Early Individual Stakeholders, First Venture Capital Investment, and Exit in the UK Startup Ecosystem

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Abstract

We analyze the effects of the pre-institutional individual stakeholders on the eventual success of the startups. We show that the quantity and experience of founding and non-founding directors and other individual investors affect the startup's type of, and value at, exit. While for founding and non-founding directors it is the number, for the other individual investors it is the presence of experienced business angels that significantly influences success. We also report indirect effects of the same pre-institutional individual stakeholder attributes on success. Indeed, they also affect the characteristics of the first venture capital investors, which in turn influence success.

JEL Classification numbers: M13, G32, G24

Keywords: startups, venture capital, founders, individual investors

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1 Introduction

Startups are a major source of innovation and technological development and thus key drivers of economic growth. Undoubtedly, the early stages of the startup, particularly before the introduction of venture capital (VC) investment, are crucial. In this "pre-institutional" period, the individual stakeholders, i.e., founders, directors and other individual investors, including the business angels (BA), play a paramount role.[1] Still, and despite of their importance, we have very little systematic evidence on the relevance and differential influence of the individual stakeholders in the early stages of the startups.

This paper investigates, making use of a novel dataset of UK-based startups, the effects of the pre-institutional individual stakeholders on the eventual success of VC-backed startups, both directly as well as indirectly through their effects on the characteristics of the institutional VC investors. We show in particular that the quantity, as a proxy for diversity, and experience of founding and non-founding directors and other individual investors affect the startup's type of, and value at, exit. But, while for founding and non-founding directors it is the number, for the other individual investors it is the experience of BA investors that has a significant influence on success, particularly, through an increase in the likelihood of exit by acquisition. We also distinguish between direct and indirect effects. We find that the diversity and experience of the early individual stakeholders also affect the characteristics of the first-VC investment, in terms of type, quantity and quality of the first-VC investors, which in turn influence startup success. We show that most (but not all) of these indirect effects pull in the same direction as the direct ones, and are thus complementary.

To determine and compare the influence of each type of stakeholder, we consider the effects of two comparable characteristics of each stakeholder group: size and experience. Team size is often used as a proxy for team diversity (Wuyts et al., 2005) whereas experience is often considered a proxy for team "quality" and thus a measure of vertical rather than horizontal differentiation. We argue that the size of the teams of founders and non-founding directors, and thus their diversity of knowledge and skills, have a positive direct impact on startup success. We expect the number of individual investors to be

[1] The investments of non-founding individuals and the importance of the business angels (BA) appear to be growing over time everywhere. Estimates suggest that the total size of BA investment has long surpassed VC investment in the US and increasingly in some other countries as well (Lerner et al. 2018).

less important, as their contribution is in financial rather than in human capital. Their experience as investors should be more relevant, instead. In terms of indirect effects, we argue that return-driven Independent VCs (IVCs) are more sensible to the individual stakeholder characteristics than other types of VCs such as Corporate VCs (CVCs). Hence, we expect that the traits that lead directly to success may also be more conductive to IVC investment, which in turn is also more likely to lead to startup success.

So far there exists very little systematic information and data about the individual stakeholders of the startups. This is for at least two reasons. First, individuals (e.g., BAs) may be reluctant to reveal their identity and share information about their activities, both for strategic reasons as well as to avoid personal exposure (Kaplan and Lerner, 2016). Investments made on an individual basis are often not subject to regulatory disclosure requirements (e.g., in the US). Second, most databases on startups, such as VentureXpert (VX) and Venture Source, emanate from surveys of venture capital firms (Da Rin et al., 2013). As a result, they contain relatively good information about the VCs and their investments but they possess much less information about individual investors, founders or directors, particularly before the introduction of VC investment.[2]

To analyse the relevance of the individual stakeholders in the startup ecosystem, we have created a novel, comprehensive dataset of UK-based VC-backed startups, with extensive information on ownership, control and valuation. In contrast to many other countries (e.g., the US), the UK requires all private companies -even the very small ones- to submit mandatory filings to Companies House (CH), the registrar of companies.[3] Among others, each company has to fill extensive details on the identities of its shareholders and directors, and, prior to 2009, extensive details on share issuances, including the *allottees* and the share price, which determines the valuation of the startup.

Our sampling strategy consists in selecting, from the entire universe of companies in the UK, all those that received first VC-investment between 1999 and 2005 (according to VX). We then obtained, from this sample of VC-backed startups, all their available

[2] A few papers (e.g., Hellmann and Puri, 2000; Hsu, 2004) also use hand-collected data, mostly through surveys or proprietary databases. However, the scope of some of these studies may be limited by the size of the sample and the private source of the data makes the analysis difficult to replicate.

[3] As ackowledged by Kaplan and Lerner (2016), VCs are typically not required to submit much information to the United States Securities and Exchange Commission or other regulators, after the Investment Company Act of 1940.

information in CH from incorporation until up to 5 years after first VC-investment. To the best of our knowledge, our database will be the first that includes a wide sample of VC-backed start-ups in any country that has information on the identity of all the shareholders and directors at each point in time and on the number and value of the shares owned by each shareholder at each point in time. Moreover, given the legal nature of the source documents, the information we collected should be more accurate than that obtained through surveys, which is the usual source of information of most of the existing startup databases (Da Rin et al., 2013).

Our database provides, first, descriptive evidence about the relevance of the individual stakeholders in startups. Individuals, despite accounting for only 11% of the total investment, represent 84% of the body of startup investors, while institutions account for 81% of the investment but only 11% of the number of investors. We show that the different types of individual stakeholders also differ in terms of number and investment. In terms of institutional investors, our database includes, in addition to IVCs and CVCs, as most databases, less structured and organised institutional investors, such as corporate venture investors (CVIs) and organisation venture capitalists (OVCs). We define CVIs and OVCs as companies that invest in startups without the structure of a formal venture capital fund, and not-for-profit/government institutions, respectively. CVIs represent an important part of the number of institutional investors (29%) although they account only for 4% of their total investment.

In terms of startup exit, about 39% of the companies in our database can be considered "successful," defined, following prior literature, as exiting in the form of an Initial Public Offering (IPO) or a Merger and Acquisition (M&A) (6% and 33%, respectively), whereas the rest end up dissolved or remain "active" without exit (44% and 17%, respectively). Despite of the significant differences in terms of final valuation, the average investment and valuation at first-VC investment do not differ significantly between eventually successful and unsuccessful ventures. Given that we use legally-binding data, we can also assess the accurateness of the attributions of exit routes, as well as of institutional investments, performed by the standard VX database. Not surprisingly, the most inaccurate assignment in the VX database is the "active" category. Instead, the classifications of the firms exiting through IPOs and those ending dissolved are the most accurate, in the sense that those classified as such are indeed actual IPOs and dissolutions, respectively.

Our regression results show how the characteristics of the startup's early individual stakeholders, i.e., founders, non-founding directors and other individual investors, affect the likelihood that VC-backed startup exits through an IPO or an M&A. Success is more likely in startups that have had larger founding teams, appointed greater number of non-founding directors, and included experienced BAs among its investors before first-VC investment. Diversity, thus, seems to be important for management, whereas experience is especially important for the non-managing investors. Decomposing the effects on IPOs and M&As, we show that the characteristics of the early individual stakeholders affect the likelihood of M&A significantly more than the one of IPO. Still, the same three startup features positively affect startup valuation at 3 and 5 years since first-VC investment, and startup final valuation, whenever it occurred.

We find that the quantity and experience of the early individual stakeholders also affect the characteristics of the first-VC investment, in terms of type, quantity and quality of the first-VC investors (IVC vs CVC, OVC and CVI, number of VCs and top vs non-top VCs). We show for instance that startups with larger and thus more diverse founding and non-founding directors are more likely to have IVCs as first-VC investors. The presence of an experienced BA investor makes it more likely that the startup will have an IVC but less likely that it will have a CVC. As the individual stakeholders affect the characteristics of the first-VC investment, there are not only direct but also indirect effects on success. Indeed, the diversity of the founders and non-founding directors, as well as the presence of a seasoned BA investor, make it more likely that the startup will have an IVC at first-VC investment, and the presence of an IVC increases the likelihood of IPO or M&A. We show that most but not all these indirect effects pull in the same direction as the direct ones, and complement the direct effects of the early individual stakeholders on the success of the startup.

Our success regressions treat the characteristics of the first-VC investment as pre-determined at exit date. Thus, our effects should be interpreted with caution. Our regressions, though, control for many of the pre-institutional determinants of first-VC investment. Moreover, the average investment and valuation at first-VC investment are not significantly different between eventually successful and unsuccessful ventures, despite exhibiting significant differences at exit. The pre-institutional characteristics are not correlated with the size of first-VC investment either, despite of being correlated with the

type, quantity and quality of the first VC-investors.

Our paper contributes, first, to the scant literature that studies the effects of the pre-institutional stakeholders on the startups' eventual success. Few papers have studied, let alone compared, the effects of the diversity and experience of the startup's set of founders, non-founding directors and other early individual investors and BAs. Among the few exceptions, Gompers et al. (2010) compares the success outcomes of serial entrepreneurs with those that are entrepreneurs for the first time. There are a few papers that study the effects of size of the founding team, but they mostly use very small samples (Cooper and Bruno, 1977; Roure and Madique, 1986). Finally, some papers have analysed the success results of firms that received BA funding (Kerr et al. 2014a; Lerner et al., 2018)

Our paper also contributes to the literature that studies the influence of the individual stakeholders on the type of VC financing. Previously, this has been studied, to our knowledge, only by Sørensen (2007).[4] As Sørensen (2007), we do not address the question of which startups obtain VC financing, but we investigate the characteristics of the individual stakeholders that make a VC-backed startup more likely to receive financing by particular types of VCs than others. Several studies have investigated the likelihood of receiving VC funding, and in particular the effects of the presence of BA investors on the likelihood of obtaining VC funding.[5] However, we know very little on the characteristics of the startups that lead, for instance, to CVC instead of IVC financing, that appeal to top VCs, or that attract large VC syndicates. Also, we have little information about the influence of the startup characteristics on the amount of the first VC investment.

Finally, our paper also contributes to the literature that studies the influence of the characteristics of the VC firms on the performance of the startups they finance. The positive influence of the presence of institutional investors on startup performance is well documented (see, for instance, Giot and Schwienbacher, 2007; Chemmanur et al., 2011; Puri and Zarutskie, 2012; Bertoni and Tykvová, 2015). However, how the specific characteristics of these VCs affect the venture success is much less well understood. The

[4]Sørensen (2007) uses a structural model based on the two-sided matching model to separate the effects of funding by an experienced VC due to sorting from those due to its differential added value.

[5]Lerner et al. (2018) and Lindsey and Stein (2018) suggest the existence of complementarities between the two sources of financing. Kerr et al. (2014a) find no significant effects while Hellmann et al. (2017) find a substitute pattern between BAs and VCs. Other studies on the likelihood of receiving VC funding include MacMillan et al. (1985), Shane and Stuart (2002), Hsu (2007) and Beckman et al. (2007).

issue that has received the most attention is the difference between CVCs and IVCs (see e.g., Dushnitsky and Lenox, 2006; Hellmann et al., 2008). A few other papers have studied the effect of VC syndication on the startups (Brander et al., 2002; Cumming and Walz, 2010; Chahine et al., 2012). Very few papers have studied the consequences of other characteristics of the VC investment. For instance, we know very little, except for Sørensen (2007), on the consequences of receiving investments from top VCs.

The rest of the paper is organized as follows. Section 2 presents the theoretical framework. Section 3 describes our unique database. Section 4 provides details on the definition of the variables. Section 5 presents the results. Section 6 concludes.

2 Theoretical framework

This section provides, first, a conceptual analysis of the influence of the three types of pre-institutional individual stakeholders (founders, non-founding directors and individual investors). Second, after analysing the direct effects, we consider the indirect effects of the individual stakeholders on success, via the characteristics of the institutional investors. Finally, we argue that the individuals and institutional investors may affect, not only the likelihood of success, but also the form of success of VC-backed startups.

2.1 Individuals and startup success

We describe the role and involvement of the three types of pre-institutional stakeholders in startups and provide an analysis of their (direct) influence in startup success. We focus on the effects of size, as a proxy for team diversity (Wuyts et al., 2005) and experience, as a measure of team quality, representing horizontal and vertical characteristics, respectively. As the arguments are similar, we provide the analysis of the founding and non-founding directors together.

2.1.1 Founding and non-founding directors

According to survey evidence of VCs (Gompers et al., 2020), the founding team is the single most important determinant of startup outcomes, both for successes (96% of respondents) and failures (92%). Certainly, the founding teams need to develop the strategy,

build the startup team, set goals and monitor progress. Similarly, non-founding directors provide additional knowledge and expertise to the initial founding team.

Team size is a characteristic of the founding and non-founding teams of directors that can greatly affect startup success. Indeed, startups are highly uncertain businesses, which need to combine different views and perspectives to understand, as much as possible, the business challenges and the environment. The startup capabilities are closely related to the knowledge and skills of their founders and directors. Large teams of founders allow for a more diverse expertise. In small samples, successful startups have already been shown to have larger, more complete, founding teams (Cooper and Bruno, 1977; Roure and Madique, 1986). Relatedly, Colombo and Grilli (2005) find that the number of founders, again as a proxy of heterogeneity, positively affects startup growth.[6]

Prior industry experience has been considered an important factor of survival and success in sociological studies, because it yields knowledge about niches (see, for instance, Brüderl et al., 1992). Management studies also consider the founders' previous experience and knowledge an important characteristic (Cohen and Levinthal, 1990). Success is argued to come after a history of investments, prior partners and past organizational decisions. Colombo and Grilli (2005), for instance, find that founders' prior entrepreneurial experience positively affects startup growth.

However, Gompers et al. (2010) finds that previously unsuccessful serial entrepreneurs have similar odds than those who are entrepreneurs for the first time. Only the entrepreneurs with previous positive achievements are more likely to succeed (see also Cooper and Bruno, 1977; Van de Ven et al., 1984). Thus, while we can expect that the size of the teams of founders and non-founding directors will have a positive direct impact on startup success, the effect of their experience is less clear.

2.1.2 Individual investors and BAs

Individual investors provide financial backing to the startups, to help the business get off the ground and/or support and carry the company through the difficult early stages. BAs are a particular type of individual investor. A BA is a seasoned individual investor, often

[6] In the management literature, some studies find a positive effect of the number of founders (Eisenhardt and Schoonhoven, 1990) while others fail to detect a significant relationship (see, for instance, Brüderl and Preisendörfer, 2000).

with high net-worth and with business experience, who directly invests part of his/her money in startups.

Involving experienced individual investors, BAs, should have positive effects for the startups. As Lerner et al. (2018) point out, BAs undertake intensive due diligence of potential investments and serve as mentors for the startups they finance. Using confidential records from two prominent US BA investment groups during the 2001-2006 period, Kerr et al. (2014a) find that firms that received BA funding are more successful overall: they are more likely to survive for at least four years and to have a successful exit. Similar results are found in Lerner et al. (2018) using data of investments by BA groups across a heterogeneous set of 21 countries. Goldfarb et al. (2013), on the other hand, finds that mixing BAs and VCs may have a negative effect on startup performance: for startups where the deals are larger, being financed only by VCs increases the likelihood of success compared to receiving financing from at least one BA.

The number of individual investors has a less clear effect on success. True, some papers have found that the number of another type of investor, the VC, has a positive effect on success (Brander et al., 2002; Cumming and Waltz, 2010). But the involvement of the individual investors, especially those that are not BAs, should be much smaller than that of the VCs (and of the founding and non-founding directors). As long as their main contribution to the startup is financial, whether the money comes from a small or a large set of investors should not be very important. Therefore we do not expect a large effect of the number of individual investors on success, whereas we can anticipate a positive effect of the existence of seasoned BA funding.

2.2 Indirect effects on success

So far we have analysed the *direct* influence of the three types of pre-institutional individual stakeholders on success of VC-backed startups. The individual stakeholders, though, may also affect success *indirectly*, via the characteristics of the institutional investors (Colombo and Grilli, 2010). Indeed, the number and experience of founders, non-founding directors and individual investors may affect the type, quantity and quality of the first-VC investors, as well as the characteristics of the transaction, which in turn have a differential influence on startup success. We now discuss each of these two steps in turn.

2.2.1 Individuals and institutional investment

The characteristics of the management/founding team have a strong influence on the VCs' selection decisions (Gompers et al., 2020). As experimentation is especially important at the earliest stages of the firm, human assets are the critical resource that differentiates one start-up from another (Kerr et al., 2014b; Manso, 2016). Surveys of VC investors (MacMillan et al., 1985) suggest that the founders' prior experience is an important selection criteria for VCs (Hsu, 2007; Beckman et al., 2007). Shane and Stuart (2002) show that founders with previous relationships with VC investors are more likely to receive VC funding. Bernstein et al. (2017) find that investors, and in particular experienced VC investors, are highly responsive to information about the founding team.

The pre-institutional characteristics of a startup influence not only whether it receives VC funding but, in case it does, also the type and the quantity and quality of the VC investors. Consider for instance the difference between IVC and CVC and OVC investment. CVC funds are said to care, not only about monetary returns, but also about strategic returns, such as the development of related businesses (Dushnitsky and Lenox, 2006; Hellmann et al., 2008). Therefore, the technological features of the startup should have a larger weight in their decision than for IVCs. Similarly, OVCs may invest in startups for reasons other than financial, like supporting the local businesses. This suggests that IVCs may be more sensible to the individual characteristics of the founding and management teams than other VCs. Hence, we expect that the traits that lead to success (the size of the founding and management teams and the presence of BAs) may also be more conductive to IVC instead of CVC or OVC investment.

Other features of the pre-institutional characteristics may be affecting the first VC investment. Because of the personal contacts, a larger number of individual investors may help attracting a larger number of VCs, i.e., it is more likely that there is VC syndication. In terms of the size of the first VC investment, Conti et al. (2013) find that, while the money committed by the very initial investors has a positive influence on future BA investment, it has no effect on VC investment. Hence, we do not expect the individuals' investment before the first VC investment to influence the VCs' investment.

2.2.2 Institutional investment and startup success

As pointed out in the Introduction, the influence of institutional investors on startup success is well established in previous literature. Despite being much less studied, the type, quality and number of VCs also affect the likelihood of success.

The presence of particular type of startup investors, such as CVCs, may have implications about the startup outcome. CVC funds provide relatively more of the non-financial resources (Riyanto and Schwienbacher, 2006; Chemmanur et al., 2014) and this may affect the probability of success of the startups that they finance. Dushnitsky and Shapira (2010), for instance, show that CVC investors exhibit significantly better performance, as measured by the rate of successful portfolio exits, as compared to IVC funds.

The number of institutional investors may also affect startup success. Syndication of VCs in startups is common, even at the first-round of investments (Lerner, 1994). Brander et al. (2002) and Cumming and Walz (2010) show that syndicated investment have higher returns than standalone investments, thereby suggesting that VCs add managerial value to the startup. Still, VC syndication may also result in conflicts of interest among VC syndicate members (Chahine et al., 2012).

2.3 Different types of success: IPO vs. M&A

Startup success is defined, following prior literature, as exiting in the form of IPO or M&A. Individuals and institutional investors may affect, not only the likelihood of success, but also the form of success of VC-backed startups.

Because of the differences in the type of support they provide to the ventures, several authors have argued that the likelihood of IPO exit may be lower than acquisition in the presence of CVC funding (Hellmann, 2002; Riyanto and Schwienbacher, 2006). While Cumming (2008) and Kim and Park (2017) confirm this intuition, Gompers and Lerner (2000) and Chemmanur and Loutskina (2008) find the opposite result.[7]

Applying the same reasoning, different stakeholders may also have different preferences

[7] Guo et al. (2015) find that CVC funding influences the choice between IPO and acquisition through two channels: CVC-backed startups receive larger investment levels (which leads to more IPO exists) and have longer duration before exit (which pushes towards more acquisitions). They suggest that the contradictory results found in the literature may be due to the differential strength of the two opposite effects in different markets.

regarding the exit strategy (Aghion and Bolton, 1992). Founders, on the one hand, may obtain private benefits from becoming managers of a publicly listed firm (Black and Gilson, 1998; Hellmann, 2006). This should make them more supportive of IPO as opposed to M&A exit. VC investors and in particular IVCs, on the other hand, should care about fast financial returns and favor faster exit routes. After an IPO, insiders need to retain a large part of their equity in the firm for some time. Therefore, VCs may have a preference for an M&A exit (Bayar and Chemmanur, 2012).

Overall, startups where VCs (and, in particular, IVCs) have more control rights at the time of exit should be more likely to choose an M&A whereas those where the founders have more control rights should be more prone to exit through an IPO. As a result, in terms of the individual investors, the likelihood of an IPO should be more likely when the founding team is more experienced and smaller and there are no BAs. Indeed, BA's incentives should be aligned to those of the VCs and they see M&A as their most preferred exit mode, according to a survey in Canada (Carpentier and Suret, 2013). In terms of the institutional investors, the likelihood of an IPO on the subset of successful startups should be higher when the percentage of ownership taken by VCs is smaller or when there are less poweful VCs.

3 Data and descriptive evidence: a unique database

To create a comprehensive dataset of UK-based VC-backed startups, we used mainly the mandatory filings submitted to Companies House (CH), the registrar of companies. This section describes this unique database and provides descriptive evidence of the relevance of the individual stakeholders in startups as well as an assessment of the institutional investments and exit classifications offered by the VentureXpert (VX) database.

3.1 Sample definition

We first had to identify the startups within the universe of UK firms. To do so, we searched for VC investments in UK companies in the VX database.[8] According to Maats

[8] We excluded investments in companies in Northern Ireland because they use a different type of document which was not provided to us. Throughout, when we refer to the UK we mean Great Britain (i.e., the UK excluding Northern Ireland).

et al. (2011), VX has the most comprehensive investment coverage of the two main VC databases (VX and VentureSource), so our VX investment-based search should guarantee that we obtain a large sample of (VC-backed) startups.

We identified all the UK-headquartered companies that received, according to VX, their first-VC investment between 1999 and 2005 (both inclusive), and were incorporated on or after 1995. We obtained all the available information in CH for these companies (described below), from incorporation until up to 5 years after first-VC investment. Although they still need to fill annual returns, UK companies are not required, since October 1st 2009, to report the details of the "allottees" (investors that bought shares at issuance). Therefore, we collected information on firms receiving first-VC investment up to 2005 (and not more recent ones) to have full information for at least 4 years since first-VC investment. We ended up with a sample of $1,044$ unique UK-based startups.[9]

3.2 Source documents and investors

For each company, we obtained, from incorporation date until 5 years after first-VC investment or "exit date" (both to be defined below), whichever came earlier:

- "The Return of Allotment of Shares" (RAS) documents, i.e., the share issuances, which include, for each allottee, the name as well as the number, class (e.g., common, preferred, etc), nominal value and price paid for the shares issued, as well as the date.
- The Annual Returns (AR) documents, which include the (accumulated) number, class, and nominal value of the shares held by each shareholder as well as the date.[10] While RAS are submitted whenever there is a share issuance, ARs are submitted one year after incorporation and each year thereafter.[11]

[9] We identified a sequence of different CH companies with the same shareholders, directors and, sometimes, the same or similar company names. In other words, some companies have "precursor" and/or "sequel" companies which, despite being legally different entities, should in practice be considered the same company. We merged all the information of precursor and sequel companies into one single company (94 companies have at least one precursor/sequel).

[10] The RAS document was formally called form 88(2) before October 2009, and form SH01 after October 2009. The AR was also called form 363 before October 2009, and form AR01 after October 2009.

[11] Note that sales of shares between investors do not have to be submitted in CH. These transactions can be identified from the ARs in two subsequent years. But we do not have the transaction price; therefore valuations can only be done based on the price reported in the RAS. Moreover, we cannot identify two subsequent share transfers within the same year, although it should happen in rare cases in start-ups.

We dropped 134 companies because of missing/inconsistent information.[12] Our final sample includes thus 910 companies.

We manually classified the investors identified in the RASs and ARs into "individuals" and "institutions."[13] Panel *A* of Table 1 shows the distribution of (unique) investors in our database, both in terms of number of investors as well as the size of their investments. Individual investors, account for the 84% of the number of investors and bring 11% of the total investment. Institutions, despite being only 11% of the body of investors, account for 81% of the total investment. The rest of the investors (5%), which include those in tax-haven countries or "nominee" companies (financial intermediary companies created to hold shares on behalf of third parties), are unknown/undisclosed (they could be institutions or individuals).

[Insert Table 1 here]

3.3 Founders, non-founding directors and other individual investors

We obtained the list of the directors of our startups from the FAME database, which collects part of the information of CH.[14] For each director in each company, we obtained his/her appointment date and resignation date (if any).[15] We identified unique directors across companies and matched these data with the individual investor data, taking into account that the names across companies may be slightly different. The directors of a given company can be investors of that company or not. We use all this information to separate individual stakeholders into founders, non founding directors and "other " (i.e.,

[12] We made sure that the total number of shares of each class held by all the investors is equal to the number of shares displayed in the AR's "Statement of Capital."

[13] We identified unique investors across companies, taking into account that the names may be slightly different. We also considered the same investor the subsidiaries of the same corporate investor and the funds of the same VC firm. To identify the funds of the VC firms, we make use of the information available in VX about the VC firms that invest in our companies.

[14] Financial Analysis Made Easy (FAME), a database published by Bureau van Dijk (BdV), contains financial and other company information for 3.8 million companies in the UK and Ireland.

[15] We classify as directors all the individuals that have been or will be directors at some point in the company. Therefore, being "director" or not is a static attribute of a person in a company, but the same person may be a director of a company but a (non-director) individual investor of another.

non-director) individual investors

We rely on the RAS and AR forms, rather than on the incorporation documents, to identify the startup founders, as many startups are set up through an acquisition of a "shelf" company.[16] We considered a director of the company a founding director or a "founder" if either (i) s/he is an investor in the first year, or (ii) s/he was appointed in the first 45 days of the company.[17]

Panel B of Table 1 shows the number and the investment of the different types of individuals in our database. Note that the individuals in this table are not unique but they appear as many times as the number of companies they are present in. The same person may, for instance, be a founding director in one company and an "other individual investor" in another one.

Not surprisingly, founders represent an important source of investment for the startups in relative terms, by investing 26% of the total individuals' investment while representing only 10% of the number of individuals. A proportion of 15% of them never invest in the company though. Non-founding directors represent a large part of the individuals in our database (35%); the average company has 9.5 of them, as opposed to 2.7 founders. Although only one out of five invests in the startup they direct, when they do invest, they invest similar quantities as founders: an average of $£76K$ for founders vs $£64K$ for non-founding directors. Other individual investors represent the most important category with more than half of the number and investment (6% of the total, institutions included). Each of these individuals invest on average $£25K$ per company.

3.4 Institutional investors and first-VC investment

We classified institutional investors into IVCs, CVCs, CVIs and OVCs. To do so, we first matched the institutional investors with the companies in the Orbis database. A matched investor is considered an IVC if its NACE code in Orbis is in the finance or management consulting areas. A matched investor in any other NACE code is considered a CVC or

[16] A shelf company is a company that has been incorporated and "put on the shelf", without having ever traded, for its later sale. It can be purchased by an actual trading company, later on, in order to save time and skip the -sometimes tedious- incorporation process.

[17] In case the first VC invested within the first year, s/he is considered a founder if s/he is an investor strictly before the VC invested. In case the first VC invested within the first 45 days, s/he is considered a founder if s/he is appointed strictly before the first-VC investment.

a CVI. We distinguish CVCs, corporations investing in startups through structured and organized funds, by searching whether they are present in the overall VX database (that is, investing in any startup included in VX, not only those in our sample). Not-for-profit/government organizations are categorized as OVC.[18]

Panel *C* of Table 1 depicts the distribution of (unique) institutional investors in our database, both in terms of number as well as the size of their investments. IVCs represent the main body of institutional investors, accounting for more than half of the investors and 86% of the investment. CVCs, despite representing only 4% of the institutional investors, account for 7% of the institutional investors' investment. CVIs, on the other hand, represent 29% of the investors, but only 4% of the investment.

We define as first-VC investment, the first time that one of these types of investors invest in the startup. Note that this may be earlier than the first-VC investment according to the VX database. This is because some of the IVC/CVC investments in the startups are not included in VX or because the first institutional investor is a CVI (see below).

3.5 Investment, ownership and valuation

We computed the overall cumulative investment in each company at each point in time. To do so, we added the money invested by all the investors in all share classes in all the RAS up to that point in time, where money invested is defined as the product of the "price paid" and the "number of shares allotted" in that RAS. In our data, the cumulative investment is, on average, $£124K$ just before first-VC investment, $£1.4m$ at first-VC investment and $£5.4m$ at 5 years after first-VC investment or exit, whichever came earlier.

We computed the ownership structure at each point in time by computing the fraction of the overall nominal capital held by each investor.[19] Nominal capital for each investor in each point in time is computed by multiplying her/his number of shares by their nominal value (and adding the nominal capital of her/his ordinary, preferred and other shares).

[18] Other institutional investors include research institutions and employee schemes. We do not classify them (or use them to define first-VC investment) because they do not take an active part in the money disbursement. Research institutions, for instance, often get ownership in exchange of technology transfer.

[19] We cannot use the number of shares as there are shares of different nominal value. For instance, 10 ordinary shares at a nominal value of 2 are worth twice as much as 10 ordinary shares at a nominal value of 1.

We computed the end-of-the-year nominal capital from the ARs. We also computed the nominal capital at intermediate dates of the submission of the RASs. Figure 1 depicts the ownership structure prior to first-VC investment, at first-VC investment and at exit, for the average company.

[Insert Figure 1 here]

We valued the companies at each RAS. To do so, we first constructed a "premium multiplier" for the ordinary shares of each RAS, defined as the (maximum) ratio of the price paid per share divided by the nominal capital of that share.[20] The valuation is obtained by multiplying the overall (i.e., company-wide) nominal ordinary capital by the premium multiplier to which we added the nominal preferred and other capital.[21] The valuation for the average startup is $£1.8m$ just before first-VC investment (the pre-money valuation), $£2.6m$ at first-VC investment (the post-money valuation) and $£8m$ 5 years after first VC-investment or exit, whichever came earlier.

3.6 Type of exit and final valuation

We now explain how we identified the type of "exit"of each startup, which may be earlier or later than the 5 years after first-VC investment. We identified the 55 *IPOs* in our dataset, which represent the 6% of the startups (see Figure 2), with a search in the major stock exchanges (although almost all of the IPOs in our database are in the London Stock Exchange). We identified the 298 *M&As* (33% of the companies) as cases in which another company buys all the shares of the startup (or, in very rare cases, a majority controlling stake). Finally, we identified the 400 *dissolutions* (i.e., 44% of our sample) as the appointment of an administrator/liquidator, as this is the time the company stops

[20] Note that different investors may pay different prices, so we took the maximum price paid. We did not count (i) shares issued to directors, as they may contain options, (ii) shares whose price paid was equal to the nominal value, or RASs where (iii) the total investment was lower than $£20,000$ or (iv) the capital issued was less than 5% of the total capital.

[21] We did that because the preferred and other capital behave like debt (multipliers larger than 1 are rare for non-ordinary shares). We run regressions using other definitions of valuation, including a premium multiplier that used information from preferred shares. The results of the regressions are very similar to those reported in the next sections, even though the magnitude of the valuation is different.

trading (final closure usually happens several years later). If none of these outcomes occurs by the end of 2017, the company is considered *active*.[22]

[Insert Figure 2 here]

We computed the final valuation, at exit, independently if this occurred before or after 5 years from first-VC investment, as follows. For IPOs, we took the market capitalization at the end of the first trading day. For M&As, we manually searched for the acquisition price in press releases of the acquirers, and complemented it through web search.[23] In case of dissolution, we assigned a final value of 0. We could not compute a final valuation for "active" companies (the assigned value is thus missing).

Figure 3 shows the cumulative investment and the valuation before first-VC investment, at first-VC investment and at exit for the average company in each type of exit.

[Insert Figure 3 here]

Cumulative investments, despite being substantially different at the end across exit types (in order, IPO, M&A, active and dissolved), they are relatively similar at first-VC investment. The average investment at first VC investment is not significantly different between eventually successful (IPOs and M&As) and unsuccessful ventures (active, and dissolved): t-statistic= -0.13 and p-value= 0.89.

We also observe that companies exiting through M&A and IPOs, despite having higher final valuations, have similar valuations at first-VC investment than the other companies. The average valuation at first-VC investment is not significantly different between eventually successful and unsuccessful ventures: t-statistic= 0.19 and p-value= 0.84.

[22] We identified 57 (6%) companies that exited through a management buy-out/buy-in or a repurchase. Management buy-out/buy-ins were identified as cases in which a company owned by the directors of the same company (for buy-outs) and from another company (for buy-ins) acquired all the shares of the startup. Repurchase happens when the VC exits the company but the company is still independent and active (sometimes the shares are redeemed, or they are bought back by the company). We include them in the active category, following VX's approach.

[23] We introduced, in case milestones or any type of variable payment that was included in the deal, the maximum possible amount, as variable payments occur rather often. Still, in more than 50% of the M&A cases, though, the price was not disclosed by the acquirer or it is unknown.

3.7 Comparison with the VX database

Given the legal nature of the CH documents, our information should be more accurate than that obtained through surveys, which is the usual source of information of most of the existing startup databases (Da Rin et al., 2013). We now compare the exit routes, as well as the number and the investments of IVCs and CVCs, in our database with those identified by the VX database. Note that individual investors and CVIs are not included in the VX database.

Table 2 compares the exit routes according to VX (columns) with the actual exit routes (rows), both defined as of the end of 2017. Not surprisingly, the most inaccurate category in the VX database is the "active" category: 287 out of the 509 companies classified as active by VX at the end of 2017 were actually dissolved at that date. Only 124 out of this 509 were correctly classified as active. 202 out of the 292 companies classified as exiting through an M&A had actually exited through an M&A. Instead, the classification of the firms exiting through IPOs or ending dissolved is more accurate: 33 out of 36 were correctly classified as IPO and 60 out of 73 were correctly classified as dissolved. There are, however, 22 startups that exited through an IPO and 340 startups that were dissolved whose exit is not correctly identified in VX.

[Insert Table 2 here]

Panel A of Table 3 compares the number and overall investment of three (out of the four) types of institutional investors in the set of firms in our database with those attributed by the VX database. To compute the overall investment according to VX, we use the VX's investor variable "Fund Estimated Equity Invested in Company at Investment Date" to identify the size of all the investments in these companies of these investors.

[Insert Table 3 here]

The table shows that VX includes 416 out of the 1,188 IVC investors of our database. But the IVC investments included in VX are the largest, and in fact VX overestimates the overall investments of IVCs (101% of our recorded investment). In terms of CVC investment, VX includes 54 out of the 86 investors, representing 99% of the overall investment by these type of VC in our database. Finally, VX includes 10 out of the 38 OVC investors, representing 60% of the overall investment by these type of VC.

Panel A does not take into account that over- and underestimation might cancel out across companies. This is why we report in Panel B how often the VX investment data matches the size of the investment in our startups, allowing for an error margin of ±20%. We report the number and percentage of startups for which VX matches, underestimates and overestimates the size of the investment of each investor. VX does well in capturing the overall VC investment but, at the individual-firm level, most of the investments included in VX either overestimate or underestimate the figures reported by firms to CH.

4 Variables and descriptive statistics

We now describe the variables used in the empirical analysis. We construct company-level variables that characterize (i) the number and experience of the individual stakeholders in the *pre-institutional period*, (ii) the type, quantity and quality of the first-VC investors at *first-VC investment* as well as the characteristics of the transaction itself (i.e., investment, ownership and governance) and (iii) the type of and valuation at *exit*. We provide a summary description of the variables in Table 4, as well as descriptive statistics and correlations of the main variables in Tables 5 and 6, respectively.

[Insert Tables 4, 5 and 6 here]

4.1 Pre-institutional period

We construct variables describing both the "quantity" and "experience" of the three types of individual stakeholders. In terms of quantity, we define the count variables "num members founding team," "num early non-founding directors" and "num other early individual investors." As shown in Table 5, on average, the startups in our sample have 2.71 founders, 0.96 non-founding directors and 2.52 other early investors prior to first-VC investment.[24] In terms of correlation, Panel *A* in Table 6 shows a negative correlation between the size of the founding team and the number of early non-founding directors.

[24] A few start-ups have zero founders because they were created with VC investment.

We created variables to characterize the experience of each of these types of individuals. In the case of the founding team and the set of early non-founding directors, we created dummy variables that identify the presence of one with experience as a director, i.e., someone that has been previously a director in one of the companies in our database. In our dataset, 11% of the startups have a founder with experience in directing and 7% have an early non-founding director with that experience. We also created a dummy variable that identifies the presence of a BA individual investor. We consider an individual investor a BA if s/he (i) has invested, throughout our database, in 2 or more companies and has invested, in total, £100,000 or more, or (ii) has invested in 6 or more companies. We identified a total of 340 unique BAs in our database (2% of the individual investors).[25] Around 12% of our startups have a BA prior to first-VC investment.

As control variables, we include the "startup age at first VC," in terms of number of years since incorporation, and the "money inv before first VC" as the (cumulative) investment just before first-VC investment (including the small investments of research institutions and unknown investors). On average, our startups are 1.52 years old at first-VC investment, and got $124K$ pounds worth of investment. We also include a dummy for the presence of a research institution in the pre-institutional period. Around 11% of the startups include a research institution before the first-VC investment.

4.2 First-VC investment

We characterize the type, quantity and quality of the institutions investing at first-VC investment. We created four dummy variables that indicate whether the first-VC investment includes an IVC, a CVC, a CVI and an OVC, respectively. As a measure of quality, we create a dummy variable for the presence of a "top IVC," defined as (i) being in the top 5% of the IVCs in terms of overall investment within our dataset, and/or (ii) being in the top 25% in terms of capital under management within the VX database (IVCs that, despite being large and experienced, do not invest heavily in the UK). Roughly 10% of the IVCs in our database are considered top IVCs. Finally, we define the "number of VC investors" as the count of VCs (of any of the four types) at first-VC investment.

[25] The identification of "business angels" is always problematic and whether an individual should be considered a BA or just an investor is somehow arbitrary. Mason and Harrison (2008) review several approaches to measure the investing behavior of BAs.

In terms of investment, ownership and governance, we define the following variables. "VC money inv at first VC" includes the overall amount of money invested by VCs at first-VC investment. "% ownership by VCs at first VC" is defined as the percentage ownership stake obtained by all the VCs at first-VC investment. "VC director app at first VC" is a dummy variable that identifies whether the VC investors appointed a director at first-VC investment. We consider that VC investors appoint a director if a new director is appointed precisely at the date of the first-VC investment.

4.3 Exit

As measures of performance, we define, according to the exit routes of the startup, the dummy variables "IPO", "M&A" and "success." Following prior literature, success includes exits as both IPO and M&A.[26] We also use the "final valuation," as described in the previous section (which can be before or after year 5). Finally, we also use the "valuation at year 3" and "valuation at year 5" since first-VC investment, defined as the linearly-interpolated value between the valuations at the closest RAs (and using a value of 0 at incorporation and the final valuation at exit). The value of these variables is equal to the final valuation if exit occurs before.

5 Results

We analyze in turn the effects of the pre-institutional individual stakeholders on the characteristics of the first-VC investment in VC-backed startups and the effects of the pre-institutional individual stakeholders and the characteristics of the first-VC investment on startup success.

5.1 Early individual stakeholders and first-VC investment

Table 7 shows the effects of the pre-institutional stakeholders on first-VC investment using probit and OLS regressions. We regress the characteristics of the first-VC investors and the first-VC transaction against the characteristics of the early stakeholders. In all

[26] Most papers interpret IPOs and M&As as success events and consider it a failure if the company closed down or remains active after several years (see, e.g., Da Rin et al., 2013).

regressions we control for startup characteristics such as age and investment at first-VC, location, and industry-year, where year refers to the year of incorporation.[27] We cluster the standard errors at the industry level.

[Insert Table 7 here]

Column 1 shows that IVCs are more likely to be first-VC investors in startups with larger founding teams, larger number of non-founding directors and smaller number of other individual investors. Instead, as shown in column 2, CVCs are more likely to invest in startups with greater number of other individual investors. The presence of an experienced BA investor also affects the likelihood of IVC/CVC investment differently: it increases that of IVC while it decreases that of CVC. The presence of BAs, as well as of smaller founding teams, are also more likely to attract CVIs and OVCs, as shown in columns 3 an 4, respectively. On the other hand, the presence of an experienced founder and the number of inexperienced non-founding directors make the CVIs more likely to appear at the first-VC investment whereas the presence of OVCs is less likely. It is worth mentioning that a larger founding team and the presence of experienced non-founding directors not only makes the presence of an IVC more likely but it also increases the likelihood that a top IVC funds the startup. In terms of the quantity of VCs (column 6), startups with greater number of other individual investors, and in particular BAs, are more likely to have more VCs. Thus, the presence of BAs increases the likelihood of VC syndication in the first-VC investment round.[28]

Summarizing, the individual stakeholders affect the likelihood of IVC, CVC, CVI and OVC investment, but in different directions. Consistent with this, IVCs and CVCs/CVIs tend not to invest simultaneously at first-VC investment. As shown before in Panel *B* of Table 6, the correlations between these variables are -0.16 and -0.53 and highly significant. The drivers of CVCs and CVIs are also different between themselves: the

[27] We obtained, from the VX database, (i) the city location of the headquarters and (ii) the main industry. In the final dataset, 46% of companies are from London, Cambridge and Oxford, 42% from the rest of England and 12% from the rest of the UK, whereas 58% are in Information Technology, 15% in Medical/Health/Life Science and 27% in Non-High Technology.

[28] One third of the first-VC investments in our dataset are syndicated. A probit regression on a dummy variable that takes a value of 1 if the number of VCs is larger than 1 and 0 otherwise, generates similar qualitative results as those presented in column 6.

correlation between these two variables is -0.10 and highly significant. Panel B of Table 6 also shows that top IVCs tend not to invest simultaneously with CVIs, but there is no correlation between their presence and the investment by CVCs or OVCs.

Columns 7 to 9 show that the individual stakeholders of the startup affect to a lesser extent the first-VC transaction. The size of the investment of the first VCs is barely affected by the characteristics of the individual stakeholders, except for the number of non-founding directors (column 7). In the presence of a greater number of non-founder directors, first VCs invest more but they also obtain a larger share of ownership (column 8). VCs also end up taking a greater ownership stake in firms with smaller founding teams and smaller number of other individual investors. The appointment of a VC director is more likely in startups with smaller and less experienced founding teams as well as those with lower number of non-founding directors (column 9). The presence of a research institution leads to the appointment of a VC director. An interpretation of the last two results is that the VC investors try to improve the governance of the startup if they perceive it to be weak when they start investing.

5.2 Early individual stakeholders, first-VC investment and exit

Table 8 displays the effects of the pre-institutional individual stakeholders and first-VC investment on exit using probit, multilogit and OLS regressions. We regress several indicators of startup performance against the characteristics of the early stakeholders, as well as on the characteristics of the first-VC investment. As before, in all regressions we control for the characteristics of the startup itself, age and investment at first-VC investment, as well as location, and industry-year. We cluster the standard errors at the industry level.

[Insert Table 8 here]

Column 1 shows the effects of the pre-institutional features as well as of the characteristics of the first-VC investment on success. A startup is shown to be more likely to be successful if it is founded by a large team and appoints a greater number of non-founding directors. It is worth pointing out that the quantitative effect of both variables is very similar and they are not significantly different, which suggests that the diversity of the non-founding directors is as important as the diversity of the founders. The effect of the size of the founding team is consistent with the results in Cooper and Bruno (1977) and

Roure and Madique (1986). A startup is also more likely to be successful if it involves BA investors before first-VC investment, which is consistent with the results in Kerr et al. (2014a) and Lerner et al. (2018) but go in opposite direction than those in Goldfarb et al. (2013).[29]

As shown in the previous subsection, these same features are those that increase the likelihood of having an IVCs as first-VC investors, whereas the presence of BA investors decreases the likelihood of CVC investment. The presence of an IVC increases in turn, as also shown in Column 1, the likelihood of success, whereas the presence of CVC investors significantly decreases this likelihood. As a result, the individual characteristics have not only a direct but also an indirect positive effect on success, via IVC and CVC investment.

As other characteristics of first-VC investment have a significant influence on eventual success, there are many other indirect effects. And a few of them pull in the opposite direction of the direct effects. For instance, having a BA investor increases the number of VCs, which in turn decreases the likelihood of success. Still, as shown in Column 2, in a regression that drops the effects of the characteristics of the first-VC investment on success, the indirect effects are either relatively weak or cancel each other. Indeed, the significance and even the magnitude of the effects of the pre-institutional features are similar, independently of the inclusion or not of the indirect effects. This is consistent with the results of Sørensen (2007) who shows that the effect of VC funding on success is more due to sorting than to treatment. Our regressions show that IVCs are more likely to invest in startups that have the determinants to be successful, but the inclusion of the indirect effect of these determinants through IVC funding does not alter their direct effect on success.

Columns 3 and 4 use multinomial logit models to decompose the effects on the variable "success" on the variables of IPO and M&A. We show first that a larger founding team, or a greater number of non-founding directors, have a positive influence on success but only through M&As and not through IPOs. Interestingly, the presence of an experienced BA investor, despite positively affecting success, decreases the likelihood of IPO.[30]

[29] Note that the presence of a research institution among the early shareholders decreases the prospect of success.

[30] Although we do not find a significant effect of the experience of the founders on success, this experience significantly increases the likelihood of M&A. This is in line with results by Colombo and Grilli (2005) and (2010) who find a positive effect of founders' previous experience (measured in terms of past

Most of the effects of the first-VC investment on success are also due to the effects on M&A. For instance, having a CVC significantly decreases the likelihood of M&A but not of IPO. Having received IVC investment has a positive influence on exiting through both IPO and M&A. However, as shown in columns 5 and 6, which replicate the results in columns 3 and 4 but substituting IVC by top IVC, the effect of the presence of a top IVC is not conducive to IPO (the coefficient is negative although not significant). In any case, these columns suggest that receiving IVC financing is more conducive to a successful exit than obtaining CVC or CVI financing.

Concerning the choice between IPO and M&A, among the successful startups, the theory suggests that those startups where VCs (in particular, IVCs) have more control rights should be more likely to exit through an M&A and those where management has more control rights should be more prone to exit through an IPO. In addition to the insights obtained in columns 3 to 6, columns 7 and 8 confirm the previous theoretical arguments. These probit regressions on the likelihood of an IPO on the subset of successful startups show that IPO is more likely when (1) the percentage of ownership taken by VCs is smaller, which should give them less control rights; (2) a top IVC is not involved, whose bargaining power could be large; and (3) the number of VCs is larger (for a given level of investment), which should make them weaker in the negotiation with the entrepreneurs.

Moreover, the results also suggest that the BAs' incentives are aligned to those of the VCs: their presence before the first-VC investment makes the IPO exit less likely. The BAs do not obtain any private benefit from the firm becoming public and, after a few years of investment, they may want to collect the benefits.

We should notice that the results are very significant even though we use as a measure of control rights the characteristics at the first-VC investment, and we do not measure control rights at the moment of the exit. Thus, our results also suggest that the first-VC investment has profound implications for the sharing of control over the life of the startups.

Finally, columns 9 to 11 display the effects of pre-institutional features and first-VC investment on valuation. We show that the pre-institutional features have long-lasting effects. Startups with larger number of founders, with a larger number of non-founding directors and being financed by BAs have a larger valuation at the three points

entrepreneurial activity and university education) on the start-up growth.

in time, often with significant coefficients. The appointment of a VC director at first-VC investment also increases the startup valuation. On the other hand, obtaining finance from syndicated VCs who own a large percentage of the startup seem to negatively affect the valuation. Thus, the number of VCs present at first-VC investment not only decreases the likelihood of a successful exit (due to the negative impact on the likelihood of an M&A) but it also leads to lower valuation of the startup. In this sense, our results suggest that syndication is negative for the startup performance. Hence, they are more aligned with the conclusions in Chahine et al. (2012) than in Brander et al. (2002) and Cumming and Walz (2010).

6 Conclusion

Despite of their importance, the relevance and the differential influence of the various types of individual stakeholders of the startups has received scant attention from previous literature. The main reason seems to be the absence of systematic information on the individual stakeholders, particularly in the pre-institutional environment. Individuals are typically reluctant to reveal their identity and share information about their activities and, in many countries, such as the US, individuals are not subject to regulatory disclosure requirements. Probably because of this, most of the common databases on startups possess very little information on founders, directors and individual investors.

We present, and make use of, a unique database of UK-based VC-backed startups, based on the mandatory filings to the registrar of companies. Our database reveals previously unknown characteristics of the startups. For instance, individuals, despite accounting for a relatively small fraction of the overall investment, represent a large fraction of the body of startup investors. We show that founding and non-founding directors represent around half of the body of individual stakeholders and around half of their investment in the startups, while the other individual investors make up for the rest. IVCs account for more than half of the number of institutional investors and the majority of the investment, while CVIs represent an important fraction of the institutional investors.

We also show that several pre-institutional features have long-lasting consequences for the startup, especially in terms of startup type of, and value at, exit. We argue that the individual characteristics have direct effects on startup success, but also an indirect

effect via the characteristics (but not the size) of the first-VC investment, which also affects success. Direct and indirect effects may sometimes pull in the opposite directions, but the indirect effects are shown to be either relatively weak or to cancel each other. Indeed, the magnitude of the effects of the pre-institutional features on success are similar, independently of the inclusion or not of the characteristics of the first-VC investment.

We build comparable measures of size and experience of the three types of individual stakeholders in the early stages of the startup. We show, consistently, that governance (founding and non-founding directors) is important in terms of number whereas investment (other individual investors) is important in terms of experience. As they have to work together, the more members the team of founders and non-founding directors have, the more expertise the team has. Instead, in terms of investors, it is important to have at least one of them with previous experience in investing.

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Figure 1: Average ownership structure

This figure shows the percentage of ownership of founders, non-founding directors, other individual investors, VCs and Other prior to first-VC investment, at first VC investment and at exit for the average company.

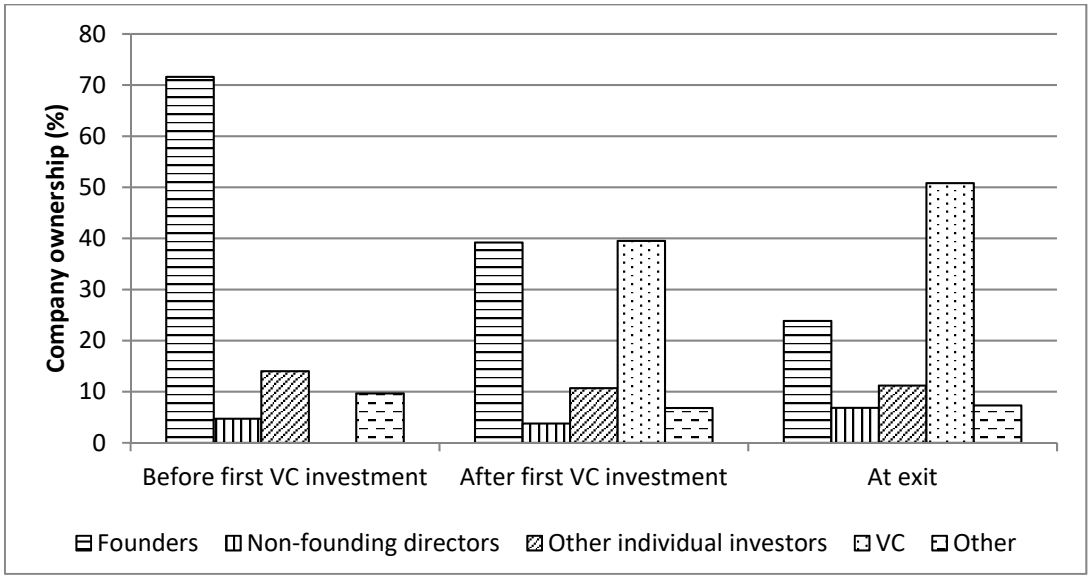

Figure 2: Company exit

This figure reports the number of start-ups by type of exit.

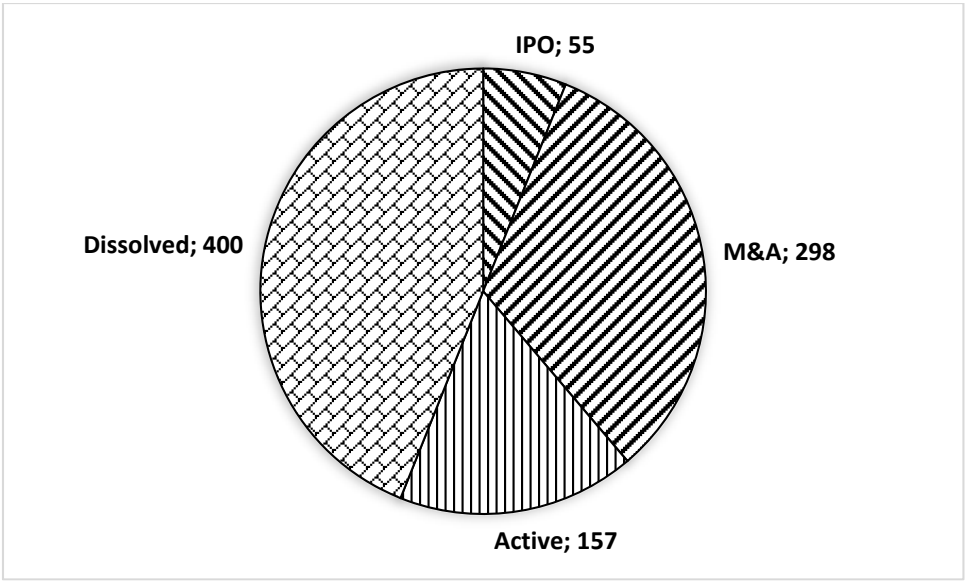

Figure 3A: Average Investment by Exit

This figure shows the cumulative investment prior to first-VC investment, at first VC investment and at exit for the average company that exits through an IPO, an M&A, remains active, has other type of exit, or ends up dissolved.

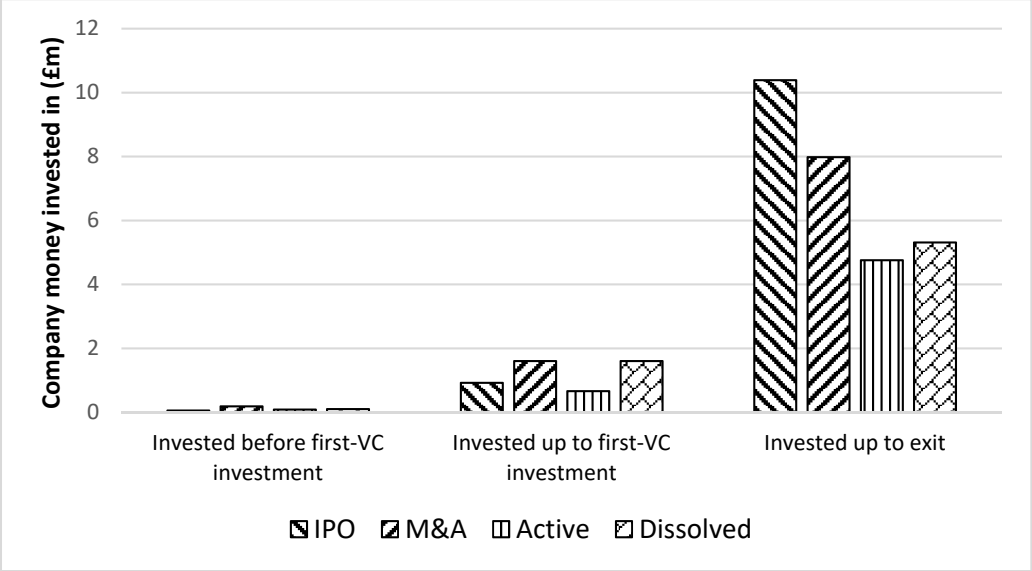

Figure 3B: Average valuation by exit

This figure shows the valuation prior to first-VC investment, at first VC investment and at exit for the average company that exits through an IPO, an M&A, remains active, has other type of exit, or ends up dissolved.

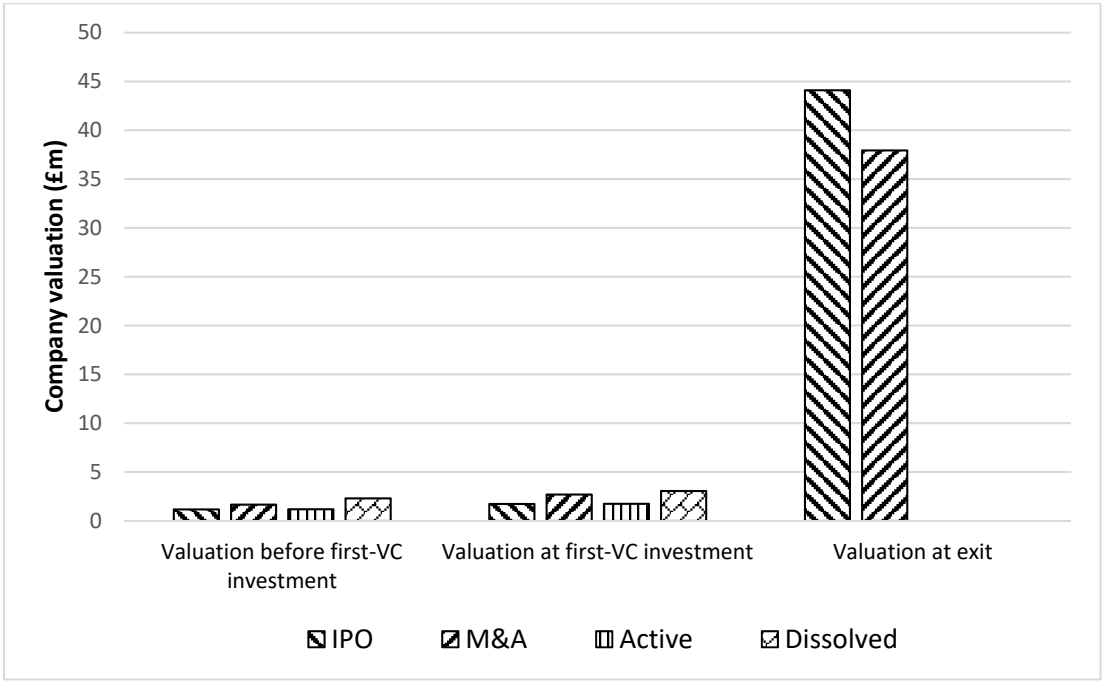

Table 1: Investors

Table 1 presents the importance of the different types of investor in our database. Panel A shows the number of unique investors and their total investment for each type and the percentage they represent of the total number of investors and the total investment. Panel B (resp. Panel C) summarises similar information about the different types of individuals (resp. institutional investors) in our database.

Panel A

Type of investors (unique)	Number	Percentage	Total investment (£m)	Percentage of investment
Individuals	16,408	84.47%	617	11.02%
Institutions	2,051	10.56%	4,552	81.25%
Unknown/Undisclosed	966	4.97%	433	7.73%
Total	19,425	100.00%	5,602	100.00%

Panel B

Individuals (not unique)	Number	Percentage	Total investment (£m)	Percentage of investment
Founders	2,465	9.89%	158.927	25.74%
Non-Founding Directors	8,670	34.80%	119.849	19.42%
Other Individual Investors	13,781	55.31%	338.575	54.84%
Total	24,916	100.00%	617.351	100.00%

Panel C

Institutional Investors (unique)	Number	Percentage	Total investment (£m)	Percentage of investment
Independent VC	1,188	57.92%	3,924.605	86.22%
Corporate VC	86	4.20%	331.787	7.29%
Corporate Venture Investment	602	29.35%	196.183	4.31%
Organisation VC	38	1.85%	57.346	1.26%
Other Instutional Investors	137	6.68%	41.891	0.92%
Total	2,051	100.00%	4,551.812	100.00%

Table 2: Comparison of the exit routes according to VentureXpert with the actual exit routes

This table shows the comparison between the exits found by VX (taken from the VX variable "Company Status") and the ones we found by displaying how many companies were classified in each category, both by VX and us. The rows show our classification and the columns show the VX classification. The M&A category for VX includes: "Acquisition," "Pending Acquisition," "Merger" and "LBO." The Active category for our classification includes: "Active," "MBO/MBI" and "Repurchase."

	Startup Exit according to VX				
Startup Exit	Active	M&A	IPO	Dissolved	Total
Active	124	28	0	5	157
M&A	87	202	1	8	298
IPO	11	11	33	0	55
Dissolved	287	51	2	60	400
Total	509	292	36	73	910

Table 3: Comparison of coverage of institutional investors by VentureXpert and our database

This table shows the comparison of our data with that of VX regarding institutional investors. Panel A compares the magnitudes for each type of institutional investor, both in terms of number of investors and total investment in the startups of our sample. The "Investment" columns show the total investment of each type of investor across our sample, both according to our database and to VX. The "VX Coverage" column shows the percentage ratio between the last two. Panel B compares, for each startup, the investment magnitude found in VX with the one we have found for every type of institutional investor, and shows whether there is a match, an overestimation or an underestimation by VX. We allowed a ±20% error margin. The results are presented in number of companies and in percentage.

Panel A

	Number			Investment (£m)		
	Ours	VX	VX Coverage	Ours	VX	VX Coverage
Independent VC	1,188	416	35.02%	3,924.61	3,982.45	101.47%
Corporate VC	86	54	62.79%	331.79	327.22	98.62%
Organisation VC	38	10	26.32%	57.35	34.18	59.60%

Panel B*

	Match	Ours is higher	VX is higher	Not investing	% Match	% Underestimate	% Overestimate
Independent VC	244	178	287	19	34.41%	25.11%	40.48%
Corporate VC	66	15	39	608	55.00%	12.50%	32.50%
Organisation VC	66	7	13	642	76.74%	8.14%	15.12%
All investors	188	190	350		25.82%	26.10%	48.08%

*182 companies were not used due to lack of data; therefore N is 728

Table 4: List of variables

In this table, we report the variables we use in the regressions and their definition.

Name of variable	Definition of variable
Num Members Founding Team	# of individuals who are founding directors
Presence Founder with Experience in Directing	dummy equal to 1 if at least a founding director has previous experience as director
Num Early Non-Founding Directors	# of individuals who are directors before first VC but who are not founding directors
Presence Experienced Early Non-Founding Director	dummy equal to 1 if at least a non-founding director has previous experience as director
Num Other Early Individual Investors	# of individual investors who are not founders or directors before first VC
Presence Early Business Angel	dummy equal to 1 if at least an early investor is a seasoned investor
Start-Up Age at First VC (years)	difference between date of first VC and date of incorporation (in years)
Money Inv Before First VC (logs)	log of the total amount invested before first VC
Presence Early Research Institution	dummy equal to 1 if at least a research institution is present before first VC
Presence IVC at First VC	dummy equal to 1 if at least an IVC invests at first VC
Presence CVC at First VC	dummy equal to 1 if at least a CVC invests at first VC
Presence CVI at First VC	dummy equal to 1 if at least an CVI invests at first VC
Presence OVC at First VC	dummy equal to 1 if at least an OVC invests at first VC
Presence Top IVC at First VC	dummy equal to 1 if at least a top IVC investment at first VC
Num VCs at First VC	# of VCs investing at first VC
VC Money Inv at First VC (logs)	log of the total amount invested by VCs at first VC
% Ownership by VCs at First VC	percentage of ownership taken by all the VCs at first VC
VC Director App at First VC	dummy equal to 1 if a new director is appointed at first VC
Success	dummy equal to 1 if the company exists through IPO or M&A
IPO	dummy equal to 1 if the company exists through IPO
M&A	dummy equal to 1 if the company exists through M&A
Valuation at Year 3 (logs)	log of market value of common shares plus nominal value of preferred shares 3 years after first VC
Valuation at Year 5 (logs)	log of market value of common shares plus nominal value of preferred shares 5 years after first VC
Final Valuation (logs)	log of the company valuation at exit date

Table 5: Descriptive Statistics

In this table, we report the descriptive statistics for the dependent and independent variables that we use in the regressions of this paper. All variables are defined in Table 4.

Variables	(1) N	(2) mean	(3) median	(4) sd	(5) min	(6) max
Num Members Founding Team	910	2.71	2	1.59	0	10
Presence Founder with Experience in Directing	910	0.11	0	0.31	0	1
Num Early Non-Founding Directors	910	0.96	0	1.62	0	17
Presence Experienced Early Non-Founding Director	910	0.07	0	0.26	0	1
Num Other Early Individual Investors	910	2.52	1	4.92	0	58
Presence Early Business Angel	910	0.12	0	0.33	0	1
Start-Up Age at First VC (years)	910	1.52	0.87	1.73	0	10.54
Money Inv Before First VC (£m)	910	0.12	0.00	0.78	0	15.85
Presence Early Research Institution	910	0.11	0	0.31	0	1
Presence IVC at First VC	910	0.82	1	0.38	0	1
Presence CVC at First VC	910	0.06	0	0.25	0	1
Presence CVI at First VC	910	0.24	0	0.42	0	1
Presence OVC at First VC	910	0.06	0	0.23	0	1
Presence Top IVC at First VC	910	0.37	0	0.48	0	1
Num VCs at First VC	910	1.63	1	1.18	1	13
VC Money at First VC (£m)	645	1.15	0.31	4.40	0.01	103.06
% Ownership by VCs at First VC	910	39.59	30.77	31.04	0.00	100.00
VC Director Appointed at First VC	910	0.48	0	0.50	0	1
Success	910	0.39	0	0.49	0	1
IPO	910	0.06	0	0.24	0	1
M&A	910	0.33	0	0.47	0	1
Valuation at Year 3 (£m)	722	6.67	1.33	23.70	0	434.61
Valuation at Year 5 (£m)	679	7.97	0.84	26.63	0	434.61
Final Valuation (£m)	590	12.70	0	39.28	0	434.61

Table 6: Correlations

This table shows correlations between some of the variables that we use in the regressions. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

Panel A

	Num Members Founding Team	Num Early Non-Founding Directors
Num Early Non-Founding Directors	-0.17***	
Num Other Early Individual Investors	0.13***	0.08**

Panel B

	Presence IVC at First VC	Presence CVC at First VC	Presence CVI at First VC	Presence OVC at First VC
Presence CVC at First VC	-0.16***			
Presence CVI at First VC	-0.53***	-0.10***		
Presence OVC at First VC	-0.18***	-0.03	-0.02	
Presence Top IVC at First VC	0.35***	0.00	-0.18***	0.00

Panel C

	Presence Top IVC at First VC	Presence CVC at First VC	Presence CVI at First VC	Num VCs at First VC
Num Members Founding Team	0.13***	0.01	-0.08**	0.02
Num Early Non-Founding Directors	0.04	0.06*	0.02	0.08**
Num Other Early Individual Investors	0.05	0.02	0.03	0.16***

Panel D

	Success	IPO	M&A
Num Members Founding Team	0.10***	-0.02	0.11***
Num Early Non-Founding Directors	0.08**	-0.01	0.09***
Num Other Early Individual Investors	0.03	0.00	0.03
Start-Up Age at First VC (years)	0.07**	-0.02	0.09***
Money Inv Before First VC (£m)	0.04	-0.02	0.05
Presence Early Research Institution	-0.05	0.00	-0.06*
Presence IVC at First VC	0.09***	0.00	0.09***
Presence CVC at First VC	-0.04	-0.01	-0.03
Presence CVI at First VC	-0.07**	0.03	-0.09***
Presence OVC at First VC	-0.07**	0.00	-0.07**
Presence Top IVC at First VC	0.07**	-0.08**	0.12***
Num VCs at First VC	-0.03	0.01	-0.04
VC Money Inv at First VC (£m)	0.00	-0.02	0.02
% Ownership by VCs at First VC	0.01	-0.05	0.03
VC Director Appointed at First VC	0.08**	-0.01	0.09***

Table 7: Effects of pre-institutional features on first VC investment

This table shows the effects of the characteristics of the start-up in its early stage, i.e., at the stage prior to the VC, on the first-VC investment. The set of independent variables includes the number of members of the founding team, early non-founding directors, and early investors, dummy variables indicating the presence of an experienced individual in those cathegories, as well a dummy variable indicating the presence of a reserach institution before first-VC investment. Other independent variables are the start-up age at the first-VC investment and the logarithm of the amount invested before the first-VC investment. As for dependent variables, “Presence IVC/CVC/CVI/OVC/top IVC at First VC” (columns 1-5) are dummy variables that indicate whether this type of VC is investing in the first-VC investment. Column 6 states the effect on the number of VCs. “VC Director App at First VC” is a dummy variable that indicates whether a director was appointed at the time of the first-VC investment (column 7). The variable "% Ownership by VCs at First VC" is the percentage of ownership taken by all the VCs in a start-up at the moment of the first-VC investment (column 8). Lastly, the variable "VC Money Inv at First VC" measures the VC investment at the time of first-VC investment and it is regressed in column 9. All the regressions control for location and industry-year. We cluster the standard errors at the industry level. Dummy variables were regressed using a maximum likelihood probit model, while numerical variables were regressed using a robust OLS. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

VARIABLES	(1) Presence IVC at First VC	(2) Presence CVC at First VC	(3) Presence CVI at First VC	(4) Presence OVC at First VC	(5) Presence Top IVC at First VC	(6) Number VCs at First VC	(7) VC Money Inv at First VC	(8) VC Ownership at First VC	(9) VC Director App at First VC
Num Members Founding Team	0.096***	0.040	-0.086***	-0.082***	0.092*	0.017	0.054	-1.923*	-0.027**
	[0.005]	[0.074]	[0.021]	[0.032]	[0.051]	[0.040]	[0.056]	[0.551]	[0.011]
Presence Founder with Experience in Directing	-0.128	-0.035	0.191***	-0.059	0.095	-0.010	-0.231	0.169	-0.308***
	[0.172]	[0.178]	[0.039]	[0.195]	[0.155]	[0.135]	[0.192]	[4.775]	[0.065]
Num Early Non-Founding Directors	0.059**	0.159**	0.064***	-0.377***	0.019	0.100*	0.202*	2.504*	-0.081***
	[0.028]	[0.066]	[0.020]	[0.120]	[0.053]	[0.033]	[0.058]	[0.766]	[0.023]
Presence Experienced Early Non-Founding Director	0.252*	-0.788*	-0.359**	0.626***	0.300**	-0.234	-0.103	1.391	-0.143
	[0.151]	[0.431]	[0.162]	[0.239]	[0.124]	[0.201]	[0.168]	[4.175]	[0.263]
Num Other Early Individual Investors	-0.014**	0.014***	0.008	0.006	0.005	0.034**	0.019	-0.569**	-0.002
	[0.006]	[0.003]	[0.007]	[0.011]	[0.012]	[0.007]	[0.007]	[0.110]	[0.007]
Presence Early Business Angel	0.151***	-0.300***	0.127***	0.497**	-0.029	0.162**	-0.072	-0.104	0.138
	[0.049]	[0.068]	[0.030]	[0.205]	[0.238]	[0.035]	[0.139]	[1.316]	[0.100]
Presence Early Research Institution	-0.033	0.296	-0.114	0.777***	-0.016	0.104	-0.231	-14.020**	0.229**
	[0.169]	[0.202]	[0.086]	[0.239]	[0.249]	[0.214]	[0.210]	[2.705]	[0.093]
Start-Up Age at First VC Investment (years)	0.134***	-0.031	-0.201***	0.014	-0.002	-0.053	0.040	-3.111*	0.031
	[0.016]	[0.070]	[0.018]	[0.065]	[0.012]	[0.032]	[0.055]	[0.783]	[0.044]
Money Inv Before First VC (logs)	-0.029*	-0.040	0.014	-0.017	0.047***	-0.027	0.027	-2.891**	-0.017
	[0.016]	[0.068]	[0.026]	[0.024]	[0.005]	[0.018]	[0.025]	[0.454]	[0.019]
Location and Industry-year Controls	YES	YES	YES	YES	YES	YES	YES	YES	YES
Constant	-0.233	-1.888**	0.300	-2.185***	-0.743***	1.642**	-0.735	30.949***	0.019
	[0.149]	[0.806]	[0.270]	[0.372]	[0.150]	[0.226]	[0.584]	[2.919]	[0.268]
Observations	902	734	900	793	908	910	645	910	910
R-squared						0.088	0.140	0.171	

Standard errors in brackets

Table 8: Effects of pre-institutional features and first-VC investment on exit and valuation

This table shows the effect of both the early stage and the first VC investment on several measures of the performance of the startup. Columns 1 and 2 considers the likelihood of a successful exit, understood as an IPO or an M&A, as opposed to any other exit route. Columns 3 and 4 (as well as columns 5 and 6) show the results of a multinomial logit model on the likelihood of an IPO or an M&A exit, understood as an IPO or M&A as opposed to any other exit route. Columns 7 and 8 show the results of a probit model on the likelihood of an IPO in the the set successful exit. Finally, columns 9 to 11 report the results of OLS regressions on the valuation of the startup 3 and 5 years after after the first-VC investment, as well as on the final valuation. All the regressions control for location and industry-year. We cluster the standard errors at the industry level. Dummy variables were regressed using a maximum likelihood probit or multinomial logit model, while numerical variables were regressed using a robust OLS. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

VARIABLES	(1) Success	(2) Success	(3) IPO	(4) M&A	(5) IPO	(6) M&A	(7) IPO vs M&A	(8) IPO vs M&A	(9) Valuation at Year 3	(10) Valuation at Year 5	(11) Final Valuation
Num Members Founding Team	0.090***	0.089***	-0.017	0.179***	0.012	0.174***	-0.117***	-0.084***	0.094	0.249**	0.371**
	[0.022]	[0.019]	[0.017]	[0.036]	[0.032]	[0.039]	[0.038]	[0.032]	[0.050]	[0.051]	[0.059]
Presence Founder with Experience in Directing	0.212	0.178	0.638	0.258*	0.721	0.229*	0.088	0.125	0.493	0.797*	1.131
	[0.147]	[0.151]	[0.517]	[0.141]	[0.574]	[0.136]	[0.444]	[0.486]	[0.343]	[0.195]	[0.959]
Num Early Non-Founding Directors	0.093***	0.088***	0.019	0.181***	0.023	0.189***	-0.131	-0.151	0.244**	0.296**	0.313
	[0.018]	[0.009]	[0.155]	[0.024]	[0.133]	[0.023]	[0.114]	[0.105]	[0.032]	[0.047]	[0.163]
Presence Experienced Early Non-Founding Director	-0.089	-0.056	0.631	-0.382**	0.786	-0.430***	0.396	0.459	-0.293	-0.263	-0.124
	[0.260]	[0.212]	[1.339]	[0.158]	[1.332]	[0.154]	[0.751]	[0.764]	[0.278]	[0.386]	[0.634]
Num Other Early Individual Investors	-0.003	-0.005	0.021**	-0.009	0.014**	-0.011	0.018***	0.020***	-0.016	-0.012	-0.010
	[0.008]	[0.006]	[0.009]	[0.014]	[0.006]	[0.013]	[0.005]	[0.007]	[0.015]	[0.031]	[0.037]
Presence Early Business Angel	0.174***	0.186***	-0.501**	0.424***	-0.537*	0.444***	-0.603***	-0.625**	0.601**	0.682	0.727*
	[0.051]	[0.048]	[0.201]	[0.096]	[0.299]	[0.094]	[0.189]	[0.249]	[0.077]	[0.255]	[0.221]
Presence Early Research Institution	-0.485**	-0.502***	-0.442	-0.878***	-0.429	-0.900***	0.613**	0.641**	0.336	-0.047	-1.706*
	[0.197]	[0.153]	[0.700]	[0.304]	[0.582]	[0.301]	[0.284]	[0.254]	[0.296]	[0.664]	[0.405]
Start-Up Age at First VC Investment (years)	0.049	0.060	-0.229***	0.144*	-0.216***	0.150**	-0.173***	-0.194***	-0.229*	-0.248*	-0.001
	[0.044]	[0.041]	[0.076]	[0.075]	[0.073]	[0.075]	[0.061]	[0.052]	[0.054]	[0.070]	[0.252]
Money Inv Before First VC (logs)	0.001	-0.005	-0.035	0.003	-0.022	-0.004	-0.059	-0.051	-0.013	0.044	-0.016
	[0.013]	[0.017]	[0.044]	[0.022]	[0.046]	[0.021]	[0.044]	[0.047]	[0.048]	[0.055]	[0.058]
Presence IVC at First VC	0.208***		0.993*	0.221***			0.432		-0.148	0.339	0.459
	[0.061]		[0.532]	[0.069]			[0.451]		[0.341]	[0.354]	[0.646]
Presence CVC at First VC	-0.224**		0.037	-0.459***	-0.615	-0.503***	0.727	0.482	-0.170	0.763	0.073
	[0.098]		[0.988]	[0.029]	[0.725]	[0.049]	[0.978]	[0.819]	[0.273]	[0.505]	[0.683]
Presence CVI at First VC	-0.025		0.579	-0.170	-0.163	-0.218**	0.416	0.238	0.285	0.496	0.324
	[0.094]		[0.575]	[0.130]	[0.447]	[0.109]	[0.310]	[0.175]	[0.261]	[0.302]	[0.591]
Presence OVC at First VC	-0.118		0.251	-0.259	-0.233	-0.318	0.459	0.465	0.069	0.310*	0.822
	[0.128]		[0.282]	[0.303]	[0.501]	[0.295]	[0.496]	[0.534]	[0.359]	[0.085]	[1.122]
Presence Top IVC at First VC					-0.727	0.331***		-0.602**			
					[0.635]	[0.087]		[0.297]			
Num VCs at First VC	-0.069**		0.008	-0.141**	0.181**	-0.146**	0.103	0.140*	-0.156*	-0.230***	-0.200
	[0.035]		[0.099]	[0.057]	[0.076]	[0.071]	[0.100]	[0.073]	[0.039]	[0.014]	[0.074]
% Ownership by VCs at First VC	-0.000		-0.010***	0.002	-0.008**	0.001	-0.005**	-0.003	-0.006	-0.000	-0.007*
	[0.000]		[0.003]	[0.001]	[0.003]	[0.001]	[0.003]	[0.002]	[0.007]	[0.010]	[0.002]
VC Money at First VC (logs)	0.054**		-0.018	0.100**	0.039	0.075*	-0.106**	-0.065	0.108	0.067	0.202
	[0.027]		[0.069]	[0.039]	[0.078]	[0.040]	[0.042]	[0.045]	[0.089]	[0.028]	[0.119]
VC Director App at First VC	0.237***		0.262	0.439***	0.259	0.430***	-0.122	-0.132	0.660***	0.807*	1.001
	[0.050]		[0.323]	[0.070]	[0.326]	[0.082]	[0.118]	[0.109]	[0.033]	[0.274]	[0.682]
Location and Industry-year Controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Constant	-1.163***	-1.030***	-2.084***	-2.695***	-1.264***	-2.649***	0.102	0.305	-1.380	-3.050	-6.044***
	[0.074]	[0.084]	[0.176]	[0.074]	[0.197]	[0.030]	[0.405]	[0.473]	[0.906]	[1.052]	[0.387]
Observations	908	908	910	910	910	910	317	317	722	679	590
R-squared									0.102	0.123	0.123

Standard errors in brackets