases, they are the primary and most significant liquidity event during the time in which the VCs are invested in the firm. We obtain exit data from VentureXpert, SDC new issues (for IPO exits) and SDC Mergers and Acquisitions databases (for M&A exits).[17] Panel A of Table 2 reports the results of the logit regressions separately for emerging nations and developed nations (not including US).[18] Standard errors are clustered at the country level.[19] The observations for Table 2 include all firms in our sample, and the data is at the entrepreneurial firm level.

Columns (1) and (4) of Panel A of Table 2 report the results with any exit (IPO or acquisition) as the dependent variable, while Columns (2) and (5) of Panel A of Table 2 report the results with only IPO exits as the dependent variable.[20] We find that the coefficient on the *Local and international VC dummy* is positive and significant in all but one specifications. Using a Wald test, we also find that the coefficient of the *Local and international VC dummy* is significantly larger than that of the *Local VC dummy* (reported in the fourth to last column). Economically, combined investment by local and international VCs is associated with a 5.7 percentage point increase in the probability of exit in emerging nations. Thus, our results indicate that venture capital investments by local and international VCs dominate those by purely local or purely international VCs investing in emerging nations.

The test on the developed nations sample provides a useful comparison for the results for the emerging nations sample, given the lower expertise difference between international and local VCs for target firms in developed nations. The results are weaker for the sample of developed nations. While there is a positive relation between international and local VC syndication on overall exit, there is no relation with IPO exits in these countries. This result is not surprising given that the expertise difference between international VCs and VCs in the home country of the target firm is likely to be lower for the sample of developed nations. However, the positive impact on exits is likely reflective of the biggest and most successful VCs entering international markets, thus lead to a certain extent of greater expertise for international VCs compared to local VCs, even in developed nations.

We also find that investment amount and total number of investing VCs have a positive association with exit probability. Entrepreneurial country GDP at the first round of venture investment has a negative association with exit probability in emerging nations. Since we are controlling for entrepreneurial country fixed effects and year fixed effects, the GDP variable essentially captures the economic cycle of a particular country. This suggests that venture investments made during better times in the economic cycle of a country perform worse (i.e., have a lower probability of eventual successful exit).[21] We find that the Hofstede cultural distance measure is negatively related to the probability of successful exit of the entrepreneurial firm in Columns (1) and (2). Nevertheless, the local-international syndication dummy is positively significant even after controlling for the other distance measures.

Note that our international VC classification relies on the use of the country of the office of the VC fund. Thus, a potential concern is that our results may be biased due to the misclassification of VC firms having a local office (i.e., in the country of the entrepreneurial firm) as international VCs. To address this concern, we obtain data on all the funds of a VC firm and the countries in which these funds' offices are located. We then flag international VCs as having a local office if any of their non-investing funds has an office in the country of the entrepreneurial firm and has a first close date before the first round investment date for the entrepreneurial firm. For funds with missing close dates, we flag international VCs as having a local office if there is a fund in the entrepreneurial firm's country regardless of the close date (which is more conservative). In unreported tests, we run our regressions by dropping the observations where firms of funds that are classified as international in our sample have a local office. Another concern may be that our results may be biased due to VC classification based on fund instead of firm location. To alleviate this concern, we also exclude remove all observations where the classification of VCs as local or international would have changed if we switched from a fund based definition to a firm based definition. The results from these tests (unreported) are consistent with the findings in Panel A of Table 2, and show a positive and significant effect of having a local and an international VC in emerging markets. Thus, our results are not significantly affected by any potential misclassification of international VCs.

We also analyze the post-IPO operating performance of firms obtaining venture capital investments as an alternative measure of performance. Our dependent variable is the post-IPO operating income to assets of the entrepreneurial firm that obtained

[17] Our exit data reflects all exits till December 2014.

[18] While our analysis uses the entire dataset, we repeat the exit analysis using the set of firms that obtain their first round of venture capital financing prior to 2005 to ensure that our analysis is not biased by the venture investments that do not have sufficient time to mature and exit. Our results are qualitatively similar.

[19] We also conduct our analysis using the Bell and McCaffrey (2002) adjustment to standard errors, suggested by Angrist and Pischke (2009), which accounts for the number of clusters in our logit analyses, and find that our results are qualitatively similar to those reported here.

[20] Prior literature and practitioner data indicates that IPO exits are considerably more profitable for venture capitalists, on average, than a private sale of the entrepreneurial firm to an existing firm (e.g., Gompers (1995)).

[21] Consistent with this, when we run our analysis without the entrepreneurial country fixed effects, we find that the negative relation between GDP and exit does not exist. In other words, when our analysis does not account for between-country differences, we find that country GDP (which now also reflects cross-sectional variation in the economic development between various countries) is either positively related to exit probability or is statistically insignificant. In addition, when we replace GDP levels with GDP growth rates in the above regression (i.e., with country fixed effects), our results remain the same, i.e., GDP change at the time of the venture investment is negatively related to the probability of successful exit.

Table 2
Effect of international VC syndication on the probability of exit.
Panel A, Columns (1) and (3), and Panel B report logit regressions where the dependent variable is one if the entrepreneurial firm has a successful exit (i.e., IPO or M&A) and zero otherwise. Columns (2) and (5) of Panel A report logit regressions where the dependent variable is one only if the entrepreneurial firm has a successful IPO and zero otherwise. In Panel A, Columns 1, 2, and 3, and Panel B the regression sample is limited to emerging nations, while in Columns 4, 5, and 6 of Panel A the regression sample is limited to developed nations. Panel B controls for but does not report the coefficients for the following variables: *Int. VC cultural distance*, *Legal distance*, *Difference in market cap to GDP*, *SD of Difference in market cap to GDP*, *Firm country prior VC investments*, *Firm country GDP*, *Stock market development*, *VC experience*, *VC investment amount*, *Number of VCs*, *VC age*, *Number of rounds*, *US VC dummy*, and *UK VC dummy*. Columns 1, 2, 4, and 5 of Panel A and all columns of Panel B include fixed effects for the year of the first round of financing, financing stage at the first round of financing, the entrepreneurial firm's industry, and the entrepreneurial firm's nation. Panel A, Columns 3 and 6 report OLS regressions where the dependent variable is the post-IPO operating income to assets of the VC-backed firm. These columns include fixed effects for the year of the first round of VC investment, number of years from IPO year, IPO year, financing stage at the first round of financing, the entrepreneurial firm's industry, and the entrepreneurial firm's nation. All variables are described in Appendix A. Heteroskedasticity corrected robust standard errors, which are clustered on the firm's nation, are in brackets. The regressions are estimated with an intercept term.

Panel A

	(1)	(2)	(3)	(4)	(5)	(6)
	Emerging nations			Developed nations		
	All exits	IPO exits	Post-IPO operating performance	All exits	IPO exits	Post-IPO operating performance
Local VC dummy	−0.054	−0.043	−1.706***	−0.291**	−0.353	0.305**
	[0.257]	[0.238]	[0.079]	[0.122]	[0.284]	[0.131]
Local and international VC dummy	0.388***	0.882***	0.273***	0.208**	0.065	0.092
	[0.130]	[0.297]	[0.037]	[0.102]	[0.137]	[0.067]
Int. VC cultural distance	−0.036***	−0.050**	−0.065***	−0.003	−0.004	0.007
	[0.013]	[0.019]	[0.004]	[0.004]	[0.006]	[0.006]
Legal distance	0.266	1.383***	0.834***	−0.238**	−0.274*	−0.062
	[0.261]	[0.506]	[0.135]	[0.094]	[0.155]	[0.128]
Difference in market cap to GDP	−0.139	−0.000	−0.255***	0.018	0.206	0.121
	[0.160]	[0.001]	[0.085]	[0.091]	[0.218]	[0.106]
SD of Difference in market cap to GDP	0.493	0.000	2.218***	−0.781***	−0.497	−0.210
	[0.686]	[0.000]	[0.449]	[0.252]	[0.795]	[0.642]
Firm country prior VC investments	0.001*	0.398	−0.001***	0.000	0.000	0.000
	[0.000]	[0.282]	[0.000]	[0.000]	[0.000]	[0.000]
Firm country GDP	−2.091***	−2.251***	0.012	−0.887	0.038	−0.107
	[0.400]	[0.384]	[0.023]	[0.723]	[0.908]	[0.093]
Stock market development	−0.127	1.078***	−0.000	0.131	0.032	−0.001**
	[0.384]	[0.207]	[0.000]	[0.096]	[0.104]	[0.000]
VC experience	0.000	−0.327***	−0.000	0.000	0.000	0.000
	[0.000]	[0.109]	[0.000]	[0.000]	[0.000]	[0.000]
VC investment amount	0.231***	0.218***		0.259***	0.241***	
	[0.027]	[0.068]		[0.036]	[0.037]	
Number of VCs	0.109***	0.041	−0.261***	0.060*	0.063	−0.009
	[0.033]	[0.045]	[0.049]	[0.033]	[0.049]	[0.012]
VC age	−0.002	−0.002	−0.005***	0.005	0.000	0.002
	[0.030]	[0.037]	[0.001]	[0.013]	[0.019]	[0.008]
Number of rounds	0.020	0.126*	0.423***	−0.073***	−0.107***	−0.016
	[0.069]	[0.068]	[0.011]	[0.024]	[0.031]	[0.021]
US VC dummy	0.672*	0.807	−0.187	−0.130	−0.069	−0.076
	[0.356]	[0.498]	[0.128]	[0.101]	[0.196]	[0.088]
UK VC dummy	0.885***	1.290***	1.980***	0.191*	0.174	−0.007
	[0.197]	[0.158]	[0.299]	[0.106]	[0.186]	[0.071]
Assets			−0.020			0.082***
			[0.048]			[0.015]
Local and international VC dummy − Local VC dummy	0.441*	0.924**	1.979***	0.500***	0.418*	−0.055
Observations	1757	1713	150	8890	8693	527
Pseudo R-sq	0.136	0.189		0.123	0.161	
Adjusted R-sq			0.337			0.399

Panel B

	(1)	(2)
	Emerging nations	
Local VC dummy	−0.081	−0.096
	[0.260]	[0.265]
Local and international VC dummy	0.585***	
	[0.180]	
Local and international VC dummy × Round no. of international VC entry	−0.158*	
	[0.083]	
Local and Int. VC dummy × *Int. VC* enters at round 1		0.455***

(continued on next page)

Table 2 *(continued)*

Panel B		
	(1)	(2)
	Emerging nations	
		[0.144]
Local and Int. VC dummy × *Int. VC* enters at round 2		−0.025
		[0.249]
Local and Int. VC dummy × *Int. VC* enters at round 3 or higher		0.232
		[0.314]
Controls	Yes	Yes
Local and international VC dummy − *Local VC dummy*	0.665*	
	[0.344]	
Observations	1757	1757
Pseudo R-sq	0.136	0.136

*** Represents statistical significance at the 1% level.
** Represents statistical significance at the 5% level.
* Represents statistical significance at the 10% level.

venture capital financing and went public in their local markets (we restrict our analysis to four years after the IPO date). Thus, we now have a panel data at the firm-year level for firms that go public. We obtain our data on operating performance from various data-sources including the Bureau Van Dijk's Osiris, Global Compustat, and CMIE Prowess databases. Since only a subset of entrepreneurial firms actually exit through IPOs, and since not all entrepreneurial firms exiting through IPOs have data in our data sources (data had to be hand-matched to the various data sources using firm names), the sample for this analysis is significantly smaller than the sample used in previous analyses.

Columns (3) and (6) of Panel A of Table 2 report OLS regressions of the post-IPO operating performance on the independent variables similar to those in the exit regressions. To control for entrepreneurial firm size, we use lagged value of assets, which is the one year prior value of log of the assets of the entrepreneurial firm in US Dollars. We also control for dummy variables for IPO year, year of the first round of venture capital financing, and the number of years between the IPO and VC financing.

We find that our results mirror the exit results, i.e., syndicates composed of both international and local VCs in emerging nations are associated with a 27 percentage point increase in post-IPO operating performance of the entrepreneurial firms they back. Further, the coefficient on the *Local and international VC dummy* is significantly different from that on the *Local VC* dummy. Thus, the combination of local VCs' location-specific skills and proximity advantage and international VCs' venture capital skills has a long-lived impact on the entrepreneurial firm. Note that there is no statistically significant difference between the *Local and international VC dummy* and the *Local VC dummy* in the sample of developed nations, consistent with a lower extent of expertise difference between international VCs and local VCs in developed markets.

Overall, consistent with hypothesis (H1), we find that firms backed by international and local VCs experience higher exit rates and post-IPO operating performance in emerging nations, suggesting that the skills and expertise of local VCs and international VCs can complement each other (particularly in emerging nations).

4.2. The timing of international VC investments

We also explore whether our results from Panel A of Table 2 are driven by international VC expertise and not due to a "deep pockets" concern wherein international VCs enter later in more successful deals. Thus, we interact our *Local and International VC dummy* with the round number at which the international VCs invest in the portfolio firm.[22] In Column (1) of Panel B of Table 2, we show our results for emerging nations. We focus on emerging nations since we show that our exit and operating performance results are stronger primarily in the sample of emerging nations from Panel A. Moreover, an expertise argument for international VCs is likely to be more relevant for emerging nations, since local VCs are less likely to have significant experience in the VC market. We find, from Column (1) of Panel B in Table 2, that the impact of local-international syndication on exit success is positive, as before. Moreover, the negative coefficient estimate on the interaction term suggests that the positive relation between local-international syndication and exit likelihood is driven by the international VCs investing in earlier rounds.

In Column (2) of Panel B of Table 3, we interact *Local and International VC dummy* with dummy variables for whether or not the international VC invested in the first round, second round, or third round and beyond. Similar to the results in Column (1), we find that the positive relation between local-international syndication and exit likelihood is driven by the international VCs investing in the first round.[23] Thus, the results in this section are consistent with hypothesis (H1) and not consistent with a "deep pockets" hypothesis.

[22] We are grateful to an anonymous referee for suggesting this test.

[23] In unreported tests, we also use the year of the VC investment, defined as year 1 in the year of the first round of financing, year 2 in the next year, and so on. We then conduct regressions based on international VC investment year similar to those in Columns (1) and (2) and report it in Columns (3) and (4). We find, consistent with our previous results, that the positive relation between local-international syndication and exit likelihood is driven by the international VCs investing in earlier years (relative to the first round of financing).

Table 3
The causal effect of international venture capitalist syndication on the probability of exit in emerging nations: IV analysis.
This table reports the results of bivariate probit estimations for VC-backed firms in emerging nations. The dependent variable in Columns (1) and (2) are, respectively, *Intl. VC dummy*, which is a dummy variable which equals one if all venture capitalists investing in the firm are located in a different nation than the entrepreneurial firm, and zero otherwise; and a dummy variable for successful exit (i.e., IPO or M&A). The dependent variables in Columns (3) and (4) are, respectively, *Local and intl. VC dummy*, which is a dummy variable which equals one if at least one venture capitalist investing in the entrepreneurial firm is located in the same country as the entrepreneurial firm and at least one investing venture capitalist is located outside the entrepreneurial firm's country, and zero otherwise; and a dummy variable for successful exit (i.e., IPO or M&A). Fixed effects are included for the year of the first round of financing, financing stage at the first round of financing, the entrepreneurial firm's industry, and the entrepreneurial firm's nation. All variables are described in Appendix A. Heteroskedasticity corrected robust standard errors, which are clustered on the firm's nation, are in brackets. The regressions are estimated with an intercept term.

	(1)	(2)	(3)	(4)
	Intl. VC dummy	Exit	*Local & Intl. VC dummy*	Exit
Local and international VC dummy				0.469**
				[0.198]
International VC dummy		0.285*		
		[0.172]		
Low foreign inv./own. regulation	0.129		−0.410**	
	[0.147]		[0.178]	
Low capital controls	0.285***		−0.053	
	[0.103]		[0.372]	
Int. VC Cultural distance		−0.024***	0.080***	−0.023***
		[0.007]	[0.028]	[0.008]
Legal distance		0.171	−0.320	0.204
		[0.136]	[0.262]	[0.166]
Difference in market cap to GDP		−0.080	0.338***	−0.081
		[0.105]	[0.063]	[0.092]
SD of difference in market cap to GDP		0.325	1.110***	0.376
		[0.417]	[0.183]	[0.433]
Firm country prior VC investments	0.002***	0.000	0.000	0.000
	[0.001]	[0.000]	[0.001]	[0.000]
Firm country GDP	1.402***	−1.237***	1.585***	−1.350***
	[0.419]	[0.268]	[0.283]	[0.282]
Stock market development	−0.453	0.001	−0.623	0.061
	[0.404]	[0.244]	[0.477]	[0.204]
VC experience	0.002***	0.000	−0.000***	0.000
	[0.000]	[0.000]	[0.000]	[0.000]
VC investment amount	0.171***	0.118***	−0.063**	0.134***
	[0.054]	[0.014]	[0.028]	[0.014]
Number of VCs	1.324***	0.072***	0.421***	0.041*
	[0.107]	[0.022]	[0.115]	[0.022]
VC age	0.070***	−0.005	−0.039**	0.000
	[0.009]	[0.016]	[0.015]	[0.016]
Number of rounds	−0.260***	0.050	0.069**	0.040
	[0.097]	[0.038]	[0.029]	[0.038]
US VC dummy		0.404*	0.611***	0.340
		[0.211]	[0.184]	[0.230]
UK VC dummy		0.510***	0.096	0.501***
		[0.120]	[0.167]	[0.124]
Observations	1622	1622	1622	1622
Prob. > Chi sq.	0.000***		0.000***	

*** Represents statistical significance at the 1% level.
** Represents statistical significance at the 5% level.
* Represents statistical significance at the 10% level.

4.3. Controlling for selection and endogeneity: instrumental variables analysis

4.3.1. Endogeneity of international VC participation: instrumental variables analysis

An important concern about our syndication results is whether international VCs actually add value to their investments or whether they simply select higher quality entrepreneurial firms (that are more likely to succeed) or more able local VC partners. In particular, there may be unobservable factors that affect both the likelihood of investment by international VCs in an entrepreneurial firm as well as the probability of a successful outcome of the investment. Thus, we use an instrumental variables approach to establish the causal effect of international VC backing on investment success. Given that our dependent variable is categorical (exit probability), standard two-stage methods are not sufficient to address this concern. Rather, we use the fact that the likelihood function of a bivariate probit model can be used to estimate models with binary dependent variables and endogenous binary variables (see, e.g., Greene (2003), p. 715).

We use two instruments for this purpose.[24] The first instrument we use is the extent of foreign ownership and investment regulations that restrict investments by international investors in a country or limits their ownership stakes in an investment. Such regulations may either prevent an international VC from investing in a country or require them to co-invest with local VCs. The second instrument is the extent of capital market controls placed by a country which may restrict the ability of international VCs to invest in a country. The data for these variables comes from the data in World Economic Forum Global Competitiveness reports and the International Monetary Fund annual reports on exchange arrangements and exchange restrictions (compiled and aggregated in the 2009 Economic Freedom of the World Annual Report). We create dummy variables which are one if the country has higher than median ratings for foreign investment and ownership regulations and capital market controls (higher ratings imply less restrictive regulations), and zero otherwise.[25]

In our analysis, we control for country fixed effects, the entrepreneurial *Firm country GDP*, the entrepreneurial firm country *Stock market development*, and the *Firm country prior VC investments* to control for the overall economic development of the entrepreneurial firm's country. Thus, it is unlikely that the above instruments reflect the effect of macroeconomic factors on the success probability of any individual firm that the VC invests in. A related concern is that international VCs may invest in countries that are expected to grow in the future and such countries are more likely to open up international investments. To allay this concern, we also run the regressions reported here with the GDP averaged over the three years after the VC investment, as well as the level of GDP in one, two, and three years after the VC investment. Our results continue to hold even after controlling for the growth in the economy of a country after the VC investment, indicating that anticipated economic growth does not invalidate our exclusion restriction.[26]

The dependent variables in the bivariate probit model are thus: the propensity of investment by an international VC and the propensity of exit. Further, since our instruments do not exhibit significant variation in developed nations, we restrict our analysis to our sample of emerging nations, and as in Table 2, the data is at the entrepreneurial firm level. Columns (1) and (2) of Table 3 report the results of this analysis. The *Low capital control* instrument is significantly and positively related to the propensity of being backed by international VCs.[27] In addition, the correlation between the error terms of the two equations is statistically significant, suggesting that there are unobservable factors that determine investment by international VCs and also affect the outcome of their investments. However, even after accounting for such unobservable factors, there is a positive causal effect of participation by international VCs on the propensity of entrepreneurial firms to succeed.

4.3.2. Endogeneity in the syndication choice of international VCs: instrumental variables analysis

We also specifically address the concern that the syndication choice of international VCs in a country (i.e., the choice to invest alone or to syndicate with a local VC) may be endogenous. In particular, the choice of an international VC to co-invest with a local VC may be correlated with unknown factors that may also predict the success of the entrepreneurial firm. Thus, we analyze the extent of success of international and local syndicates by instrumenting the choice of syndication of the international VC with a local VC.

We use the same instruments as in the previous section. We expect that restrictions on foreign ownership and investments as well as capital controls will increase the need for international VCs to syndicate with local VCs, and increase the opportunity for local VCs to syndicate with international VCs. Columns (3) and (4) of Table 3 report the results of this analysis. We find that, after controlling for any potential endogeneity in the syndication choice of international VCs, entrepreneurial firms backed by syndicates of local and international VCs in emerging nations are more likely to experience successful exits than those backed by purely international VC syndicates and those backed by purely local VCs. As expected, the *Low foreign investment/ownership regulation* instrument is negatively and significantly related to the propensity of co-syndicating with local VCs.

4.4. International VCs and proximity: natural experiment using bilateral air service agreements

We analyze whether an exogenous shift in "effective" proximity in the form of more and easier travel options can affect exit outcomes of syndicates backed by international VCs. The underlying logic here is that faster and easier travel options between the country of the VC and that of the entrepreneurial firm can facilitate monitoring by international VCs. We use the establishment of air service agreements (ASAs) between countries in our sample to proxy for the ease of travel. Various countries established

[24] Maddala (1983) (p. 120 & 123) argues that, to identify this system, we need an exogenous variation in the binary endogenous variable (i.e., international VC participation) that does not affect exit probability.

[25] The data in the Economic Freedom of the World annual report are created as rating variables from 1 to 10 where 1 represents the most restrictive and 10 represents the least restrictive regulatory regime. We do not expect the individual ratings changes to linearly impact the ability of international venture capitalists to invest in a firm, and thus use a binary version of the instruments.

[26] We also carefully examine whether our instruments have sufficient time variation to be valid instruments (since we control for country fixed effects) and find that the extent of time series variation in these instruments is substantial and as much, if not greater than, the cross-sectional variation. In particular, we decompose the variation in each instrument (call it x_{it}, where i indexes country and t indexes time) into cross-sectional ($\bar{x}_i$) and time-series ($x_{it} - \bar{x}_i + \bar{\bar{x}}$) components, the global mean $\bar{\bar{x}}$ being added back in make results comparable. We find that, for the low capital control dummy, the cross-sectional standard deviation is 0.338 and the time-series standard deviation is 0.403. Further, for the low ownership or investment regulation dummy, the cross-sectional standard deviation is 0.342 and the time-series variation is 0.404. Thus, we have substantial time-series (or within-country) variation in our instruments to identify the system.

[27] Since the US and UK VC dummy variables predict success perfectly in the first stage (i.e., participation by international venture capitalists), we exclude them from the first stage regression in specification (1). Unlike a two stage least squares model, the ML bivariate probit model allows us to exclude certain exogenous variables in the first stage.

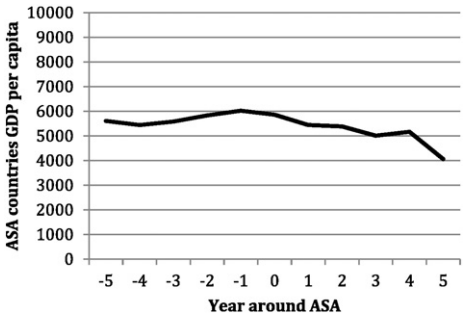

Fig. 1. Country median GDP per capita dynamics around air service agreements.

bilateral air service agreements during our sample period, which helped facilitate expansion of faster, easier, and cheaper travel options between those countries.[28] We obtain data on the date of ASAs from various government websites of the countries in our sample and news articles.[29]

An important advantage of using such bilateral agreements is that their timing is made exogenous due to the politics and bureaucracy involved in the negotiation of such treaties. Fig. 1 reports median country GDP per capita during the period from five years before and to five years after ASA agreements, with zero being the year of the ASA. From this figure, we see that, prior to the signing of the ASA, there is no significant increase in the GDP per capita for countries that sign ASAs. Thus, it is unlikely that countries experiencing substantial growth are more likely to sign ASAs. Further, after the signing of the ASAs, there is no significant increase in the GDP of ASA signing countries. Thus, it is unlikely that ASAs were signed based on unobservable information that predicts better outcomes for ASA signatory countries.[30]

We select a sample for this analysis that keeps the choice of investment by international VCs exogenous to the liberalization of travel between the country of the international VC and that of the entrepreneurial firm. In particular, we take the set of venture rounds that either had only local VC investments, or had international VC investments and no bilateral ASA between the country of the entrepreneurial firm and that of the international VC, or had international VC investments and the ASA between the country of the international VC and that of the entrepreneurial firm was signed within a three year period after the international VC investment.[31] For this subsample, we can reasonably characterize the investment by international VCs as exogenous to the signing of the ASA. To obtain plausible exogeneity of VC investment strategy, we analyze the impact of air services agreements *after* the international VC has invested in the firm. Since the international VC investment can happen at any round, we need to pinpoint the exact time of the international VC investment, which requires us to conduct our analysis at the round level. Thus, the analysis in Table 4, which reports to results of this test, is for the sample of VC-backed firms in both emerging and developed countries and the data is at the entrepreneurial firm-round level.

The analysis is designed to test how the performance of international VC backed firms changes in countries that sign an ASA after the international VC investment relative to countries that do not sign an ASA with the country of the international VC. Thus, we conduct our logit exit regressions with an interaction term between a dummy variable for the establishment of an ASA between the country of the international VC and that of the entrepreneurial firm (*ASA*) and the *International VC dummy*. The base case in these regressions is the *Local VC dummy*. We also include *ASA* by itself. If international VCs indeed face costs that are related to the lack of geographic proximity, we expect to see that international VCs will perform better if an ASA is signed after they invest in the entrepreneurial firm. The results of this analysis are reported in Table 4 and are consistent with expectation. The interaction term between the *International VC dummy* and *ASA* is positive and statistically significant in the emerging nations sample (but not in the developed nation sample). This is consistent with ASAs enhancing the effectiveness of international VCs by reducing their proximity disadvantage.

A potential source of concern with our identification method here may be that an ASA is signed with the country of the entrepreneurial firm if that country is expected to have significant improvement in economic performance (thus affecting VC-backed firm exit rates). However, if this effect were driving our result, then we should see that the signing of an ASA is also positively related to exits for local and international VC backed firms (as opposed to just for purely international

[28] Such bilateral treaties can increase travel options by allowing direct travel between the two countries, increasing the number of landing points in a country by an airline of the other country, deregulating the number of seats or flights that can be operated between two countries, deregulating fare restrictions for flights between the two countries, and deregulating ownership and other operational restrictions (e.g. code sharing, various "doing business" issues such as repatriation of currencies, the ability to select handling agents at foreign airports, and the use of computer reservations systems). Piermartini and Rousova (2013) find a positive effect of air liberalization through ASAs on passenger traffic, supporting our identification strategy.

[29] A report commissioned by the air trade group International Air Transport Association (IATA) finds that liberalization of ASAs have "generally fostered greater competition, resulting in lower fares for travellers, greater numbers of people travelling, greater choice of airlines and routes and improved service levels (higher frequencies, etc.)."

[30] In general, air services agreements are not parts of trade treaties. Further, if air agreements are part of trade treaties, they are very limited in scope. For instance, the U.S. Department of Transportation website mentions that, "… For the most part, air services are excluded from U.S. trade agreements. When air services are included, they scope of coverage is very limited." See, http://www.dot.gov/policy/aviation-policy/international-relations/air-service-agreements#sthash.dbZUPjeZ.dpuf, accessed, 5/11/2015.

[31] We also conduct this analysis using a two year cutoff and our results are qualitatively similar to those reported here.

Table 4
Effect of international VC proximity on the probability of exit – ASA as a natural experiment.
This table reports the results of logit estimations with a dummy as the dependent variable, which equals one if the entrepreneurial firm has a successful exit (i.e., IPO or M&A) and zero otherwise. Each observation represents a unique firm round. Fixed effects are included for the year of round of financing, financing stage at the round of financing, the entrepreneurial firm's industry, and the entrepreneurial firm's nation. All variables are described in Appendix A. The regression is separately estimated for investments in emerging nations and developed nations. Heteroskedasticity corrected robust standard errors, which are clustered on the firm's nation, are in brackets. The regressions are estimated with an intercept term.

	(1)	(2)
	Emerging nations	Developed nations
Local and international VC dummy	0.690	0.176*
	[0.588]	[0.096]
International VC dummy	0.143	0.202**
	[0.441]	[0.100]
International VC dummy × ASA	10.994***	0.095
	[1.280]	[0.843]
ASA	−10.121***	0.493
	[1.054]	[0.943]
Int. VC Cultural distance	−0.056***	−0.009
	[0.017]	[0.006]
Legal distance	0.424	−0.145
	[0.312]	[0.118]
Difference in market cap to GDP	−0.287	0.055
	[0.294]	[0.079]
SD of Difference in market cap to GDP	0.890	−0.593**
	[0.856]	[0.247]
Firm country prior VC investments	0.001*	0.000
	[0.001]	[0.000]
VC experience	−0.000	−0.000
	[0.000]	[0.000]
VC investment amount	0.267***	0.281***
	[0.065]	[0.028]
Firm country GDP	−1.744***	−0.266
	[0.558]	[0.660]
Stock market development	−0.997**	−0.117
	[0.505]	[0.213]
Number of VCs	0.200***	0.094***
	[0.077]	[0.033]
VC age	0.008	0.015
	[0.049]	[0.009]
Round number	0.072	0.012
	[0.135]	[0.043]
US VC dummy	0.347	−0.085
	[0.517]	[0.103]
UK VC dummy	1.009***	0.190*
	[0.339]	[0.102]
Observations	1763	10,605
Pseudo R-sq	0.172	0.124

*** Represents statistical significance at the 1% level.
** Represents statistical significance at the 5% level.
* Represents statistical significance at the 10% level.

VC backed firms). In unreported results, we interact ASA with *Local and International VC dummy* and do not find a significant effect on this interaction term. Rather, it supports the plausible exogeneity of our instrument.[32] Thus, the results in this section support the idea that international VCs' lack of proximity is an important disadvantage that drives them to choose local syndication. When barriers to travel decrease exogenously, international VC backed investments are more likely to be successful, consistent with hypothesis (H2).

4.5. Endogeneity of international VC participation: natural experiment

As an alternative to our instrumental variables analyses, we use terror activities in India as natural experiments to establish the causal impact of international VC participation on entrepreneurial firm exit rates.[33] In our sample of emerging nations, India has

[32] To further alleviate this concern, we also run the regressions reported here with the GDP averaged over the three years after the VC investment, as well as the level of GDP in one, two, and three years after the VC investment (unreported). Our results continue to hold even after controlling for the growth in the economy of a country after the VC investment. These results are available from the authors upon request.
[33] While not directly speaking to syndication effects, this test provides additional validation of the assertion that international VCs have an expertise effect which is eventually reflected in the exit of portfolio firms.

the largest extent of venture capital investments and also has a history of significant terrorist activity.[34] Thus, we use four terror attacks on major Indian cities: one on New Delhi (on October 29, 2005), and three on Mumbai (on March 12, 1993; August 25, 2003; and July 11, 2006), each of which had greater than 50 casualties, as natural experiments to assess the effect of international VC participation on entrepreneurial firm success rates. We focus on these events because relatively large attacks on major cities in a country are likely to have the greatest impact on foreign investment and receive wider media coverage. However, these events did not substantially impact the overall economic activity in India. In fact, in the years following each of these attacks, India's real GDP per capita increased. This provides support to our identification strategy since these attacks did not seem to substantially affect long-term domestic economic activity.

To further sharpen our identification, we restrict our sample to venture-backed firms getting their first round of financing in the time period between six months prior to the attack dates and seven months after the attack dates. We thus keep entrepreneurial firm level data from all countries in this analysis. The sample period restriction ensures that macroeconomic factors that affect the success of entrepreneurial firms at the time of venture capital financing are similar before and after the attack periods. We thus define a post-attack dummy variable as one for the six month period starting one month after the attack date. We add a one month buffer period since venture deals already in place or close to finalizing are likely to get funding even in the immediate aftermath of terror attacks.[35] ,[36]

We conduct our exit analysis in a differences-in-differences setting by using the *Post-attack period dummy* and the interaction between the *Post-attack period dummy* and the *India city dummy* as independent variables in our exit regressions. The *India city dummy* is one if the entrepreneurial firm is located in a city in India that experiences a terror attack, and zero otherwise. We control for city fixed effects in our estimations, so the *India city dummy* is present in the regression by itself as well. Further, in order to control for any changes in the demand for venture capital, we also include a control variable that measures the change in the number of firms obtaining venture capital financing in each city from before to after the terror-attack period. As before, we include fixed effects for the stage of financing, year of first stage of VC financing, and the industry of the portfolio firm.

In Columns (1), (2), and (3) of Table 5, we keep all VC deals in India around the time of the terror attacks. Thus, the control group in our sample is the set of all cities other than the cities that experience terror attacks in the time period immediately before the terror attacks in India. Given the empirical evidence in the literature mentioned above (that international investor participation decreases after terror attacks), we expect that entrepreneurial firms receiving venture capital financing in the immediate post-terror attack period in affected Indian cities will have a lower chance of success. In Column (2) of Table 5, we find results that are consistent with this expectation: the *Post-attack period dummy* interacted with the *India city dummy* has a negative and significant coefficient estimate. Further, in order to assess whether our identifying assumption is valid, we conduct a logit analysis of international venture capital participation using the *Post-attack period dummy* and the interaction between the *Post-attack period dummy* and the *India city dummy* as independent variables. Consistent with our expectations, we find, in Column (1) of Table 5, that the *Post-attack period dummy* interacted with the *India city dummy* is negatively associated with international VC participation.

We also test whether the decrease in exits related to terror attacks in India is greater in industries that are more dependent on international VC participation. We define dummy variable for industries with high international VC participation if, in the prior five years in a given industry and country (India in this case), the fraction of VC deals getting international VC investments is greater than the sample median. If terror attacks in Indian cities indeed affect successful exit outcomes by diminishing international VC participation, then industries with greater dependence on international venture capital should be more affected by such attacks. We find that this is indeed the case. In Column (3) of Table 5, the coefficient on the triple interaction term is negative and statistically significant. This supports the idea that the negative relation between terror attacks in India and exit rates is, in large part, driven by industries that depend to a greater extent on international VC participation.

We also conduct country level analyses by pooling all countries in our sample. This test analyzes the differences between India and other countries before and after terror attacks take place in India. This test, while not as granular as the city level tests reported above, has the benefit of greater statistical power. The results these country level differences-in-differences tests, reported in Columns (4), (5), and (6) of Table 5, are similar to those reported above. We use country fixed effects in these estimations. In particular, international VCs are less likely to invest in India subsequent to a terror attack, relative to other countries. Further, VC investments in India subsequent to an attack are less successful and such decline in success is driven by industries that depend more on international VC financing.

Our exclusion restriction assumption may not work if the quality of firms that seek venture capital financing is lower immediately after terror attacks in India. It is possible that higher quality entrepreneurial firms may feel that international VCs are better at screening them (i.e., understanding that they are indeed of higher quality) and thus stop seeking venture funding until the

[34] Prior literature has found that terrorist activity has a negative effect on foreign direct investment (e.g., Enders and Sandler (1996); Abadie and Gardeazabal (2008)). Abadie and Gardeazabal (2008) argue that terror attacks reduce international investment by increasing uncertainty. Further, corporate investors rate terrorism as an important factor in their decision to invest abroad (e.g. A.T. Kearney (2004)).

[35] An anecdotal example is that of Endeca Technologies, which negotiated its series C financing just before the terror attacks of September 11, 2001. The deal closed right after the attacks without any major setbacks. See HBS case on Endeca Technologies for details.

[36] Our results do not change qualitatively if we classify the post-attack period immediately after the attack date. Further, our results are similar if we use three months, eight months, or one year cut-off dates.

Table 5
The causal effect of international venture capitalist syndication on the probability of exit: terror attacks as a natural experiment.
This table reports the results of logit estimations where the dependent variable in Columns (1) and (4) is *Intl. VC dummy*, and the dependent variable in Columns (2), (3), (5) and (6) is the dummy variable for successful exit (i.e., IPO or M&A).

	Cross-city analysis (within India)			Cross-country analysis		
	(1)	(2)	(3)	(4)	(5)	(6)
	Int. VC participation	Exit	Exit	Int. VC participation	Exit	Exit
*Post-attack period * India city*	−3.203**	−7.054***	1.701			
	[1.581]	[1.775]	[4.287]			
*Post-attack period * India city * Industry with high Intl. VC part.*			−8.570*			
			[5.146]			
*Post-attack period * India*				−0.784**	−0.763***	−0.560***
				[0.311]	[0.056]	[0.090]
*Post-attack period * India * Industry with high Intl. VC part.*						−0.169*
						[0.089]
Post-attack period	1.187	−1.140	−19.604***	0.074	−0.027	0.023
	[1.002]	[1.216]	[4.520]	[0.081]	[0.060]	[0.046]
*Post-attack period * Industry with high Intl. VC participation*			18.557***			−0.299*
			[4.034]			[0.158]
Industry with high Intl. VC participation			2.610			0.264**
			[2.872]			[0.108]
Change in number of deals	0.079	0.327	0.371	−0.004***	0.002	0.002
	[0.286]	[0.305]	[0.317]	[0.001]	[0.001]	[0.001]
Int. VC Cultural distance		−0.351**	−0.340**		−0.003	−0.003
		[0.152]	[0.149]		[0.006]	[0.005]
Legal distance		−3.505	−4.086		0.049	0.050
		[4.832]	[5.068]		[0.109]	[0.109]
Difference in market cap to GDP		−4.421**	−5.043**		−0.054	−0.057
		[1.823]	[2.279]		[0.085]	[0.086]
SD of Difference in market cap to GDP		19.226***	21.900**		0.527	0.528
		[6.727]	[9.218]		[0.375]	[0.374]
Firm country prior VC investments				0.000	0.000	−0.000
				[0.000]	[0.000]	[0.000]
Firm country GDP				−0.403***	−0.932***	−0.926***
				[0.114]	[0.192]	[0.193]
Stock market development				−0.042	0.272***	0.280***
				[0.227]	[0.098]	[0.099]
VC experience	0.004*	−0.003*	−0.003	−0.001***	0.000	0.000
	[0.002]	[0.002]	[0.002]	[0.000]	[0.000]	[0.000]
VC investment amount	0.682**	1.056**	1.317**	0.233***	0.357***	0.357***
	[0.340]	[0.524]	[0.603]	[0.036]	[0.030]	[0.030]
Number of VCs	2.541**	−0.075	−0.250	0.286***	0.039***	0.039***
	[1.087]	[0.320]	[0.313]	[0.013]	[0.009]	[0.009]
VC age	0.085	−0.201***	−0.221**	0.010	−0.007	−0.007
	[0.093]	[0.077]	[0.097]	[0.010]	[0.008]	[0.008]
Number of rounds	0.553	0.388	0.330	−0.020*	−0.075***	−0.075***
	[0.905]	[0.648]	[0.747]	[0.011]	[0.016]	[0.015]
US VC dummy		8.287**	8.322**	4.495***	0.209	0.216
		[3.296]	[3.340]	[1.740]	[0.145]	[0.145]
UK VC dummy		6.290***	5.747***	3.025**	0.270	0.270
		[2.266]	[1.810]	[1.331]	[0.167]	[0.166]
Observations	112	98	98	4770	4680	4680
Pseudo R-sq	0.577	0.543	0.562	0.471	0.117	0.118

*** Represents statistical significance at the 1% level.
** Represents statistical significance at the 5% level.
* Represents statistical significance at the 10% level.

point that international VCs re-enter the market after the terror attacks.[37] To address this, we control for the change in the number of firms getting venture capital from before to after the terror attack period in our regressions. We do not find that the change in number of firms receiving venture capital financing removes the effect of terror attacks on entrepreneurial firm success. We also do not find that the number of entrepreneurial firms getting financing is significantly lower from immediately before to

[37] Another possibility is that higher quality entrepreneurial firms may feel that international VCs can add more value (i.e., a monitoring effect) and thus stop seeking venture financing if international VCs are less willing to participate in the aftermath of terror attacks. However, since this concedes our argument of causality of international venture backing on performance, it is not damaging to our interpretation.

immediately after the terror attack periods in India within our short window around the terror attacks. Thus, it is unlikely that our results are explained by entrepreneurial firms dropping out of the pool of firms seeking venture financing.[38]

In summary, our results provide support to the conjecture that international VCs have a causal impact on the success of entrepreneurial firms that they back. We approach the question of endogeneity of international VC participation using two different identification strategies and find similar results.

4.6. Additional robustness checks

4.6.1. Proximity effect using geographic distance

To provide additional evidence of a proximity disadvantage for international VCs, we analyze whether the syndication of international VCs with local VCs is indeed more valuable when international VCs are located geographically farther away from the entrepreneurial firm that they back. We conduct our logit exit regressions using the sample of firms with at least one international VC investing in the entrepreneurial firm, with the data at the entrepreneurial firm level for both emerging and developed nations in Panels A and B of Table 6. Our proxy for geographic distance, called *International VC distance*, is the log of one plus the average distance (in thousands of miles) between the entrepreneurial firm home nation and each of the international venture capitalists investing in the firm.[39] Panel A of Table 6 reports the result of this analysis. Consistent with expectations, international VCs that are farther away are less successful than international VCs that are closer to their investments. Importantly, we find that the coefficient on the interaction term between *International VC distance* and the *Local and international VC dummy* is positive in emerging nations. Thus, our results indicate that international VCs syndicate with local VCs to increase their chances of success, particularly when they are farther away from the country of the firm in which they invest. It is noteworthy again that these distance results are significant for emerging nations but not for developed nations.[40]

We also find that the interaction term between *International VC distance* ^{2} and *Local and international VC dummy* has a negative coefficient estimate for the emerging nations sample, consistent with the idea that the mitigation effect of local syndication on the negative relation between *International VC distance* and exit probability decreases as the distance between the international VC and the entrepreneurial firm increases. This non-linear effect may reflect the idea that syndication between venture capitalists helps international VCs helps overcome their proximity disadvantage, but introduces a coordination cost that increases with distance. For instance, local and international VCs may have different protocols and differences in the way they operate. This may make it harder for international and local VCs to coordinate their monitoring activities. Such difficulties may increase with distance. Fig. 2 plots the change in probability of successful exit when an international VC syndicates with a local VC relative to when it invests on its own. The changes are reported for different values of international VC distance. This figure shows that there is a non-linear distance effect. That is, the benefit of local syndication for international VCs increases with distance at first (as reflected in the higher probability of exit relative to if they invest themselves). However, the gain in the probability of successful exit decreases as the distance continues to increase.

4.6.2. Cultural, legal, and institutional distance

We also conduct additional robustness checks of our results. Using the sample of emerging nations, Panel B of Table 6 analyzes the impact of other types of country level distances on exit outcomes in an interaction setting similar to the one in Panel A. Thus, we interact cultural, legal, and institutional distances between the VC's country and that of the entrepreneurial firm with the presence of a local-international syndicate. Note that control variable coefficients are unreported to save space, but are available upon request.[41] In contrast to the results in Panel A, we do not find a positive coefficient estimate on the interaction terms. In particular, in Column (1), cultural distance interacted with local-international VC syndication has a negative coefficient estimate, indicating that cultural distance may make it harder for international VCs to work with local VCs (consistent with Dai et al., 2012). Further, the other distance interaction measures are insignificant in Columns (2), (3), and (4).

4.6.3. Controlling for different types of VC experience

We also control for the experience of international VCs and that of Local VCs separately instead of averaging them into one measure for our baseline analysis (utilizing all entrepreneurial firms). The results of our baseline analysis for emerging nations, reported in Column (1) in Panel C of Table 6, are qualitatively similar to our main results. That is, local and international VC backed syndicates experience the most successful exits. We also further differentiate between the experience of international VCs in the local market of the portfolio firm and that in international markets outside the country of portfolio firm. Again, our results, reported in Columns (2) and (3) of Panel B of Table 6 are consistent with our earlier results.

[38] Our results remain similar if we use the change in the amount of VC financing from before to after the terror attack period as a control variable in the regressions (unreported). Thus, the change in the amount of VC financing in the immediate aftermath of terror attacks does not drive our empirical results in this section.

[39] Distance between countries is measured as the distance between the capitals (or the most populated cities if the capital is sparsely populated) of the respective countries using the great circle formula. We obtain these distances from the CEPII website. Please see http://www.cepii.fr/anglaisgraph/bdd/distances.htm.

[40] In unreported tests, we also conduct our geographic distance analyses using city level local and international VC distances. Our results are broadly consistent with those reported here. That is, the presence of a local-international VC syndicate mitigates the negative impact of the international VC's geographic distance on exit.

[41] We also conduct these tests for the sample of developed nations. We find that our interaction terms between the *Local and international VC* dummy and the cultural and legal distance measures have non-significant coefficients in developed nations. The interaction terms with our institutional distance measures have positive coefficient estimates. Thus, local syndication for international VCs may mitigate institutional distance effects in the sample of developed nations. However, given our focus on emerging nations, we are less concerned with these measures for developed nations.

Table 6
Robustness checks.
This table reports the results of logit estimations with a dummy as the dependent variable, which equals one if the entrepreneurial firm has a successful exit (i.e., IPO or M&A) and zero otherwise. In Panel A the regression is separately estimated for investments in emerging nations and developed nations. In Panels B, C, and D the regression sample is limited to emerging nations. The regression sample in Panels A and B are further limited to observations which have at least one investing international venture capitalist. Panels B, C, and D control for but do not report the coefficients for the following variables: *Int. VC cultural distance*, *Legal distance*, *Difference in market cap to GDP*, *SD of Difference in market cap to GDP*, *Firm country prior VC investments*, *Firm country GDP*, *Stock market development*, *VC experience*, *VC investment amount*, *Number of VCs*, *VC age*, *Number of rounds*, *US VC dummy*, and *UK VC dummy*. All columns include fixed effects for the year of the first round of financing, financing stage at the first round of financing, the entrepreneurial firm's industry, and the entrepreneurial firm's nation. All variables are described in Appendix A. Heteroskedasticity corrected robust standard errors, which are clustered on the firm's nation, are in brackets. The regressions are estimated with an intercept term.

Panel A	(1)	(2)
	Emerging nations	Developed nations
Local and international VC dummy	−1.341	−0.217
	[0.822]	[0.351]
Local and international VC dummy × International distance	6.982**	1.863
	[3.017]	[1.224]
Local and international VC dummy × International distance²	−3.414**	−0.919
	[1.422]	[0.599]
International distance	−5.317**	−2.350*
	[2.346]	[1.388]
International distance²	2.225**	1.058
	[1.067]	[0.665]
Int. VC Cultural distance	−0.010	−0.005
	[0.020]	[0.009]
Legal distance	0.363	−0.232
	[0.298]	[0.145]
Difference in market cap to GDP	−0.069	0.004
	[0.127]	[0.117]
SD of Difference in market cap to GDP	0.475	−1.018***
	[0.510]	[0.290]
Firm country prior VC investments	−0.001*	0.000*
	[0.001]	[0.000]
Firm country GDP	−1.728***	−1.005**
	[0.555]	[0.482]
Stock market development	1.725***	0.077
	[0.611]	[0.079]
VC experience	0.000	0.000*
	[0.000]	[0.000]
VC investment amount	0.292***	0.268***
	[0.060]	[0.044]
Number of VCs	0.054*	0.047
	[0.030]	[0.029]
VC age	−0.024	−0.001
	[0.023]	[0.013]
Number of rounds	−0.061	−0.111***
	[0.080]	[0.022]
US VC dummy	0.747*	0.003
	[0.390]	[0.127]
UK VC dummy	0.709***	0.181*
	[0.218]	[0.101]
Observations	881	4646
Pseudo R-sq	0.163	0.113

Panel B	(1)	(2)	(3)	(4)
Local and international VC dummy	0.850**	0.091	0.100	0.259*
	[0.381]	[0.179]	[0.235]	[0.148]
Local and int. VC dummy × Int. VC Cultural distance	−0.033**			
	[0.016]			
Local and int. VC dummy × Legal distance		0.142		
		[0.392]		
Local and int. VC dummy × Diff. in market cap to GDP			0.051	
			[0.200]	
Local and int. VC dummy × SD of diff. in market cap to GDP				−0.689
				[0.439]
International VC distance	−0.501***	−0.506***	−0.499***	−0.503***
	[0.120]	[0.117]	[0.115]	[0.113]
Controls	Yes	Yes	Yes	Yes
Observations	881	881	881	881
Pseudo R-sq	0.160	0.159	0.159	0.159

Table 6 *(continued)*

Panel C	(1)	(2)	(3)
Local VC dummy	−0.114	−0.070	−0.127
	[0.225]	[0.254]	[0.229]
Local and international VC dummy	0.301**	0.378***	0.298**
	[0.142]	[0.129]	[0.145]
International VC experience	0.000		
	[0.000]		
Local VC experience	0.003		0.003
	[0.002]		[0.002]
International VC experience in target firm's country		−0.001	−0.003
		[0.001]	[0.005]
International VC experience outside the target firm's country			0.000
			[0.000]
Controls	Yes	Yes	Yes
Observations	1757	1757	1757
Pseudo R-sq	0.137	0.136	0.137

Panel D	(1)	(2)
Local VC dummy	−0.102	−0.102
	[0.324]	[0.324]
Local and international VC dummy		0.248*
		[0.134]
Local and international VC × Lead local VC	0.248*	
	[0.134]	
Local and international VC × Lead int. VC	0.877***	0.629***
	[0.231]	[0.203]
Controls	Yes	Yes
Observations	1668	1668
Pseudo R-sq	0.143	0.143

*** Represents statistical significance at the 1% level.
** Represents statistical significance at the 5% level.
* Represents statistical significance at the 10% level.

4.6.4. Lead VC classification

It may be argued that our results on the efficacy of syndicates of international and local VCs in creating value for entrepreneurial firms are driven primarily by the nature of the lead VC (i.e., whether the lead VC is local or international). In Panel D of Table 6, we redo our baseline analysis by interacting the lead VC designation of international VCs with a dummy variable for whether or not the international VC is the lead VC. As in the baseline analysis, the data for this sample is at the entrepreneurial firm level. Our results indicate that there is a positive benefit of local syndication, regardless of whether or not the international VC is the lead

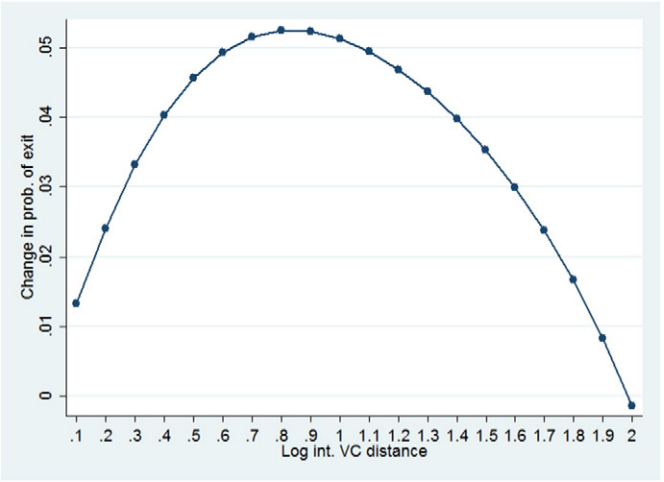

Fig. 2. Change in prob of exit for Local & Int. VC vs. International VC, by distance.

VC. However, the effect of local syndication is greater when the international VC is a lead VC, perhaps indicating that international VCs are much more likely to spend time on monitoring their investments in these cases.[42]

4.6.5. Other robustness

In unreported tests, we also run our analysis after excluding the internet bubble period (1998 to 2000), and find that our results are statistically and economically consistent with the results that we report in the paper. Thus, our results are not driven by internet bubble period investments made by VCs.

5. Conclusion

We analyze the effectiveness of international versus local venture capitalists in adding value to entrepreneurial firms. We find that entrepreneurial firms in emerging nations backed by syndicates composed of international and local venture capitalists have more successful exits and higher post-IPO operating performance than those backed by syndicates of purely international or purely local venture capitalists. We control for the potential endogenous participation and syndication by international VCs using instrumental variables analyses and a natural experiment and find a causal effect of international VC participation on successful outcomes. International VCs face disadvantages in their investments due to the lack of proximity to the entrepreneurial firm. Using air service agreements between countries as an exogenous change in effective proximity, we find that entrepreneurial firms backed by international VCs are more successful when travel becomes easier between the two countries. Overall, our results indicate that the greater venture capital expertise of international venture capitalists and the superior local knowledge and lower monitoring costs of local venture capitalists are both important in obtaining successful investment outcomes.

Overall, our results indicate that international VCs are disadvantaged due to lack of geographic proximity to their portfolio companies. They are able to overcome this disadvantage by syndicating with local VCs. The backing of portfolio companies by syndicates consisting of the local and international VCs enable entrepreneurial firms to benefit from their strengths.

Appendix A. Description of variables

Local VC dummy is a dummy variable which equals one if all investing venture capitalists are located in the same nation as the entrepreneurial firm, and zero otherwise. A VC is considered as being located in the entrepreneurial firm's nation if the VC's fund investing in the entrepreneurial firm has an office in the entrepreneurial firm's nation.

Local and international VC dummy is a dummy variable which equals one if at least one investing venture capitalist is located in the same country as the entrepreneurial firm and at least one investing venture capitalist is located outside the entrepreneurial firm's country, and zero otherwise.

Int. VC Cultural Distance this measure is the absolute value of the Hofstede cultural distance between the entrepreneurial firm's country and the investing international venture capitalist. If there are multiple international venture capitalists that invest in a particular entrepreneurial firm, then an average is taken of the absolute value of the Hofstede cultural distances.

Legal distance is a dummy variable which equals one if an international venture capitalist's home country's legal origin is different from that of the entrepreneurial firm's home country, and zero otherwise. If there are multiple international venture capitalists that invest in a particular entrepreneurial firm, then we use the average value of this measure across all international VCs.

Difference in market cap to GDP, which is the absolute difference in prior 5-year average stock market valuation to GDP between each of the international VC's home country and that of the entrepreneurial firm's home country. If there are multiple international venture capitalists that invest in a particular entrepreneurial firm, then we use the average value of this measure across all international VCs.

Difference in SD of market cap, which is the absolute difference in the prior 5 year volatility of stock market valuation to GDP between each of the international VC's home country and that of the entrepreneurial firm's home country. If there are multiple international venture capitalists that invest in a particular entrepreneurial firm, then we use the average value of this measure across all international VCs.

Firm country prior VC investment is the total number of prior VC investment rounds that have occurred in the country of the entrepreneurial firm

Firm country GDP is the GDP of the entrepreneurial firm's country in trillions of dollars.

Stock market development is the entrepreneurial firm nation's total stock market capitalization in trillions of US dollars.

VC experience is the average of the total number of prior VC investment rounds that venture capitalists investing in the portfolio firm have participated in.

VC investment amount is the log of the amount of venture capital invested, in thousands of US dollars.

Number of VCs is the total number of investing venture capitalists.

VC age is the average age of all investing venture capitalists.

Number of rounds is the number of the rounds of venture capital that the entrepreneurial firm receives.

Round number is the VC round number.

US VC Dummy is a dummy variable that equals one if at least one investing VC is from the US, and zero otherwise.

[42] Note that the *Lead intl. VC* dummy does not appear itself in these regressions since it is perfectly correlated with the sum of the dummies for purely international VC syndicates (the base case) and local-international VCs interacted with the *Lead intl. VC* dummy.

UK VC Dummy is a dummy variable that equals if at least one investing VC is from the UK, and zero otherwise.

Low foreign investment or ownership regulation is a dummy variable that is one if country has higher than median rating for regulatory controls limiting international investment or ownership, and zero otherwise.

Low capital controls is a dummy variable that is one if country has higher than the median rating for capital controls, and zero otherwise.

International VC distance is the log of one plus the average distance in thousands of miles between the entrepreneurial firm's nation and the nation of each international venture capitalist investing in the entrepreneurial firm round.

ASA is a dummy variable that is one if an air traffic agreement was signed between the entrepreneurial firm's nation and that of at least one of the international VCs syndicating in the round, and zero otherwise.

Post-attack period is a dummy variable that is one for entrepreneurial firms whose first round of VC financing lies in the time period of six months starting from 30 days after the terror attack, and zero otherwise.

India city is a dummy variable for the cities in India (where the entrepreneurial firms are located) that experience the terror attack.

India is a dummy variable for entrepreneurial firms located India

Industry with high Intl. VC participation is a dummy variable that is one if the prior five year number of VC deals involving international VCs in a given country and industry divided by the total prior five year number of VC deals in that country and year is greater than the sample median.

Change in number of deals is the difference between the number of venture capital deals in a country in the post-attack period and the number of venture capital deals in the country in the pre-attack period.

Assets is the one year lagged value of the log of the US dollar amount of assets in the IPO year.

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