

Angel Investors around the World

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ABSTRACT

Angel investors finance small high growth entrepreneurial firms in exchange for equity. Unlike venture capital (VC) and private equity (PE) funds that invest capital from institutional investors, Angels invest with their own money. This comparative disintermediation of Angel finance enables us to examine the impact from legal and cultural conditions on financial intermediation. We are using PitchBook's comprehensive data collection of over 5,000 Angel deals and 80,000 PE/VC deals from 96 countries over the years 1977-2012. The data indicate that relative to PE/VC funds, Angel investors are more sensitive to stock market conditions, legal environments, and Hofstede's cultural conditions (specifically higher levels of individualism and risk intolerance). The data further indicate that investee firms funded by Angels are less likely to successfully exit in either an IPO or acquisition on average, whether those Angels are involved in the first round or later stages. Our tests results are robust to propensity score matching methods, as well as clustering standard errors, among other things. In addition to those results, we also perform difference-in-differences tests to confirm that more stringent disclosure regulation and more forgiving bankruptcy legal changes can spawn entrepreneurial activities induced by both Angels and PE/VC funds.

Keywords: Private Equity, Angel Investor, Venture Capital, IPO, Entrepreneurship, Law and Finance, Bankruptcy Law, Culture

JEL Codes: G22, G23, G24, K22, K35

“What bugs me is this whole start-up scene is a lifestyle, and there are these [Angel] investors who think it’s sexy and want to be part of that lifestyle”
- *New York Times*, December 2015, “*Tips for the Aspiring Angel Investor*”¹

1. Introduction

Originally, the term “Angel” referred to wealthy individuals who funded the expensive Broadway theatre productions in New York. It was first used as a business terminology when William Wetzel completed his pioneering study on how entrepreneurs raised seed capital in the U.S. and described the investors who supported those entrepreneurs as “Angels” (Wetzel, 1983). Colorful quotes such as the one above illustrate the oft-repeated view that there is a culture to Angel investing. However, unlike the private equity (PE) and venture capital (VC) literature, there is little evidence on Angel investments around the world and the comparative role of international differences in culture and legal institutions in the determinants of and outcomes from Angel investments.

In this paper, we seek to add to the Angel literature by examining theory and international evidence on differences between Angel investments and PE/VC investments. We aim to shed light on how Angel investments look around the world, how Angel involvement is different from PE/VC funds, what legal and cultural environments affect Angel investments and divestments. We also consider whether regulatory changes have promoted more Angel and PE/VC funds activities.

Our analysis exploits the comprehensive data collected at the deal level of investee firms from PitchBook, which comprise 85,940 completed private equity (PE) deals from 96 countries spanning the 1977 to 2012 period. Within those deals, there are 5,397 deals in 42 countries are involved with Angels (either single funded by Angels or coinvested/syndicated with PE/VC funds). The dataset allows us to directly compare Angels and PE/VC funds at both the deal and investee firm level.

¹ http://www.nytimes.com/2015/10/03/your-money/tips-for-the-aspiring-angel-investor.html?_r=0

The data indicate that, relative to PE/VC funds, Angels prefer investing in smaller entrepreneurial firms in wealthier countries with better stock market conditions, worse legal environments, and countries with cultures characterized by higher levels of individualism and lower levels of risk-taking. Such behaviors are robust both for the first round deals and deals at all other stages. We also find that relative to PE/VC funds, those investee firms funded by Angels will have lower probability to have successful exits, in either IPO or acquisition, but better legal environments can help mitigate the negative effects, especially for IPO exits. Moreover, in our subsample tests, the “stepping stone” logic of Angels still cannot be proved because we find that firms who have received Angel investments in the first round will have lower probabilities to successfully exit in later rounds. At a country/market level, we also find significant determinants which can work together to build a well-rounded environment and spawn both Angels and PE/VC funds activities. In addition to those results, we also perform difference-in-differences tests to confirm that more stringent disclosure regulation and more forgiving bankruptcy law changes can also spawn the entrepreneurial activities induced by Angels and PE/VC funds. Our tests results are robust under various clustering methods to correct standard errors while controlling fixed effects and are robust when performing propensity score matching.

Our paper is related to a small but growing literature on Angel investors. While the literature has focused more on PE/VC finance, many studies have found that Angels are as important as VCs for start-ups and the total market for Angels is approximately the same size as VC market (Sohl, 2003; Mason and Harrison, 2002; Goldfarb, Hoberg, Kirsch and Triantis, 2007; Sudek, Mitteness and Baucus, 2008; Shane, 2008; OECD report, 2011); as such, more research on Angels is clearly warranted. The most basic reason, we believe, for comparative lack of work on Angels is the fact that data are readily available on PE/VC deals, but scantily available on Angels.

Prior research has established that Angels play a more and more important role in funding entrepreneurs in the seed and early stages and their importance in the entrepreneurial economy

has been recognized in recent years (Wetzel, 1987; Mason and Harrison, 1995; Morrissette, 2007). Angels usually can be found among the friends or family members of an entrepreneur and their capital support could be a one-time injection or an ongoing support over the lifecycle of the start-ups. Besides the financial support, most of the Angels will often provide managerial assistances as well (Landstrom, 1993; Shane, 2009; Maxwell, Jeffrey and Lévesque, 2011). Angels also geographically prefer investing in local firms, they do not prefer using conventional control mechanisms such as board seats, staging financings or contracting provisions and they usually hold small positions in the investee firms as compared with VCs (Wong, Bhatia and Freeman, 2009; Wong, 2010; ARI Halo Report, 2015).

Recent empirical studies of Angels are more focused on their contributions to the investee firms as well as documenting the differences between VCs and Angels. Kerr, Lerner and Schoar (2014) found that Angels can improve the survival, exits, employment, patenting, web traffic and financing of investee firms using a regression discontinuity analysis. Although their study only used two Angel groups' investments, their findings confirm the positive side of Angel group financing in that firms funded by those groups are achieving successful exits and reaching high employment levels. In another recent study, Lerner, Schoar, Sokolinski and Wilson (2015) extended the results of Kerr, Lerner and Schoar (2014) to an international setting by using 13 Angel groups from 12 countries and confirmed the similar positive outcomes. This study also compared the firms funded and unfunded by Angels to find out that the development stage and maturity of the startups will be negatively related to the Angel host countries' entrepreneurship friendliness. But unfortunately, those studies cannot investigate the interrelationships between Angels and VCs. Hellmann, Schure and Vo (2015) found that the investor type is dynamically persistent and Angels and VCs are dynamic substitutes of which companies that obtained more Angel financing in the past are less likely to subsequently obtain VC funding, and vice versa. Their tests results favor the views that VC funding is still associated with better exit outcomes. Dutta and Folta (2016) also find similar results regarding the successful exits rates with bigger

impact from VCs, but they also find that Angels will have equivalent impact as VCs on improving the innovation rates using patents data.

Moreover, there are several theoretical studies have built useful foundations to compare Angels and VCs. Under the assumptions that VCs will add value to the investee firms while Angels do not, Chemmanur and Chen (2006) developed a model to explain the reasons behind why entrepreneurs might want to obtain Angel investments first before approaching to VCs. Schwienbacher (2009) assumed that both Angels and VCs can add value, and his model enables to explain the differences to choose early-stage financiers between Angels and VCs from the perspective of entrepreneurs. Hellmann and Thiele (2014) provided a “Friends or Foes” theory that explicitly models the interdependences between Angels and VCs. Their model assumes that the investee firms want to proceed from Angel financing to VC financing, those VCs might use their market power or control rights to squeeze out Angels in later stages. Angels need to seek alternative exit routes when facing situation like this. One key insight from this theory is that the bargaining dynamics between Angels and VCs may determine whether the relationship between them is complements or substitutes.

Our paper builds on these important prior studies by providing large sample empirical evidence on Angel investments versus PE/VC investments around the world. To the best of our knowledge, our study is the first to use a multi-country private equity deal-level database to observe the investment behaviors of Angels versus PE/VC funds. In doing so, we not only document Angel activities around the world, but also show how legal and cultural differences affect (not intermediated) Angel investors versus (intermediated) PE/VC funds. We provide evidence that legal and cultural differences around the world have a more pronounced impact on Angel investors relative to PE/VC investors.

The remainder of this paper is organized as follows. Section 2 discusses the prior literature and develops our hypotheses. Section 3 presents the data and our summary statistics, while section 4 covers the regression analyses and robustness checks. Section 5 discusses some

limitations of the dataset and possible tests. Section 6 concludes and provides an outlook for future research.

2. Hypotheses

There is extant research confirming the significant role of private equity investments that are catalysts for the entrepreneurial growth and innovation and thus are spawning the economic growth around the world (Timmons and Bygrave, 1986; Grossman and Helpman, 1991; Gompers and Lerner, 1999; Cumming and Johan, 2013; Makhene, 2009; De Beer and Nhleko, 2009). Prior studies of Angels, however, mainly focus on the U.S. market (Kerr et al., 2014; Dutta and Folta, 2016). Very few have jumped out of this scope to consider the international differences between Angels and PE/VC funds. Mason and Harrison (2002) was studying the U.K. cases by using survey methods, Li, Shi, Wu, Wu and Zheng (2015) talks about the Chinese government policies in promoting Angel investments, Hellmann et al., (2015) is using provincial-level Angel data of Canada to compare Angels and PE/VC funds relationships, and Ding, Sun and Au (2014) compares the Angels' selection criteria in China and Denmark. Most of these studies are single-country or two-country comparison analysis of Angels and they did not consider the institutional differences between Angels and PE/VC funds in an international setting. The most recent international Angel study is Lerner et al., (2015) which focused on the heterogeneity of Angel groups' countries, but their study did not discuss the characteristics of entrepreneurial firms in different institutional environments across the world. In the literatures of VC and entrepreneurship, international studies have discussed that the institutional differences matter for financial market and economic development as well as contractual provisions and oversight intensity of PE/VC funds transactions (Cumming and Johan, 2013; Nahata et al., 2014; Lerner and Schoar, 2005). However, studies of Angels have not considered such international differences. Our study fills the gap and complements previous studies to investigate how Angels

are different from PE/VC funds when making their investment decisions facing different institutional environments across the globe.

Angel investors have a long history as informal investors in the narrow subset of private equity market (Lamoreaux, Levenstein and Sokoloff, 2004; Shane, 2009). A current trend for Angels is to form Angel groups to pool in money to make larger investments like seed-stage VC funds (Shane, 2012; Kerr et al., 2014; Lerner et al., 2015), but such format of Angels only account for about 2% of the total investments they have made (Wiltbank and Boeker, 2007).

Prior literature has outlined several major differences between Angels and PE/VC funds. First, Angels prefer investing in the seed or early stage of the start-ups while PE/VC funds usually take part in later-stage deals when firms are getting more mature. Second, the investment screen process is more sophisticated for PE/VC funds that due diligence and term sheet tools will be used to build their portfolios (Cumming and Johan, 2013). On the other hand, Angels select projects only based on their personal relationships and relatively informal procedures (Sudek, 2006). Third, the investment amount is way smaller for Angels (Ibrahim, 2008). Although Sohl (2003) estimated that there are around 300,000 to 350,000 Angels in the U.S. to invest totally about \$30 billion in around 50,000 firms yearly, the average investment amount is only around \$1 – 2 million. Fourth, Angels use their own money to invest while PE/VC funds as financial intermediaries are investing in private firms on behalf of their investors (Avdeitchikova et al., 2008). In this way, theoretically, they are facing different incentives and constraints where their investment risk tolerance profile and expected returns are deemed to be different. Aernoudt (1999) estimated that PE/VC funds are looking for investment project with expected returns around 35% - 45% while Angels only expect returns around 20%. Fifth, there are different fee structures for those two types: Angels only pay fees when they are forming groups to make investments, but PE/VC funds will have management fees plus a carried interest up to 20% - 30% (Cochrane, 2005). Moreover, according to the survey study of Shane (2005), Angels are not only investing for financial returns, but also they are investing for other social or economic reasons

such as supporting communities, favoring known partners, finding a job, learning, helping company succeed and for fun, etc. Angels are also investing their knowledge and time (Chua and Wu, 2012). It seems the original aim for Angels are quite different from PE/VC funds, they are investing in the person more than the company and they want the company to succeed but not just for huge profit from their investments.

Because PE/VC funds invest “other peoples’ money” while Angels invest their own money, we may expect that Angel investments will be more closely linked to legal, economic, and cultural conditions relative to PE/VC investments, even after controlling for other things being equal in terms of the types of investments. PE/VC funds are intermediaries between large institutional investors and entrepreneurial firms, while Angel investors invest their own capital without the process of financial intermediation. Prior work has well established that PE/VC activity is positively affected by better economic conditions, better stock market development, better legal protections for minority shareholders, and cultures favoring entrepreneurship development (Nahata, 2014).

It has been documented that going public is one of the main objectives of VC-backed companies (Black and Gilson, 1998), if entrepreneurs have this common objective with their investors, whatever they are Angels or PE/VC funds, they will follow the IPO disclosure rules to prepare their financial statements. Cumming and Walz (2010) find that higher-quality prospectus disclosure mitigates fraud and earnings management, and thus will enhance the impact of VC finance on entrepreneurial activity. It is obvious that higher-quality of securities regulation and better disclosure will magnify the impact of VC-induced entrepreneurial spawning and such effect of changes on spawning outcomes are more pronounced for those countries with such disclosure rule changes (Cumming and Knill, 2012). We thus believe that Angel and PE/VC activities will be also more in those countries that undergo more stringent disclosure regulation change.

Another important aspect of the legal environment is bankruptcy law. As personal bankruptcy law is dealing with persons who have become unable to pay off their debts and thus the level of punishment or forgiveness from this law will be the critical factor to determine the debtor's consequences of failure. It is quite related to both Angels and entrepreneurs who would face similar insolvent situations if unfortunate things happened to their own businesses. It has been documented that more forgiving bankruptcy law can be understood as a partial insurance contract offered to entrepreneurs against the consequences of failure (Jackson, 1985; Adler, Polack, and Schwartz, 2000; Lee, Peng and Barney, 2007). Moreover, bankruptcy law has also been shown to be related to the credit supply of entrepreneurial activities where less severe bankruptcy laws are correlated with greater incidence of credit rationing by lenders to small businesses (Berkowitz and White, 2004) and greater state-level exemptions in bankruptcy law in the U.S. are associated with an increase in overall entrepreneurship (Fan and White, 2003).

In addition, bankruptcy law will also determine the availability of "fresh start" if any failures happened to the entrepreneurs (White, 2005). In this sense, forgiving bankruptcy law which can offer such "fresh start" opportunity from pre-bankruptcy debts will permit entrepreneurs to enter into the economy again rapidly after business failures (Georgakopoulos, 2002; Landier, 2004; Ayotte, 2007). In fact, such repeat entrepreneurship is not uncommon in countries where a "fresh start" is permitted (Baird and Morrison, 2005; Stam, Audretsch and Meijaard, 2008). Under cross-jurisdictional setting, Armour and Cumming (2008) find that "forgiving" personal bankruptcy law has a statistically and economically significant positive effect on entrepreneurship using self-employment rates. We thus propose that in those countries with more "forgiving" bankruptcy law change will have positive impacts on the activities of entrepreneurs and such impacts are expected to be associated with a greater overall level of Angel investment, and more pronounced relative to the impact on PE/VC activity documented in prior work (Armour and Cumming, 2006).

The governance structure imposed in a venture capital fund through institutional investor veto rights, monitoring through annual (or quarterly or semi-annual) reports, and limited partnership agreements implies that PE/VC fund activities will be less sensitive to behavioral biases than Angel investors that can act without such constraints and oversight. PE/VC fund managers face less pronounced risks associated with losing their own money, and have primarily financial reasons for investment; by contrast, Angels invest directly their own money and may do so not only for pure financial reasons. We may expect angel investments will be very subject to cultural conditions of uncertain avoidance. Furthermore, as typically make investment decisions by themselves, Angels are more likely to be in individualistic societies. Finally, as individuals are more financially constrained in economic downturns relative to PE/VC funds, and because Angel investment decisions are made alone are more subject to behavioral biases, Angel investments are more likely to be affected by economic conditions relative to PE/VC funds.

Hypothesis 1: *Angel investment activity is more sensitive to legal, economic, and cultural conditions relative to PE/VC investment activity around the world.*

PE/VC funds can provide benefits such as certification, guidance, and network to start-ups and such certification and endorsement effect has been shown very important for the investment performances and exits in previous studies (Megginson and Weiss, 1991; Stuart, Hoang and Hybels, 1999; Hsu, 2004; Hochberg, Ljungqvist and Lu, 2007; Hellmann et al., 2015; Dutta and Folta, 2016). As Angels are different from PE/VC funds in many aspects we have discussed, they may be lack of the expected expertise and benefits which can bring certification effect to the investee firms, especially during the divestment stages. Therefore, we expect that, by controlling international differences, the successful exits rates will be lower for the investee firms funded by Angels, as posited in Hypothesis 2a:

Hypothesis 2a: *Firms funded by Angels will have lower probability to exit successfully by IPO or acquisition as compared with firms with PE/VC funds.*

Although Angels might not be as good as PE/VC funds to bring start-ups IPO or acquisition exits, if such company attract Angel investments in its early stage, this still sends a positive signal to the market and enables further credit through the investments tracking process. Moreover, it has been documented that PE/VC funds rarely invest in companies who received Angel funding before, only a very small fraction of those companies will attract PE/VC funding later on (Shane, 2009). Ibrahim (2008) also found that Angels will try to simplify contract terms to seek selling companies or attract PE/VC funds to reduce costs. In this sense, if those companies succeed in IPO or acquisition exits, it is still possible that the certification effect from Angels exists (Kerr et al., 2014). This is similar to a common view that Angel financing is a “stepping stone” to obtain venture capital and Angels and VCs are synergistic members of a common financing ecosystem. The best companies like Google, Facebook and Tesla Motors all benefit from the combination of these attributes and powerfully illustrate such “stepping stone” logic. We therefore expect that investee firms who have received Angel investments in the 1st round, they might have a better chance to exit successfully by an IPO or acquisition, as summarized in Hypothesis 2b:

Hypothesis 2b: *Firms receiving angel investments in the first round will have relatively higher probability to exit successfully by IPO or acquisition.*

3. Data and Summary Statistics

Our analysis exploits the comprehensive data collected at the deal level of investee firms from PitchBook, which comprise 85,940 completed PE deals in 42,617 investee firms from 96 countries spanning the 1977 to 2012 period. Among those deals, there are 5,397 deals in 4,266 investee firms from 42 countries are involved with Angels (either single funded by Angels or coinvested/syndicated with PE/VC funds). Such dataset allows us to compare Angel deals and PE/VC deals at the same time to shed more lights on this underdeveloped area in academia.

In order to provide a detailed picture for how Angel investors evolve as a more and more important financial source for entrepreneurial firms, Figure 1 and 2 outline both the Angels and PE/VC funds activities over the period from 1977 to 2012. Over the 36 years period, we can find that the overall trends for both Angels and PE/VC funds activities are upward-sloping, with small zigzags which captures the dot-com bubble and recent financial crisis. In terms of the total number of deals for each year, we can find that Angels present a little different trend as compared with PE/VC funds. It seems that the number of deals completed by Angels had not been hit too hard by the recent financial crisis with the total numbers for each year rebounded very quickly. Combined with the trend for total deal sizes, we can find that Angels and PE/VC funds share a quite different manner. In Figure 1 for Angels, the total deal sizes are peaked in 2007 and continued shrinking until recently. While in Figure 2 for PE/VC funds, the total deal sizes trend is much more synchronized with the total number of deals completed. Angels seems to be more cautious after the financial crisis than PE/VC funds.

[Insert Figure 1 and 2 About Here]

After we have shown the overall picture of both Angels and PE/VC funds activities during our sample period, we further present some key features of our PitchBook data. Table I

summarizes the key features associated with the sample distribution of completed deals across the world. Table I Panel A presents the top 10 country distribution for those completed deals in three separate groups: All Deals, All Angel Deals and All PE/VC Deals. U.S., Canada and U.K. are always the Top 3 players in all three categories. Most of the Top 10 countries in three categories are OECD countries in developed markets, but we can find that India and China cannot be neglected to be the active members from emerging markets. In terms of the industry distribution for our data, among the Top 10 industries we have listed in three categories, high-growth and high-tech industries are interchanging their ranks with software industry always ranked No. 1 for each category. However, we still can find that Angels will prefer investing and involving in deals in the retail industry which differentiate them from PE/VC funds in these league tables.

[Insert Table I About Here]

In our Table II, we further present the characteristics of Angel-involved deals in 42 countries across the world. We aim to show a detailed picture for how Angels involved in all rounds, at the 1st round and their successful exit rates, both at the investee firm level and deal level. In Table II Panel A, we are focusing on the investee firm level characteristics. For each of those 42 countries who have Angel-involved deals completed, we calculate the total number of investee firms, the percentage of firms with Angel Financing (at all rounds), the percentage of firms with Angel Financing (at 1st round) and the percentage of firms with successful exits. On average, we have shown that about 11% of investee firms in those 42 countries are having Angels involved, with about 8% of those firms are with Angels in the first round and about 24% of those investee firms will have successful exits in either IPO or acquisition. In Table II Panel B, we present similar characteristics as Panel A, but with focus at the deal level. As shown in Panel B, although there are, on average, more than 2,000 deals completed for each country yearly, only about 7% will be Angel involved deals. This is not surprising as Angel data are rarely available

and therefore our PitchBook data only captures some of the big and prominent players in this market. Furthermore, only 5% of those deals will be receiving Angel involvement in the 1st round and about 15% of total deals will have successful exits.

[Insert Table II About Here]

Table III summarizes the main variables in our dataset. We aim to investigate the preferences of picking investee firms among different investor types. The different indicator variables of All Angels, Pure Angel, Mixed Angels and PE/VC funds will be our main dependent variables. The explanatory variables include GDP per capita for the economic conditions, the domestic stock market capitalization and MSCI returns for each country's stock market conditions, minority shareholders protection index for the legal environment, Hofstede's dimensions of cultural variables, as well as a variety of control variables to capture investee firm and industry characteristics.

From our data, we can empirically confirm there are many differences between Angels and PE/VC funds in different countries and over our sample period. This provides us with a unique opportunity to explore all the possible reasons behind their investment and divestment behaviors and to compare those two investor types with each other. Moreover, the PitchBook database provides detailed information on testing international differences across countries and over time, which can further shed lights on Angel behaviors.

[Insert Table III About Here]

In Table IV, we also present a pair-wise correlation matrix for each of our variables for this study. Note that our correlations highlight some potential collinearity issues across different explanatory variables, which we explore in our multivariate empirical tests in the next section.

And we choose the most related and those variables having the most explanatory power in the following multivariate tests.

[Insert Table IV About Here]

Before we start the multivariate regression analysis, our next step is to show some of the highlighted details from our PitchBook data, and provide preliminary means difference test results regarding different characteristics between several subgroups in Table V. In panel A of Table V, we divide our entire data sample by All Angel Deals versus All PE/VC funds at the first place. And then we divide the All Angel Deals into Pure Angel and Mixed Angels deals to further compare different characteristics among those subgroups. Here below we summarize several interesting results in different categories: First, in terms of deal characteristics, Angels will always involve in smaller size deals and they prefer involving with active investee firms with more deal making every year; Second, in terms of investee firm characteristics, we find interesting results that Angels' firms have smaller sizes of employees and when PE/VC funds are coinvesting/syndicating in the same deal, the company valuation are significantly lower than Pure Angel-involved deals. This is not surprising and is consistent with the "Friends or Foes" theory proposition that when VC joined the deal in later stage they will lower the company valuation to squeeze the Angels out (Hellmann and Thiele, 2015); Third, in terms of the country characteristics differences, Angel deals are quite different in almost all facets we list: they prefer being in countries with larger entrepreneurial density, wealthier countries with larger stock market, a little better legal environment and in countries with cultures favoring individualism and entrepreneurship. Although the means difference tests have shown those characteristics differences are significant, but in actual numbers the differences are trivial which we need to focus more on the following multivariate tests. Fourth, in the last category of exit outcomes, we can find that Angels are relatively poor performers in either taking the investee firms going public

or being acquired compared with PE/VC funds who are much more sophisticated investors. The only subpanel which Angels perform a little better is comparing Pure Angels with Mixed Angels. It seems coinvestment/syndication does not increase the likelihood to exit successfully. Both parties fighting for control rights might explain the poor results here.

As we outline several interesting comparison results between subgroups in Panel A of Table V, we extend our analysis to present more results between U.S. and Non U.S. subsamples. Combined with the overall trends shown in Figure 1 and 2, we also separate our sample into pre- and post-financial crisis period to provide a more detailed picture for the data. In the first subpanel of Panel B in Table V, we show that the U.S. is an active and mature market for entrepreneurial activities. Although the U.S. deals have smaller sizes and those U.S. investee firms are relatively smaller and receiving lower company valuations, this market is much more active in terms of total number of deals per year and have much more Angel activities each year. The density for both Angels and PE/VC funds activities are much higher in the U.S. as compared with the rest of the world. The U.S. is a quite different market in terms of country characteristics in this subpanel which further emphasize the importance of our study to jump out of many previous studies with focus only on the U.S. Angel market and our study can provide more evidences to show how Angels and PE/VC funds are different internationally. The only category we need to highlight is the exit outcome. The U.S. subsample performs worse than counterparties around the world in terms of successful exits rates.

With regards to the recent financial crisis, in the 2nd subpanel of Panel B in Table V, we can find that deal making is becoming less and the sizes of deals are shrinking. However, the Angel market actually is becoming even more active after the financial crisis, the total numbers of deals are larger and the density of Angel activities is even bigger at the country level. And deals are shifting to occur at wealthier countries with larger stock market, better legal environment. Moreover, we can find that the recent financial crisis hit the IPO market harder than the acquisition market as during the post-financial crisis period, the overall successful exits rates

actually increase and this is mainly driven by the increasing rates of acquisition. The IPO rates significantly declined after the financial crisis and such trend reflects possible prudent and cautious moods among entrepreneurs, Angels and PE/VC funds to bring private firms public.

[Insert Table V About Here]

4. Regression Analyses and Robustness Checks

Now that we have laid out some of the unique interesting results from our means difference tests and some consistent findings from other studies, we perform our regression analyses in this section mainly using clustering PROBIT models by controlling year effects in addition to controlling the industry and country fixed effects and we report associated marginal effects on each explanatory variable. We also perform several subsample tests and show several robustness checks before drawing our conclusions.

4.1. What factors determine Angel investments versus PE/VC investments?

In our main regression analyses as shown in Table VI, we use dummy variables to indicate different investor type as the main dependent variables. Throughout Models (1) to (4), All Angels dummy is the major dependent variable and the dummies for Pure Angel, Mixed Angels and PE/VC funds are dependent variables in Models (5) to (7), respectively. We add different control variables from various facets in order to test how differently that different investors prefer choosing investee firms and making their investments internationally. The regressions include control variables for economic and stock market conditions, legal environments, investee firm characteristics, as well as for Hofstede's cultural dimensions. The main PROBIT regression models in Table VI use the following specification:

Dummy Variable of Investor Type = f (Economic and Stock Market Conditions, Legal Environments, Investee Firm Characteristics, Hofstede's Cultural Dimensions, Industry and Country Dummies)

Most of the major variables are defined in Table III. Note that there are a large number of explanatory variables that we could have included but chose to exclude. The primary reasons for our parsimonious specification are as follows. First, the selected variables are plausibly pertinent to investment choices across different facets and are chosen for the purpose of testing Hypothesis 1 and the following hypotheses. Second, note that the excluded variables are highly collinear. Hence, any additional control variables for the available sets of countries and years would not be perfectly suitable without potentially introducing spurious results into the regressions. Examples include some of the other dimensions of Hofstede's cultural variables, as well as other legal and institutional variables. Our selection and reporting of variables was conducted to assess the factors that directly capture the differences of investors in different institutional environments across the world.

In order to present a clear picture for how Angels make investment decisions given different institutional environments, we add different facets step by step from Model (1) to Model (4). In Model (1) of Table VI Panel A, we use the natural logarithm of GDP per capita to proxy the economic condition and the natural logarithm of domestic stock market capitalization as well as the MSCI returns to proxy the stock market conditions. From Model (1) results, we can find that Angels prefer investing in and choosing those investee firms in countries with higher GDP per capita (significant at 1%), smaller stock market (significant at 10%) with higher returns (significant at 5%). The economic significances are also large: Angels will be 12.59% more likely to involve in deals when there is a 1% increase in the natural logarithm of GDP per capita, they will also be 3.81% less likely to involve in deals when there is a 1% increase in the natural

logarithm of domestic stock market capitalization and they will be 3.60% more likely to involve in deals when there is a 1% increase in the MSCI returns.

In addition to Model (1) specification, we add minority shareholders protection index into the regression Model (2) to capture the legal environments. The minority shareholders protection index is the coded weighted average index on the ten key legal provisions identified by legal scholars as most relevant to the protection of minority shareholder rights (Guillén and Capron, 2015): powers of the general meeting for de facto changes; agenda-setting power; anticipation of shareholder decision facilitated; prohibition of multiple voting rights; independent board members; feasibility of directors' dismissal; private enforcement of directors' duties (derivative suit); shareholder action against resolutions of the general meeting; mandatory bid; and disclosure of major share ownership (Lele and Siems, 2007; Siems, 2008). Higher values indicate "better" degree of minority shareholders' protection and legal systems.² From Model (2) results, it is a little surprising that the marginal effects of minority shareholders protection index return negative results (significant at 1%). If there is a 1% increase in the minority shareholders protection index, the Angel involvement will be 3.03% lower. Angels prefer investing in and choosing those investee firms in countries of worse legal environment relative to PE/VC funds. As discussed in Hellmann and Thiele (2015), better legal environment might incur higher costs of contracting for Angels, in this sense, they might circumvent to reduce such costs and prefer making more deals in those firms residing in worse legal environments.

As we move on to test any impact from investee firm level characteristics, we utilize two variables to capture the size and activeness of the investee firm. The natural logarithm of number of employees is used to capture the firm size effect and the number of deals per year for each investee firm is used to capture the investee firm and entrepreneurs' activities within a calendar year. Model (3) in Panel A returns consistent results for other explanatory variables, all signs

² The authors are grateful to Mauro Guillén and Laurence Capron for sharing their minority protection of shareholders index and this legal index is dynamic over the years to capture a more comprehensive legal environment with more countries and years covered.

remain the same with three variables reducing the statistical significance. For our interested variable of investee firm characteristics, we find that Angels prefer investing in and choosing those investee firms with more active entrepreneurs and smaller sizes (both significant at 1%). The marginal effects of Model (3) also indicate that a 1% increase in the natural logarithm of number of employees, Angel involvement will be 1.20% lower and a 1% increase in the number of deals per year will increase the Angel involvement likelihood by 0.62%.

There are more and more international studies finding out that culture dimensions cannot be neglected in exploring the institutional differences around the world. Following the literatures confirming that cultural dimensions are related to entrepreneurship at the national level (Shane, 1993; Hayton, George and Zahra, 2002; Cumming, Johan and Zhang, 2014), we choose two out of six Hofstede's cultural dimensions: individualism (IDV) and uncertainty avoidance (UAI) in our study to further control the cultural environment in Model (4) in Panel A. The results in Model (4) show that national cultural environment seems to have insignificant impact on the Angels' investment decisions, other factors such as legal environments, stock market conditions and investee firm characteristics are more important determinants for Angels' decisions.

Up to Model (4), we have outlined a picture of how Angels, relative to PE/VC funds, make their investments decisions and choose investee firms based on different preferences: smaller firms with active entrepreneurs residing in countries with better stock market returns and worse legal environments. In the next step, we want to further test whether Pure Angel and Mixed Angels will have any different preferences. In Model (5) of Panel A, we reserve all the explanatory variables as in Model (4) with Pure Angel dummy as the main dependent variable, the results have shown that Pure Angel investors prefer investing in and choosing those smaller investee firms with active entrepreneurs in countries where stock market returns are higher and legal environment is worse. In Model (6) of Panel A, we re-run the similar regression model with Mixed Angels dummy as the dependent variable, the results are qualitatively unchanged as compared with Model (4) for all Angel investors. In the final Model (7) in Panel A, PE/VC funds

dummy is used as the dependent variable. The results have shown the quite different behaviors from such sophisticated investors like PE/VC funds, relative to Angel investors, they prefer investing in and choosing larger investee firms with less active entrepreneurs residing in countries with worse stock market returns and better legal environments. Thus, our Hypothesis 1 is partially supported from our tests in Table VI Panel A.

Moreover, as a robustness check, we present our regression tests using only the first round deals to explore the different investor preferences in Panel B of Table VI. As most of the Angels are involved in early and seed stages of start-up development, it is worthwhile to perform a subsample test to find out whether their decisions are similar at the initial stages and we expect the results will be more compelling. Throughout our Models (8) to (14), all the tests are replicated the specifications from Models (1) to (7) in Panel A, and the results support our Hypothesis 1 fully and the statistical significances are even bigger for the 1st-round deal tests. Angels will have quite different investment behaviors as compared with PE/VC funds: they prefer investing in and choosing smaller investee firms with more active entrepreneurs residing in countries with better economic conditions, smaller stock markets with higher return as well as having national cultures favoring more individualism and less risk-taking. And the economic significances are much larger for the 1st round deal tests: given results from our Model (11) as a main example, a 1% increase in the natural logarithm of GDP per capita will increase the Angel involvement likelihood by 14.88%, a 1% increase in the natural logarithm of domestic stock market capitalization will decrease the Angel involvement likelihood by 5.56%, a 1% increase in the MSCI returns will increase the Angel involvement likelihood by 3.62%, a 1% increase in the minority shareholders protection index will decrease the Angel involvement likelihood by 2.90%, a 1% increase in the natural logarithm of number of employees will decrease the Angel involvement likelihood by 1.17%, a 1% increase in the number of deals per year will increase the Angel involvement likelihood by 3.57%, a 1% increase in the individualism index will increase

the Angel involvement likelihood by 1.28% and a 1% increase in the uncertainty avoidance index will increase the Angel involvement likelihood by 0.62%.

[Insert Table VI About Here]

4.2. *Any certification effect from angel investors on successful exits?*

After we present the different investment behaviors between Angels and PE/VC funds, we want to find out how Angels perform from their investments in those investee firms. Are they receiving higher or lower returns compared with other investors? Since it is hard to get credible performance measures like IRRs or performance multiples, we follow previous literatures (Shane, 2005; Wiltbank, 2005; DeGennaro and Dwyer, 2010) to explore the successful exits rates as an alternative measure for the performances. The successful exits include either an initial public offering (IPO) exit or a successful acquisition exit. Similar to Table VI, we are using clustering PROBIT models by controlling year effects in addition to controlling the industry and country fixed effects in Table VII and our main regression models use the following specification³:

Dummy Variable of Successful Exits Type = f (Investor Type Dummy, Economic and Stock Market Conditions, Legal Environments, Investee Firm Characteristics, Hofstede's Cultural Dimensions, Industry and Country Dummies)

We report the successful exits tests first in Panel A and then perform IPO and acquisition exits tests in Panels B and C, respectively. We also perform interaction tests of minority

³ For conciseness, we exclude all control variables which contain the exact same variables in Table VI: LN of GDP per capita, LN of Domestic Market Capitalization, MSCI Returns, Minority Protection Index, LN of Number of Employees, Number of Deals per Year, IDV and UAI. These variables are all excluded in Table VII, VIII and IX.

protection index to find out whether better legal environment can help increase the successful exits performance.

In Panel A of Table VII, all dependent variable across Models (1) to (8) is the dummy variable indicating the deal is an successful exit, either in IPO or acquisition format. From Models (1) to (3), all three Angel investor type dummy returns significant negative marginal effects at 1% level, which confirm our H2a that firms funded by Angels will have lower probability to exit successfully by IPO or acquisition as compared with firms with PE/VC funds. The economic significances are thus large that All Angels will be 26.61% less likely to exit successfully relative to PE/VC funds and for Pure Angel and Mixed Angels, the likelihoods are 18.05% and 31.89% lower, respectively. The certification effect as documented in the literatures about VCs cannot apply to Angels. Model (4) results confirm the previous view and PE/VC funds will have 26.61% higher probability to bring investee firms public or through acquisition. In Model (5), we further include both Mixed Angels dummy and PE/VC funds dummy at the same time to compare whether the coinvestment/syndication actions with PE/VC funds of Angels will increase their successful exits rate. Unfortunately, still PE/VC funds certification effect exists. We have found that only pure PE/VC funds financed firms will achieve better exit outcomes, those companies do not mix Angel and PE/VC funding, and those results are consistent with the view that VCs tend to do best when investing on their own (Goldfarb, Hoberg, Kirsch and Triantis, 2012). And one explanation for these results is driven by the split of control rights between Angels and PE/VC funds who might aim to obtain more aggressive control rights (Goldfarb et al., 2012). But note that, if we interact the minority shareholders protection index with the Angel-related investor type dummy in Models (6) to (8), we can find that better legal protection can help increase the successful exits rate for Angels, especially for Pure Angels. But the marginal effects become statistically insignificant which lead us to perform additional subsample tests on IPO or acquisition exits of legal protection impacts.

In Panels B and C of Table VII, the main results stay similar to the results in Panel A that firms funded by Angels will have lower probability to exit successfully by IPO or acquisition and the certification effect only apply to PE/VC funds. For example, Panel B results indicate that Angels will be 8.23% less likely to exit by IPO relative to PE/VC funds and Panel C results indicate that Angels will also be 20.73% less likely to exit by acquisition relative to PE/VC funds. Moreover, from our interaction tests in Panels B and C, we can find that legal environment is very important in shaping a good capital market. From results of Models (14) and (15), better legal protection of minority shareholders will increase the likelihood for Angels to exit by IPO. But from results of Models (22) to (24), we cannot find similar results to support that better legal protection of minority shareholders will increase the likelihood for Angels to exit by acquisition. Better legal protection of minority shareholders will have a much bigger impact on IPO exits than on acquisition exits for Angels relative to PE/VC funds.

[Insert Table VII About Here]

Although our tests in Table VII help support our proposition in Hypothesis 2a, we are still thinking whether Angels might bring any good signals to future investors or buyers. In this way, we create a dummy variable to capture those firms who have received their 1st-round funding from Angels and we re-run similar tests of Table VII to explore the possibility of our predictions. In Table VIII, we include the new dummy variable as the main explanatory variable with different exit dummies as dependent variables. The results from Table VIII reject our Hypothesis 2b and show that firms receiving Angel investments in the 1st round will still have relatively lower probability to exit successfully, especially by an acquisition exit. Although Model (2) returns negative but insignificant marginal effects, combined with Models (1) and (3) results, we can confirm that the “stepping stone” logic cannot be applied to Angels, at least in our dataset. And the economic significances cannot be neglected that those firms receiving Angel

investments in the 1st round will be 4.41% less likely to exit successfully, 0.33% less likely to exit by IPO and 4.72% less likely to exit by acquisition relative to those firms without 1st round Angel investments.

[Insert Table VIII About Here]

4.3. *What environments will spawn Angel activities?*

After investigating the exit performance for Angels as well as PE/VC funds, we extend our study to perform tests at national level to find out what factors will spawn Angel activities within a country and what policies might be utilized in the future to promote more entrepreneurial activities induced by Angels and PE/VC funds. As a first step, we generate several dependent variables to capture the density of Angels and PE/VC funds activities at the national level. For example, in Table IX Model (1), the dependent variable is Angel Density (scaled by Total Population) which is the sum number of all Angel deals within a specific country in a calendar year and then divide by the total population of this country in that year (in millions). The other three dependent variables in Models (2) to (4) are created using similar methods, with Model (2) using total GDP as the denominator and Models (3) and (4) are for PE/VC funds densities. We use the double clustering OLS models by controlling both investee firm and year effects in addition to controlling the industry fixed effects but relaxed the country fixed effects to reduce collinearity issues and our main regression models use the following specification:

Density Variables = f (Economic and Stock Market Conditions, Legal Environments, Investee Firm Characteristics, Hofstede's Cultural Dimensions, Industry Dummies)

We find very consistent results across all models in Panel A of Table IX, higher Angels density and PE/VC funds density are associated with larger GDP per capita, larger domestic stock market capitalization, better minority shareholder protection, smaller investee firms with more active entrepreneurs and with national cultures favoring less individualism and encouraging more risk-taking. The economic significances are also non-negligible: for example, given results from our Model (1) in Panel A, a one standard deviation increase in the natural logarithm of GDP per capita will increase the Angel density by 47.81%, a one standard deviation increase in the natural logarithm of domestic market capitalization will increase the Angel density by 38.84%, a one standard deviation increase in the MSCI returns will increase the Angel density by 11.32%, a one standard deviation increase in the minority shareholder protection index will increase the Angel density by 26.22%, a one standard deviation decrease in the natural logarithm of number of employees will increase the Angel density by 6.42%, a one standard deviation increase in the number of deals per year will increase the Angel density by 4.60%, a one standard deviation decrease in the individualism index will increase the Angel density by 53.20% and a one standard deviation decrease in the uncertainty avoidance index will increase the Angel density by 15.52%. All other models in Panel A of Table IX return similar results with comparable economic significances. Note that our results are consistent with previous findings in the literatures which emphasize that some key factors for successful Angel investing will be in the areas with more supplies of both wealthy people and entrepreneurs as well as located in large cities or tech hubs where those areas have friendly attitudes towards entrepreneurship (Shane, 2005; DeGennaro, 2010). Our study extended such views on U.S. studies to an international atmosphere which can help policy makers across the world to build and spawn a healthy farm for both Angels and PE/VC funds.

Furthermore, we present additional one-year lead dependent variable analysis in Panel B in addition to the contemporaneous analysis in Panel A of Table IX, the results are robust and consistent. All the main explanatory variables signs and statistical significances did not change

and such effect is very consistent to increase the density of entrepreneurial activities within a country. Overall, countries with higher GDP per capita, larger stock market, better legal environment, and having cultures favoring less individualism and more risk-taking will supply more entrepreneurs and investors. Thus, the density for entrepreneurial activities will be enhanced.

[Insert Table IX About Here]

4.4. Will disclosure regulation change and bankruptcy law change have any impact on Angel activities?

In order to complement our previous results regarding Angels and PE/VC funds activities around the world, we further perform difference-in-differences tests to assess specifically the effects from regulatory changes in specific countries that are associated with more stringent disclosure rule and more forgiving bankruptcy law changes. Cumming and Johan (2013) found that more stringent securities regulation is positively associated with the supply and performance of VC as well as the entrepreneurial spawning induced by VC around the world. More stringent disclosure rules will enhance the entrepreneurial activities as predicted in their study which inspire us to perform similar tests in our paper about Angels⁴. Following Armour and Cumming (2008) who found that “forgiving” personal bankruptcy law has positive effect on entrepreneurship, we carried out a similar search of all bankruptcy law changes across all of the countries and years covered by our sample⁵.

⁴ Following Cumming and Knill (2012), the countries with disclosure regulatory changes in the sample term examined are: United States (“SOX”; 2002), South Korea (“Addendum to Securities Exchange Act”; 2004), Mexico (“Code of Best Practices”; 2005), Brazil (“Novo Mercado”; 2005); India (“Clause 49”; 2005).

⁵ Following Armour and Cumming (2008) and the data from International Insolvency Institute, the countries with bankruptcy law changes in the sample term examined are: Austria, Belgium, Brazil,

Before we move on to talk about the difference-in-differences analysis results, we first run preliminary means difference tests in Table X. In panel A of Table X, we compare the characteristics under the disclosure regulation change. The first subpanel is presenting the results for all deals, then for Angel deals and PE/VC deals subsequently. We can find that the regulation change with emphasis on more disclosure will have significant impact with regards to different characteristics of our sample. After the disclosure regulation change, the total number of deals is decreasing while the number of Angel deals is increasing, the investee firm company valuation become larger but those firm sizes are shrinking, the four density variables are all increasing after the disclosure regulation change indicating such rule change is favorable to foster more Angel and PE/VC activities. And those trends are consistent for both Angels and PE/VC funds. The successful exits rates are also declining but such change is mainly driven by the decreasing IPO exits rates and PE/VC deals performances.

In panel B of Table X, we compare the characteristics under the bankruptcy law change. Similar to Panel A, we have found quite similar results regarding deal, the investee firm and the density characteristics, only the exit outcomes return a little different results with the acquisition rates are increasing after the bankruptcy law change and such change is mainly driven by PE/VC deals. Moreover, we can find that both regulatory changes are in favor of spawning more entrepreneurial activities induced by both Angels and PE/VC funds. The four density variables and the number of Angel deals are significantly higher during the periods after those regulatory changes and those results are consistent across all means tests in Table X. However, for Angels, both regulatory changes seem not to affect their divestment strategies which infer again that they are different investor type compared with sophisticated investor type like PE/VC funds. Their risk profiles and preferences might be totally different.

Bulgaria, Canada, China, Czech Republic, Denmark, Finland, France, Germany, Greece, Hong Kong, Hungary, India, Indonesia, Ireland, Israel, Italy, Japan, Malaysia, Netherlands, New Zealand, Philippines, Poland, Portugal, Singapore, South Korea, Spain, Sweden, Switzerland, Thailand, Turkey, United Kingdom, United States, Uruguay and Vietnam.

[Insert Table X About Here]

Table XI reports the difference-in-differences regressions for different characteristics as dependent variables to test the impact from disclosure regulation change. We are looking for the key variable (Treat * After) across all models to support our means difference tests of Table X. From the results of Panel A for all deals, Panel B for all Angel deals and Panel C for all PE/VC deals, we find that all entrepreneurial activity related variables return statistically significant results where Model (4) for testing the total number of Angel deals and Models (8) to (11) for testing four entrepreneurial density variables all return positive coefficients and are statistically significant at 1% level. We find these difference-in-differences tests to be quite compelling as they highlight the effect of changes on subsequent entrepreneurial spawning densities, and show directly that entrepreneurial spawning activities induced by Angels and PE/VC funds are more pronounced for countries with more stringent disclosure regulation change. Furthermore, the data also show in Table XI that exit outcomes via IPOs are less likely and this is mainly driven by PE/VC deals. We have also reported the difference-in-differences regressions results in Table XII to test the impact from bankruptcy law change. We find qualitative similar results in Table XI that the difference-in-differences tests results highlight the effect of changes on subsequent entrepreneurial spawning densities, and show directly that entrepreneurial spawning activities induced by Angels and PE/VC funds are more pronounced for countries with more forgiving bankruptcy law change.

[Insert Table XI and XII About Here]

5. Limitations

We present for the first time large sample international evidence on Angel deals around the world. Despite this new step, the data are not without limitations which we hope will inspire others to work towards in the future. We cannot rule out the endogeneity fully and our dataset suffers some problems might cause concerns for the results. For example, we cannot identify the substantial heterogeneity across Angels like Lerner et al., (2015) did, we don't know whether they are a group of wealthy investors, business angels or some other organizational structures, but given our summary statistics, the magnitude of the impact we have documented in this study is likely to capture some of the large and successful Angels in the market.

Moreover, we also do not know all of the angels in all countries around the world; but our findings are robust to subsamples of the data and randomly kicking out different countries out of the sample. Our conclusions are based on the data we have from PitchBook, it might be better to consider other datasets in the future. Our data also have the limitations on variables regarding financial performances results at the investee firms. If those variables are available in the future, we can investigate whether Angels or PE/VC funds can bring benefits to those investee firms and by how much.

6. Conclusions and Future Research Directions

Our analysis exploits the comprehensive data collected at the deal level of investee firms from PitchBook, which comprise 85,940 completed private equity deals from 96 countries spanning the 1977 to 2012 period. Within those deals, there are 5,397 deals in 42 countries are involved with Angels (either single funded by Angels or coinvested/syndicated with PE/VC funds). Such dataset allows us to compare Angels and PE/VC funds at both the deal and investee firm level at the same time. We find that, relative to PE/VC funds, Angels prefer investing in active smaller entrepreneurial firms in wealthier countries with better stock market conditions, worse legal environments and having cultures favored in higher levels of individualism and lower

levels of risk-taking. Such behaviors are robust both for the first round deals and deals at all other stages. We also find that, relative to PE/VC funds, those investee firms funded by Angels will have lower probability to have successful exits, in either IPO or acquisition, but better legal environments can help mitigate the negative effects on IPO exits. Moreover, in our subsample tests, the “stepping stone” logic of Angels still cannot be proved because we find that firms who have received Angel investments in the first round will have lower probabilities to successfully divest in later rounds. At a country/market level, we also find significant determinants which can work together to build a well rounded environment and spawn both Angels and PE/VC funds activities. In addition to those results, we also perform difference-in-differences tests to confirm that more stringent disclosure regulation and more forgiving bankruptcy law changes can also spawn the entrepreneurial activities induced by Angels and PE/VC funds. Our tests results are robust under various clustering methods to correct standard errors while controlling fixed effects and are robust when performing propensity score matching.

Angels still remain as an underdeveloped area in the academia, with more creditable data becoming available in the future, researchers can explore more in this area to shed more lights on what Angels prefer, how they make investments, both locally and internationally, where the preferred locations are, how they syndicate or coinvest with other investors, which financial contracts they are using to control the rights of the firms, what the real relationships between entrepreneurs and Angels are, or how the heterogeneity among Angels will have different impact on their investments, etc.

Our study also has several policy implications which governments of countries around the world can consider to promote entrepreneurial activities: economic and stock market development conditions are important, but other factors like cultures, the national attitudes towards promoting entrepreneurship will also be important area to develop. In addition, legal reforms can also be focused on setting more stringent disclosure regulations and drafting more forgiving personal bankruptcy laws.

APPENDIX – Selection Problems and Propensity Score Matching Tests

There are worries that possible sample selection bias might cause problems for our exit outcomes tests results in the study, we use propensity score (PS) matching methods (Rosenbaum and Rubin, 1983) to address such problems following Lee and Wahal (2004) and after the PS matching, we generate two subsamples to perform the counterfactual analysis on the exit outcomes in our study. We want to find the impact of Angel funding against specific alternative counterfactuals, such as whether the investee firms would have been better off with PE/VC funding or been worse off with Angel funding.

It is true that PE/VC funds may choose those investee firms and deals which have certain type of inherent characteristics making them fit their exit strategies as compared with Angels will do. What if Angels can choose and invest in similar firms and deals like PE/VC funds, what will be the exit outcomes and is there any certification effect from Angels? Such potential endogeneity problem and the selection issue maybe particularly important with regards to successful exits and we aim to address those problems.

First, we perform the PS matching based on the deal sizes and investee firm industries as PE/VC funds' selection criteria to match Angels' to create the first subsample. Then we pose more strict matching criteria based on all characteristics as presented in Table V to generate the second subsample. We present the means difference tests results in Table A1 which include the original unmatched sample differences between All Angel Deals and All PE/VC deals and the two PS-matched subsamples differences in the other two subpanels. As shown in Table A1, we can find that as compared with the original unmatched sample, PE/VC funds select quite different deals as the differences between almost all characteristics of theirs are significantly different from Angels. In the subsequent two subpanels, we can find that, after the PS matching, the two new subsamples are presenting almost the same characteristics between Angels and PE/VC funds. Those matched subsamples help us limit the selection bias to some extent. We can move on to

perform our counterfactual analysis to see whether Angels will have certification effects on the exit outcomes.

[Insert Table A1 About Here]

As the two new subsamples are presenting almost the same characteristics, we are confident to perform a similar regression test as we did in Table VII. We report our PROBIT regression results in Table A2. What if Angels were investing in and choosing investee firms and deals which have almost the same characteristics as those of PE/VC funds, and as previously we have found the certification effects only apply to PE/VC funds, we propose that Angels could also have such certification effects on exit outcomes. However, after we perform our subsample tests, we have found consistent results as we found in Table VII, Models (1) to (3) return similar results with the marginal effects for Angels dummy are all negative and statistically significant at 1% level. Angels will be 26.61% less likely to exit successfully in our original sample, they will also be 41.80% and 41.93% less likely to exit successfully in our two newly PS-matched samples, respectively. Angels still do not provide any certification effect like their counterparts PE/VC funds even if they are investing in and choosing investee firms and deals having almost the same characteristics. It seems that PE/VC funds can bring more expertise to the investee firms and have higher likelihood to exit their investments by IPO or acquisition. It might be other unobserved characteristics that can be explained such results but by using propensity score matching methods, we provide another robustness check for our main results.

[Insert Table A2 About Here]

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Figure 1: Angel Activities Trend over 1977 - 2012

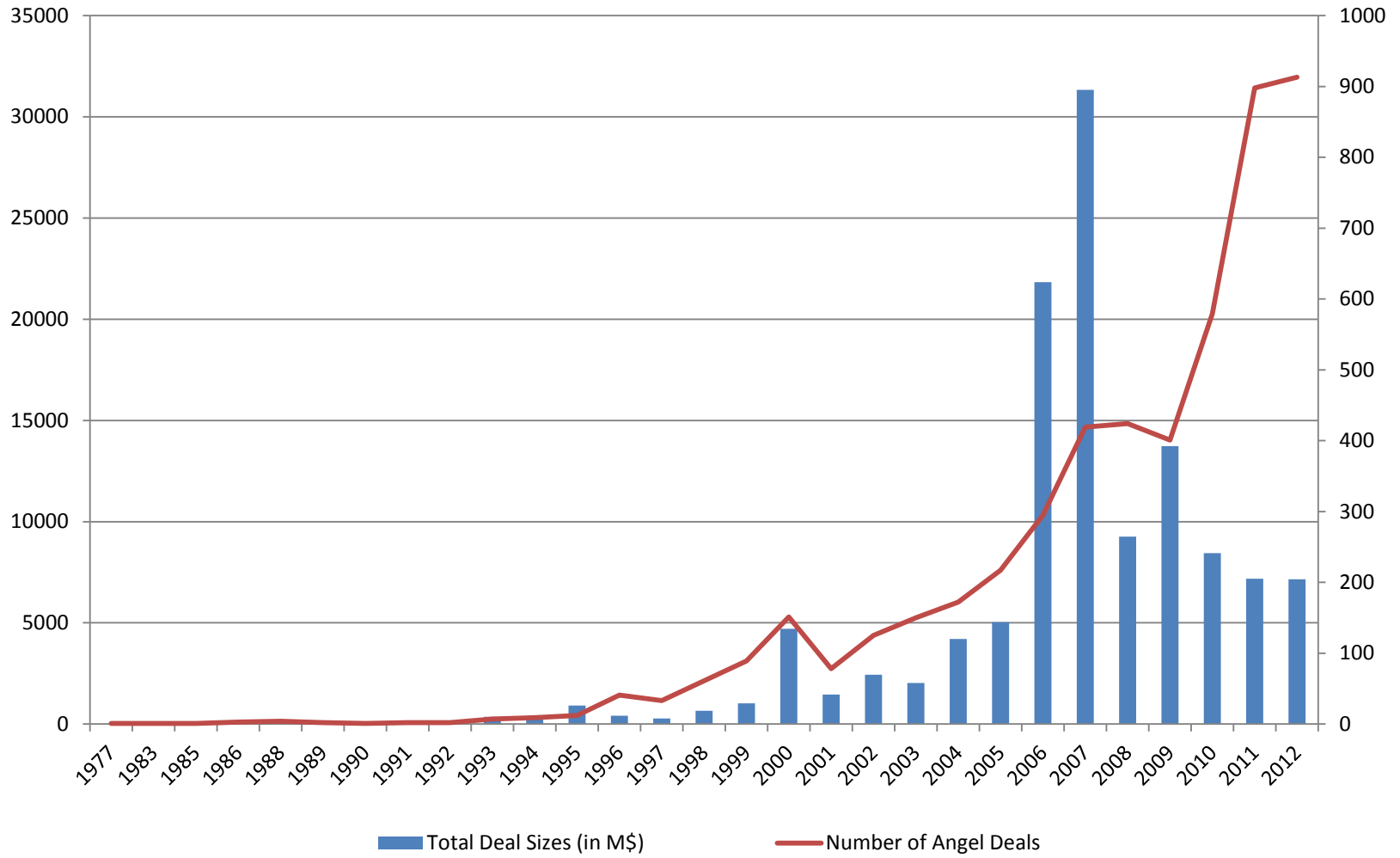


Figure 2: PE/VC Activities Trend over 1977 - 2012

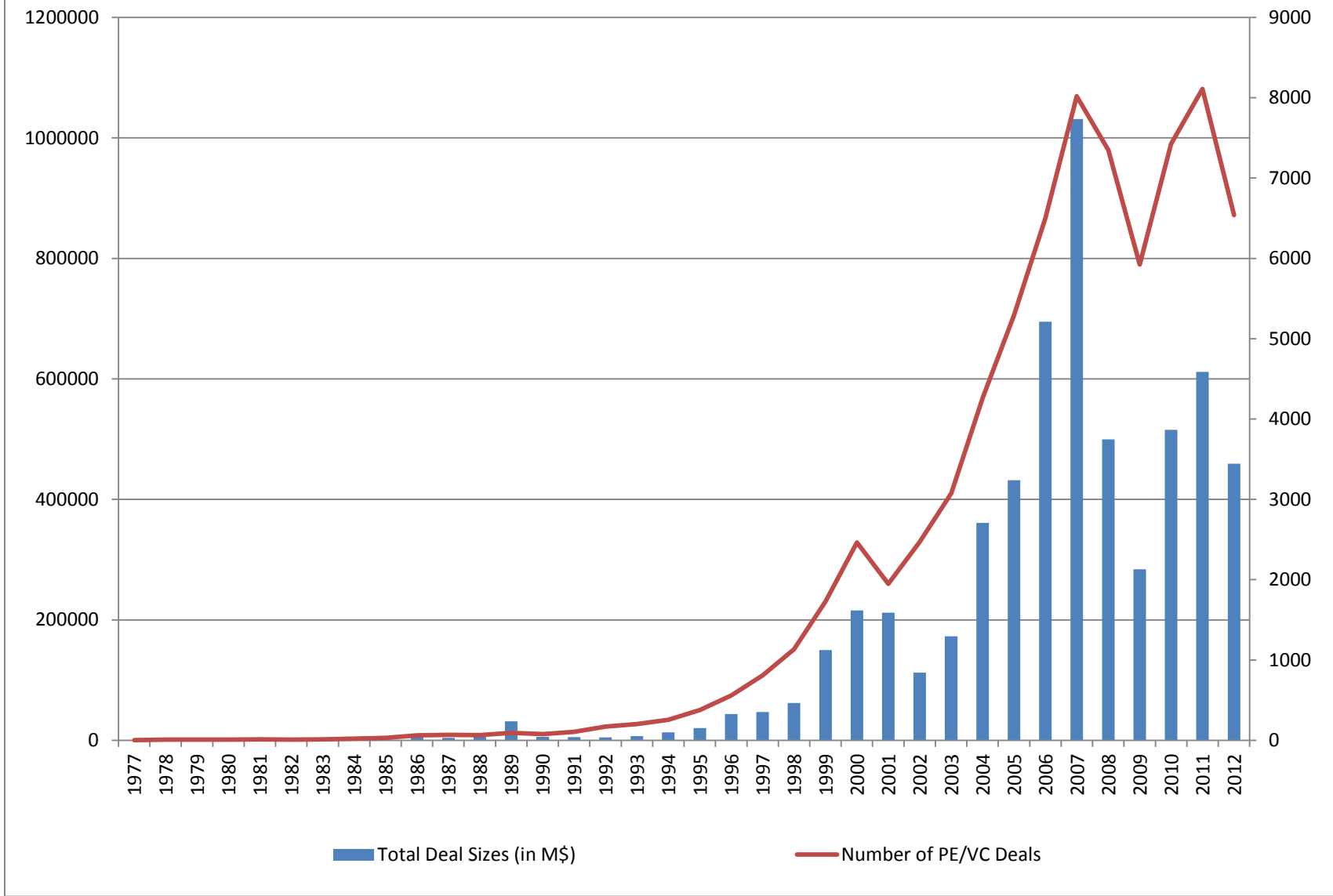


Table I. Top 10 Country and Industry Distribution for Completed Deals

This table summarizes the key features associated with the sample distribution of completed deals in the world. In this table, we show the top 10 countries and industry distribution for those completed deals in three separate groups: all, Angels and PE/VC.

Panel A: Top 10 Countries in terms of Number of Deals					
All Deals		All Angels Deals		All PE/VC Deals	
<i>Country</i>		<i>Country</i>		<i>Country</i>	
United States	73910	United States	4839	United States	69071
Canada	2770	Canada	143	Canada	2627
United Kingdom	2281	United Kingdom	123	United Kingdom	2158
India	735	Israel	52	India	694
Germany	661	India	41	Germany	623
France	592	Germany	38	France	569
China	516	France	23	China	500
Israel	512	Ireland	17	Israel	460
Netherlands	306	China	16	Netherlands	299
Ireland	255	Spain	11	Australia	239
Panel B: Top 10 Industries in terms of Number of Deals					
All Deals		All Angels Deals		All PE/VC Deals	
<i>Industry</i>		<i>Industry</i>		<i>Industry</i>	
Software	17235	Software	2129	Software	15106
Commercial Services	10096	Media	612	Commercial Services	9570
Commercial Products	6751	Commercial Services	526	Commercial Products	6624
Media	4809	Pharmaceuticals and Biotechnology	262	Healthcare Devices and Supplies	4554
Healthcare Devices and Supplies	4794	Healthcare Devices and Supplies	240	Pharmaceuticals and Biotechnology	4279
Pharmaceuticals and Biotechnology	4541	Retail	196	Media	4197
Communications and Networking	3675	Communications and Networking	156	Communications and Networking	3519
Healthcare Services	2833	Commercial Products	127	Healthcare Services	2758
Consumer Non-Durables	2509	IT Services	114	Consumer Non-Durables	2417
Computer Hardware	2379	Computer Hardware	94	Computer Hardware	2285

Table II. Country Distribution Characteristics at Portfolio Firm-Level and Deal-Level - Angel Activities in All Rounds, 1st Round and Exits in Percentages

This table summarizes the detailed features associated with the country distribution of portfolio firms and completed deals in the world. In Panel A, we show the total number of investee firms in each country and the associated angel activity percentages both in all rounds and in the 1st round as well as the percentage of portfolio firms with successful exits. In Panel B, we show the total number of completed deals in each country and the associated angel activity percentages both in all rounds and in the 1st round as well as the percentage of portfolio firms with successful exits.

Country	Panel A: Investee Firm-Level Country Distribution Characteristics				Panel B: Deal-Level Country Distribution Characteristics			
	Total Number of Firms	% of Firms with Angel Financing, all rounds	% of Firms with Angel Financing, first round	% of Firms with Successful Exits	Total Number of Deals	% of Deals with Angel Financing, all rounds	% of Deals with Angel Financing, first round	% of Deals as successful exits
Argentina	24	25.00	20.83	20.83	44	13.64	11.36	11.36
Australia	177	3.39	3.39	23.73	247	3.24	2.43	17.81
Austria	37	2.70		18.92	64	1.56		14.06
Belgium	73	6.85	4.11	24.66	138	4.35	2.17	16.67
Bermuda	53	13.21	11.32	41.51	126	6.35	4.76	18.25
Brazil	120	5.00	4.17	19.17	185	4.32	2.70	15.68
Bulgaria	17	5.88		29.41	34	2.94		14.71
Canada	1542	7.85	6.16	23.15	2770	5.16	3.43	13.94
Chile	23	4.35		13.04	34	2.94		8.82
China	273	5.13	4.40	21.98	516	3.10	2.33	12.21
Colombia	19	5.26	5.26	36.84	28	3.57	3.57	32.14
Croatia	1	100.00			2	50.00		
Czech Republic	28	3.57		25.00	50	2.00		16.00
Denmark	61	1.64	1.64	13.11	103	1.94	0.97	7.77
Finland	67	8.96	8.96	17.91	105	5.71	5.71	11.43
France	298	5.70	4.36	23.15	592	3.89	2.20	11.99
Germany	369	9.49	8.13	25.75	661	5.75	4.54	15.89
Hong Kong	61	3.28	3.28	18.03	87	2.30	2.30	12.64
India	364	9.34	7.14	14.29	735	5.58	3.54	7.89
Ireland	120	10.83	6.67	20.00	255	6.67	3.14	10.20
Israel	240	16.67	12.08	18.33	512	10.16	5.66	8.79
Italy	104	4.81	4.81	26.92	200	2.50	2.50	17.50
Japan	98	2.04	2.04	20.41	151	1.32	1.32	14.57
Jordan	2	50.00	50.00	50.00	4	25.00	25.00	25.00
Luxembourg	12	16.67	16.67	25.00	29	6.90	6.90	13.79
Mexico	45	4.44		26.67	74	2.70		18.92
Netherlands	161	3.73	2.48	25.47	306	2.29	1.31	14.38

Norway	70	1.43		21.43	108	0.93		16.67
Panama	3	33.33	33.33	33.33	4	25.00	25.00	25.00
Poland	30	3.33	3.33	16.67	41	2.44	2.44	12.20
Portugal	20	5.00	5.00		21	4.76	4.76	
Romania	11	9.09	9.09	27.27	13	7.69	7.69	23.08
Russia	36	5.56	2.78	25.00	68	4.41	1.47	13.24
Singapore	50	4.00	4.00	22.00	92	2.17	2.17	14.13
Slovenia	5	20.00	20.00		6	16.67	16.67	
South Africa	20	5.00	5.00		24	4.17	4.17	
South Korea	47	2.13	2.13	27.66	77	1.30	1.30	23.38
Spain	114	6.14	2.63	21.05	207	5.31	1.45	12.08
Sweden	110	2.73	2.73	19.09	179	2.23	1.68	12.29
Switzerland	106	4.72	3.77	25.47	209	2.87	1.91	13.88
United Kingdom	1253	7.82	5.19	20.91	2281	5.39	2.85	12.10
United States	35896	10.56	7.66	21.73	73910	6.55	3.72	11.31
On Average	1003.81	10.87	8.42	23.81	2030.76	6.61	5.00	15.05

Table III. Variable Definitions and Summary Statistics

This table provides definitions of the main variables in the dataset, the data sources, and summary statistics.

Variable Name	Definition	Mean	Median	Standard Deviation	Minimum	Maximum	Number of observations
Main Dependent Variables							
All Angels Dummy	A dummy variable equal to 1 for deals with angel investor.	0.063	0.000	0.243	0.000	1.000	85940
Pure Angel Dummy	A dummy variable equal to 1 for deals with only one angel investor.	0.017	0.000	0.128	0.000	1.000	85940
Mixed Angels Dummy	A dummy variable equal to 1 for deals with both angel investor and PE/VC investors.	0.046	0.000	0.210	0.000	1.000	85940
Pure PE/VC Dummy	A dummy variable equal to 1 for deals with PE/VC investors.	0.937	1.000	0.243	0.000	1.000	85940
Firms with 1st round Angel Financing Dummy	A dummy variable equal to 1 for later deals of those investee firms who have received Angel financing in the first round and equals to 0 otherwise.	0.116	0.000	0.320	0.000	1.000	43467
Deal Characteristics							
Deal Size	Firm-level deal size (in M\$) for the investee companies.	116.750	10.300	807.991	0.010	101002.500	52922
No. of Deals per Year	Firm-level number of deals has been made in a year for the investee companies.	1.186	1.000	0.523	1.000	11.000	85940
Total No. of Deals	Firm-level total number of deals has been made over the whole sample period for the investee companies.	3.508	3.000	2.889	1.000	41.000	85940
No. of Angel Deals per Year	Firm-level number of deals has been made in a year for the investee companies with angel investor.	343.993	365.000	264.790	1.000	818.000	76992
No. of Investors	Firm-level number of investors of each completed deal for the investee companies.	1.909	1.000	1.496	1.000	22.000	85940
Investee Company Characteristics							
Company Valuation	Firm-level valuation (in M\$) for the investee companies at the time of deal completed.	611.590	120.355	2853.799	0.010	118802.500	12758
No. of Employees	Firm-level number of employees in the investee companies.	1368.882	110.000	9976.233	1.000	805600.000	42893
LN of No. of Employees	Natural logarithm of firm-level number of employees in the investee companies.	4.860	4.700	2.089	0.000	13.5999	42893
Country Characteristics							
Angel Density (scaled by Total Population)	The total number of angel deals within a country for a specific year divided by the total population of that country in the same year.	1.162	1.190	1.017	0.001	30.977	76998
Angel Density (scaled by Total GDP)	The total number of angel deals within a country for a specific year divided by the total GDP of that country in the same year.	0.024	0.025	0.017	0.000	0.360	76998
PE/VC Density (scaled by Total Population)	The total number of PE/VC deals within a country for a specific year divided by the total population of that country in the same year.	14.983	18.667	9.421	0.001	232.475	80105

PE/VC Density (scaled by Total GDP)	The total number of PE/VC deals within a country for a specific year divided by the total GDP of that country in the same year.	0.320	0.384	0.161	0.000	6.101	80084
GDP per Capita	GDP per capita is gross domestic product divided by midyear population. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in current U.S. dollars. Source: World Bank.	43606.000	47001.430	9418.821	308.535	193892.300	80090
LN of GDP per Capita	Natural logarithm of GDP per capita.	10.625	10.758	0.475	5.732	12.175	80090
Domestic Market Capitalization	The domestic market capitalization of a stock exchange is the total number of issued shares of domestic companies, including their several classes, multiplied by their respective prices at a given time from the World Federation of Exchanges. This figure reflects the comprehensive value of the market at that time, in M\$. Source: http://www.world-exchanges.org/statistics/statistics-definitions .	13900000.000	16200000.000	5566940.000	6.200	20300000.000	79782
LN of Domestic Market Capitalization	Natural logarithm of domestic market capitalization.	16.200	16.601	1.038	1.825	16.828	79782
MSCI Returns	The country-specific Morgan Stanley Capital International index return, a proxy for stock market conditions in each country.	0.054	0.094	0.157	-0.684	1.437	79891
Minority Shareholders Protection Index	The minority shareholders protection index is the coded weighted average index on the ten key legal provisions identified by legal scholars as most relevant to the protection of minority shareholder rights (as per Guillen and Capron, 2015): powers of the general meeting for de facto changes; agenda-setting power; anticipation of shareholder decision facilitated; prohibition of multiple voting rights; independent board members; feasibility of directors' dismissal; private enforcement of directors' duties (derivative suit); shareholder action against resolutions of the general meeting; mandatory bid; and disclosure of major share ownership (as per Lele and Siems, 2007 and Siems, 2008). Higher values indicate "better" degree of minority shareholders' protection and legal systems.	7.019	7.250	0.521	1.000	8.250	77240

IDV	Hofstede's index of individualism versus collectivism. The high side of this dimension, called individualism, can be defined as a preference for a loosely-knit social framework in which individuals are expected to take care of only themselves and their immediate families. Its opposite, collectivism, represents a preference for a tightly-knit framework in society in which individuals can expect their relatives or members of a particular in-group to look after them in exchange for unquestioning loyalty. A society's position on this dimension is reflected in whether people's self-image is defined in terms of "I" or "we." Source: http://geert-hofstede.com/national-culture.html .	87.883	91.000	10.976	11.000	91.000	85514
UAI	Hofstede's index of uncertainty avoidance. The Uncertainty Avoidance dimension expresses the degree to which the members of a society feel uncomfortable with uncertainty and ambiguity. The fundamental issue here is how a society deals with the fact that the future can never be known: should we try to control the future or just let it happen? Countries exhibiting strong UAI maintain rigid codes of belief and behavior and are intolerant of unorthodox behavior and ideas. Weak UAI societies maintain a more relaxed attitude in which practice counts more than principles. Source: http://geert-hofstede.com/national-culture.html .	46.928	46.000	7.681	8.000	112.000	85514
Exit Outcomes							
Successful Exits	A dummy variable equal to 1 for either IPO or Acquisition exit.	0.116	0.000	0.320	0.000	1.000	85940
IPO Exits	A dummy variable equal to 1 for an IPO exit.	0.017	0.000	0.128	0.000	1.000	85940
Acquisition Exits	A dummy variable equal to 1 for an Acquisition exit.	0.099	0.000	0.298	0.000	1.000	85940

Table IV. Pair-wise Correlations Matrix

This table provide correlations across the main variables in the dataset. * Significant at at least the 5% level of significance.

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]	[21]	[22]	[23]	
All Angels Dummy	1.00																							
Pure Angel Dummy	0.50*	1.00																						
Mixed Angels Dummy	0.85*	-0.03*	1.00																					
Pure PE/VC Dummy	-1.00	-0.50*	-0.85*	1.00																				
LN of GDP per capita	0.03*	0.01*	0.03*	-0.03*	1.00																			
LN of Domestic Market Capitalization	0.03*	0.01*	0.02*	-0.03*	0.42*	1.00																		
MSCI Returns	0.00	0.01	0.00	0.00	-0.11*	-0.02*	1.00																	
Minority Protection Index	0.04*	0.02*	0.03*	-0.04*	0.42*	0.59*	-0.11*	1.00																
LN of Number of Employees	-0.12*	-0.06*	-0.10*	0.12*	-0.23*	-0.22*	0.07*	-0.23*	1.00															
Number of Deals per Year	0.02*	0.02*	0.01*	-0.02*	0.02*	0.04*	-0.01	0.04*	0.03*	1.00														
IDV	0.02*	0.01*	0.02*	-0.02*	0.69*	0.72*	-0.07*	0.42*	-0.20*	0.03*	1.00													
UAI	-0.01*	0.00	-0.01	0.01*	-0.06*	-0.38*	-0.01*	-0.19*	0.09*	-0.01*	-0.38*	1.00												
Angel Density (scaled by Total Population)	0.08*	0.03*	0.07*	-0.08*	0.36*	0.18*	0.10*	0.54*	-0.18*	0.06*	0.28*	-0.06*	1.00											
Angel Density (scaled by Total GDP)	0.09*	0.04*	0.08*	-0.09*	0.40*	0.28*	0.10*	0.54*	-0.21*	0.07*	0.28*	-0.05*	0.97*	1.00										
PE/VC Density (scaled by Total Population)	0.05*	0.02*	0.04*	-0.05*	0.46*	0.35*	-0.01*	0.69*	-0.22*	0.05*	0.49*	-0.21*	0.82*	0.81*	1.00									
PE/VC Density (scaled by Total GDP)	0.05*	0.02*	0.04*	-0.05*	0.49*	0.50*	-0.01*	0.70*	-0.26*	0.05*	0.52*	-0.23*	0.74*	0.77*	0.96*	1.00								
Successful Exits	-0.09*	-0.04*	-0.08*	0.09*	-0.01	-0.02*	0.03*	-0.03*	0.10*	-0.05*	-0.01*	0.01*	0.00	0.00	-0.02*	-0.02*	1.00							
IPO Exits	-0.03*	-0.02*	-0.03*	0.03*	-0.06*	-0.04*	0.06*	-0.07*	0.14*	0.02*	-0.03*	0.00	-0.04*	-0.05*	-0.05*	-0.06*	0.36*	1.00						
Acquisition Exits	-0.08*	-0.04*	-0.07*	0.08*	0.02*	-0.01	0.01*	0.00	0.04*	-0.07*	0.00	0.01*	0.01*	0.01*	0.00	0.00	0.92*	-0.04*	1.00					
Deal Size	-0.03*	-0.02*	-0.03*	0.03*	0.00	-0.05*	0.02*	-0.04*	0.22*	-0.01	-0.04*	0.03*	-0.01*	-0.02*	-0.02*	-0.03*	0.10*	0.02*	0.10*	1.00				
Company Valuation	0.00	0.01	0.00	0.00	-0.01	-0.04*	0.02*	-0.01	0.22*	0.29*	-0.06*	0.04*	0.04*	0.04*	0.01	0.00	0.01	0.05*	-0.02*	0.71*	1.00			
Total No. of Deals	0.00	0.00	-0.01	0.00	0.00	0.06*	-0.04*	0.01	0.06*	0.46*	0.07*	-0.03*	-0.05*	-0.05*	0.00	0.01*	-0.04*	0.06*	-0.07*	-0.01*	0.26*	1.00		
No. of Angel Deals per Year	0.09*	0.04*	0.08*	-0.09*	0.40*	0.49*	0.11*	0.53*	-0.25*	0.08*	0.30*	-0.08*	0.78*	0.89*	0.65*	0.68*	0.00	-0.05*	0.02*	-0.03*	0.04*	-0.05*	1.00	
No. of Investors	0.15*	-0.08*	0.23*	-0.09*	0.02*	0.03*	-0.02*	0.00	-0.15*	-0.01*	0.03*	-0.02*	-0.01*	-0.01*	0.01*	0.02*	-0.20*	-0.08*	-0.18*	-0.01*	0.04*	0.11*	-0.02*	

Table V. Mean Descriptive Statistics by Main Characteristics

This table provides the main mean descriptive statistics across different main characteristics by different deals. The table also provides the two-sample means test results between major characteristics groups in our data. Panel A presents the mean comparison tests among all angel deals, pure angel deals, mixed angel deals and pure PE/VC deals, Panel B presents the mean comparison tests for US vs. Non-US deals and Pre vs. Post Financial Crisis deals. The means test is a two-sample t-test with equal variance. *, **, *** Significant at the 10%, 5% and 1% levels, respectively.

Panel A: Descriptive Statistics - Mean Comparison Tests among All Angels, Pure Angel, Mixed Angel and Pure PE/VC Deals						
	All Angel Deals vs. Pure PE/VC Deals			Pure Angel Deals vs. Mixed Angel Deals		
	All Angel Deals	All PE/VC Deals	Mean Differences	Pure Angel Deals	Mixed Angel Deals	Mean Differences
Deal Characteristics						
Deal Size	27.821	124.884	-97.063***	10.481	33.437	-22.956
No. of Deals per Year	1.223	1.183	0.040***	1.247	1.214	0.033**
Total No. of Deals	3.482	3.509	-0.028	3.602	3.439	0.163**
No. of Angel Deals per Year	431.338	337.825	93.513***	427.586	432.535	-4.948
No. of Investors	2.799	1.849	0.950***	1.000	3.441	-2.441***
Investee Company Characteristics						
Company Valuation	595.046	611.848	-16.802	946.253	518.697	427.557
No. of Employees	509.982	1413.984	-904.002***	500.153	513.275	-13.122
Country Characteristics						
Angel Density (scaled by Total Population)	1.466	1.141	0.325***	1.424	1.479	-0.055
Angel Density (scaled by Total GDP)	0.030	0.024	0.006***	0.029	0.030	-0.001
PE/VC Density (scaled by Total Population)	16.696	14.867	1.828***	16.380	16.796	-0.417
PE/VC Density (scaled by Total GDP)	0.349	0.318	0.031***	0.345	0.350	-0.005
GDP per Capita	45513.550	43476.870	2036.683***	45068.630	45655.460	-586.836**
Domestic Market Capitalization	14700000.000	13900000.000	846793.600***	14600000.000	14700000.000	101250.800
MSCI Returns	0.057	0.054	0.003	0.062	0.055	0.007
Minority Shareholders Protection Index	7.093	7.011	0.082***	7.088	7.094	-0.006
IDV	88.840	87.819	1.021***	88.478	88.969	-0.491*
UAI	46.726	46.942	-0.217**	46.797	46.700	0.097
Exit Outcomes						
Successful Exits	0.005	0.123	-0.118***	0.010	0.003	0.007***
IPO Exits	0.000	0.018	-0.018***	0.001	0.000	0.001*
Acquisition Exits	0.005	0.105	-0.100***	0.009	0.003	0.006***

Table V. Mean Descriptive Statistics by Main Characteristics (Continued)

	Pure Angel Deals vs. Pure PE/VC Deals			Mixed Angel Deals vs. Pure PE/VC Deals		
	Pure Angel Deals	All PE/VC Deals	Mean Differences	Mixed Angel Deals	All PE/VC Deals	Mean Differences
Deal Characteristics						
Deal Size	10.481	124.884	-114.403***	33.437	124.884	-91.447***
No. of Deals per Year	1.247	1.183	0.064***	1.214	1.183	0.031***
Total No. of Deals	3.602	3.509	0.092	3.439	3.509	-0.070
No. of Angel Deals per Year	427.586	337.825	89.761***	432.535	337.825	94.710***
No. of Investors	1.000	1.849	-0.849***	3.441	1.849	1.592***
Investee Company Characteristics						
Company Valuation	946.253	611.848	334.405	518.697	611.848	-93.151
No. of Employees	500.153	1413.984	-913.831**	513.275	1413.984	-900.709***
Country Characteristics						
Angel Density (scaled by Total Population)	1.424	1.141	0.283***	1.479	1.141	0.338***
Angel Density (scaled by Total GDP)	0.029	0.024	0.006***	0.030	0.024	0.006***
PE/VC Density (scaled by Total Population)	16.380	14.867	1.512***	16.796	14.867	1.929***
PE/VC Density (scaled by Total GDP)	0.345	0.318	0.027***	0.350	0.318	0.032***
GDP per Capita	45068.630	43476.870	1591.760***	45655.460	43476.870	2178.596***
Domestic Market Capitalization	14600000.000	13900000.000	770026.100***	14700000.000	13900000.000	871276.900***
MSCI Returns	0.062	0.054	0.008*	0.055	0.054	0.001
Minority Shareholders Protection Index	7.088	7.011	0.077***	7.094	7.011	0.083***
IDV	88.478	87.819	0.659**	88.969	87.819	1.150***
UAI	46.797	46.942	-0.145	46.700	46.942	-0.242*
Exit Outcomes						
Successful Exits	0.010	0.123	-0.113***	0.003	0.123	-0.120***
IPO Exits	0.001	0.018	-0.017***	0.000	0.018	-0.018***
Acquisition Exits	0.009	0.105	-0.096***	0.003	0.105	-0.102***

Table V. Mean Descriptive Statistics by Main Characteristics (Continued)

Panel B: Descriptive Statistics - Mean Comparison Tests for US vs. Non-US and Pre vs. Post Financial Crisis						
	US Deals vs. Non-US Deals			Pre Financial Crisis Deals vs. Post Financial Crisis Deals		
	US Deals	Non-US Deals	Mean Differences	Pre Financial Crisis Deals	Post Financial Crisis Deals	Mean Differences
Deal Characteristics						
Deal Size	97.798	239.285	-141.487***	130.475	103.538	26.937***
No. of Deals per Year	1.195	1.129	0.065***	1.138	1.237	-0.099***
Total No. of Deals	3.619	2.826	0.793***	3.705	3.294	0.411***
No. of Angel Deals per Year	383.284	8.561	374.723***	169.358	507.261	-337.903***
No. of Investors	1.931	1.771	0.160***	1.932	1.883	0.048***
Investee Company Characteristics						
Company Valuation	522.527	940.119	-417.592***	492.290	806.369	-314.078***
No. of Employees	1133.142	3369.230	-2236.088***	1413.038	1310.516	102.523
Country Characteristics						
Angel Density (scaled by Total Population)	1.251	0.400	0.851***	0.607	1.681	-1.074***
Angel Density (scaled by Total GDP)	0.026	0.008	0.018***	0.014	0.034	-0.020***
PE/VC Density (scaled by Total Population)	16.677	4.395	12.283***	11.759	18.046	-6.287***
PE/VC Density (scaled by Total GDP)	0.356	0.093	0.264***	0.268	0.369	-0.102***
GDP per Capita	45053.450	34546.230	10507.210***	39828.630	47194.830	-7366.194***
Domestic Market Capitalization	15800000.000	1802092.000	14000000.000***	13600000.000	14200000.000	-556171.400***
MSCI Returns	0.051	0.073	-0.022***	0.091	0.019	0.072***
Minority Shareholders Protection Index	7.101	6.298	0.804***	6.870	7.163	-0.293***
IDV	91.000	68.030	22.970***	88.372	87.352	1.020***
UAI	46.000	52.842	-6.842***	46.882	46.979	-0.097*
Exit Outcomes						
Successful Exits	0.113	0.131	-0.018***	0.109	0.122	-0.013***
IPO Exits	0.016	0.023	-0.008***	0.023	0.010	0.013***
Acquisition Exits	0.097	0.107	-0.010***	0.086	0.113	-0.026***

Table VI. PROBIT Regression Models for How Angel Investors Make Investments

This table presents clustering PROBIT model results of the determinants of Angel versus PE/VC investments and we report the associated marginal effects on those determinants. All dependent variable across Model (1) to (14) is different indicator dummy variable to capture All Angels, Pure Angel, Mixed Angel and Pure PE/VC investors, all other variables are as defined in Table III. *, **, *** Significant at the 10%, 5% and 1% levels, respectively.

Panel A: For All Rounds Deals														
	Model (1)		Model (2)		Model (3)		Model (4)		Model (5)		Model (6)		Model (7)	
	All Angels		All Angels		All Angels		All Angels		Pure Angel		Mixed Angels		Pure PE/VC	
	Marginal Effects	z score	Marginal Effects	z score	Marginal Effects	z score	Marginal Effects	z score	Marginal Effects	z score	Marginal Effects	z score	Marginal Effects	z score
LN of GDP per capita	0.1259	2.89***	0.1961	3.43***	0.0262	1.15	0.0262	1.15	-0.0059	-0.82	0.0326	1.73*	-0.0262	-1.15
LN of Domestic Market Capitalization	-0.0381	-1.95*	-0.0535	-2.96***	-0.0098	-1.10	-0.0098	-1.10	0.0003	0.11	-0.0103	-1.32	0.0098	1.10
MSCI Returns	0.0360	2.00**	0.0418	2.51**	0.0208	1.93*	0.0208	1.93*	0.0087	3.07***	0.0124	1.38	-0.0208	-1.93*
Minority Protection Index			-0.0303	-2.58***	-0.0206	-3.36***	-0.0206	-3.36***	-0.0047	-2.19**	-0.0165	-3.38***	0.0206	3.36***
LN of Number of Employees					-0.0120	-8.67***	-0.0120	-8.67***	-0.0031	-9.19***	-0.0091	-7.20***	0.0120	8.67***
Number of Deals per Year					0.0062	2.69***	0.0062	2.69***	0.0024	2.00**	0.0037	1.89*	-0.0062	-2.69***
IDV							0.0028	1.04	0.0001	0.22	0.0024	1.04	-0.0028	-1.04
UAI							0.0000	-0.03	0.0000	0.05	0.0001	0.07	0.0000	0.03
Industry Effects	Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Country Effects	Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Year Effects	Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Number of Observations	79229		76651		39304		39304		38171		39253		39304	
Pseudo R2	0.0609		0.0627		0.0709		0.0709		0.0682		0.0627		0.0709	

Table VI. PROBIT Regression Models for How Angel Investors Make Investments (Continued)

Panel B: For Only 1st Round Deals														
	Model (8) All Angels		Model (9) All Angels		Model (10) All Angels		Model (11) All Angels		Model (12) Pure Angel		Model (13) Mixed Angels		Model (14) Pure PE/VC	
	Marginal Effects	z score	Marginal Effects	z score	Marginal Effects	z score	Marginal Effects	z score	Marginal Effects	z score	Marginal Effects	z score	Marginal Effects	z score
LN of GDP per capita	0.2251	4.47***	0.2891	4.84***	0.1488	3.19***	0.1488	3.19***	0.0264	1.74*	0.1287	3.21***	-0.1488	-3.19***
LN of Domestic Market Capitalization	-0.0779	-3.46***	-0.0928	-4.50***	-0.0556	-3.27***	-0.0556	-3.27***	-0.0069	-1.39	-0.0505	-3.37***	0.0556	3.27***
MSCI Returns	0.0449	2.08**	0.0501	2.58***	0.0362	1.92*	0.0362	1.92*	0.0105	1.63	0.0273	1.74*	-0.0362	-1.92*
Minority Protection Index			-0.0277	-2.34**	-0.0290	-2.36**	-0.0290	-2.36**	-0.0140	-3.65***	-0.0177	-1.70*	0.0290	2.36**
LN of Number of Employees					-0.0117	-5.82***	-0.0117	-5.82***	-0.0048	-5.24***	-0.0078	-4.80***	0.0117	5.82***
Number of Deals per Year					0.0357	5.87***	0.0357	5.87***	0.0116	3.49***	0.0245	5.14***	-0.0357	-5.87***
IDV							0.0128	2.62***	0.0013	1.62	0.0100	2.43**	-0.0128	-2.62***
UAI							0.0062	2.52**	0.0012	1.17	0.0048	2.34**	-0.0062	-2.52**
Industry Effects	Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Country Effects	Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Year Effects	Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Number of Observations	37301		35981		15876		15876		14064		15800		15876	
Pseudo R2	0.1043		0.1072		0.1177		0.1177		0.131		0.0911		0.1177	

Table VII. PROBIT Regression Models for Exits Outcomes

This table presents clustering PROBIT model results of the determinants of exit outcomes and we report the associated marginal effects of those determinants. The dependent variables across Model (1) to (24) are different exits dummy variable to capture all successful exits, all IPO exits and all acquisition exits, all other variables are as defined in Table III. For conciseness, we exclude all control variables which contain the exact same variables in Table VI: LN of GDP per capita, LN of Domestic Market Capitalization, MSCI Returns, Minority Protection Index, LN of Number of Employees, Number of Deals per Year, IDV and UAI. *, **, *** Significant at the 10%, 5% and 1% levels, respectively.

Panel A: For All Successful Exits																
	Model (1)		Model (2)		Model (3)		Model (4)		Model (5)		Model (6)		Model (7)		Model (8)	
	Successful Exits		Successful Exits		Successful Exits		Successful Exits		Successful Exits		Successful Exits		Successful Exits		Successful Exits	
	Marginal Effects	z score	Marginal Effects	z score	Marginal Effects	z score	Marginal Effects	z score	Marginal Effects	z score	Marginal Effects	z score	Marginal Effects	z score	Marginal Effects	z score
All Angels	-0.2661	-16.19***									-0.2796	-0.98				
All Angels * Minority Protection Index											0.0019	0.05				
Pure Angel			-0.1805	-7.18***									-0.7495	-1.42		
Pure Angel * Minority Protection Index													0.0808	1.08		
Mixed Angels					-0.3189	-10.90***			-0.1348	-3.15***					-0.0642	-0.25
Mixed Angels * Minority Protection Index															-0.0370	-1.00
Pure PE/VC							0.2661	16.19***	0.1852	7.39***						
Controls	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Industry Effects	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Country Effects	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Year Effects	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Number of Observations	39835		39835		39835		39835		39835		39835		39835		39835	
Pseudo R2	0.0427		0.032		0.0409		0.0427		0.043		0.0427		0.0321		0.0409	

Table VII. PROBIT Regression Models for Exits Outcomes (Continued)

Panel B: For All IPO Exits																
	Model (9)		Model (10)		Model (11)		Model (12)		Model (13)		Model (14)		Model (15)		Model (16)	
	IPO Exits		IPO Exits		IPO Exits		IPO Exits		IPO Exits		IPO Exits		IPO Exits		IPO Exits	
	Marginal Effects	z score	Marginal Effects	z score	Marginal Effects	z score	Marginal Effects	z score	Marginal Effects	z score	Marginal Effects	z score	Marginal Effects	z score	Marginal Effects	z score
All Angels	-0.0823	-4.77***									-0.5623	-5.01***				
All Angels * Minority Protection Index											0.0688	4.12***				
Pure Angel			-0.0544	-2.76***									-1.0118	-5.01***		
Pure Angel * Minority Protection Index													0.1353	4.63***		
Mixed Angels					Omitted					Omitted						Omitted
Mixed Angels * Minority Protection Index																Omitted
Pure PE/VC							0.0823	4.77***	0.0577	2.82***						
Controls	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Industry Effects	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Country Effects	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Year Effects	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Number of Observations	39391		39391		37868		39391		37868		39391		39391		37868	
Pseudo R2	0.1395		0.1333		0.1307		0.1395		0.1321		0.1397		0.1336		0.1307	

Table VII. PROBIT Regression Models for Exits Outcomes (Continued)

Panel C: For All Acquisition Exits																
	Model (17) Acquisition Exits		Model (18) Acquisition Exits		Model (19) Acquisition Exits		Model (20) Acquisition Exits		Model (21) Acquisition Exits		Model (22) Acquisition Exits		Model (23) Acquisition Exits		Model (24) Acquisition Exits	
	Marginal Effects	z score	Marginal Effects	z score	Marginal Effects	z score	Marginal Effects	z score	Marginal Effects	z score	Marginal Effects	z score	Marginal Effects	z score	Marginal Effects	z score
All Angels	-0.2073	-12.14***									0.0131	0.07				
All Angels * Minority Protection Index											-0.0314	-1.18				
Pure Angel			-0.1374	-5.74***									-0.1916	-0.43		
Pure Angel * Minority Protection Index													0.0077	0.12		
Mixed Angels					-0.2477	-10.00***			-0.1071	-3.03***					0.1019	0.54
Mixed Angels * Minority Protection Index															-0.0502	-1.89**
Pure PE/VC							0.2073	12.14***	0.1416	5.87***						
Controls	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Industry Effects	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Country Effects	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Year Effects	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Number of Observations	39829		39829		39829		39829		39829		39829		39829		39829	
Pseudo R2	0.0374		0.0274		0.0359		0.0374		0.0378		0.0375		0.0274		0.036	

Table VIII. Regression Models for Testing 1st-Round Angel Certification Effect on Exits

This table presents clustered PROBIT model results of the determinants of exit outcomes and we report the associated marginal effects of those determinants. We analyze separately the impact of firms with first round Angel finance. All dependent variables across Model (1) to (3) are different exits dummy variable to capture all successful exits, all IPO exits and all acquisition exits, all other variables are as defined in Table III. For conciseness, we exclude all control variables which contain the exact same variables in Table VI: LN of GDP per capita, LN of Domestic Market Capitalization, MSCI Returns, Minority Protection Index, LN of Number of Employees, Number of Deals per Year, IDV and UAI. *, **, *** Significant at the 10%, 5% and 1% levels, respectively.

	Model (1)		Model (2)		Model (3)	
	Successful Exits		IPO Exits		Acquisition Exits	
	Marginal Effects	z score	Marginal Effects	z score	Marginal Effects	z score
Firms with 1st-round Angel Financing	-0.0441	-5.07***	-0.0033	-0.68	-0.0472	-5.82***
Controls	Yes		Yes		Yes	
Industry Effects	Yes		Yes		Yes	
Country Effects	Yes		Yes		Yes	
Year Effects	Yes		Yes		Yes	
Number of Observations	23504		23340		23494	
Pseudo R2	0.0601		0.1661		0.0492	

Table IX. Regression Models for Density Tests

This table presents double clustered OLS model results of the determinants of Angel density. Panel A presents the contemporaneous analysis and Panel B presents the 1-year lead dependent variable analysis, all other variables are as defined in Table III. *, **, *** Significant at the 10%, 5% and 1% levels, respectively.

Panel A: Contemporaneous Dependent Variable Analysis									
	Model (1) Angel Density (scaled by Total Population)		Model (2) Angel Density (scaled by Total GDP)		Model (3) VC/PE Density (scaled by Total Population)		Model (4) VC/PE Density (scaled by Total GDP)		
	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic	
LN of GDP per capita	1.0240	3.37***	0.0187	3.25***	7.2385	6.45***	0.1160	5.79***	
LN of Domestic Market Capitalization	0.3805	4.76***	0.0080	5.36***	4.5284	6.90***	0.0972	8.73***	
MSCI Returns	0.7328	1.36	0.0138	1.32	2.5262	0.61	0.0411	0.59	
Minority Protection Index	0.5121	2.96***	0.0096	2.93***	5.4758	5.04***	0.1030	5.76***	
LN of Number of Employees	-0.0312	-4.35***	-0.0006	-4.38***	-0.2624	-7.88***	-0.0046	-8.21***	
Number of Deals per Year	0.0895	3.84***	0.0017	3.98***	0.2437	1.80*	0.0034	1.48	
IDV	-0.0493	-3.16***	-0.0009	-3.12***	-0.3212	-5.89***	-0.0056	-5.47***	
UAI	-0.0206	-3.33***	-0.0004	-3.26***	-0.1175	-4.73***	-0.0022	-4.51***	
Constant	-14.1809	-5.41***	-0.2732	-5.50***	-139.5022	-16.12***	-2.6146	-17.68***	
Industry Effects		Yes		Yes		Yes		Yes	
Country Effects		No		No		No		No	
Year Effects		Yes		Yes		Yes		Yes	
Number of Observations		38687		38687		39886		39886	
R2		0.4652		0.4747		0.7047		0.7371	
Panel B: Lead 1-year Dependent Variable Analysis									
	Model (5) Angel Density (scaled by Total Population)		Model (6) Angel Density (scaled by Total GDP)		Model (7) VC/PE Density (scaled by Total Population)		Model (8) VC/PE Density (scaled by Total GDP)		
	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic	
LN of GDP per capita	0.5047	6.18***	0.0093	6.02***	3.3561	7.27***	0.0490	5.75***	
LN of Domestic Market Capitalization	0.2061	5.47***	0.0043	5.97***	2.8999	11.36***	0.0616	12.47***	
MSCI Returns	-0.0573	-0.16	-0.0017	-0.25	-2.4843	-1.93*	-0.0542	-2.41**	
Minority Protection Index	0.3438	4.98***	0.0063	4.85***	2.5193	8.29***	0.0424	8.32***	
LN of Number of Employees	-0.0229	-2.97***	-0.0004	-3.16***	-0.1464	-3.68***	-0.0025	-3.39***	
Number of Deals per Year	0.0472	0.64	0.0009	0.67	0.1429	0.32	0.0028	0.36	
IDV	-0.0258	-6.59***	-0.0005	-6.59***	-0.1623	-6.08***	-0.0027	-5.15***	
UAI	-0.0070	-3.67***	-0.0001	-3.57***	-0.0591	-3.24***	-0.0011	-2.94***	
Constant	-7.0155	-9.75***	-0.1331	-9.58***	-67.5293	-15.22***	-1.2064	-14.01***	
Industry Effects		Yes		Yes		Yes		Yes	
Country Effects		No		No		No		No	
Year Effects		Yes		Yes		Yes		Yes	
Number of Observations		36215		36215		37440		37437	
R2		0.1398		0.1543		0.1847		0.2039	

Table X. Mean Comparison Tests - Disclosure Regulation and Bankruptcy Law Changes

This table provides the main mean descriptive statistics across different main characteristics by all completed deals, angel deals and PE/VC deals. The table also provides the two-sample means test results between major characteristics groups in our data. Panel A presents the mean comparison tests of Pre vs. Post Disclosure Regulation change, Panel B presents the mean comparison tests of Pre vs. Post Bankruptcy Law change. The means test is a two-sample t-test with equal variance. *, **, *** Significant at the 10%, 5% and 1% levels, respectively.

Panel A: Post Disclosure Regulation Change vs. Pre Disclosure Regulation Change - Mean Characteristics Comparisons									
	All Deals			Angel Deals			PE/VC Deals		
	Post Disclosure Regulation Change	Pre Disclosure Regulation Change	Mean Differences	Post Disclosure Regulation Change	Pre Disclosure Regulation Change	Mean Differences	Post Disclosure Regulation Change	Pre Disclosure Regulation Change	Mean Differences
Deal Characteristics									
Deal Size	98.249	108.117	-9.869	21.763	18.424	3.339	105.874	114.101	-8.228
No. of Deals per Year	1.215	1.175	0.040***	1.231	1.349	-0.118***	1.214	1.167	0.048***
Total No. of Deals	3.533	3.996	-0.463***	3.225	5.936	-2.711***	3.556	3.899	-0.343***
No. of Angel Deals per Year	440.893	79.934	360.959***	531.047	85.098	445.948***	434.145	79.671	354.474***
No. of Investors	1.950	2.058	-0.108***	2.842	3.164	-0.322***	1.883	2.003	-0.119***
Investee Company Characteristics									
Company Valuation	590.179	390.610	199.569***	628.370	181.511	446.859	589.577	393.200	196.377***
No. of Employees	1091.338	1542.028	-450.690***	326.438	724.815	-398.378	1133.934	1585.704	-451.770***
Country Characteristics									
Angel Density (scaled by Total Population)	1.435	0.283	1.152***	1.716	0.302	1.415***	1.414	0.282	1.131***
Angel Density (scaled by Total GDP)	0.030	0.008	0.022***	0.035	0.008	0.026***	0.029	0.008	0.021***
Institutional Density (scaled by Total Population)	18.774	5.322	13.451***	19.514	5.594	13.920***	18.718	5.309	13.410***
Institutional Density (scaled by Total GDP)	0.395	0.148	0.247***	0.403	0.156	0.247***	0.394	0.148	0.246***
Exit Outcomes									
Successful Exits	0.115	0.141	-0.026***	0.004	0.003	0.000	0.124	0.148	-0.024***
IPO Exits	0.012	0.040	-0.028***	0.000	0.000	0.000	0.013	0.042	-0.029***
Acquisition Exits	0.103	0.101	0.002	0.003	0.003	0.000	0.111	0.106	0.005

Table X. Mean Comparison Tests - Disclosure Regulation and Bankruptcy Law Changes (Continued)

Panel B: Post Bankruptcy Law Change vs. Pre Bankruptcy Law Change - Mean Characteristics Comparisons									
	All Deals			Angel Deals			PE/VC Deals		
	Post Bankruptcy Law Change	Pre Bankruptcy Law Change	Mean Differences	Post Bankruptcy Law Change	Pre Bankruptcy Law Change	Mean Differences	Post Bankruptcy Law Change	Pre Bankruptcy Law Change	Mean Differences
Deal Characteristics									
Deal Size	120.343	108.863	11.480	29.312	23.663	5.650	130.044	113.830	16.214**
No. of Deals per Year	1.217	1.163	0.054***	1.236	1.246	-0.010	1.216	1.159	0.056***
Total No. of Deals	3.337	3.910	-0.573***	2.944	5.359	-2.416***	3.368	3.843	-0.474***
No. of Angel Deals per Year	453.732	116.662	337.070***	527.318	114.774	412.544***	447.755	116.753	331.002***
No. of Investors	1.906	2.048	-0.142***	2.821	3.017	-0.196***	1.834	2.003	-0.169***
Investee Company Characteristics									
Company Valuation	768.269	396.184	372.085***	822.135	230.085	592.050	767.344	398.383	368.961***
No. of Employees	1263.558	1581.711	-318.153***	448.966	661.345	-212.379	1309.323	1624.569	-315.246***
Country Characteristics									
Angel Density (scaled by Total Population)	1.502	0.404	1.098***	1.740	0.400	1.340***	1.483	0.404	1.079***
Angel Density (scaled by Total GDP)	0.031	0.010	0.021***	0.035	0.010	0.025***	0.030	0.010	0.020***
Institutional Density (scaled by Total Population)	17.948	8.418	9.529***	18.925	8.425	10.500***	17.871	8.418	9.453***
Institutional Density (scaled by Total GDP)	0.372	0.210	0.162***	0.388	0.211	0.176***	0.370	0.210	0.161***
Exit Outcomes									
Successful Exits	0.120	0.126	-0.006**	0.005	0.006	-0.001	0.129	0.132	-0.002
IPO Exits	0.011	0.031	-0.019***	0.000	0.000	0.000	0.012	0.032	-0.020***
Acquisition Exits	0.109	0.095	0.014***	0.005	0.006	-0.001	0.117	0.099	0.018***

Table XI. Countries with Disclosure Regulation Changes: Difference-in-Differences Tests

This table presents clustered difference-in-differences testing model results by controlling individual investee firms and years effects estimates of testing the treat-after effects before and after the disclosure regulation changes on different investee firm, country and exits characteristics by controlling different facets of characteristics in addition to controlling the fixed effects of industry groups. All dependent variable across Model (1) to (14) in Panel A - C are different deal level, investee firm level, country level characteristics and exit outcomes, all other variables are as defined in Table III. For exits outcomes, we present clustered PROBIT difference-in-differences testing model results and report the associated marginal effects. All control variables in all testing models in Table VI are the same as those in Table V. *, **, *** Significant at the 10%, 5% and 1% levels, respectively.

Panel A: All Deals														
	Model (1)		Model (2)		Model (3)		Model (4)		Model (5)		Model (6)		Model (7)	
	Deal Size		No. of Deals per Year		Total No. of Deals		No. of Angel Deals per Year		No. of Investors		Company Valuation		No. of Employees	
	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
Treat * After	-53.7560	-1.01	0.0138	0.29	0.2854	2.07**	387.2827	4.45***	0.0436	0.47	-304.6293	-1.32	-723.0446	-1.11
Treat	-175.1325	-3.83***	0.0473	0.91	0.1945	1.07	222.6589	2.66***	-0.2137	-2.10**	87.2973	0.47	1329.5890	-1.54
After	184.1823	2.72***	0.0065	0.18	-0.6283	-3.81***	-236.3847	-3.14***	-0.1202	-1.34	481.0576	2.18**	950.9318	2.39**
Controls	Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Industry Effects	Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Country Effects	No		No		No		No		No		No		No	
Year Effects	Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Number of Observations	27891		39887		39887		38687		39887		8613		39887	
R2	0.0596		0.0277		0.3264		0.519		0.0678		0.1659		0.0366	
	Model (8)		Model (9)		Model (10)		Model (11)		Model (12)		Model (13)		Model (14)	
	Angel Density (scaled by Total Population)		Angel Density (scaled by Total GDP)		PE/VC Density (scaled by Total Population)		PE/VC Density (scaled by Total GDP)		Successful Exits		IPO Exits		Acquisition Exits	
	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic	Marginal Effects	z score	Marginal Effects	z score	Marginal Effects	z score
Treat * After	1.1802	4.39***	0.0229	4.48***	12.9657	10.01***	0.2468	10.15***	-0.0145	-0.83	-0.0158	-2.25**	0.0127	0.73
Treat	0.6395	2.46**	0.0120	2.37**	-2.4106	-1.61	-0.0477	-1.76*	0.0328	1.48	0.0187	2.19**	-0.0114	-0.50
After	-0.6870	-2.86***	-0.0137	-2.98***	-3.0590	-3.23***	-0.0651	-3.59***	0.0012	0.06	-0.0053	-0.86	-0.0120	-0.58
Controls	Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Industry Effects	Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Country Effects	No		No		No		No		No		No		No	
Year Effects	Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Number of Observations	38687		38687		39886		39886		39887		39687		39741	
R2 / Pseudo R2	0.5236		0.5331		0.8387		0.8634		0.0263		0.1273		0.0214	

Table XI. Countries with Disclosure Regulation Changes: Difference-in-Differences Tests (Continued)

Panel B: Angel Deals														
	Model (1)		Model (2)		Model (3)		Model (4)		Model (5)		Model (6)		Model (7)	
	Deal Size		No. of Deals per Year		Total No. of Deals		No. of Angel Deals per Year		No. of Investors		Company Valuation		No. of Employees	
	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
Treat * After	-297.3860	-0.80	-0.1516	-1.78*	-0.9615	-1.46	491.2840	4.02***	0.9548	1.95*	-79.9903	-0.07	1477.5610	0.73
Treat	1111.7920	1.08	0.1860	1.62	-0.0646	-0.07	318.2040	2.13**	-0.5698	-0.87	5667.8370	1.13	282.4526	0.10
After	317.3458	1.00	0.1101	1.6	0.2239	0.35	-409.3071	-3.26***	-1.0368	-2.21**	-876.1696	-0.58	-	-0.59
Controls	Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Industry Effects	Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Country Effects	No		No		No		No		No		No		No	
Year Effects	Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Number of Observations	1689		1994		1994		1994		1994		146		1994	
R2	0.1448		0.0596		0.3439		0.5995		0.062		0.3364		0.0603	
	Model (8)		Model (9)		Model (10)		Model (11)		Model (12)		Model (13)		Model (14)	
	Angel Density (scaled by Total Population)		Angel Density (scaled by Total GDP)		PE/VC Density (scaled by Total Population)		PE/VC Density (scaled by Total GDP)		Successful Exits		IPO Exits		Acquisition Exits	
	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic	Marginal Effects	z score	Marginal Effects	z score	Marginal Effects	z score
Treat * After	1.5123	3.94***	0.0288	3.92***	13.9805	8.07***	0.2485	7.72***	0.0203	0.82	Omitted		0.0154	0.67
Treat	0.9335	2.02**	0.0180	2.04**	-1.6964	-0.66	-0.0548	-1.18	0.0140	0.47	Omitted		0.0133	0.48
After	-1.2364	-3.13***	-0.0237	-3.17***	-6.7737	-3.93***	-0.1147	-3.49***	-0.0279	-1.31	Omitted		-0.0233	-1.20
Controls	Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Industry Effects	Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Country Effects	No		No		No		No		No		No		No	
Year Effects	Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Number of Observations	1994		1994		1993		1993		949		6		949	
R2 / Pseudo R2	0.605		0.609		0.8772		0.8922		0.3182		0.1276		0.3049	

Table XI. Countries with Disclosure Regulation Changes: Difference-in-Differences Tests (Continued)

Panel C: PE/VC Deals														
	Model (1) Deal Size		Model (2) No. of Deals per Year		Model (3) Total No. of Deals		Model (4) No. of Angel Deals per Year		Model (5) No. of Investors		Model (6) Company Valuation		Model (7) No. of Employees	
	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
Treat * After	-52.6589	-0.94	0.0225	0.48	0.3417	2.37**	384.0040	4.50***	0.0160	0.17	-305.1486	-1.30	-781.6904	-1.18
Treat	-192.1231	-3.72***	0.0433	0.85	0.1597	0.86	219.2589	2.66***	-0.1981	-1.96**	36.6636	0.20	-	-1.51
After	170.7299	2.49**	0.0026	0.07	-0.6357	-3.78***	-231.1890	-3.12***	-0.0874	-0.97	467.2204	1.98**	1322.1160	1029.6770 2.53**
Controls	Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Industry Effects	Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Country Effects	No		No		No		No		No		No		No	
Year Effects	Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Number of Observations	26202		37893		37893		36693		37893		8467		37893	
R2	0.0591		0.0282		0.3297		0.5165		0.066		0.1703		0.0376	
	Model (8) Angel Density (scaled by Total Population)		Model (9) Angel Density (scaled by Total GDP)		Model (10) PE/VC Density (scaled by Total Population)		Model (11) PE/VC Density (scaled by Total GDP)		Model (12) Successful Exits		Model (13) IPO Exits		Model (14) Acquisition Exits	
	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic	Marginal Effects	z score	Marginal Effects	z score	Marginal Effects	z score
Treat * After	1.1692	4.44***	0.0227	4.52***	12.9184	10.00***	0.2464	10.16***	-0.0167	-0.91	-0.0172	-2.28**	0.0080	0.49
Treat	0.6290	2.46**	0.0118	2.35**	-2.3634	-1.60	-0.0467	-1.75*	0.0362	1.57	0.0250	2.19**	0.0024	0.11
After	-0.6702	-2.84***	-0.0134	-2.96***	-2.9847	-3.19***	-0.0641	-3.56***	0.0019	0.10	-0.0024	-0.88	0.0022	0.11
Controls	Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Industry Effects	Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Country Effects	No		No		No		No		No		No		No	
Year Effects	Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Number of Observations	36693		36693		37893		37893		37893		37700		37893	
R2 / Pseudo R2	0.521		0.5308		0.8378		0.8628		0.0244		0.126		0.0198	

Table XII. Countries with Bankruptcy Law Changes: Difference-in-Differences Tests

This table presents clustered difference-in-differences testing model results by controlling individual investee firms and years effects estimates of testing the treat-after effects before and after the bankruptcy law changes on different investee firm, country and exits characteristics by controlling different facets of characteristics in addition to controlling the fixed effects of industry groups. All dependent variable across Model (1) to (14) in Panel A - C are different deal level, investee firm level, country level characteristics and exit outcomes, all other variables are as defined in Table III. For exits outcomes, we present clustered PROBIT difference-in-differences testing model results and report the associated marginal effects. For conciseness, we exclude all control variables which contain the exact same variables in Table VI: LN of GDP per capita, LN of Domestic Market Capitalization, MSCI Returns, Minority Protection Index, Legality Index, LN of Number of Employees, Number of Deals per Year, IDV, PDI and UAI. *, **, *** Significant at the 10%, 5% and 1% levels, respectively.

Panel A: All Deals														
	Model (1)		Model (2)		Model (3)		Model (4)		Model (5)		Model (6)		Model (7)	
	Deal Size		No. of Deals per Year		Total No. of Deals		No. of Angel Deals per Year		No. of Investors		Company Valuation		No. of Employees	
	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
Treat * After	-35.7186	-0.25	-0.0609	-1.10	-0.1494	-0.57	474.1415	4.13***	-0.3157	-1.02	166.2205	0.60	2000.3420	1.36
Treat	240.2602	2.17**	0.1172	1.80*	-0.0401	-0.10	-767.6395	-5.92***	0.0253	0.12	350.9227	0.73	1471.8510	0.81
After	143.5247	0.90	0.1332	3.23***	-0.2356	-0.85	-201.4750	-2.62***	0.1993	0.61	125.7449	0.44	2000.6000	-1.31
Controls	Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Industry Effects	Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Country Effects	No		No		No		No		No		No		No	
Year Effects	Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Number of Observations	27891		39887		39887		38687		39887		8613		39887	
R2	0.0596		0.0299		0.3273		0.6262		0.0683		0.1667		0.0361	
	Model (8)		Model (9)		Model (10)		Model (11)		Model (12)		Model (13)		Model (14)	
	Angel Density (scaled by Total Population)		Angel Density (scaled by Total GDP)		PE/VC Density (scaled by Total Population)		PE/VC Density (scaled by Total GDP)		Successful Exits		IPO Exits		Acquisition Exits	
	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic	Marginal Effects	z score	Marginal Effects	z score	Marginal Effects	z score
Treat * After	1.4867	4.06***	0.0280	3.47***	17.0031	9.45***	0.3221	9.51***	-0.0029	-0.03	-0.0234	-1.07	0.0303	0.33
Treat	-2.3897	-5.83***	-0.0486	-5.88***	-25.9779	-12.98***	-0.5048	-13.13***	0.0511	0.60	0.0340	1.55	0.0049	0.06
After	-0.6209	-2.49**	-0.0118	-1.98**	-9.4468	-5.78***	-0.1983	-6.56***	0.0222	0.25	0.0120	0.56	-0.0019	-0.02
Controls	Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Industry Effects	Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Country Effects	No		No		No		No		No		No		No	
Year Effects	Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Number of Observations	38687		38687		39886		39886		39887		39687		39887	
R2 / Pseudo R2	0.6379		0.6406		0.8744		0.8661		0.0268		0.1253		0.0227	

Table XII. Countries with Bankruptcy Law Changes: Difference-in-Differences Tests (Continued)

Panel B: Angel Deals														
	Model (1) Deal Size		Model (2) No. of Deals per Year		Model (3) Total No. of Deals		Model (4) No. of Angel Deals per Year		Model (5) No. of Investors		Model (6) Company Valuation		Model (7) No. of Employees	
	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
Treat * After	-174.2912	-0.18	-0.3260	-1.91*	-4.2175	-5.24***	403.3215	5.30***	-0.2300	-0.20	Omitted		2408.1160	-0.53
Treat	1664.7410	0.88	0.5704	2.19**	1.1528	1.39	-590.5413	-4.02***	1.4461	1.84*	6757.2540	2.02**	2675.1810	0.45
After	138.0113	0.16	0.4298	2.75***	2.7876	3.32***	-122.5243	-1.49	0.1987	0.17	-204.0023	-0.30	2285.8050	0.51
Controls	Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Industry Effects	Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Country Effects	No		No		No		No		No		No		No	
Year Effects	Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Number of Observations	1689		1994		1994		1994		1994		146		1994	
R2	0.1395		0.0626		0.3608		0.6452		0.0633		0.3309		0.0489	
	Model (8) Angel Density (scaled by Total Population)		Model (9) Angel Density (scaled by Total GDP)		Model (10) PE/VC Density (scaled by Total Population)		Model (11) PE/VC Density (scaled by Total GDP)		Model (12) Successful Exits		Model (13) IPO Exits		Model (14) Acquisition Exits	
	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic	Marginal Effects	z score	Marginal Effects	z score	Marginal Effects	z score
Treat * After	1.2311	5.05***	0.0201	4.00***	17.1634	8.20***	0.3052	7.46***	0.0073	0.62	Omitted		0.0066	0.60
Treat	-1.8114	-3.97***	-0.0356	-4.01***	-25.3589	-7.07***	-0.4867	-7.36***	Omitted		Omitted		Omitted	
After	-0.3434	-1.32	-0.0035	-0.66	-10.3207	-4.41***	-0.1992	-4.35***	Omitted		Omitted		Omitted	
Controls	Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Industry Effects	Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Country Effects	No		No		No		No		No		No		No	
Year Effects	Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Number of Observations	1994		1994		1993		1993		946		6		946	
R2 / Pseudo R2	0.6556		0.6692		0.9141		0.9073		0.3146		0.1276		0.304	

Table XII. Countries with Bankruptcy Law Changes: Difference-in-Differences Tests (Continued)

Panel C: PE/VC Deals														
	Model (1)		Model (2)		Model (3)		Model (4)		Model (5)		Model (6)		Model (7)	
	Deal Size		No. of Deals per Year		Total No. of Deals		No. of Angel Deals per Year		No. of Investors		Company Valuation		No. of Employees	
	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
Treat * After	-61.1317	-0.42	-0.0570	-1.00	0.0206	0.07	498.7662	3.68***	-0.3536	-1.15	197.3245	0.71	2012.8780	1.27
Treat	239.5852	2.13**	0.1068	1.58	-0.1126	-0.28	-779.2477	-5.57***	0.0179	0.09	324.6958	0.66	1462.9180	0.78
After	168.3739	1.02	0.1287	3.00***	-0.3499	-1.12	-227.1731	-2.55**	0.2313	0.70	98.9518	0.34	1996.5920	-1.22
Controls	Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Industry Effects	Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Country Effects	No		No		No		No		No		No		No	
Year Effects	Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Number of Observations	26202		37893		37893		36693		37893		8467		37893	
R2	0.0592		0.0304		0.3302		0.6265		0.0667		0.1713		0.0371	
	Model (8)		Model (9)		Model (10)		Model (11)		Model (12)		Model (13)		Model (14)	
	Angel Density (scaled by Total Population)		Angel Density (scaled by Total GDP)		PE/VC Density (scaled by Total Population)		PE/VC Density (scaled by Total GDP)		Successful Exits		IPO Exits		Acquisition Exits	
	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic	Marginal Effects	z score	Marginal Effects	z score	Marginal Effects	z score
Treat * After	1.5785	3.71***	0.0314	3.53***	17.0063	9.32***	0.3230	9.43***	0.0001	0.00	-0.0237	-1.05	0.0344	0.36
Treat	-2.4373	-5.58***	-0.0508	-6.06***	-25.8962	-12.91***	-0.5033	-13.00***	0.0480	0.54	0.0348	1.53	0.0005	0.01
After	-0.7159	-2.53**	-0.0153	-2.43**	-9.4463	-5.74***	-0.1990	-6.56***	0.0200	0.22	0.0115	0.52	-0.0042	-0.04
Controls	Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Industry Effects	Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Country Effects	No		No		No		No		No		No		No	
Year Effects	Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Number of Observations	36693		36693		37893		37893		37893		37700		37893	
R2 / Pseudo R2	0.6382		0.6411		0.8731		0.8649		0.0247		0.1238		0.0219	

Table A1. Mean Descriptive Statistics - Unmatched vs. Matched Sample Means Comparisons

This table provides the main mean descriptive statistics across different main characteristics by All Angel Deals vs. Pure PE/VC Deals. The table also provides the two-sample means test results between major characteristics groups in our data. We present three subpanel analysis which the first subpanel shows the previous unmatched sample characteristics and the subsequent two subpanels are based on propensity score matching methods based on two different criteria. The means test is a two-sample t-test with equal variance. *, **, *** Significant at the 10%, 5% and 1% levels, respectively.

	<i>Before PS Matching:</i> All Angel Deals vs. Pure PE/VC Deals			<i>After PS Matching:</i> All Angel Deals vs. Pure PE/VC Deals			<i>After PS Matching:</i> All Angel Deals vs. Pure PE/VC Deals		
	All Angel Deals	All PE/VC Deals	Mean Differences	All Angel Deals	All PE/VC Deals	Mean Differences	All Angel Deals	All PE/VC Deals	Mean Differences
Deal Characteristics									
Deal Size	27.821	124.884	-97.063***	427.658	405.161	22.498	427.658	287.757	139.901
No. of Deals per Year	1.223	1.183	0.040***	1.243	1.139	0.104	1.243	1.174	0.069
Total No. of Deals	3.482	3.509	-0.028	4.389	3.569	0.819	4.389	3.361	1.028**
No. of Angel Deals per Year	431.338	337.825	93.513***	297.792	263.556	34.236	297.792	285.333	12.458
No. of Investors	2.799	1.849	0.950***	2.771	1.576	1.194***	2.771	1.688	1.083***
Investee Company Characteristics									
Company Valuation	595.046	611.848	-16.802	761.922	712.460	49.461	761.922	516.034	245.888
No. of Employees	509.982	1413.984	-904.002***	3789.896	1623.306	2166.590	3789.896	2268.514	1521.382
Country Characteristics									
Angel Density (scaled by Total Population)	1.466	1.141	0.325***	0.987	0.877	0.110	0.987	0.948	0.039
Angel Density (scaled by Total GDP)	0.030	0.024	0.006***	0.021	0.019	0.002	0.021	0.021	0.000
PE/VC Density (scaled by Total Population)	16.696	14.867	1.828***	13.183	13.348	-0.165	13.183	13.966	-0.783
PE/VC Density (scaled by Total GDP)	0.349	0.318	0.031***	0.285	0.296	-0.011	0.285	0.309	-0.024
GDP per Capita	45513.550	43476.870	2036.683***	41747.430	41921.746	-174.316	41747.430	42077.268	-329.838
Domestic Market Capitalization	14700000.000	13900000.000	846793.600***	12685752.300	13938458.200	-1252705.890*	12685752.300	14608973.700	-1923221.410***
MSCI Returns	0.057	0.054	0.003	0.066	0.056	0.010	0.066	0.073	-0.007
Minority Shareholders Protection Index	7.093	7.011	0.082***	6.884	6.974	-0.090	6.884	6.950	-0.066
IDV	88.840	87.819	1.021***	88.007	89.618	-1.611	88.007	89.264	-1.257
UAI	46.726	46.942	-0.217**	45.847	46.035	-0.188	45.847	46.340	-0.493
Exit Outcomes									
Successful Exits	0.005	0.123	-0.118***	0.042	0.257	-0.215***	0.042	0.306	-0.264***
IPO Exits	0.000	0.018	-0.018***	0.007	0.056	-0.049**	0.007	0.111	-0.104***
Acquisition Exits	0.005	0.105	-0.100***	0.035	0.201	-0.167***	0.035	0.194	-0.160***

Table A2. PROBIT Regression Models for Exits Outcomes - Propensity Score Matching Sample Tests

This table presents clustered PROBIT model results by controlling individual investee firms and years effects estimates of testing the exits outcomes by controlling different facets of characteristics in addition to controlling the fixed effects of industry groups and countries and we report the associated marginal effects in the table. All dependent variable across Model (1) to (3) is successful exits dummy variable to capture all successful exits, either an IPO exit or an acquisition exit, all other variables are as defined in Table III. All control variables in all testing models in Table A2 are the same as those in Table V. *, **, *** Significant at the 10%, 5% and 1% levels, respectively.

	Model (1)		Model (2)		Model (3)	
	Unmatched Sample: Successful Exits		Matched Sample 1: Successful Exits		Matched Sample 2: Successful Exits	
	Marginal Effects	z score	Marginal Effects	z score	Marginal Effects	z score
All Angels	-0.2661	-16.19***	-0.4180	-6.20***	-0.4193	-6.20***
Controls		Yes		Yes		Yes
Industry Effects		Yes		Yes		Yes
Country Effects		Yes		Yes		Yes
Year Effects		Yes		Yes		Yes
Number of Observations		39835		8053		7969
Pseudo R2		0.0427		0.0678		0.0679