Why Do Entrepreneurs Refuse Venture Capital?

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Abstract

Despite the evidence on the positive effect of venture capital (VC) on portfolio firm performance, such evidence badly pulls up alongside the non-negligible number of entrepreneurial firms that chooses to refuse VC. This is the first study that investigates the determinants behind the missed realizations of VC investor-investee dyads by focusing on the Italian VC market. We theorize and empirically document that entrepreneurs' human capital background and venture-specific characteristics influence the decision to accept or refuse VC. Specifically, our findings show that technically literate founders decrease the likelihood to refuse VC while family linkages in the ownership structure increase the likelihood to refuse VC.

Keywords: venture capital, high-tech entrepreneurship, human capital, family ownership

JEL codes: G24; L21; L25; L26; M13; M21

1. Introduction

Schumpeter (1934, 1939) identified the entrepreneur as an individual with special traits. The alertness to profit opportunities is one of the most important features of entrepreneurial behavior (Casson, 2005; Kirzner, 1997; 2015). However, profit opportunities can remain unexploited simply because of the lack of sufficient funds, the highly idiosyncratic and non-transactional nature of entrepreneurial ideas (see Knight, 1921 and the "cephalization" process), and more generally information asymmetries between the entrepreneur and potential financiers (Carpenter and Petersen, 2002; del-Palacio et al., 2012). One of the most important financial intermediaries advocated in the finance and economics literature to overcome such information asymmetries is represented by venture capital (VC) funds (VCs). VCs have been portrayed as suitable financiers for young and risky high-tech ventures (HTVs), which would otherwise experience difficulties in attracting alternative sources of finance (Gompers and Lerner, 2001, 2004). Accordingly, the available empirical evidence has shown a positive impact of VC on both microeconomic – e.g., firm growth, productivity, and innovativeness (Colombo and Murtinu, 2017; Croce et al., 2013; Devigne et al., 2013; Kortum and Lerner, 2000; Puri and Zarutskie, 2012) – and macroeconomic performances – e.g., entrepreneurship rates, employment, aggregate income (Samila and Sorenson, 2011).

Despite the role-model played by VC worldwide, we do still know very little about the VC investor-investee relationship.[1] While many papers in the finance and economics literature have

[1] The first VC firm was American Research and Development (ARD). It was established in the Boston area in 1946 by academics and local business leaders and its mission was to invest in high-risk emerging start-ups that were based on technologies developed for the World War II. The typical VC investors (VCs) are nowadays organized in small partnerships often composed by less than a dozen partners ('the general partners', GPs) who raise money from institutional investors and wealthy individuals (the 'limited partners', LPs) (Gompers and Lerner, 2001). During the seven-ten years typical fund duration, VCs select portfolio companies, monitor them (Lerner, 1995), provide value added services (Hellmann and Puri, 2002), and ultimately exit the companies, distributing the returns to LPs. See Da Rin et al. (2013) for a detailed description. Many US big firms of today have received VC in their infant stages (e.g. Microsoft, Genentech, Cisco Systems, Apple Computer, Sun Microsystems, Amazon, Yahoo!). Looking at Europe (e.g., Andrieu and Staglianò, 2016; Manigart et al., 2002), the VC industry is still much smaller than the US one (Croce et al., 2013, 2014; Grilli and Murtinu, 2014, 2015), and highly fragmented across and within the Member States (Kelly, 2011). According to the European Venture Capital Association, VC investments (seed, start-up, late stage) in Europe amounted to €3.6 billion in 3,209 portfolio companies. UK (and Ireland) as well as Nordic countries (Denmark, Finland, Norway and Sweden) accounted for €0.9 billion each, while Southern Europe (Greece, Italy, Portugal and Spain) and Central Eastern Europe account for €0.2 billion and €0.1 billion, respectively. Further, one central difference between continental Europe and the US is the main role played by banks, corporations, or governments in the European market (e.g., Andrieu, 2013; Cumming

studied the decision criteria put in use by VCs in selecting promising entrepreneurial firms (Hellmann and Puri, 2000; Kaplan and Strömberg, 2003), very few works have attempted to understand the driving forces leading entrepreneurs to search for VC (Bertoni et al., 2016; Hellmann, 1998).

To the best of our knowledge, there are no studies that investigate the microeconomic determinants behind the missed realization of a VC investor-investee dyad. Therefore, the first contribution of this study is to understand which venture-level characteristics influence the likelihood that entrepreneurs refuse VC. This is extremely important because VC, in addition to advantages – such as financial resources, advice, and access to other investors, suppliers and clients –, may lead to disadvantages such as window-dressing effects (Cornelli and Yosha, 2003) or agency costs with the entrepreneurs, that is, conflicts about corporate strategy (Hellmann and Puri, 2000), appropriability hazards (Ueda, 2004), and excessive intrusion in a firm's management (Cestone, 2013; Hellmann, 1998; Sapienza, 1992).

The second contribution to the VC literature is the focus on a thin VC market as the Italian one.[2] This is an ideal setting for our research strategy: the low number of VCs in the market make the entrepreneurial choice of refusing VC an almost 'one-shot' decision. In this thin market, VCs have strong bargaining power and thus they can make take-it-or-leave-it offers. Then, entrepreneurs need to have very strong motivations to refuse VC, such as private benefits in the form of non-monetary

et al., 2017; Dushnitsky, 2012; Hellmann et al., 2008). This is also the case for the Italian VC market, even though the VC supply by bank-affiliated VCs, corporate VCs, and governmental VCs is relatively lower than that in comparable countries (source: https://www.investeurope.eu/research/activity-data/annual-activity-statistics/). For instance, in 2016 the weight of bank-affiliated and corporate VC investments on the overall VC amount in France, Germany, Spain and the UK has been 16.6%, 22.9%, 24.7% and 14.1%, respectively. In Italy, such weight has been equal to 11.2%. As regards governmental VC, in 2016, its weight on the overall VC amount in Italy (55.7%) has been much higher than that in France (23.5%), Germany (19.9%), Spain (34.3%) and the UK (17.7%). However, translating such percentages into amounts, the governmental VC supply in Italy has been around €80 million, much lower than the corresponding supply in France (around €290 million), Germany (around €200 million), Spain (around €193 million) and the UK (around €240 million). Unfortunately in our dataset there is no information on the institutional nature of VC that was refused by ventures.

[2] Accordingly to the European Venture Capital Association, Italian VC investments on GDP were equal to 0.004% compared to an European average of 0.027%. This appears to be a hard-to-change trait of the Italian VC industry, where the ratio has always been very low (see Bertoni et al., 2015). Early stage equity financing was almost absent up to the mid-1990s. It increased significantly in the 1995-2000 period, reaching a peak of 0.046% of GDP. However, from 2001 it experienced a rapid decline, and it almost disappeared in 2004, when there were only 50 investments in 36 companies. Since then, the industry struggled to recover: in the time frame 2007-2012 the VC/GDP ratio was on average equal to 0.004%.

utility and sentimental attachment to the venture. Besides, our setting – an understudied geographic area with a rather thin VC market – seems, at first glance, to be not-so-generalizable; however, at global level, the thinness of the national VC industry represents the rule rather than the exception. Indeed, only few markets beyond the US (e.g., Israel, Sweden, UK) have really matured (Economidou et al., 2018).

Specifically, our study focuses on specific human capital characteristics of entrepreneurs (i.e., technical literacy of the founding team) and family linkages in the ownership structure, and investigates both theoretically and empirically how these two dimensions may influence entrepreneurial behaviors when deciding whether to accept or refuse VC. In fact, the entrepreneurial finance literature has highlighted how the human capital possessed by the founding team and family linkages represent two key determinants affecting the decision processes through which both VCs target investments and entrepreneurs search for VC. Adopting the "*need* and *opportunity*" approach suggested by Dimov and Milanov (2010), we argue that: i) the technical literacy of the founding team is complementary to the strategic and managerial assets of VCs and it actually represents a powerful signal to attract the interest of VCs; and ii) a concentrated family ownership structure likely signals that the venture has not (yet) solved the control dilemma (Wasserman, 2017; for instance, the founding team attaches a strong socio-emotional wealth to the control of their venture's resources), and thus that the likelihood to refuse a VC deal will be higher.

We use a sample of 120 Italian HTVs that received a VC offer, 40 of which refused VC while the remaining 80 accepted it. This sample is suited for our identification strategy because it only includes ventures that did receive at least one VC offer during their life. Thus, it is not affected by any potential bias related to the inclusion in the estimation of firms that have never figured as credible targets for VCs. Our findings show that the presence of technical literacy within the founding team decreases the likelihood to refuse VC by 16.45% (and this results is even stronger for ICT firms), while family ownership increases such likelihood by +27.6%. These findings are robust to controls for i) the

presence of firms that have never received VC offers, ii) the nature of the received offer (i.e., solicited or unsolicited), and iii) the existence of financial alternatives to VC.

In addition, we also assess the impact that the decision to refuse VC has on the venture growth performance, and we find that such decision has a negative effect on the sales growth performance. Then, by means of a switching regression-type methodology with endogenous switching we show that, on average, firms that refused VC show an yearly sales growth performance of +11.7%, while the same firms would have shown an increase in yearly sales growth equal to +30.9% if they have accepted VC funding. These findings are robust to alternative estimations (i.e., propensity score matching) and several sets of exclusion restrictions.

The rest of the paper is organized as follows. Section 2 reviews the relevant literature and formulates research hypotheses. Section 3 describes the data. Section 4 explains the identification strategy and shows the econometric results. Section 5 concludes.

2. Literature review and research hypotheses

Many scientific works in the finance and economics literature have investigated the criteria put in use by VCs in selecting promising entrepreneurial firms (Fried and Hisrich, 1994; Hellmann and Puri, 2000; Baum and Silverman, 2004; Mrkajic et al., 2017). Ever since the contribution of Tyebjee and Bruno (1984), these studies have shown that VCs look predominantly at technology and market opportunities of potential investees, management team capabilities, as well as the development stage of the business idea. Conversely, only a few contributions have studied the reasons that may lead entrepreneurs to search for VC, and even less are the studies arguing about the possibility that HTVs might actually choose to refuse a VC offer (see Hsu, 2004 for a partial exception in the US context). In fact, conventional wisdom points to VC endorsement as both a measure of success for HTVs and a sort of financing panacea for alleviating entrepreneurs' liquidity constraints. Indeed, it is often argued that VCs make available to investees not only financial resources, but also coaching, advice, mentoring, and access to investment bankers and networks of suppliers, clients and customers

(Hellmann, 2000). However, VC financing is an equity investment, and thus implies a first stiff cost for the entrepreneur when transferring her venture's shares to the VC investor. More importantly, for the entrepreneur there is a loss of control of her HTV which may lead to agency costs between the investor (i.e., the principal) and the entrepreneur (i.e., the agent).

As argued by Hellmann (1998) (see also, for instance, Kaplan and Strömberg, 2001, 2003), to mitigate principal-agent conflicts, the VC investor has to retain control rights (specifically, in his paper the focus is on the possibility to replace the venture's CEO) while the entrepreneur holds high cash-flow rights to maximize her incentive to provide an effort. With a looser application of this idea, the contract may specify that, if the venture performs badly, the VC investor gets full control. Instead, whereas the venture improves its performance, the VC investor gets cash flow rights and gives away to the entrepreneur some control and liquidation rights.

Differently from Hellmann (1998), Cestone (2013) suggests that, when the VC investor needs high-powered outside claims, the entrepreneur should have more control rights to avoid excessive interference of the VC investor, and thus to have high incentives to provide effort. This leads to the fact that high-powered outside claims must be associated to lower control rights for the VC investor.

Beside the allocation of cash flow and control rights, other factors may affect the "control dilemma" of the entrepreneur (Wasserman, 2017) leading founders towards a refusal of the VC offer. First, the strategic vision of the entrepreneur might diverge from that of the investor. This leads to conflicts that absorb entrepreneurs' time and energy to the detriment of firm performance (Hellmann, 1998).[3] Second, appropriability hazards toward the entrepreneurial venture's technology and the related fear of expropriation might induce entrepreneurs with the most promising novel technologies to self-select out of the VC market (Ueda, 2004), and look elsewhere for other sources of external financing. Finally, while some VCs – e.g., bank-affiliated and government-managed VCs (Andrieu, 2013; Cumming et al., 2017; Grilli and Murtinu, 2014, 2015) - take a 'hands-off' approach to venture

[3] Sapienza et al. (1994) find that such conflict is greater in high-tech industries.

oversight (Bottazzi et al., 2008), others are very active in monitoring entrepreneurs' behavior, and many entrepreneurs see this managerial activism as an excessive intrusion in their firm's management (Cestone, 2013; Hellmann, 1998; Sapienza, 1992). The relatively higher presence of hands-off VCs in continental Europe (and in Italy) may lead to a lower likelihood of refusing VC offers; this tendency may be even reinforced by the implicit 'one-shot' nature of the decision at stake in thin VC markets, as the Italian one (see footnote 1). Thus, our findings likely represent a "lower bound", as compared to those associated to more developed VC markets, and constitute a first step in the provision to policymakers of a picture of the investor-investee relationships, which may have important backlashes on the real economy in terms of innovation, employment and economic growth – especially in countries where entrepreneurial finance opportunities are not so developed.

In our search for regularities on the venture-side characteristics that are more conducive to VC refusal, we focus on two key determinants – investigated by the entrepreneurial finance literature – that should influence the investment criteria of VCs and/or the search for equity funding by entrepreneurs. The first determinant is at the team-level and it is represented by the founders' human capital. The second one is related to the ownership structure of the venture and, specifically, to the concentration of shares into the hands of a single family. In this investigation, we adopt the same approach of Dimov and Milanov (2010) in gauging the effects of founders' human capital and family ownership – as functions of a venture's *need* and *opportunity* – on the decision to take a VC investor on board.

Starting from the founders' human capital, the VC literature highlights how this dimension represents an important selection criterion of VCs' target choice (Muzyka et al., 1996). Among many others, Baum and Silverman (2004) claim that: "[i]n the popular business press, VCs commonly report that "nothing is more important than people" (p. 417). Zacharakis and Meyer (2000) find that past experience of top management teams is a relevant selection driver of VCs (see also Burton et al., 2002). Generally, all these contributions do consider neither that entrepreneurs' human capital might also explain the entrepreneurial choice to refuse VC nor that different characteristics of the founding

team may exert a different role in this respect. We instead argue that the human capital characteristics of the founding team may have an impact on the choice to refuse VC, and make a distinction between the technical literacy of the founding team and its level of economic/managerial competences. Technical literacy within the founding team allows the venture to be alert not only to Kirznerian profit opportunities, but also to entrepreneurial opportunities (Shane and Venkataraman, 2000) in the form of, for instance, new technologies to incorporate in the processes to develop, produce and commercialize products/services, new materials to save costs alongside the production process, or new functionalities to add to the current set of products/services. In addition, as argued by Arora and Nandkumar (2012), internal technical knowledge typically allows ventures to build necessary innovative inputs instead to access the market for ideas. This may be due to the greater subjective ability of technically endowed founders to screen the market for ideas, identify and perceive cues, attributes, information and signals about potentially useful innovations, and use their technical knowledge to combine such inputs sourced from the market for ideas with the resources and assets of the venture in an innovative way, thus leading to new products/services, technologies, ideas, functions, characteristics and uses of their venture's assets (Foss et al., 2007).

On the one hand, the greater is the reliance of the entrepreneurial team on technical capabilities, the higher should be the *need* to complement these technological competencies with the strategic and managerial assets of VCs (Sapienza and Gupta, 1994). As argued, for instance, by Brush et al. (2001), to attain a sustainable competitive advantage, ventures need to assemble resources and combine them in a proper way aimed at building a unique resource base with distinctive features. To build such unique resource base, a founding team endowed with a technical core (but not with economic and managerial skills) is likely to require the VC's strategic vision, alongside with its financing resources and the economic, managerial, networking competencies in order to pursue that vision (Eesley et al., 2014). As argued by Arthur (1996): "the art of playing the tables in the Casino of Technology is primarily a psychological one. *What counts to some degree—but only to some degree—is technical expertise,* deep pockets, will and courage. Above all, the rewards go to the players who are first to

make sense of the new games looming out of the technological fog, to see their shape, to cognize them." (p. 5).

On the other hand, Bertoni et al. (2016) show that, especially in thin VC markets where sorting mechanisms (Sørensen, 2007) seem to be absent, the most interesting targets for VCs are those ventures with which the VC investor can best combine its competencies. In other terms, and using Bertoni et al.'s terminology (p. 401), "the intermediation role of VC is better described as frog-kissing (i.e., select the frog that can be turned into a prince) than as cherry-picking (i.e., select the prince)." In this respect, the technical literacy of the venture's founding team appears as a fundamental pre-requisite for attracting the interest of VCs. As shown by Hsu (2007), founding teams endowed with technical capabilities are more likely to signal the quality of their venture, and thus to be backed by VCs (and receive a higher valuation) (see also Packalen, 2007 and Gimmon and Levie, 2010). Hence, the technical literacy of the entrepreneurial team should raise the *opportunity* for a venture to secure VC. Accordingly, based on the above "need and opportunity" arguments, we expect a univocal negative impact of technical literacy on a venture's probability to refuse VC.

Instead, economic and managerial competencies possessed by the founding teams reflect a much more nuanced picture. On the one hand, a high level of founders' economic and management literacy may lead ventures to better gauge the importance of VC in their context; on the other hand, the founding teams endowed with economic and management literacy may consider VC and their competencies less crucial, since they may already possess in-house many of the strategic managerial skills that VCs would have eventually brought in (Bertoni et al., 2016). Thus, for this and other possible arguments, we prefer not to formulate any specific hypothesis related to economic and managerial literacy and we openly leave to the empirics to eventually determine the impact of such dimension on the investigated phenomenon. Therefore, as to founders' human capital, we only posit the following hypothesis:

H1. Technical literacy of the founding team decreases a venture's likelihood to refuse VC.

Not surprisingly, the VC investor-investee relationship has often been studied through the lens of the agency cost theory (Jensen and Meckling, 1976; Sahlman, 1990). The main idea is that VCs (principals) must structure the relationship to protect their investment from the potential moral hazard and opportunism of the entrepreneurs (agents). In the deal negotiation, VCs usually want to insert contractual clauses related to veto rights on entrepreneurs' decisions, power to replace the founders/CEOs and/or other key managers, stock options, liquidation preferences, dilution protection clauses, and 'ratchets' (Hellmann, 1998). Thus, the deal negotiation includes many key issues on which the two parties might disagree. Among these factors, the valuation price of the investee is surely a key one (Sahlman, 1990) but others are equally important. In the typical deal structure, VCs and entrepreneurs have to converge on the shareholder agreement covenants (Hellmann, 1998), such as the amount and timing of investment stages, the rights to access information on the venture behavior (e.g., budget plans, internal reports), restrictions on asset disposal, and buy-back provisions.[4] Thus, several bargaining clauses may lead the entrepreneur to blow up the transaction. In this respect, the pre-(eventual) deal ownership structure of the venture is an important factor to take into consideration. Ventures founded by more founders and characterized by a more diluted ownership are more likely to have solved the control dilemma – i.e., the trade-off between acquiring the resources to create value and retaining control of firm management – in favor of a more open attitude, and consequently be more keen to get VC financing (Wasserman, 2017). At the same time, VCs are more likely to approach this kind of ventures, expecting that bargaining clauses could be more smoothly discussed and then agreed upon. Conversely, for ventures with a more concentrated ownership, both the (perceived) *need* and *opportunity* to secure a VC investment could be relatively reduced, and the extant entrepreneurial and behavioral finance literature suggests that this is particularly true where the ownership is concentrated in a family. While VCs are pure profit-seeking

[4] It is worth noting that agency theory is more suited to study the VC investor-investee relationship before the investment. In fact, uncertainty and information asymmetries are at their highest level during the due diligence process, and not after the deal closing.

investors, often family-owned ventures have different and more multifaceted utility functions, which include the socio-emotional wealth attached to their business (Berrone et al., 2012). These arguments lead, from the one side, to decrease the (perceived) *need* for an external professional equity investor (and the associated transfer of control rights) and, from the other side, to reduce the *opportunity* to find it given the misalignments of objectives and the foreseen difficulties in the deal bargaining process.[5] These difficulties may also lead VCs to impose particular unfavorable conditions to family ventures in anticipation of greater problems in the management of the investment, and, in doing so, trigger the ultimate refusal by family firms. Accordingly, in an explorative study on UK family firms, Poutziouris (2001) indicates that the financial development in family firms is governed by the 'keep it in the family' tradition. Family firms are systematically more dependent on internally generated funds (i.e., retained profits) or debt finance (Anderson, Mansi and Reeb, 2003) for their survival and development than non-family ones. In addition, family firms are found to be much more reluctant in widening the equity base at the cost of handing over family business control (Tappeiner et al., 2012). Wu, Chua and Chrisman (2007) show that family involvement makes the use of equity finance less likely, and they interpret this finding with family ownership being intertwined with the goal to keep control of the venture. Indeed, the authors show that family owned ventures, when in need of external capital, prefer to have a highly levered capital structure to keep control. In the same vein, Croce and Martì (2016) show that, even though the desire to protect socio emotional wealth would limit the interest of family firms in approaching VCs, when the firm is in (financial) trouble, family goals tend to converge with economic or financial goals. Accordingly, their results evidence a negative relationship between the productivity growth in family firms and the subsequent likelihood of a VC investment, especially in first generation family firms. Therefore, we posit the following hypothesis:

H2. Family ownership increases a firm's likelihood to refuse VC.

[5] We thank an anonymous reviewer to raise this issue. In this respect, please note that we do not know the exact terms of the offers, so it is impossible for us from an empirical point of view to gauge the precise motive behind the denial. We acknowledge this as a limitation of our study.

3. Data

The sample used in this study is drawn from the RITA (Research on Entrepreneurship in Advanced Technologies) dataset, developed by a major technical Italian university, which is the most complete presently available source of microeconomic data about Italian new technology-based firms (e.g., Colombo and Grilli, 2013). Sampled high-tech ventures are less than 25 years old, were independent at foundation date and remained so up to 1/1/2008 (i.e., they were not controlled by another company although other organizations may have held minority shareholdings). All firms are privately held. They operated in the following high-tech industries: computers, electronic components, telecommunication equipment, optical, medical and electronic instruments, biotechnology, pharmaceuticals, advanced materials, avionics, robotics and process automation equipment, multimedia content, software, Internet services, and telecommunication services.[6]

For the construction of the RITA population of firms several sources were used (see On-line Appendix A for a complete list). As emphasized by the previous studies that used this data source (e.g., Colombo and Grilli, 2010; 2013; Colombo et al., 2009, 2011), the heterogeneity of sources is a very valuable strength of the RITA dataset, especially given the problems that official statistics do have in this respect (see again the On-line Appendix A). Microeconomic data included in the RITA dataset originate from two sources. The first source is a series of surveys carried out in 2000, 2002, 2004 and 2008. The second source includes secondary data about financial and accounting variables (sources: AIDA and CERVED commercial databases), which are available from 1994 to 2009.

Data collected through the above surveys include the information on whether firms received a VC offer at their foundation or after. In particular, firms were asked to indicate if they received a VC offer during their life, if they refused it or not and, in case of refusal, firms were asked to indicate the motivation of refusal. In the RITA dataset (which as of December 31st, 2012, provided information

[6] The definition of 'new technology-based firm' is still widely adopted in the EU policy arena (since the special issue in Research Policy 1998 edited by Storey and Tether, several recent country reports were published from OECD and the European Commission) and in the scientific community (e.g. Czarnitzki and Delanote, 2013; Grilli, 2014). Being aware that it may be questionable to label a 24 years old firm as 'new', in this study we use the more neutral term 'high-tech venture'.

on 1,979 HTVs), 120 firms received a VC offer during the early stages of their life.[7] Out of these 120 high-tech entrepreneurial firms, 40 refused and 80 accepted VC offers.[8]

The RITA dataset has several strengths. First, data on sample firms are very informative and allow us to build a rich set of variables that can be used in the econometric estimation, such as detailed information about demographic and human capital characteristics of entrepreneurs (e.g., technical and economic-managerial literacy of the founding teams; prior managerial experience of founders in larger firms) and the social and institutional context surrounding ventures (e.g., family linkages in the ownership structure). Second, the dataset provides information on the whole components of the founding team: this is a strong advantage compared to recent studies about entrepreneurial dynamics that use data on the principal founder only (e.g., Hmieleski et al., 2013, Rauch and Rijsdijk, 2013). Third, the RITA dataset provides an ideal testbed for identifying those ventures that could receive a VC offer since the dataset does not include lifestyle firms and firms that are purely created for tax-saving purposes.

The distribution of sample firms across industries, geographical areas and foundation dates is illustrated in Table 1. More than one-half of sample firms operate in Software & Internet industries (53.33% of total sample). The majority of VC-backed firms comes from this specific sector (57.50%), while this percentage shrinks in the sample of VC refusing firms (45%). Conversely, ICT manufacturing firms account for the 18.75% of VC-backed firms and the 35% of the refusing ones. As to the geographical location, VC-backed firms are more likely located in the north-western area

[7] Note that the representativeness of our sample with the population of Italian HTVs is not a requirement in our research setting since we are interested in the phenomenon of VC refusal, and so we only focus on those firms that *did* receive a VC offer. However it is worth noting that χ^2 tests show that there are no statistically significant differences between the distribution of the 120 sample firms and the corresponding distribution of the RITA population of 1,979 HTVs across geographic areas ($\chi^2(3)= 6.128$) and industries ($\chi^2(3)= 5.621$). Conversely, sample firms are somewhat younger than the population ($\chi^2(4)= 10.581$). Also note that the percentage of VC-backed firms on the population (4%) reflects a typical trait of the VC industry (Mulcahy, 2013).

[8] The RITA dataset also contains information on whether firms actively looked for VC financing or not. It is important to observe that, considering the principal variables included in this study (please see Table 2), the sample of firms looking for VC does not significantly differ from the sample of firms that were approached by VCs (these statistics are available from the authors upon request). Even though our results are not likely to be affected by a selection between solicited and unsolicited VC offers, we perform some robustness checks on this issue as described in Section 4.

of Italy (45%), while the 42.5% of VC refusing firms are located in the north-eastern part. Differences in both industry and geographical area are statistically significant but only at the 10% level ($\chi^2(3)$= 7.254 and $\chi^2(3)$= 6.789 for industry and geographical area, respectively). The χ^2 tests show instead that there is no statistically significant difference between the distribution of the two samples firms across foundation periods ($\chi^2(4)$= 0.495).

[Table 1 about here]

4. Results

4.1 Determinants of VC refusal

Table 2 reports the definition of variables used in the empirical analysis. To show an univariate comparison between firms refusing VC and VC-backed firms, we first look at their descriptive statistics provided in Table 3. First, as regards the test of our hypotheses, we use a dummy variable (*Family*) which indicates if family members are majority shareholders, and *Technical education* which is a dummy variable that equals one if at least one of the founders has a bachelor degree in technical/technological subjects. Second, as other proxies of the founders' human capital we include the economic education of founders (*Economic education*) and a dummy variable indicating whether at least one of the founders has prior managerial experience (*Managerial experience*). Finally, as proxies of firm size, we consider the size of the founding team (*N. founders*) and of the workforce (*N. employees*). We also employ the dummy variable *Born before 2000* as a time control for the Dot-com bubble.

[Table 2 about here]

[Table 3 about here]

Results show no significant differences between VC-backed firms and firms refusing VC along the investigated characteristics except for family ownership: a statistically significant higher proportion of family-owned firms belongs to the group of firms refusing VC.

In Tables 4a and 4b we resort to a multivariate analysis by means of probit models to analyze which venture characteristics are more likely to influence the probability to refuse VC. The dependent variable takes value one if the firm refused a VC offer during its life. Otherwise, for VC-backed firms, the dependent variable takes value zero. In particular, Table 4a reports the main model specification while in Table 4b we test the robustness of our findings to potential sample selection issues. Model I in Table 4a includes as independent variables the set of firm-level characteristics, while Model II adds the variables related to the human capital of founders. Industry and location dummies are included to control for differences across industries and regions.[9]

[Table 4a and Table 4b about here]

Results in Table 4a partially confirm what highlighted in the descriptive statistics: family-owned firms are significantly more likely to refuse VC (supporting Hypothesis H2). According to the marginal effect of the covariate in Model II, family linkages in the ownership structure lead to an increase in the likelihood to refuse VC equal to +27.60% (similarly, the marginal effect is equal to +27.61% in Model III). Moreover, this multivariate analysis indicates the significance of founders' technical education in influencing the decision to refuse VC: the presence of at least a founder with technical education decreases the probability to refuse VC (supporting Hypothesis H1). As regards the magnitude of this impact, the marginal effect in Model II indicates that the presence of founders with technical education within venture teams leads to a decrease in the likelihood to refuse VC equal to 16.45%. Conversely, the presence of founders with economic literacy shows a negligible coefficient from a statistical point of view, probably reflecting the existence of opposite forces at work, as hypothesized in Section 2.

As further evidence of these results, we consider that Hypothesis H1 may be especially supported for technology-driven firms (that is, ventures whose technology is an important source of value)[10],

[9] For the sake of synthesis, since the effect of industry and location dummies is jointly statistically insignificant (as testified by Wald tests in Model II for both industries [Prob > chi2 = 0.6686] and locations [Prob > chi2 = 0.4833]), their coefficients are omitted.

[10] We thank an anonymous reviewer for this suggestion.

such as ICT firms. We test this contingency in Model III in which we add the interaction terms between founders' technical education and two dummies representing ICT industries (i.e., ICT manufacturing and Software & Internet) and non-ICT industries (i.e., Other manufacturing and Other services). Our expectations are confirmed as results indicate that the presence of founders with technical education leads to a significant decrease in the likelihood to refuse VC especially in ICT industries with a marginal effect equal to 17.14% (while the coefficient of the interaction with non-ICT industries is not statistically significant, even though negative). In a nutshell, our two research hypotheses are fully supported – both in statistical and magnitude terms.

As to the robustness checks reported in Table 4b, in our estimates in Table 4a we do control neither for the fact that our sample does not include firms that never receive a VC offer (but that could in principle have received one), nor for the solicited or unsolicited nature of the received offer.[11] To the extent that this information is potentially correlated with our regressors, our estimates in Table 4a may be biased.[12] We deal with these concerns in two different ways. As to the first, in Model IIa we closely follow the procedure suggested by Hsu (2004). We estimate a Heckman-type two-stage probit analysis on all RITA firms – for which we have information on the variables of interest – so including both the firms that received VC offers and those that did not receive any offer (out of 664 HTVs, 120 received a financing offer and the remaining 544 did not). The first stage discriminates between firms that have received an offer and firms that did not, and the second stage investigates the probability to refuse the offer.[13] Specifically, in the first stage the dependent variable is a dummy that equals one if

[11] Another problem may be related to the fact that the decision of a VC fund manager to make an offer is endogenous to her perception on whether the entrepreneur would accept an offer or not: if the VC fund manager thinks that the entrepreneur is unlikely to accept an offer, she will not make one in the first place. Of course, these cases will never be included in our sample of VC refusal. Unfortunately detecting these cases though a survey is rather since they are more apt to be investigated though qualitative research. Moreover, it is important to highlight that we wanted to have a pure sample of firms on which we were sure they received an offer in order to avoid grey areas. We thanks an anonymous reviewer for this comment.

[12] It is worth noting that since our aim is to understand the underlying drivers behind the decision to refuse VC-backing, we prefer to focus only on those firms that had the opportunity to choose. This sampling choice is commonly made in empirical studies, also among those related to VC (Bernstein et al., 2017).

[13] Hsu (2004) had firms receiving a single offer and firms receiving multiple offers in the first stage, while the second stage investigates the probability to accept the offer or not.

the venture received a VC offer, and zero otherwise. The independent variables are the covariates of Model II; in addition, mimicking Hsu (2004), we use as exclusion restriction a dummy variable (*Patent at foundation*) that equals one if the focal firm has an assigned patent at foundation. As argued by Hsu (2004), this variable is a proxy of firm quality and thus it should increase the likelihood to receive a VC offer, but it is very unlikely to influence the outcome of the negotiation between the investor and the potential investee. Our empirical test confirms Hsu's presumption also in our context: *Patent at foundation* has a positive and significant effect on the probability to receive a VC offer. Estimates of the first stage are reported in the On-line Appendix B (Table B1). As in Hsu (2004), our results do not highlight a sample-selection bias in our data – as testified by the negligible coefficient of the Inverse Mills ratio. Further, as regards the test of our research hypotheses, results are unchanged.

As to the second concern, in Model IIb we better control for the solicited versus unsolicited nature of the VC offer. More in detail, we include a dummy variable (*Solicited offer*) that equals one if the venture actively looked for VC, and zero otherwise. The coefficient of this variable turns out to be largely insignificant, pointing to the absence of any relevant selection effect based on proactiveness by the venture or the investor. More importantly, our findings are almost unchanged.

[Table 4c about here]

Another possible concern related to our findings is the absence of any control about the existence of valid alternatives to the VC financing, which may clearly interfere with the decision to accept or refuse VC. As shown by Seghers et al. (2012), limited knowledge of finance alternatives may lead to suboptimal financing choices. Even though the authors argue that entrepreneurs' human capital enhances the knowledge of finance alternatives – and so our human capital variables could partially take into account of this issue – we do provide a specific (even though partial) robustness check. Specifically, in Table 4c we include an additional control on whether the HTV at foundation made use of bank debt (Model IIc) and the percentage of bank debt out of the whole founding financing sources (Model IId). Results do not highlight any strong and significant influence of these two

variables on the probability to refuse VC and, more importantly, leave our results unchanged. This represents a further hint that VC represents more than a simple financing source in the HTVs' eyes (see Section 2), and so its acceptance/refusal is not merely driven by the availability of alternative financing modes.

4.2 Additional evidence on the impact of VC refusal

We now investigate the consequences of the venture's choice of refusing VC. We collected accounting data for both firms refusing VC and VC-backed firms. We were able to collect information for 98 out of 120 firms that received a VC offer. Out of these 98 firms, 32 refused VC and the remaining 66 are VC-backed. Overall, we observe these firms from the time of the VC offer up to the year 2008. Our sample is composed of 698 observations (on average 7 years per firm). We focus on sales growth performance and we estimate whether a firm's growth path has been influenced by the choice of refusing VC. To this extent, we include the *VC refusal* dummy among covariates and we control for different factors affecting firm growth by including the same independent and control variables used in previous models. As a first preliminary estimate, we resort to a random-effects estimation. Results are reported in the first column of Table 5.

[Table 5 about here]

We find that the decision to refuse VC has a negative effect on the sales growth performance.[14] This seems to confirm the positive role of VC on venture growth, which is usually found in the previous literature – also in contexts different from the U.S. (Colombo and Grilli, 2010; Grilli and Murtinu, 2014, 2015). In order to dig further into this result, we then employ a switching regression-type methodology with endogenous switching (Maddala, 1983).[15] This model is composed of a probit selection equation (first stage) and two different growth equations (second stage), one for firms

[14] The same indication is found when looking at the M&A firm dynamics, where M&A is usually considered as a positive outcome for entrepreneurial ventures. Specifically, only 5 firms (12.5%) among the VC refusing ones have been acquired versus 24 ventures (30%) among the VC-backed firms, with a statistically significant difference at 5% confidence level.

[15] This methodology is not new in the VC literature (e.g. Chemmanur et al., 2011; Colombo and Grilli, 2010; Croce et al., 2013; Jelic et al., 2005; Lee and Wahal, 2004).

refusing VC and one for VC-backed firms. The three equations are jointly estimated by means of Full Information Maximum Likelihood (FIML), allowing for correlations among the error terms in the system of three equations. More in detail, in the first stage we run a probit model to predict the likelihood of refusing VC (reported in the last column of Table 5) and we calculate the inverse Mills ratios for firms refusing VC and for VC-backed firms, respectively. Among the covariates, in addition to the variables previously described, we include, as proxy for investment, the one-year lagged total assets growth.[16]

As exclusion restrictions, we include the annual amount of expenses by public administrations (in mln €) in the province (NUTS 3 level) where the firm is located (*Public Financing*; source: Italian National Institute of Statistics, ISTAT) and the annual number of VC investments in the region (NUTS 2 level) (*Local VC investments*; source: Italian Association of Venture Capital and Private Equity Investors, AIFI). Ideally, the former should indirectly capture the presence of viable (public funding) outside options to the take-it-or-leave-it offer proposed by the VC fund, while the latter should reflect the attitude of the local entrepreneurial community towards VC financing, given also the strong *home-bias* of VCs in selecting their targets (e.g., Gompers and Lerner, 2004). Then, both variables have a geographical dimension and should be uncorrelated to the sales growth performance of each single firm of the panel.[17] Accordingly, first stage estimates reveal that the coefficient of *Local VC investments* is negative and statistically significant (at the 10% confidence level), while the coefficient

[16] Alternatively, we control for a measure of stock: our findings remain unaltered. Results are not reported in the text for the sake of brevity but are available from the authors upon request. We thank an anonymous reviewer for suggesting this additional check.

[17] Finding an exclusion restriction that influences the decision to refuse VC and, at the same time, does not affect venture performance is quite difficult. Our strategy was to exploit a mismatch between the aggregation levels of the instruments (which are measured at the regional/provincial level) and of the performance measure (which is instead firm-specific). This "mismatch logic" in the search for instruments has been used in many other contexts. As regards VC research, Lee and Wahal (2004) investigate first-day return differences between VC-backed and non-VC-backed IPO firms, and use as instruments industry (SIC code) dummies, year dummies and headquarter-state dummies among others. Colombo and Murtinu (2017) study the impact of independent and corporate VC funds on the economic performance of high-tech entrepreneurial firms, and use as instruments for VC-backing a set of industry-level (4-digit NAICS code) variables (i.e. ratio between the total M&A market volume and the total number of deals; effectiveness of formal and informal mechanisms to protect innovation; importance of universities and higher education institutions as sources of external knowledge) and country-level variables (i.e. GDP growth). In our case, the availability of 'outside financing options' at the regional/provincial level should be correlated with the probability that the firm refuses VC but it should not directly affect firm performance.

of *Public Financing* is positive and significant at the 1% significance level. Moreover, in unreported regressions (available upon request), both variables were found highly insignificant in the second stage, confirming their validity as exclusion restrictions.

In the second stage of the endogenous switching regression model, two separate pooled regressions are estimated for firms refusing VC and for VC-backed firms, respectively. The dependent variables are represented by sales growth performance. The covariates include the inverse Mills ratios estimated in the first stage (to account for the endogenous nature of VC refusal based on unobservable factors) and all of the covariates included in the first stage. It is important to observe that the inverse Mills ratios are positive and statistically significant in both equations. The predicted values of firm growth are then used to answer the following question: what would the growth of a firm refusing VC have been had it received VC funding? Results are reported in Table 6.

[Table 6 about here]

On average, firms refusing VC show an yearly sales growth performance of +11.7%, while the same firms would have shown an increase in yearly sales growth equal to +30.9% if they have accepted VC funding. Therefore, this analysis confirms that there would be a considerable value-adding effect of VCs on the growth of firms refusing VC.[18]

As robustness checks we first run a propensity score matching (PSM) analysis on the probability to refuse a VC offer. Covariates are the same we used in the first stage of the endogenous switching regression model reported in Table 5. Results are reported in the On-line Appendix, see Table B2, while in Table B3 we report the comparison between the average firm growth of treated firms (i.e., firms refusing VC) and that of untreated matched firms (i.e., VC-backed firms). On average, firms refusing VC show a yearly sales growth performance of +10.6%, while matched VC-backed firms

[18] It is important to highlight that our results are not driven by a selection effect by VCs because we only look at firms that received a VC offer. This excludes any screening effect that can allegedly influence our results on the estimation of VC impact. Moreover, the result about the significance of VC impact is reinforced by the fact that the growth improvement of VC-backed firms is lower than the absolute value of growth deterioration of firms refusing VC.

show an increase in yearly sales equal to +26.8%. The difference is statistically significant at the 5% confidence level – as reported in Table B3 (see the On-line Appendix).

Second, in the same spirit of Bosma et al. (2004), we acknowledge that our instruments may not be entirely satisfying. At the same time, we stress that exclusion restrictions are not considered strictly mandatory in these types of models (see e.g., Li and Prabhala, 2007) and, more importantly, alternative and rather different choices of exclusion restrictions lead to almost unchanged results. Specifically, findings are the same when we use as an additional exclusion restriction in the endogenous switching regression model (shown in Table 5), that is, a variable extracted from the World Values Survey that captures the internal locus of control of inhabitants in the region (at NUTS 2 level) where HTVs are located (i.e., the item "I decide my goals in life by myself"). As shown by the extant literature, internal locus of control is a more prevalent psychological trait in individualistic cultures (Mueller and Thomas, 2001), where entrepreneurs are more likely to consider themselves as self-sufficient (Pinillos and Reyes, 2011), and consequently entrepreneurs are less likely to accept the entry of a new partner within their team.

Again looking at the On-line Appendix, first stage estimates in Table B4 reveal that the coefficient of this variable is positive and statistically significant (at the 1% confidence level). As reported in Table B5, on average firms refusing VC show a yearly sales growth performance of +11.5%, while the same firms would have shown an increase in yearly sales growth equal to +28.7% if they have accepted VC funding. The difference is statistically significant at the 1% significance level. Similar results are obtained with the replication of the Hsu (2004)'s identification strategy (in his analysis on the determinants of venture performance), and the choice of firm innovativeness (*Patent at foundation*) as additional exclusion restriction (results available upon request). Therefore, despite unavoidable limitations, all these robustness checks suggest that there would have been a considerable value-adding effect of VCs on the growth of firms that refused VC.

5. Conclusions

VC is a key financing instrument for entrepreneurial ventures. These latter are usually priced by financial markets on their ability to attract rounds of investment from VCs. This is partly due to the fact that many US leading companies have been VC-backed entrepreneurial ventures. Accordingly, one would expect that a VC offer is celebrated by an entrepreneur like she had won one billion dollars, especially in countries where VC supply is rather thin. However, reality is far from this. In many cases, entrepreneurs do refuse VC. So, why does this happen?

This study aims at shedding light on this issue that has been totally overlooked by the extant literature. We do provide some answers to this interesting question looking at a particularly underdeveloped VC market, such as the Italian one. Grounding on the economics and finance literature on VC, we theorize on which entrepreneurial team- and venture-specific factors could significantly influence the entrepreneurial decision to refuse VC. Furthermore, we show the impact of the refusal choice on firm growth performance, and highlight what would the growth of refusing firms have been had they got VC funding. Using a sample of 120 HTVs which received a VC offer during their life, we use multiple estimation strategies and find out a series of findings which have several implications.

First, the ownership structure of a venture is an important factor behind VC refusal. In particular, family ownership makes more likely for a venture to refuse VC. Given the hypothetical growth performance entrepreneurial ventures could have achieved with VC, family linkages in the ownership structure of nascent entrepreneurial ventures may represent an hurdle towards firm growth. Specifically, the high percentage of family firms in the Italian (and European) economy and the dominant tight approach adopted by Italian families in the management of their firms[19] may help explain the poor development of the VC industry in this context.

[19] Accordingly to the Italian Association of Family Businesses in Italy (AIDAF), in Italy there are around 784,000 family businesses, i.e. more than 85% of the total number of firms. The percentage is in line with the other major European countries: France (80%), Germany (90%), Spain (83%) and the UK (80%). But what differs is that 66% of the Italian family businesses are fully managed by family members, while this applies to only 26% and 10% of French and UK family businesses, respectively.

Second, VC refusal and its underlying motivations are influenced by the human capital characteristics of the founding teams. Specifically, ventures whose founders have educational literacy in technical subjects are less eager to refuse VC. This finding complements the literature explaining how high-tech ventures need to combine a strong technical core with economic and managerial competencies (e.g., Colombo and Grilli, 2005); more interestingly, we highlight how this combination can be realized through partnerships with VCs and not necessarily within the founding team.

Third, VC refusing ventures achieved a significantly lower growth performance than the one of VC-backed firms. Further, firms refusing VC show a lower growth than what the same firms would have achieved had they accepted VC funding. This latter result may represent a policy problem. In fact, the impact of ventures' growth on the aggregate growth embodies a social welfare issue. Specifically, our empirical evidence shows that some ventures have suitable *a priori* characteristics to enhance social welfare, but they choose not to do it.

A possible explanation relates to the potential agency conflicts with VCs in terms of different strategies, appropriability concerns, and potential loss of control. As to the latter, (some) entrepreneurs may be more likely to prefer private benefits of control (e.g., non-monetary benefits including sentimental attachment to the venture) than a higher venture growth "but shared with the VC" (see the "control dilemma" highlighted by Wasserman, 2017). The fact that the willingness to keep firm control *at all costs* may lead entrepreneurs to refuse VC, and thus choose sub-optimal growth paths for their firms, is surely worth of reflection from a policy perspective. Furthermore, the ways this problem can be ameliorated represent limitations in our study and promising future research avenues.

First, future studies should investigate how the entrepreneurial decision to refuse VC potentially interacts with funding alternatives available at the time of the VC offer, such as crowdfunding, business angel funding, loan guarantee schemes, bank loans, factoring and short-term finance provided by suppliers (Bruton et al., 2015). In the same vein, it would also be interesting to analyze

whether the institutional heterogeneity of VC investors which is found to impact differently many dimensions of the investees (e.g., Bertoni et al., 2013) may also affect VC refusal patterns. Second, it is necessary to deeply investigate how the political, cultural, legal, and institutional barriers may shape the behaviors of entrepreneurs and VCs when interacting in entrepreneurial finance markets (Moore et al., 2015). Finally, research is needed to understand how entrepreneurs may deal with corporate governance problems with VCs. Being principal-principal conflicts a serious issue in HTVs (Colombo et al., 2014), particular attention should be devoted to understand the role of banks, covenants and the maturity of debt in preventing horizontal agency problems, especially when these latter are associated with the allocation of control rights (Khanin and Turel, 2015).

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Tables

Table 1. Distribution of sampled firms across industries, geographical areas, and foundation periods.

	VC-backed firms		Firms refusing VC		Total	
	N. firms	**%**	**N. firms**	**%**	**N. firms**	**%**
Industry						
ICT manufacturing	15	18.75%	14	35.00%	29	24.17%
Software & Internet	46	57.50%	18	45.00%	64	53.33%
Other manufacturing	15	18.75%	7	17.50%	22	18.33%
Other services	4	5.00%	1	2.50%	5	4.17%
Total	**80**	**100%**	**40**	**100%**	**120**	**100%**
Geographical area						
Northwest	36	45.00%	13	32.50%	49	40.83%
Northeast	20	25.00%	17	42.50%	37	30.83%
Centre	16	20.00%	6	15.00%	22	18.33%
South&Isles	8	10.00%	4	10.00%	12	10.00%
Total	**80**	**100%**	**40**	**100%**	**120**	**100%**
Foundation period						
1980-1985	6	7.50%	2	5.00%	8	6.67%
1986-1991	15	18.75%	7	17.50%	22	18.33%
1992-1997	18	22.50%	8	20.00%	26	21.67%
1998-2003	29	36.25%	15	37.50%	44	36.67%
2004-2008	12	15.00%	8	20.00%	20	16.67%
Total	**80**	**100%**	**40**	**100%**	**120**	**100%**

Table 2. Definition of variables.

Variable	Definition
VC refusal	Dummy that equals one if a firm refuses VC financing
N. founders (logs)	Number of founders in logarithm
N. employees (logs)	Number of employees at foundation in logarithm
Born before 2000	Dummy that equals one for firms that were founded before 2000
Family	Dummy that equals one if the focal firm is a family firm
Economic education	Dummy that equals one if at least one of the founders has gained a bachelor degree in economic subjects.
Technical education	Dummy that equals one if at least one of the founders has obtained a bachelor degree in technical subjects.
Managerial experience	Dummy that equals one for firms with one or more founders with a prior management position in a company with more than 100 employees

Table 3. Descriptive statistics: VC-backed firms and firms refusing VC.

	VC-backed firms	Firms refusing VC	Firms refusing VC vs. VC-backed firms	
	I	II	III	
	Mean	Mean	Diff	Sign.
N. founders (logs)	1.240 (0.049)	1.303 (0.061)	0.063 (0.082)	
N. employees (logs)	1.227 (0.126)	0.927 (0.125)	-0.300 (0.199)	
Born before 2000	0.788 (0.046)	0.650 (0.076)	-0.138 (0.084)	
Family	0.050 (0.024)	0.200 (0.064)	0.150 (0.057)	***
Economic education	0.288 (0.051)	0.200 (0.064)	-0.088 (0.085)	
Technical education	0.625 (0.054)	0.500 (0.801)	-0.125 (0.096)	
Managerial experience	0.375 (0.054)	0.325 (0.075)	-0.050 (0.093)	

Legend: in columns I and II, we report means and standard errors (in round brackets) for VC-backed firms and firms refusing VC, respectively. In column III, we report the Wald test on the difference between the mean value of VC-backed firms and the mean value of firms refusing VC. *** p-value<.01.

Table 4a. Estimation results: probability to refuse VC.

		Model I		Model II		Model III	
		I		II		III	
N. founders (logs)		0.2149		0.3613		0.3879	
		(0.301)		(0.319)		(0.321)	
N. employees (logs)		-0.1473		-0.1313		-0.1252	
		(0.119)		(0.132)		(0.136)	
Born before 2000		-0.2741		-0.4522		-0.4592	
		(0.305)		(0.309)		(0.313)	
Family		0.9443	**	0.8879	**	0.8904	**
		(0.417)		(0.435)		(0.452)	
Economic education				-0.3224			
				(0.295)			
	Economic education × ICT sectors					-0.3876	
						(0.327)	
	Economic education × non-ICT sectors					0.1238	
						(0.758)	
Technical education				-0.5293	*		
				(0.285)			
	Technical education × ICT sectors					-0.5527	*
						(0.325)	
	Technical education × non-ICT sectors					-0.4524	
						(0.588)	
Managerial experience				-0.0709		-0.0454	
				(0.301)		(0.308)	
Const.		-0.7242		-0.2845		-0.2865	
		(0.694)		(0.733)		(0.73)	
Industry dummies		YES		YES		YES	
Geographical area dummies		YES		YES		YES	
Obs.		120		120		120	

Legend: estimates are derived by means of probit regressions with standard errors robust to heteroskedasticity through the Huber-White method**.** Industry and geographical area dummies are included in the estimates (coefficients are omitted in the table). Standard errors in round brackets. * p < .10; ** p < .05. ICT sectors and non-ICT sectors in Model III are two dummy variables capturing the macro-industry of HTVs. Note that this specification avoids any "dummy trap" since the vector of industry dummies is plugged in with a more fine-grained segmentation, and at the same time, it keeps full comparability across the different models.

Table 4b. Estimation results: probability to refuse VC (robustness checks).

	Model IIa		Model IIb	
	I		II	
N. founders (logs)	0.2339		0.3393	
	(0.324)		(0.326)	
N. employees (logs)	-0.3133		-0.1305	
	(0.21)		(0.131)	
Born before 2000	-0.4182		-0.4455	
	(0.313)		(0.315)	
Family	1.1691	**	0.8692	**
	(0.504)		(0.432)	
Economic education	-0.8023		-0.3332	
	(0.494)		(0.294)	
Technical education	-0.7181	**	-0.5102	*
	(0.31)		(0.285)	
Managerial experience	-0.2355		-0.0491	
	(0.316)		(0.302)	
Inverse Mills Ratio	5.5556			
	(4.444)			
Solicited offer			0.2212	
			(0.338)	
Const.	4.2986		-0.3221	
	(3.705)		(0.738)	
Industry dummies	YES		YES	
Geographical area dummies	YES		YES	
Obs.	120		120	

Legend: estimates are derived by means of probit regressions with standard errors robust to heteroskedasticity through the Huber-White method**.** ICT sectors include ICT manufacturing and Software & Internet while non ICT sectors refer to Other manufacturing and Other services. Industry and geographical area dummies are included in the estimates (coefficients are omitted in the table). Standard errors in round brackets. * $p < .10$; ** $p < .05$.

Table 4c. Estimation results: probability to refuse VC (robustness checks).

	Model IIc		Model IId	
	I		II	
N. founders (logs)	0.4107		0.3716	
	(0.327)		(0.325)	
N. employees (logs)	-0.1659		-0.1379	
	(0.134)		(0.134)	
Born before 2000	-0.4042		-0.4429	
	(0.313)		(0.31)	
Family	0.8646	**	0.8893	**
	(0.434)		(0.434)	
Economic education	-0.326		-0.3227	
	(0.296)		(0.295)	
Technical education	-0.5092	*	-0.526	*
	(0.287)		(0.285)	
Managerial experience	-0.0648		-0.07	
	(0.303)		(0.301)	
Debt at foundation	0.3666			
	(0.35)			
Percentage of debt at foundation			0.0014	
			(0.006)	
Const.	-0.4491		-0.3105	
	(0.742)		(0.739)	
Industry dummies	YES		YES	
Geographical area dummies	YES		YES	
Obs.	120		120	

Legend: estimates are derived by means of probit regressions with standard errors robust to heteroskedasticity through the Huber-White method**.** Industry and geographical area dummies are included in the estimates (coefficients are omitted in the table). Standard errors in round brackets. * p < .10; ** p < .05.

Table 5. Impact of VC refusal on sales growth performance.

			Endogenous Switching regression					
	Random Effects		Second stage: firms refusing VC		Second stage: VC-backed firms		First stage: probability to refuse VC	
	I		**II**		**III**		**IV**	
VC refusal	-0.333	***						
	(0.110)							
N. founders (logs)	0.331	*	-0.131	*	0.008		0.628	
	(0.175)		(0.075)		(0.083)		(0.397)	
N. employees (logs)	-0.016		-0.029		-0.066		-0.120	
	(0.086)		(0.071)		(0.041)		(0.163)	
Born before 2000	-0.548	**	-0.225		0.216	*	-0.717	
	(0.266)		(0.178)		(0.127)		(0.607)	
Family	-0.174		-0.018		-0.063		-0.417	
	(0.172)		(0.169)		(0.110)		(0.564)	
Economic education	-0.079		0.049		-0.103		-0.236	
	(0.172)		(0.130)		(0.092)		(0.379)	
Technical education	-0.009		0.109		0.122		-0.865	**
	(0.127)		(0.235)		(0.078)		(0.338)	
Managerial experience	0.183		-0.099		0.057		0.446	
	(0.143)		(0.160)		(0.090)		(0.352)	
Total assets growth$_{t-1}$			0.208	*	0.049		-0.274	***
			(0.128)		(0.033)		(0.101)	
Inverse Mills Ratio			1.423	***	0.518	***		
			(0.029)		(0.018)			
Public financing							0.001	***
							(0.000)	
Local VC investments							-0.003	*
							(0.002)	
Const.	1.086	**	0.275		-0.057		-4.227	***
	(0.552)		(0.681)		(0.219)		(1.495)	
Industry dummies	YES		YES		YES		YES	
Geographical area dummies	YES		YES		YES		YES	
Obs.	800		698		698		698	

Legend: the dependent variables are sales growth (columns I, II and III) and the likelihood to refuse VC (column IV). Estimates in column I are derived by means of random-effects panel regressions with standard errors robust to heteroskedasticity through the Huber-White method**.** The system of three equations in columns II, III and IV composed of a probit selection equation and two different growth equations – one for firms refusing VC and one for VC-backed firms – is jointly estimated by means of Full Information Maximum Likelihood (FIML). Industry and geographical area dummies are included in the estimates (coefficients are omitted in the table). Standard errors in round brackets. * p < .10; ** p < .05; *** p < .01.

Table 6. Actual and hypothetical growth for VC-backed firms and firms refusing VC.

Sales growth		
Actual growth for firms refusing VC	Growth for firms refusing VC if they had obtained VC	Growth variation
0.115	0.298	0.183***
(0.028)	(0.015)	(0.032)

Legend: estimates based on the endogenous switching regression model performed in Table 5. Standard errors in round brackets. *** $p < .01$.