



# Do international investors enhance private firm value? Evidence from venture capital

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**Abstract**

We examine the impact of international venture capital investors on private firm success spanning 81 countries over the years 1995–2010. The data examined indicate that, relative to deals in which the investor base is purely domestic, private firms that have an international investor base have a higher probability of exiting via an initial public offering (IPO) and higher IPO proceeds. The evidence is consistent with the view that while the benefits of internationalization may be difficult and costly to manage, for those firms that succeed in managing cross-border coordination costs, there is potential value for an IPO firm. The benefits relative to the costs of internationalizing the investor base for private firms sold in acquisitions, by contrast, are much less pronounced. The most important source of this benefit appears to be access to capital.

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## INTRODUCTION

Important developments in the literature on the internationalization of venture capital (VC) give rise to questions of whether international investors add value to entrepreneurial firms, and if so, by exactly how much. On one hand, we may expect that international investors do very little for entrepreneurs other than provide a source of capital, since the geographic, legal, and cultural distances are too large across countries. Indeed, Nahata, Hazarika, and Tandon (2014) provide cross-country evidence that these factors are important in comparing the success of international venture capital investment across countries. On the other hand, international investors may enable advantages such as increased access to capital, knowledge associated with experience in international deals and/or international networks and resources that add value to private entrepreneurial firms (Bertoni & Groh, 2014; Tykvová & Schertler, 2014). Moreover, depending on what individual portfolio companies (PCs) need, they may be able to get any managerial assistance through local VC resources, the Internet, or even over the phone. In this article we empirically study the strategic benefits associated with international investors and consider whether these benefits outweigh the costs associated with legal, geographic, cultural, and informational differences across countries.

We address these issues in this article by examining over a decade of data on tens of thousands of transactions involving venture capitalists (VCs) and their PCs from three sources: SDC Platinum's *VentureXpert*, *Mergers & Acquisitions*, and *Global New Issues* databases. The data enable extensive comparisons across countries for dozens of countries around the world.

The data indicate that the internationalization of a PC's investor base does, in fact, create value in terms of PC outcome and the performance of the PC exit (i.e., M&A deal value or IPO proceeds). Private firms with an international VC syndicate decrease their likelihood of being unsuccessful while increasing their likelihood of exiting via IPO. Private firms with an international VC syndicate have higher proceeds when exiting via IPO. The data further indicate that the internationalization benefits to private firms exiting via IPOs are more robust and larger than that to private firms sold in M&As. For those firms that succeed in managing the costs of cross-border coordination, there is potential value for an IPO firm, but the potential value for an acquired firm is less pronounced.

Our findings are consistent with the view that international venture capital investors add significant value to entrepreneurial firms. Another interpretation of the results could be that companies that show early signs of being more promising are more likely to attract international investors. We test this alternative interpretation with the use of Abadie – Imbens matching, and difference-in-differences, among other tests which are outlined in the robustness section. Future research might further investigate the mechanisms on attracting international investors.

Our study contributes to the existing VC literature, specifically with regard to VC syndicates and the internationalization of VC investment. We seek to extend the literature by examining whether a direct relationship exists between an international VC base and PC outcome as well as metrics for the financial success of specific exit outcomes. Our results suggest that PC firms that want to maximize the likelihood of exiting via IPO and the performance of that IPO may consider international VCs when looking for potential investors. If larger investments or deal values are observed in PC's who receive cross-country investment, it could be beneficial for these private firms to position themselves as attractive targets for international VCs as well as actively seek out international investment.

Though research has been done on international syndicates, this specific focus has yet to be addressed.

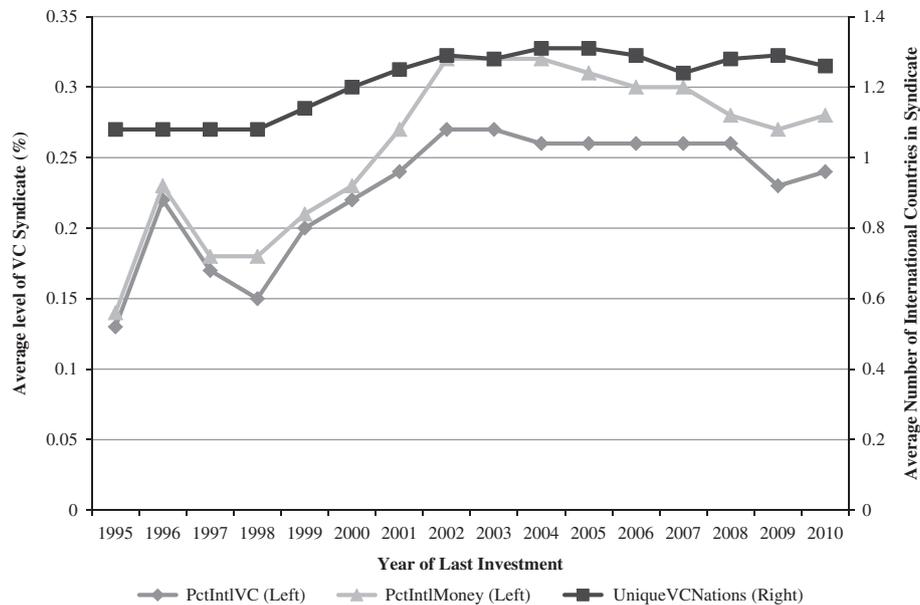
For example, examine what factors influence the probability that a specific private equity deal will be financed internationally. Makela and Maula (2006) examine a sample of cross-border syndicates and what influences the level of investment in international PCs. Related studies have examined the effect of internationalization from specific countries such as China (Dai, Jo, & Kassiech, 2012). Li, Vertinsky, and Li (2014) study the probability of VC-backed IPOs and M&As (jointly) amongst a sample of only cross-border VC deals. Jääskeläinen and Maula (2014) study network ties among foreign VC-backed European IPO vs M&A outcomes.

The papers that are perhaps closest to ours are Bertoni and Groh (2014) and Nahata et al. (2014). Bertoni and Groh (2014) study detailed evidence on cross-border IPOs vs M&A exits in Europe. Nahata et al. (2014) find that cultural distance between countries is positively associated with VC success. Our work differs from prior work with regard to sample, scope, methods, and intent. Our data include 81 countries around the world. Unlike other papers, we compare domestic to international deals around the world to examine whether or not the *extent* of the internationalization of the PC investor base is important in both exit outcomes (IPOs vs M&As) and their valuations. Further, we explicitly consider the potential costs of internationalizing a PC's investor base on institutional distance, information asymmetry, unfamiliarity, and cultural differences as well as differences in the relationship between PC and VC domicile nations. We address the endogeneity of the decision to diversify a PC's investor base using various techniques to ensure that this empirical complication does not bias our results, as well as differences in IPO and M&A exits.

The rest of the article is organized as follows. The next section develops hypotheses. The subsequent section explains our empirical methodology. Information on our data collection is provided in the section after that. Empirical results are then provided, and finally, we offer robustness tests, explain the limitations of our analysis and conclude.

## THE IMPACT OF INTERNATIONAL INVESTORS ON PRIVATE FIRMS

Recent literature has established the benefits of internationalizing a *public* firm's investor base. Some of these benefits include better terms for raised capital (Pagano, Roell, & Zechner, 2002), a lower cost of capital (Martin & Rey, 2000), imported governance system (Stulz, 1999), reduced systematic



**Figure 1** Average VC internationalization levels across time.

Note: This figure provides summary statistics for the different proxies for international VC syndicates across time. Level of Internationalization a yearly average based on our three international syndicate proxies. Specifically the averages are based on *PctIntlVC*, *LnNumIntlNation*, and *PctIntlVCMoney*. Sample term is 1995–2010 for PC exit. Further details on the variables and data sources are in the Appendix.

risk, and better name recognition (Merton, 1987). More generally, a large literature on cross-listing suggests that there are benefits of internationalization for firms that list abroad (for a comprehensive list of papers in this area, see the survey by Karolyi, 2006).

Separately, research on *private* firms asserts that VCs provide value to their PCs by extending to them a valuable network (Hsu, 2004; Zhang and Yu, 2015). Though this research does not touch on the value of a geographically diversified network, it is intuitive that the scope of the network might be of importance. For example, one could argue that the distance between the VC and the PC – even a portion of them in the case of a syndicate – could limit the amount of advice provided by the VCs. Conversely, one could argue that having geographic diversity in a PC's investors could potentially help the PCs outcome. Zacharakis, McMullen, and Shepherd (2007), for example, find that VCs in different countries rely on market information or human capital factors differently. Theoretically, an internationally diversified VC syndicate could ensure that investment occurs in the most valuable aspects of the PC based on diversity of thought, which could impact the exit supported by the VC syndicate, or even whether or not the syndicate decides to pull funding from a given PC.

Can private firms see the same benefits to internationalization of their investor base as public firms? Since private firms neither have the operational expansion opportunities that public firms do nor the name recognition (even in domestic markets), and since the opportunity for internationalization may be limited, as some VCs limit their investments to entrepreneurs that they know personally or are within 100 miles (see Cumming and Dai, 2010)<sup>1</sup>, it is not clear that the benefits of internationalizing the investor base of private firms would be beneficial.

Notwithstanding the local bias in venture capital, the landscape for private equity is becoming increasingly global (Megginson, 2004). Indeed, Madhavan and Iriyama (2009) suggest that the percentage of international investments in portfolios for VCs domiciled in the United States has increased from an average of 0.5% in 1980 to 20.8% in 2005. Figure 1 supports these findings. An examination as to whether or not the internationalization of the investor base for *private* firms provides benefits for the firm thereby increasing its value is therefore warranted.<sup>2</sup>

Theoretically, the PC, diversifying across investors, could increase the amount of advice provided by investors and the potential affiliation network to which syndicate members have access, thereby enhancing the expected value of the VC investment.

Knill (2009), however, finds that there are costs of VC diversification – that is, the VC investing in *more* PCs – for the PC based on a VC's limited resources, since diversification across geographic locations or number of invested PCs could entail considerable time and expense. Indeed, the expense of involvement across geographically dispersed portfolios exceeds that of more focused investment portfolios (Gompers & Lerner, 1999).

Notwithstanding the costs of VC geographically diversified portfolios, Hochberg, Ljungqvist, and Lu (2007) find that better-networked VCs see better fund performance. By expanding the geographic scope of IPO listing opportunities to international VCs that have networks with a greater number of investment banks around the world and institutional purchasers of IPOs, the domicile nation of the VC could be an important consideration. Foreign VCs can aid PCs by providing access to its network, including lawyers, bankers and accountants, thereby providing private firms additional opportunities to go public (Caglio, Hanley, & Marietta-Westberg, 2011). Given that the potential costs of VC internationalization are less important for the IPO process, which is more about raising money for the investors of the PC, the impact of internationalization on the likelihood of IPO should, therefore, be positive.

**Hypothesis 1:** International VC syndicates are positively associated with the likelihood of PCs exiting via IPO.

The situation for M&As may be different, however. For PCs that merge with other firms, geography, legal standards and culture are potentially much more pivotal. Consistent with this notion is the fact that cross-border mergers for *public* firms can be associated with low, or even negative, announcement stock returns among countries with high levels of legal restrictions (Moeller & Schlingemann, 2005) and cultural differences (Conn, Cosh, Guest, & Hughes, 2005). Making matters worse, the coordination costs associated with legal and cultural differences are often more pronounced in the case of private M&As (Conn et al., 2005) since information asymmetries associated with private firms are much more pronounced (Gompers & Lerner, 1999).

Also factoring into the potential costs of cross-border mergers is the fact that contracting and negotiation costs in M&As rise as the diversity in the international VC syndicate increases (Cumming & Johan, 2013). Since VC limited partnerships

operating across countries are more likely to mandate cash-only distributions due to differences in fund mandates and legal rules across countries (Cumming & Johan, 2013), costs may therefore be higher. Given the pivotal role of costs in cross-border M&A, particularly cross-border *private firm* M&A, the benefit of VC internationalization for this exit type is likely to be less significant than that for IPO. Formally stated, this becomes:

**Hypothesis 2:** International VC syndicates are less important for facilitating M&A exits than IPO exits.

For PCs that exit via IPO, an international syndicate of VCs might allow for better knowledge of local market conditions. It has been widely documented that local knowledge among VCs translates into greater proceeds (Gompers & Lerner, 1999). Gompers and Lerner show that VCs have specialized skills at timing the market, and their relationship with investment banks enables better terms for the IPO process. Unlike the case of M&A exits where two companies merge across different legal regimes and cultures, IPO exits are characterized by substantial governance and liquidity benefits associated with international VC investors prior to exit, thereby enhancing IPO valuations (Zattoni & Judge, 2012; Judge et al., 2015). With access to more shareholders, different stock markets, levels of efficiency and market “hotness”, proceeds could increase significantly with international VC networks (Syvrud, Knill, Jens, & Colak, 2013).

For PCs that exit via M&A, VC networks could provide more opportunities to be acquired, which might result in better deal values. Foreign VCs potentially provide access to an expanded network, thereby providing their PCs a greater scope of potential opportunities to be acquired by firms from different countries. It is therefore possible that deal values may be pushed higher if foreign VC syndicates have large enough networks of both potential investors and parties necessary to undertake an M&A deal (Bertoni & Groh, 2014). However, in view of the contracting and coordination costs discussed above, we would not expect the benefit of investor internationalization on deal values to be as pronounced in an M&A relative to an IPO.

**Hypothesis 3:** There is a positive relationship between the extent of international VC syndicates and total IPO proceeds, and this relationship is stronger than that between the extent of international syndicates and M&A deal values.



## DATA

The data in the article are collected from three sources. The VC and PC characteristics are collected from SDC Platinum *VentureXpert*. We collect data on all VC investments in firms whose last year of VC investment occurred between 1995 and 2010. This data spans 81 PC domicile nations and 36 VC domicile nations. There are 67,635 PC/VC investment observations for 31,942 unique PCs. M&A deal characteristics for the PCs that have been acquired are collected from SDC Platinum's *Mergers & Acquisitions (M&A)* database. IPO characteristics for the PCs that have exited via IPO are collected from SDC Platinum's *Global New Issues* database.

### Measures of Success

The PCs are counted as successful if they are acquired (exit via M&A) or go public (exit via IPO). In our analyses we consider each type of successful exit separately, as well as examining the IPO and M&A firms jointly. In our sample, 25% of the PCs successfully exited, which is comparable to the 25% reported by Nahata (2008) and the 26% reported by Hochberg et al. (2007). Since a survey of firms by Brau et al. (2006) finds overwhelmingly (~90% of respondents) that their reason to IPO is financing for growth, we examine the deal value (M&A) or proceeds (IPO) gained when PCs exit.<sup>3</sup> A PC's successful outcome is proxied by the total deal value (proceeds) resulting from an M&A (IPO) exit. In our sample, a PC with a successful IPO exit receives on average US\$153 million, and a PC with a successful M&A exit receives on average \$113 million in terms of constant 2005 US dollars. The details of variable construction for our dependent variables are found in the Appendix.

### PCs' and VCs' Characteristics

Using SDC Platinum's *VentureXpert* database, we keep only those observations with data on the domicile nation of both the PC and VC firms. As the average investment term before PC exit is approximately 5 years, we need to make sure that all PCs in our analysis have at least 5 years between the date of first investment and the final year of our sample (2010).<sup>4</sup> Following Nahata et al. (2014), companies that do not successfully exit by 2005 are classified as unsuccessful.

Specifics about the VC/PC investment relationship are obtained including: (1) *Investment term*, (2) *Years since last inv*, (3) *Portfolio size/mgr*, and (4) *Industry M/B*. Longer investment terms and periods since last investment increase the probability that

a firm will have exited from VC investment.<sup>5</sup> *Portfolio size/mgr* controls for the number of companies that each manager must oversee affecting how much "hand holding" he might be able to provide. Based on several papers including Gompers and Lerner (1999) and Cumming and Johan (2013), we include *Industry M/B* to control for any industry cycle impact.

Some VCs are more knowledgeable than others due to experience and their gained skill set, leading to implications on PC current status. To control for this, we include a proxy for VC skill: *Expertise*. The proxy comprises the number of funds a VC has successfully raised.<sup>6</sup> This proxy implicitly assumes the retention of VC management but should not be problematic as long as VCs are able to hire similarly talented executives to lead their firms. Following Cumming and Knill (2012) we assume that the fund is the first in sequence where the number of successfully raised funds is missing. *Expertise* also serves to control for VC grandstanding, which was brought to light by Gompers and Lerner (1999). *Expertise* may also proxy for the affiliation that is offered by the VC becoming larger and attaining more clout in the industry. As the VC grows, it will be able to offer its PCs more management expertise, financial assistance, and certification in the ultimate exit strategy (Megginson & Weiss, 1991).

Gompers and Lerner (1999) predict that syndication improves due diligence, which implies that VCs that participate in syndication will invest in higher quality PCs and the resulting probability of exit should be higher. We, therefore, include the variable *Prefer to originate*. Related to this but acknowledging that the size of VC networks has an impact on PC exit performance (Hochberg et al. 2007; Hsu, 2004) we include a variable for *VC syndicate size*. To control for VC fund characteristics we include *Corporate VC*, an indicator variable that marks whether a VC is corporate or not and follows Cumming and Knill (2012).

Gompers and Lerner (1999) explain that investment at certain stages entails more risk, and Knill (2009) explains that investment in these stages, accordingly, offers more opportunity (for diversification) than others. We include *Early stage*, an indicator variable taking on the value of one for the riskiest stage of the entrepreneurial life cycle. Similarly, there are some industries that are riskier than others and we include indicator variables for each industry as identified by *VentureXpert*. The details of variable construction for our characteristic variables are found in the Appendix.

### M&A and IPO Deal-Specific Venture Capital Data

*VentureXpert* contains data on the type of exit for each PC; however it does not contain data on the value of the M&A transaction or the proceeds of the IPO. *M&A* and *Global New Issues* databases contain dollar outcomes; however, they are very limited in the offering of venture capital variables. To examine the impact of PC and VC characteristics on the dollar value upon successful exit of the PC, we hand merge SDC's *M&A* and *Global New Issues* databases with the *VentureXpert* data on private venture capital deals. For each PC in *VentureXpert* that exits via M&A we hand match the target firm name in SDC Platinum M&A. Likewise, for each PC that exits via IPO we cross match the issuer firm name in SDC platinum *Global New Issues*. In our sample, 9339 observations are linked to M&A exits and 7873 observations are linked to IPO exits. Following Caglio et al. (2011), we exclude ETFs, closed-end funds, offers with warrants, private placements, investment trusts and REITs. We include only those firms with reported values for M&A deal values and IPO proceeds. Using this filter, our final sample comprises 2181 M&A and 3134 IPO exits. All dollar values are reported in terms of constant 2005 US dollars.

### Macroeconomic Data

We collect various macroeconomic factors known to impact VC investment outcomes, M&A deal values, and IPO proceeds. Previous research indicates that certain macroeconomic variables may drive a VC's decision on cross-border investment. Following much of the extant literature, we use the value of the macroeconomic environment in the PC nation in our analyses.<sup>7</sup> Following Cumming and Knill (2012), we include the *VC supply* to proxy for the number of VCs available for investment in a given nation. We include *Polity* and *Economic Freedom* to control for the relationship between economic policy and institutional framework on entrepreneurial activity, as enhanced economic freedom has been shown to increase probability of a successful exit for firms with international VC investment (see e.g., Wang & Wang, 2012), and political risk has been shown to affect foreign investment (see e.g., Bekaert, Harvey, Lundblad, & Siegel, 2014). *GDP per capita* is included to control for general market/economic conditions. *Domestic credit* is included to control for the likelihood that a firm will be able to access bank credit, which has been documented as a significant source of capital for entrepreneurial firms.

Evidence suggests that firms with international IPO listings originate from countries with lower

stock market development (Caglio et al., 2011). *Market turnover* is included to control for the differences in stock market development, which may impact a PC's exit strategy.<sup>8</sup> It is also possible that a PC's domestic market is too small, causing the firm to look for alternatives in exit strategy. *Market Capitalization*, the natural log of the market capitalization of the PC domicile nation, is therefore included to control for the size of the domestic marketplace. Unless otherwise noted, all macroeconomic variables are calculated for the PC domicile nation. The details of variable construction for country characteristics are found in the Appendix.

### Capital Markets Liability of Foreignness

International syndicates bring a myriad of complex obstacles not present in a domestic syndicate. Indeed, Grinblatt and Keloharju (2001) suggest that factors such as geographic distance, language and culture matter to investors considering foreign investment. If the internationalization of the VC syndicate is to bring a net benefit to PCs, the benefits must exceed the costs of the investor relationship. We therefore must consider the costs inherent in international investment. To that end, we quantify a measure of capital markets liability of foreignness (CMLOF) to control for potential costs associated with internationalization. Bell, Filatotchev, and Rasheed (2012) introduce the theory of CMLOF by analyzing institutional distance, information asymmetry, unfamiliarity and cultural differences as the main sources of liabilities faced by firms seeking investments from foreign markets.

To create our cost measure, we first create four indices to quantify the costs associated with institutional distance, information asymmetry, unfamiliarity, and cultural differences. We create our institutional distance index based on legal variables commonly used in extant literature separated into three categories: accounting, enforcement, and shareholder rights. Following Nahata et al. (2014), we include La Porta, Lopez-de-Silanes, Shleifer, and Vishny's (LLSV) (1998) accounting standard measure as our proxy for the accounting quality. To proxy enforcement, we use the cumulated value of LLSV's corruption level, efficiency of judicial system, rule of law, risk of expropriation, and repudiation of contracts ratings in our enforcement index. To proxy shareholder rights, we include Spamann's (2010) revised anti-director rights index. Each category is normalized and ranges from 0 (weak legal standards) to 1 (strong legal standards). We calculate these values for the PC as well as VC domicile nations. Since we are interested in the distance

between the two nations (vs which is stronger), we take the cumulated absolute value of the differences between the PC and VC nations in each category and normalize the index so the resulting values range from 0 (no institutional differences) to 1 (high institutional difference). Specifically, we create our institutional distance component as follows:

$$CMLOF_{Legal} = \frac{(|(PC_{Accounting} - VC_{Accounting})| + |(PC_{Enforcement} - VC_{Enforcement})| + |(PC_{ShrhlrRights} - VC_{ShrhlrRights})|)}{3} \quad (1)$$

where  $CMLOF_{Legal}$  is our legal index component of CMLOF measuring the institutional distance between each PC/VC pair,  $PC_{Accounting}$  and  $VC_{Accounting}$  are the accounting categories of the index for the PC and VC nations respectively,  $PC_{Enforcement}$  and  $VC_{Enforcement}$  are the enforcement categories of the index for the PC and VC nations respectively, and  $PC_{ShrhlrRights}$  and  $VC_{ShrhlrRights}$  are the shareholder rights categories of the index for the PC and VC nations respectively.

We create our measure for information asymmetry by calculating the distance between the PC and VC nations with regard to information flows, as suggested in Bell et al. (2012). To account for how easily two nations can communicate given their technology capabilities, we follow Portes and Rey (2005) to measure our information flow index. Specifically, we collect from World Development Indicators the number of Internet users per 100 people and the number of phone lines per 100 people, each scaled by 100. For each PC/VC pair, we cumulate the absolute value of the difference between the PC and VC nations for each of the two proxies, and normalize the index so the resulting values range from 0 (no informational asymmetry) to 1 (high informational asymmetry). Specifically, we create our information asymmetry component as follows:

$$CMLOF_{InfoAsymmetry} = \frac{(|(PC_{Internet} - VC_{Internet})| + |(PC_{Phones} - VC_{Phones})|)}{2} \quad (2)$$

where  $CMLOF_{InfoAsymmetry}$  is our information flow index component of CMLOF measuring the informational distance between each PC/VC pair,  $PC_{Internet}$  and  $VC_{Internet}$  are the scaled number of internet users in the PC and VC nations respectively, and  $PC_{Phones}$  and  $VC_{Phones}$  are the scaled number of phones lines in the PC and VC nations respectively.

We create our measure for unfamiliarity by calculating the geographical distance between the PC and VC nations. The motivation behind this proxy is

that nations located further (closer) apart are likely to be less (more) familiar with each other due to factors such as time zones. Following Coval and Moskowitz (1999, 2001), among others, we proxy geographical distance using the great circle distance (kilometers) between the capitals of the PC and VC nations.<sup>9</sup> We normalize this distance so the resulting

index,  $CMLOF_{geographic}$ , ranges from 0 (no geographical distance) to 1 (large geographical distance).

Next, we create our measure for cultural differences following the spirit of Ahern, Daminelli, and Fracassi (2015) and Tihanyi, Griffith, and Russell (2005) by using the four Hofstede (1980) culture indices: power distance, masculinity, individualism, and uncertainty avoidance. Specifically we compute the cultural distance as follows:

$$CMLOF_{Culture} = \frac{(\sum_{i=1}^4 (PC_{Culture} - VC_{Culture})^2)^{\frac{1}{2}}}{4} \quad (3)$$

where  $CMLOF_{Culture}$  is our cultural index component of CMLOF measuring the cultural distance between each PC/VC pair, and  $PC_{Culture}$  and  $VC_{Culture}$  are the culture index measure  $i$  for the PC and VC nations respectively. Our resulting index again ranges from 0 (no cultural differences) to 1 (large cultural differences).

Finally we create our overall CMLOF measure by cumulating the values of each of our four capital market liability of foreignness components. Specifically, we compute the capital markets LOF variable as follows:

$$CMLOF = CMLOF_{Legal} + CMLOF_{InfoAsymmetry} + CMLOF_{Geographic} + CMLOF_{Culture} \quad (4)$$

where  $CMLOF$  is the cumulative distance between each PC and VC nation factoring in institutional, information, proximity, and cultural differences between the pair. Our index ranges from 0 (no differences between the countries) to 4 (large differences between the countries). By construction, all domestic PC/VC pairs would have a CMLOF value of 0. This creates a mechanical relationship with our international proxies, as there will only be a liability of foreignness when international VCs are present. To adjust for this relationship, and control for the notion that each nation will have a unique ranking for investment environment with a PC nation likely

attracting VCs from countries with stronger and weaker environments than the domicile nation, we replace domestic PC/VC CMLOF with the average CMLOF for the PC nation in the year of last investment for unsuccessful PCs, or the year of exit for successful PCs.<sup>10</sup> The details of variable construction for CMLOF variables are found in the Appendix.

### International VC Syndicates

Our main variable of interest is the internationalization of a PC's investor base. We create three different measures of *Intl* to determine whether there is a base impact of international VC syndicates and whether a marginal increase in international investors can further impact VC investment performance. Our first proxy is *PctIntlVC*, which is the number of unique international VCs scaled by the total number of unique VCs invested in the PC. Our second proxy, *LnNumIntlNation*, controls for the number of different nations involved in a syndicate, and is defined as the natural log of 1 plus the number of unique VC domicile nations in a syndicate that are not the same as the PC's domicile nation. Our third proxy, *PctIntlVCMoney*, controls for the capital invested by international VCs, and is defined as the amount of dollars invested in the PC by international VCs scaled by the total dollar amount invested in the PC from all VCs.<sup>11</sup> This proxy follows the corporate finance literature that examines the costs or benefits of large investors (see, e.g., La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 1999, 2000) by focusing on dollars invested.

The benefits of obtaining international VCs may not be linear given the inherent difficulties associated with cross-border dealings. It is possible that net benefits are greater for PCs that are domiciled in nations with strong relations to the domicile nations of the VCs in the syndicate. To control for the bilateral relations between the PC and VC's domicile nations, we weight each of our three international proxies by a measure of political relations. Following Knill, Lee, and Mauck (2012) and Gupta and Yu (2009) our proxy for political relations is based on United Nations voting records. The motivation behind this proxy is that nations with more closely related UN General Assembly votes are likely to have stronger political relations than those nations with weakly related votes. We use Gartzke's (1998) "S" measure to quantify the similarity amongst two countries' votes where "S" measures the bilateral political relations (*PR*).<sup>12</sup> Specifically, we calculate the *PR*

measure using the equation:

$$PR = 1 - \left[ 2^* \frac{dist}{maxdist} \right] \quad (5)$$

where *PR* is the bilateral political relations, *dist* is the sum of the distances between votes for a given country pair and year, and *maxdist* is the maximum possible distance between votes for a given country pair and year. First, the distance between votes is calculated by classifying "No" votes equal to 0, "Abstain" votes equal to 1, and "Yes" votes equal to 2.<sup>13</sup> For each vote the distance is equal to 1 if the two countries vote differently, and 0 if the two countries vote the same. This measure is then cumulated over the year for each country pair. Our *PR* measure ranges from -1 (all votes different) to +1 (all votes the same). We then shift our political relations measure by adding 1 so that our *PR* measure ranges from 0 (all votes different) to 2 (all votes the same).

We create *PctIntlVC PR* by summing the *PR* measure for each international VC in a syndicate, and then scaling by the total number of unique VCs invested in the PC. We create *LnNumIntlNation PR* as the natural log of 1 plus the cumulated *PR* measure for each unique international VC nation. Finally, we create *PctIntlVCMoney PR* as the cumulated total of the amount of dollars invested in the PC by each international VC multiplied by the individual *PR* measure, then scaled by the total dollar amount invested in the PC from all VCs. In this manner syndicates where the average political relations measure is high (low) will carry a heavier (lighter) weight in the international proxies. In weighting our proxies for internationalization in these ways, we effectively enhance (diminish) the value our variable of interest in cases where the relationship between the PC and VC countries is good (poor).

The details of variable construction for our variables of interest are found in the Appendix.

### Data Characteristics

The majority of the PCs in our sample are domiciled in the United States, United Kingdom, France, Germany, and Canada. These five countries also have the most internationalized syndicates (i.e., that have syndicates with at least one VC outside of the PC domicile nation). There are, of course, countries that have more observations than others since some countries have more active VC markets. In our empirical analyses below, we consider subsets of countries, based on VC access to credit, international deal experience, and networks.

The international component of the syndicates in our sample ranges from purely domestic to purely international investors, with the average international component comprising 22% of PCs' total investors. On average, a firm's investors come from 0.31 unique international countries, with approximately 25% of investor capital raised abroad. Interestingly, the median of all three internationalization proxies is 0, which supports the findings of Bruton, Ahlstrom, and Puky (2009) and Gompers and Lerner (1999), who suggest that VCs are hesitant to invest in PCs that are located in a different nation.

There are a few concerns with regard to multicollinearity in our sample. In each of our analyses we see significant correlations between various macroeconomic variables. Since extant literature suggests that all of the variables are important in the analysis, we orthogonalize variables where necessary so that the correlations do not impact

the analysis. That said, excluding each of the variables individually does not alter the qualitative results in the article.

The country breakdown and specifics about syndicates in each country as well as data characteristics on all of the variables in our analysis are available upon request.

Table 1 provides univariate comparison tests that provide a feel for how international VC syndicates impact the performance of PCs. Specifically, we examine the impact of VC internationalization on various measures of PC exit performance for the whole sample. We separate our PCs into those that have at least one international VC (Intl=1) and those that have purely domestic VC investors (Intl=0). Looking at Tests 1–3, we find support for Hypotheses 1 and 2. Supporting the contentions of Hypothesis 1, we see that PCs with international VC syndicates have a significantly higher chance of going public than those PCs with purely

**Table 1** Difference-in-means

| Characteristic                                      | International syndicate | Domestic syndicate | Intl-Dom |
|---|-------------------------|--------------------|----------|
| <i>1. Prob(Unsuccessful)</i>                        |                         |                    |          |
| Mean  | 0.75                    | 0.74               | 0.01     |
| N   | 25503                   | 42132              |          |
| <i>2. Prob(Exit via M&amp;A)</i>                    |                         |                    |          |
| Mean  | 0.11                    | 0.15               | -0.04*** |
| N   | 42132                   | 4526               |          |
| <i>3. Prob(Exit via IPO)</i>                        |                         |                    |          |
| Mean  | 0.14                    | 0.10               | 0.04***  |
| N   | 42132                   | 4526               |          |
| <i>4. M&amp;A and IPO: Successful exit (Mil \$)</i> |                         |                    |          |
| Mean  | 14.64                   | 11.58              | 3.06***  |
| N   | 19699                   | 34593              |          |
| <i>5. M&amp;A: Deal value (Mil \$)</i>              |                         |                    |          |
| Mean  | 3.75                    | 5.28               | -1.53*** |
| N   | 18317                   | 32967              |          |
| <i>6. IPO: Proceeds (Mil \$)</i>                    |                         |                    |          |
| Mean  | 11.50                   | 6.86               | 4.64***  |
| N   | 19100                   | 33033              |          |

*Notes:* This table provides difference-in-means results for three categories of PC outcome and measures of success of the exits from 1995 to 2010. The results are split by international and domestic syndicates. Domestic syndicates refer to instances where the PC and VCs are located within the same country. International syndicates refer to instances where the PC has at least one VC located in a different country than the PC. *Unsuccessful* is an indicator variable taking the value of 1 if a PC goes defunct or remains private and 0 otherwise. *M&A* is an indicator variable taking the value of 1 if a PC exits via a merger or acquisition and 0 otherwise. *IPO* is an indicator variable taking the value of 1 if a PC exits via an initial public offering and 0 otherwise. *Successful exit* is defined as the total deal value of an M&A deal (Mil 2005 \$), total proceeds from the IPO of a PC (Mil 2005 \$), or \$0 if the PC is unsuccessful. *Deal value* is defined as the total deal value of an M&A deal (Mil 2005 \$) for a PC. *Proceeds* is defined as the total proceeds (Mil 2005 \$) from the IPO of a PC. Further details on the variables and data sources are in the Appendix. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

domestic syndicates. There is a 14% probability of going public with an international syndicate and a 10% chance of going public with a domestic syndicate (Test 3), and this difference is significant at the 1% level. Supporting the contentions of Hypothesis 2, there is an 11% chance of being acquired with an international syndicate and a 15% chance of being acquired with a domestic syndicate, and this difference is significant at the 1% level. Test 1 suggests that internationalization is inconsequential to the probability of PCs being unsuccessful (i.e., liquidating or remaining private).

Tests 4 and 6 provide support that the internationalization of VC syndicates results in better performance following PC exit via an IPO, consistent with Hypothesis 3. Test 6 shows that IPO proceeds are \$11.50 million with international syndicates, and only \$6.86 million with domestic syndicates, and this difference is significant at the 1% level. However, Test 5 shows that M&A deal values are \$3.75 million with international syndicates and \$5.28 million with domestic syndicates, and this difference is significant at the 1% level. Combining the results in Tests 5 and 6 supports the contentions of Hypothesis 3 and further suggests that the results of Test 4 are driven by IPOs.

Overall, the univariate results suggest that it is beneficial for PCs to take on international VCs subject to the mode of exit. This benefit is seen in a statistically significant increase in the probability of a VC-backed IPO (Hypothesis 1) and deal values associated with an IPO (Hypothesis 3). However, internationalization implies a lower probability of an M&A exit and lower proceeds with M&A exits (Hypotheses 2 and 3).

**EMPIRICAL METHOD**

Our empirical analysis proceeds in two steps. We first consider whether international VC investors affect the performance of VC investments in terms of exit outcomes. Second, we consider whether international investors affect the exit performance of firms who exit via M&A or via IPO in terms of firm value, as measured by *Successful outcome*.

To examine whether international VC syndicates affect the performance of VC investments (Hypothesis 1), we run the following multinomial logit regression at the PC/VC relationship level.

$$Pr(CurrentStatus_j) = \Psi(\alpha + \beta_0 Intl_j + \beta_1 X_i + \beta_2 Inv_{ij} + \beta_3 I_j + \beta_4 T_j + \beta_5 Y_k), \quad (6)$$

where *CurrentStatus<sub>j</sub>* is an indicator for the PC<sub>j</sub>'s current status. The indicator variable takes the value of 0 if PC<sub>j</sub> is Unsuccessful (i.e., is liquidated or remains private), 1 if PC<sub>j</sub> exits via M&A, and 2 if PC<sub>j</sub> exits via IPO.<sup>14</sup> *Inv<sub>ij</sub>* consists of investment-specific data (between VC<sub>i</sub> and PC<sub>j</sub>) such as: the term of the investment (*Investment term*), how long it has been since the last VC firm investment (*Yrs since last inv*), the number of investments each manager at the VC firm manages (*Portfolio size/mgr*), and the market-to-book value of the PC's industry (*Industry M/B*). *X<sub>i</sub>* is a vector of VC characteristics including whether or not the VC prefers to originate in a syndication relationship (*Prefer to originate*), whether or not the VC is corporate (*Corporate VC*), whether or not the VC invests in early stage entrepreneurship (*Early stage*), the number of successful funds the VC has raised (*Expertise*) as well as the size of the VC syndicate (*VC syndicate size*). *I<sub>j</sub>* is an indicator variable for the industry of the portfolio firm and *T<sub>j</sub>* is an indicator variable for the year of last VC investment in the PC. *Y<sub>k</sub>* contains macroeconomic variables to control for characteristics of the funding market in country *k* at time *t*-1, such as: *Market Cap*, a proxy for the size of the market in a nation, *GDP per capita*, the percentage increase in a nation's gross domestic product, *VC supply*, the number of VC deals originating in a nation, *Domestic credit*, a proxy for the development of the debt market, *Turnover*, a proxy for the liquidity of the market, *Polity*, the level of democracy in a nation, and *Economic Freedom*, an index of the level of freedom individuals in a nation have from government restraint (see the Appendix for formal definitions of all variables). Robust errors are clustered around PC to control for firm effects.

Our variable of interest is *Intl<sub>j</sub>*, which is a proxy for the level of internationalization in a VC syndicate for PC<sub>j</sub>. The proxy takes six forms: (1) *PctIntlVC*, (2) *LnNumIntlNation*, (3) *PctIntlVCMoney*, (4) *PctIntlVC PR*, (5) *LnNumIntlNation PR*, and (6) *PctIntlVCMoney PR*. The first three are raw variables capturing the degree of internationalization in a syndicate. The last three weight our original set of proxies by a measure of bilateral political relations to control for the relationship between country pairs. Specifically *PctIntlVC PR* is the cumulated PR measure for each of the unique international VCs scaled by the total number of unique VCs invested in the PC, *LnNumIntlNation PR* is the natural log of 1 plus the cumulated PR measure for each unique VC nation invested in the PC, and *PctIntlVCMoney PR* is the cumulated measure of the product between each individual VC's PR measure and VC dollars invested in the PC, then scaled by the

total amount of dollars invested in the PC by all VCs. If Hypothesis 1 is correct, we expect to see a positive and statistically significant coefficient on  $\beta_0$  when the current status is IPO. This indicates that the internationalization of the VC investor base increases the odds of a firm successfully exiting the venture capital phase via the preferred exit route: IPO.

Because the decision to have international investors is not exogenous, we must control for the endogeneity of this variable. We control for this potential bias by using an Instrumental Variable (IV) approach, first estimating the level of internationalization in syndication and, second, using this predicted value as our new variable of interest in a probit or tobit analysis of the PC's exit.

In order to run IV analysis, we must first find an instrument that is correlated with the level of internationalization, but uncorrelated with our two success proxies. The CMLOF theoretically controls for the main obstacles a firm must overcome in order to receive foreign investment. To proxy for these obstacles we use CMLOF, our novel measure quantifying the degree of capital markets LOF between each PC/VC pair,<sup>15</sup> as the single excluded instrument. Specifically, our first stage equation is as follows:

$$Intl_j = \alpha + \gamma_0 CMLOF_{ij} + \gamma_1 X_i + \gamma_2 Inv_{ij} + \gamma_3 I_j + \gamma_4 T_j + \gamma_5 Y_k + \gamma_6 C_j + \varepsilon, \quad (7)$$

where  $Intl_j$  is one of our six proxies for the level of internationalization in a VC syndicate for PC<sub>j</sub>, CMLOF is a measure of the CMLOF between VC<sub>i</sub> and PC<sub>j</sub>, and  $C_j$  is an indicator variable for PC domicile nation. All other variables are as defined in Eq. (6). Robust errors are clustered around the PC to control for firm fixed effects. We use this model to return predicted values for  $Intl_j$ ,  $Intl^*_j$ , and run the second stage probit regression using the predicted values as our variable of interest on our dependent success variables. Specifically, our second stage probit equation is as follows:

$$Pr(Exit_j) = \alpha + \psi_0 Intl^*_j + \psi_1 X_i + \psi_2 Inv_{ij} + \psi_3 I_j + \psi_4 T_j + \psi_5 Y_k + \psi_6 C_j + \varepsilon, \quad (8)$$

where  $Exit_j$  is an indicator for the PC<sub>j</sub>'s outcome type. The indicator variable takes the value of 0 if PC<sub>j</sub> is unsuccessful (i.e., is liquidated or remains private), and 1 if PC<sub>j</sub> exits successfully (i.e., IPO or M&A separately).  $Intl^*_j$  is the predicted value of  $Intl_j$  from our first stage model in Eq. (7). All other variables are as defined in Eq. (6), and robust errors are clustered around the PC to control for firm

effects. If Hypothesis 1 holds, we expect to see a significantly positive sign on  $\psi_0$ .

To examine the impact of the internationalization of VC syndicates on the performance of PC firms that exit successfully (Hypothesis 3), we perform additional IV analyses, changing only the second stage equation to predict dollar value upon PC exit. Specifically our second stage tobit equation is as follows:

$$Ln(SuccessfulExit_j) = \alpha + \lambda_0 Intl^*_j + \lambda_1 X_i + \lambda_2 Inv_{ij} + \lambda_3 I_j + \lambda_4 T_j + \lambda_5 Y_k + \lambda_6 C_j + \varepsilon, \quad (9)$$

where  $Ln(SuccessfulExit_j)$  is the natural log of 1 plus the successful dollar outcome of a PC exit in millions of 2005 constant US dollars (i.e., the total deal value a target PC<sub>j</sub> receives from M&A or the total amount of proceeds a PC<sub>j</sub> raises in an IPO).  $SuccessfulExit_j$  is set equal to 0 if a PC<sub>j</sub> does not successfully exit (i.e., is liquidated or remains private).  $Intl^*_j$  is the predicted value of  $Intl_j$  from our first stage model in Eq. (7).  $T_j$  is an indicator variable for the year of last VC investment in the PC if the exit is unsuccessful, or an indicator variable for the year the M&A or IPO took place if the PC exit is successful. All other variables are as defined in Eq. (6), and robust errors are clustered around the PC to control for firm effects. Detailed definitions are once again included in the Appendix. If Hypothesis 3 holds, and having an international VC investor base increases the performance of the exiting PC, we expect to see a significantly positive sign on  $\lambda_0$ .

## REGRESSION RESULTS

Table 2 reports regression results for the impact of international VC syndicates on the exit outcomes of VC-backed firms. Panels A and B of Table 2 each report nine specifications: three each for unsuccessful exits, M&A exits, and IPO exits, where the three proxies for VC internationalization are considered separately: percent international VC,  $\ln(1 + \text{the number of international nations})$ , and percent international money. Panel A (B) reports the results where the internationalization measures are unweighted (weighted by international differences in bilateral political relations).

Panel A of Table 2 shows that all three measures of internationalization improve the probability of an IPO exit, and the effect of investor internationalization is statistically significant at the 1% level in each of the Models 7–9. The economic significance is such that a one-standard deviation increase in internationalization improves the probability of an IPO by 1%. With the average probability of an IPO at 12%

Table 2 PC outcome

| Intl =                | Prob(Unsuccessful)  |                     |                    | Prob(Exit via M&A)    |                       |                       | Prob(Exit via IPO) |                        |                        |
|-----------------------|---------------------|---------------------|--------------------|-----------------------|-----------------------|-----------------------|--------------------|------------------------|------------------------|
|                       | 1                   | 2                   | 3                  | 4                     | 5                     | 6                     | 7                  | 8                      | 9                      |
|                       | PctIntl IVC         | LnNum IntlNation    | PctIntl Money      | PctIntl VC            | LnNum IntlNation      | PctIntl IMoney        | PctIntl VC         | LnNum IntlNation       | PctIntl Money          |
| Intl                  | -0.05***<br>[0.01]  | -0.02***<br>[0.01]  | -0.02**<br>[0.01]  | 3.70E-03<br>[0.00]    | 3.74E-03<br>[0.00]    | -8.95E-04<br>[0.00]   | 0.05***<br>[0.01]  | 0.02***<br>[0.01]      | 0.02***<br>[0.01]      |
| Investment term       | -0.01***<br>[0.00]  | -0.01***<br>[0.00]  | -0.01***<br>[0.00] | 1.12E-03***<br>[0.00] | 1.12E-03***<br>[0.00] | 1.16E-03***<br>[0.00] | 0.01***<br>[0.00]  | 0.01***<br>[0.00]      | 0.01***<br>[0.00]      |
| Yrs since last inv    | -0.02***<br>[0.00]  | -0.02***<br>[0.00]  | -0.03***<br>[0.00] | 0.05***<br>[0.00]     | 0.05***<br>[0.00]     | 0.05***<br>[0.00]     | -0.02***<br>[0.00] | -0.02***<br>[0.00]     | -0.02***<br>[0.00]     |
| Portfolio size/Mgr    | 0.04***<br>[0.01]   | 0.03***<br>[0.01]   | 0.04***<br>[0.01]  | -0.01**<br>[0.00]     | -0.01**<br>[0.00]     | -0.01**<br>[0.00]     | -0.03***<br>[0.01] | -0.03***<br>[0.01]     | -0.03***<br>[0.01]     |
| Industry M/B          | -0.01<br>[0.05]     | -3.55E-03<br>[0.05] | -0.02<br>[0.05]    | 0.11***<br>[0.02]     | 0.10***<br>[0.02]     | 0.11***<br>[0.02]     | -0.10**<br>[0.05]  | -0.10**<br>[0.05]      | -0.09**<br>[0.05]      |
| Prefer to originate   | 0.01***<br>[0.00]   | 0.01***<br>[0.00]   | 0.01**<br>[0.00]   | 3.30E-03**<br>[0.00]  | 3.33E-03**<br>[0.00]  | 3.71E-03**<br>[0.00]  | -0.01***<br>[0.00] | -0.01***<br>[0.00]     | -0.01***<br>[0.00]     |
| Corporate VC          | 0.02***<br>[0.00]   | 0.02***<br>[0.00]   | 0.02***<br>[0.00]  | -0.01***<br>[0.00]    | -0.01***<br>[0.00]    | -0.01***<br>[0.00]    | -0.02***<br>[0.00] | -0.01***<br>[0.00]     | -0.01***<br>[0.00]     |
| Early stage           | 0.02***<br>[0.00]   | 0.03***<br>[0.00]   | 0.02***<br>[0.00]  | 7.47E-04<br>[0.00]    | 6.09E-04<br>[0.00]    | 1.62E-03<br>[0.00]    | -0.03***<br>[0.00] | -0.03***<br>[0.00]     | -0.02***<br>[0.00]     |
| Ln(Expertise)         | -0.01***<br>[0.00]  | -0.01***<br>[0.00]  | -0.01***<br>[0.00] | 3.81E-04<br>[0.00]    | 4.39E-04<br>[0.00]    | 2.58E-04<br>[0.00]    | 0.01***<br>[0.00]  | 0.01***<br>[0.00]      | 0.01***<br>[0.00]      |
| Ln(VC syndicate size) | -0.02***<br>[0.01]  | -0.02***<br>[0.01]  | -0.03***<br>[0.01] | 0.01***<br>[0.00]     | 0.01***<br>[0.00]     | 0.01***<br>[0.00]     | 0.01**<br>[0.00]   | 0.01*<br>[0.01]        | 0.02***<br>[0.01]      |
| VC supply             | 1.93E-05<br>[0.00]  | -1.76E-03<br>[0.00] | 2.70E-04<br>[0.00] | 4.99E-03***<br>[0.00] | 0.01***<br>[0.00]     | 4.71E-03***<br>[0.00] | -0.01***<br>[0.00] | -3.57E-03***<br>[0.00] | -4.98E-03***<br>[0.00] |
| Ln(GDP per capita)    | 0.03***<br>[0.00]   | 0.03***<br>[0.00]   | 0.03***<br>[0.00]  | 9.90E-05<br>[0.00]    | -2.37E-04<br>[0.00]   | 6.60E-04<br>[0.00]    | -0.03***<br>[0.00] | -0.03***<br>[0.00]     | -0.03***<br>[0.00]     |
| Ln(Market cap)        | -0.01***<br>[0.00]  | -0.01**<br>[0.00]   | -0.01**<br>[0.00]  | 0.01***<br>[0.00]     | 0.01***<br>[0.00]     | 0.01***<br>[0.00]     | 2.94E-03<br>[0.00] | -2.65E-04<br>[0.00]    | -8.02E-04<br>[0.00]    |
| Domestic credit       | -1.78E-03<br>[0.01] | 4.34E-03<br>[0.01]  | 3.29E-03<br>[0.01] | 0.01***<br>[0.00]     | 0.01***<br>[0.00]     | 0.01***<br>[0.00]     | -0.01*<br>[0.00]   | -0.01***<br>[0.00]     | -0.01**<br>[0.01]      |
| Economic freedom      | -0.01<br>[0.04]     | -0.01<br>[0.04]     | -0.03<br>[0.04]    | 0.07***<br>[0.02]     | 0.07***<br>[0.02]     | 0.07***<br>[0.02]     | -0.06*<br>[0.03]   | -0.06*<br>[0.03]       | -0.05<br>[0.04]        |
| Polity                | 0.03***<br>[0.01]   | 0.04***<br>[0.01]   | 0.04***<br>[0.01]  | 0.02**<br>[0.01]      | 0.02**<br>[0.01]      | 0.02**<br>[0.01]      | -0.05***<br>[0.01] | -0.06***<br>[0.01]     | -0.06***<br>[0.01]     |
| Turnover              | 0.01***<br>[0.00]   | 0.02***<br>[0.00]   | 0.02***<br>[0.00]  | -4.64E-03**<br>[0.00] | -4.89E-03**<br>[0.00] | -4.59E-03**<br>[0.00] | -0.01**<br>[0.00]  | -0.01***<br>[0.00]     | -0.01***<br>[0.00]     |
| Year FE?              | Yes                 | Yes                 | Yes                | Yes                   | Yes                   | Yes                   | Yes                | Yes                    | Yes                    |
| Industry FE?          | Yes                 | Yes                 | Yes                | Yes                   | Yes                   | Yes                   | Yes                | Yes                    | Yes                    |
| Observations          | 67,635              | 67,635              | 62,745             | 67,635                | 67,635                | 62,745                | 67,635             | 67,635                 | 62,745                 |

Pseudo  $R^2$       0.2332      0.232      0.2378      0.2332      0.232      0.2378      0.2332      0.232      0.2378

Panel B: PR-weighted international proxies

| Intl =                | Prob(Unsuccessful)    |                             |                          | Prob(Exit via M&A)    |                             |                          | Prob(Exit via IPO)     |                             |                          |
|-----------------------|-----------------------|-----------------------------|--------------------------|-----------------------|-----------------------------|--------------------------|------------------------|-----------------------------|--------------------------|
|                       | 1<br>PctIntl VC<br>PR | 2<br>LnNum IntlNation<br>PR | 3<br>PctIntl Money<br>PR | 4<br>PctIntl VC PR    | 5<br>LnNum IntlNation<br>PR | 6<br>PctIntl Money<br>PR | 7<br>PctIntl VC PR     | 8<br>LnNum IntlNation<br>PR | 9<br>PctIntl Money<br>PR |
| Intl                  | -0.05***<br>[0.01]    | -0.01**<br>[0.01]           | -0.01<br>[0.01]          | 5.64E-03<br>[0.00]    | 6.79E-03<br>[0.00]          | 3.30E-03<br>[0.00]       | 0.05***<br>[0.01]      | 0.01*<br>[0.01]             | 4.27E-03<br>[0.01]       |
| Investment term       | -0.01***<br>[0.00]    | -0.01***<br>[0.00]          | -0.01***<br>[0.00]       | 1.11E-03***<br>[0.00] | 1.12E-03***<br>[0.00]       | 1.15E-03***<br>[0.00]    | 0.01***<br>[0.00]      | 0.01***<br>[0.00]           | 0.01***<br>[0.00]        |
| Yrs since last inv    | -0.02***<br>[0.00]    | -0.02***<br>[0.00]          | -0.03***<br>[0.00]       | 0.05***<br>[0.00]     | 0.05***<br>[0.00]           | 0.05***<br>[0.00]        | -0.02***<br>[0.00]     | -0.02***<br>[0.00]          | -0.02***<br>[0.00]       |
| Portfolio size/Mgr    | 0.04***<br>[0.01]     | 0.03***<br>[0.01]           | 0.04***<br>[0.01]        | -0.01**<br>[0.00]     | -0.01**<br>[0.00]           | -0.01**<br>[0.00]        | -0.03***<br>[0.01]     | -0.03***<br>[0.01]          | -0.03***<br>[0.01]       |
| Industry M/B          | -0.01<br>[0.05]       | -4.59E-03<br>[0.05]         | -0.01<br>[0.05]          | 0.11***<br>[0.02]     | 0.10***<br>[0.02]           | 0.11***<br>[0.02]        | -0.09**<br>[0.05]      | -0.10**<br>[0.05]           | -0.09**<br>[0.05]        |
| Prefer to originate   | 0.01***<br>[0.00]     | 0.01***<br>[0.00]           | 0.01***<br>[0.00]        | 3.21E-03**<br>[0.00]  | 3.18E-03**<br>[0.00]        | 3.62E-03**<br>[0.00]     | -0.02***<br>[0.00]     | -0.01***<br>[0.00]          | -0.01***<br>[0.00]       |
| Corporate VC          | 0.02***<br>[0.00]     | 0.02***<br>[0.00]           | 0.02***<br>[0.00]        | -0.01***<br>[0.00]    | -0.01***<br>[0.00]          | -0.01***<br>[0.00]       | -0.01***<br>[0.00]     | -0.01***<br>[0.00]          | -0.01***<br>[0.00]       |
| Early stage           | 0.03***<br>[0.00]     | 0.03***<br>[0.00]           | 0.02***<br>[0.00]        | 7.43E-04<br>[0.00]    | 6.32E-04<br>[0.00]          | 1.62E-03<br>[0.00]       | -0.03***<br>[0.00]     | -0.03***<br>[0.00]          | -0.02***<br>[0.00]       |
| Ln(Expertise)         | -0.01***<br>[0.00]    | -0.01***<br>[0.00]          | -0.01***<br>[0.00]       | 2.84E-04<br>[0.00]    | 3.07E-04<br>[0.00]          | 1.05E-04<br>[0.00]       | 0.01***<br>[0.00]      | 0.01***<br>[0.00]           | 0.01***<br>[0.00]        |
| Ln(VC syndicate size) | -0.02***<br>[0.01]    | -0.02***<br>[0.01]          | -0.03***<br>[0.01]       | 0.01***<br>[0.00]     | 0.01***<br>[0.00]           | 0.01***<br>[0.00]        | 0.01***<br>[0.00]      | 0.01***<br>[0.01]           | 0.02***<br>[0.01]        |
| VC supply             | -1.73E-04<br>[0.00]   | -1.65E-03<br>[0.00]         | -9.61E-05<br>[0.00]      | 0.01***<br>[0.00]     | 0.01***<br>[0.00]           | 4.70E-03***<br>[0.00]    | -4.84E-03***<br>[0.00] | -3.70E-03***<br>[0.00]      | -4.61E-03***<br>[0.00]   |
| Ln(GDP per capita)    | 0.03***<br>[0.00]     | 0.03***<br>[0.00]           | 0.03***<br>[0.00]        | -3.91E-04<br>[0.00]   | -1.39E-03<br>[0.00]         | -5.34E-04<br>[0.00]      | -0.03***<br>[0.00]     | -0.03***<br>[0.00]          | -0.03***<br>[0.00]       |
| Ln(Market cap)        | -0.01***<br>[0.00]    | -0.01**<br>[0.00]           | -4.37E-03*<br>[0.00]     | 0.01***<br>[0.00]     | 0.01***<br>[0.00]           | 0.01***<br>[0.00]        | 3.87E-03*<br>[0.00]    | -1.46E-03<br>[0.00]         | -2.62E-03<br>[0.00]      |
| Domestic credit       | 2.20E-03<br>[0.01]    | 0.01<br>[0.01]              | 0.01<br>[0.01]           | 0.01***<br>[0.00]     | 0.01***<br>[0.00]           | 0.01***<br>[0.00]        | -0.01***<br>[0.00]     | -0.02***<br>[0.00]          | -0.02***<br>[0.01]       |
| Economic freedom      | -0.01<br>[0.04]       | -0.02<br>[0.04]             | -0.02<br>[0.04]          | 0.08***<br>[0.02]     | 0.08***<br>[0.02]           | 0.08***<br>[0.03]        | -0.06*<br>[0.03]       | -0.06*<br>[0.03]            | -0.05<br>[0.04]          |
| Polity                | 0.05***<br>[0.01]     | 0.05***<br>[0.01]           | 0.05***<br>[0.01]        | 0.02**<br>[0.01]      | 0.01*<br>[0.01]             | 0.01*<br>[0.01]          | -0.06***<br>[0.01]     | -0.06***<br>[0.01]          | -0.06***<br>[0.01]       |
| Turnover              | 0.02***<br>[0.00]     | 0.02***<br>[0.00]           | 0.02***<br>[0.00]        | -4.12E-03**<br>[0.00] | -4.43E-03**<br>[0.00]       | -4.24E-03**<br>[0.00]    | -0.01***<br>[0.00]     | -0.01***<br>[0.00]          | -0.01***<br>[0.00]       |
| Year FE?              | Yes                   | Yes                         | Yes                      | Yes                   | Yes                         | Yes                      | Yes                    | Yes                         | Yes                      |

Table 2: (Continued)

| Intl =                | Prob(Exit via M&A) |                     |                  |               |                     |                  | Prob(Exit via IPO) |                     |                  |
|-----------------------|--------------------|---------------------|------------------|---------------|---------------------|------------------|--------------------|---------------------|------------------|
|                       | 1                  | 2                   | 3                | 4             | 5                   | 6                | 7                  | 8                   | 9                |
|                       | PctIntl VC PR      | LnNum IntlNation PR | PctIntl Money PR | PctIntl VC PR | LnNum IntlNation PR | PctIntl Money PR | PctIntl VC PR      | LnNum IntlNation PR | PctIntl Money PR |
| Industry FE?          | Yes                | Yes                 | Yes              | Yes           | Yes                 | Yes              | Yes                | Yes                 | Yes              |
| Observations          | 67,635             | 67,635              | 62,745           | 67,635        | 67,635              | 62,745           | 67,635             | 67,635              | 62,745           |
| Pseudo R <sup>2</sup> | 0.2332             | 0.232               | 0.2376           | 0.2332        | 0.232               | 0.2376           | 0.2332             | 0.232               | 0.2376           |

Notes: The multinomial logit model used for PCs is  $Pr(CurrentStatus) = \Psi(\alpha + \beta_0 Intl + \beta_1 X_i + \beta_2 Inv + \beta_3 T_j + \beta_4 Y_k)$  where  $\Psi$  is the cumulative logistic probability distribution function. Current Status is the current status of the PC: Unsuccessful (i.e., Private or Defunct), M&A or IPO.  $Inv_{ij}$  is a vector of investment-specific data such as: Investment term, Yrs since last inv, Portfolio size/mgr (scaled by 10), and Industry M/B (scaled by 10).  $X_i$  is a vector of VC characteristics including: Prefer to originate, Corporate VC, Early stage, Expertise and VC syndicate size.  $I_j$  is an indicator variable for the PC firm's industry, and  $T_j$  is an indicator variable for the year of last VC investment.  $Y_k$  is a vector of macroeconomic variables including Ln(VC supply), Ln(GDP per capita), Ln(Market cap), Domestic credit (scaled by 100), Economic freedom, Polity (scaled by 10) and Turnover (scaled by 100). Each macroeconomic variable is defined as the value in the PC nation in year  $t-1$ . Intl is defined as PctIntlVC, LnNumIntlNation, or PctIntlVCMoney (separately). PctIntlVC is the number of VCs a PC has outside of the PCs domicile nation scaled by the total number of unique VCs. LnNumIntlNation is the natural log of 1 plus the number of unique VC nations in a PCs syndicate outside of the PCs domicile nation. PctIntlVCMoney is the amount of money invested in a PC by VCs outside of the PCs domicile nation scaled by the total amount of money invested in the PC. Panel A reports the results for the un-weighted international proxies. Panel B reports the results for the PR-weighted international proxies, where PR is defined as the bilateral political relations measure between each VC nation and PC nation. Definitions for control variables are in the Appendix. The base specification is Public Status = Unsuccessful. Investment (PC) data specifics are from VentureXpert. Marginal effects are reported and robust standard errors (clustered around PC) and are given in brackets. Sample includes VC/PC relationships in SDC Platinum where the last year the portfolio company was updated was between 2000 and 2010. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

(Table 2 Panel A), an improvement in the probability of an IPO by 1% represents an 8% improvement in a successful outcome relative to the average level of success, which implies that the economic significance of this effect is meaningful. Panel B reports similar results for the PR-weighted measure of internationalization on the likelihood of an IPO. The effect is statistically significant in Model 7 (8) at the 1% (10%) level, and insignificant in Model 9. The economic significance in Panel B is likewise consistent with that in Panel A, whereby a one-standard deviation increase in internationalization gives rise to a 1% increase in the probability of an IPO, or an 8% improvement relative to the average likelihood of an IPO. Overall, the data are consistent with Hypothesis 1.

In unreported tests and in earlier versions of this article (available on request), we added nonlinear terms to the regressions, such as quadratic terms for internationalization. Results of those tests suggest the presence of a convex relationship between internationalization and the probability of an IPO, whereby a greater degree of internationalization gives rise to exponentially large benefits. However, different specifications of the nonlinear terms are not completely robust in respect of estimating the economic significance of the main effect and the nonlinear effect. As such, in Table 2 we report the results without the nonlinear term.

Both panels A and B of Table 2 show no statistically significant effect of the impact of internationalization on the probability of an M&A exit, consistent with Hypothesis 2. We see that there is a statistically significant reduction in the probability of a PC either facing liquidation or remaining private in Models 1–3. Given the mutually exclusive nature of the PC outcome, this meshes nicely with Hypotheses 1. The economic significance of this latter effect is such that a one-standard deviation increase in internationalization (by each of the three measures) is associated with a 1% reduction in the probability of an unsuccessful exit.

The control variables in Table 2 are significant in ways that are consistent with extant literature on VC exits. For example, consistent with Cumming and Knill (2012) we find a significantly positive relationship between *Expertise* and exits via IPOs. This follows the strand of literature that finds that VC is value-added active investment and that it depends on the quality of the fund managers.<sup>16</sup> Our measure for risk, *Early stage*, is negatively related with IPOs and positively related with unsuccessful exits, all statistically significant at the 1% level. Various other

control variables are significant in the exit outcome regressions; however, their inclusion does not materially impact the international investor variables. Overall, the data are consistent with the view that international VC syndicates improves VC backed IPO exit markets, consistent with Hypothesis 1.

One interpretation of the results in Table 2 is that companies that show early signs of being more promising are more likely to attract international investors. As such, we performed a number of robustness checks. For example, we segregated the data into subsamples based on whether or not the syndicated international investors came from countries with a weaker legal environment vs those from countries with a stronger legal environment relative to the entrepreneur's home country. This check is relevant, since we may predict that better performing entrepreneurs will select investors from countries with better legal conditions to facilitate their international expansion due to the improved contractual certainty and better developed markets. Likewise, this check nicely rules out countries that might be unduly influential in the data, such as the United States and the United Kingdom. We did not find a material difference in the statistical and economic significance of the results relative to those reported in Table 2.

To further check for endogeneity, in Table 3 we present instrumental variable estimates of the effect of internationalization on exit outcomes.<sup>17</sup> The first stage estimates are untabulated but available in the online supplementary information.<sup>18</sup> The second stage estimates show that, relative to the evidence in Table 2 without controlling for possible endogeneity, there is stronger evidence of a statistically significant relationship between IPO and M&A exit outcomes and internationalization. The results are statistically significant at the 5% level or stronger in all of the specifications for IPOs (Models 1–3), however we see no significance in all of the specifications for M&As (Models 4–6). In terms of the economic significance, the data indicate that a 1-standard deviation increase in internationalization conservatively gives rise to, on average, a 35.57% increase in the probability of an IPO (Table 3 Models 1–3). Based on the sample average probability of IPO of 12%, this amount is certainly economically meaningful. This evidence is consistent with Hypothesis 1. Consistent with Hypothesis 2, the M&A evidence in Table 3 Models 4–6 shows a statistically insignificant effect of internationalization on the probability of an M&A, consistent with our findings in Table 2 Models 4–6. Importantly, the Cragg-Donald F-stats

as well as the Stock-Yogo statistics verify the validity of CMLOF as an instrument.

Instrumented variable regression results for the impact of VC internationalization on PC exit performance are presented in Table 4 (the first step estimates are presented in the online supplementary information). The standard estimates without instrumental variables produced similar inferences and are available on request. The data indicate that the internationalization of VC syndicates, regardless of how it is measured, is significantly (at the 10% level) positively associated with proceeds in IPO exits and negatively associated (at the 1% level) with deal values in M&A exits. These results are robust to a number of control variables. The economic significance of the effect on IPO proceeds (i.e., Models 1–3) is such that a 1-standard deviation increase in internationalization is associated with an increase in IPO proceeds of 6% to 18%.<sup>19</sup> Relative to the average level of proceeds of \$112.18 million (Table 2 Panel A), the economic significance of this effect is meaningful. Models 7–12, by contrast, show evidence of a marginally significant relationship between internationalization and M&A deal values, economically speaking. Though all models show a statistically significant effect of internationalization on M&A deal value, a 1-standard deviation increase in internationalization is associated with a decrease in M&A deal value of 2% to 3.5%. Importantly, the effect is small, but negative, which meshes well with the insignificant impact of internationalization on the likelihood that PCs with international VC syndicates will exit via M&A. The validity of the instrument is once again verified. Overall, the data provide strong support for Hypothesis 3.

#### ADDITIONAL CONTROL VARIABLES

To examine and control for potential costs of PC internationalization, in untabulated results we added to the most restrictive models in our base specifications in Tables 2–4, proxies for geographic, cultural and legal distance. Following Li et al. (2014), we include both the main effect of these proxies and an interaction term with international. Results show that adding controls for geographic, cultural and legal distances yields results that are qualitatively similar to those reported in Tables 2–4. Likewise, other measures of regulatory, cultural, network, and cognitive distance (e.g., Beugelsdijk & Mudambi, 2013; Tykvová & Schertler, 2014) did not affect these inferences in the data.

Table 3 Instrumented PC outcome

| Intl =                     | Probability of exit via IPO |                       |                      | Probability of exit via M&A |                     |                     |
|----------------------------|-----------------------------|-----------------------|----------------------|-----------------------------|---------------------|---------------------|
|                            | PctIntlVC                   | LnNum<br>IntlNation   | PctIntlVC<br>Money   | PctIntl VC                  | LnNum<br>IntlNation | PctIntlVC<br>Money  |
| Intl*                      | 1.43**<br>[0.58]            | 1.21**<br>[0.49]      | 1.62***<br>[0.63]    | -0.64<br>[0.65]             | -0.53<br>[0.55]     | -0.43<br>[0.71]     |
| Investment term            | 0.05***<br>[0.00]           | 0.06***<br>[0.00]     | 0.06***<br>[0.00]    | -2.51E-03<br>[0.00]         | -3.04E-03<br>[0.00] | -3.00E-03<br>[0.00] |
| Yrs since last inv         | -0.19***<br>[0.02]          | -0.19***<br>[0.02]    | -0.18***<br>[0.02]   | 0.50***<br>[0.03]           | 0.50***<br>[0.03]   | 0.50***<br>[0.04]   |
| Portfolio size/Mgr         | -0.01**<br>[0.00]           | 0<br>[0.01]           | -0.01*<br>[0.00]     | 0<br>[0.00]                 | -0.01<br>[0.01]     | -0.01<br>[0.01]     |
| Industry M/B               | -0.07***<br>[0.03]          | -0.08***<br>[0.03]    | -0.07**<br>[0.03]    | 0.14***<br>[0.03]           | 0.15***<br>[0.03]   | 0.15***<br>[0.03]   |
| Prefer to originate        | -0.08***<br>[0.02]          | -0.08***<br>[0.02]    | -0.06***<br>[0.02]   | 0.06***<br>[0.02]           | 0.06**<br>[0.02]    | 0.05***<br>[0.02]   |
| Corporate VC               | -0.14***<br>[0.04]          | -0.16***<br>[0.04]    | -0.14***<br>[0.04]   | -0.05<br>[0.04]             | -0.05<br>[0.05]     | -0.06<br>[0.04]     |
| Early stage                | -0.12***<br>[0.03]          | -0.12***<br>[0.03]    | -0.10***<br>[0.03]   | -0.02<br>[0.03]             | -0.01<br>[0.03]     | 0<br>[0.03]         |
| Ln(Expertise)              | 0.04***<br>[0.01]           | 0.04***<br>[0.01]     | 0.05***<br>[0.01]    | 0.02<br>[0.01]              | 0.02<br>[0.01]      | 0.01<br>[0.01]      |
| Ln(VC syndicate size)      | -0.01<br>[0.05]             | -0.23*<br>[0.13]      | -0.01<br>[0.05]      | 0.20***<br>[0.05]           | 0.26*<br>[0.15]     | 0.18***<br>[0.06]   |
| VC supply                  | -0.06***<br>[0.02]          | -0.02**<br>[0.01]     | -0.08***<br>[0.02]   | 0.08***<br>[0.02]           | 0.07***<br>[0.01]   | 0.07***<br>[0.02]   |
| Ln(GDP per capita)         | 0.31<br>[0.64]              | 0.75<br>[0.53]        | 0.55<br>[0.64]       | 0.37<br>[0.93]              | 0.08<br>[0.83]      | -0.08<br>[0.96]     |
| Ln(Market cap)             | 0.09<br>[0.08]              | 0.08<br>[0.08]        | 0.07<br>[0.08]       | -0.05<br>[0.11]             | -0.04<br>[0.11]     | -0.06<br>[0.11]     |
| Domestic credit            | -1.92E-03*<br>[0.00]        | -2.05E-03**<br>[0.00] | -2.26E-03*<br>[0.00] | -2.86E-04<br>[0.00]         | -2.87E-04<br>[0.00] | 3.09E-02<br>[0.00]  |
| Economic freedom           | 0.02<br>[0.03]              | 0.04*<br>[0.02]       | 0.03<br>[0.03]       | 0.01<br>[0.04]              | -0.01<br>[0.04]     | -0.02<br>[0.04]     |
| Polity                     | -0.08<br>[0.08]             | -0.03<br>[0.07]       | -0.05<br>[0.08]      | 0.01<br>[0.18]              | -0.02<br>[0.18]     | -0.01<br>[0.20]     |
| Turnover                   | -6.96E-04**<br>[0.00]       | -5.74E-04*<br>[0.00]  | -3.72E-04<br>[0.00]  | -1.72E-04<br>[0.00]         | -2.12E-04<br>[0.00] | 4.64E-05<br>[0.00]  |
| Constant                   | 2.16<br>[1.32]              | 1.36<br>[1.18]        | 0.99<br>[1.31]       | -9.09***<br>[2.42]          | -8.49***<br>[2.33]  | -8.07***<br>[2.61]  |
| Year FE?                   | Yes                         | Yes                   | Yes                  | Yes                         | Yes                 | Yes                 |
| Industry FE?               | Yes                         | Yes                   | Yes                  | Yes                         | Yes                 | Yes                 |
| Domicile Nation FE?        | Yes                         | Yes                   | Yes                  | Yes                         | Yes                 | Yes                 |
| Cragg-Donald F-stat        | 213.95                      | 184.53                | 147.71               | 213.95                      | 184.53              | 147.71              |
| Stock-Yogo level exceeded? | 10%                         | 10%                   | 10%                  | 10%                         | 10%                 | 10%                 |
| Observations               | 64,995                      | 64,995                | 60,317               | 64,868                      | 64,868              | 60,207              |
| Pseudo R <sup>2</sup>      | 0.161                       | 0.161                 | 0.1684               | 0.2817                      | 0.2817              | 0.2835              |

Notes: The IV second-stage probit model used for PCs is  $Pr(Exit_i) = \alpha + \phi_0 Intl_i^* + \phi_1 X_i + \phi_2 Inv_{ij} + \phi_3 I_j + \phi_4 T_j + \phi_5 Y_k + \phi_6 C_j + \epsilon$  where Exit is a PC exit via IPO in Models 1–3 and M&A in Models 4–6.  $Inv_{ij}$  is a vector of investment-specific data such as: Investment term, Yrs since last inv, Portfolio size/mgr and Industry M/B.  $X_i$  is a vector of VC characteristics including: Prefer to originate, Corporate VC, Early stage, Expertise and VC syndicate size.  $I_j$  is an indicator variable for the PC firm's industry, and  $T_j$  is an indicator variable for the year of last VC investment.  $Y_k$  is a vector of macroeconomic variables including VC supply, Ln(GDP per capita), Ln(Market cap), Domestic credit, Economic freedom, Polity and Turnover. Each macroeconomic variable is defined as the value in the PC nation in year  $t-1$ , and  $C_j$  is an indicator for the domicile country of the PC.  $Intl_i^*$  is the predicted value of Intl from the first stage OLS model:  $Intl_i = \alpha + \gamma_0 CMLOF_{ij} + \gamma_1 X_i + \gamma_2 Inv_{ij} + \gamma_3 I_j + \gamma_4 T_j + \gamma_5 Y_k + \gamma_6 C_j + \epsilon$ . Definitions for control variables are in the Appendix. Standard errors are reported in brackets and are clustered around the PC. Sample includes VC/PC relationships in SDC Platinum where the last year the portfolio company was updated was between 2000 and 2010, and last investment in a portfolio company was between 1995 and 2010. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .



Table 4 Instrumented PC exit performance

| Intl =                | LnProceeds for Exit via IPO |                  |                 | LnDeal value for Exit via M&A |                  |                 |
|-----------------------|-----------------------------|------------------|-----------------|-------------------------------|------------------|-----------------|
|                       | PctIntlVC                   | LnNum IntlNation | PctIntlVC Money | PctIntlVC                     | LnNum IntlNation | PctIntlVC Money |
| Intl                  | 9.84*                       | 8.32*            | 11.28*          | -6.68***                      | -5.59***         | -6.83***        |
|                       | [5.65]                      | [4.78]           | [6.02]          | [0.30]                        | [0.20]           | [0.23]          |
| Investment term       | 0.21***                     | 0.22***          | 0.21***         | -0.02**                       | -0.03***         | -0.03***        |
|                       | [0.04]                      | [0.04]           | [0.04]          | [0.01]                        | [0.01]           | [0.01]          |
| Yrs since last inv    | -0.94***                    | -0.95***         | -0.87***        | 2.69***                       | 2.70***          | 2.67***         |
|                       | [0.10]                      | [0.10]           | [0.12]          | [0.01]                        | [0.01]           | [0.01]          |
| Portfolio size/Mgr    | -0.09**                     | -0.05            | -0.07           | -0.09***                      | -0.11***         | -0.10***        |
|                       | [0.04]                      | [0.05]           | [0.05]          | [0.02]                        | [0.02]           | [0.02]          |
| Industry M/B          | -0.25                       | -0.34            | -0.23           | 1.18***                       | 1.23***          | 1.15***         |
|                       | [0.28]                      | [0.28]           | [0.29]          | [0.03]                        | [0.03]           | [0.03]          |
| Prefer to originate   | -0.42*                      | -0.43*           | -0.25           | 0.47***                       | 0.48***          | 0.35***         |
|                       | [0.22]                      | [0.22]           | [0.20]          | [0.07]                        | [0.07]           | [0.07]          |
| Corporate VC          | -1.22***                    | -1.37***         | -1.22***        | 0.00                          | 0.08***          | -0.04           |
|                       | [0.35]                      | [0.42]           | [0.35]          | [0.02]                        | [0.03]           | [0.02]          |
| Early stage           | -0.74***                    | -0.78***         | -0.75***        | -0.33***                      | -0.31***         | -0.25***        |
|                       | [0.28]                      | [0.26]           | [0.26]          | [0.07]                        | [0.07]           | [0.07]          |
| Ln(Expertise)         | 0.52***                     | 0.55***          | 0.56***         | 0.30***                       | 0.28***          | 0.26***         |
|                       | [0.13]                      | [0.12]           | [0.12]          | [0.04]                        | [0.04]           | [0.04]          |
| Ln(VC syndicate size) | 1.97***                     | 0.43             | 1.89***         | 2.09***                       | 3.00***          | 2.07***         |
|                       | [0.44]                      | [1.26]           | [0.49]          | [0.06]                        | [0.07]           | [0.06]          |
| VC supply             | -0.30                       | 0.01             | -0.41*          | 0.45***                       | 0.26***          | 0.44***         |
|                       | [0.19]                      | [0.07]           | [0.22]          | [0.02]                        | [0.02]           | [0.02]          |
| Ln(GDP per capita)    | 0.60                        | 3.40             | 1.68            | 4.68***                       | 2.38***          | 1.74***         |
|                       | [6.50]                      | [5.41]           | [6.33]          | [0.11]                        | [0.11]           | [0.11]          |
| Ln(Market cap)        | 2.15**                      | 2.07**           | 1.95**          | 0.43***                       | 0.49***          | 0.48***         |
|                       | [0.85]                      | [0.85]           | [0.91]          | [0.06]                        | [0.06]           | [0.06]          |
| Domestic credit       | -3.89E-03                   | -4.88E-03        | -0.01           | -0.01***                      | -0.01***         | -0.01***        |
|                       | [0.01]                      | [0.01]           | [0.01]          | [0.00]                        | [0.00]           | [0.00]          |
| Economic freedom      | 0.26                        | 0.39*            | 0.28            | 0.01***                       | -0.09***         | -0.14***        |
|                       | [0.28]                      | [0.23]           | [0.28]          | [0.00]                        | [0.00]           | [0.00]          |
| Polity                | -0.31                       | -6.50E-04        | -0.25           | 24.13***                      | 23.90***         | 23.78***        |
|                       | [1.10]                      | [1.07]           | [1.11]          | [0.01]                        | [0.01]           | [0.01]          |
| Turnover              | -0.01***                    | -0.01***         | -0.01**         | -2.21E-03***                  | -2.75E-03***     | -3.27E-04       |
|                       | [0.00]                      | [0.00]           | [0.00]          | [0.00]                        | [0.00]           | [0.00]          |
| Constant              | -10.32                      | -15.27           | -14.87          | -259.43***                    | -255.15***       | -248.96***      |
|                       | [14.29]                     | [13.28]          | [14.32]         | [0.11]                        | [0.11]           | [0.11]          |
| Year FE?              | Yes                         | Yes              | Yes             | Yes                           | Yes              | Yes             |
| Industry FE?          | Yes                         | Yes              | Yes             | Yes                           | Yes              | Yes             |
| Domicile Nation FE?   | Yes                         | Yes              | Yes             | Yes                           | Yes              | Yes             |
| Cragg-Donald F-stat   | 142.05                      | 137.59           | 114.31          | 108.89                        | 120.83           | 95.26           |
| Stock-Yogo            | 10%                         | 10%              | 10%             | 10%                           | 10%              | 10%             |
| level exceeded?       |                             |                  |                 |                               |                  |                 |
| Observations          | 51,434                      | 51,434           | 47,580          | 50,651                        | 50,651           | 46,893          |
| Pseudo R <sup>2</sup> | 0.1207                      | 0.1207           | 0.1216          | 0.2545                        | 0.2545           | 0.252           |

Notes: The IV second-stage tobit model used for PCs is  $\ln(\text{SuccessfulExit}_i) = \alpha + \lambda_0 \text{Intl}_i^* + \lambda_1 X_i + \lambda_2 \ln \text{Inv}_{ij} + \lambda_3 I_i + \lambda_4 T_j + \lambda_5 Y_k + \lambda_6 C_j + \varepsilon$  where SuccessfulExit is the natural log of the total value of a PCs exit (i.e., Deal value for M&A, Proceeds for IPO, or \$0 for unsuccessful) in millions of 2005 dollars.  $\text{Inv}_{ij}$  is a vector of investment-specific data such as: Investment term, Yrs since last inv, Portfolio size/mgr and Industry M/B.  $X_i$  is a vector of VC characteristics including: Prefer to originate, Corporate VC, Early stage, Expertise and VC syndicate size.  $I_i$  is an indicator variable for the PC firm's industry, and  $T_j$  is an indicator variable for the year of last VC investment.  $Y_k$  is a vector of macroeconomic variables including VC supply, Ln(GDP per capita), Ln(Market cap), Domestic credit, Economic freedom, Polity and Turnover. Each macroeconomic variable is defined as the value in the PC nation in year  $t-1$ , and  $C_j$  is an indicator for the domicile country of the PC.  $\text{Intl}_i^*$  is the predicted value of  $\text{Intl}_i$  from the first stage OLS model:  $\text{Intl}_i = \alpha + \gamma_0 \text{CMLOF}_{ij} + \gamma_1 X_i + \gamma_2 \ln \text{Inv}_{ij} + \gamma_3 I_i + \gamma_4 T_j + \gamma_5 Y_k + \gamma_6 C_j + \varepsilon$ . Definitions for control variables are in the Appendix. Standard errors are reported in brackets and are clustered around the PC. Performance data comes from SDC Platinum's M&A and Global New Issues databases. Sample includes VC/PC relationships in SDC Platinum where the last year the portfolio company was updated was between 2000 and 2010, and last investment in a portfolio company was between 1995 and 2010. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

**FURTHER ENDOGENEITY TESTS**

Since endogeneity is a concern in our data, we provide additional tests beyond our instrumented variable approach and control variables/fixed effects to ensure that endogeneity is not masking the true relationship between our variable of interest and our outcome variables including Matching and Difference-in-difference.<sup>20</sup>

To test that our results are robust, we use the Abadie – Imbens matching technique.<sup>21</sup> We match the closest two PCs with domestic syndicates to our treated firms: those PCs that have international VC syndicates. First, firms are matched exactly on domicile nation, year, and industry. Then, nearest-neighbor matching is used for all other variables per the model specification. We report the bias-corrected values of the difference in firm performance or proceeds with the corresponding standard error (in the brackets underneath) and *t*-stat in Table 5. In every case, we find results that are qualitatively similar to those found in Tables 2–4. Specifically, the statistical significance is retained, if not enhanced, for successful outcomes (Models 1 and 2) and IPO proceeds (Models 5 and 6). Results in Models 3 and 4 show no statistical significance for M&A deal value. Overall, the results of the article remain quite robust suggesting that endogeneity does not drive the results supporting Hypotheses 1–3.

To complement our matching analysis in minimizing the probability that endogeneity is causing our results, we consider difference-in-difference tests to assess the effect of a structural break in the level of international VC syndication (*% of investors*) across

our sample period. To this end, we examine the effect of financial liberalization in specific countries (specifically, South Korea and India) that liberalize during our sample period. Table 6 reports the difference-in-difference regressions. The results of our difference-in-difference analysis support our base results. This support is evidenced by the positive and significant marginal effect on the interaction term (Treat\*After) in all of the models that test our hypotheses.

In untabulated results, we examine several other aspects of the data to minimize our concern that endogeneity is a problem in our analysis. We examine two cases: (1) when international investors are from countries with a weaker vs stronger legal environment relative to the entrepreneur’s home country, and (2) when international investors have more or less expertise vs the local investor. For the former, the statistical and economic significance are qualitatively identical. For the latter, statistical significance is identical, although the economic significance is marginally less pronounced for the subset of international investors with less expertise. In this regard, it is quite notable that if more promising firms are more likely to attract investors from higher quality legal environments and more experienced investors, these robustness checks are important in that they show that the data are consistent with the view that the benefits from internationalization of a firm’s investor base is not explained by reverse causality. Overall, the results of the paper remain quite robust suggesting that endogeneity does not drive the results supporting Hypotheses 1–3.

**Table 5** Advanced matching estimators

| PC Success            | Ln(SuccessfulExit) |                   | Ln(Deal value) |                | Ln (Proceeds)     |                 |
|-----------------------|--------------------|-------------------|----------------|----------------|-------------------|-----------------|
|                       | 1<br>2 Matches     | 2<br>2 Matches    | 3<br>2 Matches | 4<br>2 Matches | 5<br>2 Matches    | 6<br>2 Matches  |
| Mean Difference: Intl | 0.36***<br>[0.09]  | 0.34***<br>[0.09] | 0.25<br>[0.15] | 0.21<br>[0.16] | 0.44***<br>[0.14] | 0.16*<br>[0.09] |
| Total Obs             | 2844               | 2808              | 1650           | 1633           | 2221              | 2102            |
| Size                  | No                 | Yes               | No             | Yes            | No                | Yes             |
| CMLOF                 | No                 | Yes               | No             | Yes            | No                | Yes             |
| Domicile Match        | Yes                | Yes               | Yes            | Yes            | Yes               | Yes             |
| Industry Match        | Yes                | Yes               | Yes            | Yes            | Yes               | Yes             |
| Year Match            | Yes                | Yes               | Yes            | Yes            | Yes               | Yes             |

Notes: This table presents the results from Abadie – Imbens matching. We match each international syndicate firm to 2 different non-international syndicate firms from the same country and compare the measures of our “success” proxies (*SuccessfulExit*, *Deal value* or *Proceeds*). Firms are matched exactly on domicile nation, year, and industry. Nearest neighbor matching is used for all other variables per the model specification. We report the bias-corrected values of the difference in firm performance or proceeds with the corresponding standard error (in the brackets underneath) and *t*-stat. The total number of firms (internationally connected and not) are reported in the row named “Total Obs”. Intl is an indicator variable set equal to 1 if a PC has at least one VC from a nation other than the PCs domicile nation. \*\* *p*<0.05, \*\*\* *p*<0.01.

**Table 6** Difference-in-differences

| PC Success                  | Current Status – Mlogit     |                            |                            | SuccessfulOutcome – Probit                      |                   | PC exit performance – Tobit |                    |
|-----------------------------|-----------------------------|----------------------------|----------------------------|---|-------------------|-----------------------------|--------------------|
|                             | 1<br>Prob<br>(Unsuccessful) | 2<br>Prob(Exit<br>via M&A) | 3<br>Prob(Exit<br>via IPO) | 4<br>Prob(Successful<br>outcome– IPO<br>or M&A) | 5                 | 6<br>Ln(SuccessfulExit)     | 7                  |
| Treat*After                 | -76.01***<br>[5.86]         | 63.66***<br>[4.26]         | 12.35**<br>[5.81]          | 1.50***<br>[0.35]                               | 1.26***<br>[0.35] | 34.71***<br>[0.19]          | 32.91***<br>[0.20] |
| Treat                       | 0.13***<br>[0.03]           | -0.08***<br>[0.00]         | -0.05<br>[0.03]            | 3.06***<br>[0.42]                               | 4.56***<br>[0.49] | 6.73***<br>[0.19]           | 8.83***<br>[0.20]  |
| After                       | 0.05<br>[0.05]              | 0.04***<br>[0.00]          | -0.09*<br>[0.05]           | 0.18<br>[1.44]                                  | 0.19<br>[0.13]    | -0.70***<br>[0.08]          | -0.59***<br>[0.08] |
| Controls                    | Table 2                     | Table 2                    | Table 2                    | Table 3 Model 1                                 | Table 3 Model 2   | Table 4 Model 1             | Table 4 Model 2    |
| Year, Industry, Country FE? | Yes                         | Yes                        | Yes                        | Yes   | Yes               | Yes                         | Yes                |
| Observations                | 67,635                      | 67,635                     | 67,635                     | 68,650  | 67,529            | 56,647                      | 55,734             |
| Pseudo R <sup>2</sup>       | 0.2357                      | 0.2357                     | 0.2357                     | 0.1811  | 0.186             | 0.1021                      | 0.1069             |

Notes: The multinomial logit model used in successful exit PC analysis is:  $Pr(CurrentStatus_t) = \psi(\alpha + \delta_1 X_i + \delta_2 Inv_{ij} + \delta_3 I_j + \delta_4 T_j + \delta_5 Y_k + \delta_6 Treat^*After_{t-1} + \delta_7 Treat_{t-1} + \delta_8 After_t)$  where  $\psi$  is the cumulative logistic probability distribution function. Current Status is the current status of the PC: Unsuccessful (i.e., Private or Defunct), M&A or IPO.  $Inv_{ij}$  is a vector of investment-specific data such as: Investment term, Yrs since last inv, Portfolio size/mgr and Industry M/B.  $X_i$  is a vector of VC characteristics including: Prefer to originate, Corporate VC, Early stage, Expertise and VC syndicate size.  $I_j$  is an indicator variable for the PC firm's industry, and  $T_j$  is an indicator variable for the year of last VC investment.  $Y_k$  is a vector of macroeconomic variables including VC supply, Ln(GDP per capita), Ln(Market cap), Domestic credit, Economic freedom, Polity, and Turnover. Each macroeconomic variable is defined as the value in the PC nation in year  $t-1$ . The probit model used in successful PC exit analysis is:  $Pr(SuccessfulOutcome_t) = \alpha + \phi_1 X_i + \phi_2 Inv_{ij} + \phi_3 I_j + \phi_4 T_j + \phi_5 Y_k + \phi_6 C_j + \phi_7 Treat^*After_{t-1} + \phi_8 Treat_{t-1} + \phi_9 After_t + \epsilon$  where SuccessfulOutcome is an indicator variable taking the value of 1 if a PC exits via M&A or IPO, and 0 otherwise, and  $C_j$  is an indicator for the domicile country of the PC, and all other variables are defined above. The tobit model used in PC exit performance analysis is:  $Ln(SuccessfulExit_t) = \alpha + \omega_1 X_i + \omega_2 Inv_{ij} + \omega_3 I_j + \omega_4 T_j + \omega_5 Y_k + \omega_6 C_j + \omega_7 Treat^*After_{t-1} + \omega_8 Treat_{t-1} + \omega_9 After_t + \epsilon$  where SuccessfulExit<sub>t</sub> is the natural log of 1 plus the total value of a PC's exit (i.e., deal value for M&A, proceeds for IPO, or \$0 for unsuccessful) in millions of 2005 dollars, and all other variables are defined above. Treat<sub>t</sub> is defined as an indicator variable set equal to 1 if a PC is domiciled in Korea or India, and 0 otherwise. After<sub>t</sub> is an indicator variable set equal to 1 if the year of last investment is after 1995, and 0 otherwise. Definitions for control variables are in the Appendix. Standard errors are reported in brackets and are clustered around the PC. Performance data comes from SDC Platinum's M&A and Global New Issues databases. Sample includes VC/PC relationships in SDC Platinum where the last year the portfolio company was updated was between 2000 and 2010, and last investment in a portfolio company was between 1995 and 2010. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

Given the battery of robustness tests employed in our analysis, it is our suggestion that the results found herein are not skewed based on endogeneity. We acknowledge, however, that there is currently no way to empirically rule this out completely. Though we have undertaken all of the econometric techniques possible to allay fears of endogeneity, there is a chance, however small, that endogeneity remains a problem.

**SOURCES OF INTERNATIONALIZATION BENEFITS**

To examine the channel through which the benefit of VC syndicate internationalization might flow, we segregate the data based on three aspects of VCs: (1) access to capital, (2) international deal experience, and (3) VC connectedness. Analyzing subsamples bifurcating at proxy medians, we find evidence suggesting that the benefit of internationalization stems from VC access to capital. Less evidence exists for the internationalization benefit stemming from VC international deal experience and VC

connectedness.<sup>22</sup> Since this analysis does little to isolate individual benefit sources, it is difficult to pinpoint which sources are most important. For brevity, therefore, these results are not included but are available upon request.

In an effort to further investigate the potential channels through which international benefits are derived, we split our sample into groupings based on our three benefit proxies. In Panel A of Table 7, we analyze a sample of firms with international syndicates that fall above the median in one of our benefit categories, while falling below the median in the remaining two categories. This isolates the benefit associated with an individual benefit source. In Panel B, we repeat this analysis using our firms with international syndicates that fall above the median in two benefit categories, while falling below the median in the remaining category. This allows us to ascertain whether certain combinations of benefits are important.

Looking to Panel A of Table 7, our methodology of isolating benefits reveals that Access to Capital is the

**Table 7** Benefit derivation of VC internationalization

Panel A: One benefit proxy above the media, two benefit proxies below the median

| PC outcome  | Probability of exit via IPO |                    | Probability of exit via M&A |                  | LnProceeds for Exit via IPO |                       | LnDeal Value for Exit via M&A |                      |
|---|-----------------------------|--------------------|-----------------------------|------------------|-----------------------------|-----------------------|-------------------------------|----------------------|
|   | Un-weighted                 | PR-weighted        | Un-weighted                 | PR-weighted      | Un-weighted                 | PR-weighted           | Un-weighted                   | PR-weighted          |
| <i>Panel A.1: Access to Capital Above Median with International Deal Experience and VC Connectedness Below Median</i> |                             |                    |                             |                  |                             |                       |                               |                      |
| Intl*   | 3.70***<br>[1.08]           | 28.21***<br>[8.25] | 1.36<br>[1.46]              | 10.37<br>[11.13] | 43.02***<br>[13.01]         | 327.80***<br>[99.15]  | -18.47***<br>[0.45]           | -140.73***<br>[0.37] |
| Observations  | 44,164                      | 44,164             | 44,154                      | 44,154           | 34,595                      | 34,595                | 34,468                        | 34,468               |
| Pseudo R <sup>2</sup>   | 0.1521                      | 0.1521             | 0.2958                      | 0.2958           | 0.1231                      | 0.1231                | 0.2624                        | 0.2624               |
| Year, Ind, Cty FE?  | Yes                         | Yes                | Yes                         | Yes              | Yes                         | Yes                   | Yes                           | Yes                  |
| Controls?   | Yes                         | Yes                | Yes                         | Yes              | Yes                         | Yes                   | Yes                           | Yes                  |
| <i>Panel A.2: International Deal Experience Above Median with Access to Capital and VC Connectedness Below Median</i> |                             |                    |                             |                  |                             |                       |                               |                      |
| Intl*   | 2.05<br>[1.39]              | 15.62<br>[10.60]   | 0.49<br>[2.07]              | 3.71<br>[15.75]  | 42.79***<br>[14.67]         | 326.02***<br>[111.77] | -6.17***<br>[0.49]            | -47.01***<br>[0.41]  |
| Observations  | 43,100                      | 43,100             | 43,091                      | 43,091           | 33,895                      | 33,895                | 33,829                        | 33,829               |
| Pseudo R <sup>2</sup>   | 0.1542                      | 0.1542             | 0.3063                      | 0.3063           | 0.1258                      | 0.1258                | 0.2672                        | 0.2672               |
| Year, Ind, Cty FE?  | Yes                         | Yes                | Yes                         | Yes              | Yes                         | Yes                   | Yes                           | Yes                  |
| Controls?   | Yes                         | Yes                | Yes                         | Yes              | Yes                         | Yes                   | Yes                           | Yes                  |
| <i>Panel A.3: VC Connectedness Above Median with International Deal Experience and Access to Capital Below Median</i> |                             |                    |                             |                  |                             |                       |                               |                      |
| Intl*   | 0.23<br>[1.25]              | 1.75<br>[9.55]     | 0.07<br>[1.63]              | 0.54<br>[12.39]  | 7.59***<br>[0.44]           | 57.86***<br>[0.38]    | 4.74***<br>[0.46]             | 36.15***<br>[0.35]   |
| Observations  | 44,317                      | 44,317             | 44,309                      | 44,309           | 34,747                      | 34,747                | 34,632                        | 34,632               |
| Pseudo R <sup>2</sup>   | 0.1532                      | 0.1532             | 0.2990                      | 0.2990           | 0.1233                      | 0.1233                | 0.2642                        | 0.2642               |
| Year, Ind, Cty FE?  | Yes                         | Yes                | Yes                         | Yes              | Yes                         | Yes                   | Yes                           | Yes                  |
| Controls?   | Yes                         | Yes                | Yes                         | Yes              | Yes                         | Yes                   | Yes                           | Yes                  |

Panel B: Two benefit proxies above the median, one benefit proxy below the median

| PC outcome  | Probability of exit via IPO |                    | Probability of exit via M&A |                 | LnProceeds for Exit via IPO |                       | LnDeal Value for Exit via M&A |                     |
|---|-----------------------------|--------------------|-----------------------------|-----------------|-----------------------------|-----------------------|-------------------------------|---------------------|
|   | Un-weighted                 | PR-weighted        | Un-weighted                 | PR-weighted     | Un-weighted                 | PR-weighted           | Un-weighted                   | PR-weighted         |
| <i>Panel B.1: Access to Capital and International Deal Experience Above Median with VC Connectedness Below Median</i> |                             |                    |                             |                 |                             |                       |                               |                     |
| Intl*   | 4.14***<br>[1.09]           | 31.56***<br>[8.29] | 0.53<br>[1.41]              | 4.06<br>[10.72] | 49.21***<br>[0.36]          | 374.97***<br>[0.34]   | 2.11***<br>[0.41]             | 16.09***<br>[0.33]  |
| Observations  | 44,943                      | 44,943             | 44,942                      | 44,942          | 35,367                      | 35,367                | 35,201                        | 35,201              |
| Pseudo R <sup>2</sup>   | 0.1526                      | 0.1526             | 0.2995                      | 0.2995          | 0.1244                      | 0.1244                | 0.2672                        | 0.2672              |
| Year, Ind, Cty FE?  | Yes                         | Yes                | Yes                         | Yes             | Yes                         | Yes                   | Yes                           | Yes                 |
| Controls?   | Yes                         | Yes                | Yes                         | Yes             | Yes                         | Yes                   | Yes                           | Yes                 |
| <i>Panel B.2: Access to Capital and VC Connectedness Above Median with International Deal Experience Below Median</i> |                             |                    |                             |                 |                             |                       |                               |                     |
| Intl*   | 3.39***<br>[1.27]           | 25.82***<br>[9.67] | 0.34<br>[1.77]              | 2.60<br>[13.52] | 37.85***<br>[13.48]         | 288.43***<br>[102.71] | 26.01***<br>[0.49]            | 198.21***<br>[0.40] |
| Observations  | 42,971                      | 42,971             | 42,941                      | 42,941          | 33,590                      | 33,590                | 33,483                        | 33,483              |
| Pseudo R <sup>2</sup>   | 0.1521                      | 0.1521             | 0.2976                      | 0.2976          | 0.1228                      | 0.1228                | 0.2654                        | 0.2654              |
| Year, Ind, Cty FE?  | Yes                         | Yes                | Yes                         | Yes             | Yes                         | Yes                   | Yes                           | Yes                 |
| Controls?   | Yes                         | Yes                | Yes                         | Yes             | Yes                         | Yes                   | Yes                           | Yes                 |
| <i>Panel B.3: VC Connectedness and International Deal Experience Above Median with Access to Capital Below Median</i> |                             |                    |                             |                 |                             |                       |                               |                     |
| Intl*   | 2.43**<br>[1.22]            | 18.55**<br>[9.31]  | 0.68<br>[1.96]              | 5.20<br>[14.91] | 43.47***<br>[12.78]         | 331.22***<br>[97.37]  | -5.21***<br>[0.47]            | -39.67***<br>[0.40] |
| Observations  | 43,876                      | 43,876             | 43,859                      | 43,859          | 34,512                      | 34,512                | 34,438                        | 34,438              |
| Pseudo R <sup>2</sup>   | 0.1537                      | 0.1537             | 0.3073                      | 0.3073          | 0.1251                      | 0.1251                | 0.2682                        | 0.2682              |
| Year, Ind, Cty FE?  | Yes                         | Yes                | Yes                         | Yes             | Yes                         | Yes                   | Yes                           | Yes                 |

Table 7: (Continued)

Panel B: Two benefit proxies above the median, one benefit proxy below the median

| PC outcome | Probability of exit via IPO |             | Probability of exit via M&A |             | LnProceeds for Exit via IPO |             | LnDeal Value for Exit via M&A |             |
|------------|-----------------------------|-------------|-----------------------------|-------------|-----------------------------|-------------|-------------------------------|-------------|
|            | Un-weighted                 | PR-weighted | Un-weighted                 | PR-weighted | Un-weighted                 | PR-weighted | Un-weighted                   | PR-weighted |
| Controls?  | Yes                         | Yes         | Yes                         | Yes         | Yes                         | Yes         | Yes                           | Yes         |

Notes: The IV second-stage probit model used for PCs is  $Pr(Exit_{it}) = \alpha + \phi_0 IntI_{it}^* + \phi_1 X_{it} + \phi_2 Inv_{it} + \phi_3 I_{it} + \phi_4 T_{it} + \phi_5 Y_{it} + \phi_6 C_{it} + \epsilon$  where Exit is an indicator variable taking the value of 1 if a PC exits via M&A (Exit via M&A) or IPO (Exit via IPO), and 0 otherwise.  $Inv_{it}$  is a vector of investment-specific data such as: Investment term, Yrs since last inv, Portfolio size/mgr and Industry M/B.  $X_{it}$  is a vector of VC characteristics including: Prefer to originate, Corporate VC, Early stage, Expertise and VC syndicate size.  $I_{it}$  is an indicator variable for the PC firm's industry, and  $T_{it}$  is an indicator variable for the year of last VC investment.  $Y_{it}$  is a vector of macroeconomic variables including VC supply, Ln(GDP per capita), Ln(Market cap), Domestic credit, Economic freedom, Polity, and Turnover. Each macroeconomic variable is defined as the value in the PC nation in year  $t-1$ , and  $C_{it}$  is an indicator for the domicile country of the PC.  $IntI_{it}^*$  is defined as  $PctIntI_{it}VC$  or  $PctIntI_{it}VC$  PR in the predicted value of  $IntI_{it}$  from the first stage OLS model:  $IntI_{it} = \alpha + \gamma_0 CMLOF_{it} + \gamma_1 X_{it} + \gamma_2 Inv_{it} + \gamma_3 I_{it} + \gamma_4 T_{it} + \gamma_5 Y_{it} + \gamma_6 C_{it} + \epsilon$ . The IV second-stage tobit model used for PCs is  $Ln(SuccessfulExit) = \alpha + \lambda_0 IntI_{it}^* + \lambda_1 X_{it} + \lambda_2 Inv_{it} + \lambda_3 I_{it} + \lambda_4 T_{it} + \lambda_5 Y_{it} + \lambda_6 C_{it} + \epsilon$  where SuccessfulExit is the natural log of 1 plus the total value of a PCs exit (i.e., deal value for M&A, proceeds for IPO, or \$0 for unsuccessful) in millions of 2005 dollars, and all other variables are defined above. For this table we run our analyses on a subset of our original data. Specifically we split our sample based on the median values of our three benefit proxies: Access to capital, International deal experience, or VC connectedness. Access to capital is proxied by the total capital under management for a VC, International deal experience is proxied as the number of unique international syndicates a VC is part of prior to the year of last investment in PC<sub>*i*</sub>, and VC connectedness is proxied by a network variable measured as the total number of VCs a VC has syndicated with in the 5 years prior to the year of last investment in PC<sub>*i*</sub> normalized by the total possible VC/VC pairs. Panel A reports the results for international syndicates having one of our three benefit proxies above the median, but falling below the median for the other two benefit proxies. Panel B reports results for international syndicates having two of our three proxies above the median, but falling below the median for the third benefit proxy. Definitions for control variables are in the Appendix. Standard errors are reported in brackets and are clustered around the PC. Performance data comes from SDC Platinum's M&A and Global New Issues databases. Sample includes VC/PC relationships in SDC Platinum where the last year the portfolio company was updated was between 2000 and 2010, and last investment in a portfolio company was between 1995 and 2010. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

only benefit source that is associated with an increased likelihood of IPO exit (Models 1 and 2). As in prior results, there is very little evidence of an effect of internationalization on M&A exits (Models 3 and 4). Our methodology is unable to reveal much about the relative importance of the benefit sources statistically speaking since all models are significant at the 1% level. Economically speaking, the results suggest that Access to Capital and International Deal Experience are more important than VC Connectedness.

In panel B, all three pairs of benefits are significantly (both economically and statistically) associated with a higher probability of IPO exit and higher proceeds. In line with previous results on M&A deal values, we see a negative association between internationalization and M&A deal values when both VC connectedness and international deal experience are above the median. Interestingly, the effect on deal value becomes significantly positive when greater access to capital is paired with either more international deal experience, or greater connections, suggesting once again that Access to Capital is the most important benefit source. Overall, these findings suggest that the benefits of internationalization are derived from VCs with better access to capital, and (marginally) more international deal experience and better connections.

### LIMITATION OF ANALYSIS AND FUTURE RESEARCH

Due to the private status of the PCs included in this analysis, these companies do not have to adhere to the disclosure standards or the quarterly filings imposed by a government enforcer (e.g., the Securities and Exchange Commission in the United States). Moreover, due to the illiquidity of private equity funds and the longer-term investment duration, credible valuation is almost impossible. As such, the performance measures included in M&A analysis are either voluntarily provided by the firms or estimated by *SDC Platinum*. To the extent that this information is either exaggerated (e.g., to encourage future investment) or estimated incorrectly, the analysis may be somewhat biased. Further, *SDC's Mergers & Acquisitions* and *Global New Issues* databases do not list VC firm names for all IPOs with VC-backing, and does not contain any information on domicile nation of VCs. To the extent that VC firm names were not listed, or could not be merged with *VentureXpert* VC data, the IPO analysis may be somewhat biased.

We have considered other robustness checks that are not reported herein but are available on request. First, we included variables for other types of VCs, including bank-affiliated VCs and government VCs. These fund types were a much smaller portion of our sample, and did not materially impact our findings.



Second, we considered including an indicator variable for whether a deal occurred after the recent financial crisis. Third, we have tried different models including (1) alternate macroeconomic variables and (2) levels of the domicile nations of the venture capitalists (PC exit analysis) and the acquiring firm (M&A analysis) as well as the listing nation (IPO analysis). Fourth, we considered exclusion of different countries such as the United States and United Kingdom for the sample, as well as different subperiods. Similarly, as discussed above, we considered subsets of deals depending on whether or not the investors came from higher quality or lower quality legal environments. In all cases, the results are at least qualitatively similar and in most cases are qualitatively identical. These results, among others, are available on request.

### CONCLUSION

Much research has been conducted on the benefits of internationalizing a *public* firm's shareholder base. Most of the benefits of investor internationalization for public firms surround operational expansion, name recognition and a reduction in the cost of capital. Research on VC suggests that it is the advice that VCs offer that helps their invested firms to ultimately succeed, in many cases reaching public markets via IPO (as well as superior post-IPO performance). Since internationalizing a PC's investor base may put this touted benefit of the VC/PC relationship at risk, and since these small firms are not at a point where they can be expanding their operations into foreign countries or where there name would have any international recognition on which to build, it isn't immediately obvious that internationalizing their investor base would be beneficial. That said, research on VC syndicates suggest that VC networks are valuable to PCs and the scope of these networks may impact their ultimate success.

Our research seeks to find which effect is stronger and ultimately whether or not internationalization of a PC's investor base is beneficial, with regard to either their private firm outcome (i.e., failure, remaining private, exiting via M&A or exiting via IPO) or their exit success (i.e., M&A deal value or IPO proceeds and underpricing).

Our findings suggest that the internationalization of a VC syndicate is insignificantly associated with the probability of an M&A exit but significantly positively associated with the likelihood of an IPO exit, which according to extant literature, is the preferred mode of exit for PCs. The internationalization of VC syndicates is weakly associated with M&A

deal value and strongly associated with IPO proceeds raised. Our results are robust to a number of checks for endogeneity. We explored some evidence that the magnitude of the internationalization benefit for IPOs may well be increasing at an increasing rate, but hope this issue of nonlinearity will be explored in further detail in future work. These results suggest that private firms may be wise to consider internationally syndicated VCs. Likewise, VCs may want to consider more internationally diverse syndicates. Finally, policymakers should encourage international VC investment into their countries.

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### NOTES

<sup>1</sup>The home bias literature addresses many reasons why investors opt to invest in companies within close proximity – that is, in the same country, to them. See, for example, Chan, Covrig, and Ng (2005) for reasons why investors opt for familiarity. It is noteworthy that much of this literature examines public firms (vs the private firms we examine in our article).

<sup>2</sup>Since private firms in most countries are not required to disclose financial information, obtaining reliable data on cost of capital is not tractable. We therefore focus on metrics that are more reliable and accessible such as exit outcome and performance of exits such as M&A (deal value) and IPO (proceeds).

<sup>3</sup>We do not mean to suggest here that maximizing deal value/proceeds is the only goal of PCs exiting via M&A or IPO, respectively. A survey by Graham and Harvey (2001) suggests that CFOs rate the following motives for issuing common stock (for the almost 40% of private firm respondents, this equates to an IPO) most important: providing shares for compensation, high stock price, sufficient profits to fund activities and maintaining a target debt-to-equity ratio. All of these are consistent with maximizing proceeds.

<sup>4</sup>Results are robust to dropping those firms who have not exited by 2005 and are available upon request.



<sup>5</sup>The inclusion of Portfolio size/mgr reduces the sample size by roughly half due to missing data. Following Cumming and Knill (2012) we replace missing values of Portfolio size/mgr with 1. Results are robust to omitting this replacement and are available upon request.

<sup>6</sup>Results are robust for other proxies of expertise, such as prior IPO success (Nahata, 2008).

<sup>7</sup>Following Schertler and Tykova (2012), in previous analyses we use the differences between PC and VC nations as alternative macroeconomic measures. Our results were robust to this change.

<sup>8</sup>Results are robust to using number of listed firms rather than market turnover as our measure of stock market development. Due to high multicollinearity between the two proxies, both could not be included in the analyses.

<sup>9</sup>We obtain the longitude and latitude for the nations from the CEPII website ([http://www.cepii.fr/CEPII/fr/bdd\\_modele/download.asp?id=6](http://www.cepii.fr/CEPII/fr/bdd_modele/download.asp?id=6)).

<sup>10</sup>If a country does not have any international VC investment, we replace the domestic CMLOF value with the highest ranking of our index value in our sample (2.72).

<sup>11</sup>The dollar amount invested by each VC was scarcely populated in the data set. If we drop VCs with missing data our sample contains 27,234 observations, roughly a third of our original sample. To reduce the resulting sample bias, we replace missing values of amount invested by VC with the minimum dollar amount VCs prefer to invest in a PC. Results are qualitatively identical when using the variable without replacement and are available upon request.

<sup>12</sup>UN voting records have been used as a political relations proxy in, among others. A comprehensive list of all UN General Assembly votes from 1946 to 2008 is provided by Erik Voeten's website (Voeten & Merdzanovic, 2009 <http://dvn.iq.harvard.edu/dvn/dv/Voeten>).

<sup>13</sup>For robustness we compile results defining "Yes" votes equal to one and "No" votes equal to 0. Results are similar and are omitted for brevity.

<sup>14</sup>The base specification is Public Status = Unsuccessful.

<sup>15</sup>Our CMLOF measure is significantly correlated with each of our six international proxies (i.e., the variable it is instrumenting). CMLOF is not highly correlated with our second stage outcome variables; for example, CMLOF and prob(Successful exit) are correlated at 3.50%, while CMLOF and Successful outcome are correlated at 3.71%.

<sup>16</sup>See, for example, Gompers and Lerner (1999), and Nahata (2008).

<sup>17</sup>We do not present PR-weighted international variables in Table 3 for brevity. Results are qualitatively identical and are available upon request.

<sup>18</sup>The marginal effect of CMLOF in this stage is positive. Though this may be initially surprising to some, we note that this supports the contentions of Nahata et al. (2014), who find a positive relationship between cultural distance and PC success. We also note that in untabulated results, we examine the first stage analysis with a squared CMLOF term. This analysis reveals a nonlinear (i.e., convex) relationship between CMLOF and internationalization. This nonlinear relationship allows for the possibility of a positive linear term.

<sup>19</sup>These numbers are extracted from the full models that are provided in the even-numbered models. The first of these numbers is calculated as the percentage increase of  $[\exp(9.84 \times 0.2069) - 1]$  from the sample average of 112.18 (Table 2, Panel A).

<sup>20</sup>See Reeb, Sakakibara, and Mahmood (2012) for a list of techniques to address endogeneity.

<sup>21</sup>In unreported results, we used propensity score matching with results being consistent. Results from Abadie – Imbens matching, which corrects any bias in its matching technique, are used since common support graphs for propensity score matching (available upon request) suggest bias in the propensity score matching.

<sup>22</sup>These results, as well as results separated by quartiles, can be found in the online supplementary information for our unweighted and PR-weighted international proxies.

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## APPENDIX

**Table A1** Variable definitions

| Variable  | Variable definition  | Source   |
|---|--|--|
| <i>Panel A: Outcome variables and variables of interest</i> |  |  |
| PC public status  | The current public status of PC <sub>i</sub> as of status date: unsuccessful (PCs are either written off or remain private), subsidiary (exit via M&A) or public (exit via IPO).   | VentureXpert (VX)  |
| SuccessfulOutcome   | The current public status of PC <sub>i</sub> as of status date: unsuccessful (PCs are either written off or remain private), or successful (exit via M&A or via IPO).  | VX   |
| SuccessfulExit  | The total value of a successful exit in millions of constant 2005 US dollars: the total value of investment between the acquiring investment firms and target PC if exit via M&A or the total proceeds raised in all markets if exit via IPO.  | M&A/Global New Issues (GNI)  |
| Deal value  | The total value of the investment between the acquiring investment firms and the target PC in millions of constant 2005 US dollars.  | M&A  |
| Proceeds  | The total proceeds raised in all markets in millions of constant 2005 US dollars.  | GNI  |
| PctIntIVC   | The number of VCs a PC has outside of the PC's domicile nation scaled by the total number of unique VCs.   | VX, M&A, GNI; own calculation  |
| LnNumIntlNation   | The natural log of the number of unique nations of the VCs in a PC's syndicate, not including the domicile nation of the PC.   | VX, M&A, GNI; own calculation  |
| PctIntIVCMoney  | The amount of money invested in the PC from VCs a PC has outside of the PC's domicile nation scaled by the total amount of money invested in the PC from all VCs.  | VX, M&A, GNI; own calculation  |
| PctIntIVC PR  | The summation of the bilateral political relation measure between the PC and VC for each unique international VC scaled by the total number of unique VCs.   | VX, M&A, GNI; Knill et al. (2012) and Gupta and Yu (2009); own calculation |
| LnNumIntlNation PR  | The natural log of 1 plus the summation of the bilateral political relation measures between the PC and VC for each unique nation of the VCs in a PC's syndicate, not including the domicile nation of the PC.   | VX, M&A, GNI; Knill et al. (2012) and Gupta and Yu (2009); own calculation |
| PctIntIVCMoney PR   | The summation of the product of the bilateral political relation between the VC and PC and the total amount invested by the VC measure amount scaled by the total amount of money invested in the PC from all VCs.   | VX, M&A, GNI; Knill et al. (2012) and Gupta and Yu (2009); own calculation |
| PR  | The distance between UN voting records for a given bilateral pair. Specifically, $PR = 2 - [2 * \text{dist} / \text{maxdist}]$ , where dist is the sum of the distance between votes for a given bilateral pair and year and maxdist is the maximum possible distance between votes for a given bilateral pair and year. | Knill et al. (2012) and Gupta and Yu (2009); own calculation               |
| <i>Panel B: Investment characteristics</i>                  |  |  |
| Investment term   | The year VC <sub>i</sub> last invested in PC <sub>j</sub> minus year VC <sub>i</sub> first invested in PC <sub>j</sub> .   | VX   |
| Yrs since last inv  | The number of years since VC <sub>i</sub> last invested in PC <sub>j</sub> .   | VX   |
| Portfolio size/Mgr  | The number of PCs in which VC fund invests divided by the number of managerial staff in the VC, scaled by 10.  | VX   |



Table A1: (Continued)

| Variable                               | Variable definition  | Source   |
|--|--|--|
| Industry M/B                           | The market-to-book ratio for the industry to which PC <sub>i</sub> belongs ((data item 24 × data item 25)/data item 60).   | Compustat  |
| Size                                   | The natural log of total assets before the offering in millions of US dollars.   | M&A, GNI   |
| <i>Panel C: VC characteristics</i>     |  |  |
| Prefer to originate                    | An indicator variable describing the preferred role VC <sub>i</sub> takes in syndications; equal to 1 if VC <sub>i</sub> prefers to originate and 0 otherwise.   | VX   |
| Corporate VC                           | An indicator variable that takes on a value of 1 where VC <sub>i</sub> is a corporate VC and 0 otherwise.  | VX   |
| Early stage                            | An indicator variable that takes on a value of 1 if VC <sub>i</sub> invests in early-stage PCs and 0 otherwise.  | VX   |
| Ln(Expertise)                          | The natural log of the number of successful funds VC <sub>i</sub> has closed.  | VX; own calculation  |
| VC syndicate size                      | The number of firms (VC <sub>i</sub> ) invested in the PC.   | VX; own calculation  |
| <i>Panel D: Market characteristics</i> |  |  |
| VC supply                              | The natural log of the number of VC deals in a country-year at the time of first investment.   | VX   |
| GDP per capita                         | The GDP per capita in the PC domicile nation. GDP per capita is the natural log of gross domestic product per capita (purchasing power parity) in constant 2005 US dollars in country k.   | WDI  |
| Ln(Market cap)                         | The natural log of the market capitalization of country k in constant 2005 US dollars.   | WDI  |
| Domestic credit                        | The private domestic debt securities issued by institutions and corporations as a share of GDP in the PC domicile nation, country k.   | WDI  |
| Economic freedom                       | An index measuring the level of economic freedom for the PC domicile nation.   | Heritage Foundation  |
| Polity                                 | An index measuring the level of democracy for the PC domicile nation.  | <a href="http://www.sytemicpeace.org/polity/polity4.htm">www.sytemicpeace.org/polity/polity4.htm</a>         |
| Turnover                               | The ratio of the value of total shares traded to market capitalization for the PC domicile nation.   | WDI  |
| CMLOF                                  | The capital markets liability of foreignness between the PC and VCs domicile nations. This is an index based on the cumulated distance of our four distance variables: Geographic distance, Cultural distance, Legal distance, and Information flow distance. The resulting index could range from 0 (no capital markets LOF) to 4 (high capital markets LOF). For domestic PC/VC pairs we replace CMLOF with the average CMLOF measure for the PC nation in the year of last investment for unsuccessful firms and year of exit for successful firms. | WDI, Bell et al. (2012); own calculation   |
| CMLOF legal                            | The cumulated value of the absolute value of legal index distance between the PC and VCs domicile nations. This is an index based on three legal components: Accounting distance, Enforcement distance, and Shareholder rights distance. The value is normalized to create a range from 0 (low legal distance) to 1 (high legal distance).   | Nahata et al. (2014); Spamann (2010); La Porta et al. (1998) and Transparency International; own calculation |
| Accounting                             | LLSV's accounting standard measure normalized to create a range from 0 to 1.   | Nahata et al. (2014) and La Porta et al. (1998)  |
| Enforcement                            | A country-specific index comprised of the cumulate value of four components: corruption level, efficiency of judicial system, rule of law, risk of expropriation, and repudiation of contracts ratings. Each rating is normalized as is the final index value, creating a range in values from 0 to 1.   | Nahata et al. (2014); La Porta et al. (1998) and Transparency International                                  |
| Shrhlr rights                          | The revised anti-director rights index, normalized to create a range in values from 0 to 1.  | Spamann (2010)   |
| CMLOF info asymmetry                   | The cumulated value of the absolute value of information asymmetry index distance between the PC and VCs domicile nations. This is an index based on two information components: the number of Internet users per 100 people, and the number of phone lines per 100 people in a given country. The index value is normalized to create a range from 0 (low informational distance) to 1 (high informational distance).   | WDI; own calculation   |

Table A1: (Continued)

| Variable             | Variable definition   | Source  |
|----------------------|---|---|
| CMLOF geographic     | The great circle distance (in kilometers) between the capitals of the PC and VC domicile nations. This distance is normalized to create a range in values from 0 (no geographical distance) to 1 (large geographical distance).   | Coval and Mosokwitz (2001, 1999); own calculation         |
| CMLOF culture        | The cumulated value of the square root of the squared cultural distance between the PC and VCs domicile nations. This is an index based on the four Hofstede culture components: Masculinity, Individualism, Power Distance, and Uncertainty avoidance. The index value is normalized to create a range from 0 (low cultural distance) to 1 (high cultural distance). | Nahata et al. (2014) and Hofstede (1980); own calculation |
| Treat                | An indicator variable taking the value of 1 if a PC is domiciled in Korea or India.   | Bekaert, Harvey, and Lundblad (2005)                      |
| After                | An indicator variable taking the value of 1 if the year is greater than 1995.   | Bekaert et al. (2005)                                     |
| Total amnt inv in PC | The total dollar amount invested in a PC by all the VCs in the syndicate.   | VX  |
| Access to capital    | The amount of capital a VC firm has under management.   | VX  |
| Intl deal experience | The number of syndicates each VC is a part of where the PC domicile nation is different than the domicile nation of the VC prior to the year of last investment in PC <sub>i</sub> .  | VX  |
| VC connectedness     | The number of unique VCs a VC has syndicated with over the 5 years prior to the year of last investment in PC <sub>i</sub> normalized by the total possible VC partnerships over the time span.   | VX  |

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