PRIVATE CAPTIVE FUND PROVIDERS AND THE LIKELIHOOD OF ACHIEVING SUCCESSFUL VENTURE CAPITAL EXITS

Jose Martí*
Universidad Complutense de Madrid

Inmaculada Aguiar-Díaz
Universidad de Las Palmas de Gran Canaria

María Victoria Ruiz-Mallorquí
Universidad de Las Palmas de Gran Canaria

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Abstract

We analyze the impact of the relationship between private captive venture capital firms (VCFs) and their parent investors on the likelihood of achieving successful exits in investee firms. We argue that the differences in strategic goals and the way venture managers are appointed and incentivized may affect the exit way achieved by different types of captive VCFs. In particular, we focus on private captive VCFs solely funded by a corporation or a financial institution, as well as on semi-captive VCFs jointly funded by several entities. We find that captive VCFs backed by corporations show a higher likelihood of exiting their portfolio firms more successfully than those backed by financial institutions and semi-captive VCFs. VCFs backed by corporations seem to have strategic goals that are compatible with the maximization of portfolio return, and their venture managers may contribute with valuable specific industry knowledge. Conversely, the managers of VCFs wholly owned by financial institutions rarely contribute with industry and technology knowledge and are even more affected by the lack of adequate compensation packages.

Keywords: venture capital, captive investor, agency theory, parent investor, managers, exits

JEL classification: G24, M13, C25

*Corresponding author. Email: jmartipe@ccee.ucm.es

Introduction

The venture capital (VC) industry is composed of two separate market segments. First, the creation of VC firms (VCFs, henceforth) requires the interaction between primary investors and VC managers. Second, once the vehicles have closed their fundraising processes, the allocation of the funds raised requires interaction between VC managers and entrepreneurs. The VC industry is then affected by the interaction of two agency relationships and the potential conflicts of interest between the participants involved in both market segments. In the first segment, fund providers (i.e., limited partners or the parent investor) act as principals, whereas VC fund managers act as agents. In the second segment, VC managers act as principals, while entrepreneurs act as agents.

The relationship between VC managers and the entrepreneurial teams of investee firms has been extensively analyzed in the literature (e.g., Amit, Brander, and Zott 1998; Kaplan and Strömberg 2001; Sahlman 1990; Croce, Martí, and Murtinu 2013; Admati and Pfleiderer 1994). However, we agree with Gompers and Lerner (2000) and Manigart and Sapienza (2000) that it is important to extend the analysis to the relationship between VC managers and the providers of funds to VCFs.

The VC activity is carried out by different types of vehicles (Bertoni, Colombo, and Quas 2015). In the case of independent VCFs (IndVCFs, hereafter), general partners launch funds with a limited life span to attract commitments from various limited partners. In some cases, however, the creation of the VCF is decided by one sole fund provider, called the parent investor, to accomplish one or several strategic goals, in addition to the main financial goal. The parent investor, which is usually a corporation, a financial institution, or a government agency, then appoints a management team to allocate the pool of money committed. These vehicles, which are not initially created with a limited life span, are identified as Captive VCFs (CapVCFs, hereafter). In addition to the two main VCF types, there are VCFs jointly funded by several corporations, financial institutions and/or government agencies. In contrast with IndVCFs, these vehicles are launched as a joint initiative of the fund providers, which later hire a management team. These vehicles, known as semi-captive VCFs, also have strategic goals and, initially, do not have a limited life span. Sometimes, they are jointly analyzed with CapVCFs (Chemmanur, Loutskina, and Tian 2014).

Since there is consensus in the literature about the positive role VC plays in bridging the equity gap in entrepreneurial businesses (e.g., Bertoni, Colombo, and Grilli 2011; Bertoni,

Ferrer, and Martí 2013; Chemmanur, Krishnan, and Nandy 2011; Croce, Martí, and Murtinu 2013; Mayer, Schoors, and Yafeh 2005), the sustainability of the overall VC industry requires full understanding of the equilibrium between both market segments. In IndepVCFs, limited partners are willing to commit money in future fundraising processes if they receive a fair return from successful divestments in the stakes held in portfolio firms (Sahlman 1990; Black and Gilson 1998; Cumming and MacIntosh 2003a). However, in addition to the main financial goal, captive and semi-captive VCFs also aim to achieve other strategic goals (Arping and Falconieri 2009; Colombo and Murtinu 2017; Hirsch and Walz 2013). We argue that the relationship between primary investors and VC managers in those firms may affect the relationship between VC managers and the entrepreneurial teams of investee firms, thus having an impact on the likelihood of achieving a successful exit.

In this work, we focus on the agency relationship between VCFs that are created by primary investors to achieve specific strategic goals, either by a sole parent investor (CapVCFs, henceforth) or by several investors (i.e., semi-captive VCFs), and the management team fund providers appoint to run the vehicle. Since government-backed VCFs have been extensively analyzed in the literature (e.g., Cumming and MacIntosh 2006; Luukkonen, Deschryvere, and Bertoni 2013; Cumming, Grilli, and Murtinu 2017; Colombo, Cumming, and Vismara 2016; Suchard, Humphery-Jenner, and Cao 2021), we concentrate on private fund providers to captive and semi-captive VCFs. We aim to analyze whether the compatibility between strategic and financial goals and the characteristics of compensation schemes granted to VC managers in these VCFs affect the likelihood of achieving successful exits in investee firms.

The geographical focus of our work is the Spanish VC market, which recorded an investment activity only behind that of the UK, France, and Germany in Europe (OECD 2017; Invest Europe 2023). Out of the population of 1,931 VC-backed firms that received the initial investment between 2005 and 2016, we obtained full VC and accounting data for 1,444 firms (74.8%). Once independent and government-backed VCFs are excluded, our sample is composed of 480 firms backed by private captive and semi-captive VCFs.

As the first contribution of this work, we contribute to highlighting the heterogeneity across different types of private CapVCFs, and how it affects the likelihood of achieving successful exits. Second, we complement the limited existing evidence that compares exit patterns among different types of private CapVCFs. Third, we provide support to the idea that CapVCFs backed by corporations are more likely to make strategic and financial goals compatible and set up efficient compensation schemes for VC managers than other captive and

semi-captive VCFs. Finally, we provide initial evidence on the impact of agency costs on the exit performance of semi-captive VCFs, which has been mostly neglected in the literature.

1. Theoretical background and hypotheses

2.1 The agency relationship between fund providers and VC managers in CapVCFs

The agency relationship between the parent investor and VC managers is affected by adverse selection and moral hazard problems that could give rise to conflicts between both parties. The agency costs between fund providers and VC managers may affect the overall success in selecting, managing, and successfully divesting portfolio firms. In particular, these conflicts may have an impact on the relationship between VC managers and entrepreneurs, thus affecting the likelihood of reaching successful exits in investee firms (Cumming and MacIntosh 2003a). The two main mechanisms to align the interests of primary investors and VC managers are compensation schemes and covenants (Gompers and Lerner 1999; Dushnitsky and Shapira 2010; Tykvová 2018). These mechanisms, however, may depend on the type of VCF and primary investors involved.

The management team of CapVCFs could either be composed of employees appointed from the parent investor's group or professionals hired in the market. In both cases, they become employees of the CapVCF. In addition to the salary, they have a compensation scheme that may vary across CapVCF types. In most cases, it will depend on the performance of the VC vehicle, whereas in others it may depend on the performance of the parent company. Since CapVCFs are created to pursue not only financial but also strategic goals (e.g., Arping and Falconieri 2009; Da Rin, Hellmann, and Puri 2013; Hirsch and Walz 2013; Colombo and Murtinu 2017), there might be conflicts between financial and strategic goals that could affect the relationship between VC managers and the parent investor. In the context of agency theory, the presence of strategic goals may lead to the existence of private benefits for the parent investor (Shleifer and Vishny 1997), which may affect the relationship with VC managers and, hence, have an impact on the relationship between the latter and the owners/managers of investee firms. Conflicts of interest may arise as both parties could be seeking different goals. In particular, the strategic goals may lead to the termination of a project led by an investee firm, against the interests of both VC managers and the entrepreneurial firm (Arping and Falconieri 2009).

As regards compensation, since the vehicles launched as CapVCFs are not usually created with a limited life, compensation schemes cannot imitate the capital gains incentive (i.e., carried interest) on the overall portfolio, which is standard in IndVCFs, because there is no moment in

which the fund is liquidated to compute the final gain. The alternative setting is to create a compensation package that rewards capital gains obtained in each portfolio company, even though this approach may lead to perverse effects for the overall portfolio (Stolpe 2003). Hence, the agency relationship between VC managers and the parent investor is complex due to the existence of different goals and the difficulty of applying appropriate compensation schemes.

Numerous studies have compared the exit success of IndVCFs and CapVCFs, even distinguishing between different types of CapVCFs, (e.g., Cumming and Johan 2008; Cumming, Grilli, and Murtinu 2017; Luukkonen, Deschryvere, and Bertoni 2013; Colombo and Murtinu 2017; Gompers and Lerner 2000). In all of them, IndVCFs perform significantly better and show higher success in divestments than CapVCFs, especially when the former are compared with government-backed VCFs (e.g., Cumming and MacIntosh 2006; Grilli and Murtinu 2014; Colombo, Cumming, and Vismara 2016; Zhang and Mayes 2018; Suchard, Humphery-Jenner, and Cao 2021; Luukkonen, Deschryvere, and Bertoni 2013). Fewer studies, however, have focused on how differences among CapVCFs, and specifically between private CapVCFs, may determine a different likelihood of achieving successful exits. Semi-captive VCFs have also received little attention in the literature, sometimes jointly analyzed with CapVCFs (Hassan and Leece 2008; Chemmanur, Loutskina, and Tian 2014).

2.2 The alignment of interests between fund providers and VC managers in private captive and semi-captive VCFs

What is common in all captive and semi-captive VCFs is the presence of strategic goals (Bottazzi, Da Rin, and Hellmann 2008; Hirsch and Walz 2013), in addition to the traditional financial goals of IndVCFs. These strategic goals, however, are different across types of CapVCFs (Chemmanur, Loutskina, and Tian 2014). We argue that these differences, along with the higher or lower relative importance of financial goals, may reduce the compatibility between VC managers' and parent investor's goals.

We investigate to what extent the differences in strategic goals, compensation schemes, and characteristics of primary investors may impact the relationship between VC managers and portfolio firms, thus affecting the likelihood of achieving successful exits. In particular, we focus on VCFs backed by a corporation (CorpVCFs), by a financial institution (FinVCFs), and semi-captive VCFs.

We define CorpVCFs as VC subsidiaries, divisions, or investment arms wholly owned (directly or indirectly) by a single corporation. In most cases, US CorpVCFs directly invest

from the balance sheet (Chemmanur, Loutskina, and Tian 2014; Lantz and Sahut 2010). CorpVCFs aim to pursue strategic goals, such as access to new technologies or business models synergic with the current portfolio of products/services, or the identification of potential acquisition targets (Benson and Ziedonis 2009; Hellmann 2002). The strategic goals may pursue investments to fix weaknesses (e.g., to face internal innovation deterioration) or to identify promising startups to strengthen their market power (Ma 2020).

On the positive side, CorpVCFs may profit from the parent's industrial knowledge of the market and/or the technology to screen and add value to entrepreneurial projects (Colombo and Murtinu 2017). In addition, VC managers frequently have previous experience in screening and structuring VC investments (Chemmanur, Loutskina, and Tian 2014). Due to the combination of industry knowledge and VC experience, CorpVCFs could show similar performance to that of IndVCFs (Gompers and Lerner 1998) or even claim superior achievements in innovation (Chemmanur, Loutskina, and Tian 2014).

On the negative side, however, VC managers are employees whose compensation packages may depend on the performance of the parent investor (i.e., the corporation) and not necessarily on the performance of the VCF (Strebulaev and Wang 2021). This could make VC managers relatively failure-tolerant (Chemmanur, Loutskina, and Tian 2014). Parent investors may drive managers to invest in new market entrants to avoid future competition (Arping and Falconieri 2009), or may tend to object to the acquisitions of portfolio firms by their competitors (Masulis and Nahata 2009).

But, usually, corporations set up CorpVCFs to invest in firms that are compatible with, synergic, or complementary to the parent's lines of business, thus allowing the alignment of interests between both parties and leading to the positive effects highlighted above. CorpVCFs frequently hire professional managers with compensation packages related to the performance of the VC vehicle. If the parent investor acts to prioritize the corporation's firm performance, the management teams of CorpVCFs are subject to high turnover (Strebulaev and Wang 2021). These professionals would not agree to risk their reputation by accepting low performance at the vehicle level balanced by a high performance at the parent investor level. VC managers are aware that building a sound reputation would allow them to launch funds as general partners of IndVCFs in the future. This is a very powerful incentive for them to achieve outstanding performance in the form of successful exits, which is the track record prospective limited partners would certainly look at.

Similar to CorpVCFs, financial institutions may create a separate VC subsidiary or invest from the balance sheet. The strategic goals of FinVCFs aim to increase the customer base for the core business (provision of loans and other financial products) of the parent investor (Hellmann, Lindsey, and Puri 2008; Murtinu and Johan 2018). FinVCFs may be used as corporate governance instruments to reduce agency costs in lending to early-stage firms (Stolpe 2003).

Their managers may also be appointed by the financial institution or hired from outside. In contrast with CorpVCFs, however, internal managers would not contribute with industry-specific knowledge to portfolio companies. Furthermore, they are risk-averse employees with unattractive compensation schemes (Tykvová 2006). Financial institutions cannot give out very generous bonuses because top managers of other larger subsidiaries belonging to the same group would be disappointed (Dushnitsky and Shapira 2010). In the case of VC managers hired outside, in addition to unattractive compensation packages, the strict investment procedures imposed by the financial institution on all subsidiaries and divisions would certainly distort their actions, thus leading to an even higher turnover than that observed in CorpVCFs.

On top of that, maximizing the return generated by the VCF is not crucial if the parent investor profits from an increase in bank-related financial activity generated by portfolio firms (Tykvová 2006; Hellmann, Lindsey, and Puri 2008; Murtinu and Johan 2018). The parent investor may tend to establish long-term relationships with portfolio firms rather than focusing on achieving a fast successful exit to maximize the return of the VC vehicle (Dolvin, Mullineaux, and Pyles 2007). A longer holding period will certainly affect the return.

In sum, the lack of adequate internal human capital, together with unattractive bonuses, and the lack of proper alignment of interests with VC professionals hired outside will affect the likelihood that portfolio firms of FinVCFs reach a successful exit. Hence, we put forward the following hypothesis:

Hypothesis 1: Firms backed by CorpVCFs are more likely to achieve successful exits than those backed by FinVCFs.

Semi-captive VCFs present organizational characteristics that lie between those of IndVCFs and CapVCFs. Hassan and Leece (2008) wonder whether this type of VCF follows the behavior of CapVCFs or that of IndVCFs, or whether they display their distinctive behavior. Similar to IndVCFs, a semi-captive VCF is structured as a separate investment vehicle with several independent fund providers (e.g., corporations, financial institutions, and/or

government agencies, among others). As in CapVCFs, however, the vehicle is created by several investors to pursue some strategic goals, and a VC management team is appointed to run the vehicle (i.e., the vehicle was not set up by those managers).

In some cases, a large company creates a semi-captive VCF and accepts the participation of other industrial partners, and the strategic goal is close to the core activity of the leading corporation (Lantz and Sahut 2010). In most cases, however, all participants may share a common initial strategic goal to set up the semi-captive VCF (e.g., to develop a specific activity in a given area). Nevertheless, all investors would still have their own main strategic goals. In that way, there might be a conflict of interest between the main strategic goals of each investor and the strategic goal of the semi-captive VCF. Furthermore, even if all partners share a common goal at the time the semi-captive VCF was established, this conflict may arise at some point in time. Therefore, conflicting strategic goals among fund providers may distort the activity of VC managers.

As in CapVCFs, VC managers are employees who receive a salary plus a bonus based on performance. The fact that this type of VCF often starts as a CapVCF, and then raises money from sources other than the parent company (Hassan and Leece 2008), would mean that those managers could be appointed by one of the investors. They could then tend to focus on the main goals of the related investor, thus leading to potential conflicts with other fund providers in the semi-captive VCF. In this case, agency problems would arise between this dominant investor and the rest of the (minority) investors, since the former could seek its benefits based on its strategic objectives, against the interests of other minority investors (Shleifer and Vishny 1997; Maury and Pajuste 2005). However, in cases in which there is not a dominant lead investor, more dispersed ownership without adequate alignment mechanisms based on compensation schemes would affect management control, potentially leading to larger managerial discretion and greater agency costs (Jensen and Meckling 1976).

Hence, due to the existence of strategic goals, as in the case of CapVCFs, problems among investors, and poor compensation schemes, we find possible conflicts among different fund providers over time. In addition, agency costs due to dispersed ownership and coordination problems among fund providers would ultimately affect the performance of portfolio firms and the likelihood of achieving successful exits. Since all of these arguments would hold when we compare CorpVCFs and semi-captive VCFs, we outline the following hypothesis.

Hypothesis 2: Firms backed by CorpVCFs are more likely to achieve successful exits than semi-captive VCFs.

Regarding the comparison between FinVCFs and semi-captive VCFs, the higher likelihood of achieving successful exits by both types of VCFs is conditioned by the larger or smaller impact of the lack of industry-specific and managerial expertise of VC managers, observed in FinVCFs, when compared with the agency problems of dispersed ownership and lack of proper control in semi-captive VCFs. Hence, we can only outline two competing hypotheses, depending on the larger impact of the former versus the latter argument (a), or the larger effect of the second against the first (b).

Hypothesis 3a: Firms backed by FinVCFs are less likely to achieve successful exits than semi-captive VCFs.

Hypothesis 3b: Firms backed by FinVCFs are more likely to achieve successful exits than semi-captive VCFs.

2. Data and methods

3.1 Context: the Spanish VC market

In the European scene, the Spanish VC market recorded an investment activity only behind that of the UK, France, and Germany in 2022 (Invest Europe 2023). Briefly reporting its historical development, the national government established the first VCF in 1972 and the first two private VCFs were created four years later. By 1986, 18 out of 22 existing VCFs were backed by government agencies (Balboa and Martí 2004). The number of VCFs backed by private investors sharply increased in the 1990s and, especially, over the last 20 years. Conversely, some government-backed VCFs merged or were liquidated. As a result, there were 128 domestic VCFs, of which 18 were government-owned, and 266 foreign VCFs with portfolio firms located in Spain as of December 2022 (Source: SPAINCAP/Webcapitalriesgo[1]). The 110 private domestic VCFs include 69 independent VCFs, 18 CorpVCFs, 6 FinVCFs, and 17 semi-captive VCFs.

3.2 Sample

We construct our dataset from several sources. First, we retrieved all VC-related data from SPAINCAP/Webcapitalriesgo. We obtained detailed information about investments (i.e., lead

[1] SPAINCAP (https://spaincap.org) is the new acronym of the Spanish Private Equity and Venture Capital Association. Webcapitalriesgo (https://www.webcapitalriesgo.com) is the service provider that conducts the annual surveys and updates the activity dataset about Spain on behalf of SPAINCAP and Invest Europe since 2002.

investor, syndication, amount invested, year of investment, stage of development, industrial sector, location, and company VAT identifier), VCFs (i.e., name, type of investor, number of years doing business, fundraising and investment activity), and divestments (i.e., year and type of divestment). In the case of syndicated investments, we take into account the characteristics of the initial lead VCF to control for the 'bandwagon effect' highlighted by Brander, Du, and Hellmann (2015). Second, we complemented the information about VC-backed firms in Orbis, including the year of establishment, location, industrial sector, tangible assets, and total assets. Third, we confirmed the type of VCFs and their fund providers in SPAINCAP, Webcapitalriesgo, Orbis, and the respective websites of all VCFs.

We focus on companies that received their initial VC investment between 2005 and 2016, tracking all divestment activity until March 2023. In that period, VC investors reported 2,486 initial investments in 1,931 companies, once syndication duplicates were excluded (Source: SPAINCAP/Webcapitalriesgo). Following previous studies (e.g., Brander, Du, and Hellmann 2015; Anderson, Chi, and Wang 2017), we perform the analysis at the portfolio firm level (one observation per portfolio firm).

We found full information (i.e., accounting data, VCFs involved, investment and divestment characteristics) for 1,444 portfolio firms, which represent 74.8% of the population analyzed. Since our focus is on private captive VCFs, we excluded 635 firms backed by government-owned VCFs and 329 companies backed by IndVCFs.[2] Out of the remaining 480 portfolio firms, there were 408 divested and 72 non-divested firms as of March 2023. The largest group includes 202 invested by FinVCFs. In 38 firms, the lead investor at the time of the initial investment was a CorpVCF. The remaining 168 were funded by semi-captive VCFs.

3.3 Model and methodology

In the spirit of Cumming, Grilli, and Murtinu (2017), our baseline model has the following structure:

SuccessExit = f (VCF types, VCF characteristics, firm characteristics, other controls)

Dependent variable

SuccessExit is a dummy that takes a value of 1 in case of a successful exit, and 0 otherwise. The official classification of divestments reported by Invest Europe and SPAINCAP details the

[2] We also include them in the additional analyses carried out as further robustness checks.

following exit routes: IPOs, trade sales (i.e., including the full acquisition of the investee firm, or just the sale of the VCFs' stake to a third party[3]), sales to another VCF, buybacks (i.e., sale of the stake to managers, and/or other previous shareholders), and write-offs (Invest Europe 2023). Extant literature, which is mostly based on the US market, pools together IPOs and acquisitions as successful exits (e.g., Nahata 2008; Brander, Du, and Hellmann 2015; Cumming 2008; Cumming and Dai 2013). In the case of European data, however, Cumming, Grilli, and Murtinu (2017) consider IPOs and trade sales[4] as successful exits. Hence, the dependent variable takes a value of 1 for IPOs, trade sales, and sales to other VCFs, whereas the value is 0 for write-offs, buybacks, and other exit ways (e.g., convertible loans not converted and reimbursed as regular loans at maturity).

Independent variables

FinVCF and *CorpVCF* are dummy variables that take a value of 1 if the VCF is wholly owned by a financial institution or a corporation (i.e., parent investor), respectively, and 0 otherwise. *SemicapVCF* is a dummy variable that takes a value of 1 if the VCF is jointly backed by several entities, and 0 otherwise.

Control variables

Following previous empirical evidence, we consider three groups of control variables. The first one includes those related to VCFs. *Syndicated* is a dummy that takes a value of 1 if more than one VCF participates in the initial investment, and 0 otherwise (Bottazzi, Da Rin, and Hellmann 2008). *VCFsize* is the natural logarithm of the average amount of funds raised by the VCF in the previous five years, as suggested by Bottazzi, Da Rin, and Hellmann (2008) or Cumming (2008).

The second group focuses on the characteristics of investee firms. Following Cumming, Fleming, and Schwienbacher (2006), among others, we include the stage of development, the high- or low-technology nature of the portfolio firm, the degree of information asymmetry, as well as firm size and age. The stage of development at the time of the initial investment is defined by four dummies that take the value of 1, if the firm was, respectively, at the seed, start-

[3] In the US, the usual classification separates full acquisitions from secondary sales of the stakes held by VCFs to a third party (Cumming and MacIntosh 2003a), whereas in Europe trade sale is a category that includes both (e.g., see Invest Europe 2023). In addition, Invest Europe introduced a new category to compute sales to other VCFs. Hence, the number of acquisitions and secondary sales, following the US methodology, matches the sum of trade sales and sales to other VCFs in Europe.

[4] Their data are based on a dataset before the separation of sales to other VCFs from trade sales.

up, other early, or later VC stage, following the definitions of Invest Europe (2023), and 0 otherwise. *High-tech* is a dummy that takes a value of 1 if the investee firm's industrial sector is considered as high technology,[5] and 0 otherwise. Information asymmetry is measured by *Tangibility,* which is defined as the quotient between the firm's tangible and total assets in the year of the first VC investment. *FirmSize* is the natural logarithm of total assets at the time of the initial investment. In addition, we include *FirmAge*, defined as the natural logarithm of the number of years the investee firm was in existence at the time of the initial VC investment (Bottazzi, Da Rin, and Hellmann 2008). Finally, sample firms are grouped into six categories to define industry sector dummies: Primary & Utilities, Manufacturing, Pharma & Other R&D, Commerce, Information and Communication Technologies, and Other services.

The last group includes two variables to control for market conditions at the time of divestment. *VarGDPpc* is the annual growth of per capita gross domestic product (GDP) in the region where the investee firm is located, in the exit year (Cumming and Johan 2008). $ExitYear_t$ are exit year dummies that take a value of 1 in the year in which the final divestment occurred (Cumming, Fleming, and Schwienbacher 2006; Brander, Du, and Hellmann 2015), and 0 otherwise, with *t* ranging from 2006 to 2023.

In Table 1, we report the description of all variables.

(INSERT TABLE 1 AROUND HERE)

Estimation method

Given the dichotomous nature of the dependent variable (successful versus unsuccessful VC exit), we estimate non-linear probit models (Johan and Zhang 2016) to test our hypotheses.[6] In our tables, we report only marginal effects, which bear the economic meaning of the results. In this way, we show by how many percentage points the probability of achieving successful exits changes when an independent variable is equal to 1. We implement all models at the portfolio firm level (one observation per portfolio firm). To test our hypotheses, we estimate our baseline model omitting either investee firms funded by FinVCFs (Model 1A) or by semi-captive VCFs (Model 1B).

[5] The classification as a high-technology firm was taken from the original data provided by SPAINCAP, as this is a question requested and audited in the data-gathering process of the annual survey.

[6] Other authors who analyze VC exits using a binary variable (e.g., Cumming and MacIntosh 2003b; Anderson, Chi, and Wang 2017), resort to logit models. Probit and logit models provide similar results, so the choice depends on the assumption regarding the probability distribution of the dependent variable, which is normal cumulative in probit and logistic in logit.

But the relationship between the type of parent investor and the characteristics of investee firms (Brander, Du, and Hellmann 2015), or the likelihood that some VCFs may be better than others in picking winners (Ke and Wang 2020), could raise endogeneity concerns. As a robustness check, we resort to instrumental variable (IV) two-stage least squares (2SLS) linear models.[7] We also repeat the estimation after conducting a resampling procedure. Moreover, we consider the number of different investor types in the ownership structure of semi-captive VCFs. Finally, we include additional analyses in which we apply alternative definitions of the dependent variable or the sample.

3.4 Descriptive statistics

In Table 2, we show that 72 out of 408 (17.65%) divested portfolio firms were classified as successful exits. As usual in Europe, none of them were divested through an IPO (Bertoni and Groh 2014; Jenkinson and Sousa 2015). The largest group is represented by firms invested by FinVCFs, with the exit success rate being 14.63%. Firms backed by semi-captive VCFs obtained a similar percentage of successful exits. In contrast, CorpVCFs achieved a 44.74% success rate (17 out of 38 exits). Furthermore, in 22 out of the 38 investees of CorpVCFs (58%), there is a similarity in the activity of the invested company and that of the parent investor, either in the same sector or in a sector with synergies. Regarding the exit pattern, 17 of the cited 22 invested companies (77%) were successful divestments. These data offer initial support for the argument that corporations are more likely to succeed due to the ability of their VC managers to share industrial knowledge and management skills with investee firms.

(INSERT TABLE 2 AROUND HERE)

In Table 3, we report sample distribution by industry, region, year of initial investment, and year of divestment. 140 firms belong to the activity sector of Information and Communication Technologies. Regarding regions, half of the sample belongs to Catalonia and Madrid, where the two main Spanish venture hubs are located. Both regions and the Basque Country also show the highest percentages of successful exits. In Panel C, we show a balanced distribution of initial investments over time. The reduced numbers in 2009 and 2010 were caused by uncertainty after the financial crisis, whereas the reduction in 2012 and 2013 was caused by the tough economic measures undertaken by government authorities to avoid an international rescue of the Spanish economy.

[7] The estimation was carried out using linear models due to the impossibility of reaching convergence with IV Probit, caused by the existence of numerous fixed effects (Brander, Du, and Hellmann 2015).

(INSERT TABLE 3 AROUND HERE)

Table 4 shows descriptive statistics of control variables. Regarding VCF characteristics at the time of the initial investment, most investors were domestic VCFs, with a scarce presence of syndicated deals at that time. However, we observe a larger percentage of successful exits in syndicated deals. With regards to the characteristics of investee firms, 82.1% of high-technology firms reach successful divestments, as well as younger and smaller firms. We also highlight that successful exits occur more often in firms located in regions with higher per capita GDP.

(INSERT TABLE 4 AROUND HERE)

Table 5 shows the correlation matrix and variance inflation factors, which allow us to discard multicollinearity concerns.

(INSERT TABLE 5 AROUND HERE)

3. Results and robustness

4.1 Results

In the first column of Table 6, we show the results for Model 1, in which the omitted variable is *FinVCF*. *CorpVCF* presents a highly significant positive marginal effect of 0.2052 (p-value<0.01), thus providing support to the prediction of the higher likelihood of CorpVCFs, compared to FinVCFs, in achieving successful exits (Hypothesis 1). This value becomes economically important when we recall the 17.65% share of successful exits in the overall sample. However, firms funded by semi-captive VCFs do not show significantly different likelihood of achieving successful exits than those funded by FinVCFs.

In the second column, we repeat the estimation of the baseline model, with *SemicapVCF* being the omitted variable.[8] Our results show that the likelihood of achieving successful exits is higher only in companies backed by CorpVCFs, as predicted in Hypothesis 2. The marginal effect of *CorpVCF* is 0.1242 (p-value<0.1). In contrast, those funded by FinVCFs do not significantly beat the success exit rate observed in semi-captive VCFs. These results do not provide any valuable evidence regarding hypothesis 3.

[8] The estimation of model 1A would allow us to indirectly test hypothesis 2 (*CorpVCF* versus *SemicapVCF*) by comparing the coefficients of the variables *CorpVCF* and *SemicapVC*F. However, we estimate model 1B, which is a variant of model 1A with the reference variable changed, to make the results more visible to readers. Nevertheless, the test of linear combination between both coefficients shows a positive significant difference (p-value<0.1) that coincides with the results of model 1B for *CorpVCF*.

(INSERT TABLE 6 AROUND HERE)

4.2 Robustness checks and additional evidence

Endogeneity

We address endogeneity concerns in our model and check the effect of changes in the definition of the dependent variable and the sample to corroborate our results. Following Brander, Du, and Hellmann (2015), the type of fund provider (e.g., corporation, or financial institution) may be related to the characteristics of investee firms because VCFs carry out a selection process based on their investment strategies. Along the same lines, Ke and Wang (2020) argue that the ownership structure of VCFs can be endogenous because some VCFs may be simply better than others when it comes to picking winners. Hence, the probit approach might neglect to take into account selection and endogeneity issues (Cumming, Grilli, and Murtinu 2017). As a consequence, the potential correlation between independent variables and the error term could bias the results.

We resort to IV 2SLS linear models, in which we include year dummies to control for the year of initial investment. In addition, for each potentially endogenous independent variable (i.e., *CorpVCF*, *FinVCF*, or *SemicapVCF*), we define as instrumental variables the natural logarithm of the amounts invested by the respective type of VCF per region and year, in the year before the initial VC investment (Source: SPAINCAP/Webcapitalriesgo). We argue that the availability of funds for each VCF type is likely to affect the probability of receiving VC funding (Brander, Du, and Hellmann 2015). We confirm that the instruments are correlated with the respective endogenous variables, whereas they are not correlated with the error term. In the lower part of Table 7, we only report the coefficients of instrumental variables, all of which are significant (complete first-stage results are available upon request). Regarding second-stage estimation results, the upper part of Table 7 reports the new coefficients of models 1A and 1B. In column 1, the coefficient of *CorpVCF* is positive and significant (p-value<0.01), thus providing further support to hypothesis 1. In column 2, we test whether firms invested by CorpVCFs and FinVCFs exhibit a higher likelihood of achieving successful exits than semi-captive VCFs. We find that CorpVCFs show a higher likelihood of exiting successfully than semi-captive VCFs, significant at the 1% level. Conversely, the same does not apply to firms funded by FinVCFs.

In addition, in columns 3 and 4 we repeat the estimation using a resampling procedure. Even though the marginal effects are identical to those of Table 6, there are important changes

in the standard errors. As a result, the marginal effects of *CorpVCF* are now significant at the 1% level not only in model 1A but also in model 1B.

We also analyze the possible effect of the number of different types of investors in semi-captive VCFs, represented by the following four types: corporations, financial entities, government agencies, and others (e.g., associations, universities, etc.). We create the variable *Semicap_Nin*v, which takes the value 0 when the VCF is not semi-captive, and the values 2, 3, and 4, respectively, when 2, 3, and 4 different types of investors are involved, none of them with a majority ownership stake. We find that 32% of semi-captive VCFs have two different types of investors, 28% have three different types, and 40% have four different types. Since this variable is highly correlated with *SemicapVCF*, we replace it with *Semicap_Ninv*. The results are presented in column 5 of Table 7. The coefficient of *Semicap_Ninv* is positive and not significant, as in the case of the variable *SemicapVCF*. Therefore, the inclusion of heterogeneity in semi-captive VCF ownership, which could lead to possible agency problems, does not alter the initial results.

(INSERT TABLE 7 AROUND HERE)

Additional analyses

In Table 8, we repeat the estimation of models 1A (Panel A) and 1B (Panel B) for different samples. In column a), we add as non-successful exits non-divested firms with a holding period exceeding ten years (20 companies). In column b), we consider all captive VC-backed firms (i.e., we add 635 divestments of firms backed by government-owned VCFs). In column c), the sample includes all firms funded by private VCFs (i.e., we add 329 divestments of firms backed by independent VCFs). In column d), we consider all divested VC-backed firms (i.e., we add 635 divestments of firms backed by government-owned and 329 divestments of firms backed by independent VCFs).

All results show similar patterns and significance levels to those reported in Table 6. In particular, in all specifications of Panel A, the marginal effects of *CorpVCF* are significant at the 1% level. Interestingly, the estimation of the model including all divested firms leads to very similar marginal effects to those reported in Table 6 for our variable of interest. As regards Panel B, the significance level of *CorpVCF* is 5% in Model 1A, in Specifications b and d, and significant at the 1% level in Specification c.

In sum, we find solid support for hypothesis 1. In contrast, we only find partial support for hypothesis 2, while no evidence is found to support hypothesis 3. Hence, only CorpVCFs show a higher likelihood of achieving successful exits than FinVCFs and semi-captive VCFs.

4. Discussion

Extant literature concentrates on the interaction between VCFs and their portfolio firms, whereas the relationship between VCFs and their fund providers is not subject to the same attention. Regarding the latter, previous studies focused on the differences between IndVCFs and CapVCFs, globally considered, or between government-backed VCFs and IndVCFs. Very few studies have looked at differences among CapVCFs. We focus on the existence of different strategic objectives across private captive VCF types, which are not always compatible with financial objectives, as well as on the motivation and experience of VC managers. In our hypotheses development, we relate those characteristics to the likelihood of achieving successful exits in different types of private CapVCFs.

As a test lab for our analyses, we focus on a highly representative sample of divestments from the Spanish VC industry, which includes observations from all VCF types.

Our results support the higher probability of achieving successful exits in CorpVCFs (20.52%), compared to FinVCFs. We argue that strategic and financial goals are more compatible in CorpVCFs than in FinVCFs. In addition, corporations seem to profit from the market and/or industry knowledge to screen and add value to entrepreneurial projects (in line with Colombo and Murtinu 2017), and the interests of VC managers are more aligned with those of parent investors. In contrast, FinVCFs seem to adhere more to strategic objectives linked to increasing the banking activity with investee firms (Tykvová 2006; Murtinu and Johan 2018; Hellmann, Lindsey, and Puri 2008).

Our results also show that CorpVCFs exhibit a higher likelihood of achieving successful exits (12.42%) than semi-captive VCFs. It looks as if the potential market and industry knowledge provided by some of the fund providers in the latter does not compensate for the existence of coordination problems and the lower capacity to control and incentivize VC managers. Conversely, FinVCFs do not show a higher likelihood of achieving successful divestments than semi-captive VCFs. It seems that the control parent investors may impose on VC managers when compared to semi-captive VCFs, does not compensate for their lack of industry and technology knowledge.

These findings comparing private CapVCFs and semi-captive VCFs are new in the literature and complement the comparison between IndVCFs and CapVCFs, which was extensively analyzed.

Implications

As regards the implications for parent investors, they should critically analyze whether creating a CapVCF is sustainable in the long run or not. Strategic goals should at least be compatible with financial goals, and the management team appointed should have experience and proper incentives. Both aspects are crucial for the vehicle to survive and reach strategic goals without risking the capital committed by the parent investor.

In this regard, it seems that corporations are better able to profit from a VC vehicle than financial institutions. Financial institutions now only show a (decreasing) 5% share of total commitments to VC vehicles (Invest Europe 2023), which is more than five times lower than the share they had three decades ago. In addition to the potential problems highlighted in this paper, under Basilea III proceedings, financial institutions are penalized if they allocate money to risky equity investments. Financial institutions are switching to a model whereby they create feeder funds to attract money from their customers to allocate it to IndVCFs, thus just playing the role of financial intermediary.

For practitioners, VC managers should also pay attention to the compatibility between the parent investor's strategic and financial goals to avoid putting at risk their reputation in the VC industry.

Limitations and avenues for future research

The main limitation of our work is the assumption, conditioned by the lack of information about returns achieved in each divestment, that IPOs and trade sales always represent successful exits. Second, we may cite the geographical focus in one country, which at least allows us to avoid country-specific differences in our sample. A third limitation is the lack of more specific information about the strategic goals and the process of selection of the managers of private CapVCs.

For future research, it would be interesting to further analyze the compatibility between strategic and financial goals, as well as the characteristics and incentives of the management team in CorpVCFs. It would also be interesting to extend this research to a wider group of European countries, complementing the information collected in this work with a hand-collected survey about the characteristics of management teams appointed by parent investors

and the nature of strategic goals in CapVCs. In addition, there is room to analyze the impact of the characteristics of the investors involved in semi-captive VCFs on performance.

5. Conclusion

In this work, we argue that the likelihood of achieving successful exits in investee firms depends on the relationship between VCFs and the providers of funds. We highlight problems regarding how parent investors appoint and incentivize VC managers in FinVCFs and in semi-captive VCFs, as well as the existence of strategic goals that may not be compatible with the main goal of maximizing portfolio return. These problems lead to a lower likelihood of exiting successfully in FinVCs and semi-captive VCFs when compared to CorpVCFs.

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Tables

Table 1. Variable definitions

Variable name	Definition of variable
Dependent variable	
Success	Dummy =1 if the investee firm was divested via IPO, trade sale or sale to other VCF, and 0 otherwise (buyback, write-off, and other).
Independent variables	
CorpVCF	Dummy =1 if the VCF is wholly owned by a corporation, and 0 otherwise.
FinVCF	Dummy =1 if the VCF is wholly owned by a financial institution, and 0 otherwise.
SemicapVCF	Dummy =1 if the VCF is jointly backed by several corporations, financial institutions and/or other entities, and 0 otherwise.
Control variables	
Syndicated	Dummy =1 if more than one VCF participates in the first round, and 0 otherwise.
VCFsize	Concerning the year of the first VC round, it is the natural logarithm of the average amount of funds raised by the lead VCF in the previous five years.
Stage1	Dummy =1 if the investee firm received the initial investment at the seed stage, and 0 otherwise.
Stage2	Dummy =1 if the investee firm received the initial investment at the start-up stage, and 0 otherwise.
Stage3	Dummy =1 if the investee firm received the initial investment at other early stages, and 0 otherwise.
Stage4	Dummy =1 if the investee firm received the initial investment at the later VC stage, and 0 otherwise.
HighTech	Dummy = 1 if the investee firm was classified as a high-technology firm in the annual survey data collection process carried out by Webcapitalriesgo on behalf of SPAINCAP and Invest Europe, and 0 otherwise.
Tangibility	Quotient between tangible and total assets in the year of the first VC investment.
FirmSize	Natural logarithm of 1 plus total assets of investee firm, in the year of the first VC investment.
FirmAge	Natural logarithm of 1 plus the number of years, the investee firm was in existence, in the year of the initial VC investment.
VarGDP	Percentage variation of GDP per capita in the region where the investee firm is located, in the exit year.
Exit year	Dummy=1 for each year from 2006 to 2023.
Industrial activity	Dummy=1 for each industrial activity: Primary & Utilities, Manufacturing, Pharma & Other R&D, Commerce, ICT, and Other services, and 0 otherwise.
Region	Dummy=1 for each Spanish region (17).

Table 2. Divested firms by type of private captive VCF

	Nº invested firms	% over total firms	Nº success	Nº non-success	% success over nº firms	Chi^2 test success vs. non-success
CorpVCF	38	9.31	17	21	44.74	21.1593***
FinVCF	202	49.51	29	173	14.63	2.9809*
SemicapVCF	168	41.18	26	142	15.48	0.9261
Totals	408	100	72		17.65	

CorpVFC: VCF is wholly owned by a corporation. *FinVFC*: VCF is wholly owned by a financial institution. *SemicapVCF*: VCF is jointly backed by several entities, which could be corporations, financial institutions, and government agencies, among others, none of which holds a majority stake.
***, **, * indicate significance levels of <1, <5, and <10%, respectively.

Source: Own elaboration, based on data from SPAINCAP, Webcapitalriesgo, and Orbis.

Table 3. Sample distribution and success rate by industry, region, and exit year

Panel A. Sample distribution and success rate by industry

	Industry	Nº firms	% firms	Nº successful exits	% successful exits	Success rate by industry (%)
1	Primary & utilities	57	13.97	14	19.44	24.56
2	Manufacturing	54	13.24	6	8.33	11.11
3	Pharma & other R&D	14	3.43	1	1.39	7.14
4	Commerce	47	11.52	5	6.94	10.64
5	Information and Communication Technologies	140	34.31	31	43.06	22.14
6	Other services	96	23.53	15	20.83	15.63
	Total	408	100.00	72	100.00	Avg.: 15.20

Panel B. Sample distribution and success rate by region

	Region	Nº firms	% firms	Nº successful exits	% successful exits	Success rate by region (%)
1	Andalusia	29	7.11	2	2.78	6.90
2	Aragon	10	2.45	1	1.39	10.00
3	Asturias	25	6.13	3	4.17	12.00
4	Balearic islands	5	1.23	1	1.39	20.00
5	Canary Islands	1	0.25	0	0.00	0.00
6	Cantabria	2	0.49	0	0.00	0.00
7	Castile-La Mancha	3	0.74	0	0.00	0.00
8	Castile-León	11	2.70	1	1.39	9.09
9	Catalonia	127	31.13	31	43.06	24.41
10	Valencian Community	37	9.07	6	8.33	16.22
11	Extremadura	8	1.96	0	0.00	0.00
12	Galicia	35	8.58	2	2.78	5.71
13	La Rioja	3	0.74	0	0.00	0.00
14	Madrid	77	18.87	19	26.39	24.68
15	Murcia	6	1.47	0	0.00	0.00
16	Navarre	21	5.15	4	5.56	19.05
17	Basque country	8	1.96	2	2.78	25.00
	Total	408	100.00	72	100.00	Avg.: 10.18

Panel C. Sample distribution by investment and exit year, and success rate by exit year

	Investment year		Exit year				
Year	**Nº invested firms**	**% invested firms**	**Nº divested firms**	**% divested firms**	**Nº successful exits**	**% successful exits**	**% success exit over nº divested**
2005	19	4.66	0	0.00	0	0.00	0.00
2006	44	10.78	2	0.49	0	0.00	0.00
2007	42	10.29	3	0.74	2	2.78	66.67
2008	48	11.76	11	2.7	0	0.00	0.00
2009	25	6.13	12	2.94	1	1.39	8.33
2010	23	5.64	22	5.39	6	8.33	27.27
2011	47	11.52	25	6.13	3	4.17	12.00
2012	25	6.13	32	7.84	5	6.94	15.62
2013	26	6.37	33	8.09	8	11.11	24.24
2014	44	10.78	26	6.37	0	0.00	0.00
2015	33	8.09	42	10.29	4	5.56	9.52
2016	32	7.84	33	8.09	6	8.33	18.18
2017			29	7.11	3	4.17	10.34
2018	-	-	51	12.5	10	13.89	19.61
2019	-	-	25	6.13	7	9.72	28.00
2020	-	-	24	5.88	8	11.11	33.33
2021	-	-	18	4.41	5	6.94	27.77
2022	-	-	20	4.90	4	5.56	20.00
Totals	408	100.00	408	100.00	72	100.00	Avg.: 17.83

Source: Own elaboration, based on data from SPAINCAP, Webcapitalriesgo, and Orbis.

Table 4. Descriptive statistics of control variables

Variable	All firms	Success	Non-success	Test
Syndicated	0.1225	0.2917	0.0863	23.2540***
VCFsize	7.2231	7.1045	7.2485	0.3645
Stage1	0.5319	0.4306	0.5536	3.6038*
Stage2	0.3211	0.3889	0.3065	1.8442
Stage3	0.0809	0.0556	0.0863	0.7544
Stage4	0.0662	0.1250	0.0536	4.8954**
HighTech	0.7549	0.8472	0.7351	4.0273**
Tangibility	0.1017	0.0919	0.1038	0.4822
FirmSize	6.8986	8.1584	6.6286	-6.0781***
FirmAge	0.8684	0.8008	0.8829	0.9201
VarGDPpc	0.6816	0.2388	0.7765	1.1235

All variables are described in Table 1.
Tests: Chi2 for dummies and T-test for continuous variables.
***, **, * indicate significance levels of <1, <5, and <10%, respectively.

Source: Own elaboration, based on data from SPAINCAP, Webcapitalriesgo, and Orbis.

Table 5. Correlation matrix and variance inflation factor(VIF)

Panel A. Correlation matrix

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Success	1												
2.CorpVCF	0.228***	1											
3.FinVCF	-0.086*	-0.317***	1										
4.SemicapVCF	-0.048	-0.268***	-0.829***	1									
5. Syndicated	0.239***	0.060	-0.071	0.037	1								
6.VCFsize	-0.018	0.002	0.498***	-0.500***	-0.030	1							
7.Stage2	0.067	0.051	-0.146***	0.118**	0.015	-0.162***	1						
8.Stage3	-0.043	0.091*	-0.168***	0.117**	0.081	-0.105**	-0.204***	1					
9.Stage4	0.110**	0.152***	-0.066	-0.022	0.051	-0.005	-0.183***	-0.079	1				
10.HighTech	0.099**	-0.072	0.108**	-0.067	0.091*	0.120**	-0.170***	-0.165***	-0.078	1			
11. Tangibility	-0.024	0.001	-0.188	0.191***	-0.038	-0.148***	0.106**	0.045	0.065	-0.284***	1		
12.FirmSize	0.289***	0.102**	0.018	-0.078	0.144***	0.071	0.141***	0.068	0.108	-0.076	0.159***	1	
13.FirmAge	-0.046	-0.127***	0.164***	-0.091*	-0.016	0.178***	0.036	0.097	0.017	0.019	0.016	0.093*	1
14.VarGDPpc	-0.056	-0.034	0.004	0.015	0.050	-0.041	0.008	0.048	-0.099	0.065	-0.013	-0.031	0.049

Panel B. Variance Inflation Factor (VIF)

Variable	2	3	4	5	6	7	8	9	10	11	12	13	14
Model 1A	1.22	-	1.57	1.06	1.45	1.28	1.24	1.15	1.20	1.16	1.13	1.11	1.02
Model 1B	1.22	1.62	-	1.06	1.45	1.28	1.24	1.15	1.20	1.16	1.13	1.11	1.02

All variables are described in Table 1

***, **, * indicate significance levels of <1, <5, and <10%, respectively.

Table 6. Regression results in the likelihood of reaching successful exits

	Model 1A	**Model 1B**
	ME (SE)	ME (SE)
CorpVCF	0.2052***	0.1242*
	(0.0985)	(0.0868)
FinVCF	Reference	-0.0402
		(0.0376)
SemicapVCF	0.0418	Reference
	(0.0404)	
Syndicated	0.1779***	
	(0.0723)	
VCFsize	-0.0115**	
	(0.0057)	
Stage2	0.0003	
	(0.0316)	
Stage3	-0.0758***	
	(0.0212)	
Stage4	0.1053	
	(0.0960)	
HighTech	0.0509*	
	(0.0279)	
Tangibility	0.0575	
	(0.0776)	
FirmSize	0.0425***	
	(0.0080)	
FirmAge	-0.0318	
	(0.0192)	
VarGDPpc	0.0663***	
	(0.0205)	
Industry	Yes	
Region	Yes	
ExitYear	Yes	
Nº Observations	408	
Pseudo R^2	0.3390	
Log-likelihood	-125.6790	

Estimation method: probit. ME: marginal effects. Dependent variable: *SuccessExit*, dummy =1 if the investee firm was divested via IPO, trade sale, or sale to other VCFs, and 0 otherwise. All variables are described in Table 1. The results of the control variables coincide in the estimation of models 1A and 1B (i.e., the same model with a different reference variable)

***, **, * indicate significance levels of <1, <5, and <10%, respectively.

Table 7. Regression results on the likelihood of reaching successful exits: Robustness checks

	(1)	(2)	(3)	(4)	(5)
	Re-estimation model 1A	Re-estimation model 1B	Re-estimation model 1A	Re-estimation model 1B	Re-estimation model 1A
	B (SE)	B (SE)	ME (SE)	ME (SE)	ME (SE)
	2SLS Second stage	2SLS Second stage	Resampling	Resampling	Probit
CorpVCF	0.2868*** (0.0890)	0.1894*** (0.0971)	0.2052*** (0.0286)	0.1242*** (0.0450)	0.2228*** (0.1056)
FinVCF	Reference	-0.0928 (0.0618)	Reference	-0.0402 (0.0765)	Reference
SemicapVCF	0.1059 (0.0657)	Reference	0.0418 (0.0552)	Reference	-
Semicap_Ninv	-	-	-	-	0.0183 (0.0154)
Controls	Yes	Yes	Yes	Yes	Yes
	Instruments 1st stage	Instruments 1st stage	-	-	-
FundInv_CorpVCF	0.1157*** (0.0044)	0.1120*** (0.0046)	-	-	-
FundInv_FinVCF	-	0.1140*** (0.0030)	-	-	-
FundInv_SemicapVCF	0.0993*** (0.0765)	-	-	-	-
Nº Observations	408	408	408	408	408
Pseudo R^2	0.1305	0.1316	0.3390	0.3390	0.3040
Log-Likelihood	-	-	-125.6790	-125.6790	-132.3208
Root MSE	0.3559	0.3557	-	-	

Estimation method: 2SLS (IVreg) in specifications 1 and 2; Probit with resampling (bootstrap) in specifications 3 and 4. Dependent variable: *SuccessExit*, dummy =1 if the investee firm was divested via IPO, trade sale or sale to other VCFs, and 0 otherwise. *FundInv:* logarithm of the amounts invested by the respective type of VCF per region and year, in the previous year of the initial VC investment. In column 5, the variable *SemicapVC* is replaced by *Semicap_Ninv*. Semicap_Ninv: takes the value 0 when the VCF is not semi-captive, and the values 2, 3, 4, respectively, when 2, 3 and 4 different types of investors are involved. The remaining variables are described in Table 1. All variables in specifications 1 and 2 are referred to the year of the initial investment. Root MSE: mean square error.

***, **, * indicate significance levels of <1, <5, and <10%, respectively.

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Table 8. Regression results on the likelihood of reaching successful exits: Additional analyses

	(a)	(b)	(c)	(d)
	ME (SE)	ME (SE)	ME (SE)	ME (SE)
Sample	**With some non-exited as failures**	**Including GovVCFs**	**Including IndVCFs**	**Including all divested firms**
Panel A. Re-estimation of model 1A. (Omitted: FinVCF)				
	Model 1A_a	Model 1A_b	Model 1A_c	Model 1A_d
CorpVCF	0.1947***	0.1434***	0.3101***	0.2131***
	(0.0953)	(0.0718)	(0.1061)	(0.892)
SemicapVCF	0.0466	0.0322	0.0596	0.0426
	(0.0388)	(0.0299)	(0.0686)	(0.0426)
GovVCF	-	-0.0147***	-	-0.0357
		(0.0213)		(0.0304)
IndVCF	-	-	0.1714***	0.1198***
			(0.0497)	(0.0392)
Others controls	Yes	Yes	Yes	Yes
N. Obs.	428	973	670	1,235
Pseudo R^2	0.3324	0.2662	0.3329	0.3490
Log-Likelihood	-129.4610	-230.0121	-262.0811	-363.4547
Panel B. Re-estimation of model 1B. (Omitted: SemicapVCF)				
	Model 1B_a	Model 1B_b	Model 1B_c	Model 1B_d
CorpVCF	0.1050*	0.0797**	0.2280***	0.1366**
	(0.0805)	(0.0561)	(0.1083)	(0.0787)
FinVCF	-0.0446	-0.0244	-0.0548	-0.0338
	(0.0357)	(0.0175)	(0.0581)	(0.0270)
GovVCF	-	-0.0451**	-	-0.0725**
		(0.0211)		(0.0275)
IndVCF	-	-	0.1095***	0.0360**
			(0.0575)	(0.0383)
Others controls	Yes	Yes	Yes	Yes
N. Obs.	428	973	670	1,235
Pseudo R^2	0.3240	0.2662	0.3329	0.3490
Log-Likelihood	-129.4610	-230.0121	-262.0811	-363.4547

Estimation method: Probit models. ME: Marginal effects. Dependent variable: *SuccessExit*, Dummy =1 if the investee firm was divested via IPO, trade sale, or sale to other VCF, and 0 otherwise. Control variables: All variables included in Table 6 are considered, but not reported here for the sake of brevity. *GovVCF*: Dummy =1 if the lead investor is a VCF backed by government agencies, and 0 otherwise. *IndVCF*: Dummy =1 if the lead investor is an independent VCF, and 0 otherwise. Model 'a' includes as a failure non-divested firms with a holding period exceeding 10 years. Model 'b' includes all divested captive VC-backed firms. Model 'c' includes all divested private VC-backed firms. Model 'd' includes all firms divested by all VCF types.
***, **, * indicate significance levels of <1, <5, and <10%, respectively.