Prior co-investments and exits:

A study on European venture capital syndicates.

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ABSTRACT

Building on recent developments in the literature, we investigated whether the practice of repeatedly investing with the same partners impacts outcomes for venture capital syndicates. Research shows that European venture capitalists have different attitudes to their American counterparts, which might result in a different ability in benefiting from prior co-investing activities. Hence, we analysed how successful prior collaborations and the concentration of prior ties in an investment syndicate affects the probability of successfully exiting an investment. We also examined the role of prior ties as a determinant of the time to successful exit. From an analysis of 922 first-ever syndicated rounds in Europe between 2000 and 2009, we find that prior ties are not a significant determinant of successful exits. However, prior *successful* collaborations do play a significant role, as does the concentration of prior ties. We also find that a U-shaped relationship links prior co-investments with the to time to exit. These results should be helpful for managers involved in inter-organisational investment collaborations and to policymakers looking for ways to spur the European venture capital ecosystem.

Keywords: prior co-investments, syndication, venture capital, entrepreneurial finance, time to exit

1. Introduction

Venture capitalist (VC) activity is risky by nature because providing venture capital means investing in firms that are often in the most uncertain stage of their lifecycle. Accordingly, VCs frequently implement strategies to reduce the risk of their investments. One of these practices is to invest alongside other VCs in the same deal (Lerner 1994). Traditionally, this type of syndication is known for several positive effects beyond diversification and risk sharing – including its ability to create additional resources and increase value and for its capacity to afford better leverage in negotiations and learning processes (Lerner 1994; Bygrave 1988; Sorenson and Stuart 2001; Hochberg, Ljungqvist, and Lu 2007; Tian 2012). Accordingly, it is also common for VCs to repeatedly invest with the same partners (Sorenson and Stuart 2001; Wright and Lockett 2003). In fact, how this practice affects syndicate performance has been the subject of several, mostly US-focused, studies with very interesting and somewhat conflicting findings (Guler 2007; De Clercq and Dimov 2008; Hochberg, Ljungqvist, and Lu 2010). Some researchers have found that repeatedly investing with same partners leads to better outcomes for the syndicates concerned (Hochberg, Ljungqvist, and Lu 2010), while more recent evidence suggests that the link between prior co-investments and the probability of a successful exit is an inverted U-shaped relationship (Bellavitis, Rietveld, and Filatotchev 2020). There is also evidence to suggest that the actual relationship is dependent on the type of success being considered, with more prior collaborative experiences being more likely to lead to exits via an M&A rather than an IPO (Wang, Pahnke, and McDonald 2021).

However, the literature suffers from three main gaps that we aim to address with this paper. First, from an empirical perspective, all existing evidence is focused on US data, but there is good reason to test these findings in other regions (Bellavitis, Rietveld, and

Filatotchev 2020). The European venture capital scene may lag behind the US, but venture capital is still a highly developed industry in Europe. According to the OECD (2017), seven out of the ten best countries for venture capital investments are European, and recent data suggest a relevant increase in for 2021 both in terms of number of deals (more than 9000, + 21%) and value (€B 106, +126%) (Pitchbook 2021).

Second, Europe and the US have behavioural and cultural differences in their approach to syndication (Manigart et al. 2002; Arundale 2020). For example, when deciding whether or not syndicate, European firms tend to give much more credence to monetary reasons, such as a lack of capital to fund an investment or a desire to share risk, while US firms typically stress the benefits of value adding, including sharing information, swapping best practices, and increases in deal flow, i.e., the rate at which a VC is receiving new business opportunities.

To discuss European venture capitalist syndicates likelihood of seeing a successful exit, we framed our analysis through the theoretical framework proposed by Gulati, Wohlgezogen, and Zhelyazkov (2012). We expect that the poorer the VCs' attitude towards collaboration, the more the positive effects of increased trust and cooperation might be reduced.

To test our hypothesis empirically, we built a unique dataset of 922 first-ever rounds of syndicated investments occurring in Europe between 2000 and 2009. Further, we traced all co-investments between those syndicate members back to 1995. What we found was that prior ties between syndicate members are not a significant determinant of a successful exit. However, we find that the number of prior *successful* collaborations and the number of prior ties within a single couple of VCs both increase the probability of a successful outcome.

Notably, our analysis considers the duration of the investments, a dimension of performance that has been neglected in the literature so far. To the best of our knowledge, this is the first study to investigate the relationship between prior ties in syndicates and the amount of time needed to exit the investment. We theorise that a U-shaped relationship will exist between prior co-investments and the number of days from the first investment to the exit. Further, we argue that stronger prior ties might result in increased collaboration, leading to a reduced time to exit, while, at the same time, increasing levels of trust might lead the syndicate to take excessive risks, also due to a looser contractual structure. Consequently, these competing forces will form a U-shaped relationship. Having tested this hypothesis on a sub-sample of 362 syndicated investments that resulted in a successful exit, we do, in fact, see a significant U-shaped relationship between the number of prior co-investments and the time to exit.

Although we cannot fully control for all potential endogeneity issues that could affect our results, we performed a set of robustness tests including a correction for potential sample selection bias. Overall, our findings provide a novel view of the potential effects of the decision to syndicate with the same partners, which increases our understanding of the dynamics of venture capital syndicates in Europe.

2. Theory and hypotheses

2.1. Syndications and prior co-investments

The benefits of syndication have been discussed at length in the literature. Several studies show that syndication can reduce uncertainty and lower the risks associated with an investment. Research also highlights that syndicated VCs can benefit from an enhanced venture selection process (Lerner 1994), additional resources (Bygrave 1988), and additional value creation (Tian 2012). Inviting other VCs to participate in a deal might

increase the likelihood that them will reciprocate, improving deal flow (Sorenson and Stuart 2001; Hochberg, Ljungqvist, and Lu 2007). Further, investing a lower stake can allow for better liquidity management, and it can mean one has more leverage to exercise in negotiations, which can both result in better terms (Lerner 1994). Other important motivations for syndication include learning from co-investors (Bergemann and Hege 1998) and avoiding capital restrictions (Manigart et al. 2006).

That said, syndication practices are not without their risks. The literature identifies the dangers of free riding, conflicts between syndicate members, and self-serving behaviour (De Clercq and Dimov 2008). Moreover, having numerous firms in a syndicate can slow down decision-making processes (Hopp and Rieder 2011), and it can expose firms to the risk of losing their competitive advantage as their strategies are revealed to competitors (Casamatta and Haritchabalet 2003; Zhelyazkov 2018).

This paper looks at VC syndications through the theoretical framework proposed by Gulati, Wohlgezogen, and Zhelyazkov (2012). This framework, based on the literature on interorganisational collaboration and strategic alliances, focuses on the concepts of cooperation and coordination. As such, it offers a valuable angle for looking at the dynamics of VC syndication (Zhang and Guler 2020; Zhelyazkov and Tatarynowicz 2021).

Cooperation implies that a VC firm proposes the set of resources it is willing to contribute, and it negotiates what is expected in return. This sort of negotiation takes place within VC syndicates and often includes what is called an “exchange of hostages” in the form of a shared equity investment. This shared investment is thought to reduce the likelihood of opportunistic behaviour. Additionally, cooperation creates an interdependence between the resources and skills contributed by the syndicate members, which is

positively related to the outputs expected. However, this interdependence also creates fertile ground for cooperation failures and costs, where VCs might contribute less than agreed to the syndicate's management or they might aim to obtain more benefits than what was initially agreed. These changes in a firm's contribution to an alliance's objectives form a point of view that has been defined as *relational risk*.

Within this framework, coordination between partners is an expression of efficiency – specifically, how efficiently of information sharing and decision-making is designed and practiced, plus the effectiveness with which resources are combined. Compared to cooperation, coordination looks at different dimensions of alliance. It focuses on specific routines that partners implement when they manage the alliance. Like every interorganisational alliance, VC syndicates have mechanisms for dividing labour that usually mean partners must depend on each other for 'getting things done'. For instance, if decisions must be made quickly as developments in the market come to hand, investment monitoring might be assigned to one partner who has the responsibility to communicate those developments to all. This creates task interdependence, which is positively related to both the cost of coordination and to the risk of coordination failures, such as omitting relevant activities, wrongly allocating resources among syndicate members, or finding that certain complementary activities are, in fact, incompatible. Gulati, Wohlgezogen, and Zhelyazkov (2012) defines the risk of unexpected coordination costs and/or coordination failures as *operational risk*.

Prior co-investments by VCs have an impact on the relational and operational risks associated with syndicated investment. According to Beckman, Haunschild, and Phillips (2004) and Goerzen (2007), the decision to invest with partner firms may be interpreted as an "exploration" versus an "exploitation" problem, where establishing new relationships with unknown partners represents the former, while enacting pre-existing

ties typifies the latter. Following this construct, we will refer to firms that have previously collaborated together in syndicated investments as “friends” and to firms that have not collaborated as “strangers”.

Friends repeatedly investing together is a form of exploiting previous connections – one that impacts the trust held within a syndicate. Here, the cooperation dimension of the collaboration becomes highly relevant. This is because, when motivation and commitment are considered crucial for a successful investment, alliances between friends, who should enjoy a higher level of trust, are essential.

On the other side, exploring new opportunities might also be associated with coordination, where one is trying to combine partner resources in the most effective ways, looking for information-sharing, or is wanting “more heads” in the decision-making process. Of course, investing with strangers may come at the cost of increased operational risk since determining all of a partner’s characteristics might be difficult before one starts to collaborate (Gulati, Wohlgezogen, and Zhelyazkov 2012; Meuleman et al. 2017). Therefore, even if a long-term investment relationship between friends is driven by cooperation issues, we cannot rule out that the decision to invest repeatedly with the same partners might also be relevant from a coordination point of view.

In any case, it is reasonable that, at a certain point, the positive effect of these interactions may break down and might even negatively impact the outcomes the syndicate is trying to achieve (Gulati, Wohlgezogen, and Zhelyazkov 2012). For instance, from a cooperation perspective, trust accumulated through shared experiences often leads to less formal arrangements, which may not be robust enough to manage very complex challenges (Uzzi 1999). The literature also suggests that high levels of trust can result in errors of judgment. Also, the thresholds often included in everyday tasks that would

trigger an alert might start to disappear (Zahra, Yavuz, and Ucbasaran 2006). In turn, unexpected issues may result that negatively impact the syndicate's management and/or lengthen the duration of the investment. Therefore, although there are several good reasons for VCs to choose prior partners for new investments, there are also some downsides to this choice.

2.2. Empirical evidence

Existing empirical evidence on prior co-investments is very fragmented and almost exclusively focused on the US due to challenges with data availability (Kaplan and Lerner 2016). Goerzen (2007) contribution, although not specifically focused on VCs, explores how repeated partnerships affect alliance performance. His findings suggest that, when firms only concentrate on exploiting their established networks, they might be trapped in a suboptimal equilibrium where the resources and competencies needed to develop a competitive advantage are out of reach. For example, sticking to entrenched relationships might close a network to newcomers who could bring relevant knowledge on the most up-to-date trends and technologies. Adopting a network perspective, Hochberg, Ljungqvist, and Lu (2010) analysed a sample of US companies, showing that prior co-investments reduce partner-specific risks and increase the likelihood of a successful exit. Gompers, Mukharlyamov, and Xuan (2016) investigate the consequences of homophily between VCs, showing that VCs with similar personality traits are more likely to invest together. However, they also find that this form of exploitation substantially reduces the probability of the investment's success.

Bellavitis, Rietveld, and Filatotchev (2020) analysed a sample of 4550 US ventures spanning 1980-2017. They find that prior co-investments are a double-edged sword: prior ties contribute to the probability of a more successful exit up to a certain point, after which

the venture-specific risks increase. The rising risk is due to the costs associated with making a suboptimal choice from a smaller pool of all possible ventures, as well as the reduced monitoring that typically results from overly trustful relationships having shared many prior co-investments. Furthermore, they observe that VCs that repeatedly co-invest could reduce deal flow, since the investment partners are reduced to a smaller circle of friends. Wang, Pahnke, and McDonald (2021) focus on the relational embeddedness of VC syndicates having analysed the effects of collaboration on performance over a sample of 11000 VC-backed US ventures. They report that the greater the prior experience within a syndicate, the higher the likelihood of an exit by acquisition, while less embedded syndicates are more likely to exit via an IPO. Syndicates with more prior ties are associated with shared identities and higher ability to coordinate effectively, leading to domain specific outcomes such as acquisitions. Conversely, less embedded syndicates include more diverse ideas and identities, resulting in a better ability to provide ventures with a more diversified range of resources. Such diversification leads to strategies that can create value for the public markets, naturally leading to IPO. Overall, their analysis shows empirical evidence consistent with the hypothesis that repeated collaborations between VCs is positively correlated to exits by acquisition.

From these heterogeneous findings, it is clear that, based on US data, there can be no straightforward conclusion on the relationship between prior co-investments in VC syndicates and a start-up's success. In this uncertain landscape, we believe that focusing on European data might add valuable evidence, especially because the literature suggests that European decisions to syndicate follow different patterns from US. For example, Schwienbacher (2008) finds that since European VCs are less active in target companies, syndications may have a more prominent impact on US companies than on European ones. In addition, European VCs tend not to use instruments of control and contingent

funding efficiently because they are often too focused on protecting themselves from the downside of risk. As a result, the performance of US VCs is positively linked to short funding intervals, while the opposite is true for their European counterparts who tend to stay invested for longer periods (Schwienbacher 2008).

Differences are spotted also when it comes to the drivers of syndication. European firms assign far more importance to financial motives, such as diversification, liquidity management, and capital restrictions. This is as opposed to US firms that stress value-creation motives more, i.e. the sharing of competencies, information, and improvements to deal flow (Manigart et al. 2002).

Arundale (2020) highlights that US VCs are more likely to syndicate among friends, even if they are direct competitors. Arundale's study also finds that US VC firms are likely to club together to capture potential good investments at a very early stage. On the other hand, American VCs seem reluctant to syndicate with European VCs, since Europeans have a lower propensity for risk and tend to impose very strict terms on entrepreneurs. However, this suggests a missed opportunity since international syndicates are more effective in achieving a successful outcome (Chemmanur, Hull, and Krishnan 2016).

Arundale (2020) delves deeper in the differences among the two regional investors, arguing that the US style of investing is more collaborative than the EU's. The study also reports that, from a relational agency perspective, it looks like US firms are better at reducing information asymmetry through more effective collaborations, whereas European VCs show a conservative approach that can create conflicts over the timing of exits. This consequently tends to reduce the syndicate's overall performance.

Thus, the evidence suggests that European firms might be failing to appreciate the wide array of benefits provided by a syndicate with high levels of cooperation; they may be

ruling out the advantages of additional resources, trustful relationships, and increases in deal flow (Bottazzi et al. 2001; Manigart et al. 2002; Bellavitis, Rietveld, and Filatotchev 2020). While the most recent evidence on US ventures suggests that friends in a syndicate might be positively linked to successful outcomes – even if only up to a certain point – the profound differences between US and European firms in their attitudes towards syndicate partners suggests caution in assuming that the same dynamics apply to both. There is a need for research on the European contingent (Manigart et al. 2006; Arundale 2020).

In line with the theoretical framework introduced above, the less collaborative attitude of European VCs might lead to a higher risk of cooperation failures. Indeed, if a VC exhibits a lower ability or willingness to share the resources and competencies that were negotiated at the time of syndication, there is a higher likelihood of cooperation failure. In this context, choosing familiar partners might be of significant benefit. Such a decision could reduce the complexity and formality of any contract and/or result in a overall reduction to transaction costs. However, when collaboration is sought with only the aim of sharing the investment risk and obtaining additional capital, rather than sharing resources, competencies, and building interorganisational relationships, the benefits might be negligible. In this regard, we might expect a greater incidence of cooperation failures and lower benefits for European VCs. Either might result in a different relationship between the number of prior ties and the probability of a successful outcome than for US firms.

2.3. Hypothesis development

a) Likelihood of a successful exit

Building on previous findings on the effects of prior co-investments, we theorise that the

likelihood of a successful exit by a VC syndicate will not only be associated with the intensity of the VC's prior co-investments but also with other characteristics such as the share of successful prior ties and the concentration of prior ties in a specific dyad. In addition, we conjecture that the number of prior co-investments between the syndicate members will affect the time to exit.

Following the literature, we argue that a greater number of prior ties among co-investors will impact the trust dynamics within a syndicate. At low levels of familiarity, increasing number of prior ties would result in stronger connections, higher mutual trust, and improved knowledge sharing between syndicate members will reduce relational risk due to a lower risk of cooperation failures. In line with previous studies on US firms, we expect that there will be an inverted U-shaped relationship between prior ties and the likelihood of a successful exit (Bellavitis, Rietveld, and Filatotchev 2020). Thus, the following hypothesis will be tested:

Hypothesis 1a: In European venture capital syndicates, an inverted U-shaped relationship exists between the number of prior co-investments and the likelihood of a successful exit.

A syndicate's outcomes, however, might be dependent on the specific characteristics of previous collaborations among the partners. The literature suggests that the outcomes of prior ties can be a significant determinant in future decisions to syndicate together (Zhelyazkov and Tatarynowicz 2021). For example, Zhelyazkov and Gulati (2016) find that when partners abandon a syndicate, it disrupts the potential for future collaborations resulting in serious consequences, such as being excluded from future deals. Similarly, Zhelyazkov (2018) show that a previous failed collaboration among two VCs would decrease the likelihood that one of them might introduce the other to a third party.

Consequently, we might expect that the fallout from prior experiences does not just affect whether a syndicate forms but also the outcomes of that syndicate if it does come together. Friends might see different outcomes because they are better able to, say, align their interests or design the processes needed to manage the investment. We anticipate that these qualities will improve dramatically in investments where prior ties saw successful exits. Accordingly, we believe that a syndicate's share of successful prior experiences will be correlated to a successful outcome. Thus, we tested the following hypothesis:

Hypothesis 1b: The share of successful prior ties is positively correlated to the probability of a successful exit.

Another relevant dimension associated with prior ties is the concentration of relationships within a specific dyad in the syndicate. The literature shows that the distribution of prior collaborations in multiparty syndicates is a relevant issue. Familiarity is thought to play an important role in alleviating tensions between syndicate members. For instance, Zhang, Gupta, and Hallen (2017) highlight how larger syndicates might find it difficult to coordinate. Additionally, they are more at risk of opportunistic behaviour. Their results suggest that the density of prior ties can reduce these concerns. Along this line, Zhang and Guler (2020) find that the familiarity among existing syndicate members can impact the types of newcomers that are invited to join, ultimately affecting syndicate formation. Similarly, we can expect that, when the share of prior ties is more concentrated in a specific dyad, the risk of tensions within the syndicate will be lower. In addition, more concentrated prior ties might suggest a lower level of overlap in resources and higher trust levels among members that are less embedded, increasing the stability of the syndicate (Bellavitis, Rietveld, and Filatotchev 2020). This leads to the following hypothesis:

Hypothesis 1c: A higher level of concentration of prior ties among the same dyad is more

likely to result in a successful exit.

b) Prior syndications and time to exit

The "time to a successful exit", i.e., the time elapsed between forming a syndicate and exiting it with a successful outcome, has captured the interest of several scholars. Indeed, securing an M&A or launching a successful IPO is only one characteristic of a positive outcome for a VC syndicate; the time taken to exit is another important dimension of performance (Black and Gilson 1998; Cumming and Johan 2010).

The empirical evidence on the duration of VC investments is not straightforward. One stream of literature suggests that investments that take longer do not necessarily result in better performance, but rather resulting in lower returns (Espenlaub, Khurshed, and Mohamed 2015). Conversely, the view of VC investments as patient capital supports a positive relationship between investment duration and VC performance (Biesinger, Bircan, and Ljungqvist 2020). Therefore, the literature does not provide a unanimous view on the link between investment duration and the performance of VC investments. We assume that quicker successful exits are a positive outcome, since unlike other early-stage investors (e.g., friends and family, business angels), VCs must account to others for the returns achieved on the capital invested. Realising a successful exit in a shorter timeframe allows the VCs to earn a return on the money invested, bolstering their reputation as successful fund managers. In addition, achieving early returns means VCs can redirect their efforts towards other investment opportunities, increasing the firm's overall returns (Giot and Schwienbacher 2007). Likewise, limited partners have the opportunity to find new investments for the capital they receive back (Black and Gilson 1998).

Empirical evidence also shows that syndication can have an ambiguous effect on the

length of an investment in that, often, syndication leads to more patience for the investment to mature. Sethuram, Taussig, and Gaur (2021) looked at this relationship from the perspective of agency theory in an emerging economy context. They found that the risk-sharing and collaborative practices found in syndicates can reduce the time spent monitoring investments. As a result, the syndicate often exercise more patience, increasing the duration of the investment. On the other hand, benefits related to syndication might contribute to short investment duration, improving the access to a wider range of buyers, leading to higher share prices (Espenlaub, Khurshed, and Mohamed 2015).

So, with mixed evidence again, we turn to our framework provided by Gulati, Wohlgezogen, and Zhelyazkov (2012). This framework suggests that an increase in the number of prior ties should increase trust among syndicate members. Accordingly, each party's interests will be better aligned and resources will be used more effectively, reducing relational and operational risk. In turn, the investment should be managed better and less time should be needed to successfully exit from the investment. In short, levels of cooperation within the syndicate should increase. That said, as discussed earlier, increasing levels of trust over a certain threshold might lead the syndicate to take risks for which it is structurally unprepared or relax monitoring, and these are issues that will increase the length of the investment. This relationship has never been tested but, contributing the first empirical analysis of this relationship, we predict a U-shaped function will describe this relationship well. Accordingly, the following hypothesis will be tested:

Hypothesis 2: In a venture capital syndicate, the number of prior co-investments among the syndicate members has a U-shaped relationship to the time to exit.

3. Data and methodology

3.1. The data source and the collection process

One of the reasons why the literature on syndicated deals is so scant is that European data is rarely offered in a single database and requires merging data from several source. Doing this often results in data comparability issues among the several providers, a lack of a common firm identifier and subsequent lack of coherence in the data. As a result, most of the literature focuses on US firms (Kaplan and Lerner 2016). We gathered the investment data from the Eikon database on the Private Equity Screener platform provided by Refinitiv, restricting our focus to investments in European firms made by European investors. Refinitiv gathers data from the most reliable sources of information on venture capital (i.e., VentureXpert) (Thomson Reuters 2020) and is the most used data source in this field of application (Kaplan and Lerner 2016). According to Lerner (1994), together with the Dow Jones' Venture Source, Eikon presents the most complete coverage of investing activities. This endorsement and the granularity of information available convinced us to rely on Eikon.

Building our sample began with collecting data on VC firms, investments, and target companies within the period 1 Jan 1995 and 31 Dec 2009. A 10-year distance from the last record (dated 31 Dec 2009) allowed us to capture observations of subsequent exit events. In line with Sahlman (1990), a ten-year horizon is the average time required by VCs to recoup their investments.

A vast amount of information in the data we collected was incomplete. Hence, the process of integrating, populating, and eventually checking the validity of the database was non-trivial. Throughout this process, we selected data that offered a high degree of trustworthiness, avoiding the use of measures such as company valuations, revenues, and

capital table histories that are subject to strong arbitrariness or lack quality data sources.

To study the influence of VC investments on company performance, we followed Wang, Pahnke, and McDonald (2021) and focused on first-ever rounds received by target companies. This choice was guided by the fact that investment-level uncertainty and syndication activities are positively correlated (Beckman, Haunschild, and Phillips 2004). Since the degree of uncertainty is higher when a firm first establishes itself, first rounds are more likely to be syndicated (Gompers 2002) as opposed to follow-ons. Firms may then seek to further reduce this uncertainty by relying on previous ties, given that trust is a viable way of mitigating company-level risks (Gupta and Sapienza 1992; Norton and Tenenbaum 1993). In addition, the past literature suggest that syndication in follow-on rounds often involves the phenomena of "window dressing", i.e., where VCs invest in top-performing ventures simply to show their partners that they have a high quality portfolio (Lerner 1994; Gulati and Gargiulo 1999; Chung, Singh, and Lee 2000; Devigne et al. 2013). Including such follow-on deals in our sample would likely bias our results because it would capture effects that are not linked to prior ties and syndicate embeddedness. Therefore, we decide to focus only on first-ever rounds.

To compare the performance of different syndication-backed companies, we integrated the information collected from Eikon with company data on future exits events. To do this, we used Zephyr – a database of M&A deals provided by Bureau Van Dijk – and conducted a company-level analysis on all the companies in our sample that had received a first-round investment by a VC syndicate.

a) Database building process

We started with a database containing 16,121 investment rounds in European ventures made by investment management firms and private equity firms headquartered in Europe

as well. The database included syndicates comprising different funds belonging to the same venture capital firm, and, further, different firms that ultimately belong to the same holding company. Because this is widespread in the venture capital industry, we devoted some effort to identifying these cases. Any investments that were not attributable to at least two different venture capital firms were removed from the database. These processes culled the sample to a final database of 2,583 syndications over the period. From this sample, we selected 922 first-round syndicated investments. We then constructed a second database containing the syndicate outcomes for the 10 years following the sample period, i.e., 1 Jan 2010 to 31 Dec 2019.

In selecting the syndicated deals to include in the sample, our aim was to measure the interactions occurring between the VCs prior to each investment. Therefore, we needed to trace all investments made by the venture capitalists over the whole dataset. To this end, we identified every previous co-investment made by each VC within five years preceding each of the 922 investments. This meant we were not only able to distinguish dyads of VCs with a track record of at least one previous syndication, but we could also estimate the strength of their relationship by counting the number of prior co-investments conducted in the preceding five years. Following Gupta and Sapienza (1992) and Norton and Tenenbaum (1993), we classified the deals into two categories: deals where the firms that had previously invested together, i.e., friends, and deals where the firms had not collaborated over the past five years, i.e., strangers.

b) Venture capital-level data

For each VC, we collected information on the country of their headquarters, the amounts of equity invested in the period of analysis, the number of funds, and their capital under management. From this analysis, we found that 70.49% of the deals involved friends. In

line with existing research, syndicating with known partners appears to be a recurring theme when it comes to VC behaviour (Lerner 1994).

c) Deal-level data

For each of the 922 first-ever rounds, we collected the date of the investment and the size of the syndicate. These years, heavily influenced by the global financial crisis and the dot-com bubble, present an overall floating trend. Table 1 shows the year in which the first investment was received and suggests that the highest number of syndications happened in 2000 (221 investments), while the lowest occurred in 2002 (57 records). We found a total of 362 successful exit events, which corresponds to 39% of overall first rounds, divided into M&As, including leveraged buyouts, mergers, and acquisitions, and IPOs. From this, we observed 79% of the exits were M&As.

<<<<<<<<< Table 1 about here >>>>>>>>>

3.2. Methodology and variables

a) Dependent variable

All the variables included in the analysis are described in Table 2. As we want to shed light on the different factors leading to liquidity events, our dependent variable equalled 1 in case of an exit by the portfolio company, and 0 otherwise. We used the number of days from the first investment to the day of the exit as the time to exit.

<<<<<<<<< Table 2 about here >>>>>>>>>

b) Independent variables

We calculated all the prior co-investments made by each firm participating in a certain

deal with any others present in the syndication. To account for possible "false friends", i.e., firms that invested together but then stopped for a long period of time, we only considered previous investments made by a dyad over the past five years. This threshold is commonly used in studies dealing with VC syndication and other types of collaboration (McFadyen and Cannella 2004; Zhelyazkov and Gulati 2016). An example is useful here. Consider, for instance, two VCs that invested together in 2001, 2002, 2003, and 2009. If we consider the 2003 round, we have a prior syndication count of two investments. However, when considering the 2009 syndication, we have no prior co-investments, since their last deal was more than five years ago. Thus, the value of this independent variable for each first-ever investment is the sum of prior co-investments by the syndicate members in the previous five years divided by the total number of syndicate members. When testing H1a, we included both the direct effect and the quadratic relationship of this variable in terms of a successful exit and the time to exit.

When testing H1b, we calculated the number of successful co-investments at the syndicate level that happened before a specific investment. Then we divided this number by the total number of co-investments, similar to Wang, Pahnke, and McDonald (2021). This gave us the share of successful prior ties.

When testing H1c, we took the highest number of previous co-investments by the same dyad at the syndicate level. Then we divided this number by the total number of prior co-investments in that syndicate. This gave us the concentration of prior ties between the syndicate members.

c) Control Variables

To investigate the determinants of a successful exit, we controlled for several variables. Nanda, Samila, and Sorenson (2020) identify the "persistent winner" effect, where successful firms tend to boost the performance of the portfolio companies in which they

invest. Further, we agree with Bellavitis, Rietveld, and Filatotchev (2020) that VCs past experiences can influence their support for a venture, and so we included this as an independent variable, operationalizing the concept as a count of the successful exit events occurring for each VC firm in the syndicate (*syndicate experience*) at the date of the investment.

The size of the syndicate is a relevant determinant of an investment's performance (Kim and Park 2021). When analysing prior ties, we controlled for larger syndicates by using a formula that 'relativizes' the absolute value of prior co-investments (Bellavitis, Rietveld, and Filatotchev 2020). For every syndicate, we calculated the maximum number of dyads as $\frac{n(n-1)}{2}$, where n is the number of investors in the syndicate. This measure, termed *potential dyads,* was used to control for the effect of larger syndicates, as more partners participating in a round means a greater number of prior co-investments.

As the literature points out, uncertainty levels are mediated by more experience (Hochberg, Ljungqvist, and Lu 2007; Hopp 2010). Therefore, we controlled for *company age* as a measure of the complexity of the investment. Younger companies were deemed to be more risky than older, more experienced ones.

To control for the distance between the investors and the venture, we calculated the *geographical distance* between every VC firm and the target company they invested in. Computing this measure at the investment level, we divided the sum of the single distances (VC A-company A, VC B-company A, and so on) by the number of venture capital firms in the syndicate. The distance was computed using information from Eikon on the home city of the firms and companies. The distance used was the car travel distance between two points using the GeoRoute function in Stata 17.

In addition, we included the vintage year of the VC fund to control for the age of the fund at the time of exit. This variable served as a proxy for the pressure of needing to close the fund and distribute any returns.

To account for the ups and downs of the economy, which are strictly correlated to how exit opportunities progress through time, we measured the *market hotness* of each country for each year of our analysis. This metric, being a count of the number of exit events occurring each year in every country of our analysis, allowed us to control for the influence of a particularly positive climate or a declining M&A activity. It was included in the regression modelling as a control for to the days necessary to exit the investment.

Lastly, to control for the level of commitment the syndicate held for the target company, we included a dummy indicating whether any follow-on rounds had taken place *(follow-on investment)*.

Table 3 shows the descriptive statistics for the entire sample. The mean value of the exit dummy is 0.39, suggesting that less than 40% of the firms receiving a first investment were able to achieve a successful exit. Among them, the average number of days taken to exit the investments is 2085 (5.7 years). The last two columns in Table 3 show that there is no significant difference in the success of an exit nor in the days taken to exit between syndicates without prior ties and syndicates with at least 1 previous co-investment. Additionally, our analysis shows that more than half of the sample received an additional investment after the first syndicated investment (follow-on=0.61), and the average age at which firms received their first investment is 5.4 years. The t-tests indicate that friends are more likely to invest in younger firms than strangers, which might suggest that friends are better equipped to deal with uncertainty. The statistical tests also indicate that, on average, syndicates composed of friends are larger (difference in potential dyads = 0.71)

and have a higher level of previous experience (difference in syndicate experience = 10.54).

This leads also to discuss the values of successful ties and tie density. Successful previous collaborations are, on average 45% of total number of prior ties, and the number of ties in a single dyad is, on average, 43% of the total number of prior ties. Table 4 shows that these two variables are strongly correlated in our sample, since it is very likely for friends who have made successful investments in the past to invest together again. Clearly, these two variables are never included in the same regression due to a serious risk of multicollinearity.

<<<<<<<<< Table 3 about here >>>>>>>>>

<<<<<<<<< Table 4 about here >>>>>>>>>

4. Econometric results

Given the binary nature of our dependent variable (being the occurrence of an exit for each target company), we used logit regressions to estimate the effects of prior co-investments on successful exit events. In addition, following Sethuram, Taussig, and Gaur (2021), we used negative binomial regression to model the number of days to exit from the first investment. We preferred this model over Poisson regression because it accounts for overdispersion in our dependent variable.

4.1. The likelihood of a successful exit

We estimate a logit model to explain the probability that the characteristics of a venture

capital syndicate observed at the first-ever round will lead to a successful exit (Table 5). The estimation included controls for industry, fund vintage year, and country. As suggested by the VIF values at the bottom of the table, which are well below the critical threshold of 5, multicollinearity is not a concern (Greene 2012). Model 1 reports only the control variables, while Model 2 tests a linear relationship between the co-investments and the likelihood of successful exit. We find a positive and insignificant coefficient, suggesting that there is no evidence of a relationship between the number of prior co-investments and the likelihood of a successful exit. In Model 3, we test for the same correlation as for Model 2 but with a quadratic relationship as has been done in previous studies. The coefficients are still not statistically different from zero. Our results, therefore, do not provide empirical support for Hypothesis 1a, suggesting that the network embeddedness of European VCs does not seem to have any effect on the likelihood that the investment will go well. This finding is in contrast to what Bellavitis, Rietveld, and Filatotchev (2020) found for their US counterparts, confirming the hypothesis of different characteristics of the European VC ecosystem.

<<<<<<<<< Table 5 about here >>>>>>>>>

As regards our control variables, focusing on Models 1-3. we find, unsurprisingly, that syndicate size is a positive and significant determinant of a successful exit. Larger syndicates are associated with larger networks and this increases the likelihood of finding potential buyers. In addition, as expected, we observed that firms that received at least one follow-on investment after the first investment were much more likely to turn in a successful exit. Concerned that our sample only comprises first-ever investments, we repeated the estimations without including the follow-on investments dummy and found

that the results held.

Model 4 tests the relevance of successful prior ties on the likelihood of a successful exit. The coefficient is positive and significant, suggesting that a higher share of successful prior experiences is positively linked to the likelihood of a successful exit. This provides empirical support for Hypothesis 1b. Similarly, Model 5 adds the impact of the concentration of prior ties in a single dyad (Tie density) on the probability of a successful exit. The positive and significant coefficient suggests that, when prior ties are concentrated in a single dyad, there is a substantially higher probability of successfully exiting an investment. Thus, Hypothesis 1c is supported.

The control variables in Models 4 and 5 are coherent with the main model, except for the surprising positive relationship of the average distance between the company receiving the investment and the VCs. When tie density or the level of successful ties is included in the regression, the distance between company and VCs seems to increase the chances of successful exit. This result might be related to the fact that, once the strength of a friendship has been accounted for, VCs might benefit extending their network further from where they are physically located, to seize more interesting opportunities. However, this conclusion should be interpreted with caution because it might be subject to selection effects, where certain characteristics attached to companies impact the probability that they are selected in the first instance.

4.2. Time to exit

Table 6 shows the results of the negative binomial regression models with the days between the first investment and a successful exit as the dependent variable. All models included controls for industry, average vintage year of the fund, and country. Model 1 shows the results for the control variables. Model 2 estimates a linear coefficient and

Model 3 tests for the existence of a quadratic relationship. As the coefficients for Model 3 demonstrate, there is a significant U-shaped relationship between the number of prior co-investments and the days to exit, with a negative linear term (t-stat -2.84) and a positive quadratic term (t-stat 4.11). These results mean that an increase in previous co-investments (starting from the lowest values) is associated with a decrease in the days to exit, but only up to a certain point. After that, the relationship inverts and additional co-investments will increase the time needed for a successful exit. In our sample, the turning point occurs at about 4.6 average previous co-investments per syndicate member.

<<<<<<<<< Table 6 about here >>>>>>>>>

Turning to the control variables in Table 6, we observe that syndicate size is associated negatively with the time to exit and that this association persists when introducing the independent variable capturing the effect of prior ties. A negative relationship here is not surprising. Remember that our sample is composed only of successful exits, and the larger syndicates often rely on larger networks of potential buyers. As a result, they will be able to reduce the time to exit of their syndicated investments exploiting a larger network. In addition, we also observed that receiving a follow on-investment after the first had a positive and significant effect. At a first sight, this result might seem counterintuitive because in our theoretical framework faster exits are seen as better exits. However, in line with the "grandstanding" dynamic introduced by Gompers (1996), a quicker exit achieved for reasons related to the age or reputation of the VC firms might leave some opportunities untapped. With additional investments, such opportunities can often be capitalised upon, which is likely to be the dynamic captured by our *follow-on* control variable. Notably, these dynamics could be further investigated with valuation information. But, as

mentioned, such data are often difficult to find and turn out to be unreliable.

<<<<<<<<<Figure 1 about here >>>>>>>>>

A more straightforward interpretation of what this quadratic relationship means might be provided by the marginal effects shown in Figure 1. The graph suggests that the average days to exit change from 2211 days (6.05 years) with 1 prior co-investment to 1729 days (4.73 years) with a 4.6 ratio of prior co-investments to syndicate size. Then, as this ratio reaches 9, the time to exit increases again to 2237 days (6.12 years). Thus, Hypothesis H2 is supported.

4.3. Robustness tests and endogeneity

Finally, we performed a battery of additional test, in order to confirm the robustness of obtained results.

As regards the significance of the U-shaped relationship embedded in Hypothesis 2, following the suggestions of Haans, Pieters, and He (2016), we performed the test provided by Lind and Mehlum (2010). The results were statistically significant (*t*-stat= 3.09, $p<.01$), supporting a U-shaped relationship between the number of prior co-investments and the time to exit. Next, the graphical analysis of the marginal effects in Figure 1 suggests that the U-shape is well evident on both sides of the distribution. The *utest* command in Stata also provided us with the value of the turning point as equal to 4.60, confirming that this is well within the data range of the prior average co-investments per syndicate member. In addition, we also estimated the cubic and log specifications, and can confirm that they can be ruled out.

One issue that might impact our results is selection bias since we cannot control for all factors that led a syndicate to invest in a specific venture. These characteristics might be related to the probability that the VCs will have a successful exit or that it will take less time to achieve this objective. For instance, a syndicate with more prior ties might be more likely to invest in more promising ventures, leading to a correlation between the outcome that we observe and the ex-ante selection process of the syndicate. Following the procedure adopted by Wang, Pahnke, and McDonald (2021), we tried to account for this issue by applying a Heckman selection model. Specifically, we rebuilt our entire dataset by matching each syndicate with five other potential firms that were not funded by that syndicate. As such, we create a simulated dataset where VCs randomly invest in firms other than their original investments, and we appended this simulated dataset to our original data. We then recreated the relevant independent variables and, most importantly, we recalculated all the average distances between each venture and the syndicate members. As in previous studies (Sorenson and Stuart 2001; Hallen 2008; Wang, Pahnke, and McDonald 2021), we used this as an exclusion restriction in Heckman correction's first stage probit model, shown in Table 7, removing that variable from the main equation. We then calculated the inverse Mills ratio that was included as a control variable in our main regression, as reported in Tables 8 and 9. According to Certo et al. (2016), the significance of the independent variable in the selection equation should be evaluated jointly with the significance of the inverse Mills ratio in the main equation. The results in the probit equation in Table 7 suggest that, since the level of prior co-investments is not a significant determinant of the firms being selected by the syndicate, selection effects are unlikely to have affected our results. This result is confirmed by the insignificance of Mills ratio in the regressions included in Tables 8 and 9 (Certo et al. 2016).

Furthermore, since the previous positive experiences are significantly related to the likelihood of a successful exit, they might be relevant as controls when testing the relevance of H1. Thus, we estimated additional regressions controlling for previous successful exits and the percentage of ties in the same dyad. The results, unreported and available on request, still show an insignificant relationship between prior coinvestmnets and the likelihood of a successful exit.

Although our results might be robust to selection bias, we suggest caution in their interpretation. Indeed, residual sources of endogeneity might exist. We cannot control for all variables that might be correlated with the probability of success and the time to exit, resulting in potential omitted variable bias. In addition, cross sectional data do not allow us to control for time-invariant effects that might be related to firms and syndicates. Even though we tried to consider as much relevant information as possible, at the cross-sectional level, we acknowledge that residual heterogeneity might still be present.

5. Discussions and conclusions

This study builds on recent contributions in the literature (Bellavitis, Rietveld, and Filatotchev 2020; Arundale 2020; Sethuram, Taussig, and Gaur 2021; Wang, Pahnke, and McDonald 2021) and focuses on two important dimensions of performance for VCs syndicates: the likelihood of a successful exit and the duration of a successful investment.

The literature has explored the role of prior ties on the likelihood of successful investments and highlighted how the level of prior ties impact the type of exit that is achieved. The available, US-focused, evidence shows that a U-shaped relationship exists between prior co-investments and likelihood of a successful exit of a VC syndicate. We argue that our knowledge of this phenomena is still limited and that reasons exists to test this finding on the European landscape. Indeed, previous literature suggests the

existence of several differences between European and US venture capitalists, including syndication drivers and risk sharing practices (Arundale, 2020), but these occurrences have been investigated only in the US context. However, investigating this phenomenon is relevant since the European VC market is still hosting countries that are crucial for VC investment on a global level. Therefore, understanding whether these findings hold into the European market will better inform us regarding the different approaches appropriate to this context.

At this regard, we analysed how the likelihood of a successful exit relates to: i) the number of prior co-investments; ii) the share of successful prior ties; and iii) tie density. In addition, we undertook the first investigation into the relationship between prior co-investments and the time to exit. Our analysis was performed on a unique dataset of 922 syndicated investments between 2000 and 2009, where we isolated and counted the number of prior co-investments at the investment level.

As highlighted above, previous studies have called for additional research on the role of prior ties in determining syndicate performance in regions other than North America (Bellavitis, Rietveld, and Filatotchev 2020). This analysis of VC funding in Europe answers this call. Adopting a theoretical framework based on the work of Gulati, Wohlgezogen, and Zhelyazkov (2012), we analysed how these relationships between prior ties, successful exits and time to exits evolve. Further, we integrated recent findings on European VCs, which suggests that they are not able to capture the advantages of prior ties in the same way as their US counterparts. These claims find support in the literature, which suggests that European VCs often collaborate purely for monetary reasons and have a less collaborative attitude overall. According to our theoretical framework, these are attitudes that negatively impact the benefits attached to increased cooperation. Therefore, in line with literature on US data, we tested the existence of an inverted U-

shaped relationship between European VC syndicates and the probability of a successful outcome. We could expect this relationship might be characterised by a different steepness or an earlier turning point compared to what has been found with US VCs. However, our results show that prior co-investments in VC syndicates in Europe are not a significant determinant of the likelihood of a successful exit at all (Bellavitis, Rietveld, and Filatotchev 2020). They extend Arundale (2020) findings, which show that European VCs have a different attitude towards syndication. Interestingly, prior co-investments do not appear significant in any specification when testing the likelihood of success. Overall, this seems strengthen the idea that US and EU VCs differ. European VCs attitude might be less used to collaborate with syndicate partners, potentially offsetting cooperation and coordination benefits within syndicates.

Furthermore, based on the literature highlighting the importance of previous experience when forming syndicates (Zhelyazkov and Gulati 2016; Zhelyazkov and Tatarynowicz 2021), we investigated whether these prior successful outcomes are positively and significantly correlated with the likelihood of a successful exit. Successful prior experiences may mean syndicate members cooperate better and coordinate more effectively and, as a result, are more likely to reach a successful exit. Our results suggest that, all else being equal, a higher share of successful prior ties significantly increases the probability of achieving a successful exit. This hints that, although the level of prior co-investments is not a significant determinant of the likelihood of success, the level of prior successful interactions between the members of a VC syndicate is an important determinant of the likelihood of a successful exit. The prior successful experiences might have led friends to achieve better investment management practices and reducing internal frictions.

Along this line, and with the aim of delving deeper into syndicate characteristics, we

investigated the role of the concentration of prior ties among syndicate members, as called for by (Bellavitis, Rietveld, and Filatotchev 2020). The literature shows that familiarity between syndicate members can result in a more effective combining of resources and higher levels of trust between syndicate members. Our results suggest that a higher share of prior ties concentrated in a single dyad is linked to a significantly higher probability of a successful exit. An interesting trend that we observe in our data is that the syndicates with more prior successful ties were often the syndicates where the share of prior ties was concentrated in a specific dyad. This suggests a "winning team never changes" dynamic that is relevant for both hypotheses 1b and 1c. These results suggest that familiarity between syndicate members can effectively reduce the concerns of opportunistic behaviour and reduce the risk of tensions between the syndicate, resulting in higher trust also by the other syndicate members that are less embedded.

Lastly, we offer the literature the first ever analysis of prior co-investments as a determinant of the number of days taken by syndicated VCs to successfully exit their investments. Within our theoretical framework, we argue that increasing levels of friendship can increase cooperation levels among syndicate partners, leading to less time to exit the investment. However, we also suggest that a certain threshold exists, after which increasing levels of trust among long-time friends leads partners to take riskier decisions for which the syndicate may not be prepared from a structural and contractual point of view. In addition, with increasing levels of trust the syndicate members might lower their monitoring thresholds, which could give rise to management issues. Both these conditions would result in longer investment durations. We empirically tested this hypothesis, finding that prior co-investments determine the time to exit via a significant U-shaped relationship, in support of our hypothesis. Our results suggest that the reduction in time to exit peaks at 4.6 average prior co-investments per syndicate member, a

threshold after which the time to exit increases again. To the best of our knowledge, this is the first study to test the relevance of prior ties on the time to exit for successful investments.

Our results hold against a battery of robustness tests, as well as controls for sample selection bias. Additionally, the U-shaped function we uncovered holds against several cross-checks.

Our article has several limitations that might be addressed by future research. Despite being robust to a set of controls for sample selection bias, our findings are necessary constrained by a series of issues. Our results are focused on European countries and investigate a phenomenon that might have a relevant geographical dimension, both within our sample and in other countries. On one hand, European countries differ substantially in terms of capital markets development. Indeed, although our results are robust to country controls, we do not control for each European country's own peculiarities in terms of stock market development and investment attitude.

On the other hand, different approaches within other countries and cultural contexts might shed light on different dynamics compared to what we found. For instance, existing findings on cross-cultural VCs syndicates suggest that culture can play a role in these dynamics as well (Dai and Nahata 2016). Compared to US syndicates that are well integrated on a national level, European ones might still be affected by a lower level of integration that we cannot control for in our data. We leave this task to future research, which can further investigate if these dimensions impact on venture capital syndicates likelihood of success, including variables that take into account more specifically for the characteristics of syndicate individual members.

Another relevant limit of our study relates to the cross-sectional data, which do not allow us to estimate the probability of an exit at a specific point in time. Although

we tried to collect data on a panel dimension, this process turned out to be very difficult because, when firms are acquired, their financials and data became unavailable. However, this limitation is common to most studies on private equity and venture capital. Moreover, our performance variables are limited due to the same data issues. Despite a successful exit event and the time to exit being important indicators of a successfully performing syndicate, more information could be obtained by analysing firm-level performance variables. However, such data are very difficult to obtain and are often unreliable. Future research can analyse new dataset that include more specific performance variables, including the sales growth and profitability, allowing a more precise estimate of the impact of prior co-investments on the performance of new firms.

Another avenue that might be explored further regards the role of the lead VCs in the syndicate and if the prior ties of this fund are more or less important than those of the whole syndicate. We controlled for the concentration of ties in a specific dyad but had no information on which VC was the lead. We believe this might be an interesting direction for future studies that can control for the specific characteristics of the lead VC in the syndicate.

Lastly, our results should be viewed as correlational rather than causal. Although we implemented a correction for sample selection bias and the results still held, we cannot rule out the presence of residual endogeneity related to the characteristics of the VCs and the venture that we cannot control for. We leave this task for future studies that might employ instrumental variables methodologies in order to account for potential confoundedness in the relationship between prior co-investments in VC syndicates and start-up performance.

Despite these limitations, we provided new empirical evidence on the role of prior co-

investments for European VC firms. In addition, we show that a significant relationship exists between successful outcomes, the share of successful prior ties, and tie density. We also delivered the first-ever evidence of the role of prior ties as a determinant of the time to successfully exit investments. These findings should be of interest to VCs and managers who undertake projects that involve co-investments. More specifically, our finding that prior ties do not influence the likelihood of successful exit may suggest a certain degree of freedom in partner choice, but managers should be aware of the significant effect that prior ties can have on the time needed to exit these investments. Such consideration is especially relevant if these investments have a soft time boundary, as with the VC investments that we analysed. Similarly, our results suggest that previously successful friends co-investing together are more likely to achieve successful outcomes and a similar result is observed for the concentration of ties within a single dyad. Therefore, the composition of a syndicate might be designed to leverage a certain level of exploitation as best practice. However, as highlighted above, this is only the first study of these relationships, and we leave it to future research to further explore the role of prior ties in VC syndications.

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6. Declarations of interest statement

No potential competing interest was reported by the authors.

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8. Tables and figures

Table 1 Status of target companies after 10 years from the first investment received (in company units).

Year of first investment received	**Status of the company after 10 years**							
	(a) IPO	(b) Acquisition (pending)	(c) Merger	(d) LBO	(a+b+c+d) Successful Exits	Active	Defunct	Total
2000	19	65 (3)	4	8	96	94	31	221
2001	11	42 (1)	4	1	58	55*	14	127
2002	7	19 (0)	0	2	28	28	1	57
2003	10	21 (2)	1	2	34	47	3	84
2004	9	30 (2)	0	3	42	42	1	85
2005	7	15 (0)	0	4	26	37	1	64
2006	4	17 (2)	1	2	24	40	0	64
2007	4	14 (2)	0	0	18	55	2	75
2008	1	16 (0)	0	1	18	61	0	79
2009	4	10 (0)	0	4	18	48**	0	66
Overall	**76**	**249**	**10**	**27**	**362**	**507**	**53**	**922**

* One company: status classified as “Others”

**One company: status classified as “In Registration”

Table 2 List of variables included in the analysis

Variable	Description
Exit	Dummy variable, equal to 1 if the VCs exited via IPO or M&A
IPO	Dummy variable, equal to 1 if the exit was an IPO and 0 if no-exit
M&A	Dummy variable, equal to 1 if the exit was a trade sale (M&A) and 0 if no-exit
Days to exit	Number of days to exit from the first investment
Co-investments	Number of times the syndicate members co-invested in the previous 5 years divided by the number of syndicate members
Successful ties	Number of previous ties with a positive outcome divided by the total number of prior ties at the syndicate level
Tie density	Highest number of ties concentrated within a single dyad divided by the total number of prior ties at the syndicate level
Syndicate experience	Number of prior exits on a syndicate level
Potential dyads	Number of potential dyads in the syndicate, calculated as $\frac{n(n-1)}{2}$ where n is the number of syndicate members
Company age	Age of the company at first investment
Company distance	Average distance between the syndicate members and the company
Av. fund vintage year	Average of the syndicate members' vintage year
Market hotness	Number of exit events occurring in each year, in every country of our analysis
Follow-on investment	Dummy, equal to 1 if the firm ever received a follow-on investment after the first-ever syndicated investment observed in our data

Table 3 Summary Statistics. The table shows the statistics of the entire sample of syndicated first-ever rounds. The column Difference is the difference between friends and strangers and the t-stat corresponds to the null hypotheses of equal means.

	Descriptive Statistics					Mean comparison tests	
Variable	N	Mean	SD	Min	Max	Difference	t-stat
Exit	922	.398	0.490	0	1	-0.00748	(0.22)
Days to exit	353	2085.28	1392.741	150	6534	-163.4	(1.05)
Co-investments	922	.481	1.166	0	14.5		
Co-investments^2	922	1.59	9.293	0	210.25		
Successful ties	323	.448	0.420	0	1		
Tie density	323	.426	0.410	0	1		
Syndicate experience	922	12.364	23.368	0	244	10.54***	(-6.69)
Potential dyads	922	3.7	1.769	3	21	0.715***	(-5.96)
Company age	805	5.399	8.018	0	41.025	-0.691*	(2.24)
Company distance	922	238.711	206.211	0	891	-22.68	(1.59)
Av. fund vintage year	880	1997.874	5.030	1971	2008	-0.603*	(1.72)
Market hotness	319	23.571	24.207	2	81	5.105*	(-1.81)
Follow-on	922	.617	0.486	0	1	0.0365	(-1.09)
N						922	

T-statistics appear in parentheses* p < 0.1, ** p < 0.05, *** p < 0.01.

Table 4 Correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1) Successful exit	1.000												
(2) Days to exit	0.735*	1.000											
(3) Co-investments	0.064	0.076*	1.000										
(4) Co-investments^2	0.078*	0.133*	0.850*	1.000									
(5) Successful ties	0.167*	0.148*	0.154*	0.113*	1.000								
(6) Tie density	0.140*	0.130*	0.107	0.085	0.978*	1.000							
(7) Syndicate experience	0.066*	0.055	0.356*	0.244*	0.197*	0.180*	1.000						
(8) Potential dyads	0.094*	0.052	0.128*	0.058	0.023	-0.054	0.031	1.000					
(9) Company age	-0.038	-0.015	-0.041	-0.012	-0.065	-0.040	0.019	-0.101*	1.000				
(10) Company distance	-0.021	-0.026	-0.022	-0.016	0.101	0.107	0.163*	-0.111*	-0.028	1.000			
(11) Av. fund vintage year	0.028	0.009	-0.129*	-0.091*	-0.050	-0.042	-0.160*	-0.015	-0.142*	-0.071*	1.000		
(12) Market hotness	0.143*	0.095*	0.081*	0.047	0.000	-0.005	-0.089*	0.041	-0.078*	-0.125*	-0.133*	1.000	
(13) Follow-on investment	0.207*	0.301*	0.091*	0.072*	0.115*	0.094	0.134*	0.119*	-0.122*	0.024	0.019	0.016	1.000

*** p<0.01, ** p<0.05, * p<0.1

Table 5 Logit regression of prior co-investments on successful exit events

	(1) Successful exit	(2) Successful exit	(3) Successful exit	(4) Successful exit	(5) Successful exit
Syndicate experience	0.004	0.003	0.003	-0.006	-0.006
	(0.004)	(0.004)	(0.004)	(0.006)	(0.006)
Potential dyads	0.115**	0.111**	0.115**	0.221***	0.235***
	(0.046)	(0.047)	(0.047)	(0.076)	(0.076)
Company age	-0.007	-0.007	-0.007	-0.015	-0.016
	(0.011)	(0.011)	(0.011)	(0.028)	(0.028)
Company distance	-0.000	-0.000	-0.000	0.002**	0.002**
	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)
Follow-on Investment	0.821***	0.820***	0.818***	0.637*	0.641*
	(0.184)	(0.184)	(0.184)	(0.357)	(0.357)
Co-investments		0.060	-0.072	0.103	0.107
		(0.074)	(0.168)	(0.104)	(0.104)
Co-investments^2			0.021		
			(0.026)		
Successful ties				0.868**	
				(0.407)	
Tie density					0.874**
					(0.416)
Industry effects	Y	Y	Y	Y	Y
Country effects	Y	Y	Y	Y	Y
Average vintage year of the fund	Y	Y	Y	Y	Y
Constant	-2.567**	-2.582**	-2.586**	-2.372	-2.442
	(1.227)	(1.228)	(1.228)	(1.621)	(1.630)
R-squared	0.106	0.106	0.107	0.222	0.222
N	753	753	753	262	262
Chi-square	107.861	108.546	109.447	79.981	79.847
VIF	3.50	3.48	3.57	2.63	2.63

*p<0.1, **p<0.05, ***p<0.001.

Table 6 Days to exit and prior co-investment.

	(1) Days to exit, Negative Binomial	(2) Days to exit, Negative Binomial	(3) Days to exit, Negative Binomial
Co-investments		0.015	-0.125***
		(0.029)	(0.044)
Co-investments^2			0.014***
			(0.003)
Syndicate experience	-0.003	-0.003*	-0.002
	(0.002)	(0.002)	(0.002)
Potential dyads	-0.049***	-0.051***	-0.043**
	(0.016)	(0.017)	(0.017)
Company age	0.003	0.003	0.002
	(0.005)	(0.005)	(0.005)
Company distance	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)
Market hotness	0.002	0.002	0.003
	(0.002)	(0.002)	(0.002)
Follow-on	0.744***	0.740***	0.753***
	(0.089)	(0.089)	(0.086)
Industry effects	Y	Y	Y
Country effects	Y	Y	Y
Average vintage year of the fund	Y	Y	Y
Constant	6.376***	6.394***	6.321***
	(0.588)	(0.588)	(0.575)
R-squared	0.023	0.023	0.025
N	308	308	308

Robust standard errors appear in parentheses. *p<0.1, **p<0.05, ***p<0.001.

Table 7 Heckman Selection model. First stage probit equation modelling shows the probability of being selected by a certain syndicate at the time of first investment.

	(1) Receiving an investment
Avg company distance	-0.003***
	(0.000)
Syndicate experience	0.003**
	(0.001)
Venture age at first investment	-0.012***
	(0.004)
Market hotness	0.002
	(0.001)
Prior co-investments	-0.001
	(0.010)
Syndicate size	0.071
	(0.052)
Constant	0.138
	(0.424)
R-squared	0.228
N	4108
Chi-square	785.282
VIF	3.21

*p<0.1, **p<0.05, ***p<0.001

Table 8 Logit regressions on the probability to exit, controlled for sample selection bias

	(1) Successful exit	(2) Successful exit	(3) Successful exit	(4) Successful exit	(5) Successful exit
Syndicate experience	0.006	0.004	0.005	-0.004	-0.004
	(0.004)	(0.005)	(0.005)	(0.006)	(0.006)
Potential dyads	0.112**	0.105**	0.109**	0.174**	0.191**
	(0.051)	(0.051)	(0.052)	(0.079)	(0.080)
Venture age at first investment	-0.008	-0.007	-0.006	0.013	0.011
	(0.023)	(0.023)	(0.023)	(0.045)	(0.045)
Follow-on investment	1.194***	1.193***	1.186***	1.144***	1.135***
	(0.231)	(0.231)	(0.231)	(0.417)	(0.417)
Prior co-investments		0.088	-0.067	0.079	0.091
		(0.089)	(0.215)	(0.119)	(0.119)
Prior-co-investments^2			0.027		
			(0.038)		
% of successful prior ties				1.211**	
				(0.506)	
% of ties in the same dyad					1.161**
					(0.508)
Inverse Mills ratio	-0.099	-0.082	-0.089	0.431	0.444
	(0.241)	(0.241)	(0.242)	(0.443)	(0.443)
Constant	0.012	0.046	0.040	-2.904	-3.051
	(1.847)	(1.855)	(1.851)	(2.003)	(2.006)
Industry effects	Y	Y	Y	Y	Y
Country effects	Y	Y	Y	Y	Y
Average vintage year of the fund	Y	Y	Y	Y	Y
R-squared	0.136	0.137	0.138	0.207	0.205
N	542.000	542.000	542.000	195.000	195.000
Chi-square	101.275	102.314	103.095	55.955	55.415

*p<0.1, **p<0.05, ***p<0.001

Table 9 Negative binomial regressions on the days taken to exit, controlled for sample selection bias

	(1) Days to exit, Negative Bino-mial	(2) Days to exit, Negative Bino-mial	(3) Days to exit, Negative Bino-mial
Prior co-investments		0.026	-0.094**
		(0.025)	(0.048)
Prior-co-investments^2			0.012***
			(0.004)
Syndicate experience	-0.003**	-0.004**	-0.003*
	(0.002)	(0.002)	(0.002)
Potential dyads	-0.046**	-0.050***	-0.043**
	(0.019)	(0.019)	(0.019)
Venture age at first investment	-0.007	-0.006	-0.005
	(0.009)	(0.009)	(0.009)
Market hotness	0.001	0.001	0.002
	(0.002)	(0.002)	(0.002)
Follow-on investment	0.796***	0.793***	0.802***
	(0.118)	(0.118)	(0.115)
Inverse Mills ratio	0.009	0.002	0.014
	(0.095)	(0.095)	(0.094)
Constant	6.443***	6.498***	6.373***
	(0.576)	(0.593)	(0.572)
Industry effects	Y	Y	Y
Country effects	Y	Y	Y
Average vintage year of the fund	Y	Y	Y
R-squared	0.019	0.019	0.021
N	241.000	241.000	241.000

*p<0.1, **p<0.05, ***p<0.001

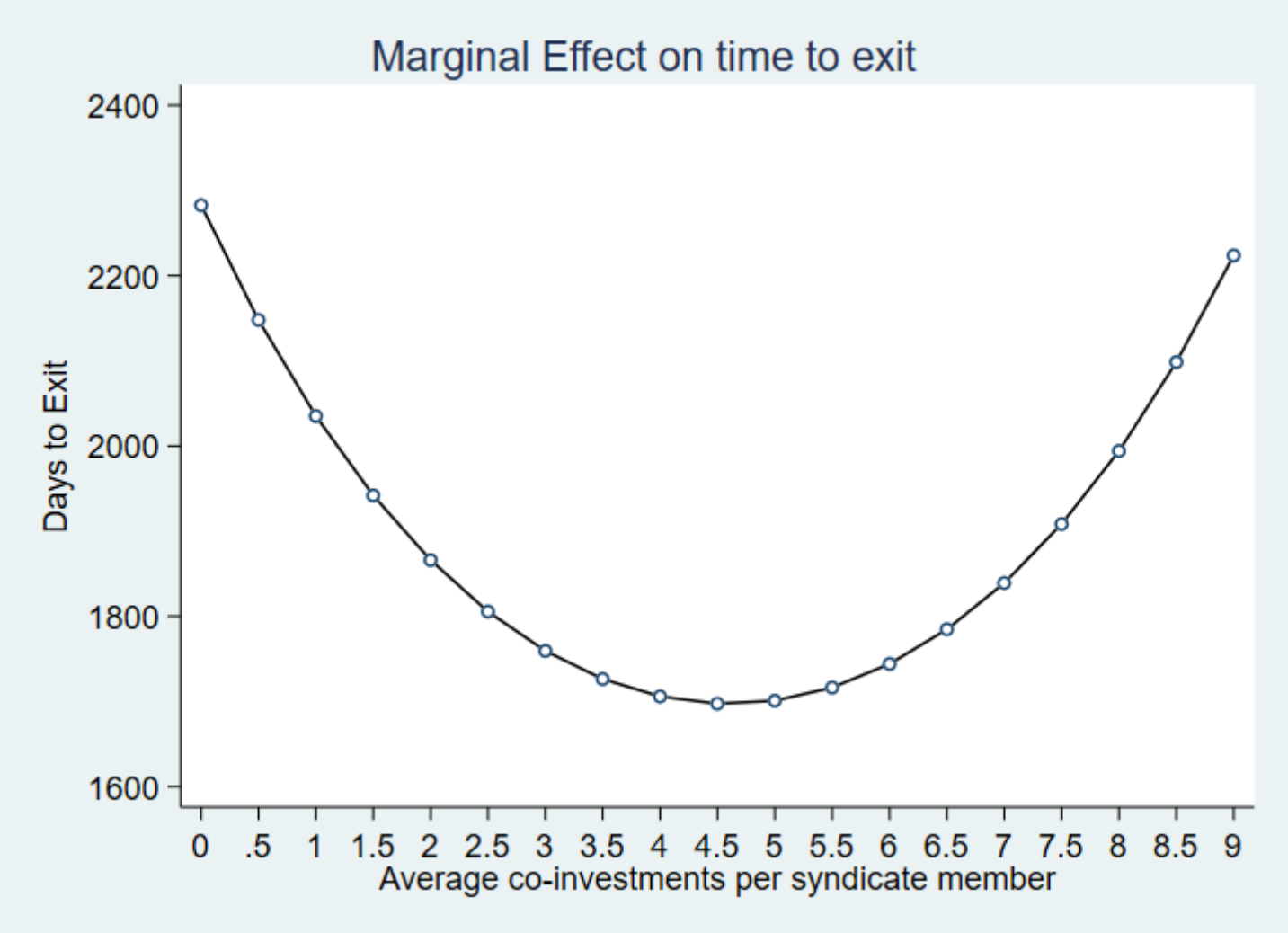

Figure 1 Marginal effect of prior co-investments modelled by negative binomial regression.